

**An investigation into the causes and impacts of land degradation, and possible
management strategies and mitigation measures in the Oshana region, Northern
Namibia**

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Declaration

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Abstract

Land degradation is a complex phenomenon, and its relation to various impacts has attracted research from various disciplines. Many researchers concluded that the deterioration of the environment is mainly caused by human activities. Anthropogenic activities, which can lead to land degradation, are overgrazing, rapid increase in number of livestock, sand mining, climate change, deforestation, and population pressure. Many parts of Namibia are affected by land degradation, hence the purpose of this study. This study investigated the causes and impacts of land degradation in the Oshana region of Namibia. The research objectives of this study include an exploration of existing national legislation and policies directly or indirectly addressing land degradation.

The research design adopted is a case study, using both quantitative and qualitative methods, and primary and secondary data. The study population comprised residents from the Oshana region, and a small subset of employees of the Namibian Ministry of Environment and Tourism, the Ministry of Agricultural Water and Forestry and the Ministry of Land Reform. Hundred questionnaires were used to collect data from the respondents (both residents and officials) and out of these, 86 questionnaires were returned. The questionnaires to residents were distributed during the annual Ongwediva trade fair, using a random sampling method. The questionnaires distributed to officials used purposive sampling, focussing on relevant Ministries that deal with land degradation. The questionnaire comprised both closed and open-ended questions. Closed questions were analysed with Excel, and open-ended questions by thematically categorising similar concept.

The literature review explored the extent of the problem, and the causes and impacts of land degradation. A review of Namibian policies identified a problem with coordination of legislation between departments, a lack of data for planning, and a lack of monitoring.

The case study shows that the bigger portion of the Oshana region is communal land, and communal land rights and leaseholds are the most common land ownership models in the Oshana region. According to the respondents the major causes of land degradation in the region are climate change, overgrazing, population pressures, urbanisation and poor soil and low rainfall. These factors contribute a lot to the loss of fauna and flora, and desertification. The study also highlights sand-mining as a more recent challenge in the region, which up to now has been uncontrolled. Although most respondents were aware of land degradation, they also felt that the local community is not empowered to deal with land degradation problems, nor does the community get together to address them. Only about 40% of the respondent felt that community members were involved in decision-

making. They identified that land degradation policies require more public input in order to achieve land degradation goals. The respondents also stated that existing policies, laws, regulations, plans and programmes were not fully implemented, and felt the laws also needed changing to adapt to environmental conditions and to the specific context in Oshana. The respondents felt communal ownership of land should be encouraged, but that there should be a fairer system of land allocation, so that some people do not control large tracts of land, while others have very little land. They suggested solutions to the problem of land degradation, such as awareness campaigns, the enforcement of grazing management plans, policies about revegetation of areas and the prevention of dual grazing (when people who controlled and fenced 'private' land, still let their cattle graze on the commonage). They also felt that limits should be placed on the number of livestock in each village, as currently there is no penalty for over stocking.

Lastly, the study recommends that land degradation management strategies and mitigation measures be mainstreamed into all policies, which should be regularly amended every decade, as laws get outdated. New laws, policies and plans should combine both scientific and local knowledge, with more public participation. Better implementation of existing policies, laws, regulations and strategies is also needed, including better coordination between departments. Poverty and diversifying sustainable livelihoods should be addressed, as poverty is one of the reasons people overuse local resources.

Keywords:

Namibia, Oshana region, land degradation, impacts, causes, management strategies, mitigation measures

Opsomming

Grond degradasie is 'n komplekse verskynsel, en die verhouding tot verskeie impakte het navorsing uit verskeie dissiplines gelok. Baie navorsers het bevind dat die agteruitgang van die omgewing hoofsaaklik deur menslike aktiwiteite veroorsaak word. Antropogeniese aktiwiteite wat tot grond degradasie kan lei, is oorbeweiding, vinnige toename in die aantal vee, sand-mynbou, klimaatsverandering, ontbossing en bevolkings-druk. Baie dele van Namibië word geraak deur grond degradasie, dus die doel van hierdie studie. Hierdie studie het die oorsake en impakte van grond degradasie in die Oshana-streek van Namibië eksplisiet ondersoek. Die navorsing doelwitte van hierdie studie sluit in 'n verkenning van bestaande nasionale wetgewing en beleid wat regstreeks of onregstreeks aan grond degradasie aandag gee.

Die navorsingsontwerp wat aangeneem is, is 'n gevallestudie wat beide kwantitatiewe en kwalitatiewe metodes gebruik, sowel as primêre en sekondêre data. Die studie bevolking bestaan uit inwoners van die Oshana-streek, asook 'n klein deelversameling van werknemers van die Namibiese Ministerie van Omgewing en Toerisme, die Ministerie van Landbou, Water en Bosbou en die Ministerie van Grondhervorming. Honderde vraelyste is gebruik om data van die respondente (beide inwoners en beamptes) in te samel en daaruit is 86 vraelyste terug ontvang. Die vraelyste aan inwoners is tydens die jaarlikse Ongwediva handelskou uitgedeel, met behulp van 'n ewekansige steekproefmetode. Die vraelyste wat aan beamptes versprei is, het 'n doelbewuste steekproefneming gebruik, met die fokus op relevante ministeries wat met grond degradasie handel. Die vraelys het beide geslote en oop vrae ingesluit. Geslote vrae is geanaliseer met behulp van Excel, terwyl oop vrae geanaliseer is deur tematies soortgelyke konsepte saam te kategoriseer.

Die literatuuroorsig het die omvang van die probleem ondersoek en wat die oorsake en impak van grond degradasie was. 'n Oorsig oor die Namibiese beleid het 'n probleem geïdentifiseer met die koördinering van wetgewing tussen departemente, 'n gebrek aan data vir basiese beplanning en 'n gebrek aan monitering.

Die gevallestudie illustreer dat die groter gedeelte van die Oshana-streek gemeenskaplike grond is, en gemeenskaplike grondregte en huurkontrakte die algemeenste grondbesit modelle in die Oshana-streek is. Volgens die respondente is die belangrikste oorsake van grond degradasie in die streek, klimaatsverandering, oorbeweiding, bevolkings-druk, verstedeliking en swak grond en lae reënval. Hierdie faktore dra baie by tot die verlies van fauna en flora, sowel as tot verwoestyning. Die studie beklemtoon ook sand-mynbou as 'n meer onlangse uitdaging in die streek, wat tot nou toe nie beheer

was nie. Alhoewel die meeste respondente bewus is van grond degradasie, het hulle ook gevoel dat die plaaslike gemeenskap nie gemagtig is om probleme met grond degradasie te hanteer nie. Die gemeenskap kom ook nie saam die uitdaging aan spreek nie. Slegs sowat 40% van die respondent het gevoel dat gemeenskapslede betrokke was by besluitneming. Hulle het bevind dat grond degradasie beleid meer openbare insette vereis om grond degradasie-doelwitte te bereik. Die respondente het ook verklaar dat bestaande beleide, wette, regulasies, planne en programme nie ten volle geïmplementeer word nie en het ook gevoel dat dit ook nodig was dat die wette moes verander om aan te pas by omgewings-omstandighede en die spesifieke konteks in Oshana. Die respondente het gemeen dat gemeenskaplike eienaarskap van grond aangemoedig moet word, maar dat daar 'n regverdiger stelsel van grondtoewysing moet wees, sodat sommige mense nie groot dele van die land beheer nie, terwyl ander baie min grond het nie. Hulle het oplossings voorgestel vir die probleem van grond degradasie, soos bewusmakingsveldtogte, die handhawing van weidings-bestuursplanne, beleid oor die herbeplanting van gebiede en die voorkoming van dubbele weiding (wanneer mense wat privaat grond beheer en omhein het, hulle vee steeds toelaat om te wei op die meentgrond). Hulle het ook gevoel dat daar perke op die aantal vee in elke dorp geplaas moet word, aangesien daar tans geen boete vir oorbeweiding is nie.

Laastens beveel die studie aan dat grond degradasie bestuur strategieë en versagtingsmaatreëls in alle beleide opgeneem word, wat gereeld elke tien jaar gewysig moet word, aangesien wette verouder word. Nuwe wette, beleide en planne moet beide wetenskaplike en plaaslike kennis kombineer, met meer openbare deelname. Beter implementering van bestaande beleide, wette, regulasies en strategieë is ook nodig, insluitend beter koördinerings tussende departemente. Armoede en diversifisering van volhoubare lewensbestaan moet aandag geniet, aangesien armoede een van die redes is waarom mense die plaaslike hulpbronne oorbenut.

 Sleutelwoorde:

Namibië, Oshana-streek, grond degradasie, oorsake, impakte, bestuur-strategieë, versagtingsmaatreëls

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List of acronyms and abbreviations

CBNRM	Community Based Natural Resource Management
COP	Conference of the Party
CPP	Country Pilot Partnership Programme
CRIC	Committee of Review and Implementation of the Convention
DEA	Department of Environmental Affairs
DLDD	Desertification, Land Degradation and Drought
Ed	Editor
Eds	Editors
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GIZ	German Deutsche Gesellschaft für Internationale Zusammenarbeit (English: Corporation for International Cooperation GmbH)
GoF	Group of Friends
GRN	Government of the Republic Namibia
IECN	Integrated Environmental Consultants Namibia
IIED	International Institute for Environment and Development
IISD	International Institute for Sustainable Development
INTOSAI WGEA	International Organization of Supreme Audit Institutions Working Group on Environmental Auditing
INDC	Intended National Determined Contributions
IRLUP	Integrated Regional Land Uses Plans

LD	Land Degradation
LDN	Land Degradation Neutrality
MAWF	Ministry of Agriculture, Water and Forestry
MET	Ministry of Environment and Tourism
MLR	Ministry of Land Reform, previously Land and Resettlement
MURD	Ministry of Urban and Rural Development
NAM-PLACE	Namibia Protected Landscape Conservation Area Initiative
NAPCOD	National Action Programmes to Combat Desertification (NAPCOD)
NAFOLA	Sustainable Management of Namibia's Forested Lands
NAP3	Third National Action Programme
NBC	Namibian Broadcasting Corporation
NBSAP	National Biodiversity Strategy and Action Plans
NBSAPII	Namibia's Second National Biodiversity Strategy and Action Plan
NCCSAP	National Climate Change Strategies and Action Plan
NILALEG	Namibia Integrated Landscape Approach for Enhancing Livelihoods and Environmental Governance
NPC	National Planning Commission of Namibia
NRMPS	National Rangeland Management Policy and Strategy
NSA	Namibia Statistic Agency
PACD	Plan of Action to Combat Desertification
RAISON	Research and Information Service of Namibia
SADC	Southern African Development Community
SEA	Strategic Environmental Assessment
SDGs	United Nations Sustainable Development Goals
SCORE	Scaling up community resilience to climate variability and climate change in Northern Namibia
SLM	Sustainable Land Management
SME	Small and Medium Enterprises
SOC	Soil Organic Carbon
SRAP	Sub-Regional Action Programme

UNCCD	United Nation Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNCSD	United Nation Conference on Sustainable Development
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WOCAT	World Overview of Conservation Approaches and Technologies

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Chapter 1: Overview

1.1 Introduction

This chapter presents the contextual information for the research, problem statement, research aim, and the research questions and objectives to be addressed in the study. Additionally, other areas covered in the chapter include the significance of the study, and delimitation and the limitations. The chapter also gives the operational definitions of key terms and provides a motivation for the study.

Land degradation (LD) is gaining importance as one of the major environmental issues all over the world, and developing countries are not an exception (Petja, 2008: 147). In Africa, land degradation is linked to the challenge of sustainable long-term food productivity and agricultural development (Petja, 2008: 147). It is evident that disparities in land distribution and migration from rural to urban areas are believed to be some of the factors contributing to accelerated land degradation.

1.2 Definition of key concepts

1.2.1 Land degradation and desertification

The land degradation concept has been defined as “the decrease or damage of the organic or fiscal productivity and complexity of forest, pasture, range, woodlands or irrigated cropland, rain-fed cropland, resulting from natural processes, land uses or other human activities and habitation” (INTOSAI WGEA 2013:12). Additionally, land degradation has also been defined as “habitation patterns leading to the destruction of vegetation cover, soil erosion and contamination” (INTOSAI WGEA 2013:12). It is an issue of global concern affecting most parts of the world and according to various sources, urgent action is needed to address this phenomenon (Nkonya *et al.*, 2016: 2; MET, 2010, 2011a; 2015a & 2015b). Land degradation causes are often very complex and diverse (Kibbassa, 1997). Johnson and Lewis (1995) also argue that the problems of land degradation are the result of complex natural and a multitude of other processes, along with anthropogenic values and constraints.

Desertification is a specific form of land degradation where arid, semiarid and relatively dry sub-humid areas become deserts as a result of drought, climate change, deforestation, loss of vegetation, and inappropriate agriculture (UNCCD, 2017).

1.2.2. Resilience

According to Allison and Hobbs (2004) resilience is a theory that has “its foundation in systems thinking, including complex systems theory, and is essentially about understanding the characteristics of change and the interactions between human and natural systems” The concept “resilience” means “the maximum amount of disturbance a system can experience and still return to the same equilibrium”.

Sustainable land management refer to the process that “combines technologies, policies and activities, aimed at integrating socio-economic principles with environmental concerns, so as to simultaneously maintain or enhance production/services (Productivity), reduce the level of production risk (Security), protect the potential of natural resources and prevent degradation of soil and water quality (Protection), be economically viable (Viability) and socially acceptable (Acceptability)” (Sanz *et al.*, 2017: 23).

According to the FAO (2003) mitigation measures refer to an “intervention intended to reduce ongoing degradation”. The goal here is to start improving resources and reverse further degradation and its functions. Mitigation effects “tend to be visible in the short to medium term: this then provides a strong incentive for further efforts. The word mitigation is also sometimes used to describe the reductions of impacts of degradation” (FAO, 2003).

1.3 Study background

Land degradation is of global concern, occurring in most agro-ecologies and terrestrial biomes, in both highly industrialised and low-income countries (Nkonya, 2016:2). Overcoming and combating land degradation cannot be achieved over a short period, due to its complexity, and the fact that it is dynamic. Land degradation due to anthropogenic activities impacts sustainability, in its social, economic and environmental dimensions. Furthermore, when it comes to social aspects, land degradation is linked to increased poverty as it is negatively correlated with sustainable livelihoods (Barbier & Hochard, 2016:1). Food insecurity is another aspect closely linked to land degradation, and it requires the protection and enhancement of sustainable livelihoods (Akhtar-Schuster *et al.*, 2017:7). Land degradation is already a worldwide challenge, but there is a risk that it may become more detrimental in the near future (Maiangwa *et al.*, 2007:785). An article in the *New Era* newspaper pointed out that in the country of Namibia there are 14 regions and most of them have been impacted by land degradation (New Era; July 28, 2015). Out of the 14 regions, the Oshana region has the highest levels of land degradation (New Era; July 28, 2015). One of the factors associated with this

is that the region is overwhelmed by the inability to enforce grazing plans, uncontrolled animal movement, and uncontrolled fire events (New Era; July 28, 2015). The rate of land degradation in this area is not only causing social challenges for the inhabitants but also to the wildlife and entire ecosystems (Maiangwa *et al.*, 2007: 785). Land degradation in these regions, particularly the most affected Oshana region, has caused policymakers to incorporate mechanisms to mitigate against this phenomenon in the Namibian National Development Plan (NDP 5).

Some of the undesirable causes of land degradation, like that experienced in the Oshana region, include serious depletion of organic materials from the soil, biodiversity loss and total reduction in soil fertility, contributing towards desertification and further aggravating the effects of climate change (Maiangwa *et al.*, 2007: 785). Farmers in the Oshana region follow unsustainable rangeland management practices, compounded by overstocking vast areas of land with a very low carrying capacity due to lack of water and high settlement densities (Lal, 2010). The same areas are also affected by bush encroachment, which is a wide-spread challenge in Namibia (Lal, 2010). These factors, combined with erratic rainfall and frequent flooding, result in erosion of the organic material in the rich top soil (Lal, 2010). The above highlighted environmental and economic threats have prompted the study to focus on investigating the phenomena of land degradation and effective management strategies and mitigation measures, which can help to address the environmental crisis through a case study of the Oshana region, making use of a questionnaire and informal interviews. The general overview of the research gives a snapshot of information on land degradation from a global perspective, narrowing it down to a continental level Africa, Southern Africa, Namibia and Oshana Region where the study took place.

1.4 Motivation of the study

In the local media, the New Era newspaper featured a catching headline “*Land degradation - a threat to development*” which provided an overview of how the nation is threatened by poor rangeland and fire management practices, uncontrolled mining, unsustainable use of water, and climate change (New Era, July 28, 2015). In the same vein, the Namibian Newspaper of 17 September 2015 published the headline “*Land degradation terrorises Namibia*” in which Namibia’s Environmental Commissioner Teofilus Nghitila pointed out that approximately 80 million Namibian dollars (worth R80 million) were spent on drought relief programs in 2013, with land degradation being the main result of the drought and bad management practices (New Era, September 17, 2015).

According to Maiangwa *et al.* (2007) land degradation is considered to be a very important topic of the 21st century. Generally, land degradation affects agronomic productivity, the environment, and

food security as approximately 40% of world agricultural land is seriously degraded (Maiangwa *et al.*, 2007: 785).

Similarly, research conducted by Kangombe (2010:112) in the four “O” Northern regions of Namibia explored the causes and impacts of land degradation in the Oshana region and recommended the development of a long-term system for building community resilience to adapt to climate change as a possible mitigation measure. This study revealed that there was a lack of adequate ecological data on land degradation and little alignment of policies related to land degradation to address currently evolving climate changes (Kangombe, 2010: 112). Since Namibia is largely characterised as an arid country, it is highly vulnerable to the impacts of land degradation and urgently requires efficient and effective protection measures against any other environmental threats that can further worsen the situation (Ruppel *et al.*, 2016:25).

These current happenings in the country underline the need to investigate how issues of water, climate change, and population growth are linked to land degradation in the Oshana Region. Land degradation remains a very complex issue that requires long-term interventions. According to the Ministry of Land and Resettlement (now Land Reform) very little information has been published on local anthropogenic activities that exacerbate land degradation (MLR, 2016:1-3).

This study aims to address this very practical and urgent problem, both at the societal and national level. It is important to explore the causes, effects, as well as potential management strategies and mitigation measures relating to land degradation. It is rather crucial to devise effective ways of managing land uses, especially in the view of the ever-increasing population figures in the Oshana region (Kangombe, 2010: 113). The justification of this study centres around contributing towards the volume of knowledge through an assessment of the relevant anthropogenic factors contributing towards land degradation, as well as formulating management strategies and mitigation measures to curb land degradation that can be applied. It is expected that the results and lessons learned from this research may also be of significance to other regions with similar agro-ecological zones that may be experiencing comparable challenges.

1.5 Research problem

Land degradation is not well addressed in Namibia. This is evident from how the laws, policies and actions are not strongly articulated to address the problem. There is little information available on land degradation in the Oshana region that could be utilised by decision-makers and scientists. The study by Kangombe (2010: 107) on vegetation measures found out that land degradation in the

Oshana region is primarily caused by zero or minimal implementation of land conservation strategies by farmers who rely on farming as their only source of living.

This study by Kangombe (2010: 108) further established that land degradation in the Oshana region was predominantly caused by overstocking, soil erosion, loss of biodiversity and population pressures. The researcher in the study mentioned above suggested that above listed causes of land degradation could be addressed through effective environmental laws, policies and those effective monitoring tools in protecting the environment may help address the current problems experienced by the Oshana residents. The researcher believed that a well-informed society is more likely to conserve the land than an ignorant one, regardless of how binding the environmental laws, plans and policies are. These also imply that if there is a lack of community education on the effects of land degradation and the importance of conserving our natural resources, then the environment may become exposed or vulnerable.

The research problems that needs to be addressed are overgrazing, sand mining, climate change, deforestation and rapid number of livestock that lead to land degradation in the Oshana region. The continuous degradation of the land in the Oshana region is posing several threats not only to the environment but also to the social and economic life of the residents, as experienced by the investigator who happens to reside in the same region. Its impacts are also being felt at the national level as it is compromising the food security and economic stability of the region and the country at large. Because Namibia is an arid environment, it is accepted that the country is highly vulnerable to the impacts of land degradation (Ruppel *et al.*, 2016: 25). They mention the Third National Action Programme to implement the Convention to Combat Desertification (NAP3) and that it mentions the challenge of “inadequate institutional and individual capacity and weak mechanisms of cross-sector collaboration for sustainable land management”, with “overlapping and contradictory capacities” and opposing goals of the various Ministries (Ruppel *et al.*, 2016: 179).

1.6 Research aim and objectives

The main objective of this study is to investigate the causes and impacts of land degradation in the Oshana region, through a study of the literature as well as a case study of the area, making use of a questionnaire, selected interviews and secondary data. The research also aims to investigate if any programmes for land restoration, rehabilitation and reclamation exist in the area. In order to attain the above aim, the objectives listed below should be attained.

The four specific objectives of the study are:

1. To conduct a literature review on the causes and impacts of land degradation globally and locally, as well as associated management strategies and mitigation measures
2. To find out what international agreements and national legislation and policies exist to combat land degradation in Namibia and assess whether these are adequate and being implemented.
3. To explore the case study of the Oshana region in order to:
 - Investigate the causes of land degradation in the Oshana region.
 - Investigate the impacts of land degradation in the Oshana region.
 - Determine the Oshana community's awareness level on land degradation.
4. To propose effective management strategies and mitigation measures for land-degradation that suits the Oshana region and its people.

The proposed study has a practical significance; hence the recommendations are aimed at addressing practical issues and should eventually assist in preventing land degradation problems in the region.

1.7 Research design, methodology and methods

1.7.1 Overview of research design and methodology

A research design is “the plan for how the study will be conducted”, by deciding what data will be collected, from where, among what groups, and through which methods and technologies, as well as how the data will be analysed (Berg, 2001: 28). The investigation design used for this study was a case study. A case study is a methodological approach, not a data-gathering technique, which is about systematically gathering adequate information about a specific social setting or group to permit understanding of how it functions (Berg, 2001: 225).

The case study primarily focussed on a descriptive research design and made use of various methods to collect information, such as using secondary data, a survey, direct observation, as well as a limited number of interviews. The case study research made use of primary and secondary, as well as qualitative and quantitative data. The primary data was collected through a survey as it permits collection of a large amount of data in a highly economical way, and the literature indicated this method would have the potential to produce the desired results.

Both qualitative and quantitative methods were employed in order to avoid biases which could be encountered when one method is employed in isolation of the other. According to Berg (2001: 225-

233) a descriptive research design enhances the opportunity to integrate the qualitative and quantitative methods of data collection in order to come up with more comprehensive research as the two methods complement each other,

1.7.2 Methods

This section outlines the methods used in the study to collect and analyse the research data. According to Williams (2007) research methods are defined as the approaches taken to carry a study, applying either qualitative or quantitative approaches or a combination of the two approaches (Williams, 2007: 65-72). This study has used a mixed methodology, with both qualitative and quantitative data, to obtain and analyse data. Primary data was obtained through interviews while secondary data was obtained through a desk-top study of legislation and policies, census and other data, as well as the review of empirical literature about the Oshana region. The empirical studies enabled the researcher to identify relevant themes and theories relating to land degradation, its causes, impacts and potential solutions (Williams, 2007: 65-72).

1.7.3 Literature review

According to Saunders *et al.* (2012: 15) a literature review is undertaken in order to help answer the research questions. The literature review was very instructive in terms of understanding any relevant past research in this area of study, in order to justify undertaking the present study. This provided the researcher with a deeper insight into the area of study, defining delimitations and limitations of the studies already undertaken and paved the way to the formulation of the problem statement. The results of the study were compared with the findings of other researchers. The literature review also examined the insights of others about the legislation, policies and plans, which supported the study arguments. The researcher was also able to cite some of these comments made by the Namibian policy-makers on the extent of land degradation in Namibia or in the Oshana region. The theory on land ethics by Aldo Leopold (1949) was important, as it motivated this study, explaining how humanity is connected to the land and stressing the need to care for our planet (Leopold, A. 1949, Singer, 1990).

1.7.4 Review of legislation, policies and plans

A desk-top study of legislation, policies and plans enabled the identification of relevant international policies and national level laws and policies applicable to the subject area. The research aided in

gaining a deeper understanding of how the issue of land degradation is addressed in the country's environmental laws, policies and plans. The documents were arranged per subject area, first looking at environmental legislation, then at planning and development legislation, followed by legislation relating to agriculture and land issues (including land reform).

1.7.5 Survey

1.7.5.1 Overview

The research was mainly focussed on land degradation in the area. One of the challenges of using a survey is that respondents may withhold the reasons for land degradation in their responses, especially if the causes are anthropogenic, with the respondents being at the centre of the issue. A survey focus on answering “questions that have been raised, to solve problems that have been posed or observed, to assess needs and set goals, to determine whether or not specific objectives have been met, to establish baselines against which future comparisons can be made, to analyse trends across time, and generally, to describe what exists, in what amount, and in what context.” (Isaac & Michael, 1997: 136).

1.7.5.2 Questionnaire

A questionnaire was chosen as a method of data gathering as it can be used to describe a situation and also to assess the correlation between two or more variables (Saunders *et al.*, 2012:49). It can be used for searching questions to permit for exploration of answers which are critical to the study topic (Saunders *et al.*, 2012:49). The study tried to safeguard the reliability and validity of the data collecting instrument, and the researcher assessed the capability of the questionnaires to achieve the intended goals or objectives. The researcher tried to ensure that the questions on the questionnaires correspond with the objectives or main aim of the research. The study also carried out a pilot study to find out the reliability of the questionnaires as the main data collecting instrument. This was done to make sure that the questionnaires are interpreted the same by different respondents to make sure that the questionnaires produced the same or almost the same results when re-tested. If the questionnaires can give accurate and adequate responses to the focal area of research, then the instruments are effective enough.

The same questionnaire was also used for interviews. This implies that in some cases, the study may incorporate some of the questions in the respondents' vernacular language to avoid communication breakdown. The targeted respondents were 56 residents of the Oshana region, especially communal

farmers who are more likely to feel the impact of land degradation and 44 officials from MET, MLR and MAWF.

1.7.5.3 Research sample and sampling procedure

The selection of information-rich samples comprises an identification of group or individual which are considered to be knowledgeable or experienced with the concept under study (Cresswell & Plano Clark, 2011:48). The research sample size was intended to be 100 respondents. Random sampling was used to select the residents of Oshana Region. The questionnaires were distributed randomly by the researcher during the Ongwediva annual trade fair, and the total number of respondents was high. However, the elderly people who cannot read and write English did not want to participate in the study. Ongwediva annual trade fair is an event that is held annually for a week long, to encourage both big and small local entrepreneur to engage in sustainable business, and is attended by people from all walks of life. In “random sampling, individuals are selected from the population in such a way as to accord every individual of the population the equal chance of being selected” (Mabuku, 2015:45). The adopted method was relevant for this study as the sampling technique gives everybody who contributed in this study an equal chance of being selected. However, the fact that people who could not read or write English did not participate, made that the sample is not representative of the general population of the region.

Additionally, purposive sampling method was also used to sample other key informants, who in this case were staff members from the MET, MLR, MAWF and the staff from the Regional Council. This method was essential for this study as it purposively targeted people believed to be knowledgeable about the study subject. According to Rubin (2006), the power of purposive sampling lies in selecting information-rich cases for in-depth analysis connected to the central issues being studied.

1.7.5.4 Data collection

The researcher collected data using questionnaires. Out of the 100 survey questionnaires that were distributed, a total of 86 were returned. Out of the 56 questionnaires handed out to community members, 49 were returned (87,5%), and out of 44 questionnaires given to officials, 37 were returned (84%). The study tried to make sure that research questions were clear and was easily interpreted by the respondents without any difficulty or challenges. The questionnaire had both closed, and open-ended questions.

1.7.5.5 Data analysis

The study applied descriptive data analysis to analyse the data. Possible explanatory variables in my research include the relationship between human behaviour and land degradation. The study investigated the major contributory factors of land degradation, ranging from environmental policy implementation, poverty, ignorance on land conservation and population density about the harm caused to the land.

Excel software was used to analyse the both qualitative and quantitative data. Graphs and tables were used by the researcher to summarise the information derived from the questionnaires for easy data interpretation and analysis. The observation by the researcher herself, especially on the affected sites, is also included in the discussion.

1.8 Ethical issues

The researcher, in this case, emphasised that the information will be kept confidential and was intended to use for her study at Stellenbosch University. The information collected through the research would also assist in coming up with effective management strategies and mitigation measures for restoring degraded land. The research would also be anonymous, with no names written down in the data collection process. This also assured the respondents of the level of confidentiality, thereby ensuring that the research did not harm anyone. Issues of confidentiality were taken into consideration. The researcher first obtained ethical approval from Stellenbosch University and then sought approval from the local leadership before distributing the questionnaires. Permission was also sought from the Chief Regional Officer of the Regional Council to reach the degraded sites where the researcher took some photos of the scenes to show evidence of the actual situation of land degradation in Namibia.

The researcher made sure that participation was voluntary and the consent was given after the respondents were fully informed of their rights. They were also informed that the research was for academic purposes only. The research involved direct interaction with the respondents, as the researcher distributed the questionnaires personally. Written consent was obtained prior to handing each respondent a copy of the questionnaire to fill in. This process provided the researcher an opportunity to clarify issues which were not clear to the respondents. The research further involved institutional consultations while seeking additional facts or statistics on land degradation for Oshana region and Namibia as a whole from the Environmental Management Authority.

This research did not have access to any personal information from any respondents and all responses were coded. This enabled the researcher to uphold professional ethics and promote a research environment that was conducive to allowing the participants to answer the questions freely.

The researcher organised a consultation meeting with representatives of the Oshana Regional Council to inform them about the intended study, its objectives and approach and seek approval to engage directly with community members. The scanned copy of the letter from the Regional Council is attached as Appendix B.

1.9 Limitation of the study

Geographically the study was confined only to the Oshana region, with a total area of 8 647km², which means the research findings did not reflect the true representation of the total country, or even of the whole region. The size of the region in itself posed a very big challenge. Financially, the research was not externally funded, hence the researcher had to utilise her private resources to ensure that the questionnaires were distributed and collected. Focussed group meetings could have made distribution and collection of questionnaires easier, but there were no funds for this. Since the researcher resides in the same region, not many challenges were encountered in reaching out to the respondents.

1.10 Outline of chapters

Chapter 1 introduces the study and gives an overview of the research problem, research aim and objectives, the research design, methodology and methods.

Chapter 2 is a literature review, exploring the literature available on land degradation, both nationally and at the global level.

Chapter 3 provides an overview of both international agreements and the national Namibian laws and policies that are in existence to combat land degradation.

Chapter 4 explores the impact of land degradation, using the case study of the Oshana Region.

Chapter 5 is the conclusion of the study, which shows how each of the research objectives were achieved. The chapter ends by making recommendations.

Chapter 2: A literature review of land degradation

2.1 Overview

This chapter focused on reviewing the literature on the concept of land degradation and its causes and impact on the environment. Land degradation forms a small sub-set of a wider range of environmental changes which may or may not be viewed as degradation depending on the land use. The study further highlighted how land degradation worldwide is affecting the environment on earth. Additionally, this section provides evidence of studies done in Southern Africa and Namibia in order to document the current local knowledge on the causes and impact of land degradation. It provides a review of possible mitigation measures, policies and strategies addressing land degradation in Namibia. It is against this background that it is argued that land degradation can only be judged in the context of a specific time frame, economy, temporal scale, culture, environment and politics (Yu, 2011:26).

2.2 Land degradation worldwide

Eswaran *et al* (2001: 10) pointed out that globally land degradation is a major issue due to the associated decrease in the quality of land caused by human activities. Moreover, the decline in the quality of land started long ago during the 20th century, and will remain high on the international agenda during the 21st century (Eswaran *et al*, 2001: 10).

Land degradation trends show that nearly one-third of the world's fertile topsoil has been lost to date due to erosion. The world continues to lose topsoil at a rapid rate of more than ten million hectares annually. According to the UNDP's book "Listening to our Land: Stories of Resilience", 40% of the world's agricultural land is seriously degraded, and 40% of the world's degraded land are in places that already have the highest incidence of poverty (UNDP, 2017: 3-4). In Africa about two-thirds of the land is impacted by degradation, affecting about 485 million of the population (which make up 65% of Africa's people). Globally, land degradation has negatively impacted the global Gross Domestic Product (GDP), with up to 5% of potential agricultural GDP being lost (UNDP, 2017: 3-4).

According to Stockings (2000:7-15) land degradation is the deterioration in the quality of land, its topsoil, vegetation, and water resources, usually caused by excessive or inappropriate exploitation. According to Stockings (2000: 7-15) the impact of land degradation and its environment could be viewed in four ways namely:

1. A permanent or temporary decline is in the productive capacity of the land which implies a loss of actual productivity, biomass or in potential productivity, or a loss or change in vegetative cover. In the Oshana region, the production capacity of the soil is still viewed as in a temporary decline as a result of land degradation, although the threat of permanent decline is regarded as great (Kangombe, 2010:112-114). There is still room for recovery if corrective interventions are undertaken urgently.
2. A decline in the land's capacity to support life, i.e. providing resources for human livelihoods and nature. Evaluation can be done based on past land-use baseline data.
3. The loss of a range of species or ecosystem and loss of biodiversity complexity as part of a deterioration in the quality of the environment.
4. Fluctuating ecological risk can be the consequence of the increased exposure of environment or humans to destruction or crisis. It can be explored through a base-line study of pre-existent risk of destruction or crisis. Klintenberg *et al.* (2007) implies that a delay in implementing corrective measures to land degradation issues can lead to increased vulnerability, which can eventually become a social threat as a result of land deterioration.

The soil is considered one of the non-renewable and limited world resources. It is important to keep on maintaining the fertile soil to provide ecosystem services. Achieving the goal of soil sustainability and land requires an interdisciplinary approach and thus provides challenges to decision makers, scientists, policy-makers and land users (Masila, 2016:6).

Land resources are the basics of productive activities that contribute to and shape the development path of a country, ultimately resulting in employment and food security.

Human activities such as forced migration, increasing conflict over land rights, intensive agricultural practices, the use of damaging extractive technology and rapid population growth negatively impact the environment (land) and these impacts are compounded by extreme climatic patterns (Masila, 2016:6). According to Jensen (2016), the global industrial economy is the engine for massive environmental degradation and massive human (and nonhuman) impoverishment. In his research, Jensen (2016) found out that the global challenge of land degradation is centred primarily on industrialisation or anthropogenic factors. The distinctiveness of the land was generally identified by features of the men who lived on it (Leopold, 1949: 203).

In India degradation of the environment are through the excessive exploitation of soil, water and air (Chopra, 2016.1593). Pollution is regarded as an opportunity, as well as a major challenge, to the environment in India in term of environmental quality. The country regards environmental degradation as one of the primary causes of a variety of long-term challenges, such as loss of biodiversity, habitat destruction, soil erosion and deforestation (Chopra, 2016.1593).

In China, the causes of desertification are attributable to climate change as well as human factors. These include production of Chinese medicinal herbs, overexploitation of mineral resources, intensive collection of fuelwoods, rangeland degradation and overgrazing (Kapalanga, 2008.19).

In Southern West America and in Southern Mexico, the study on land degradation by Yu (2011: 232) postulates that the overall land degradation is not a simple problem caused by human-induced problems, but is a multifaceted process that involves interplays between the environment and human agents at various temporal and partial scales.

In the **Caribbean and Latin America**, about 16% of the land area has been affected by land degradation. The impact is less in South America and more severe in Meso-America where 63 million hectares, or 26% of the total area, were affected (Kapalanga, 2008.19).

In **Australia**, the research done by Conacher (2001: 363) reported that the implementation of policies and strategies by the Australian government to combat land degradation in that country is limited by a lack of skills and resources in local government and the complexity of the country.

2.3 Overview of land degradation in Africa

Land degradation is viewed as a major problem facing many African countries. Many factors have been identified and are seen as potential contributors to land degradation (Nyamwange, 1995: 201). The factors can be categorised into two dimensions viewed as the main contributors to land degradation; these are human-made and natural factors. The human-made factors are overgrazing; over-cultivation and deforestation, while poverty and population growth also contribute to the problem (Nyamwange, 1995: 201).

Deforestation have been viewed as heavily concentrated in countries with big forests remaining (Nyamwange, 1995: 201). It is reported that the rates of deforestation in developing countries were high, especially in Sub-Saharan Africa, where the mean rate of deforestation was 1, 2 % per year, similar to Asia, but less than deforestation in Latin America. The second important form of land degradation in Africa was desertification, which was most prominent in the drylands of the world

(Nyamwange, 1995: 202). The United Nations Environment Programme (UNEP) in the early 1980s reported that about 1, 5 million hectares of cropland and rangeland in developing nations were subject to desertification, affecting the livelihoods of at least 253 million people (Nyamwange, 1995: 202).

Soil erosion is another form of land degradation dominating African countries, and is reportedly extremely severe in the highlands of Northern Ethiopia. These highlands carries about 90% of the economic activities and 80% of the population of Ethiopia. Agricultural land of about 20 000 km² is so badly eroded that it is unlikely to be able to sustain cropping in the future. Other African countries severely affected by soil erosion are South Africa, Tanzania, Lesotho and Kenya (Nyamwange, 1995: 202).

Moreover, chronic poverty is another factor in the African continent that contributes to land degradation as impoverished rural people tend to over-utilise available local natural resources in order to meet their basic energy and food needs. To meet these demands, they overgraze their pastures bringing under cultivation marginal land, cutting down trees and in the process degrading the productive land. Addressing poverty is therefore an important element of addressing land degradation.

2.4 Land degradation in Southern Africa

Based on the findings of previous assessments and according to Nkonya (2016), the effects of land degradation can be divided into proximate and underlying causes. Proximate causes are those that directly cause land degradation which are further subdivided into two categories:

- Biophysical factors (topographic-steep slopes, land use, extreme climate events, soil erodibility)
- Unsustainable land management practices, for example, land clearing, unsustainable irrigation practices, excessive fertiliser application, mono-cropping.

The proximate/direct and underlying/ indirect and drivers of land degradation in the SADC Sub-Region are summarised in Table 1 on the next page.

Table 1: Indirect and direct drivers of land degradation in SADC

Direct/Proximate drivers of land degradation	Indirect/Underlying drivers of land degradation
<ul style="list-style-type: none"> • Slash and burn/shifting agricultural practices • Overgrazing • Forest/wildfires • Urban environment expansion • Energy demands 	<ul style="list-style-type: none"> • Poverty • Climate change • Low/limited governance capacity • Population pressure • Cultural Norms • Local climatic conditions

Source: SADC SRAP 2015, MEA 2005.

2.5 Land degradation in Namibia

Namibia is the driest country in Sub-Saharan Africa. It is situated in South-Western Africa, between 17 and 29 degrees South and 11 and 26 degrees East and covers a land area of 825 418 km². As shown in Figure 1, it borders Angola, Botswana, Zambia and South Africa (MET, 2011b). Its physical geographic background is largely attributable to its position at the border of the continental shelf of the Southern African subcontinent in the climatic sphere of influence of the Tropic of Capricorn and the Benguela Current (MET 2011c).

Scoons (2009) and Eleni (2013:2) observed that there was a positive correlation between population density, the rate of land degradation and the rate of poverty. Similarly, the population is increasing in the Oshana region, and is accompanied by an increase in land-based activities, ranging from house construction, deforestation and illegal mining activities (Araki, 2005).

Overgrazing is also a problem in Namibia, which has an estimated 2.9 million cattle (UNDP, 2017: 11) Cattle production makes up more than 2% of the national agricultural GDP, and the annual value of this is about N\$900 million.

According to Maiangwa (2007: 785), the impacts of land degradation have rational economic implications for poor rural regions and low-income countries. It is very true in developing countries because of the focus on agricultural production - which is important for livelihoods - and the development of the rural population that depend on the primary sector. Namibia is a developing nation and as such falls under the stated category of countries whose economy mainly rests on farming. It

means land degradation can have a serious impact on the citizens, especially those in rural areas, with Oshana being one such example.

As is often the case in other developing countries, agricultural land in Namibia is being lost due to land degradation and abandonment, further deepening poverty and increasing food insecurity. Again, the high demand for farming land, even at subsistence level, has led to a high rate of land degradation (Imbamba, 1996:2). This indirectly contributes to the migration of local farmers to marginal areas where they are likely to cause additional and irreversible damage (Imbamba, 1996:2). Authorities are discouraged to resettle farmers or residents on virgin and productive lands as this could simply exacerbate the land degradation crisis.

Ineffective environmental laws and policies can affect the environment negatively, hence the need to analyse Namibian laws, policies and plans from this perspective and to arrive at informed and effective recommendations. Akhtar-Schuster *et al.* (2011: 299) believe that links with climate change, poverty, biodiversity loss, water, health, food and energy insecurity as well as human displacement urgently require the mainstreaming of land issues into national cross-sectoral policies and international negotiations.

Land degradation could successfully be addressed, if the right policy instruments are put in place and, most importantly, when both local people and scientists are authors and actors of the development process (Zdruli, 2010:481). There is a need to mainstream land degradation issues into national policies and frameworks as encouraged by an international mechanism such as the United Nation Convention to Combat Desertification (UNCCD) and the Millennium Development Goals (MDGs), now replaced by the Sustainable Development Goals (SDGs) (Akhtar-Schuster *et al.*, 2011: 299). Mainstreaming of land degradation into all policies and development at national, regional and international activities is important for mitigating measures (Akhtar-Schuster *et al.*, 2011: 299).

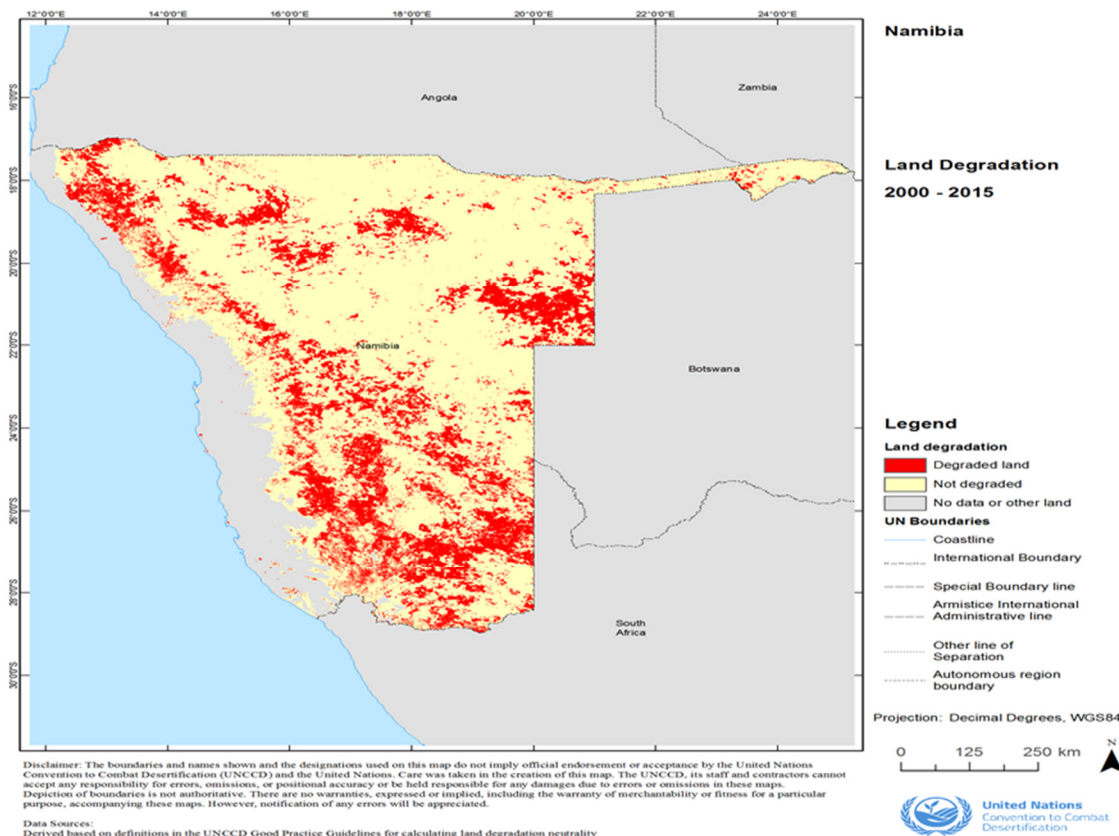


Figure 1: Map of land degradation in Namibia (UNCCD, 2018)

Land degradation is shown on the map of Namibia above, with degraded land indicated in a red colour. The yellow colour is the land that is not degraded and the rest as shown on the map is areas with no data available. A few studies have been done before on land degradation, but used different methods, such as the study of Seery which used several primary indicators of land degradation to monitor the risk. This process has demonstrated some practices relevant to other developing countries, as well as other state agencies, struggling to contribute to monitoring and understanding of land degradation (Seery, 2004:17).

The 'Namibian' newspaper of 24 November 2017 quoted the Namibian Environmental Management Authority stating that there was already evidence of a high rate of nutrient depletion in soils within the Oshana region, as reflected by its ever-decreasing productivity (Namibian, 2017:8). They also stated that if effective interventions are not implemented, residents will eventually struggle to survive, let alone afford to send their children to school.

Land degradation resulting from unsustainable land management practices has not only been recognised as a threat to the environment in Sub-Saharan Africa (SSA), but also to livelihoods, as the majority of people directly depend on agricultural production. It has also been regarded as a major

challenge to sustainable development in Namibia by the MLR as far back as 1996. It is also recognised that it may require restorative interventions (Linger, 2011:16; MLR, 1996). In most situations, restoration is not very simple and does not take place overnight, hence the need to focus on preventive measures before any degradation or soon after the restoration of degraded areas or lands. On the same note, Ruppel *et al.* (2016:24) say that it is a challenge, because restoration and rehabilitation of degraded land are difficult and can only be achieved over a long period. Apart from taking long to restore the degraded land, costs will also be incurred in the exercise which is in most cases unbudgeted for. Land degradation severely impacts Namibia's economy, but no adequate information system exists to monitor the degree and distribution of various types of land degradation in the country (MET, 2015:35).

The country's population depends on natural resources for sustainable livelihoods. Despite the complexity of combating land degradation, the government has put in place some measures to address land degradation, even though little information is available to understand the land use change that effects land degradation due to human activities (MLR, 2016: 1-3). In the case of land resources, information is required on trends and likely actions needed to attenuate degradation (MET, 2015:35).

Namibia has come a long way in creating information systems and appropriate technologies at all levels, but there is still an inadequate application of technologies identified to achieve the overall objective to prevent and reverse land degradation in affected areas, in support of poverty and environmental stability (MET, 2014b). However, improving institutional and individual capacity as well as strengthening cross-sectoral collaboration mechanisms between government, agencies, relevant actors and research institutions is significant for positive coordination (Ruppel *et al.*, 2016: 179).

2.6 Land degradation in the Oshana region

The Namibian Broadcasting Corporation reported in a televised documentary dated June 18, 2017, that land degradation and desertification remain a concern for Namibia where the Oshana region was amongst the regions where only a slight increase in population has resulted in a drastic overuse of the soils, resulting in land degradation (NBC documentary, 2017). Conservation farming is one of the mitigation measures mentioned in the programme, where farmers no longer plough but only reap to maintain soil structure and texture as well as soil fertility (Klintonberg *et al.* 2007:506-525).

It was further reported that there was a need to relocate or resettle some of the residents of the Oshana region in order to reduce the pressure on the land, since random migration has reportedly been observed as farmers have started relocating in search of arable soils or better rangelands.

According to Naam (2015) “we are pushing the planet towards a tipping point, where the corals will die, and the forests burn, and life will become much, much harder. We have the resources to solve those problems, even now, but politics and economics and nationalism all get in the way”. As emphasised by Naam (2015), politics, economics and nationalism could either help solve or become a stumbling block to mitigation measures for land degradation. This study implies that there should be a determination by the government to put in place effective measures and policies that support conservation and biodiversity.

2.7 Types of land degradation in Namibia

In Namibia various types of land degradation can be found, such as deforestation, desertification, sand mining, bush encroachment, soil erosion and increased soil salinity. Each of these types are discussed in the following subsections.

2.7.1 Deforestation

The land degradation of natural woodland and forest due to uncontrolled burning and harvesting of wood trees mostly for building materials; water scarcity and climate change are common phenomena in Namibia and are compounded by poverty and overdependence on natural resource due lack of employment opportunities in the region (CCP, 2005:115). A study conducted by Klintonberg (2007: 519) concluded that deforestation in North Central Namibia was almost completely attributable to agricultural related activities and estimated that increases of the population led to about 1 hectare of deforestation per person (Klintonberg, 2007:519).

In areas classified as Community Forests, the Namibian Government has transferred the responsibilities of managing forest resources and sharing generated benefits to local communities. In order to obtain such rights, communities have to establish a management committee with a functional constitution responsible for the implementation of the forest management plans that prevent overutilization and forest degradation. Other key responsibilities assigned to management committees include representing the interests of local residents and acting on their behalf. Community Forests comprise areas that span farms, settlements, grazing areas and other types of land use and can only be established where forest and tree resources form a significant part of the natural environment.

2.7.2 Desertification

Drylands are highly prone to desertification due to slow recovering and limited primary productivity following human destruction. In comparison with other biomes primary causes of desertification in arid, semi-arid that lead to degradation of resources are fragmentation, vegetation degradation, reduced cover and biodiversity loss due to factors such as encroachment, unplanned grazing, excessive wood collection, the invasion of exotic species and the land conversion for inappropriate agricultural practices (FAO, 2015: 10).

Desertification in the context of Namibia was investigated and determined to be caused by some specific land management activities, such as fencing off communal land in absence of formal control over land use management practices, as well as absentee farm management (Seely, 1994: 28). The farmland is then left with no activities taking place such as agricultural production that could create jobs and contribute towards food security. Fencing encourages long-term, wide spreading grazing in one area, worsening desertification and degradation of bush-encroachment (Seely, 1994: 29). The manifestation of desertification resulting from those practices is subsequent to soil denudation and reduction in vegetation following overgrazing. The other primary causes in Namibia resulting in desertification are deforestation, bush encroachment and impoverished soil base resulting from over ploughing.

2.7.3 Sand mining

Illegal sand mining in Namibia is becoming a problem that threaten local people and livestock. Large-scale illegal excavation by construction companies, including by Chinese companies, is being done for brick-making and road construction, with certain local villagers and traditional authorities receiving payments for this per load. It destroys grazing land and maize fields. According to recent newspaper articles, the Namibian government has reacted to take the necessary step to ensure that proper procedures are followed in an environmental-friendly and systematic way (Kambowe, 2018; Ashipala, 2018a & 2018b; Ndanki, 2018: 7). According to the Namibia Environmental Management Act (NEMA), all activities that are listed, need environmental clearance certificates. The Namibian government has asked the Uukwambi Traditional Authority in Oshana region to stop illegal sand mining which has become a problem in the region. Sand mining not only involves the activities of illegally extracting sand but also removing micro-organisms and plants. They are also removing known and unknown different species that could potentially benefit future generations socially and through economic emancipation (Kambowe, 2018; Ndanki, 2018: 7).

2.7.4 Bush encroachment

Bush encroachment has been acknowledged in Southern Africa since the late nineteenth century with an annual woody cover change rate reportedly ranging between 0.131 to 1.275% (O'Connor *et al.*, 1994). In semiarid rangelands, bush encroachment results in dense thickets, often comprising thorny or unpalatable bushes which reduce the carrying capacity and thus the economic value of rangelands (De Klerk, 2004). The least bush encroachment is observed on lands under communal tenure, large environments with large herbivores, moderate bush encroachment on freehold land and most rapid encroachment is found on small protected areas at present. Bush encroachment occurs almost in every region of Namibia, affecting different land uses and ecosystems. This presents a complex problem across the country and can serve as an indicator of land degradation. Overgrazing is one of the factors that drive bush encroachment (Birch, 2017: 1-4). Bush encroachment in Namibia is an overwhelming problem for communal and commercial agriculture. The solution to rehabilitate encroached areas are through bush thinning of undesirable woody plants, using manual, biological and chemical control methods. Moreover, bush control entails costs in the form of thinning operation that can result in losses of Soil Organic Carbon (SOC).

People are harvesting bush encroachment to combat land degradation which results in the loss of productive agricultural land (Photo 2). Encroacher bush is harvested to produce energy and charcoal which contributes in the form of rehabilitating the land and create employment opportunities for local people. Stafford *et. al* (2017) valued a selected number of ecosystem services from landscape restoration projects in South Africa and Namibia in order to shed light on the economics of land impacted by bush encroachment and alien plant invasions. They valued the total value of these services at US\$5.8 and US\$2.1 billion for Namibia and South Africa respectively. The most valued ecosystem service benefit assessed was water provision, followed by timber products and wood-fuels, such as biomass used for electricity, and then grazing.



Photo 1: Bush encroachment (Photo taken by the author)



Photo 2: Charcoal making (Photo taken by the author)

2.7.5 Soil erosion

Soil erosion is mainly caused by either water or by wind resulting in loss of the soil surface layer and creation of mineral nutrient pools, rich in organic matter. The soil erosion process is mainly caused by human activities, resulting in a reduction of natural vegetation, less soil covered by crops, reduced soil stability, tillage leading to landslides and soil creep (Sanz *et al.*, 2017: 49). The Oshana region is prone to flooding and spells of droughts which exacerbate soil erosion.

2.7.6 Salinity

Salinity refers to the presence of soluble salts in soil or water. Salinity is one of the major problems preventing the growth of crop production worldwide (Mwazi, 2012: 45). Generally, it disturbs plant growth by increasing osmotic stiffness, making it more difficult for the plants to absorb water and nutrients from the soil (Mwazi, 2012:45). Globally, waterlogging and salinity problems are common and are intensified by multiple factors not limited to waste water irrigation, inappropriate cropping patterns, torrential rains and floods, inadequate and uncontrolled drainage, a lack of adequate knowledge and ill-informed management decisions. In Northern Namibia, high evaporation results in pans and omiramba (ephemeral rivers) drying up, leading to the precipitation of salts and increased salinity of the shallow aquifers (MAWF, 2006). The Etosha pans in the Oshana region are a large mineral pan, illustrating an extreme example of this salinity of the soil.

2.8 Key drivers of land degradation

The causes of land degradation in Namibia have been discussed and covered in past projects such as Namibia's Programme to Combat Desertification (NAPCOD) and the Country Pilot Partnership

(CPP) on Sustainable Land Management (Hengari, 2017: 14). The results of these projects (CPP and NAPCOD) inform the land degradation factors identified in the Third National Action Programme (NAP3) for Namibia to implement the United Nation’s Convention to Combat Desertification (UNCCD) (MET, 2011b: 11). According to Klintenberg and Seely (2004) research on monitoring land degradation in Namibia found out that it is also important to assess the current and potential land degradation risks of different ecosystems in order to ensure that effective mitigation actions are taken early to prevent or reduce further damage to degraded land. To this effect, data from factors with major contributions to land degradation in Namibia was used to calculate land degradation risk patterns for different parts of Namibia.

After assessing various land degradation risks, the study established that the following factors are important: over-consumption of firewood, increased population density, overgrazing due to overstocking, construction, and limited livestock movement (Klintenberg & Seely, 2004: 7-8). Other major causes of land degradation are summarised in Figure 2 below, based on research by Hengari (2017). This study also refers to the role of poverty, poor soils and low rainfall, expanding agricultural production, lack of technologies and poor sectoral collaboration.

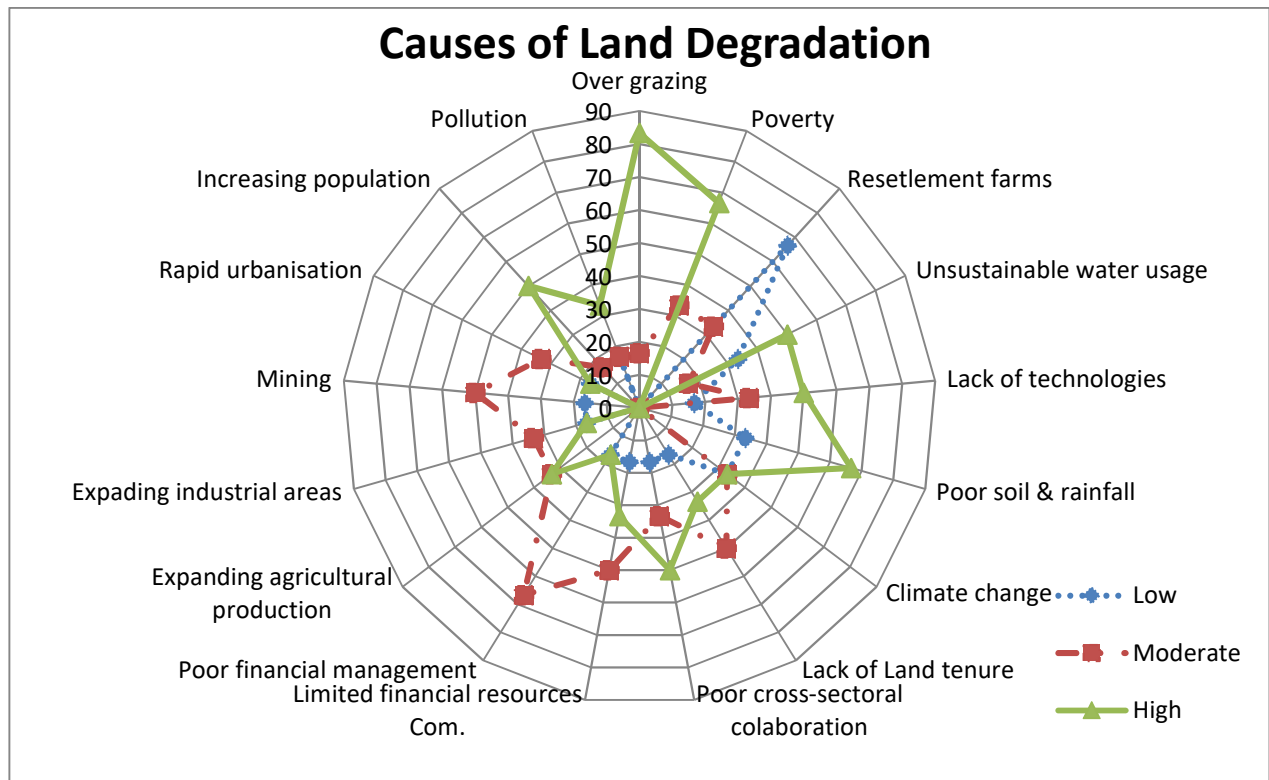


Figure 2: Causes of land degradation in Namibia (Hengari, 2017)

2.8.1 Climate change and land degradation

Namibia is experiencing “a consistent increase in daily maximum temperatures” (Dirkx *et al.*, 2008, as cited in MET, 2011a), impacting the ability to implement sustainable land management methods for agricultural and natural resources. The potential increase in temperature combined with increasing rainfall intensities and variability, and evaporation will add further stress on natural resources and to the capacity to maintain food production (MET, 2011a: 2). Namibia is regarded as one of the developing countries most vulnerable to climate change impacts. It is predicted that there would be further increases in temperatures, evaporation rates as well as rainfall variability that will further worsen existing challenges facing the country (MET, 2011a: 2). Climate change is predicted to have a large impact on infrastructure, including drainage systems and sewage, communication, electrical transmission, water pipes, dams, railways, roads, buildings, and houses (UNCCD, 2017: 48).

2.8.2 Land tenure and land degradation

Gilolmo *et al.* (2016) have published evidence against the widespread view that communal tenure is associated with a higher degree of land degradation than other land tenure types, thus increasing the risk of desertification or bush encroachment. As stated earlier, bush encroachment is actually a least observed risk under communal tenure (Gilolmo *et al.*, 2016).

That does not mean that the communal land areas do not have land degradation problems. This tenure system contributes to land degradation as residents compete for the utilisation of resources and nobody assumes responsibility and direct management resources and associated costs (Hengari, 2017:14). This is further exacerbated by the fact that financially better off residents are illegally fencing off large areas, forcing the poor who constitute the majority of the residents, to overstock and overgraze the commonage (common rangeland) (Klintonberg & Seely, 2004:7-8).

2.8.3 Land use planning and land degradation

Land use activities in Namibia that can intensify land degradation, are mining and agriculture at the national level. Namibia being an arid country, with infertile soils, it is the driest land for farming in the world (Kangombe, 2010:15). Farmers in the Northern region of the country keep goats, sheep, game animals and cattle as livestock for production.

Planning in Namibia has two levels of planning, namely Integrated Land Use Plans and Development Plans. The National Planning Commission (NPC) coordinates developmental planning at national level (i.e. the National Development Plan), while the Ministry of Urban and Rural Development (MURD) is tasked with coordinating Integrated Land Use Plans at the local level and MLR similarly at the regional level. An Integrated Regional Land Use Plan (IRLUP) for the Oshana region is still under discussions, unlike other regions which have already completed Regional Land Use Plans, for example the Zambezi region. The Regional Land Use Plans in Namibia allows community-based natural resources to manage their natural resources at their own local planning level. As part of the IRLUPs, strategic environmental assessments (SEAs) are done of the zonations and planned projects, as well as of the various sectors in the report (i.e. conservation and tourism, agriculture, etc.). The purpose of the SEA, which in the Zambesi IRLUP, included an Ecosystem Services Assessment, is to help promote sustainability

2.9 Impact of land degradation in Namibia

2.9.1 The effect of land degradation

Land degradation poses an existential threat to all species. It negatively impacts economic development, socio-cultural values, air quality, the quality of water resources and food security (ICLEI, 2017, 2). Land degradation results in shrinking agriculture production and threatens rural livelihoods as well as food security at national level. The rural population is currently migrating to urban centers in search of better livelihoods (ICLEI, 2017, 2).

2.9.2 Poverty

Poverty can affect local people depending on how they manage their land. Farming requires labour, capital and investments in the land. Poverty tends to motivate farmers to focus on basic needs rather than materialise benefits which may take longer to achieve (MET, 2005:19). It must be clear that it does not mean that poor people are the main degraders of the land while the richer are conservers. The social life and stability in Namibia are threatened by conflict over farming land and overgrazing, especially in the communal land at the Northern region of the country (MET, 2005:19). Poverty pressures increase drastically due to overutilization of a natural resource that forces subsistence farmers to utilise resources too intensively. The degraded land in return affects those dependent on subsistence agriculture for survival and as a result increases poverty (MET, 2005:19).

The Government of Namibia' has put in place projects to subsidise natural resources use such as establishing the food bank as food aid scheme, providing free water, and drought aid scheme for livestock. According to the suggestion made in the Policy Review of 2005, it was suggested that to alleviate the impact of poverty; policies should advocate the promotion of alternative income generating activities and secure tenure over resources to minimise dependency of the poor (MET, 2005:19). The government in the 1997 National Drought Policy also tried to shift away from supporting drought relief towards promoting more appropriate and sustainable farming techniques to empower farmers to become more resilient, to better cope with droughts (Ruppel-Schlichting *et al.*, 2016:186).

2.9.3 Food security

Land degradation might not pose a direct threat to global food production, but it is a serious threat to livelihoods, rural incomes and food security in many parts of the globe. The food gap between what is needed to maintain minimal per capita consumption and what is produced is broadening in developing countries and mostly in Africa. The study by Berry (2006: 11) found out that about 66 countries with low incomes are affected by land degradation, threatening food security. Moreover, this relationship includes as an economic return to agricultural, the availability of nonfarm income and distribution (Berry, 2006: 11).

2.10 Possible solutions to land degradation

2.10.1 Land use planning

Land use planning is concerned with the principles of law and of planning. Law is concerned with the regulation of society and people, while land use planning is concerned with the regulation of the environment and people. The focus of land use planning in this section is the role it can play as a solution to land degradation and land practice planning such as people and the environment, society and regulation (Ruppel *et al.*, 2016:193). Linking land use planning with environmental planning will also bring additional benefits.

Land degradation is not an undefeatable problem. While no single approach can solve multiple tasks to address every situation, land use planning, and pastoral forest management are leading to much lower-impact farming solutions. The restoration approach is one of the most cost-effective greenhouse mitigation measures which is regarded as a measure that can play a major role in the preservation of the Paris Climate Agreement (Climate-Focus, 2015). Solutions to land degradation

should be based on a combination of local, indigenous and scientific knowledge. Land use planning therefore need to address the issues mentioned above, such as being linked to environmental planning (such as SEAs), including participation and collaboration of local and indigenous communities, as well as basing planning on the restoration approach.

2.10.2 Sustainable land management technologies

Hengari (2017: 10) reviewed some financing mechanisms that are available for Sustainable Land Management (SLM), as identified in the Review for the Integrated Investment Framework for the Management of Land Degradation. However, access to these funds by the rural poor, who have a direct impact on natural resources and cause land degradation, is limited. It is due to the lack of tangible assets (cash and fixed assets) to use in accessing the funds, the lack of financial management skills, the lack of understanding of the different biological processes of the resources utilised and basic cultural practices that many times defies efforts to implement SLM in these areas. Cultural perceptions and poverty also play a role in hampering the application of SLM technologies (Hengari, 2017: 10).

2.10.3 Sustainable land livelihoods and community-based conservation

Livelihoods of people of Namibia in the communal land are mainly based on resources and combining resources and strategies relating to natural resource utilisation, gardens, and crop-based agricultural and livestock production. The combination of strategies and resources above is done in a search to exploit opportunities for income generation (Long, 2004: 56). People are vulnerable due to variable rainfall and drought to mention a few, but there are a variety of other reasons, including the occurrence of predator and wildlife species that damage the water points; livestock lost to carnivores and loss of crops to elephants. There is poor access to markets by rural community members; health risks associated with malaria, limited substitute sources of income and lack of secure land tenure. These enable them to achieve a degree of income security, household food and minimise the risks (Long, 2004: 56).

Any policy to address land degradation therefore needs to address the concept of sustainable livelihoods, which require policies to explore possible alternative or additional livelihoods. A diversity of livelihoods would make communities more resilient and able to withstand climate challenges such as droughts and floods.

Community Based Natural Resource Management (CBNRM) and Community Forests are also methods to diversify livelihoods, by allowing local communities to co-manage and benefit from wildlife resources and forests on their land.

2.10.4 Rehabilitation

Rehabilitation of land degradation involves multiple stakeholders, professionals, policy-makers and local people (FAO, 2002). Land degradation rehabilitation has losers and winners with some losing nutrients, control and power. Therefore, rehabilitation may not be worthwhile economically in some cases. It is recommended to build frameworks that accommodate complex inter-related issues and different perspectives.

There is a need to develop robust but appropriated techniques at national and global level, as the field indicators of land degradation impact and indicators of degraded land (Haigh, 2015: 7). Namibia started with the rehabilitation process with land degradation target setting at the national level for two regions (Hengari, 2015: 7). These two regions are Otjotjondjupa and Omusati regions, and their reports are still in draft format (Hengari, 2015: 7). The assessment of land degradation in these two regions used the UNCCD global indicators, which are: land cover/land use, land productivities and soil organic carbon. Bush encroachment was tested as an additional indicator of land degradation for Namibia (Hengari, 2015: 7). Land rehabilitation based on the above-mentioned global indicators can only be done after the processes of setting targets are complete.

2.10.5 Land degradation awareness and participation

Environmental challenges are dynamic and complex in nature. Therefore, they require a diversity of values and knowledge to be brought into discussions on solutions, in a flexible and transparent decision-making process (Beder, 2006: 105-121). Participation in environmental decision-making is important for inclusion in international and national policies. For this reason, to address land degradation problems, both scientific and local knowledge should be combined to provide more information and understanding regarding both technical and practical information (Beder, 2006: 105-121). Therefore, awareness and participation in environmental related problems are importantly reinforced by the philosophies of learning, trust, equity and empowerment.

The government of Namibia and its people are aware of land degradation phenomena that are seen as serious problems. The land degradation solution needs remedial interventions to address the causes

and impacts. It has been recognised that there is a need to integrate sustainable land management into national plans and programmes at all levels.

During September 2013 in New York, Iceland and Namibia, as Permanent Representatives from the UN, launched the ‘Group of Friends’ (GoF) for Desertification, Land Degradation and Drought (DLDD) (Wagner, 2013). The Group of Friends (GoF) is a forum and informal interest groups that aim to maintain the momentum of the UN Conference on Desertification, Land Degradation and Drought to promote a land degradation neutral world. It was established during the United Nations Conference on Sustainable Development at Rio+20 in the circumstance of the post-2015 development agenda (Wagner, 2013). One of their goals was to make sure that DLDD gets included in the Sustainable Development Goals of 2015, which it was, as Goal 15. This goal is about protecting, restoring and promoting “sustainable use of terrestrial ecosystems, sustainably managed forests”, combatting desertification, and halting and reserving “land degradation and biodiversity loss”.

2.11 Summary

The review of past literature on the land degradation concept, its causes and its impact on the environment revealed that this is an issue of importance across the globe. The study highlighted how land degradation worldwide is affecting the environment and further extended to Southern Africa and Namibia to find out the specific local causes and impacts of land degradation, and revealed the direct and indirect drivers of land degradation in SADC regions.

The chapter mainly concentrated on the review of the causes, and impacts of land degradation and possible solutions and mitigation measures. It further looked at the policies and strategies available to address land degradation in Namibia. Moreover, the focus was on the articulation of types of land degradation and how it linked to three dimensions of sustainability, such as social, environmental and economic issues. It also became clear that sustainable solutions will require a combination of indigenous and scientific knowledge approaches.

Lastly, but not least, it concluded that land degradation issues in Oshana are real and visible; its negative impacts are already being felt, not only in the particular region, but by the entire Namibia. The region is about to come up with management and mitigation strategies through the Oshana regional council under the Ministry of Urban and Rural Development that will assist the country in restoring or preventing land degradation.

Chapter 3: International agreements and national laws and policies

3.1 Overview

This chapter will briefly outline the international agreements and national laws and policies that guide the planning and management of degraded land at both global, national and regional levels. Land degradation normally happens due to human and non-human pressures, such as increasing population, deforestation and vegetation loss, unsustainable farming practices, fencing and uncontrolled bushfires (DEA, MET, 2006, 1). Policies and law are there to ensure that land use is controlled and regulated for humans and non-humans to utilise natural resources sustainably. Since Namibian independence in 1990 the challenges of land degradation, such as drought and desertification, have been high on the government agenda (Coetzee *et al.*, 2014). Various projects and programmes at a national and regional level have been developed to address the same challenges from a different perspective. The Namibian Rangeland Policy of 2013 stated that overuse of natural resources is one of the factors that contribute to land degradation. This section will focus on international and national legal instruments that relate to environment, biodiversity and land related activities.

3.2 International agreements

The United Nation Environmental Programme (UNEP) has recognised land degradation as a major environmental, social and economic problem with more severity in semi-arid and arid regions of Africa. Following the United Nations Conference on the Environment and Development (UNCED) that was held in Rio in 1992, the Plan of Action to Combat Desertification (PACD) was adopted by the United Nations with the goal of arresting and preventing land degradation (Kibbassa, 1997:1). After the PACD, the Convention to Combat Desertification (UNCCD) was prepared by UNEP in 1994 with the aim of improving the livelihoods of drylands inhabitants. Land degradation, especially in Africa, was classified as a process caused by complex interaction among economic, cultural, social, political biological and physical factors (UNCED, 1992:3). This is still the case, and according to MET (2015a): “The recently adopted post-2015 United Nations Sustainable Development Goals (SDGs) incorporate land degradation under Goal 15 on the protection and promotion of sustainable use of terrestrial ecosystems, halt desertification, land degradation and biodiversity loss”.

UNCCD is the only legally binding international agreement that acknowledges the close linkages between environment and development to provide for sustainable land management. This Convention is primarily concerned with environment and development activities in the arid, semi-arid and dry

sub-humid areas, known as the drylands, that harbour most vulnerable ecosystems and population groups.

The new UNCCD 2018-2030 Strategic Framework is the most inclusive global commitment to achieve Land Degradation Neutrality (LDN) in order to restore the productivity of large stretches of degraded land, to improve the livelihoods of more than 1.3 billion people, and mitigate the impacts of drought on vulnerable populations. It aims to avoid, minimize, and reverse desertification/land degradation, as well as to mitigate the effects of drought in affected areas at all levels in order to achieve land degradation-neutrality. The UNCCD in particular encourages the participation of local people in efforts geared towards combating desertification and land degradation. The UNCCD secretariat facilitates cooperation between developed and developing countries, particularly around knowledge and technology transfer for sustainable land management (MET, 2011b, UNCCD, 2018).

As the dynamics of land, climate and biodiversity are intimately connected, the UNCCD collaborates closely with the other two Rio Conventions; the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC), in order to benefit from the synergies between these instruments to ultimately address the multi-faceted challenges with a synergistic approach and provide for the best possible utilisation of natural resources.

It was 1992 when Namibia's Green Plan was presented at the United Nation Convention to Combat Desertification (UNCCD) at the conference in Rio, Brazil. It is when the parties decided and agreed to promote issues related to combatting desertification, land degradation and drought. Namibia is a signatory to the convention since 1995.

The Rio Conference of 1992 aimed to bring together chiefs of government and heads of state along with government officials and senior diplomats across the globe including journalist and United Nations agencies official and non-governmental organisation. The outcomes concluded at Earth Summit included Agenda 21, which required that issues of deforestation, global climate change, desertification and biological diversity be mitigated. The summit further developed the principle of how nations should base their policies and future decisions by considering the implications of environment and socio-economic development (UNCED, 1992:2).

Agenda 21, and the 3 Rio Conventions on Biodiversity, Climate Change and Desertification were among instruments which emerged directly from the Earth Summit (UNCED, 1992:2). Agenda 21, as adopted in 1992 at the Rio Conference, was restated and strengthened at the 2012 Rio+20

Conference, where the document ‘The Future We Want’ was adopted. Sections 205 to 210 of this document deals with ‘Desertification, land degradation and drought’.

Namibia has embraced each of these instruments with enthusiasm and has recognised sustainable development as the cornerstone of the country’s desire to become a prosperous and industrialised nation by 2030. The sustainable use of natural resources is anchored in Namibia’s Constitution of 1990, which makes sound environmental management a constitutional imperative.

In order to provide for the successfully implementation of the 3 Rio Conventions that Namibia ratified, MET, through the cabinet, in October 2014 launched the 3 Rio Conventions strategies and action plans. These are the National Climate Change Strategies and Action Plan (NCCSAP), Namibia’s Second National Biodiversity Strategy and Action Plan (NBSAPII) as well as the third National Action Programme (NAP3) (MET, 2011b: 36).

The United Nation Framework Convention on Climate Change (UNFCCC) has adopted the Paris Climate Change Agreement on 12 December 2015, and about 196 Parties are a member of this convention. This agreement adopted a new framework for internationally coordinated effort to tackle climate change. The Paris agreement established a goal for global warming to be below 2 degrees Celsius pre-industrial. It requires each country to establish their own Intended National Determined Contributions (INDCs) (Climate-focus, 2015, 1). However, the implantation of INDC in Namibia presents a major challenge to the government as multiple constraints and shortcomings need to be overcome. Moreover, to fulfil the needs for institutional capacity and individual, clean production technologies and transfer of the latest environment-friendly, adaptation and mitigation techniques and sufficient financing from the green climate fund in a smooth manner, and timely for INDC successful implementation (INDC, 2014: 19). Namibia has set national targets to restore degraded land in INDC, and LDN reports.

3.3 Namibia’s current efforts and programmes to restore land degradation through international cooperation

Namibia has embarked on various programmes to promote an integrated landscape management approach in key agricultural and forest landscapes, reducing poverty through sustainable nature-based livelihoods, protecting and restoring forests as carbon sinks, and promoting LDN.

3.3.1 The National Land Degradation Neutrality Report of 2015

The National Land Degradation Neutrality Report of 2015 supports the NAP3 and provides specific LDN related targets to be achieved to make Namibia land degradation neutral by 2030. The UNCCD supported the LDN assessment of 2015 and current LDN programmes and the GIZ supported the LDN pilot project and have been supporting the implementation of the NAP3 and the progress towards the achievement of LDN in Namibia (Hengari, 2018: 8). As part of the effort to achieve LDN, Namibia identified seven land degradation hotspots to be a target in the short term for exclusive restoration actions. The Oshana, Otjozondjupa and Omusati regions were identified as part of these hotspots. The land degradation in these regions is mostly attributable to the occurrence of bush encroachment that reduces the economic viability of cattle farming in Otjozondjupa region while high cattle densities in cattle post areas in Omusati region contribute towards vegetation and soil degradation (Hengari, 2018.8).

The UNDP currently manages the next new MET project, the Namibia Integrated Landscape Approach for Enhancing Livelihoods and Environmental Governance to Eradicate Poverty (NILALEG) Project (2018 – 2023), which will continue supporting the implementation of various sub-projects aimed at achieving the national LDN targets (Hengari, 2018: 8).

3.3.2 Namibia Land Degradation Report Update

In 2015 the country developed a report on Land Degradation Neutrality (LDN) with targets of which Namibia began with the implementation process. From 2015 to 2018: it started with the First and Second Phases of the GIZ funded LDN project – linked to the potential future task of integration it with the Integrated Regional Land Use Plan (IRLUP). The aim is to prevent, arrest and reverse land degradation and assist in contributing to the global sustainable future that Namibia wants (MET, 2015: 5). The Namibia land degradation report revealed the current effort that it is part of, the new UNCCD LDN implementation programmes and Namibia will therefore continue to obtain limited support from the UNCCD for the implementation of LDN work in the country. The UNCCD support relies on each country's request for specific support with implementing transformative land degradation management related projects in identified areas (Hengari, 2018.16).

The plan is to address land degradation and desertification and it identified actions to be taken by the government, individuals, the private sector and civil society organisations, to ensure sustainable development in Namibia. The implementation of the LDN pilot project in Namibia by the Ministry of Environment and Tourism has been accomplished through support from the GIZ Sector Projects

on Soil Protection, Combating Desertification, and Sustainable Land Management. The projects were implemented from August 2015 to August 2018 in the selected project pilot sites of Otjozondjupa and Omusati region (Hengari, 2018: 6).

Namibia identified 7 land degradation hotspots to be a target for exclusive restoration actions in the near future (Namibia- National LDN Report 2015) and the Otjozondjupa and Omusati regions were identified as part of these hotspots. This is because of the occurrence of bush encroachment that reduces the economic viability of cattle farming in the Otjozondjupa region and the high cattle densities in cattle post areas in the Omusati region causing vegetation and soil degradation. It was therefore decided to start activities under the LDN pilot project in these regions. The GIZ-supported projects produced land degradation assessment products; conducted economics of land degradation assessment and provided land degradation related policy inputs for the development of the Otjozondjupa IRLUP (Hengari, 2018:16).

3.3.3 Namibia Integrated Landscape Approach for Enhancing Livelihoods and Environmental Governance to Eradicate Poverty (NILALEG) Project

The NILALEG programme aims to promote forest landscapes and agriculture through and integrated landscape management approach that will reduce poverty through sustainable protecting, nature-based livelihoods, and restoring forests as carbon sinks and promoting LDN (MET, 2016: 5). This project contributed towards attainment of several LDN targets such as improving cropland productivity, reducing bush encroachment, and restoring forest land. It also contributed towards some of the Namibian INDC targets through the implementation of conservation agriculture and agroforestry, improvement of forest productivity, reducing wood removal and restoration of grasslands. The project also helps attain the NBSAP target 2 which deals with the minimisation of loss of natural habitats and adherence to sustainable farming and forest and rangeland management practices (MET, 2016: 5).

3.3.4 Sustainable Management of Namibia's Forested Lands (NAFOLA) Project

The NAFOLA project is funded under the United Nations Development Programme (UNDP). It intends to assist community conservancies in maintaining their forests by focusing on ecological goods and services in the current dryland forests. It provides local people with registration, formation and gives rights to manage their forests (UNDP, 2014: 2). Training was provided to farmers with emphasis on gender equity and training community member to market their natural products and

manage their income generated from natural resource product. The project aimed to restore 500 000 ha and adopt sustainable land management and improve restoration technologies (UNDP, 2014: 2).

This project supported the Ministry of Agriculture, Water and Forestry with the institutionalisation of conservation agriculture at national and local level, through the launching of the national strategy as well set up of regional level structures to coordinate conservation agriculture issues at the local level. Furthermore, the project purchased implements and tractors that are conservation agriculture oriented for practical implementation. It further assisted farmers by constructing cattle kraals to help reduce grazing pressures at Kunene region in 2017 at a regional level (UNDP, 2014: 1-27).

3.3.5 Scaling up community resilience to climate variability and climate change in Northern Namibia, with a special focus on women and children (SCORE) Project

Implementation of this SCORE project is through the Ministry of Environment and Tourism, with the United Nations Development Programme as an accredited entity and the Ministry of Agriculture, Water and Forestry as an implementing partner. The project duration is five years and its focus is on *“Scaling up community resilience to climate variability and climate change in Northern Namibia, with a special focus on women and children”* (SCORE, 2015: 2). The project is implemented in the following seven Northern regions of Namibia that were selected as major land degradation hot spots: Kavango East and Kavango West, Kunene, Oshikoto, Ohangwena, Omusati and Oshana (SCORE, 2015: 2). These regions are threatened by increasingly and regularly extreme weather events, such as floods which causes damage to agricultural production and infrastructure, as well as droughts. The project is aimed at supporting the adaptive capacity of about 4 000 households to reduce their vulnerability to floods and droughts (SCORE, 2015: 2).

The project results are drought and flood measures provided by restoring three existing earth dams, serving 6 010 males and 10 548 females and constructing/restoring/ six hand dug wells, each serving an average of two villages benefiting 627 females and 443 males (SCORE, 2015).

3.4 National laws and policies in line with international agreements

3.4.1 Overview

Namibian laws and regulations were reviewed that relate to the environment, agriculture and land and are governed under three ministries, namely the Ministry of Agriculture, Water and Forestry (MAWF), the Ministry of Environment and Tourism (MET) and the Ministry of Land Reform

(MLR). The Republic of Namibia has been committed to adopting legislation, policies and plans to address the issue of land degradation at the national level.

3.4.2 The Environmental Management Act 7 of 2007

The Namibian Environmental Management Act, which became operational in 2012, assist the country in carrying out its obligations and duties at both local, regional and national level. Its goals are to make sure that people consider activities that harm the environment, including land degradation. Tools used to do this are Environmental Impact Assessments (EIAs), required of all large development projects, and Strategic Environmental Assessments (SEAs).

The Act also ensures that all interested and affected people must participate in these environmental assessments. It also stated that the principle of the ‘polluter pays’ is applicable, which means the polluter must pay the cost of damage to the environment to prevent further deterioration (MET, 2008: 7-12).

3.4.3 National Biodiversity Strategy and Action Plan

According to the NBSAP policy, first adopted in 2001 and now with NBSAPII, adopted in 2013, aimed to protect ecosystems and unique biodiversity. Its vision is “Namibia’s biodiversity to be healthy and resilient to threats and for the conservation and sustainable use of biodiversity to be a key drivers of poverty alleviation and equitable economic growth, particularly in rural areas” (MET, 2013). Namibia needs reliable baseline information because data on some critical areas are lacking, including the value of biodiversity, awareness and ecosystem services for society and the economy, as well as the extent of biophysical factors such as biodiversity loss and land degradation. The establishment of baseline information is needed to maintain the status quo on these issues, so that subsequent trends can be monitored and positively influenced (MET, 2014:16).

3.4.4 National Climate Change Strategy and Action Plan of 2009

The Strategy of 2009 was developed for adaptation and mitigation issues in the country that affect social, economic and environmental developmental potential (MET, 2013: 13). This action is an instrumental operation that offers practical and comprehensive tools which guide climate change issues in a manner and mechanisms for implementation. It is clear that climate change knowledge, understanding and awareness both in term of impact, responses and risks are fast in developing the world. Therefore, the need for a mid-term review of this strategy for impact and implementation is expected (MET, 2013: 13).

3.4.5 National Policy on Climate Change for Namibia of 2011

This policy was established to recognise the challenges of climate change as environmental problems. It promotes the welfare of people accepting policies aimed to preserve biological diversity, essential ecological process and ecosystems of Namibia. It also aimed to utilise sustainable natural resources to benefit all Namibians. It has five objectives which aim to develop, implement strategies and enhance capacities, and synergies at local, regional and national level. It also aimed to develop effective adaptation and mitigation strategies such as food security, water, human health and infrastructure development and to secure funding resources and investments (MET, 2011a: 8-9).

3.4.6 Third National Action Programme (NAP3) of 2014-2024

The NAP3 strategies was formulated to address the issues of land degradation at the national level (MET, 2014: 9-17). The strategy is the national strategy for Namibia to implement the activities of the United Nation Convention to Combat Desertification (UNCCD) that has implemented through the MET and the Department of Environmental Affairs in Namibia (MET, 2014: 9-17).

One of the important issues that NAP3 highlights is that the capacity and knowledge to implement the activities at the institutional level are still lacking (MET, 2015: 16). The capacity of the land to support particular land degradation levels is often not taken into account in some policies (Jones, 2009, 9).

NAP3 describes Namibian's environment, desertification, land degradation and drought process and threats to its land-based agricultural production. It explains the causes of land degradation and the different types of land degradation which occurs in the process. The objectives and desired outcomes of NAP3 are also closely aligned with the strategic and operational objectives of the "United Nation Convention to Combat Desertification (UNCCD)" (MET, 2014: 9-17). Namibia views the sustainable management of land as the key basis for addressing the threats stood by Desertification, Land Degradation and Drought (DLDD) (MET, 2014: 9-17)

The objectives of NAP3 in Namibia are to stop and combat land degradation and desertification in affected areas and to mitigate the effects of drought in Namibia, to support poverty reduction and environmental sustainability. However, there is slow progress on monitoring tools that was set to monitor land degradation at the country level. It builds a foundation laid by its earlier Country Pilot Partnership Programme (CPP) and National Action Programmes to Combat Desertification (NAPCOD) as well as ongoing good practices in the selected area of sustainable land management.

It has been designed with six outcomes to cover the themes of education and advocacy awareness, institutional framework and policy and for DLDD, monitoring system for DLDD, on-the-ground action to reverse and prevent land degradation, financial support, and research and development (MET, 2014:11-37). The National Action Programme (NAP) focus on the implementation of the UNCCD activities at national level, and on national needs and priorities to be promoted at the international level. The issue is related to sustainable land management and require closely working with regional and sub-regional partners on the importance of desertification, land degradation and drought (MET, 2014:11).

3.5 National laws, policies and plans related to planning and development

3.5.1 National Planning Commission Act 2 of 2013

The National Planning Commission (NPC) is responsible for planning national programme, plans and project in line with the National Development Act of parliament as per articles 129, 98 and 95 of the Namibian Constitution of 1990. Its goal and objective are to ensure sustainable, balanced development, social harmony, equity and economic growth (Ruppel-Schlichting *et al.*, 2016: 202).

At the regional level, there are 14 administrative regions and each region has a Regional Governor heading a Regional Council and each region is divided into several constituencies. Regional Councillors are politically appointed and their duties are to oversee those constituent's wellbeing. They play a role in promoting and planning the development of each constituent region (Ruppel-Schlichting *et al.*, 2016: 202).

3.5.2 National Development Plan 5 & Vision 2030

The fifth National Development Plan (NDP5) is a framework organised around four pillars founded on the principle of sustainable development namely, social transformation, economic progression, good governance and environmental sustainability (NDP5, 2017:7). These pillars align with the effort to combat inequality and poverty as outlined in Vision 2030 of the Republic of Namibia. In addition to this principle, the pillars support the continental development and global frameworks to Namibia's commitment, such as SADC's regional indicative strategic development framework, the African Union's Agenda 2063 and the Paris Agreements (COP 21) (NDP5, 2017: 7). However, Namibia's effort to promote economic diversification and enhancement of growth, as well as sustainable environmental protection remains a problem. It includes over-regulation and a mismatch of skills in

the Namibian workforce between available skills and the skills needed by the labour market (NDP5, 2017: 7).

Moreover, strategies for the conservation of sustainable natural resources require the strengthening of sustainable land management to achieve LDN, with the most important issues addressing rangelands management, conservation agriculture and restoration of bush-encroached land. Unfortunately, there is a challenge of weak coordination between institutions on activities related to sustainable land management (UNDP, 2017: 11 & 57).

3.5.3 Regional Development Plans

The regional development plans are drafted at the regional level under the Regional Councils Act 22 of 1992. The country's councillors mandate are to ensure planning and development in their regions (Ruppel-Schlichting *et al.*, 2016:206). They make provision for regional development plans which provide an overview of the region with a situational analysis of the future development of the region. Namibia to date has carried out four Integrated Regional Land Use Planning projects, Omaheke combined with Otjozondjupa in 2005, the four North-Central regions combined Oshikoto, Ohangwena, Oshana, and Omusati in 2002, Zambezi (Caprivi before) region in 2001 and Kunene in 1999 (Ruppel-Schlichting *et al.*, 2016:206-207), although these plans have since been updated with a Karas IRLUP in 2011 as a pilot project with a parallel Strategic Environmental Assessment (SEA) process and new Zambezi, Kavango East and Kavango West IRLUPs in 2015. These IRLUPs were drafted with a parallel SEA process. The gaps that were originally identified regarding these plans are that they are not being implemented and also the non- alignment of these plan to existing laws and policies (Ruppel-Schlichting *et al.*, 2016:206). The Oshana region IRLUP has not yet been developed.

3.5.4 The Regional Planning and Development Policy of 1997

This policy was established under the NPC's supervision. Its emphasis is on addressing trends of increasing degradation of woodland, rangelands and pastures and it gives attention to forest, water and soil management as development tools. It also encourages strategies such as controlled grazing cycles and soil conservation (Ruppel-Schlichting *et al.*, 2016:186).

3.5.5 The Regional Councils Act 22 of 1992

The levels of Government and Departments in Namibia dealing with planning, development, agriculture, environment, land degradation are highlighted below at National level. At regional level there are 121 constituencies; Oshana has a Regional Council and 14 constituencies.

The Constitution of Namibia made a provision for three governance system comprising regional, local and central levels. The government structure includes executive, judiciary and legislature (Ruppel *et al.*, 2016: 485). The **Ministry of Environment and Tourism** is responsible for the safeguarding of natural environment for Namibia. The mission is to rehabilitate and maintain essential ecological processes to conserve biological diversity and life- support systems and to ensure that natural resources are used sustainably to benefit all people both future and present generation (Jones, 2009: 49). MET is also responsible for all three Rio Conventions under the Department of Environmental Affairs through the sub-division multilateral environmental agreements.

The **Ministry of Agriculture, Water and Forestry** is responsible for agriculture, water and forestry resources. The overall goal of the ministry is to sustain and increase levels of agriculture productivity, national, real farm incomes and household food security. The Department of Forestry is responsible for the development of conservation strategies and assessment of forestry resources, providing community forest services, combat desertification and promote afforestation. It also mitigates and prevents forest fire (Jones, 2009:49). MAWF is more about implementing the activities of sustainable land management, while MET is more about coordinating these activities between partner institutions.

The **Ministry of Land Reform** is responsible for overseeing land administration and facilitate integrated land use planning for each region. MLR promotes sustainable livelihoods and sustainable utilisation of renewable natural resources (Jones, 2009: 49)

3.5.6 Town Planning Ordinance 18 of 1954

This Ordinance, inherited from the South African government, deals with regulation and control of land use in local authority zones, which are settlement, villages, towns and municipalities areas which are administered by Regional Councils. It requires the authority to prepare town planning schemes within their capacities or prerogative. The land is normally zoned for various purposes such as business, industrial and residential under these town planning scheme (Ruppel-Schlichting *et al.*, 2016:200). This Town Planning Ordinance could potentially help combat land degradation, but

currently not all the towns have adopted and prepared town planning schemes. Additionally, town planning schemes are optional unless the local authority is instructed by the Minister to prepare a scheme (Ruppel-Schlichting *et al.*, 2016:200).

3.5.7 Township and Division of Land Ordinance 11 of 1963

This Ordinance regulates the formation of townships, and it is a constituent part of the town planning system. The purpose of the Ordinance is to provide for developmental planning for urban land. Planning can be undertaken by a private developer or by the local authority who obtain approval from the Minister. Approval is granted on conditions regarding the intention for utilising the land, for example, limitation on buildings (Ruppel-Schlichting *et al.*, 2016:200). It is a very old ordinance dating back to 1963; and it therefore requires urgent amendment as fragmentation is rapidly growing in towns.

3.5.8 Strategic Action Plan for the Implementation of Renewable Energy Policy

The Renewable Energy Strategic Action Plan developed by the Ministry of Mines and Energy aimed to ensure that environmental protection; socio-economic development and broad economic development be promoted. This also links to the country's climate change policies.

3.5.9 The Green Plan of 1992

Today, the Green Plan of 1992 is seen as the founding document for Namibia's Environmental Investment Fund, which was launched in 2012 with the aim of supporting and promoting investments in Namibia's natural and environmental resources (UNDP, 2014, 84). It was formulated for Namibia to have a common position in natural resource management and conservation of the environment. The plan was utilised to draft the Environmental Management Act, providing a foundation for the legal framework in the country. Further outputs of the Green Plan include that of Community Forests, Integrated Regional Land Use Plans and Communal Conservancies (Ruppel-Schlichting *et al.* 2013. 118).

3.6 National policies, laws and plans that related to agriculture

3.6.1 The National Agricultural Policy of 1995

The National Policy of Agriculture is in charge of increasing food production and improving employment opportunities, nutritional status and household food security in the country. The policy

viewed land degradation as a serious problem and distinguish water as a limited resource. It also accepts that growth within the agriculture sector should not harm the environment (Ruppel-Schlichting *et al.*, 2016:185). The policy objective is to focus on increasing the productivity of agriculture, improve the country's economy, and contribute to the Gross Domestic Product through farm income.

3.6.2 The Green Scheme Policy of 2003

This policy provides for irrigation based agronomic projects in Namibia. The policy emphasised the need for Environmental Impact Assessment (EIA) and what is required for one to obtain an environmental clearance certificate. The scheme further emphasises water pricing methods. However, there have been several obstacles to implement this policy. If the Green Scheme Project expanded as planned, these are most markedly at the potential loss of biodiversity. The Green Scheme Policy also becomes one of the drivers of agriculture production, and Namibia is one of the driest countries of Southern Africa (Ruppel-Schlichting *et al.*, 2016: 186.). There was also a Green Plan that was drafted in 1992 and presented at the United Nation Conference on environment and development in Rio de Janeiro. This plan analysed and identified environmental challenges facing Namibia and action to overcome them (NAM-PLACE. 2011: 33).

3.6.3 The Soil Conservation Act 76 of 1969

This Act was established in 1969 to address soil conservation, and although it was established during the colonial regime, it still remains clear and applicable to Namibia. It makes provision for the conservation of soil, the protection and improvement, and controls prevention of soil erosion. It requires compliance in term of prevention of soil erosion and conservation. The problem that delays effective soil conservation in Namibia is fragmentation of responsibilities concerning the soil (Ruppel-Schlichting *et al.*, 2016:188).

3.6.4 The Agricultural Pests Act 3 of 1973

This Act is important in this research since is dealing with agriculture and pests that can cause land degradation. Pest control is necessary to prevent further land degradation from loss of biodiversity and drought. This Act deal with the registration of nurseries, diseases at nurseries and insects, eradication of exotic animals and control of plant diseases and plants infected by insects, plant and insect. This Act's objectives are designed to prevent diseases for plant and animals in agricultural sectors (Ruppel-Schlichting *et al.*, 2016: 189).

3.6.5 National Forestry Strategic Plan

The Plan was drafted and compiled by MAWF in 1996. It was developed to satisfy forestry strategies and objectives that guide forestry development and projects. The plan promotes land acquisition for organisations and communal farmers that intend to protect the forest economically and sustainably (NAM-PLACE. 2011:33).

3.6.6 The National Drought Policy and Strategy of 1997

Originally the government provided a lot of drought assistance during the very regular droughts, which promoted dependency and a lack of adaptation to drought. The National Drought Policy of 1997 shifted the obligation for the management of drought from the government to support drought relief towards promoting more appropriate and sustainable farming techniques. Its objective is to empower farmers to become more resilient, to better cope with droughts (Ruppel-Schlichting *et al.*, 2016:186).

3.6.7 National Rangeland Management Policy and Strategy of 2012

The National Rangeland Management Policy and Strategy of 2012 (NRMPS) was originally started in 2009 as a draft policy. The NRMPS addresses issues such as guiding principles for range management, advisory bodies to government, research and training needs and approaches, financial aid programmes to farmers and awareness campaigns under the general public. The policy identifies that quantitative data on the conditions of rangelands is lacking, but that North-Central Namibia is the area with the most overstocked, and therefore degraded rangelands (GRN, 2012).

It identified water point distribution as having a major impact on grazing and rangeland conditions, with areas near waterpoints being degraded, with very little perennial grasses, and further away underutilised. The focus of the policy is on improving the nutrient and water cycle, as well as biodiversity, of rangelands. Rangelands in good condition can produce 4 times as much fodder as poor veld. The policy identifies proactive drought and land use infrastructure planning, and the timely and flexible adjustment of animal numbers to available fodder sources as very important, with regular assessments and record-keeping of fodder availability. Incentives for timely adjusting animals are promoted, as well as developing further water infrastructure in underused areas (GRN, 2012).

3.7 National laws, policies, and plans related to land in Namibia

3.7.1 The Agricultural (Commercial) Land Reform Act 6 of 1995

This Act was formulated in 1995 after the end of the colonial regime. About 44% of the total land area in Namibia, namely approximately 36.2 million hectares, and about 52% of land useable for agricultural, was held under freehold title. This type of land is commonly called the ‘commercial farming sector’. It was regulated by Act of 1995, the Agricultural Land Reform Act. This Act controls agricultural land reform in the country; the acquisition of agricultural land by foreign nationals, and it also established a Lands Tribunal that settles any arguments that may arise in the form of land matters between landowners and the government (Ruppel-Schlichting *et al.* 2016:188). From the information above the Namibian laws and policies are there, but there is a need to mainstream land degradation into all sectors (both commercial and communal land).

3.7.2 Land and Agriculture Policy

In most developing countries national economic and national government policies have direct effects on land degradation (Seely, 1995: 9). Most policies initiatives and effort have failed and resulted in degrading resources on which livelihood of people depend for survival. Beside other things, the environmental impacts long term is not well considered in the policies. However, most of the developmental strategies have focused largely on increasing the productivity within individual subsector, without paying attention to the critical interactions between sectors (Kibbassa, 1997: 34). Countries with dry land in most cases herders and farmers have been a loser in such decisions. This policy impact on agriculture and land because they made provision for environmental protection and promoted protected area such as community-based natural resource in Namibia. However, it limits the government role to regulatory functions and provision for technical support that enable farmers to improve knowledge to manage their natural resources effectively (Ruppel *et al.*, 2016: 184). The farmers do all the groundwork managing their agricultural resources and land with the support from the government. Government provide administration support and necessary fiscal. Moreover, the issues of land degradation such as bush encroachment require cooperation effort (Ruppel *et al.*, 2016: 184).

3.7.3 Land Use Planning Policy of 1994

The Ministry of Land Reform drafted this policy in 1994, and it defines five physiographic land reform types which are proclaimed state land, private-owned commercial farmland, wetland system

including their catchment areas, urban areas and proclaimed state land (Ruppel *et al.*, 2016:184). The land use policy emphasises the need to protect the sustainability of biodiversity, the essential ecological processes and natural resource management. In Namibia, colonial regime policies in the past have driven a large number of stock and people into “homelands” with low productivity (Seely, 1994: 9). These disrupted coping mechanisms and indigenous strategies for surviving in the semi-dry land environment. In many states in semi-arid and arid environments, the regime and legislative measures have been enacted against the nomadic use of land by hindering, controlling and restricting the movement of livestock and people (Kibbassa, 1997: 23).

3.7.4 The National Land Policy of 1998

MLR drafted this policy in 1998 and it is based on the national commitment and constitutional principles to address the economic injustices and social issues inherited from the colonial regime. Kibbassa (1997: 24) argued that conflict over land rights and carrying capacity is a problem. Policies are there to regulate resources and promote environmentally sustainable land uses, but resettlement schemes in Namibia in most cases result in conflicts over land right issues between new settlers and previous land users, resulting in unsustainable land uses (Kibbassa, 1997:24). The policy also calls for the proclamation and establishment of urban areas as municipalities and townships.

This policy strives to promote community participation and decentralisation involvement (Ruppel *et al.*, 2016:184). This policy suggested tax incentives and financing for the rehabilitation and protection of the natural environment including for land degradation. These suggested tax incentives were instituted for planting indigenous trees. In addition to planting indigenous trees, the policy also suggests the use of alternative types of energy, instead of the cutting down trees for firewood, to reduce deforestation (Ruppel *et al.*, 2016:184). There was also a need for creating awareness countrywide of land degradation through commemoration of desertification day. This policy clearly supports sustainable land use to reduce and reverse the causes and impact of land degradation, as stated in article 95(1) of the Namibian Constitution (Ruppel *et al.*, 2016:184).

3.8 Other policies and regulations related to land degradation

Table 2 below sets out other relevant policies not mentioned above.

Table 2 : Further land reform policies

Names of the policies, laws and regulations	The purpose in relation to combatting land degradation
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The National Resettlement Policy of 2001	It provides for resettlement, which socially, environmentally and institutionally enables disadvantage people to become self-dependant in line with the government's basic objective (Ruppel <i>et al.</i> , 2016: 186). The policy has been revised and the new policy developed for 2018-2027 which is still in draft format. They identified some gaps and challenges, such as the poor production on agriculture land; most of the resettlement farmers are poor with low and sporadic income which is attributed to lack of training, insecure land tenure rights and lack of skills. Other common obstacles are water scarcity, land size, stock theft, animal diseases, marketing issues, labour issues and poor farmer infrastructures (MLR, 2018:11).
The National Land Tenure Policy of 1995	The colonial regime in Namibia has slanted land ownership of the country favouring the white minority (Ruppel <i>et al.</i> , 2016:180). After Namibian independence government has made plans to implement several laws aimed at inclusive land reform. Legal entities, the state and natural person can hold land in the country. In addition to that, all communal land in Namibia belongs to the government in trust for the ethnic tribes who are located on the land (Ruppel-Schlichting <i>et al.</i> , 2016:180). The government is in charge of this land plus certain urban properties, military bases, game parks and all nature reserves. This policy is intended to guide land tenure rights in the country and cover both commercial, communal and urban land (Ruppel <i>et al.</i> , 2016:185).
Communal Land Reform Act 5 of 2002	Namibia land reform is aimed at filling the gaps concerning the allocation of customary land or leasehold rights with regard to communal land. It provides for Communal Land Boards and describes the powers of Chiefs and Traditional Authorities (TA. It also prescribes the communal land administration process (Gilolmo, 2014:23). The act makes provision for mitigation of the impact of water provision, roads works, prospecting mining and prevention of land degradation. It provides certain rights to the Traditional Authority (TA) and communal farmers and representation on the board of communal land (Ruppel <i>et al.</i> , 2016:187). The act addresses the issues of sustainable management and conservation of natural resource management through regulations made in terms of section 45 of the act. Section 18 of the act also prohibits fencing of communal areas without authorisation therefor.

3.9 Coordination of relevant laws, policies and plans for land degradation in Namibia

Land degradation has been recognised as a major challenge in Namibia pre and post-independence (Kibbassa, 1997). Namibia has enacted several laws and related policies and action plans aimed at developing the country while ensuring the protection of its fragile environment. The government is the main custodian of Namibia's land through the Ministry of Environment and Tourism, the Ministry of Agriculture, Water and Forestry, the Ministry of Land Reform (previously Land and Resettlement) and the Ministry of Fisheries and Marine Resources. One of the major concerns of environmental problems in Namibia is land degradation and is believed that everything is the basis of land for survival such as plants, water, animals and human being. Farming in Namibia has deep social and cultural meaning, and about 70% of the Namibian population depend on agricultural activities for livelihoods (Ruppel *et al.*, 2016:177). There are several policies related to land degradation in the

country which are governed through the ministries mentioned above, to ensure sustainable land management at the country level is well managed and protected. Most policies are geared to improve human well-being and increase productivity (Kibbassa, 1997:34). Coordination of laws and policies is required to implement laws and policies in areas where they are relevant (MET, 2010, 27).

3.10 Institutional arrangements and implementation of laws and policies in Namibia

The government as the custodian of the law is responsible for implementation and enforcement and Namibia has been experiencing growth and severe problems of land degradation. These problems have an impact on aquatic systems, agricultural land and indigenous fauna and flora. Policies and strategies at the national level are developed to deal with climate change, land use, agriculture, biodiversity, rangelands, environment impact assessment and water management. However, there is no specific legislation directed to land degradation at the national level (Klintonberg et al., 2007: 506-525).

From the land degradation legislation information above, it is clear that almost everything happens on land and there is an urgent need for action to address the causes and impact of land degradation in Namibia.

Due to ignorance, the environment may suffer drastically due to degradation or anthropogenic factors. Ineffective environmental laws and policies can affect the environment negatively, hence the need to analyse them and also make positive recommendations. As far back as 1996 the MLR has indicated land degradation as one of the major challenges to sustainable development in Namibia (MLR, 1996). This is a regional problem as land degradation, as a consequence of unsustainable land management practices, is a threat to the environment in Sub-Saharan Africa (SSA), as well as to livelihoods, where the majority of people directly depend on agricultural production and natural resources (Linger *et al.*, 2011:16).

According to the guidelines of the Namibian Environmental Management Act 7 of 2007, the principles require that the functional integrity of ecological systems be fully considered to ensure that these systems stay sustainable; that public participation in decision making affecting natural resources is promoted and that equal access is provided to these natural resources (MET, 2008: 8).

Ruppel *et al.* (2016) highlighted the inadequate institutional and individual capacity and weak mechanisms of cross-sector collaboration for sustainable land management (Ruppel *et al.*, 2016: 179). This study has identified the inadequate application of technologies to achieve the overall objective

of preventing and reversing land degradation in affected areas, in support of poverty and environmental stability. In addition, improving cross-sectoral collaboration between government, agencies, relevant actors and research institution is significant for positive coordination (Ruppel *et al.*, 2016: 179).

Finally, laws and policies regarding land degradation should be applied by all the people that are in a position to do so. It requires a number of different actions, such as:

- Regular reviews of legislation and policies and problems with their implementation, such as lack of coordination with other departments;
- The use of technologies such as GIS to keep track of the extent of the land degradation problem;
- Periodic visitations by the appointed/assigned personnel with the relevant qualifications or knowledge depth to make the necessary observations and analysis of the land to properly adjust or make an improvement (if necessary) to the policies, or their implementation.

3.11 Barriers to the solution of land degradation and policies support

Barriers and negative response from the public/population will arise if there is a lack of awareness. If the population targeted by the policies are not aware of the benefits and consequences of neglecting the use of set policies, they are bound to oppose it. But with the necessary awareness and knowledge, compliance and support are more likely to be expected.

The solution to barriers of land degradation is to support policies developed through sound partnerships and intersectoral synergy in order to improve natural resource management and achieve the sustainable goal. What is needed is to establish partnerships between government agencies and the private sector and non-government organisations to fully develop strategies and policies, and to implement and provide services to land managers (MET, 2005:32-34).

In addition, an appropriate supporting environment should be developed that includes incentives, regulation and policy to support sustainable land management. Issues that need to be investigated include providing residents with resettlement schemes and communal land with land tenure security, as well as providing land tenure security which includes a provision of schemes and exclusive right over land in communal land.

3.12 Summary

It is therefore evident that for policies to work they require proper implementation and coordination, depending on what they are and their target points of improvement, as well as how they are relayed to and received by the public. All these factors depend on each other for there to be a major positive effect. The chapter outlined and explained the relevant laws, policies and plans, related to environmental land degradation in Namibia. It identified policies and laws at both international and national levels that serves as a guiding principle to addressing degraded land in the country. The policy framework recognised land degradation as a major threat to social, environmental and economic problems which tend to be worse in the semi-arid and arid regions of Africa.

Namibia presented a Green Plan in 1992 at the Rio conference as an effort to combat land degradation. Since then, Namibia became a party to the Convention of Combating Desertification, Land Degradation and Drought in 1995. The country recognised sustainable development as the cornerstone of the country's desire to become a prosperous and industrialised nation by 2030. In addition to the agreements and international laws and policies, the country established its own Intended National Determined Contributions (INDC) for climate change mitigation and adaptation measure under the Paris Agreements. The National development plans have identified goals and objectives to ensure sustainable, social, balanced development, harmony, equity and economic growth.

There are various externally and nationally funded programmes that are currently supporting Namibian efforts to avoid, minimize and reverse land degradation. Namibian laws and policies have been developed across various sectors to tackle matters related to or that may potentially exacerbate land degradation, in line with international agreements. This highlights the fact that LDN is a priority on the Namibian agenda.

The national laws, policies and plans related to land, environment and agricultural have been addressed in this chapter. All strategies to prevent, arrest and reverse land degradation are identified. They also assist the country in contributing to the global future we all want.

Some of the laws and legislation that are still in effect in Namibia related to land degradation are old and need amendment, considering technological changes and advancements in knowledge systems over time. The institutions responsible for compliance and monitoring need to do more in term of creating awareness and implementation of the designed activities.

Chapter 4: A case study of the Oshana region

4.1 Introduction

Namibia is the driest country in Sub-Saharan Africa. It is located in South-Western Africa, between 17 and 29 degrees South and 11 and 26 degrees East, and covers a land area of 825 418 km². As shown in Figure 3 below, it borders Angola, Botswana, Zambia and South Africa (MET, 2011a: 19). According to the MET (2011: 19b) “The physical geographic context of Namibia is determined by its position at the border of the continental shelf of the Southern African subcontinent in the climatic sphere of influence of the Tropic of Capricorn and the Benguela Current”. The area is prone to disasters such as drought, veld fires and floods. Tremendous rainfall in the past years has caused flooding in certain regions, resulting in the overflowing of the Kunene River. The expansion of the Kunene River overflowing through the neighbouring country Angola to Namibia was a result of heavy rainfall causing water to spread along all seasonal rivers within the Oshana Region (NSA, 2014: 3).

This section will discuss the profile of the region, such as the location and physical environment, population, economic, soil and climate for the reader to get an insight into the region. It further analyses the data collected from the research participants, and then compares this information against the literature review.

4.2 Background to the region

4.2.1 Location and physical environment

The Northern part of Namibia used to be called Owambo (or Wambo), which consist of the four “O” regions of the country: Oshana, Ohangwena, Oshikoto and Omusati. As shown on the map (Figure 3) it borders with Angola in the North, the Kunene region to the West, Etosha National Park in the South and Kavango region in the East (Kangombe, 2010: 18).

The country got its independence in 1990, after that it started with the new administration of managing the land.

Oshana is located in the Northern regions of Namibia and has a main town called Oshakati. The name Oshana defines the most prominent landscape feature in the area, namely the shallow water body filled with flood water and rainwater flowing from Angola to fill the (Oshana) wells during the rainy season (Kangombe, 2010, 18). . It is one of only three regions in Namibia without either a coastline

or foreign border. Oshana is made up of 14 constituencies, namely: Okaku, Okatana, Okatyali, Ompundja, Ondangwa, Ongwediva, Oshakati East, Oshakati West, Uukwiyu Uushona, and Uuvudhiya (NSA, 2014: 20).

Omahangu is a major essential crop grown in Oshana, while the fish which breeds in the oshanas (wells) provide an important source of dietary protein. The Southern portion of Oshana is an extensive savannah plain stretching as far as the Etosha Pan, but the generally high salinity of soil and water renders it unsuitable for grazing or cultivation (NSA, 2014: 20).

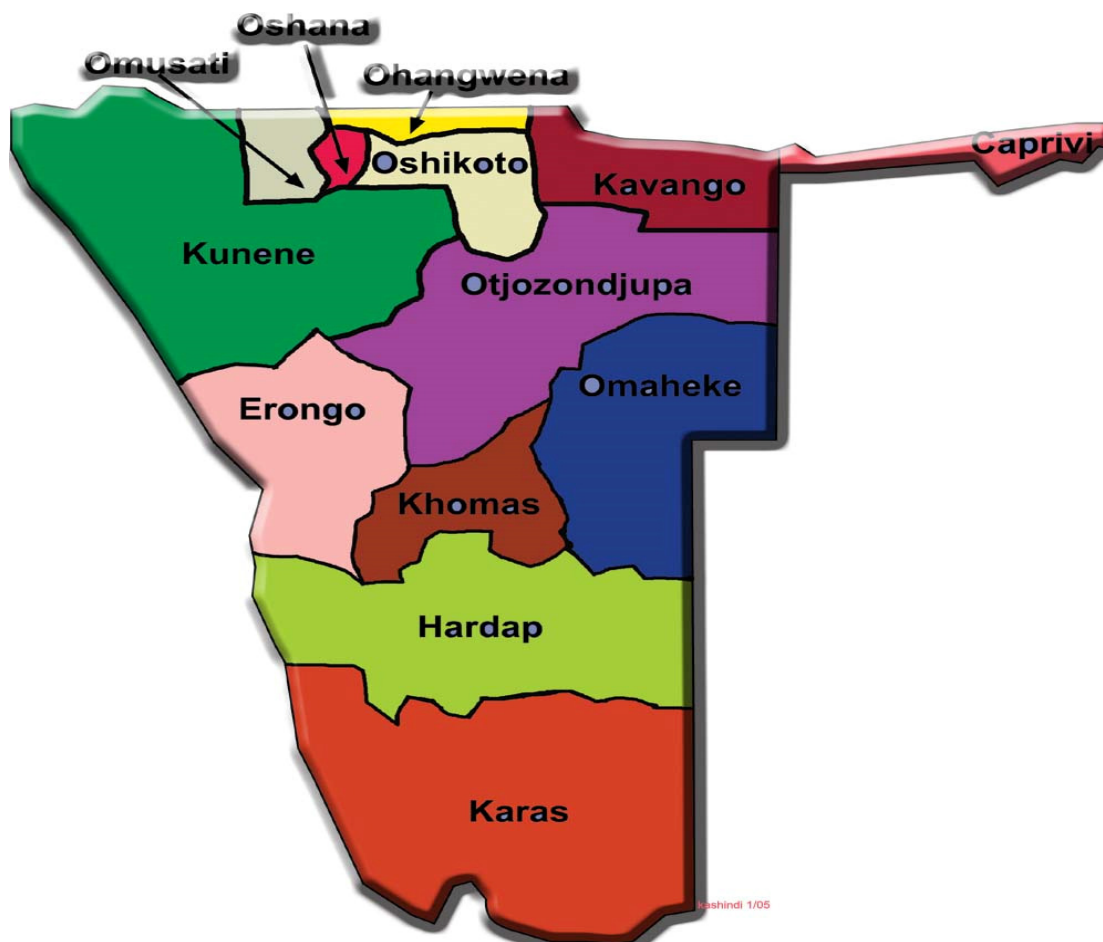


Figure 3: Maps of Namibian Regions (NSA, 2014)

Oshana region is the smallest among the 14 regions. The livestock in the region are goats, sheep and cattle for subsistence farming. The people of the region depend on livestock, as crop production is poor in the region (Mendelsohn, 2000: 18).

4.2.2 Climate

Generally, the Oshana region is described as semi-arid. The rainfall season is restricted to the summer months starting from November to April when the temperature is also higher. The average rainfall ranges from 400 to 500 mm during the rainy season (MET, 2011b: 12). The Northern regions have higher temperatures that lead to higher evaporation rates and as a result, lead to a reduction in water availability, which badly affects agriculture. With climate change in the region, it is expected that extreme weather events such as droughts and floods would become more common (MET, 2011b: 13).

4.2.3 Soil

The name Oshana relates to the most prominent landscape feature in the Oshana region, which is characterised by shallow, seasonally inundated depressions/wetlands which support the local agro-ecological system (Watanabe *et al.*, 2016). Most of the soils are silty and clay (Mendelsohn, 2000: 18). The soils are salty in many areas due to high evaporation and repeated flooding in those regions with higher rainfall. As the region is categorised as an arid and semi-arid environment, the productivity of the soil is generally low. This leads to sparse growth of plants in a dry climate which means that there is a little organic material to make its way back to the soils. The rates of soil creation are very low compared to other regions with higher rainfall, for example the Zambezi region. There are nine different types of soil which are well recognised in the country. The types of soil differ depending on potential factors such as water-holding capacity, depth, nutrient contents, chemical aspect and salinity (Mendelsohn, 2000: 18).

4.2.4 Land tenure

Namibia has a dual land ownership system, i.e. state land (includes communal land and protected areas) and freehold land. The administration of communal land in trust for the benefit of the local traditional communities, as well as for the purpose of promoting the economic and social development in communal areas, vests in the State. Communal land is not tradable while commercial land can be bought by private individuals who become legitimate owners of the land purchased. Thus, communal land used by local residents has been appropriated to a large extent because 'ownership' of commonages is vested in the state and traditional authorities (Mendelsohn, 2011). A high percentage of the Namibian population lives in communal lands with limited financial and natural resources (Hengari, 2017:14). This is one of the major contributing factors to the potential high land degradation risk as indicated by Klintonberg and Seely (2004: 7-8).

The government is trying to rectify this problem by resettling people on government-owned resettlement farms. However, it has been recognised in NAP3 that these resettlement farms are potential hot spots for land degradation, especially since environmental issues are not considered in the programme and the purchased farms are often subdivided into smaller units, which cannot support sustainable farming. Post-settlement support is also weak, contributing to overgrazing. It therefore remains important that government ensures implementation of sustainable management practices on these farms (Klintenberg & Seely, 2004: 7-8).

The typical land tenure granted to communal farmers is in the form of a communal land use right which is heritable and transferrable and valid for 100 years. NAP3 also identifies that the “lack of secure and exclusive group land tenure over grazing resources” in these communal areas are problematic and a problem for SLM. It means farmers can’t keep others off land they want to protect, or that they can’t get loans on land in these areas.

4.2.5 Population

The population densities of the Northern regions are estimated at 18.7 people per km². Availability of water in the region has attracted many people from different regions for resettlement, since the people of that region mainly depend on land for farming. Water salinity, higher levels of soil and low soil fertility contribute to poor agriculture in this area even though subsistence farming is common in the rural area (MET, 2011a). According to the 2001 Census, nearly half of the population of the country, about 43% of the total population, live in this part of the country. Oshana region is the second most densely populated area, after the Capital city, Windhoek, and is also the most urbanised area of all four “O” regions (MET, 2011a).

According to the 2011 Census, the total population of Oshana region was 176 674 people in 2011, compared to of 161 915 people in 2001. The population for 2011 included a total of 96 559 females, compared to 80 115 males (NSA, 2014: 8). The lack of biodiversity in the Oshana region has been noted and felt by the residents and the nation at large. These are indications of the low rainfall and overgrazing, causing environmental change (Klintenberg *et al.*, 2007: 506-525).



Photo 3: Typical homestead in the Oshana region (Photo taken by the author)

4.2.6 Economics

According to the Census data of 2011, the total population of the Oshana region includes 8.8 % poor and 29.4% extremely poor inhabitants of the country. The poverty lines (both the lower and upper bound) are calculated as the amount below which persons are classified as extremely poor or simply as poor. For instance, any person who was not able to at least spend N\$277 per month on basic necessities was considered extremely poor and if a person was not able to at least spend N\$377 per month on basic needs was considered to be poor. Of the total percentages of people, 97.4 % have access to safe drinking water; 19% to electricity; 51 % have access to flush toilets for sanitation, the population per hospital beds are 222 and the literacy rate of those aged 15 years and older, is + 89% (MUR, 2011, 7).

The main source of income in the region is: farming with 36%, wages and salaries with 32%, pensions 12%; business and non-farming with 13%; cash remittance with 5% and other incomes with 2.8%. The unemployed are 41% and HIV/AIDS prevalence was 29 % in 2016 (MUR, 2011: 7). In terms of economic development in the region, the following developments have been established there (MUR, 2011, 7):

1. An agro-food processing plant and a salt plant established at the Uukwangula settlement area.

2. Expansion of Small and Medium Enterprise (SME) business sites and premises.
3. Development of community income generating entities and construction and expansion of an open market.
4. Development of aquaculture fish farming.



Photo 4: Livestock at the grazing area (Photo taken by the author)

The Oshana region is poorly forested, with approximately 1m^3 tree volumes per hectares, and 23 trees per hectare. There are no timber trees, which is an important species, in the region and those can only be found in the Zambezi region. Similarly, the Oshana region can be comparable to Zambezi region because they are both prone to flooding during the rainy season. It has groves of naturally occurring fruit trees species, such as jackal-berry, which survive on the bounds of the temporary flooded plains called Oshana in the local language (UNDP, 2014: 5). Marula and Bird Plum trees are also found. The communal land which has dry forests with an open nature, which make them accessible to grazing, crop farming and settlements (UNDP, 2014:5)

4.3 Research method

4.3.1 Data collection procedures

The data collection was conducted during August 2018, after the researcher obtained a letter of authorisation in writing from the Chief Regional Officer of the Regional Council to undertake the

study in that region. The authorisation letter is attached as Appendix B. About 100 questionnaires were distributed to the target population comprised of representatives of the 10 Oshana Regional Officers, 20 persons at the Ministry of Environment and Tourism, 14 copies to the Ministry of Agriculture, Water and Forestry and the Ministry of Land Reform, and 56 to Oshana region farmers and community members. The residents were selected randomly to get valid information about Oshana region. This section will focus on data analysis of the case study.

4.3.2 Overview of data analysis

According to Mabuku (2015: 48) data analysis refers to accumulation and reduction of data to develop summaries, breaking data into parts of manageable size, applying statistical techniques and looking for patterns. Furthermore, analysing of data is important to assist the researcher to detect reliable patterns within the information, for example the co-variance of two or more variables (Mabuku, 2015: 48). Quantitative data were analysed using Microsoft Excel to create charts, graphs and tables.

4.4 Findings

4.4.1 Demographic information

Table 3 indicates the population of the Oshana region according to the 2001 and 2011 census figures. According to the report of the Namibia Inter-censal Demographic Survey of 2016, 43.1% of the households in the Oshana region are male headed while 56.9% are headed by females, and the national values were at 53.6% and 46.4% respectively (NSA, 2017). The majority of the participants were male, while the number of participants who were heads of households was also higher than those who were not heads of households.

Table 3: The population of Oshana region for 2001 and 2011 (Census data)

Year	2001	2011
Rural	11 209	96 873
Urban	49 897	79 801
Total population of Oshana Region	161 916	176 674



Photo 5: Oshana Regional Council's Office (Photo taken by the author)

Figure 4 indicates the sex and household hierarchy of people who participated in the study, being mostly male heads of households, which seems to differ from the regional population make-up according to the census data mentioned above, which shows that the region has 56% female-headed households.

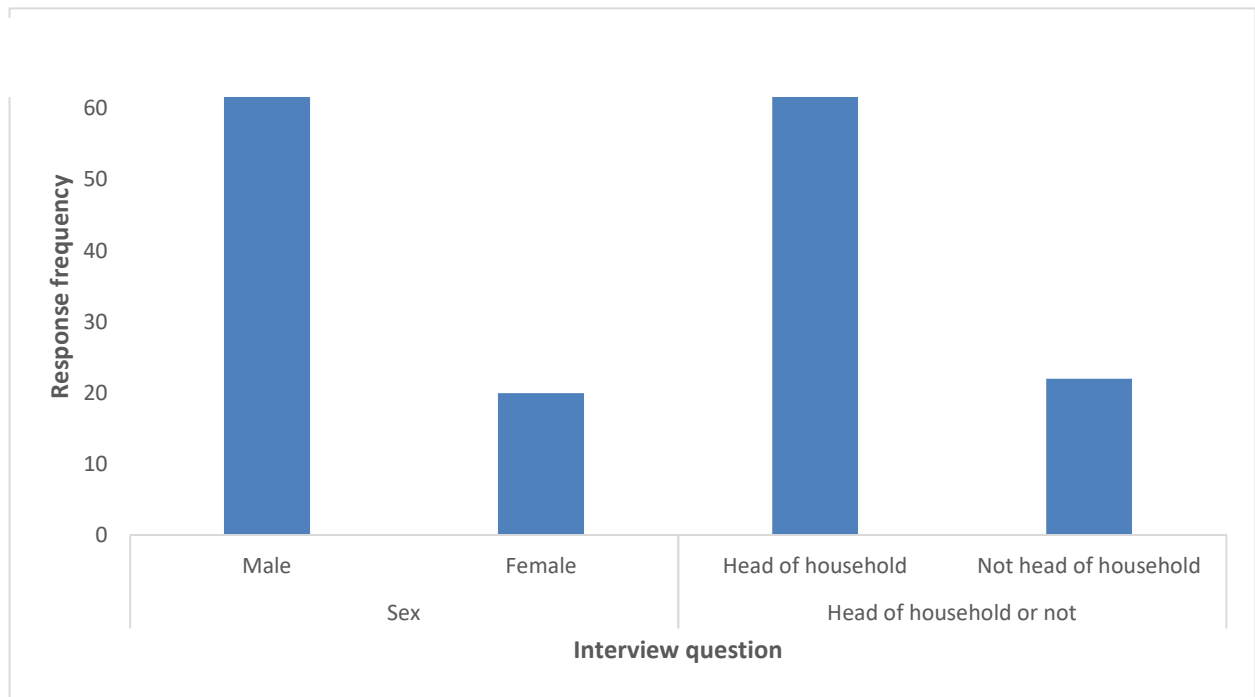


Figure 4: Gender and household hierarchy of participants

The chart below (figure 5) shows the level of education amongst the study participants. The majority of the respondents (76%) had tertiary qualifications, while the rest of the participants (24%) had high school as their highest level of academic qualification. The figure on the level of education shows that there was no one with only primary education, nor any without formal education. This differs quite a lot from the 2011 census information for the region, which shows 6,3% of the population have tertiary education, 24,5% secondary education, 40,2% primary education, 27,5% incomplete primary and 1,5% no formal education (NSA, 2014: 24). The fact that community members that could not speak English did not want to participate, influenced the study. The inclusion of government officials in the study also increased the level of education of the participants.

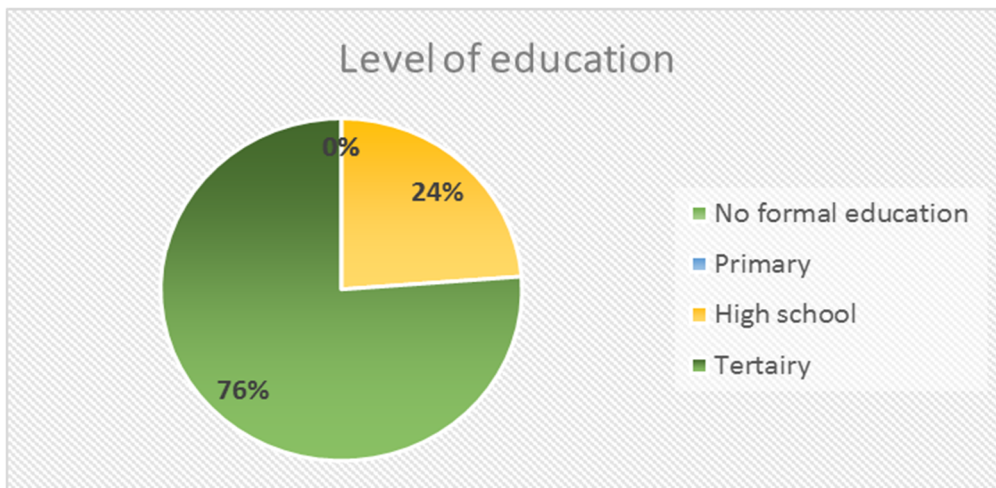


Figure 5: Respondent's level of education

The Chart below shows that the participants in the study were between the ages of 18 and 59 years of age. The age group between 19 and 39 years of age had the highest participation of 72%, followed by the age group of 40 to 59 years with 24% participation. The age group that participated the most, aged between 19 and 39, seemed to understand the phenomenon of land degradation the most. Some wanted to give much more information related to land degradation related issues than was asked, and the researcher therefore gave them a chance to answer some closed- ended questionnaires in the open-ended format.

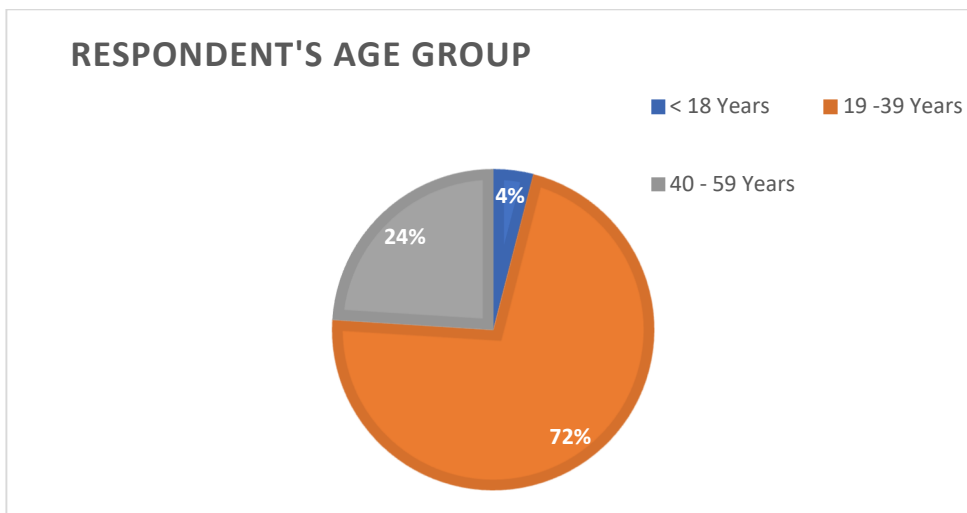


Figure 6: Participant's age group

From figure 7 below, the most common household size recorded during the interviews was 1 to 4 people, while the least common household size was 12 to 15 people for community members.

The household sizes ranged from 1 to 15 household members. However, most households constituted of 1-4 member which accounted for 46.5% responses, followed by 41.9% of response being a 5-8 member of the household. In comparison, the average national household size in 2016 was at 3.9, and for Oshana 4.2 persons per household. The household sizes that ranged from 9-11 and 12-15 members were the least common with 9.3% and 2.3%.

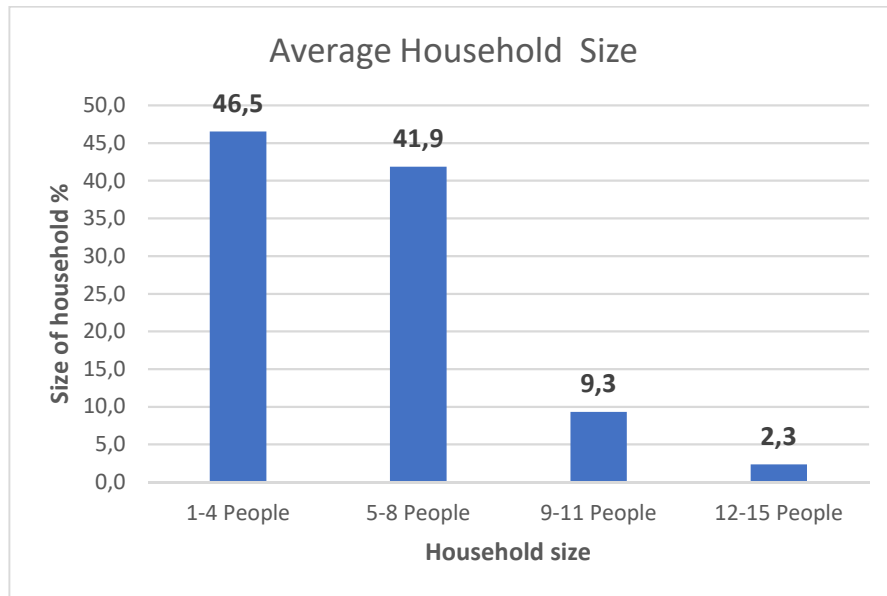


Figure 7: Average size of households in the Oshana region

Figure 8 below shows that the majority of the households represented in the interviews did not receive any government grants. However, for the households that received government grants, the pension grant was the most prevalent, while the orphans and vulnerable children's grant was the least prevalent. The purpose of this question was to find out how this community is surviving, to contribute to knowledge of livelihoods, poverty levels and the economy.

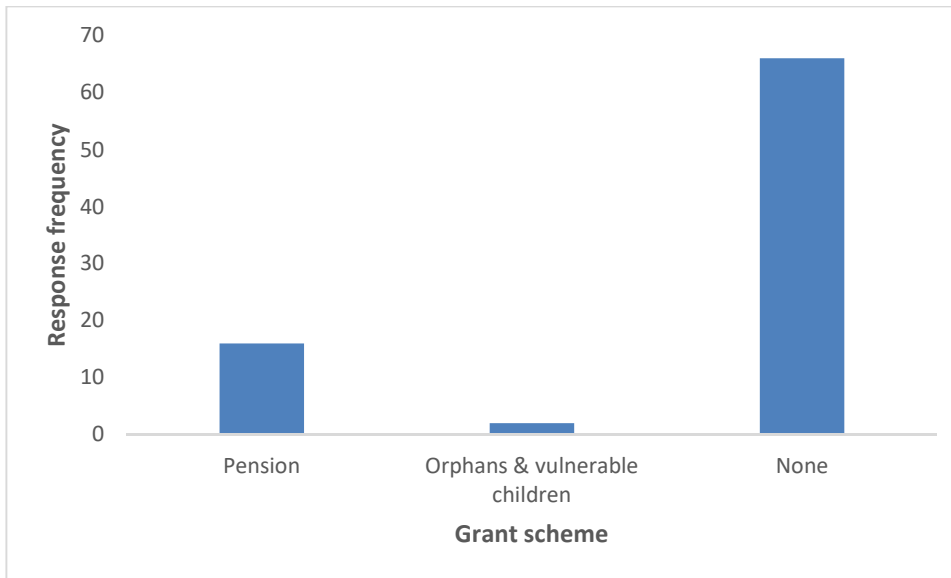


Figure 8: Type of government grants received by respondents

The most common type of livestock owned by respondent households was goats, while horses were recorded to be the least (figure 9). The study revealed that the types of livestock for farming in this community are mostly goats and cattle. Households have a large number of cattle that compete for grazing in communal land, contributing to land degradation. According to the Oshana 2011 Census Regional Profile (NSA, 2014), 28.7% of the households kept cattle, 22.0% poultry, 45.6% had crops, 1.6% were involved in horticultural activities and the remaining 0.4% in other activities

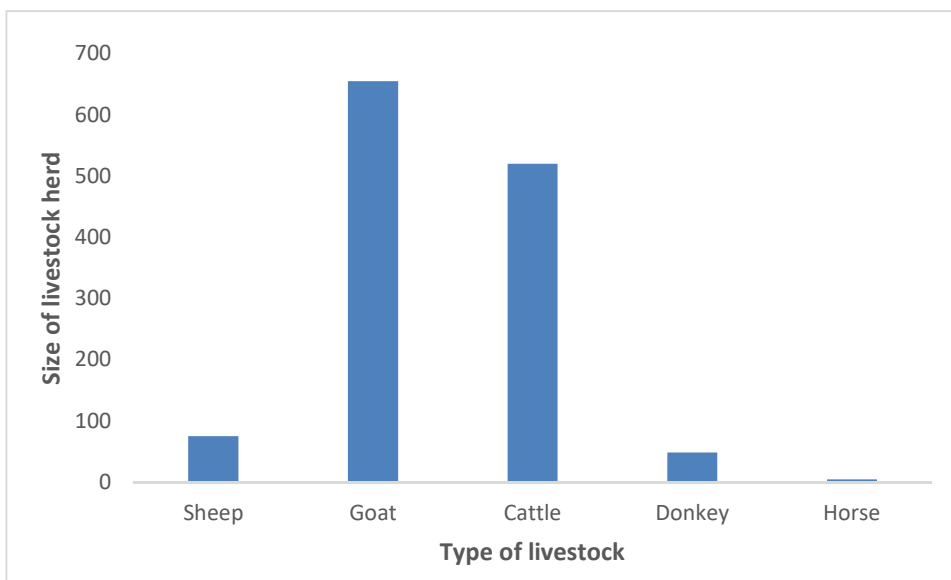


Figure 9: Types of livestock owned by communities in Oshana region

From Figure 10 below, the main source of income for the majority of participants was employment, followed by livestock farming recorded as a second highest source of income. The main livelihood

of the community in this region is livestock farming, and most people as shown in the figure below are employed people. The major source of income of the study participants in the region is characterised by employment and livestock farming practices. Typically, 79% of the respondents are employed, while 21% of the respondents are dependent on livestock farming as their main source of income. None of the participants in this survey listed their source of income as generated from the selling of craft, but it is also a source of income to some community members in the region.

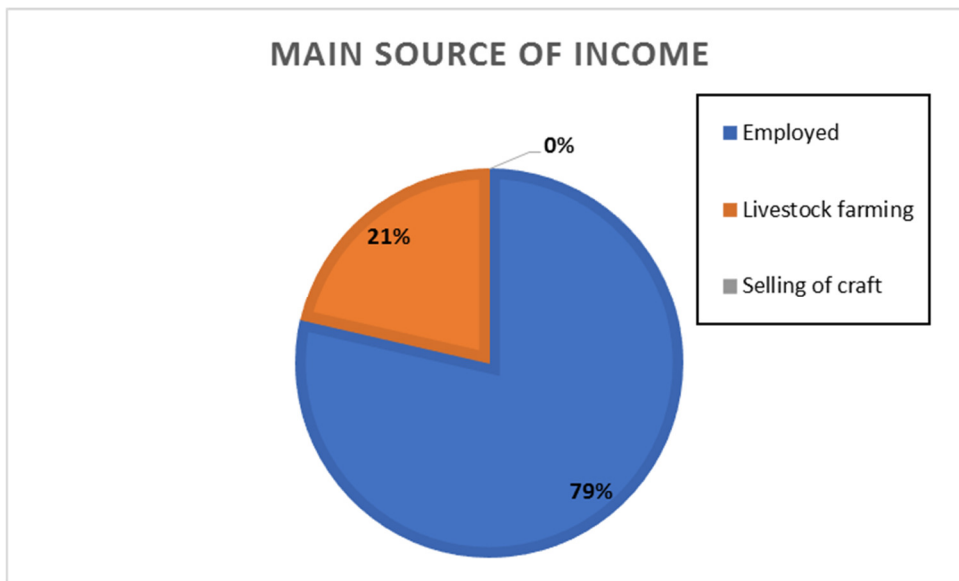


Figure 10: The main source of income for livelihood in Oshana region

4.4.2 Awareness of causes and impacts of land degradation

The majority of the study participants revealed that they knew something about land degradation and that they had seen evidence of land degradation in their community (figure 12). It was very interesting to note that the majority that participated in this research know what land degradation is, and the researcher only had to explain to a few respondents the meaning of land degradation in the local language. After the explanation, they indicated that they knew what the phenomenon was, but just did not understand the use of the terminology. Most of the participants revealed that they have seen and knew that land degradation existed in their community. They further revealed that it is becoming an everyday phenomenon, especially when related to illegal sand mining.

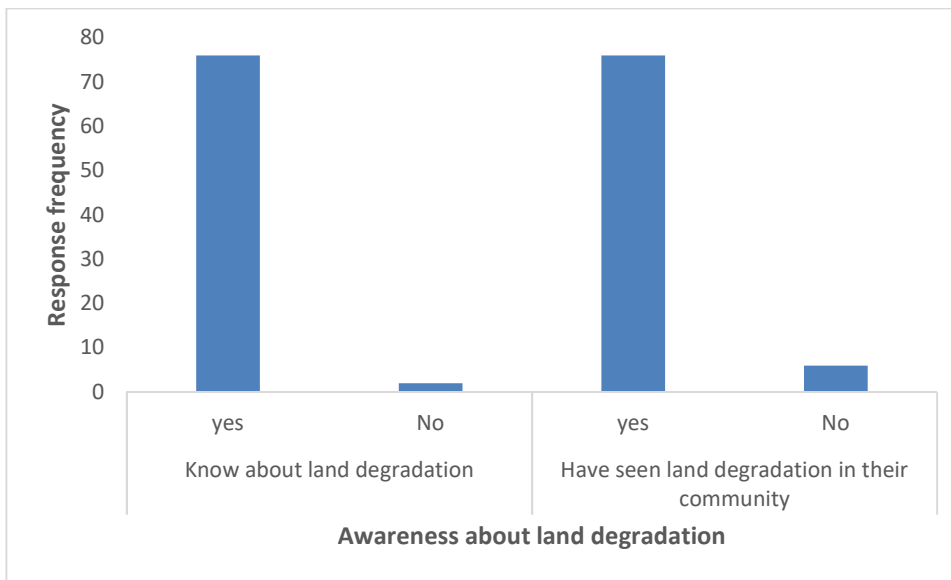


Figure 11: Awareness about land degradation in the Oshana region

Figure 12 below indicates what people saw as the main causes of land degradation in the region. They listed as land degradation causes a variety of sources, ranging from anthropogenic to natural activities. According to the respondents, climate change, overgrazing, poor soils and rainfall, increasing population numbers, and rapid urbanisation were recorded as the 5 most prevalent causes of land degradation, with 13,8%; 12,4%; 11,3%, 9,9% and 7,1% respectively, while resettlement farms and expansion of industrial areas were recorded as the least prevalent causes. The majority of participants indicated that they had visited other regions before, and revealed that they thought the causes of land degradation in their communities were rather different from those in other regions.

It should be noted that other aspects mentioned in the literature and in National Actions Plans, such as poverty, resettlements farms and sand mining, were not seen as very important by the respondents of this study. The fact that resettlement farms are not seen as an important issue in the Oshana region relating to land degradation is interesting, as it contradicts what NAP3 mentions as a problem. This could just be that the overgrazing problem in these areas are similar to that experienced in communal areas, and therefore it is just seen as part of the overall overgrazing problem, which the respondents noted as the second most cause, after climate change.

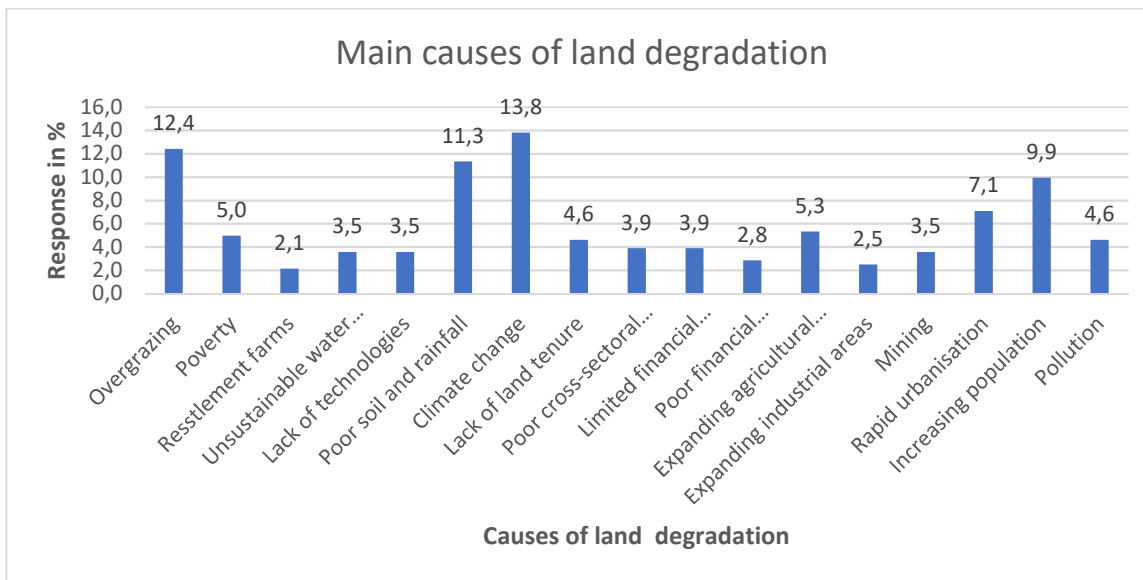


Figure 12: Main causes of land degradation in the Oshana region

Even though the respondents did not see mining as an important cause of land degradation, it is a growing problem in the region. The consequences of sand mining are shown in the photo below. The impact of sand mining has put the lives of people and animals at risks. It also destroys traditional homesteads and vegetation as seen in the photo below.

Interesting enough, neither sand mining, nor just mining, was mentioned as a problem in NAP3. Illegal sand mining in Namibia seems to have been ongoing for a number of years, first mentioned in newspaper articles from about 2012 in relation to Kavango (Shigweda, 2012). This is an important issue that needs to be addressed and requires further research. Although 2018 newspaper articles (Kambowe, 2018; Ashipala, 2018a & 2018b) mentioned that the national government has identified it as a problem, has halted illegal mining, seized illegally mined sand, and requested the traditional authority to address the problem, there does not yet seem to be adequate management tools, such as monitoring of the problem. According to the above newspaper articles, it seems as if poverty is also promoting some villagers to offer their mahangu (pearl millet) fields for sand mining, for a once-off cash payment, while other villagers are very opposed to the mining. Some traditional authorities have also been implicated in having received payments to allow the mining (Kambowe, 2018).



Photo Impact of sand mining in the Oshana region (Ashipala, 2018a)

Desertification is perceived by the community to be the leading type of land degradation with 31% selecting it, and with a response of 24% viewing land degradation as the loss of soil structure. Soil erosion and habitat loss was each selected by 22% of the responses as shown in the figure 13 below.

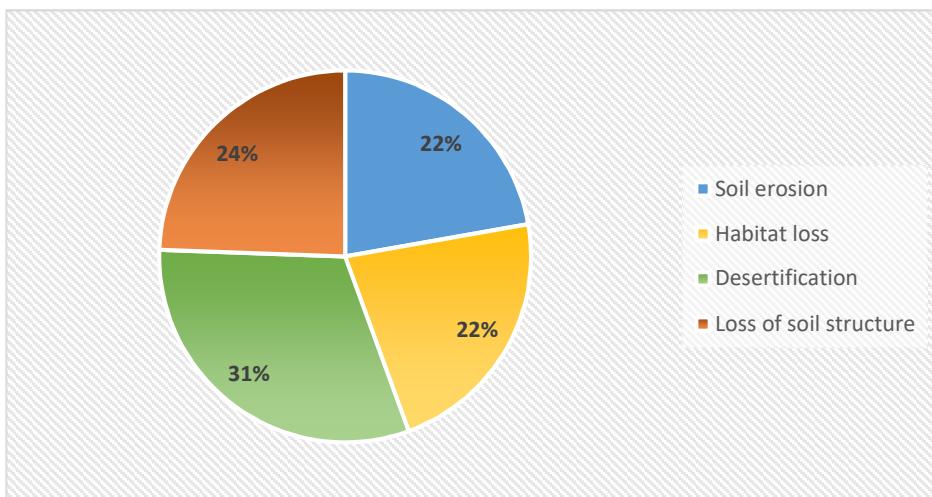


Figure 13: Impact of land degradation on the environment

Table 4 and figure 14 below

is an indication that respondents have been to other regions and 55% of the participants felt that land degradation is different in their region, with a slight difference in the percentage of those in

disagreement (45%). Additionally, all the respondents felt that land degradation creates negative impacts on the environment.

Table 4: Community knowledge on land degradation subject

Community opinion on land degradation	The response in percentage (%)	
	Yes	No
Have you been to other regions?	92.9	7.1
Land degradation causes are different from other regions	55	45
Land degradation have negative effects on the environment	100	0

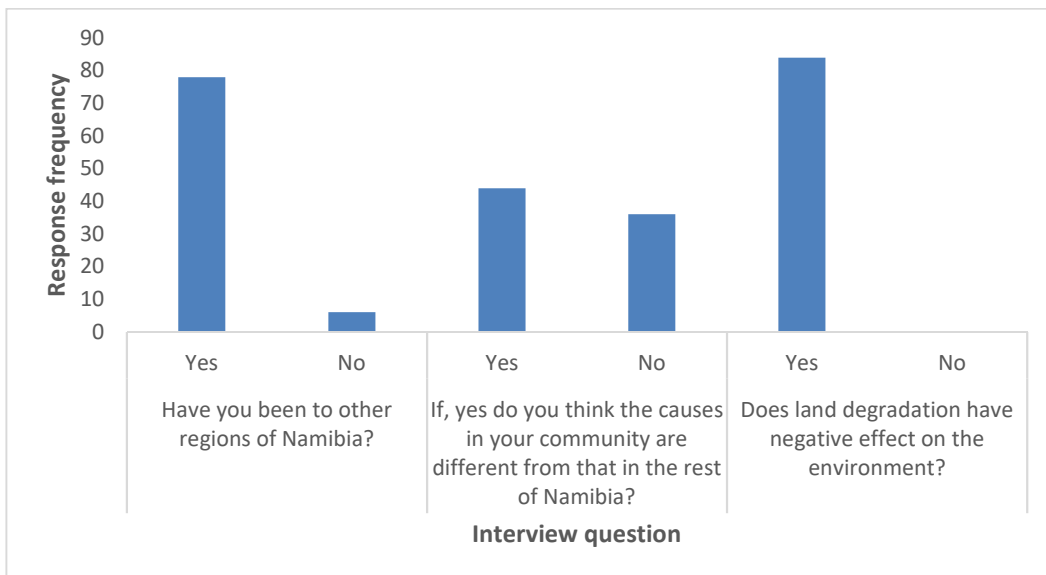


Figure 14: Opinions regarding land degradation

From figure 15 below, desertification was recorded as the main possible impact of land degradation, while soil erosion and habitat loss were recorded as the least possible impact of the phenomenon.

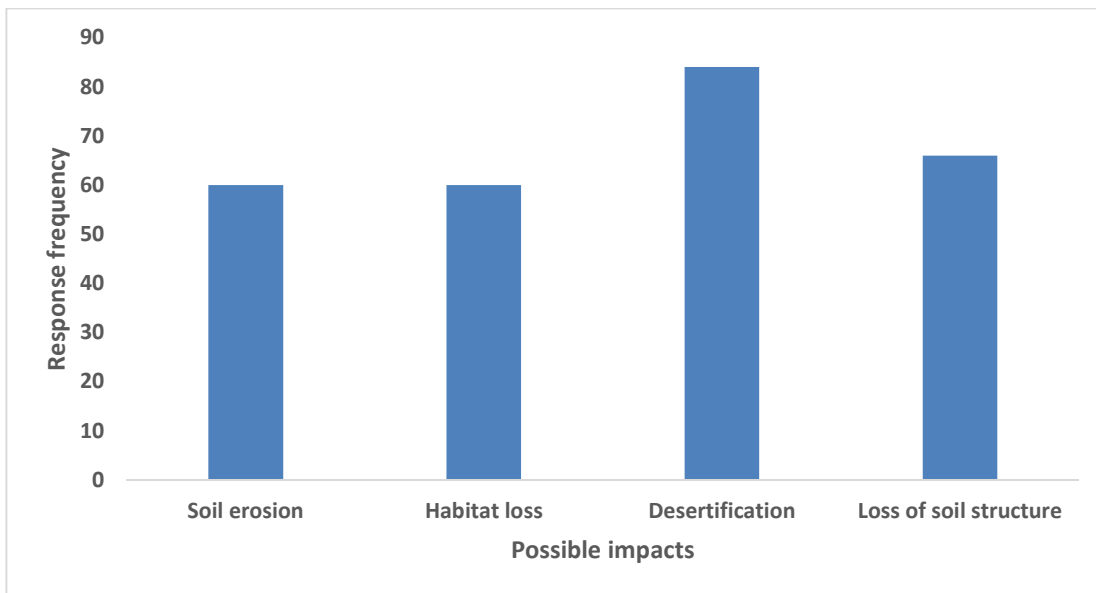


Figure 15: Main impact of land degradation in the Oshana region

The community in Oshana were also asked about the main socio-economic challenges in the region. They perceived that there were a lot of challenges and problems in their region. However, according to them, land degradation, population growth and extreme climate events were the top issues the community is faced with. Land degradation was distinguished as the major problem followed by population increases and extreme climate events, with 21%, 18% and 18% support respectively.

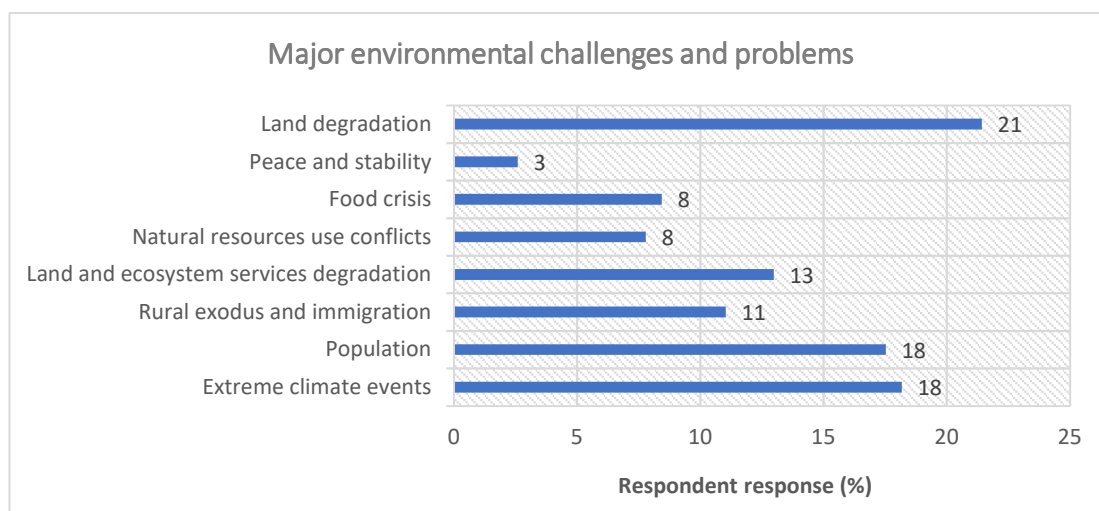


Figure 16: Environmental challenges and problems in Oshana

Table 5 below shows the community's viewpoints on their involvement in decision making into the land degradation programme. The results show that 58% of the respondents believed the local community was not empowered or capacitated to be able to deal with land degradation problems, with 33% unsure whether the local community was empowered. The view that the community does not come together to address land degradation problems was held by 40%, while 44% of participants were unsure about this answer. Forty percent of respondents believed that community members were involved in decision-making processes, while 37% was unsure about this answer. These answers illustrate a very important issue, as it highlights that land degradation policies in Namibia require more public input, which is a very important aspect of achieving LDN.

Moreover, according to 42% of the respondents, there is a monitoring system for land degradation, while 47% respondent were not sure about such structures being in place. Moreover, 40% of the participants believed that they were involved in community developmental decision making. About 37% and 23% are of the opinion that they were not sure of their involvement or are not involved in decision-making at all.

Table 5: Community involvement in decision-making

	The response in percentage (%)		
	Yes	No	Not sure
Local community is empowered to deal with land degradation problems	9	58	33
Does the community get together to try address land degradation problems?	16	40	44
Are there disagreements on solving land degradation problems?	32	5	63
Do you have a local monitoring system for land degradation?	12	42	47
Community members are involved in the developmental decision-making process	40	23	37

4.4.3 General responses on awareness, causes and impacts of land degradation

The majority of participants revealed that they had seen evidence of land degradation in their community (figure 12). It was very encouraging to know that the majority that participated in this research knew what land degradation was and the researcher was only required to explain to a few respondents what the concept of land degradation meant in the local language. After this explanation, they understood what land degradation was.

4.5 Successes and failures of environmental law and policies implemented in the region

The international mechanisms are encouraging mainstreaming land degradation into national frameworks and policies. The international mechanisms include the Millennium Development Goals (MDGs), replaced in 2015 with the Sustainable Development Goals, and United Nations Conventions to Combat Desertification (UNCCD) (Akhtar-Schuster *et al.*, 2011:299-312). Moreover, the mainstreaming of land degradation has faced a number of policy barriers, knowledge, legal, financial and interrelated institutional.

The UNCCD has been in operation for 15 years, however, successes in preventing and reversing land degradation are widely perceived to be limited in Namibia. Akhtar–Schuster *et al.* (2011), in their study on combating land degradation and desertification, revealed that Namibia is more advanced in term of an integrated approach. The research further suggested that scientific findings are more effective to enter policy that required coordination strategize and stimulate the global scientific research to support the upscaling and mainstreaming of effort to combat land degradation (Akhtar-Schuster *et al.*, 2011: 299-312). Although Namibia shows an impressive degree of integration, more need to be done in order to strengthen further the mainstreaming of land degradation.

4.6 Recommendations by participants regarding changes of laws, policies and plans

The majority of the respondents, both residents and officials, felt that laws, policies, plans and programme should be implemented fully, to solve land degradation problems. They further complained that communal ownership plays a major role in land in the community of the Oshana region, but that private ownership is problematic in Oshana because those who have ‘privatised’ their land, by actions such as fencing off the land, are still grazing their cattle on the commonage, thereby depleting the resource in the commonage. Land degradation of Oshana region is viewed as being due to dual grazing, overstocking and unsustainable use of resources. Respondents further identified that there was a need to amend laws, plans and policies to be able to adapt to the changes in environmental conditions.

Many respondents to the study suggested that the solutions to land degradation would be awareness campaigns, training, strict enforcement of laws, such as the prevention of dual grazing, and enforcing the grazing management plan. Another solution revealed by the majority of participants for the problems of land degradation is to limit the number of livestock in each village, because currently there is no penalty for those who overstock. There is a need for control measures in term of sustainable land management. The majority of participants further felt that there is a lack of implementation by

lawmakers regarding environmental management in Namibia. There is a need for money for environmental-related matters or co-financing resources. The respondents felt that the government needed to introduce laws that improves-revegetation of areas to avoid land degradation and promote sustainable grazing by harmonising the carrying capacity in both communal and commercial land. A lot of people have identified that a few individuals owned (or controlled) large tracks of land, while others had very little land. These participants therefore recommended that collective ownership of land as communities should be encouraged.

The majority of participants revealed that laws and policies should address situations at hand in the communities, instead of applying general policies that are written and copied from elsewhere. They also emphasised that policymakers should include land degradation in all related laws, policies and programme at the national level, for example when they do environmental impact assessment; they should consider mainstreaming of land degradation in assessment.

Many other respondents pointed out that the laws, policies and programme need enforcement as they were initially developed to address the problems of land degradation. They also stress that there is a need for adequate financing and personnel to implement the policies and improve community ownership cooperation with the enforcement of the laws. Many people also revealed that the laws must be strictly followed, with regular amendment every decade, as laws get outdated.

The majority of the participants revealed that the country needs to formulate and implement policies that guide sand mining for brick making and construction in the rural community for commercial purposes. A lot of people emphasised that MET needed to do more towards decentralisation of activities and allocate more environmental inspectors to the regions.

4.7 Recommendations by participants regarding solutions to land degradation

The majority of research participants revealed in the additional comments section of the questionnaire that communities should fully be involved in addressing the problems of land degradation, because they are not only the ones most affected, but also contribute to the challenge.

It was also pointed out by many participants that the region needs a programme for capacity building for residents regarding the use of natural resources in a sustainable way. This pre-supposes that the regional council will be equipped with a competent team with the right skill sets to spearhead land degradation programmers/efforts.

It was also felt that stakeholder coordination on sustainable land management committee should be strengthened and that tilling methods should be improved. Communities need to abandon a technology that contributes less to land degradation. People from specific offices that deal with land must go out in the field and educate community members about the negative impacts of land degradation in their areas and help come up with ways to reduce or deal with land degradation problems. Implementing clear policies with directives on the issues of land degradation will help to create awareness among the community members, as well as helping to avoid land pollution and illegal sand mining, and business selling.

One respondent suggested that replanting vegetation and grass can stop heavy rains from damaging their land, and it could protect the topsoil from being washed away. The majority of respondents again suggested that involving the community members in developmental decision-making processes is needed, as well as education on the importance of trees. A lot of people suggested that minimising the number of animals in communal and collective ownership should be encouraged as possible solutions. There was a feeling that the local community should come together and address the issue seriously.

Finally, the participants revealed that as part of land management in the Oshana region Environmental Impact Assessment needs to be carried out for activities listed under the Environmental Management Act (EMA). There was a lot of participants in need of more awareness by traditional authorities not to give out land for EMA listed activities without Environmental Clearance Certificate.

4.8 Summary

The case study of the Oshana region was investigated in the form of a survey by distributing questionnaires to 100 different respondents, community members and officials working in the area. The objective was to establish the current types of land degradation that exists, the causes and impacts and what will be possible solutions. The study has provided insights into the causes and the impact of land degradation in the region.

Land degradation in the Oshana region is due to overgrazing, overstocking and unsustainable use of natural resources. According to participants urban people are bound by environmental laws and policies, while rural area people do not seem to abide by these same policies and regulations. They only identify land degradation based on physical evidence, but more need to be done to monitor the degraded land. They revealed that the problems of land degradation are due to lack of implementation of plans and policies and due to politics. It was felt that there is a need to review the livestock

ownership models, as well as impose restrictions on the number of livestock that can be held by a single household. In order to avoid overgrazing, it was suggested that households owning more than 150 livestock should be encouraged to apply for a government resettlement farm following the procedures as established by the Ministry of Land Reform.

Chapter 5: Conclusion and recommendations

5.1 Introduction

Eswaran (2001) pointed out that land degradation was and still a major issue in the globe due to its decrease in the quality of land caused by human activities. He further pointed out that, the decline in quality of land started during the 20th century and in the 21st century and it will remain high on the international agenda (Eswaran, 2001:10). In Africa about two-thirds of the land is degraded, affecting about 485 million of the population (UNDP, 2014). Land degradation is also a major problem in Namibia, and specifically in the Oshana region.

As it is important to keep on maintaining the fertile soil for future generations, the objective of this study therefore was to investigate the causes, the impacts of and possible mitigation measures for land degradation in the Oshana region. The investigation and conclusions of the research findings were attained as shown below. The methodology employed in the study was a combination of a literature review and a case study, making use of a number of sources of information, including questionnaires. Oshana region is one of the smallest regions in comparison to other regions in Namibia, but very populated as based on physical observation by researcher, as well as on census data illustrating the fast growth of urbanisation.

Based on the investigation of the causes and impacts of land degradation, the study revealed that most of the respondents in the study felt that the 5 main causes of land degradation in the region were climate change, overgrazing, low rainfall and the poor quality of soil, population pressures, as well as rapid urbanisation. Although mentioned by much fewer respondents, sand mining also seem to be very problematic, as identified by recent newspaper articles.

5.2 Summary and discussions based on an investigation of each objective of the study

The study identified some objectives on existing policies and legislation to address land degradation phenomenon and how existing policies were implemented. It further investigated the causes and impacts of land degradation and proposed management strategies that will best suit the region. In this section each objective is explained separately, based on the evidence identified in the study, to demonstrate that each outcome of the research was attained through the results produced.

5.2.1 Objective 1: A review of the literature on the causes and impacts of land degradation

The first objective was that conducting a literature reviews on the causes and impacts of land degradation globally, as well as associated mitigation measures. Chapter 2 gives a theoretical overview of land degradation phenomenon by focusing on reviewing literature of the concept of land degradation regarding the causes and its impacts on the environment. Information underlined the fact that land degradation worldwide is affecting the major parts of the earth.

The literature review explored definitions of, as well as different ways land degradation takes place. It gave an overview of land degradation in other countries, in Africa, in Southern Africa and in Namibia. It explored the proximate (direct), as well as underlying (indirect) drivers or causes of land degradation. Important proximate causes in Africa are overgrazing and unsustainable agricultural practices, while indirect causes are climate change, population pressures, limited government capacity and chronic poverty. Ineffective laws and policies were mentioned as a problem for land degradation. These are all issues experienced in the Oshana region.

In Namibia there seem to be a direct correlation between population density and land degradation, and as the Oshana region is the second most densely populated region after the capital city of Windhoek, land degradation is expected to be found there. In Namibia there is also a high demand for agricultural land, with many people migrating to marginal land. Many migrants are also moving to the Oshana region, as it is much less dry than other parts of the country.

The types of land degradation found in Namibia included desertification, deforestation, sand mining, bush encroachment, salinity and erosion. Many people in Africa are dependent on natural resources, making sustainable livelihoods an important concept. The problem of fencing and its contribution to desertification was specifically discussed.

Potential solutions to land degradation included land use planning, sustainable land management technologies, diversifying sustainable livelihoods (including Community Based Natural Resource Management), rehabilitation and restoration of land (linked to preventative policies), awareness campaigns and strategies and more participation and collaboration of local communities in policy-making and planning.

The concept of mainstreaming land degradation into all laws, policies and plans was also discussed, including the need for environmental impact assessment. Government policies and laws in Namibia are designed to realise the Namibian vision to achieve social cohesion with viable institutions,

environmental and stable sustainable economic. However, there is insufficient integration and implementation of projects and programme, as suggested by Kangombe (2010) who also reported that there is a lack of coordination of activities between institutions, leading to overlapping of information related to environmental laws and policies. The research by Jones (2009) further found out that inappropriate coordination of laws, policies and plans hampers the effective implementation of measures to combat land degradation in the semi-arid and arid environment. The need for more information on land degradation trends, as well as monitoring, was also explored.

In addition, land restoration programmes and policies should enhance the livelihood security of local communities. For successful implementation it is required that an Integrated Land Use Regional Plan be drafted for each region and that both scientific and local knowledge should contribute to these Integrated Land Use Regional Plans

5.2.2 Objective 2: To find out what international agreements and national legislation and policies exist to combat land degradation in Namibia.

The second objective was to establish what international agreements and national legislation and policies exist to combat land degradation in Namibia and assess whether it is adequate and being implemented. The study in Chapter 3 discovered that Namibia is a signatory to many international treaties that deal with combating drought, land degradation and desertification. These international treaties and agreements included the 3 Rio Conventions, namely the Convention on Biological Diversity (CBD); the UN Framework Convention on Climate Change (UNFCCC) and the Plan of Action to Combat Desertification (PACD), later followed up by the UNCCD. The Sustainable Development Goals also include goal 15.3 dealing with land degradation, in addition to addressing poverty and other development goals.

Chapter 3 also provides a comprehensive review of existing policies and strategies at the national level that underpin the policy and regulatory framework that creates an enabling environment for successful implementation of possible mitigation measures to address land degradation in Namibia. These include laws, policies and plans on land degradation, on the environment, on agriculture and land reform, and on planning and development. Important policies on land degradation and the environment include the Namibian Constitution of 1990, the Green plan of 1992, NAPCOD of 1994; the National Drought Policy and Strategy of 1997, the Namibian Environmental Management Act 7 of 2007, the National Policy on Climate Change of 2010 (followed by the National Climate Change

Strategy and Action Plan of 2013), NAP3 of 2014, as well as the LDN National Report of 2015. In addition, there are land resettlements and reform legislation, as well as planning legislation.

The country has also adopted its own policies and actions plans to address the problem. Unfortunately, it was noted in the literature and by respondents of the study that the policies and laws were not well coordinated, which may hamper success of local interventions that are geared towards domestication of international agreements on the ground. There are National Action Plans on LDN, as well as a National Report on LDN of 2015, which gives an overview of projects on LDN and sets targets for UNCCD. However, LDN is a cross cutting issue that requires mainstreaming across all sectors. Recognition of synergies across sectors as well as coordinated development and implementation of programmes will be beneficial. The inadequate integration and implementation of projects are a direct result of lack of coordination in planning. The National Actions Plans such as NAP3 also seem to be out-dated, as problems such as sand mining is not even mentioned in it.

The bureaucratic system on the approval process especially when it comes to processing of Environmental Impact Assessments and issuance of permits also remain great challenges. This is evident by the majority of research participants that mentioned when one is applying for a forest permit, they have to seek approval from three different Ministries namely, MAWF, MLR and MET dealing with the same law and policies. Examples of the duplication of efforts are also seen where MET and MAWF deal with the Environmental Management Act and the Forestry Policy.

There are Integrated Regional Land Use Plans (IRLUP) for some regions, for example the Zambezi region, to help manage the land sustainably. But the Oshana Regional Land Use Plan is still under discussion by the responsible institution.

The coordination of rural development was guided by several policies including the Namibia Constitution, the Decentralisation Policy, and the National Rural Development Policy and Decentralisation Enabling Act of 2000. With regard to the overgrazing problem, there is no policy specifically for dealing with overstocking and overgrazing and the land degradation it causes, and there is a lack of authority over common grazing land and community control. There is inappropriate decision-making due to a lack of understanding of legislation, plans and policies. Finally, there is also a lack of understanding of environmental outcomes, related to climatic constraints and environmental development.

5.2.3 Objective 3: To explore the case study of the Oshana region in order to investigate the causes and impacts of land degradation in the region, as well as determine the community awareness of land degradation:

The purpose this of objective was to explore the case study of the Oshana region in order to investigate the causes and impacts of land degradation in the Oshana region, the impacts of land degradation in the Oshana region as well as to determine the Oshana community's awareness level on land degradation.

Chapter 4 addressed the case study, by first giving an overview of the region based on secondary data. The results of a survey then revealed that according to the respondents the following issues were the main causes of land degradation: overgrazing, climate change, poor soils and low rainfall, increasing population pressures, and rapid urbanisation. In the literature review, causes of land degradation in Africa, were shown as biophysical factors, as well as unsustainable land management practices. Additionally, the literature review revealed that poverty was another factor contributing to land degradation and this was due to chronic poverty that led to rural people to over-utilising resources for survival. Direct drivers of land degradation are agricultural practices, such as slash and burn, overgrazing, deforestation, urbanisation and energy demands. The indirect drivers are climate change, poverty, limited governance capacity, population pressure, cultural norms and local climatic conditions. In Namibia, other studies identified land degradation to be caused by overgrazing as the most important direct driver, while climate change and poverty were important indirect drivers of environmental degradation. Climate change and its potential increase in temperature, combined with increasing rainfall intensities and variability and evaporation, will stress the natural resources and their capacity to maintain food production.

Based on the comparison on the study findings and the studies done in other countries, it can therefore be concluded that what has been the main causes of land degradation in Namibia are similar to causes as identified in other countries, but the main causes in Namibia, are not the same as identified by the respondent in this study. The differences may be due to the fact that in Namibia residents of the Oshana Region are involved in communal farming on a large scale, while illegal sand mining does not seem to be a concern in most other countries. This could be due to the lack of capacity to manage and monitor the problem of land degradation, as acknowledged in NAP3. This is evident from the literature as also has been noted in Namibia, that land degradation is caused by human activities (overgrazing, illegal sand mining, and deforestation).

The resettlement process in Namibia was identified as a hot spot for land degradation in communal areas by NAP3. The government is trying to rectify the problems by resettling people from the communal land to government-owned resettlement farms. However, the respondents in this study did not select resettlements farms as a main cause of land degradation. Although it has been reported that spatial analysis has revealed the communal land tenure system does not account for more land degradation than the freehold tenure areas, overgrazing and overstocking is still frequently observed on commonages (Gilolmo, 2016). The livestock population is ever increasing in the Northern region of Namibia, impacting on grazing land and loss of long-term productivity.

The research in this case study also provides some insight that illegal sand mining in the region is also rapidly increasing, causing more severe damage to the land and needs to be addressed.

The awareness level of the Oshana Community about land degradation was very high, with more than 75% of the participants revealing that they know what land degradation is and that they had seen evidence in their community. They have also noted that it is a major threat to food security and environmental degradation.

Also important is that a majority of respondents believed the community were not empowered or capacitated to be able to deal with land degradation problems, with a majority also believing that the community does not come together to address these problems. Many participants (44%) were unsure if the community members participate in decision-making. This is a very important issue, as it highlights that land degradation policies in Namibia require more public input, which is a very important aspect of achieving LDN.

5.2.4 Objective 4: To propose effective management strategies and mitigation measures for land-degradation in the Oshana region.

The majority of the respondents in the study indicated that land degradation could successfully be addressed if the right policy instruments are put in place. Solutions to land degradation mentioned by them included awareness campaigns, training, strict enforcement of laws such as the prevention of dual grazing, and enforcing the grazing management plan. The majority of the respondents pointed out that the responsible institutions for managing land related activities need to do more awareness campaigns on the implementation of laws, policies, plans and programmes at the national, regional and local level, and also enforce the laws.

In addition, participation and collaboration of local communities were seen as very important, and policies and plans addressing land degradation will be more successful when local people and scientist are both authors and actors of the development process.

The research through the literature and policy review showed that it is necessary to mainstream land degradation into plans such as the Integrated Regional Land Use Plan (IRLUP) in each region. Mainstreaming of land degradation should also be promoted in the developmental sectors through the use of Environmental Impact Assessments (EIAs) for any development projects and Strategic Environmental Assessments (SEAs) for all policies and plans at the national, regional and local level. It is therefore advisable to incorporate land degradation phenomenon into environmental impact assessment for any new development, plans and programme.

There are various programmes currently under implementation in the country with the objective to reverse and restore land degradation in areas considered to be hot spots. Through international agreements these are NAFOLA, SCORE and NILALEG as identified in the study. These programmes can be upscaled and replicated elsewhere, such as in the Oshana region.

5.3 Recommendations

(a) It is necessary to align and harmonize policies related to land degradation. The Government of Namibia needs to introduce laws or regulations that limit the number of livestock per individual per region, although this might be difficult for some community members to adapt to, as some community members use the farming of livestock to achieve wealth and prestige, besides for meat and manure

(b) More emphasis should be placed on land degradation education and awareness as the most appropriate solutions to help reversing of land degradation. The Ministry of Environment and Tourism should do more on activities related to the Environmental Management Act, including awareness creation, decentralisation of environmental inspectors in the region and training inspectors for on the ground inspections.

(c) It is necessary to deal with the effects of the rapidly evolving climate change. One issue that needs to be addressed is the diversifying of sustainable livelihoods. Communities should also be encouraged to invest in rangeland management activities, adapted livestock breeds, and animal health to improve adaptive capacities. The researcher also proposes the urgent development of a long-term system for building community resilience to adapt to climate change for the Oshana region.

(d) Bankable projects /programmes to help restore degraded land in the country should be identified that can assist Namibia and that can be financed through international financing mechanisms and instruments. Upscaling and replication of current or previous projects that improve climate resilience is crucial. Land degradation policies require more public input in order to achieve land degradation goal.

(e) More research is needed on the following:

(i) Programme for monitoring soil quality and change in vegetation cover

(ii) Building community resilience for climate change adaptation

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5. What is your highest level of education completed?

A= No formal education B= Primary C=High school D=Tertiary

6. What is the head of household’s occupation?

A= Employee B= Self-employed C= Unemployed D= Pensioner E= Temporal worker

7. What is the average size of your household?

A= 1-4 people B= 5-8 people C= 9-11 people D= 12-15 people
E= Over 16 people

8. Does your household receive any of the following government grants?

A=Pension B=Disabilities C= Orphans and Vulnerable children D=Other

QUESTION 9 FOR COMMUNITY MEMBERS ONLY.

9. A. Do you have livestock? Yes No

B.

Type of livestock	Number
Sheep	
Goats	
Cattle	
Donkeys	
Horses	

10. What are the household’s main sources of income (your livelihoods)?

A= Livestock farming B= Selling of Craft C= Employed D= Others (give details).....

SECTION 2: LAND DEGRADATION

11. Do you know what land degradation is? Yes No

12. Do you see land degradation in your community? Yes No

13. What do you think are the main causes of land degradation in your community?

List of possible causes of degradation in Namibia	X
Overgrazing	
Poverty	
Resettlement farms	
Unsustainable water usage	
Lack of technologies	
Poor soil and rainfall	
Climate change	

Lack of land tenure	
Poor cross-sectoral collaboration	
Limited financial resources	
Poor financial management	
Expanding agriculture production	
Expanding industrial areas	
Mining	
Rapid urbanisation	
Increasing population	
Pollution	
Other:	

14. Have you been to other regions of Namibia? Yes No

15. If yes, do you think the causes in your community are different from that in the rest of Namibia
 Yes No

16. Does land degradation have a negative effect on the environment? Yes No

17. What are the impacts of land degradation in your community?

Possible impacts of land degradation	X
Soil erosion	
Soil capping	
Habitat loss	
Desertification	
Loss of soil structure	
Other:	

18. Does land degradation affect the social life of the people in your community?

Score from 1 – 5 (1 = Less likely, 3 = Moderate & 5= Most likely)

1	2	3	4	5

19. Does the land degradation affect the economic growth of the community?

Score from 1 – 5 (1 = Less likely, 3 = Moderate & 5= Most likely)

1	2	3	4	5

20. In your opinion, what are the major environmental challenges and problems in the Oshana region?

Possible challenges	X
Extreme climate events	
Population growth	
Rural exodus and immigration	
Land and ecosystem services degradation	

Natural resources use conflicts	
Food crisis	
Peace and stability	
Land degradation	
Other	

21. Can land degradation in the Oshana region be addressed/ eradicated? Yes No

22. Does the role of communal ownership plays a major role in land degradation in your community?
 Yes No

23. Does the role of private ownership plays a major role in land degradation? Yes No

24. A. Do you think the current Namibian environmental laws, policies and programmes with regards to land degradation are able to address the problem?

Score from 1 – 5 (1 = Less likely & 5 = Most likely)

1	2	3	4	5

B. Are the laws, policies and programmes being well implemented in the region?

Score from 1 – 5 (1 = Poor, 3= Fair & 5= Well)

1	2	3	4	5

C. What recommendations can be made regarding changes to these laws, policies and programmes?

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25. A. Are the current programmes and campaigns in Namibia initiated to curb land degradation effective?

Score from 1 – 5 (1 = Less effective, 3= Moderate & 5= Most effective)

1	2	3	4	5

B. Are they presently/ or currently doing enough? Yes No

26. Answer the following questions about the local community

	YES	NO	NOT SURE
Are the local community empowered enough to deal with the problem of land degradation?			
Does the community get together to try and address the problem?			
Are there disagreements about how the problem should be solved			
Do you have local monitoring system for land degradation?			

APPENDIX B: APPROVAL LETTER FROM THE REGIONAL COUNCIL



OSHANA REGIONAL COUNCIL

Tel: 065 - 220 441 / 363 / 927
Fax: 065 - 221 292
E-mail: ramushembe@oshanarc.gov.na

Private Bag 5543
Oshakati, Namibia

Enquiries: Regina N Amushembe

29 August 2018

Ms. Natalia Hamunyela
PO BOX 23378
Windhoek

Dear Ms. Hamunyela

SUBJECT: PERMISSION TO CONDUCT FIELD STUDY IN OSHANA REGION

Your letter dated 29 August 2018 hereby acknowledged.

This letter serves to inform you that permission is hereby granted for you to carry out research study on the topic titled: *Investigation into the Causes and Impacts of and possible Mitigation Measures for Land Degradation in the Oshana Region, Namibia.*

We wish you all the best in your study.

Yours sincerely


.....
MARTIN P. ELAGO
CHIEF REGIONAL OFFICER

All official correspondences must be addressed to the Chief Regional Officer