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GOVERNING THE COMMONS TO ATTAIN LAND DEGRADATION NEUTRALITY IN LESOTHO BY 2030

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ABSTRACT

Land degradation is labeled as a universal problem that corrodes the three pillars of Sustainable development: social, environmental and economic. Social and ecological processes are frequently treated as different units and yet this is where environmental problems emanate. In an effort to address land degradation, the UNCCD (United Nations Convention to Combat Desertification) drafted a concept called Land Degradation Neutrality (LDN) which was later adapted into the Sustainable Development Goals. The UNCCD invited countries to set their voluntary LDN targets and Lesotho followed suit. With Lesotho's targets in place, this study aims to analyse how Lesotho can facilitate effective implementation of LDN through understanding of the local socio ecological factors contributing to degradation and their interlinkages. The study focuses on Lesotho's rangeland socio-ecological system as an area of prime concern due to its being the major land cover (60%), the benefits derived from rangelands and the vulnerability to erosion. To analyse the rangeland socio-ecological system (SES), the study employed the Socio-Ecological System Framework, designed by Elinor Ostrom and fellow scholars. A detailed desk analysis was compiled, and a survey was undertaken in Lesotho with the use of an online survey software. Results from the study describe Lesotho's rangeland SES as unique in terms of the hierarchy and power dynamics. The role of Chiefs in land management is crucial and a potential bottleneck in the system. Ineffective implementation of laws causes rangelands to be susceptible to degradation. The results further indicate that practices that are deeply embedded in the farming culture such as rest rotation (leboella) should be widely adopted. In terms of local indigenous knowledge, herd boys were recognized as a vital component in the rangeland SES and the governing system (i.e. ministries) should utilize their knowledge as they are the major custodians of rangelands in Lesotho. The study therefore offers insight on how Lesotho can act locally towards the greater achievement of the LDN as a global goal.

Key words: rangelands, socio-ecological systems, LDN

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ABBREVIATIONS

CPR	Common Pool Resource
DCO	District Soil Conservation Officer
DRRM	Department of Range Resources Management
FAO	Food and Agricultural Organization
GA	Grazing Association
IAD	Institutional Analysis Development Framework
LDN	Land Degradation Neutrality
MFLR	Ministry of Forestry and Land Reclamation
MAFS	Ministry of Agriculture and Food Security
MEMWA	Ministry of Energy, Meteorology and Water Affairs
MFRSC	Ministry of Forestry, Range and Soil Conservation
MLGCA	Ministry of Local Government and Chieftainship Affairs
MTEC	Ministry of Tourism, Environment and Culture
SDG	Sustainable Development Goals
SES	Social Ecological System
SLM	Sustainable Land Management
SOC	Soil Organic Carbon
UNCCD	United Nations Convention to Combat Desertification
UNU-LRT	United Nations University Land Restoration Training Programme
WOCAT	World Overview of Conservation Approaches and Technologies

1. INTRODUCTION

The pursuit of human wellbeing connotes our high dependency on nature. Increased anthropogenic activities, adhering to the human demands, are said to be the main cause of land degradation (Pacheco et al. 2018). Land degradation is putting the health, livelihoods and security of an estimated 1.5 billion of the world population at risk (Paolo & Sujith 2016). Although numerous studies have examined the impact of human activities on ecosystems, only a few have analysed the interdependence of the social system and the natural environment (Akhtar-Schuster et al. 2017). Social and ecological processes are frequently treated as different units and yet this is where environmental problems emanate from (Fikret et al. 2000).

Land degradation is therefore labeled as a universal problem that corrodes the three pillars of Sustainable development: social, environmental, and economic (Gnacadja & Wiese 2016; UNCCD 2016) by intensifying soil loss, water quality deterioration and biodiversity decline (Pacheco et al. 2018). Sustainable land management (SLM) is among UNCCD's first approaches in addressing land degradation through exercising practices that ensure sustainable use of natural resources while also ensuring that their productivity and environmental functions are intact and available for future generations (Schwilch et al. 2013). The call for global sustainable governance was perpetuated by the establishment of the Millennium Development Goals (MDGS) (Pierre 2006). Goal number 7 of the MDGS was to attain environmental sustainability which encompassed restoring degraded lands. It was during this time period that the world was beginning to pay much critical attention to the importance of soil and land. Paolo and Sujith (2016) stated that it was through the United Nations Convention to Combat Desertification (UNCCD) that the consciousness of land degradation neutrality was initially brought to the world. "The future we want", which is an outcome document of the Rio+20 conference, recognized the need for urgent action towards attaining a land degradation neutral world (Heshmati 2013). The UNCCD made exceptional efforts to ensure that the goal of a land degradation neutral world was included in the Sustainable Development Goals (SDGs), introduced in the year 2015 (Kapović et al. 2018). The SDG goals call for more collective country efforts towards sustainable development. Goal number 15, which is known as "life on land", has the key goal to: "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" (The SDG Report 2018, p. 11). One of its sub-targets (15.3) focuses specifically on the importance of achieving land degradation neutrality.

Land Degradation Neutrality (LDN) became a new paradigm that emerged in the world in the year 2012, after the UNCCD noticed the slow uptake of SLM (Cowie et al. 2018). In 2014, UNCCD recognized the World Overview of Conservation Approaches and Technologies (WOCAT) as a vital tool in addressing land degradation globally (Liniger et al. 2019). Akhtar-Schuster et al. (2017) emphasise the importance of accessing information for decision making as a crucial factor in achieving LDN. Despite the slow uptake, SLM is a fundamental element in achieving LDN as the overall goals of a neutral state are to improve the productivity of land resources through sustainable management and restoration of soil, water, and biodiversity, therefore contributing to poverty reduction and climate change adaptation (Gnacadja & Wiese 2016).

The UNCCD defines LDN as follows: *"a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security*

remain stable or increase within specified temporal and spatial scales and ecosystems” (Kust et al. 2017). The main objectives of LDN include to maintain and improve sustainable ecosystems, improve core human resilience to land degradation and to improve and reinforce land governance (Cowie et al. 2018).

The fundamental and pioneering part of this definition is that it entails balancing degradation alongside developments. While degradation should rather be avoided, LDN recognizes that it will not be preventable in all cases. Attaining neutrality implies that the degradation processes that cannot be averted have to be counterbalanced and offset (Wunder & Bodle 2019). The three key LDN indicators are: (i) land cover, (ii) land productivity and (iii) carbon stocks (Liniger et al. 2019). Soil, ecosystem condition and the risks of land degradation have fully been drawn to global attention (Chasek et al. 2015) of which LDN is regarded as a bold vision that requires strong leadership at both national and community levels (Wunder & Bodle 2019). The 2030 deadline set by political decision makers is now less than 11 years away, leaving a demanding time frame for action.

Countries were invited by the UNCCD to formulate their voluntary country specific LDN targets that align to their development requirements and conditions (Sims et al. 2019). Furthermore, the UNCCD encouraged countries to utilize LDN as a decision-making tool in planning for anticipated land degradation so as to combat and reverse desertification (Sayah et al. 2019). The concept of a degradation neutral world employs great consideration to reversing land degradation through restoration activities. It also emphasises the need to reverse degradation by the implementation of sustainable land management practices while also prioritizing avoiding degradation by addressing its main drivers. It is based on the fundamentals of protecting biodiversity and land ecosystems in order to improve land productivity by 2030 (Cowie et al. 2018). Considering agricultural land and rangelands, which are regarded as risk prone, the LDN approach aptitudes to neutralize degradation through restoration and hence stabilizing the global average of productive non-degraded land (Safriel 2017).

Effective implementation of LDN and SLM targets requires an understanding of the local socio-ecological factors contributing to degradation and their interlinkages (Akhtar-Schuster et al. 2017). Rivero and Hakizimana (2014) stated that the reason why various technical measures in land management in Mexico failed was due to managers’ and technicians’ failure to consider the social, cultural and economic factors in addition to the ecological ones. Redman et al. (2004) pointed out that it is no longer tenable to address social and ecological issues in isolation. Humans must be considered as drivers of change operating within the environment and should also be considered as part of the ecosystem (Okpara et al. 2018).

Rangelands are ecosystems that cover around 40% of the Earth’s ice-free terrestrial surface (Cowie et al. 2019). Rangelands are commonly utilized by humans for domestic livestock grazing and are thus one of the natural resources that are defined as part of the complex Social Ecological System (SES) (Li & Li 2012; Briske & Walker 2017). They consist of resources such as vegetation and subsurface water and are most commonly utilized by humans for domestic livestock grazing. On the social side lies shared livestock genetic material, cultural practices values and societal norms (Briske & Walker 2017). The governance structure, management dynamics and use of natural resources are normally the main entities affecting the rangeland SES.

Vast parts of the world's rangelands are degraded, mainly due to unsustainable land management practices and overgrazing (Marques et al. 2016). Lesotho in Africa is one of the countries where rangeland degradation has been defined as a challenge that needs to be tackled. The country has already acknowledged the challenge and is among the countries in Africa that took notice of the UNCCD invitation in 2015 to set specific national LDN targets. The LDN target setting in Lesotho was based on national priorities and goals as land degradation is a crucial factor in the country's economy. The implementation process for achieving the LDN targets is complex and involves not only the ecological factors that need to be taken into consideration but also the socio-economic ones. In particular, it's important to build up social consensus and a common understanding on why rangeland degradation needs to be tackled, what needs to be changed in order to achieve the desired changes and how the changes can be integrated into long-term sustainable rangeland management. It therefore becomes vital to understand the interactions within the social-ecological system surrounding rangeland management in Lesotho and their implications for achieving LDN by 2030.

In this report I aim to compile a desk analysis of the social-ecological system of rangeland management in Lesotho and to try to identify potential bottlenecks and leverages within the system that might be influencing the implementation of Lesotho's LDN goals related to rangeland management.

The research objectives were the following:

- To investigate what factors in existing policies and laws governing the rangelands of Lesotho that may affect susceptibility to land degradation.
- To identify the current rangeland management practices and values that farmers might be willing to give up in order to achieve no net loss from the 2015 baseline, and LDN before 2030.
- To identify what current grazing management practices might support livestock farmers to move towards actions to promote, restore and sustain healthy rangeland ecosystems.
- To draft a conceptual framework that visualizes key elements for attainment of sustainable land management in the rangelands of Lesotho, hence ensuring LDN.

1.1 Background

Human actions, that may be driven by their perceptions, cultures and values, have direct influence on ecosystem processes (Cumming et al. 2006). This brings forth the requirement to understand the interactions between the human system and the land system (Okpara et al. 2018). A socio-ecological system (SES) is therefore defined as an articulate system of both biophysical and social factors that interact regularly in a robust manner (Fikret et al. 2000; Redman et al. 2004). It is important to emphasize that the biophysical and social components are of equal importance. Machlis (1997) describes SES as complex system, continuously changing and therefore constantly adapting. It is also very important to further acknowledge that humans (the social aspect), either as individuals or institutions, form the larger bureaucratic element of the system due to their influence and their ability to implement changes in reaction to different stimuli. On the other hand, the biophysical component, which is also described as the ecological patterns and processes, exhibits changes due to the interactions occurring within the system (Redman et al. 2004; McGinnis & Ostrom 2014).

The interactions are defined as activities that liaise between the social and ecological elements of the SES such as land use decisions and land cover changes (Redman et al. 2004). In order to examine the essential characteristics of the interactions and monitor them accordingly, a framework must be applied.

Frameworks are useful tools for explanation of relationships and outcomes in an SES (Ostrom 2011). Amongst the numerous researchers who have made strides in the SES arena is Elinor Ostrom (Rivero & Hakizimana 2014; Thiel et al. 2015). Along with scholars associated with the Vincent and Elinor Ostrom workshop in Political Theory and Policy Analysis, was establishment of the Institutional Analysis Development Framework (IAD), which is exemplary in assessing institutions but was criticised for its inability to describe the larger socio-ecological complexities, especially for Common Pool Resources (CPR) (Rivero & Hakizimana 2014). To address the shortcomings of IAD, Elinor Ostrom, in collaboration with different scholars, modified the IAD to form the Social Ecological System Framework (SESF) (Ostrom 2009; Thiel et al. 2015). The SESF is defined as a diagnostic tool used to evaluate and mediate between the ecological and social systems within an SES, providing a common language for SES researchers globally (Ostrom 2007, 2009). The framework provides the major first tier variables (dimensions) (Fig. 1) that shape the SES which are: the resource unit, the resource system, actors, and the governance system (McGinnis & Ostrom 2014). The governance system and the actors describe the social part of the system whereby the governance system is responsible for setting the all rules and measures. The resource users or actors are entrusted with utilizing but also maintaining the resource system according to the rules set by the governing system (Janssen et al. 2004; McGinnis & Ostrom 2014). The resource unit is defined as entities dependent upon the resource systems (Ostrom 2007, 2009). Both the resource unit and resource system form the ecological component of the system. This study recognizes the processes of extraction and maintenance as the most important forms of interactions and outcomes. It is also important to note that the SESF explains that a complex SES is often dynamic such that there exist related ecosystems and a social political setting that also influences the governing laws set by the governance system (Fig. 1).

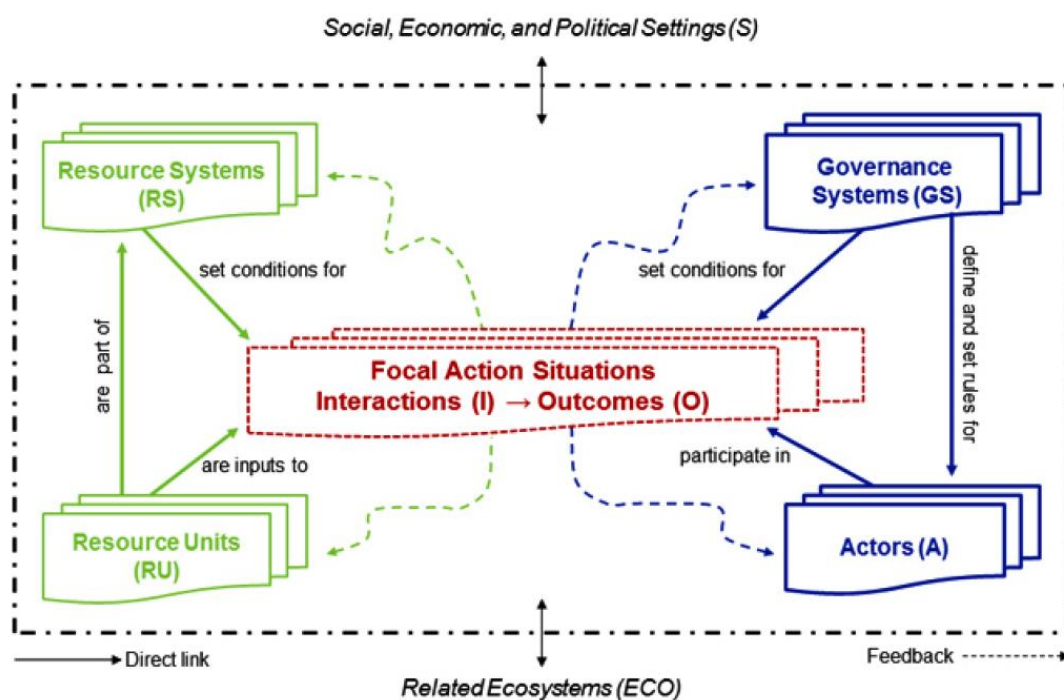


Figure 1 The Socio Ecological System Framework adopted from McGnis and Ostrom (2014), demonstrating the four first tier variables, the focal action situations, the direct links and feedbacks.

1.2 Rangeland degradation in Lesotho

Rangeland utilization is an important pillar in Lesotho's economy and fundamental elements of its populations' cultural, ecological and social demands. Over 60% of the country is classified as rangelands with the high mountains of African alpine and sub-alpine grasslands as the main locations for livestock summer and winter grazing (DRRM [Department of Range Resources Management] 2014; Heshmati 2013). Lesotho's climate is categorized as temperate with warm summers and very cold winters (especially in the highlands) (LMS 2017). The country is divided into ten administrative districts and four agro-ecological zones (Fig. 2) namely the foothills, lowlands, highlands and the Senqu River valley (FAO 2017). The agro ecological zones are due to the difference in elevation with the mountains ranging from as high as 3400 m and lowlands at 1100 m above sea level, but also signifying a varied difference in soils, climate patterns and seasonality (Ebenebe et al. 1999). The majority of the population, which depends mainly on agriculture, lives in the foothills and lowlands of the country (Worldbank 2018). The livestock types grazing on Lesotho's rangelands are sheep, goats, cattle, horses and donkeys. This study focused only on sheep though as they have a high population of 1,346,596 animals (Bureau of Statistics 2015). The people of Lesotho (Basotho) rapidly adopted merino sheep which generate cash income through sales of wool (Swallow 1987). Merino sheep, which originated from Australia, were obtained in Cape Town by Lesotho migrant laborers in South Africa in the early 1900s (Swallow 1987). The remittance they received from mining was used to purchase the sheep as the Basotho men had realized that not only are the sheep good for meat production but also for economic gain from the sale of wool. With more and more laborers retiring from the harsh mining conditions, more of them turned to the rearing of sheep and goats, which meant increasing livestock numbers on rangelands. To the present day, 50% of the rural community residing in the mountain areas heavily depend on the wool and mohair industry (Worldbank 2018).

Overgrazing and animal trampling have aggravated soil erosion in both rangeland and cropland areas (Darkoh 1984).

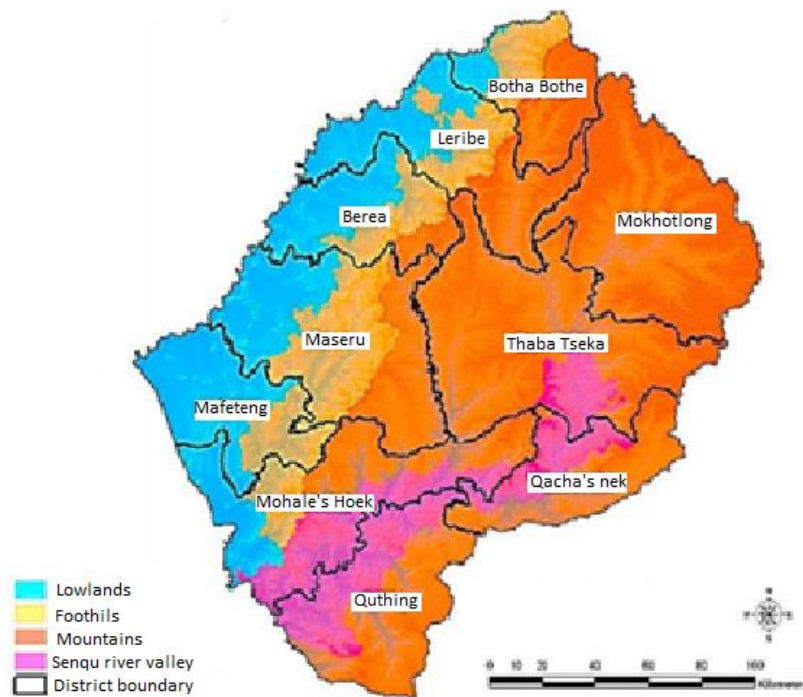


Figure 2. The ten administrative districts of Lesotho and the four agro-ecological zones that are categorised according to elevation. (Source: Ministry of Energy and Meteorology 2017).

The degradation of rangelands remains a great challenge to Lesotho as it is the main cause for loss of pristine biodiversity (MTEC 2006). The rangelands also suffer immense invasion by species such as *Chrysocoma ciliate* (Hae 2016). The Land cover atlas of Lesotho and the Lesotho soil information systems [LESIS] (FAO 2017; LESIS 2018) highlight the emerging barren patches of land in rangelands as indicative symbols of vegetation loss (Fig. 3). Currently, the country has initiated a national rangeland assessment to quantify the ration of rangelands degraded. Rangelands are managed communally and therefore attributed as the main driver of degradation of the land allocated for agricultural activity (Pule et al. 2004). Desertification in Lesotho is a contributing factor to the deterioration of the land base. It has been a problem in the country since the early 1900's caused by loss of vegetative cover through overgrazing, frequent droughts, deforestation and improper land management (Swallow 1987).

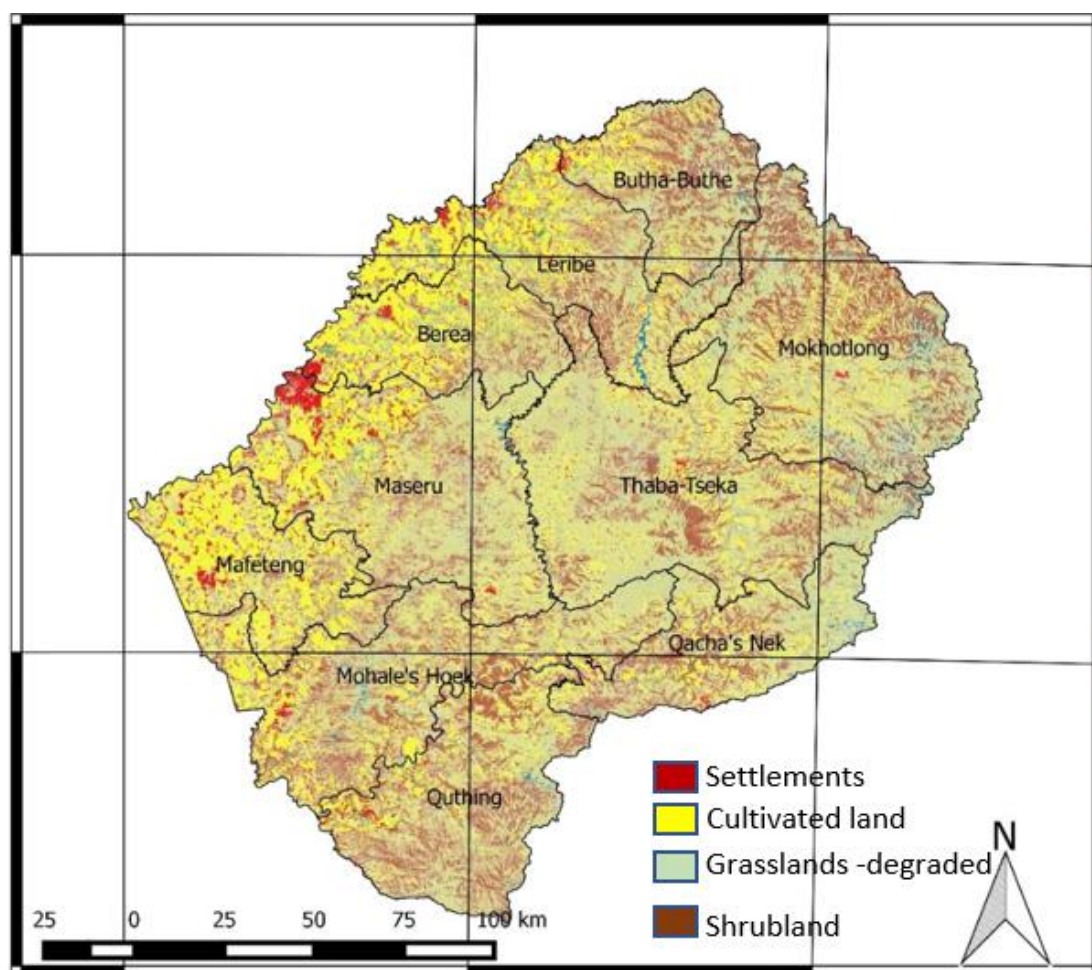


Figure 3. Map of Lesotho showing settlements, cultivated land, shrubland and degraded grassland. (Source: LESIS 2018).

1.3 National LDN targets

Lesotho set its specific voluntary LDN targets committing to improving soil organic carbon (SOC), land cover and productivity by 5% in and before 2030 (UNCCD 2018). A country baseline towards attainment of LDN in Lesotho was established by the focal Ministry.

The focal Ministry in Lesotho addressing land degradation is identified as the Ministry of Forestry, Range and Soil Conservation due to its core mandate of providing policy and strategic leadership in three key areas: Forestry Development; Range Resources Management and Soil and Water Conservation (DRRM 2014). The three areas contribute tremendously to improving land productivity and hence are vital to LDN given the “holisticness” of the LDN definition (Akhtar-Schuster et al. 2017). Lesotho set its targets towards attaining stable land conditions of land resources such as forests and vegetation while also improving on the current situation and status of degradation. Lesotho’s specific and measurable targets to attain degradation neutrality include (MFRSC 2017; UNCCD 2018):

- Improving productivity and soil organic carbon by 2% in all land classes by 2030 as compared to 2015
- Rehabilitating 600,000 hectares of degraded land to functionality by 2030

- Converting 134,600 ha of brush land back to rangelands by 2030 as compared to 2015
- Halting the conversion of forests and wetlands to other land cover classes by 2022
- Increasing forest cover by 61,325 ha by 2030 as compared to 2015
- Reducing the rate of soil erosion and sealing (conversion to artificial land cover) by 20% by 2030 as compared to 2015

The expectation with LDN is that a significant difference will be noticeable in the foothills and lowlands, through the stern efforts of the Ministry.

2. METHODS

Data collection for this study incorporated two distinctive approaches. The first approach was to conduct a detailed literature review through gathering information from websites, books, journal articles, reports, peer reviewed publications, dissertations and conference papers as well as hard copies of other credible reports that examined Land Degradation Neutrality and the Social Ecological System Framework.

The second approach was to conduct a survey in Lesotho using a global online survey software called Survey Monkey (Appendix 1). In total 50 livestock farmers from the 10 districts of the country (five farmers per district) were selected through random sampling and interviewed using structured questionnaires. The interviews were conducted through electronic mobile devices (cell phones). Twenty District Conservation Officers (DCO) from the Focal Ministry (Ministry of Forestry, Range and Soil Conservation) were engaged to conduct the interviews (two officers per district). The Principal Soil Scientist from the Ministry headquarters office facilitated and organized the District Conservation Officers team.

The Lesotho UNCCD focal person was also interviewed using a semi-structured questionnaire through Survey Monkey (Appendix 2).

Findings from the survey complemented the extensive literature review.

2.1 Data Analysis

The study employed the Socio Ecological System Framework to analyse the data and findings obtained.

The framework identified the four first-level core subsystems of Lesotho's rangeland as follows: Governance System (GS) as Ministry of Forestry Range and Soil Conservation (MFRSC) Department of Range Resources Management (DRRM), Resource System (RS)- Rangelands, Actors (A)- livestock farmers and Resource Unit (RU)- Sheep.

3. RESULTS AND DISCUSSION

The findings from the study commence by describing Lesotho's Rangeland SES in terms of the variables adopted under the four first-level core subsystems (Resource System, Governance System, Resource Unit and Actors) which are the 2nd tier variables. The second-tier variables offer a more generalized, yet content specific description of the SES indicating the variables that drive the system and the cultural aspects that influence the system. The

description will also highlight the links that need to be managed while also establishing leverages that must be enhanced (Cowie et al. 2019).

3.1 The Resource System-Rangelands

The rangelands of Lesotho are characterised by native grasses which are mainly connected to animal grazing (DRRM 2014). In total 60% of the country's land cover is estimated to be rangelands which amounts to 2 million hectares. Lesotho is the only country in the world situated completely over 1000 m above sea level, which varies from 1000 m to about 3400 m (FAO 2017). The high elevations are home to alpine vegetation and are also sources of pristine wetlands that are characterized by the lush green vegetation.

3.1.1 External shocks

The rangelands in Lesotho are described to be deteriorating due to weak institutional arrangements, poor grazing management practices, climatic conditions, overstocking, fire, and brush invasion (DRRM 2014). In the early 1900s when farmers noticed that the rangeland condition was declining, a system of seasonal rotational grazing whereby animals were rotated from the cattle posts in summer to the lowland grazing areas in winter was introduced (Eldredge 1986; Kimble 1979). The seasonal rotation system developed distinct system boundaries known as the grazing zones A, B and C. This demarcation of grazing is adopted nationally and is in line with the country's four ecological zones: mountains, lowlands, foothills and the Senqu river valley (Swallow 1987). In summer, livestock graze on the grazing area A, which is the mountains zone. The grazing zone B, also known as foothills, are designated autumn grazing areas. The foothills are situated at the base of the mountains. In winter, the animals graze in the C grazing areas. These areas are either found close to or are within the villages. This system was established as a method of facilitating rotational grazing, and although it is used countrywide, rangelands are still exhibiting signs of degradation.

Climate also plays a critical role. Lesotho's climate is defined as temperate with rainfall amounting to almost 700 mm per annum (LMS 2017). Among the various factors affecting the productivity of Lesotho's rangelands is the extreme and lengthy droughts. The first of the droughts to be recorded is that of 1933 (O'Connor et al. 2014). This was later followed by droughts in 1968, 1983, 1990, 2002, 2007 and 2011, respectively. Normally droughts follow erratic rains, which are synonymous for washing away topsoil.

Another element causing degradation and affecting the productivity of the rangelands is overstocking. With more and more Basotho men obtaining wealth through animal husbandry, more and more sheep were grazing on rangelands. Historical records from Swallow (1987) stated the carrying capacity of the rangelands as 8 ha per Animal Unit (AU). Motsamai et al (2002) noted that this carrying capacity has been exceeded by 75%. It is estimated that rangelands are overstocked by 40-80%, which has greatly affected the grass yields and therefore put the system under immense pressure.

Unprescribed fires are a major detriment to rangelands. The main cause of fire is anthropogenic activities (MTEC 2012). Herders, who are the major custodians of the rangelands, burn grass with the aim of attaining an early green lush. Other sources may be campfires, cigarette stumps and burning on dump sites. The precarious fires have also been shown to contribute to brush invasion (Hae 2016). Lesotho's brush encroachment is described to be an invasion by native and not alien plant species. However, the shrub outcompete the

native grass resulting in encroachment of invader species. This leaves livestock with non-palatable grass species and reduces native grass coverage.

3.2 Resource Unit-Merino Sheep

The main livestock on Lesotho's rangelands are sheep, goats, cattle, horses and donkeys. This study recognizes sheep as the resource unit due to the large population (1,342,534 animals) (Bureau of Statistics 2015). The main sheep breed in Lesotho is the merino sheep (Fig. 4; Swallow 1987) whose adoption was led by commoners who used income from migrant labor and agricultural production to purchase the animals imported from Cape Town in South Africa, in the early 1900's. Merino sheep are renowned worldwide for the quality of their wool that is non prickly, tough and stain resistant. Although the sheep are also used for meat, the interesting aspect of this resource unit is their economic importance as commodities of the wool and mohair industry.

3.2.1 Economic factor

Wool and mohair contribute up to 48% of Lesotho's Gross Domestic Product (GDP) (Africa Development Bank 2015). Half the population of the rural community depend on the wool and mohair sector (Woodfine 2013). This has amped this resource unit up to be of high economic value in the country. Rearing of sheep is not only a subsistence activity but also economic, and hence sheep are regarded as an investment (Swallow 1987). The Government of Lesotho saw the potential of upscaling this industry and in collaboration with donor institutes proposed the Wool and Mohair Promotion Project (WAMPP). This is a project designed to upscale the wool and mohair industry of Lesotho by introducing climate-smart rangeland management, improving animal nutrition and ensuring national markets for both meat and wool and mohair products (Worldbank 2018). The project is ongoing, and results are yet to be envisaged.

The Ministry of Agriculture facilitates the shearing sheds countrywide where the wool and mohair shearing occurs. The animals are sheared from the month of September to mid-December using handheld shearing scissors. The shearing sheds are also communal property with minimal upkeep. The wool is categorised according the quality of fibre, and then transported to be auctioned and sold in neighbouring South Africa (Worldbank 2018).

The highest population of sheep and goats is concentrated in the highland areas, the foothills and mountain regions. The direct relationship between the resource unit and the resource system is that low productivity of rangelands and low forage yield results in low quality wool yields (DRRM 2014). This is evidenced by the figures stating that in 1970, a Lesotho merino sheep produced on average 5 kg of wool but as of 2011 it produced only 2.74 kg (Pomela 1999).

3.2.2 Cultural value

Sheep in Lesotho also have a cultural value. They are used to perform rituals, as dowry payment and as food during cultural celebrations (Swallow 1987). Because of the cultural significance, farmers are hesitant to remove unproductive livestock from rangelands.



Figure 4. Lesotho merino sheep. The sheep originates from Australia and it is renowned for its high-quality fibre. (Photo: <https://belafrique.com/our-destinations/lesotho> 2019)

3.3 The governance system

3.3.1 The structure

The governance system of Lesotho's rangeland (Fig. 5) is hierarchical and involves several governing bodies. At Government level, the Ministry of Local Government and Chieftainship is responsible for the administration of chiefs and councillors countrywide. The Ministry of Agriculture and Food Security serves to ensure sustainable food production. The Ministries have extension officers in each district who serve as advisors to the farmers.

Lesotho is a constitutional monarchy, and the presence of chiefs in local settings is very important in land management. The chiefs are regarded as liable for conflict management and livestock authorisation. The chiefs hold the vital role of the "main doorway" or entry point to society. Extension officers have to inform and sensitize the local chief of any interventions before speaking directly to the community. This is where power dynamics are seen, as the chief conveys information that may interest him. This may be viewed as a bottleneck within the system.

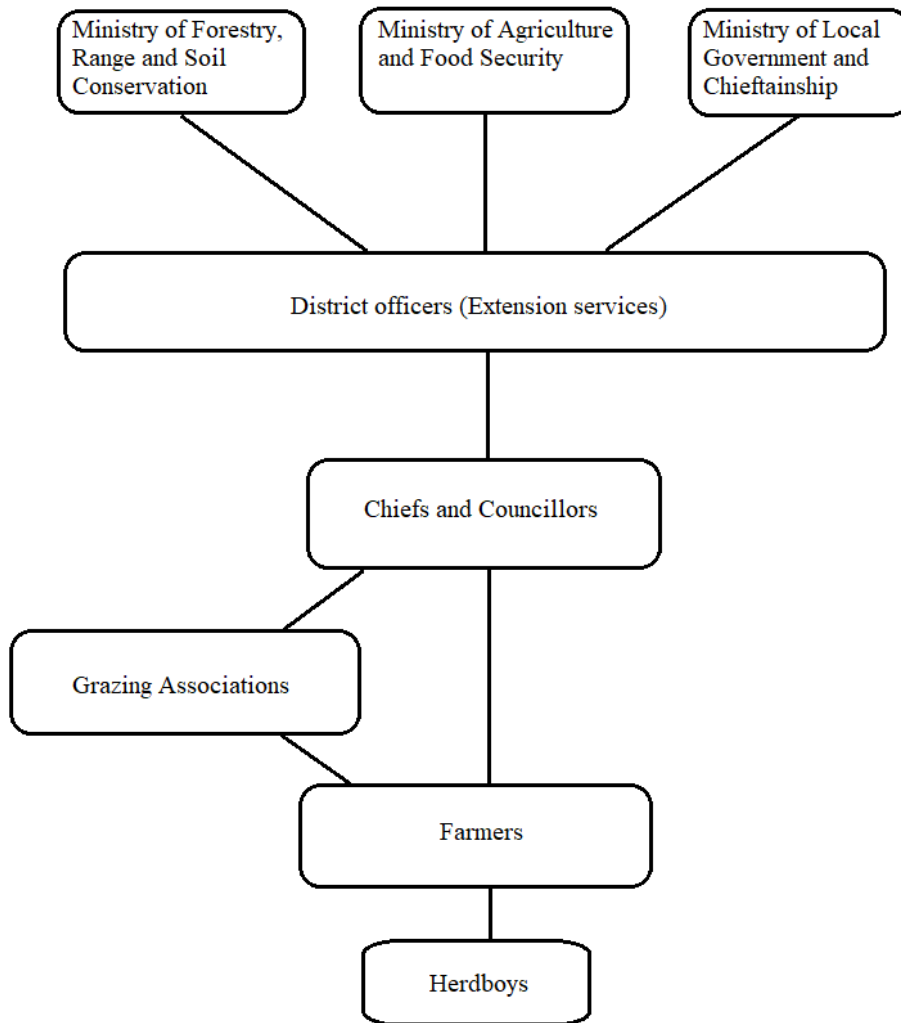


Figure 5. The structure of Lesotho's rangeland governing system, from the ministerial level to the local level; the local herd boy.

3.3.2 Focal ministry

The Ministry of Forestry, Range and Soil Conservation is the main organization responsible for the rangeland SES. The Ministry was established in 2003 and hosts three distinct departments, which are the Department of Forestry, the Department of Soil and water Conservation and the Department of Range Resources Management (DRRM 2014).

According to FAO (2017), Lesotho has a forest cover of about 2% of the total land cover. A country that is predominantly a rural society signifies heavy reliance on fuelwood for heating and cooking. The Department of Forestry's vision is to protect and manage forests, especially indigenous forests, and to ensure energy supply for communities whilst also protecting the environment. The Forest Act of 1998 entails elements such as an integrated approach to forest management and conservation of the land base (DOF 1998). Inter alia to the vision of conserving the land base is the mandate of the Department of Soil and Water Conservation. It is mandated to provide technical guidance to land users in order to conserve water and reclaim the degraded land base through tailor made integrated watershed management approaches.

Implementation of conservation activities dates back to the early 1930's to 1960's, a period that has been named the Pre-Pim's report phase (DSWC 2013). The activities include the construction of mechanical conservation structures to control soil erosion and reclaim eroded areas.

Although conservation initiatives in Lesotho enjoy tremendous support from donors such as the Food and Agriculture Organization (FAO), International Fund for Agriculture Development (IFAD) and Global Environmental Fund (GEF), land degradation remains a challenge. The Government of Lesotho ratified the United Nations Convention to Combat Desertification (UNCCD) in 1995 with the Department of Soil and Water Conservation as focal department. In compliance with the UNCCD ten-year strategic plan, Lesotho formulated its National Action Plan (NAP), and later in 2015 aligned it to suit the prevailing conditions of desertification. The document outlines strategies to implement anti-desertification measures, to develop early warning systems to enhance preparedness and promote public awareness of desertification control and management of the effects of drought (Pomela 2015). The strategies listed are in alignment with the sentiments that the time is ripe to agree on zero net land degradation to secure the continuing availability of productive land for present and future generations (Pomela 2015; Cowie et al 2018). These sentiments birthed the concept of Land Degradation Neutrality which is vested as part of the mandate of the Department of Soil and Water Conservation.

Land degradation in Lesotho is very prominent on rangelands, which is the major land cover type, and therefore this study focused on management of rangelands in the SES context, but without excluding mandates of the other key departments. This is because all key functions of each department are vital in establishment of a well-managed productive land base for the country. The Department of Range aims to ensure sustainable management of rangelands, to enhance biodiversity and ensure optimum productivity of rangelands (DRRM 2014). Over the years, rangeland degradation has been attributed to old and outdated policies and laws. The Department of Range published their Range Resources Management Policy in 2014. The key objectives of the policy include developing and implementing efficient and effective strategies to avert land and vegetation degradation (DRRM 2014). The policy also emphasizes the need for well-structured institutional arrangements and proposes an institutional arrangement with a two-way communication system, between farmers to the Ministry in order to address efficient management of rangelands (Fig. 6).

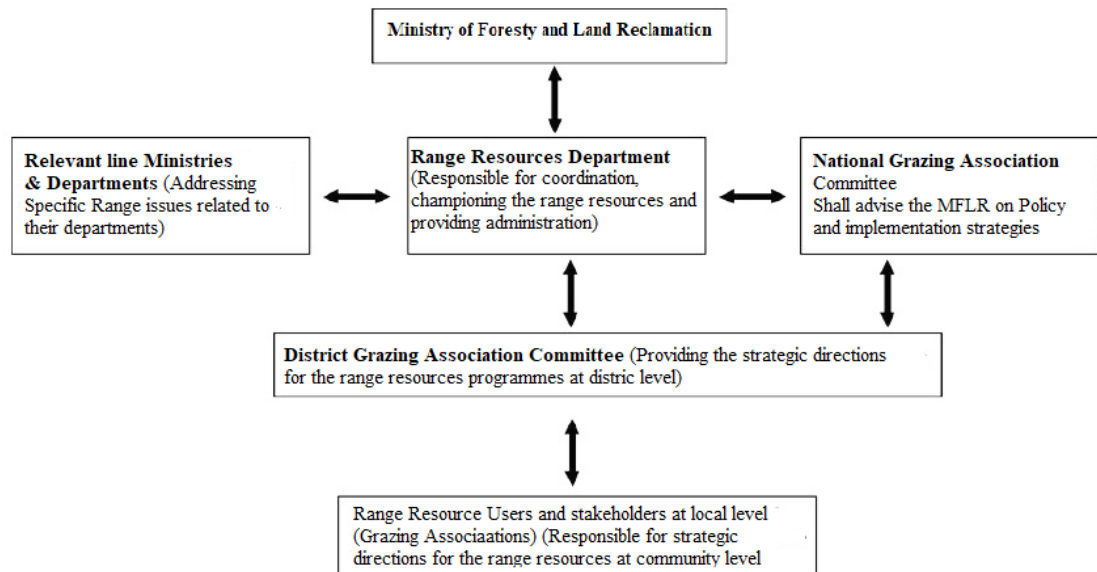


Figure 6. Proposed institutional arrangement for management of Lesotho’s rangeland from the 2014 DRRM policy. The double-headed arrows illustrate two-way communication (reporting and feedback processes).

3.3.3 Land tenure

The land tenure governing the rangelands is communal ownership. This system is said to be responsible for the degradation due to overgrazing (Pule et al 2004). “Land is free” is an undocumented but well-known statement that farmers use to utilize grazing land. Access and use of common pastures in some areas is governed by grazing associations and local area chiefs. Grazing associations are registered bodies of farmers utilizing a common grazing area. They form an association in order to regulate grazing and implement proper land management practices.

3.3.4 Local managers (Grazing Association Herd Boys)

In early 1980 Lesotho, through aid from the USA, formulated community-based management institutions called grazing associations (Ntsohi et al. 2014). They are allocated exclusive grazing rights on rangelands which creates a sense of ownership, and hence effective management of resources. Currently there are 84 grazing associations countrywide. Ntsohi et al. (2014) state that where grazing associations are operational, an improvement in the rangeland condition is visually observed. Farmers have strong communication links through associations and local authorities. Herdmanship is another crucial entity to animal farming. Herding as part of the culture of Basotho dates back to the 17th century and it has seemingly taken high priority. Males (mostly young boys from age six) look after the family livestock or are employed by a wealthy livestock owner to create take-home pay which, however, disallows their access to and retention in education (Pitikoe 2016). This study recognises the herd boys’ indigenous knowledge in land management, as they interact with both rangelands and sheep on a daily basis.

3.4 Actors-Farmers

Although a definite figure for the population of livestock farmers could not be provided, literature reveals that 80% of the population rely on agriculture (Worldbank 2008). Basotho has historically been defined as composed of pastoralists instead of cultivators (Swallow 1987). Ownership of livestock in Lesotho is regarded as an investment. Sheep and cattle are used for cultural ceremonies and dowry payments. The wool and mohair industry is the bedrock of the rural economy from subsistence farmers to breeders (Swallow 1987). From the early inhabitants of Lesotho (Bushmen), livestock farming was practiced inclusive of hunting and the nomadic lifestyle. Rearing of animals grew popular through the years and although most men from Lesotho became migrant labourers to South Africa, they invested most of their remittances in animal husbandry.

Farmers have adopted grazing associations as a means to collaborate in their efforts towards sustainable utilization of grazing land. The associations are proving to be successful, as rangelands governed by them are comparatively productive (Ntsohi 2014).

Lastly, the Rangeland SES is also described by defining the exogenous elements which operate within the system. The system is not static, but dynamic, and these factors greatly affect the sustainability of the system. Lesotho's rangeland SES operates within a fragile political system with weak law enforcement. Conflicts arise between the farmers and governing bodies and are mainly driven by ineffective communication. Political interference hovers over the initiatives of land restoration and the credibility of extension services is compromised.

3.5 Review of existing policies and legal frameworks

The current and central policy governing management of Rangelands in Lesotho is the DRRM Rangeland Management Policy of 2014 whose main aim is to attain sustainable development and management of rangeland resources for the enhanced biodiversity, optimum productivity and improved livelihoods of the present and future generations (DRRM 2014). It came about as a national outcry of dissatisfaction on the use of old and outdated legal frameworks governing the rangelands of Lesotho. This was in reference to previous documents such as the Land Husbandry Act No.22 of 1969, Range Management and Grazing Control Regulations 1980 and subsequent amendments, and Livestock Range Management Policy of 1994 (DRRM 2014).

The current policy is indeed all encompassing as it highlights the role of the Ministry in collaboration with stakeholders and institutions in development and implementation of strategies to address and reverse rangeland degradation whilst also restoring degraded land. It was developed through a consultative process where stakeholders such as local chiefs, farmers and herd boys were engaged. The policy is yet to be amended into a law. Although the policy discourages unprescribed burning of rangelands, transhumance and overstocking, not as much legal action is taken as would be envisaged. According to the survey, livestock farmers indicated that policies and laws in Lesotho are not very efficient in combating land degradation. In total 44% of the respondents interviewed indicated that policy enforcement is very weak in addressing land degradation. The success of LDN highly depends on proper implementation of policies and laws that address land degradation at the national level (Dooley et al 2015). Policies should be backed by a legal framework that stipulates the subsequent action that will be taken in the event of violating policies. It is also vital for

countries to endorse their policies and laws in support of attaining degradation neutrality. The Lesotho LDN target setting exercise was inclined towards the national goals such as vision 2020 and the National Strategic Development Plan 2 (NSDP2). Action towards achieving neutrality should therefore ensure that the primary needs of the community are addressed while the expectations of the national visions of sustainable development are also met.

3.6 Current rangeland management practices

Rangeland management practices are influenced by various factors such as the harsh weather conditions, steep terrain and farmers' motives. Livestock farming is both substantive and commercial to farmers (low scale). Sheep breeding has become not only popular but also economically beneficial, hence attracting more Basotho to livestock farming. The livestock farmers of Lesotho have classified grazing systems that have been used from precolonial times to the present. Local authorities are more responsible for administering practices such as rest rotation grazing (leboella) which is deeply embedded in the culture. Farmers hold great attachment to their practices and local chiefs have been the major custodians of local rangelands. Rangeland resting (leboella) and animal exclusion are key in developing strategies to rehabilitate and conserve biodiversity. Rangeland resting offers plants a preferable period to recover, reproduce and endure harsh conditions (Brunynooghe & MacDonald 2008)

From the survey, the farmers highlighted the four main grazing systems. The grazing systems are continuous, seasonal rotation, high density, and rest rotation (leboella) grazing. The farmers indicated that they practice rest rotation most frequently as opposed to the other grazing system, as shown in figure 7. High density grazing is the least practiced. The respondents also expressed that the high practice of rest rotation produces visible results on rangelands. Forty-two percent noticed a high impact on land due to rest rotation whereas only 14% did not notice any impact. Rest rotation grazing is very rooted in the Basotho livestock rearing culture. Sixty-seven percent of the farmers indicated that it is a practice that they strongly recommend and would like for it to be adapted on a larger scale countrywide (Fig. 8). It is a practice that they will not give up as it has produced significant benefits to their rangelands. A total of 18.2% of the farmers indicated that they do not recommend wide adoption of rest rotation, while 14.4% highlighted that maybe they would (on a neutral basis) (Fig. 8). The study therefore identifies the practice of rest rotation as a leverage to the SES.

The strong attachment and value given to the rest rotation (leboella) practice was well pronounced in this study. Benefits from this practice, have been witnessed from as early as 1920. The LDN planning process should therefore incorporate traditional values and practices while also considering the ecological expertise on land management (Okpara et al. 2018). The benefits of rest rotation include enhanced plant diversity and improved rangeland productivity (Rampai 2017). External interventions can at times affect the social aspects of rangeland system and yield negative results on the resource system (Li & Li 2012). It is therefore very important to recognize and pay attention to the culture, values and practices while establishing the advancements that can be undertaken to address degradation neutrality (Okpara et al. 2018).

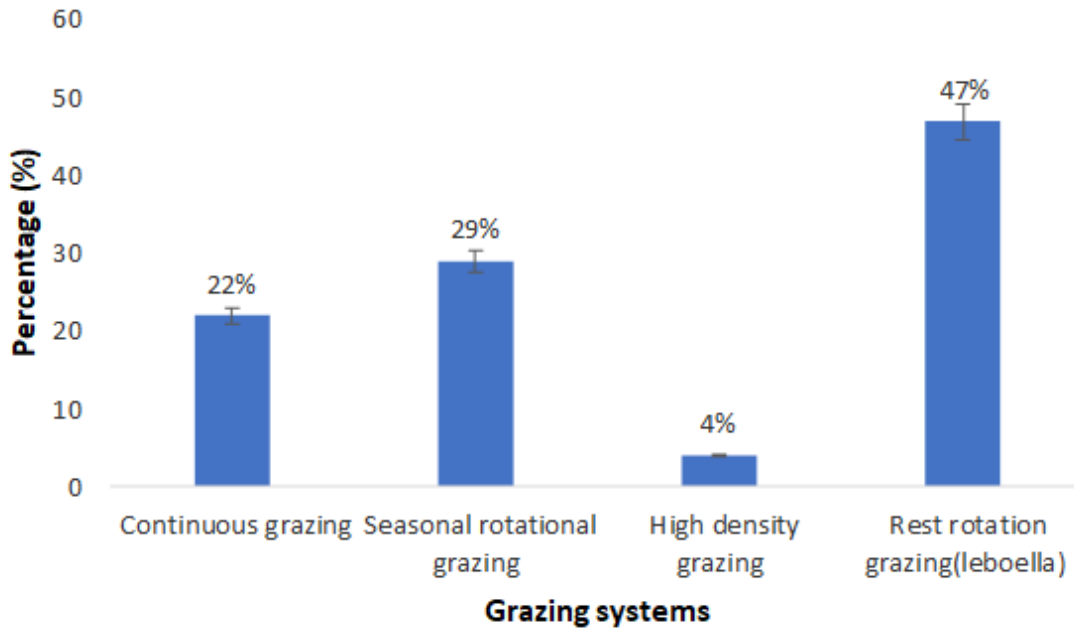


Figure 7. Grazing systems practiced by livestock farmers in Lesotho, showing the least and the most practiced systems.

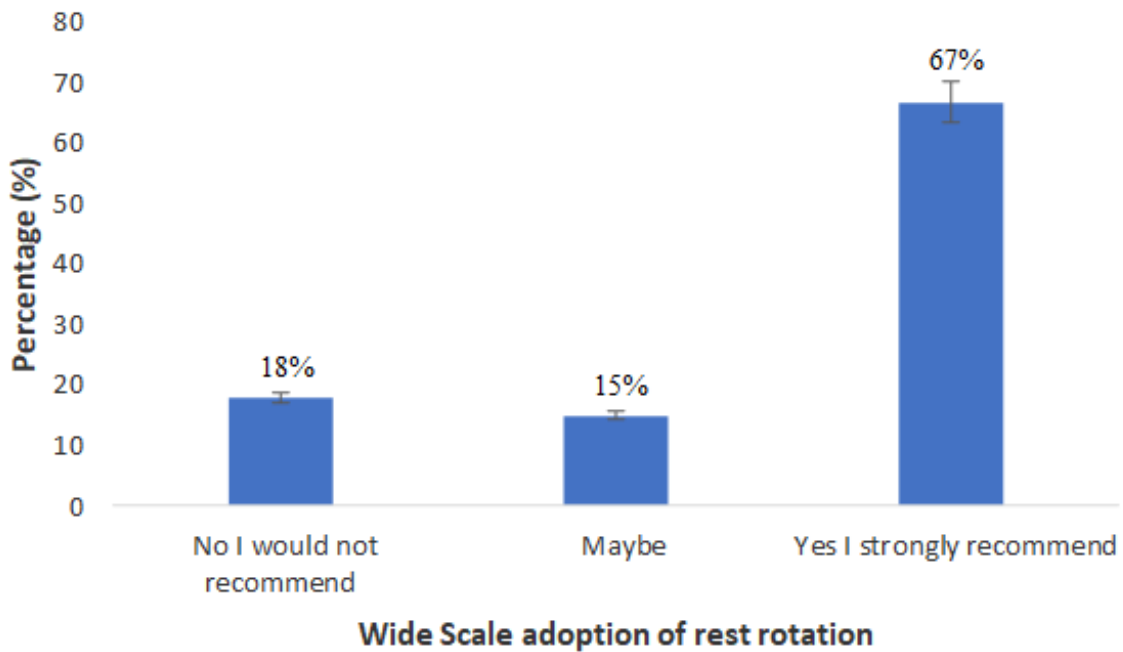


Figure 8. Respondents' opinions on wide-scale adoption of the rest rotation grazing system.

3.7 Promotion of farmer stewardship

Rangeland governance through focal ministry and department must also adopt and encourage new concepts of rangeland management. Farmers should be encouraged to participate in collaborative learning and collective action at both the local and regional scales. Briske and Walker (2017) reveal that management of rangelands requires adaptation to new concepts and

practices. Farmers must acknowledge themselves through effective management practices not only as managers but as rangeland stewards (Pacheco et al. 2018). The lack of institutional support and scientific counsel has been noted as the major deterrent to combatting land degradation. Results obtained from the survey regarding extension services indicated that 45% agreed to receiving guidance from government extension services. The focal ministry has established district offices in the 10 districts of Lesotho which deploy extension services and advisory to farmers. The ministry organizes farmer training and study tours to engage and capacitate farmers accordingly. The survey indicated that 25% of the respondents do not receive adequate government extension services. Farmers as land custodians must be informed and kept updated on land management issues. In the current phase, where Lesotho is faced with changing weather conditions that are negatively affecting their production, they must be well informed and knowledgeable about adaptive and response measures (LMS 2017). Farmers therefore indicated through survey responses that capacitation is the most crucial step to addressing land degradation (Fig. 9). Thirty-six percent of the respondents indicated capacitation of farmers. This result was followed by 34.6% who agreed on developing laws and policies, while 16.4% agreed on encouraging farmer incentives.

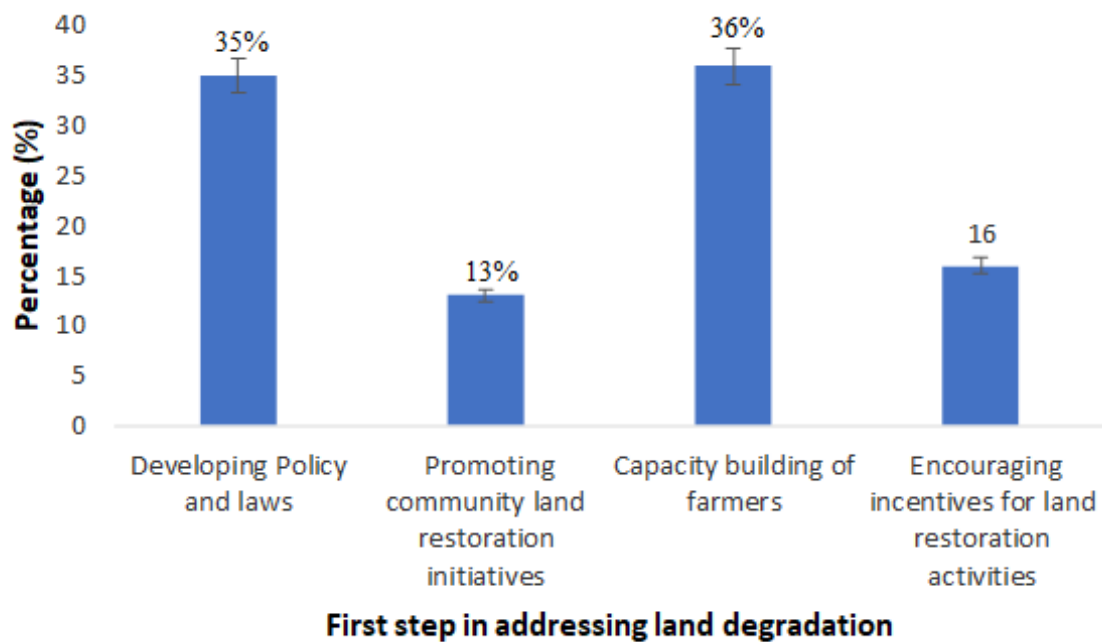


Figure 9. First step /actions that are crucial in addressing land degradation of rangelands.

An enabling environment for LDN depicts a state where all stakeholders are active and willing to participate (Kust et al. 2017). They are characterized as both committed and responsible stakeholders whose primary aim is to address land degradation. The farmers do require capacity building. But it is also important for the technical extension officers to be capacitated as well. Awareness instills motivation and action towards proper land management (Willemen et al. 2018). Although some farmers vouched mainly for encouragement of incentives, Pagiola (1999) argues that it is privately beneficial to farmers as individuals and hence not sustainable for the broader land management objective.

4. CONCLUSION AND RECOMMENDATIONS

To view the rangeland management sector of Lesotho through a Socio Ecological System lens is important in planning for LDN initiatives. Identifying and defining all important first tier and second tier variables in the rangeland SES provides guidance in terms of understanding the social and the biophysical elements involved. For instance, Lesotho's rangelands are overstocked due to the extensive grazing by sheep which are not viewed as food but as "investments". The cultural practices and norms increase the value of sheep and hence it can be viewed as a major bottleneck to government initiatives such as the need to de-stock rangelands as an answer to overgrazing. An interesting aspect to the social side of the system is the power influence dynamics identified between the chiefs and the governing ministries. Although the focal ministry is seen as a body that affirms rules and regulations governing rangelands, the chief is addressed prior to disseminating the information to the community. This can be viewed as both a leverage and bottleneck as there remains uncertainty as to the chief's acceptance.

Policies and law play a pivotal role, and the current Range Management policy is no exception. However, due to weak law enforcement in the country, adherence to laws and guidelines is still a problem. This is a factor that can distinctively hinder progress towards attainment of LDN by 2030. An attribute that is worth enhancing in pursuit of LDN is the rangeland management practices that are deeply rooted in Basotho culture such as rest rotation (Leboella). The grazing practice is said to yield positive results on rangeland productivity and plant diversity. It is therefore recommended as a practice that should be promoted throughout the country.

Achieving degradation neutrality and proper land management can also be facilitated by increasing awareness and understanding which is said to spark motivation among various stakeholders. The farmers vouched for capacitation towards rangeland management as the most crucial step that should be taken to address land degradation. Farmer capacitation could lead them more towards actions to restore and sustain their rangelands. Farmer to farmer participatory training must be encouraged. This study also established the crucial role that herd boys play in the land management of Lesotho. By virtue of herd boys interacting with both the environment and the sheep daily, they are therefore vital knowledge hubs upon which the Ministry can prioritize and develop a systematic information sharing venture and platform.

With reference to the findings, the study therefore makes the following recommendations:

- Improve farmer capacitation initiatives that promote land stewardship. Quinlan (1995) explains that during colonial rule, Lesotho's farmers were perceived as land managers whereas during post-colonial rule they were regarded as land users. This therefore calls for strong initiatives that can help the farmers realise their essence as critical actors in the vision towards degradation neutrality.
- For the focal Ministry to create strong governance links with the Ministry of Agriculture and the Ministry of Chieftainship. Because LDN is a time bound goal, leading ministries should assist each other and not operate unconnectedly. Realization of a degradation neutral Lesotho will benefit the governance, the economy and more importantly the productivity of the land.

- This study lastly recommends a conceptual framework for rangeland SES that is capable of designing and implementing management strategies that benefit farmers, rangelands and government at both local and regional scales (Fig 10).

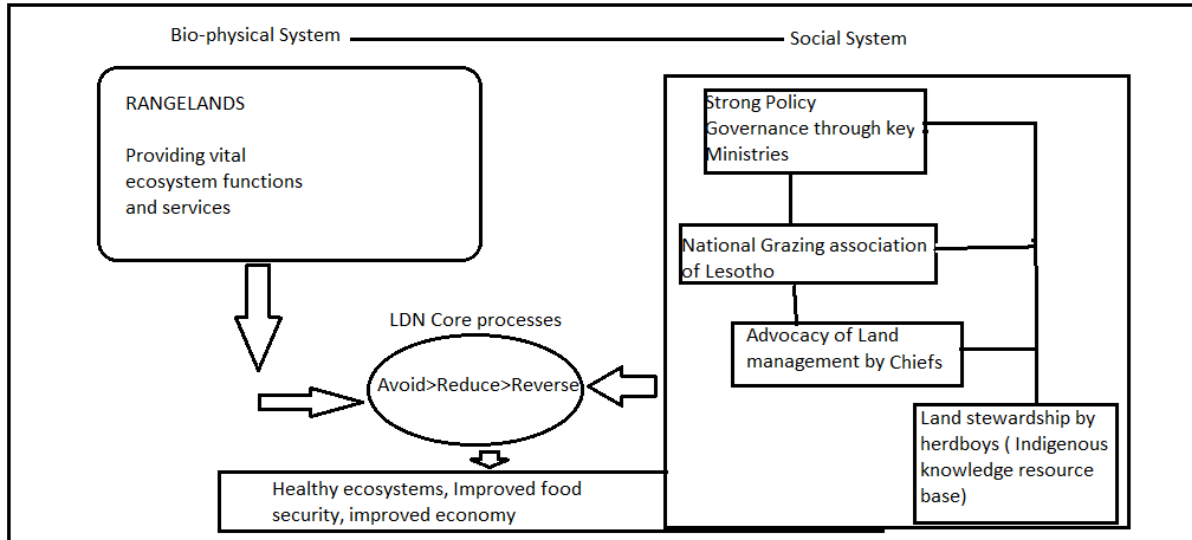


Figure 10. A draft conceptual framework for the rangeland SES of Lesotho and the elements and their interactions, showing the potential and benefits of attaining LDN.

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APPENDICES

Appendix I

FARMER LDN SURVEY

A United Nations University Land Restoration Training (UNULRT) study aimed at identifying the practices and values of Basotho Livestock farmers towards land management.

Question Title

1. Location (District)

- MASERU
- MAFETENG
- LERIBE
- BOTHA BOTHE
- QUTHING
- QACHAS NEK
- MOKHOTLONG
- THABA TSEKA
- MOHALES HOEK
- BEREA

Question Title

2. Gender

- MALE
- FEMALE

Question Title

3. How long have you been a farmer?

- 1 to 5 years
- 5 to 10 years
- 10 to 20 years
- 20 to 30 years

Question Title

4. What are the three most economically beneficial activities in your community?

- Livestock farming
- Crop farming
- Industry (mining and weaving)
- Transportation
- Public service (working for the government)

Question Title

5. As a livestock farmer, which of the following grazing systems do you practice?

- Continuous grazing
- Seasonal rotational grazing
- High density grazing
- Rest rotation grazing (leboella)

Question Title

6. Have you noticed any impact on grazing land due to continuous practice of the grazing system you apply?

no noticeable impact

medium (visible)

High impact

Question Title

7. Would you recommend wide scale adoption of the grazing system you use?

No, I would not recommend

Maybe

Yes, I strongly recommend

Question Title

8. Can you say Livestock farmers in your community APPRECIATE their land?

no

maybe

yes

Question Title

9. Do you receive guidance on land management from Government extension services in your area?

No, we do not

Sometimes

Constantly guided

Question Title

10. To what extent do you think policies and laws play a role in combating land degradation in Lesotho

weak

medium strength

Strong

Question Title

11. If you could make any change to the current Rangeland management system, what would you change?

Private ownership of grazing land

Introduce incentives for farmer restoration initiatives

Implementation and enactment of laws

Effective engagement of all stakeholders

Question Title

12. As a farmer what can you say should be the first step in addressing land degradation on grazing land

Developing policy and laws

Promoting community land restoration initiatives

Capacity building of farmers

Encouraging incentives for land restoration activities

Done

Appendix II

NCCD FOCAL
PERSON

SurveyMonkey

#1

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Friday, July 12, 2019 6:44:10 AM
Last Modified: Friday, July 12, 2019 7:04:28 AM
Time Spent: 00:20:18
IP Address: 41.203.191.100

QUIZ SUMMARY

40%	Jun-15	01-Jan	100%
SCORE	POINTS	RANK	PERCENTILE

QUIZ RESULTS

Correct	Incorrect	Partially Correct	Skipped	Total Questions
	0	2	0	2

Page 1: UNCCD FOCAL Person

Q1 About how long have you been in your current position (Focal Person)?

Years	5
Months	10

Q2 What roles do you play as a Focal person (you can

*

**Country (5pts)
Team**

Lead

select multiple
answers)?

05-Oct pts

Q3 In Your Opinion what are the major challenges to combating Land Degradation in Lesotho?

1. Political interference
2. Shortage of resources.
3. Capacity

Q4 Lesotho is among the first countries to successfully set voluntary Land Degradation Neutrality targets in Africa. Are there any measures that have been placed to facilitate attainment of these targets?

Areas of operation have been selected countrywide to monitor progress until 2030.

Q5 How is the community engagement program run in Lesotho to address or promote LDN Initiatives?

Communities are employed on a temporary rotational basis to work on the catchments to promote the initiative.

01-Feb

UNCCD FOCAL PERSON SurveyMonkey

Q6 In your view, which three (3) stakeholders play a vital

*
Experts (1pt)

role in ensuring that by 2030 Lesotho will be a
Degradation Neutral
state

1/5 pts

Q7 What is your view on the importance of National Policies and laws that address LDN at regional (districts) and local scale?

They have to be harmonised so that they embrace the LDN concept. The success of LDN depends entirely on proper implementation of policies and laws.

Q8 When Lesotho attains LDN by 2030, What are the benefits you see for the country?

Improved productivity and fertility of the soil, hence positive changes in the environment and the living conditions of the local Communities.