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GENDERED FOCUS ON LAND DEGRADATION IN BOTHA-BOTHE, LESOTHO: PERCEPTIONS, IMPACTS AND CHALLENGES WITH REHABILITATION

Mapita Makatleho Morapeli
Ministry of Forestry, Range and Soil Conservation, Lesotho
mapitamorapeli@gmail.com

Supervisor
Magnfríður Júlíusdóttir
University of Iceland
mj@hi.is

ABSTRACT

Land degradation is a serious environmental problem in most sub-Saharan countries including the Mountain Kingdom, Lesotho. Land rehabilitation measures have been intensively undertaken throughout the country to address this problem as well as enhancing livelihoods of the Basotho. The impact has been low, however, as restoration takes quite some time. This study aimed at exploring gendered farmers' perceptions of the problem, its impacts and challenges in addressing it. The focus was on a rural community in Botha-Bothe district, Lesotho, where government land rehabilitation measures have been undertaken. Open-ended questions were used to obtain views from key informants, men and women farmers and herders. The findings showed that participants experienced land degradation in various ways, and many were more concerned about degradation of croplands than rangelands. Some male herders described rangeland condition as not deteriorating. Rangeland management is a male-oriented activity while women are more active in crop farming and expressed more worries about degradation impacts on food security and workload. Land management decisions are tied to household headship and men dominate decision making on land issues. Concerns were raised about youths' and herders' willingness to participate in rehabilitation measures.

Key words: land degradation, land management, rehabilitation measures, perspectives

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TABLE OF CONTENTS

1. INTRODUCTION

The importance of land as a resource is invaluable to human livelihoods due to provision of agricultural products. In southern Africa, agriculture is a livelihood source for more than two thirds of the population (Ighodaro et al. 2013). In Lesotho, around 80% of the country`s rural population depends on agricultural production for a living (Mekkib et al. 2015). However, with the prevailing high soil erosion rate of 39.5 million tons/year (Kakonge 2002), livelihood sustenance is endangered. The severity of land degradation is increased with soil erosion (Kiage 2013). With the advent of changing climate (erratic rainfall, recurring dry spells, changing growing season length, etc.) and due to natural biophysical features of the landscapes, the negative impact on agricultural production has increased.

The government of Lesotho declared a state of emergency on food security in 2012, as a result of drought, coupled with low soil productivity due to erosion (Leduka et al. 2015). The government's vision to attain a food secure nation by 2020 (Kingdom of Lesotho 2004), is only feasible with productive agriculture, which depends on proper management of croplands and rangelands. To address land degradation, the government of Lesotho in 2003 established the Ministry of Forestry, Range and Soil Conservation as solely responsible for rehabilitation of degraded land (Government of Lesotho 2008). Each year government allocates over 10 million US Dollars for land reclamation activities as part of the Poverty Alleviation Program (PAP) throughout the country. People are engaged for some 20 days, after which they receive some cash. The researcher's own experience over the past 13 years of serving this ministry is that land recovery due to this initiative has been quite low in the past 10 years, or since its inception.

Land is a precious resource in sustaining day to day nutrition. Both men and women contribute in both crop and livestock production in Lesotho, but there are cultural norms such as patriarchal decision making on resource use within families; which define their roles in farming. Culturally women in Lesotho are obliged with tending of crops from weeding to harvesting. It is also their obligation to provide household nourishment. Land degradation negatively impacts agricultural productivity and consequently on women's cultural role to ensure household food security.

The impacts of land degradation are not limited to food insecurity but extend to conflicts over resource use among neighbouring communities and also contribute to migration of men in search of paying jobs. Due to the migration of men, agricultural activities in some households are left with the women who are also loaded with many household chores (ChwaaraeTeg 2015). The gender action plan of the United Nations Convention to Combat Desertification (UNCCD), emphasises inclusion of women in addressing land and water issues, as they make up 43% of the agricultural labour force in developing countries (UNCCD 2008). According to Collantes et al. (2018) the inclusion of women in land management issues creates an enabling environment for addressing land degradation.

In view of the above situation, the researcher was intrigued by the gendered effects of land degradation in rural farming communities in Lesotho, as well as various farmers' views on rehabilitation measures undertaken. The objectives of the study were twofold:

a) To increase knowledge on gendered perceptions on land degradation and its impacts.
b) To understand land management challenges faced by different types of farm households, including type of farming (crop-livestock) and gender of the household head.

The research questions were:

1. What views do men and women have on land degradation and how are they affected by it?
2. What are the actions men and women take to halt land degradation and which challenges do they experience in land management?

2. LITERATURE REVIEW

2.1.1 Land degradation

Land, as part of nature, is comprised of water, plants, animals, microclimate, soil and geographic formations and processes (Katyal & Vlek 2000). The phenomenon of land degradation hence refers to the deterioration of the functionality of each of these components in a given landscape. It is deterioration of ecosystem functionality or productivity (Stavi & Rattan 2015) and is specific for a given land use (Katyal & Vlek 2000), e.g. arable land and rangeland.

Southern African soils are low in organic matter and clay content (Msangi 2007). These properties render them less favourable for crop production as they have low water holding capacity. The sub-Saharan region is also drier relative to other parts of the world and the condition worsened from 1970 to 2000, when drought globally escalated (Stavi & Rattan 2015). The effect of climate in this regard is related to the rainfall patterns as soils crack during dry spells and detach easily during heavy rainfall, resulting in formation of deep gullies (Engdawork & Bork 2016). Under different land use and management practices, land degradation indicators will differ.

Land degradation is a consequence of several drivers in different parts of the world. However, agricultural practices account for 80% of global land degradation (Tesfahunegn 2019). The causes of this enormous problem in agricultural production vary by studies and places; from burning of grasslands and woodlands in Tanzania (Kangalawe 2012), land use change and drought in South Africa (Msangi 2007) and poor land management practices and overgrazing in Lesotho (FAO [Food and Agricultural Organization] 2017). The causes may be more complicated than the above-mentioned in the era of climate change, and the sustainable management of the environment also requires appreciation of the perspectives of different decision makers (Kangalawe 2012). Land management choices that farmers make are influenced by their perceptions of the resource, which can differ from one place to another ((Engdawork & Bork 2016). According to Laurent et al. (2015), human views, opinions or behaviour are an outcome of individual knowledge. Land management is at times influenced by circumstances beyond farmers' control. In a situation where farmers have limited farmland, for example, it is impossible to fallow land even though they might know the importance of it (Orchard et al. 2017).

The land degradation impacts experienced by countries differ based on reliance of the country on agriculture. On a global scale, land degradation affects the livelihoods of 1.5 billion people (Kiptoo & Mirzabaev 2014). The majority of people affected are found in developing countries (UNCCD 2016). In the Southern African region, most land is used for agriculture and sustains the livelihoods of most of the rural communities. In the beginning of the 21st century, agriculture in Lesotho sustained 80% of the rural population (CIAT [International Center for Tropical Agriculture] 2018), 70-75% in Namibia and 70% in Zimbabwe (Msangi 2007).

2.2 Lesotho land tenure

The customary laws of Lesotho gave individuals usufruct rights to land, but not ownership as land belongs to all Basotho (Lesotho people, the singular form is Mosotho), with the King as the trustee. This tradition dates as far back as the 19th century when the nation was founded after several wars over land ownership and boundaries between the emergent nation and the then residents of the Cape Colony and Dutch settlers in the Free State (Kishindo 1993). Individual land users owned the crops they produced but not the land, and user rights were nullified for individuals who decided to move to reside in other villages. Such croplands would be reverted to the chief for reallocation to people under his authority (Pule & Thabane 2004). Land reallocation, however, was at times done with favouritism by the chiefs. Elderly women and widows were often the victims of such bias. Personal property on residential sites belonged to individuals and could be taken along when moving away. The new local governance ruling, which aims at accountability, transparency and decentralization of services, includes community councillors executing some roles which were previously performed by chiefs, such as land allocation (Moran et al. 2009). In the past, there were fewer people and land allocation to the newly married males as family heads was not a challenge, unlike now. Population growth and environmental degradation are usually correlated. As population grows while farmland remains the same, production cannot sustain livelihoods and marginal lands are then converted into croplands (Bechtel 2010).

Customarily, women in Lesotho accessed land through their husbands for either farming or residential purposes as land allocation was a right to married men only. Divorced or separated women, as well as widows, did not own land unless they remarried or were sometimes allocated pieces of land by their birth families for food production (Kishindo 1993). There have been several shifts on women and land ownership in Lesotho over the years as evidenced by different legislation that government passed on land and women's rights. The Land Act of 2010 gives women rights to own and inherit land (Kingdom of Lesotho 2010). This has been such a big commitment by the government in ensuring equality for both men and women. Before that, women did not have inheritance rights to land belonging to their spouses in cases of death or divorce. Another move has been the passing of the Legal Capacity of Married Persons Act of 2006, which gives both women and men equal rights over the property they own (Kingdom of Lesotho 2006), meaning that women are no longer regarded as minors to either their fathers or spouses. However, the implementation of these legal frameworks is still far from being achieved due to the patriarchal culture of the Basotho nation (ChwaaraeTeg 2015).

African women play a significant role in agriculture irrespective of land ownership, which differs from one country to another. In Malawi, women land ownership is relatively higher than most countries in the southern African region (Behrman 2017), though men still own more land. Land ownership is important in land management as it influences decision making. Women's land ownership to some extent influences bargaining power within households (Doss 2005). Household headship, similarly plays a role in land management decision making and adoption of new innovations in agricultural production (Peterman et al. 2014). In sub-Saharan Africa, common women's roles include care of the elderly and childcare, preparation of meals for the family, house cleaning, fuelwood and water collection and then crop production (Riley & Krogman 1993). Childcare and other household chores' roles are usually not substitutable between men and women, leaving more workload on women during farming peak seasons. In dry areas, women put more effort than men into controlling land degradation as well as rehabilitation of degraded lands, but the extent may vary in different countries (Karmebäck et al. 2015).

2.3 Women's role in agriculture

The role of women in agriculture varies from country to country over the world, with a significant contribution in less developed countries where they are involved as labourers on farms or as farmers themselves. In Lesotho, Mozambique and Sierra Leone, the contribution of women's labour in agriculture is around 60% while it is at 30% in south-eastern Asia (FAO 2011). Basotho women in the past owned land through their husbands only as they were not allocated land. Common women´s tasks in agriculture were weeding, bird-scaring, harvesting and threshing, while men would till the land (Eldredge 1993). This work division remained the same even after introduction of implements such as ox-drawn ploughs.

In Lesotho, women have for a long time played a very important role in food production as they have always been into farming unlike men who would leave in search of other jobs. The patriarchal culture of Basotho, however, favours that men as heads of the families make decisions and some family decisions therefore had to wait while they were away. Migration of Basotho men to South Africa started in the early 19th century when they were engaged in the mines or farms for some earnings (Maphosa & Morojele 2013). Around the year 1886 the demand for male labourers in South African mines increased, coinciding with the time when agricultural production was relatively low in the country (Kishindo 1993).

The country lost most of its arable land as peace agreements under British rule, which continuously shifted the country's borders, leaving a smaller area for agricultural production (Mensah & Naidoo 2011). Another driver of migration during the colonial rule has been taxation; men were compelled to leave their families in search of jobs that would afford them to meet their tax obligations (Mensah & Naidoo 2011). Agriculture was therefore left to women as men went to the mines to support the household livelihood. However, the Basotho male labour force in the South African mines dropped significantly after the year 2000 (Fogelman 2016). Nonetheless, retrenchment of Lesotho migrant labourers from South African mines does not imply enhanced agricultural productivity as earnings from the mines supported acquisition of agricultural inputs (Eldredge 1993). In developing countries, the effect of labour migration on agriculture is usually compensated by remittances sent back home as the remaining family members could afford to hire casual/external labourers to complement family labour in the execution of agricultural activities (Atamanov & Van den Berg 2012).

3. METHODS

3.1 Study area

The Mountain Kingdom of Lesotho is a small southern African country (30,588 km^2) completely enclaved by the Republic of South Africa (Letsie & Grab 2015). The study was conducted in the northern district called Botha-Bothe, in Ha Ketlane village, which is in the north-western part of the district. The area is just along the country's border with South Africa. Soils in the Mountain Kingdom are generally derived from either basalt or sedimentary rock formation (Majara 2005). Within the study area, soils are of sedimentary rock origin (sandstone), deep on foot slopes where agricultural production is undertaken, shallower on slopes where the rangelands are.

Based on the four agroecological divisions of the country (mountains, lowlands, foothills and the Senqu River valley), the study area is within the foothills zone where the elevation ranges

between 1,800 m to 2,000 m above sea level (LMS [Lesotho Metereological Services] n.d.). The study sub-catchment area is comprised of seven villages (Paballong, Ha Seapi, Ha Sejakane, Ha Ketlane, Ha Mokotjela, Ha Mou, and Ha Lepatoa,). The focus was on Ha Ketlane as rehabilitation measures had been undertaken in that village. Figure 1 shows a map of Lesotho with the four agroecological zones and the study district Botha-Bothe shown in the north.

Figure 1. Districts and agroecological zones of Lesotho. (Source: Mekbib et al. 2015).

The population of the study area in 2016 was 94 males and 115 females, from 41 households (Bureau of Statistics [BOS] Leotho 2016). Land use in the study area included rangelands with some scattered indigenous shrubs, arable land, patches of exotic tree plantations and settlements. A mixture of rainfed crop and livestock farming was a common practice, though proximity of arable land to the Caledon River, which borders the country with South Africa, would allow for irrigation. Ha Ketlane was purposefully selected because the government land rehabilitation programme had been ongoing in the area since 2017. The measures undertaken have been removal of encroaching shrubs from rangelands, grazing exclusion, construction of stone structures to halt erosion on rangelands as well as in crop lands and tree planting around homesteads as windbreaks (M Seapi, 27 June 2019, Ngoajane Community Council Lesotho, personal communication).

3.2 Research method and data collection

Qualitative primary data was collected from individual farmers and key informants in interviews, while secondary data used was obtained from various sources. The study aimed at attaining farmers' insights on land degradation as well as restorative approaches used in the study area. A qualitative approach was used as it is relevant in understanding peoples' experience of a phenomenon or situation (Nowell et al. 2017). A total of 16 participants (Table 1) were interviewed.

Table 1. Study participants by categories.

Category	Number	Source of information on
Key informants (chief and councillor)	2	Natural resources management and governance at local level.
Herders (usually men of various ages)	2	Drivers and indicators of rangeland degradation.
Male crop farmer	2	Land degradation from crop production view.
Male crop and livestock farmer	2	Degradation from both crop lands and rangelands, trends on rangeland condition
Female crop farmer from male headed household	2	Experiences on crop farming and land management under male household headship.
Female crop and livestock farmer from male headed household	2	Women's needs and experience in both crop and livestock farming.
Female crop farmer from female headed household	2	Challenges they faced as family heads in relation to crop farming, land degradation as well as rehabilitation program implemented.
Female crop and livestock farmer from female headed household	2	Challenges they faced as family heads in relation to crop farming, land degradation as well as rehabilitation program implemented.
TOTAL	**16**	

The roles of the local chief and councillor included protection of natural resources, so including them as key informants in the study was valuable. Farmers were divided by gender, household headship and type of farming (crop and/or livestock farming) as they might have had different experiences and challenges related to land degradation. Household headship was an important consideration due to gendered norms in decision making within farming households. Herders were also included as they were on a daily basis herding livestock and therefore exposed to the environment and could share changes observed over time on rangelands.

Selection of participants among farmers and herders was done with the assistance of local authorities as they were familiar with the characteristics of households in the study area. It is always decent to recognize the community's social structures (Hennink et al. 2011); it is polite and acceptable to report to the chief upon arrival in a village. To avoid the bias of local authorities, several names of farmers were noted from them, from which the research assistants picked for the different categories.

Face-to-face interviews were conducted using open-ended questions. This allowed for probing and use of follow-up questions for more clarity. It is always convenient conducting interviews at participants' home (Hennink et al. 2011). For this study, some respondents were interviewed at their homes while some crop farmers were interviewed in the fields as they were harvesting crops, in the busy season when the study was undertaken. Interviewing in the fields was useful as respondents could easily relate the questions asked to what they saw in the fields. All responses were recorded on a voice recorder upon approval of the respondents. The interview frames were piloted in a different farming community to ensure clarity of the interview guide. Before each interview a letter was read to the interviewee, which introduced the research

assistants, the study aims and the ethical considerations of the study. The interview guides for the different categories are attached as appendices.

The research assistants were two gentlemen from the Ministry of Forestry, Range and Soil Conservation in Botha-Bothe district. They were both very knowledgeable about working with communities on land management. One was from the Soil and Water Conservation Department while the other was from Range Resources Management. Their positions could have influenced participants responses as some might have known them from their previous visits on their normal mandate. The respondents might have overstressed some impacts of land degradation hoping officials would influence decisions on assistance with the problem. Some responses on land management might have also been inclined towards pleasing the research assistants, knowing the efforts they took to create awareness in the communities. There is also a possibility that women felt uncomfortable responding to some questions on decision making, as men are culturally family heads in Lesotho.

3.3 Data analysis

All the field records were transcribed by the research assistants in the local language, Sesotho. The researcher went through the records, read the transcripts and translated to English. Thematic analysis was a relevant tool for the study as it allows investigating similarities and differences in the views of the respondents (Nowell et al. 2017). The transcripts were coded and grouped into themes. With the initial codes, the researcher narrowed down relevant responses as participants had been at liberty to answer in their own way due to the open-ended questions. Similar codes were grouped together and named under sub-themes and then into themes. Thematic analysis involves investigating participants' responses and underlying reasons behind the responses they give (Maguire & Delahunt 2017). The established themes were interpreted in the context of former studies on similar issues.

4. RESULTS

This section presents findings obtained on perceptions and impacts of land degradation on men and women. Their land management practices were also looked into and the rehabilitation measures used to address land degradation. Themes are presented below and interpreted, giving voice to participants by direct quotes.

4.1 Perceptions on land degradation

To understand how participants perceived land degradation in their community, they were asked to describe the causes and indicators they have observed over time, in the context of their agricultural production.

The key informants, i.e. the councillor and chief, both attested to water erosion being a cause of land degradation, but they had different views on the indicators. According to the chief, land degradation is caused by drought and the indicators were gullies and bare rocks. This was his explanation:

> *….it means that land has changed from what it was in the past. There are dongas, in some areas bare rock due to water erosion. In my view this is caused by drought as vegetation withers and dries up; and is washed off during heavy rains.*

The councilor however regarded the land degradation indicators to be reduced soil fertility and crop yield connected to the changing climate:

> *On croplands the situation is getting worse. Fields close to the river are eroded as the river overflows. In some areas the situation is not as bad, but climate change has really affected us, crop yields have been reduced and soil fertility is reduced. On rangeland soil is eroding, leaving bare rocks in some areas. Thatch grass is less abundant.*

Most of the farmers stated that the conditions of both rangelands and cropland were changing. Reduction in crop yield seemed a common indicator amongst all respondents, followed by development of gullies in the fields, as they all agreed that croplands are continually degrading. They also attributed low crop production to decreasing soil fertility. On rangelands the participants' views differed. Among farmers, some women and most men, it was alluded to that the rangeland condition was deteriorating as indicated by reduced vegetation cover and bare rock patches. One elderly male crop farmer reported improper management of rangelands as the cause of rangeland degradation and put it this way:

> *On crop lands is low yield. I get low yield compared to the past, the soil is less productive. On rangelands degradation relates to not taking good care of our rangelands, like rotation. The condition is really bad right now. I swear by the living God, rangelands have degraded (Ka Molimo le thefulehile).*

On the other hand, herders claimed that rangeland condition has not changed as they managed their resource properly:

> *On crop land, degradation is advancing. Crop yields have reduced significantly compared to the past. On rangelands, the condition is as good as before due to rotation and exclusion of grazing for some time.*

With that view they stated that bare rock patches have always been there, they were not new to the landscape.

It is evident that land degradation in croplands was viewed as more serious by the respondents, in the form of erosion and fertility depletion. The causes vary from overgrazing on grazing areas, to heavy rainfall following prolonged droughts on arable land. To most women farmers, land degradation was related to crop farming as they mentioned more indicators related to croplands degradation, leaving out rangelands. A summary of responses on awareness of land degradation, causes and indicators is shown in Table 2. The most remarkable indicators reported on croplands were crop failure and development of gullies.

4.2 Land degradation impacts

Farmers experienced quite similar impacts of land degradation. Crop and livestock farmers put more emphasis on livestock productivity which was dependent on rangeland, as farmers hardly bought feed for livestock. The practice was grazing livestock on communal rangelands. One female crop and livestock farmer described the impacts as undesirable for livestock as the general health of the animals was bad:

> *I am negatively affected as food insecurity results. With livestock, products are reduced as rangelands are in bad condition. We sell our livestock at low prices as they are emaciated.*

Table 2. Farmers' definitions and views on causes and indicators of land degradation

Land degradation defined	**Causes**	**Indicators-croplands**	**Indicators-rangeland**
Soil erosion	Drought	Crop failure/low crop yield	No grass
Low soil productivity	Runoff/ water erosion	Gullies	Bare rock
Change of soil structure	Use of chemical fertilizer		Thatch grass less abundant
	Climate change		Shrub encroachment
	River flooding		Less abundance of some palatable grass species
	Heavy rains		Rills

An impact particularly mentioned by women farmers was food insecurity though it affected everyone in the family. This can be interpreted as failure to fulfil their obligation of providing household nutrition. Everyone looked to them for food and they reported that as very stressful. Those women farmers who were also heads of their families reported that a lot of obligations they had were affected as income from agricultural and natural products was declining due to land degradation. They could no longer get enough thatch grass for sale, and it was difficult to provide for the needs of dependent grandchildren, as one widow described:

> *Degradation in croplands affects me negatively. Food insecurity is a problem. This problem is very stressful, too much thinking is not healthy. On the other hand, degradation of rangelands affects me as a woman though I do not own livestock. From rangelands we get thatch grass for our houses, we sell excess for household income. Lately such grasses are not as abundant as in the past. This is also stressful as I am raising my grandchildren, for whom I provide school fees, bus fare and other needs. It is now hard to meet their needs as income sources have dropped. My husband passed away, so I must provide for my family.*

Rangeland degradation affected both crop and livestock farmers as they described their dependency on livestock despite ownership, as confirmed by one female crop and livestock farmer:

> *…it is difficult now for me as a woman to support the family's nutrition. I must buy food and it is costly. Though I don't own livestock, rangeland degradation also affects me as I use livestock for different activities*.

In farming communities, livestock provide draft power and manure, and also have some cultural use. The challenge of food insecurity cuts across both crop and livestock farmers, resulting in high costs of living as farmers are compelled to buy food.

With land degradation, soils were reported to be low in fertility and farmers were compelled to use fertilizers. One male crop farmer reported:

I am bound to apply fertilizers on crop lands, this is a negative impact.

For crop and livestock farmers, the impact was less as they were mixing both organic and inorganic fertilizers, while crop farmers usually did not have the same access to organic fertilizers.

4.3 Land management at community level

4.3.1 Local governance

At the community level, governance structures included the chief and community councillor. The councillor's roles included coordination of developments at the local level, and control and management of natural resource use including rangelands. The chief on the other hand was responsible for peace keeping in the community, conflict resolution, development issues, environmental protection and overall leadership. These key informants were asked how often they had meetings/gatherings on crop- and/or rangeland issues as well as about community attendance and participation during such meetings.

The community councillor served several villages which constituted her electoral division. In the study area, the councillor attested to having at least three meetings annually on land management. During the cropping season, normally livestock would be moved to the highlands for summer grazing. Therefore, closure of rangelands in the low-lying areas called for a planning meeting with community members during that time. Crop harvesting overlapped with the cold season, during which livestock were brought back from the summer pastures. In all meetings, community involvement was commendable according to the councillor, who held at least three meetings yearly:

> *… before cropping season, during the cropping season and during harvesting. We don't conduct the gatherings on Sundays, but during the week. Community members fully participate. They are also compliant with protection of thatch grass, through exclusion of livestock from grazing.*

The chief confirmed having frequent public meetings on crop- and rangeland management, with acceptable participation:

> *Indeed, we hold gatherings on range management more frequently, three times per month or at least twice. People do participate on range management issues, they are always interested, more men than women attend…*

To the frequent meetings held by the chief, more men attended than women. It shows that range management and general land matters in the community were handled more by men than women. Women were more involved with house chores and childcare. Day-to-day governance of the village was more of the chief's responsibility as the traditional leader, than the community councillor's.

Incidences of grazing in closed rangelands by either local or neighbouring villagers' livestock was reported by the chief and such occurrences would be reported to the responsible neighbouring chiefs before acting:

> *Our problem is non-compliant herders who graze their herds in closed/rested rangelands. Sometimes such herds are from neighbouring villages. Then I must write a letter to their chief notifying him/her of the incidence, sometimes they stop. Even in my village there are obedient and disobedient individuals.*

Protecting and restoring the landscape requires cooperation with the neighbouring communities, and cannot be done by each village in isolation. Damage of croplands through livestock grazing was also reported as herders sometimes were disrespectful and herded livestock in the fields.

4.3.2 Land management practices

Use of terraces was a common practice among the respondents, followed by construction of furrows, tree planting and use of stone structures. One farmer described the land management practices he used as follows:

> *There are terraces on my fields since years back. Some people have furrows above theirs and plant trees, it is quite common to see a few trees in dongas on crop lands.*

The farmers mentioned that terraces have been there for a long time and were maintained. Some farmers used other measures than terraces to curb erosion on the fields such as tree planting and stone structures. Terraces were confirmed to be good in reducing runoff and consequently erosion, along with use of soil binding trees which were also seen as effective in retarding erosion in dongas. However, few people were planting trees. The effectiveness of diversion furrows was equally acknowledged by one male farmer:

> *To retard erosion we do this, my fields are below other people's fields, we construct diversion furrows above the fields, we maintained the furrow from the past years till now.*

This was one of the few reported incidents of voluntary land management works to ensure that the furrows did not fill up with silt. Maintaining the furrows is quite laborious. Some women farmers claimed that they were getting too old for that activity but used to do it in the past. Instead they reported working in groups in constructing stone structures to trap silt within their fields, which was regarded as less laborious than maintenance of furrows.

Crop farming in the study area was for subsistence, only a few farmers would sell surplus locally. The major crops produced were maize, sorghum and beans, with a few also growing vegetables, pumpkins and potatoes. The farmers and key informants interviewed confirmed conventional tillage as a more dominant practice than conservation agriculture. The few farmers that practiced conservation agriculture were women, especially from female headed households. One of the women farmers gave this account on the extent to which women were involved in land management within the community:

> *… yes to some extent, they are the ones into conservation agriculture more than men. Their inclusion is improving as they are leading conservation agriculture*.

Women's involvement in land issues seemed to be progressing and they lead conservation agriculture rather than men. Benefits from use of conservation agriculture were evident in the

account of one woman farmer and household head, who explained that it was possible to produce food crops in a marginal field with conservation agriculture:

> *On one field I use conservation agriculture as it is seriously eroded, however my children say that it is too intensive, and I am not fit for that. But with conservation agriculture I am able to have some good harvest unlike if I hire men to do conventional tillage. Even this year my harvest is good, the soil is conserved with conservation agriculture and looks fertile.*

This woman managed to produce food on land which could be unproductive if using conventional tillage, as it involved more disturbance of the soil. She also cut on labour cost which would be necessary under conventional tillage, as she did the labour-intensive tillage on her own. Conservation agriculture was proved a good practice for soil and moisture conservation. Most men crop farmers used conventional tillage though they were aware of the mentioned benefits of conservation agriculture. Under conventional agriculture, most farmers used tractors followed by animal traction for sowing. Only a few used animal power throughout crop production activities. One male farmer used both tillage practices, but conservation agriculture only on small plots:

> *I use both conservation agriculture and conventional, conservation agriculture on a small piece of land as it's labour intensive though it conserves soil and moisture and gives good yield.*

Some farmers use both practices to minimise risk of crop failure from dependency on one practice, but conservation agriculture was also reported to give good yield in addition to soil and moisture conservation.

Few farmers conveyed practicing rotational cropping under conventional tillage. This is usually detrimental as monoculture depletes soil nutrients in the long run. Under conservation agriculture farmers ensured mixed cropping which was good for soil fertility balance. One man reported managing soil fertility through use of farm manure and confirmed its effect on physical properties such as soil structure:

> *I use organic fertilizer. I stopped using chemical fertilizer as I found organic manure very good in improving soil structure.*

Some farmers were aware of degradation in the form of fertility depletion and were also aware of the long-term effects of chemical fertilizers, explaining their preference for organic manure. It was quite common to leave crop residues in the fields where they were either grazed or collected for use as fuel, contributing to fertility depletion.

Some farmers were both livestock and crop farmers. The main animals kept were cattle and sheep while a few had goats, donkeys and horses. Feeding livestock was entirely dependent on grazing on rangelands, which are communal resources. On rangelands, herders mentioned some practices used to keep rangelands in a good state such as rotational grazing and removal of shrubs from rangelands, as one of them described:

> *Apart from rotation, another practice is removal of shrubs as they suppress grasses, as advised by officials from Ministry of Forestry.*

Community members did not remove shrubs voluntarily; it was done under the government land rehabilitation programme, explaining why they reported being advised by government officials. Under the programme both men and women in the community had equal chances of being engaged and paid for their work. The cleared area would be reseeded to speed up recovery and closed for grazing.

4.3.3 Land management measures and rehabilitation challenges

The chief confirmed the effectiveness of the measures undertaken by the government programme and readiness of community members to extend the area under restoration:

> *The community shows great interest on rehabilitation measures undertaken by the government. They are willing to extend the area under rangeland rehabilitation as they see impact. Stone structures are accumulating silt, so they realize that they are effective*.

On the same issue of the measures' effectiveness, one crop farmer observed that erosion was an ongoing process not easy to control. He acknowledged, however, the effectiveness of the government rehabilitation programme:

> *Erosion is continuing, it is difficult to curb, but without these measures it could have been worse.*

This showed that the farmer was aware that erosion, as a natural process, was ongoing. The government programme gave some wages which can explain why they showed interest even in extending the area, as that would mean job creation for them. The major activity was removal of shrubs from the rangelands.

Some elderly women farmers had built some stone structures jointly in their fields to stop gullies from advancing. Women farmers also recognised the importance of trees in land rehabilitation and as a source of fuelwood later. Amongst their cultural responsibilities, women had to collect fuelwood for preparation of household meals. A woman crop farmer and household head commented on the efficiency of trees in stabilizing soils and was content that they got free tree seedlings, as trees could later be used for fuelwood:

> *Trees are very effective in stabilizing the soil. We get trees free of charge from the Ministry of Forestry. From trees we also get fuel wood. They are very useful.*

On the other hand, some men had a contradictory view on tree planting. In their view there was not enough grazing land and planting trees would reduce it.

Farmers mentioned several challenges related to fruitfulness of the efforts taken to restore degraded areas. One challenge cited was cost of gabion wires for use in stabilizing gullies, which they couldn't afford buying on their own. Added to this was the issue of unwillingness to undertake land rehabilitation voluntarily. It was rare for farmers to voluntarily undertake land rehabilitation measures. One elderly man, a crop farmer, attested that adoption of land restoration measures was particularly a challenge among youth compared to elders, as they wanted some earnings out of it. This is despite efforts undertaken to create awareness of the environment and land rehabilitation by government officials:

> *For us elders, we have tried to follow what extension officers advised, but young people don't. They want to be paid*.

An elderly participant was also concerned that youth, as future generations, lacked appreciation of the value of land, both currently and in the future:

> *Young people are not willing to work voluntarily. They don't understand the value of land and environment.*

Negligence among community members was also revealed as a concern. Some crop farmers would not take measures to halt small rills within their fields until so wide and deep that use of tractors for ploughing was impossible. One crop farmer expressed his worries about negligence in this manner:

> …n*egligence of some farmers, they wait until gullies are wide and deep before trying any measures.*

One woman crop farmer aired that they experienced vandalism on both crop- and rangelands. Herders were sometimes unruly and damaged common resources or individual crop fields.

> *On rangelands, insubordination of herders is a problem. They graze on rested rangelands, this retards recovery of our grazing areas. This problem sometimes extends to our fields.*

Grazing rested rangelands was a serious problem delaying rangeland restoration. Women were scared of acting against the herders if damage occurred within their croplands, unlike men who could challenge these men and even confiscate intruding animals. Seizure of such livestock was done by men. Women could only alert men, as one woman crop farmer informed:

> *[A] serious problem is uncontrolled grazing of livestock, even in our fields. Being a woman, I cannot impound such animals…*

This shows that rangeland matters are men's responsibility. Women would only alert men of incidences of livestock intrusion but would never confiscate the animals.

There was also a view of climate change as a challenge. Farmers reported experiencing heavy rainfall following prolonged drought. Such conditions were not favourable for crop growth and grass growth on rangelands and worsened land degradation. Some respondents alleged that lack of knowledge on land management issues was another handicap. In some instances, technical skills were lacking for undertaking some rehabilitation measures as the councillor declared:

> *The challenge is inadequate knowledge on land management and conservation measures to rehabilitate gullies*.

Farmers practicing conservation agriculture were faced with the challenge of soil compaction as crop residues left on fields attracted livestock. A woman farmer composted residues at home to avoid this problem:

> *The crop residues and weeds I remove and compost from home, then use as manure. Leaving them on the fields attracts livestock trampling and compaction.*

This problem was related to habitual grazing of croplands following crop harvest. Under conventional agriculture farmers would winter plough to discourage the grazing, but conservation agriculture requires grazing exclusion.

4.4 Involvement of women in land management

Women who owned livestock were included in range management issues upon the passing of their spouses, or during the absence of their spouses. One herder shared this information on inclusion of women:

> *We include women in rangeland issues as in some households, livestock is managed by women in absence of their husbands*.

Some women might be involved in rangeland management late in their lifetimes, while others participated earlier when men were away searching for jobs. Women feel that they should have full right to land access as they could take reasonable decisions in the absence of their partners. However, women don't openly express their opinions, as one woman family head declared:

> *Yes, sometimes men are away for jobs, so women take charge and make decisions. Men cannot decide alone just because they are family heads, no. In their absence women handle matters very well. We support each other as women, and I am suggesting that women be given full right to land access. The only challenge is that women don't want to express their opinions, they shy away*.

Men took most decisions and women had to follow their partner's decisions. Such decisions included choice of crops, fertilization of fields, practicing conservation agriculture and when to sell part of their livestock, to name some common issues. Some women felt that men overpowered them in land management decisions despite their willingness to take part, as one expressed it:

> *Yes, some women own livestock, therefore take part in such issues. Women are willing to participate, but men as heads sometimes deny them that liberty to decide on farming issues.*

One crop farmer confirmed that indeed men took farming decisions while women decided on household chores. He confirmed that he could not be controlled by a woman:

> *I am the one who decides on general agricultural production. My wife takes a lead in house chores. She is also responsible for education for our children. Sir, I cannot hide this, I cannot be led by a woman ("Ntate ha hona ntho eo nka potelang hara eona, bo 'm'e nna haba mpalame holimo"). She also approves that I take the lead on all matters.*

Gender inequality in decision making still exists. Some women found it proper that their partners make decisions, while other women felt belittled.

5. DISCUSSION

This study looked into the participants' insights on land degradation problems in the farming context in the Botha-Bothe district in Lesotho. The findings will be discussed in relation to the research questions along with the literature reviewed.

5.1 Farmers' knowledge on land degradation

The findings revealed that both men and women were aware of land degradation and acknowledge that it is occurring in their environment. This is grounded on the different explanations that respondents gave. Some defined it in relation to an increase in soil erosion, decline in soil fertility and decline in rangeland productivity. Based on the various attributes they used to explain the phenomenon, an element of change was mentioned. They viewed the situation now in comparison with the past, confirming that the situation had changed. This understanding is in line with the definition that land degradation is the decline of output from an ecosystem (Stavi & Rattan 2015). From the agricultural perspective, land degradation is failure of land to give output (Katyal & Vlek 2000). In the context of this study, output would be crops, and grass in rangelands.

Among the indicators declared, crop yields had dropped significantly, and grass was less abundant. The majority of women in crop and livestock farming described land degradation with a cropland focus, with most of them leaving out degradation on rangelands though asked about both. Men in crop and livestock farming, however, responded to both, accordingly telling about the situation on both croplands and rangelands. On rangelands, the farmers defined land degradation as the deterioration of rangeland condition as shown by shrub encroachment and reduction in grass abundance. On croplands the major features were gullies and decline in crop productivity. Thus, the phenomenon land degradation is not the same with different land uses (Msangi 2007) and also changes over time (Katyal & Vlek 2000). The few responses to the issue of rangeland condition did not suggest good rangeland condition, however, as Lesotho rangelands are not properly managed (FAO 2017). The gender difference in focus on crop-/rangeland management can be ascribed to gender difference in livestock herding as it is usually men's responsibility while women would engage in crop production from as far back as the 19th century in Lesotho (Kishindo 1993). Both men and women were conversant with the problem within the context in which they were engaged. Men were habitually engaged in the more physical crop farming activities such as ploughing and harrowing, while women would be weeding, harvesting and winnowing.

Appreciation of the above by the respondents forms the body of knowledge men and women have on the issue. Knowledge is very important in influencing ones actions/behaviour and perception (Laurent et al. 2015). Management of land is among other things dependent on the perception farmers have of the resource and how they rank its status as good or bad. Farmers in Chile adopted soil and water conservation measures as they were aware of the land degradation problem. On the other hand, farmers in Umbulo-Awassa in Southern Ethiopia neglected the measures as they viewed land as unproductive and not worthy of the laborious measures (Engdawork & Bork 2016).

Prevalence of dongas and rills was most obvious amongst all responses, showing that soil erosion was the prevalent form of land degradation in the area. Reports show that land degradation in Lesotho is in the form of soil erosion, fertility depletion, leaching and acidification (Msangi 2007). Second to gullies, participants recognized annual reduction in crop

yield, which impacted on household nutrition. Food shortage in Lesotho called for the government declaration of food security state of emergency in 2012. The shortage was among other factors a result of soil erosion and rangeland deterioration (Leduka et al. 2015).

5.2 Farmers' participation in land management

Protection and management of natural resources are responsibilities of local government at the village level in Lesotho. Chiefs play a key role in local governance as chieftainship has a long tradition in the mountain kingdom. In the new democratic dispensation of decentralization, community councillors have been introduced as part of local governance to work with chiefs (Moran et al. 2009). As the respondents stated, land management issues are communicated between the local authorities and the community through public gatherings. The authorities confirmed good attendance and commendable participation in such gatherings though the councillor held a few compared with the chief. That could be ascribed to the wide area that an electoral division under each councillor covered. The chief held frequent gatherings where more men attended than women. As marriages in Lesotho are patriarchal (Kishindo 1993), it is common for men to be attending in higher numbers as decisions within households and at the community level were taken by them, as is quite common in the drylands (Karmebäck et al. 2015). It is rooted in the patriarchal Basotho culture and men´s minds that they are born to decide and to supress women (Kishindo 1993).

Rangelands are communal property while croplands are privately owned by individual farmers as provided by the country's land tenure (Kishindo 1993). Local governance structures in the village are responsible for management of locally available natural resources including rangelands (Kingdom of Lesotho 2007). In Lesotho, farming and tending of ruminants, is a male-oriented activity whereby livestock are herded daily into communal rangelands by men while women are more into crop production and production of other non-ruminant short cycle animals. Some herders in this study regarded rangeland condition to be the same as before and not degrading, while some male farmers claimed it was indeed deteriorating. This reflects different views among men as herders or farmers on rangeland condition. This diversity in perceptions was usually reflected in the way they treated the grazing areas. Some failed to comply with grazing exclusions and intruded on the rested areas. Farmers confirmed to grazing the common areas in rotation. In summer, livestock were taken to the highlands and lowland pastures would be closed or rested. The issue of noncompliance through infringing on rested areas confirms the assertion that the country's rangelands are not properly managed (FAO 2017).

Deliberations on crop production revealed that most farmers used conventional tillage despite awareness of the benefits of conservation agriculture. The few farmers that had adopted conservation agriculture were mostly women who were household heads. This shows that women who still had their spouses around could not easily adopt the new practices and some women mentioned being overpowered by men in decision making. Despite the new laws on women´s land rights in Lesotho, decision making on land issues still remained influenced by men, as it is the Basotho culture for men to decide. In the past, women accessed land through their spouses (Kishindo 1993), but now, the new legislation is so far not fully implemented (ChwaaraeTeg 2015). Limited land ownership by women means that they have limited influence on household decision-making on various matters as shown in a study conducted in Ghana (Doss 2005). In Malawi, where marriages are often matrilineal, land ownership and decision making are different. Studies revealed that women under sole land ownership had more decision-making power within the household, including on reproductive health, unlike those

under joint land ownership with spouses (Behrman 2017). In Ha Ketlane, men´s dominance in households with joint ownership of land resources was also depicted. Women farmers heading households showed good adoption of conservation agriculture, unlike both men and women in households headed by men. With the cultural responsibilities that women have, land degradation poses an extra burden on women as household chores are not interchangeable between them and their spouses (Riley & Krogman 1993). Women pursue their traditional roles while simultaneously committing to land management activities to control land degradation.

Land management practices also depend on the size of land a farmer owns. In Swaziland, where farmers' perceptions on soil degradation were studied, it was revealed that farmers were aware of the value of land management practices such as crop rotation and land fallowing. However, they could not practice them due to small landholdings and fear of crop failure (Orchard et al. 2017). In Ha Ketlane farmers reported using both conventional and conservation tillage on different fields to minimise risk of crop failure. To them crop failure risk is a limiting factor to alternative tillage practice. Knowledge or awareness of the practices cannot alone assure good land management, all factors need unison consideration.

In the study area, soil fertility is enhanced with mixed cropping practice, which is done under conservation agriculture, unlike in conventional tillage where most of the farmers seemed to practice mono-cropping. To address soil fertility depletion under conventional agriculture farmers used both organic and chemical fertilizers, while farmers into conservation agriculture reported using organic manure only. The study revealed conservation agriculture practice to be mostly undertaken by women farmers who were also heading families, while most households headed by men practised conventional agriculture. These differences in soil fertility management by the gender of the household head show that gender influences decision making. Previous findings from Kenya, Zimbabwe and Malawi show no difference in use of chemical fertilizer among men and women farmers. However, in Malawi, household headship influences fertilizer use, as women heading households were more likely to use chemical fertilizer than women farming in households headed by men (Peterman et al. 2014). In Ha Ketlane farm households headed by women were more into the use of organic fertilizer, as they practiced conservation agriculture.

With changing climatic conditions, respondents found it difficult to attain optimal land management and rehabilitation. Heavy and erratic rainfall followed by dry spells were experienced. As Stavi & Rattan (2015) stated, land degradation occurs extensively in the drylands due to drought. Drought affected the effectiveness of rehabilitation measures undertaken, such as rangeland reseeding. Dry periods extended and delayed revegetation of the reseeded area. Land management and rehabilitation is also challenged by unwillingness of many farmers to adopt land management practices proved effective by some farmers in the area. Now farmers want to get paid for undertaking land management measures, as is the practice under the government land rehabilitation programme. Without direct financial incentive, especially young people were claimed not to be motivated to undertake initiatives to control erosion. They were reported as hesitant to engage in land management activities, which is worrisome as they are the future generation. If the youth can´t be activated more, it sets the country at risk of further degradation, as pressure to feed the increasing population results in exploitation of farmlands (Bechtel 2010).

Different views on benefits of restoration measures, such as tree planting, also influence their adoption. To women, tree planting is viewed as beneficial as trees will provide fuelwood in the

future. Some men view tree planting as a threat to limited grazing area, as they are sometimes planted on slopes for conservation purposes.

5.3 Land degradation impacts

The impact of land degradation on human livelihoods varies from country to country depending on reliance on agriculture for sustenance. In sub-Saharan Africa 60-70% of the population is sustained by agriculture (Ighodaro et al. 2013) while in Lesotho 80% of the population is entirely reliant on agriculture (Mekkib et al. 2015). According to the respondents, the several impacts they experienced from land degradation are interlinked. The ultimate impact of land degradation is on general human health. The issue of food insecurity along with low income, impose stressful conditions for human health, as some women in the study mentioned.

Most farmers reported the impact of low crop yield as a result of land degradation, and this in turn leads to food insecurity at household level. In Lesotho, food insecurity is widespread as an assessment conducted in 2015 showed that the country's total annual crop production accounted for only 30% of the national food requirement (Leduka et al. 2015). Food shortage affects everyone within a household, but they all look to women for provision of nourishment at the household level (Riley & Krogman 1993). It has been discovered in Lesotho that women-headed households were more affected by food shortages though they had more dietary diversity than households headed by men (Leduka et al. 2015). This finding conforms to this study's findings, showing that women farmers heading households adopted conservation agriculture. They grew a more diverse variety of crops on a piece of land concurrently (mixed cropping) as they could decide on their own. On the other hand, conventional agriculture farm households were headed by men in the study area.

Rangeland degradation impacted both on animal health and the income of men and women. Women mentioned that less abundance of thatch grass on rangelands affected their income, as they used to cut and sell it. Animal health was affected by land degradation as animals were weak from inadequate feeding from the poor rangelands. Income generated from livestock sales was said to be little as animals were sold at a very low price or not at all due to their poor condition.

Farmers who used animal traction for crop farming were also affected as animals were unfit for traction, compelling the use of tractors. This increased the costs of crop production and family living in general. In Shehengu, South Africa where livestock farming has been a male activity, soil erosion was reported to affect animal health by 66% (Ighodaro et al. 2013). With erosion, soil is bare and therefore grazing large herds is unsustainable. Livestock keeping in Lesotho is a prestigious practice, portraying one's socio-economic status, particularly with men as household heads. The more animals you own, the more dignified you are. For this reason, farmers overlook the condition of the area and keep animals not only for livelihood needs, which in turn leads to yet more degradation.

6. CONCLUSIONS AND RECOMMENDATIONS

Land degradation is a serious environmental problem affecting most developing countries (UNCCD 2016). Both men and women in this study were aware that land, particularly under crop production, is degrading. On rangelands, however, some men had a perception that the situation has been the same, thus there is no degradation. The role and contribution of women

in agriculture seems not affected by their lack of power on land management decision making. However, land degradation imposes more workload and stress on women, while on the other hand it results in migration of men in search of jobs. Women household headship enables them to explore alternative practices that enhance food security such as conservation agriculture, as it is women's cultural role to ensure household nourishment.

Based on the findings of this study the following recommendations are proposed:

- Men should be encouraged to enhance involvement of women in land management, as the Lesotho legislation provides. This could contribute positively to a more sustainable management of land and agricultural production. Women feel left out even if they attend such decision-making meetings. It is the responsibility of all development agencies and government ministries with both gender and land use focus to help communities look beyond their current social structures and remove barriers that create the gender gap.

- Continued sensitisation of the communities on land management in general is required, with more emphasis on controlling degradation on croplands as currently a lot of public meetings focus on rangeland management. Conservation agriculture is confirmed as a beneficial practice for good yield and for soil and water conservation, Adoption of this practice should be promoted more and more.

- Attention should also be focused on engaging young men and women in land management as the future generations. This could in future help control this problem and conserve this invaluable resource, land. Youth should be treated as priority in land rehabilitation programmes to attract their interest in finding sustainable solutions. Otherwise the situation will be worse in the future.

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APPENDICES

APPENDIX I

Introduction letter from the researcher

Dear Sir/Madam

Request for your participation in research as part of a training programme

My name is Mapita Makatleho Morapeli, a public servant in the Ministry of Forestry, Range and Soil Conservation in Botha-Bothe district. I am currently undertaking a United Nations University land restoration training in Iceland and this research forms part of that.
I therefore plead your participation in this study, by responding to the questions I prepared. I would like to know your views on land degradation, how it affects you, your views on the current restoration measures and what could be done to improve land rehabilitation.
If you are willing to participate, research assistants, who are also employees of the aforementioned ministry will take you through the questions and your conversation will be recorded.
No part of the interview or the report in the end, will be used against you as an individual, or anyone, confidentiality and anonymity will be maintained. Your participation is voluntary.

Thank you in advance for your time.

Kind Regards,

Mapita Makatleho Morapeli

APPENDIX II

Interview frame for key informants (chief and councillor)

Background information

1. Sex: Male/Female Household head status: Female Headed Male Headed Household size
2. Age: <30 30-39 40-49 >50
3. What is your status in local governance: chief or community councillor?

Land degradation

1. What is your understanding of land degradation?
2. What indicators of land degradation do you notice on crop lands and rangelands in your village? What changes have been in: soil properties; and species composition; water flow patterns on crop-/rangelands.? Other changes? History of changes?
3. **Land management**
    1. How is degradation of crop-/rangelands affecting you as a chief/community councillor regarding governance of your village? In your village, how do farmers till the land (conventional/ conservation agriculture)? In your experience why do they use this method and not the other? Which one gives more yield or is more effective in halting land degradation?
    2. Do farmers generally practice conventional or conservation agriculture?
    3. For conventional agriculture, is tillage done by animal power or tractor drawn?
    4. What land management practices are used in your village? Why and since when? (E.g. terraces, furrows, stone structures, binding trees, etc.)
    5. Are women in general part of decision making on crop-/ rangeland management within your community? If not, why? If yes, has inclusion of women on rangeland and crop land decision making within your community improved from the past? What changes would you like to see in crop-/rangeland management? Are there some changes that would specifically benefit of women? If yes, why?
    6. On what issues within your community do woman participate?
    7. What measures do you have in place to ensure proper crop-/rangeland management in the village? Are the measures successful? How do you handle non complaint village members?
    8. How often do you have meetings/gathering on crop-/rangeland management issues? How is the attendance and participation on community members?

Land rehabilitation

1. What restoration measures have been employed in your area? Croplands and rangelands.
2. What have been the impacts from those restoration measures, if any?
1. Who introduced the restoration measure? (farmers, NGO, Government)?
2. Are there significant results of the restoration measures undertaken? If yes, which are they? If not, why poor results?
3. How is the adoption of the restoration measures? (reasons behind good or poor adoption)?
   (labour demanding; costly to implement; too technical (requiring expertise); other reasons). Do community members ever volunteer to undertake land rehabilitation activities?

4. What challenges do women in your community face with crop-/rangeland degradation and rehabilitation? What specific needs do women have in crop-/rangeland management in this village
5. As the authority in the village what would be the optimal situation regarding crop-/rangeland management in your village?

APPENDIX III

Interview frame for herders

Background information

4. Household head status of livestock owner: Male Headed Female Headed
5. Household size of livestock owner
6. Herders age: <30 30-39 40-49 >50
7. Livestock size you herd: Cattle Sheep Goats Horses/Donkeys

Land degradation

1. What is your understanding of land degradation?
2. What are indicators of land degradation on crop lands and rangelands? What has changed in terms of soil biophysical properties and species composition on rangelands comparing now and the past, water flow patterns, etc.? History of indicators?
3. How is land degradation and rangeland degradation affecting you as a herder?

Land management

1. What Rangeland management practices are practiced in your community? (rotation leboella, reseeding, uprooting shrubs)?
2. Which practice works best, what are the challenges?
3. Who decides within the household you are working for on range management and livestock nutrition and health issues?
4. Are women part of decision making on land rangeland management within your community? Would you encourage their involvement? How and why?
5. On what issues are women given stake in decision making, both within households and within the community at large?
6. Has inclusion of women on rangeland and crop land decision making within your household and your community improved from the past years, what is the situation?
7. What changes would you propose on rangeland and land management in general to attain sustainability?

Land rehabilitation

1. What restoration measures have been employed in your area? Croplands and rangelands?
2. Any impacts from these restoration measures?
3. Who introduced the restoration measure? (farmers, NGO, Government)?
4. Any significant results of the restoration measures undertaken under the government programme? Which are they?
5. How is the adoption of the restoration measures and why (reasons behind success or poor adoption)?
6. Are the measures labour demanding, costly to implement, too technical (requiring expertise)?
7. What are other challenges in your view as a herder are associated with land degradation and government rehabilitation programme?

APPENDIX IV

Interview frame for male farmers

Background Information

1. Household head status: Female Headed Male Headed Household size
2. Age: <30 30-39 40-49 >50
3. Are you farming both crops and livestock?
4. Livestock kept: Cattle Goats Sheep Horse/Donkeys
5. What are the main crops grown?

Land Degradation

1. What is your understanding of land degradation?
2. What indicators of land degradation do you notice on crop lands and rangelands? What changes have been in: soil properties; and species composition; water flow patterns on crop-/rangelands.? Other changes? History of changes?
3. **Land Management**
    1. How is degradation of crop-/rangelands affecting you as a man using the land? On your piece of land how do you till (conventional/ conservation agriculture)? Explain why using this method, instead of the other, which one gives more yield or is more effective in halting land degradation?
    2. Do farmers in the area generally practice conventional or conservation agriculture?
    3. For conventional agriculture, is tillage done by animal power or tractor drawn?
    4. Describe your crop farming, any rotation? How do you manage crop residues (remove or leave on fields)? Why?
    5. Do you use fertilizers? Organic/inorganic, why or why not?
    6. What land management practices are you using? Why and since when? (E.g. terraces, furrows, stone structures, binding trees, etc.)
    7. Who decides within household on land management and farming in general (choice of crops to grow each year, conventional or CA, terracing, livestock issues etc.)? On what issues does your spouse participate in decision making, both within household and within community?
    8. Are women in general part of decision making on crop-/ rangeland management within your community? If not, why? If yes, has inclusion of women on rangeland and crop land decision making within your household and your community improved from the past? What changes would you propose to land management? Are there some changes that would specifically benefit women? If yes, how?

Land Rehabilitation

1. What restoration measures have been employed in your area? Croplands and rangelands.
2. What have been the impacts from those restoration measures, if any?
3. Who introduced the restoration measure? (farmers, NGO, Government)?
4. Are there significant results of the restoration measures undertaken? If yes, which are they? If not, why poor results?
5. How is the adoption of the restoration measures? (reasons behind good or poor adoption)?
   (labour demanding; costly to implement; too technical (requiring expertise), other reasons)

6. In your experience as a male farmer/land user, what other challenges are associated with land degradation and government rehabilitation programme?
7. What would your needs be as a male farmer/land user in cropland and rangeland rehabilitation?

APPENDIX V

Interview frame for female farmers

Background Information

1. Household head status: Female Headed Male Headed Household size
2. Age: <30 30-39 40-49 >50
1. Are you farming both crops and livestock?
2. Livestock kept: Cattle Goats Sheep Horse/Donkeys
3. What are the main crops grown?

Land Degradation

1. What is your understanding of land degradation?
2. What indicators of land degradation do you notice on crop lands and rangelands? What changes have been in: soil properties; and species composition; water flow patterns on crop-/rangelands.? Other changes? History of changes?
3. **Land Management**
    1. How is degradation of crop-/rangelands affecting you as a woman using the land? On your piece of land how do you till (conventional/ conservation agriculture)? Explain why using this method, instead of the other, which one gives more yield or is more effective in halting land degradation?
    2. Do farmers in the area generally practice conventional or conservation agriculture? For conventional agriculture, is tillage done by animal power or tractor drawn?
    3. Describe your crop farming, any rotation? How do you manage crop residues (remove or leave on fields)? Why?
    4. Do you use fertilizers? (organic/inorganic) Why or why not?
    5. What land management practices are you using? Why and since when? E.g. (terraces, furrows, stone structures, binding trees, etc.)
    6. Who decides within household on land management and farming in general (choice of crops to grow each year, conventional or CA, terracing, livestock issues etc.)? On what issues do you participate in decision making, both within household and within community?
    7. Are women in general part of decision making on crop-/ rangeland management within your community? If not, why? If yes, has inclusion of women on rangeland and crop land decision making within your household and your community improved from the past? What changes would you propose to land management? Are there some changes that would specifically benefit of women? If yes, why?

Land Rehabilitation

1. What restoration measures have been employed in your area? Croplands and rangelands.
2. What have been the impacts from those restoration measures, if any?
3. Who introduced the restoration measure? (farmers, NGO, Government)?
4. Are there significant results of the restoration measures undertaken? If yes, which are they? If not, why poor results?
5. How is the adoption of the restoration measures? (reasons behind good or poor adoption)?
   (labour demanding; costly to implement; too technical (requiring expertise); other reasons)

6. In your experience as a woman farmer/land user, what other challenges are associated with land degradation and the government rehabilitation programme?
7. What would your needs be as a female farmer/land user in cropland and rangeland rehabilitation?