



**LHDA Contract 1330: Development of the
LHWP Wetlands Conservation Strategy and Monitoring Plan**



Vol III
**Review of rangeland management,
issues and potential solutions**

March 2020





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Prepared by:

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PREFACE AND ACKNOWLEDGEMENTS

Anchor Environmental Consultants (Anchor), in collaboration with Wetland Consulting Services (WCS), were appointed by the Lesotho Highlands Dams Authority (LHDA) to assist with the development of a Wetland Conservation Strategy and Monitoring Plan for the Katse and Mohale Dam catchments.

The study was led by Dr Jane Turpie from Anchor Environmental Consultants (Pty) Ltd. Gary Marneweck, Dieter Kassier and Bhuti Dlamini from Wetland Consulting Services (Pty) Ltd. (WCS) undertook the specialist work on wetlands. The engineering plans were drawn up by engineer Belayneh Girma Teklemariam. Kat Forsythe and Kevin Coldrey of Anchor assisted with the socio-economic component along with the late Sauli Ramatla of the Department of Range Resource Management. Gwyneth Letley of Anchor, and Johannes Hachmann and Rabia Mathakutha of WCS assisted in the preparation of the report. The study team is grateful to the LHDA for their guidance and input on earlier versions of the report.

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We are also grateful to the many individuals who provided input on rangeland use and management in interviews and discussions, including Professor Qalabane Chakela (University of Lesotho), Mr Stanley Damane (Director Department of Environment), Mr Bore Motsamai (former Director of Range Management), Mr Remaketse Mochochoko (Department of Landuse planning), Mr Motoho Maseatile (Director of Water Affairs), Mr Tente Masia (Department of Chieftainship), Ms Regina Mating (Department of Range Resource Management) and Mrs 'Malipholo Hae (Department of Range Resource Management).

This Volume III report, which covers task 5 of the overall study, has been prepared for the particular purpose outlined in the Scope of Work. No responsibility is accepted for the use of this report, in whole or in part, in any other context or for any other purpose.

List of reports under LHDA Contract 1330: Development of the LHWP Wetlands Conservation Strategy and Monitoring Plan

- Volume I. Importance and condition of wetlands in the Katse and Mohale catchments, and priorities for rehabilitation.
- Volume II. Action plan for rehabilitation
- Volume III. Review of rangeland management, issues and potential solutions
- Volume IV. LHWP Wetlands conservation strategy and monitoring plan

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1 INTRODUCTION

1.1 Background and rationale

Katse and Mohale Dams were constructed in the Lesotho Highlands as the Phase 1A and 1B, respectively, of the Lesotho Highlands Water Project (LHWP), and are managed by the Lesotho Highlands Development Authority (LHDA) which reports to the LHDA Board and the Lesotho Highlands Water Commission (LHWC). The dams were completed in 1996 and 2002, respectively. The location of the dams and their catchment areas are shown in Figure 1.1.

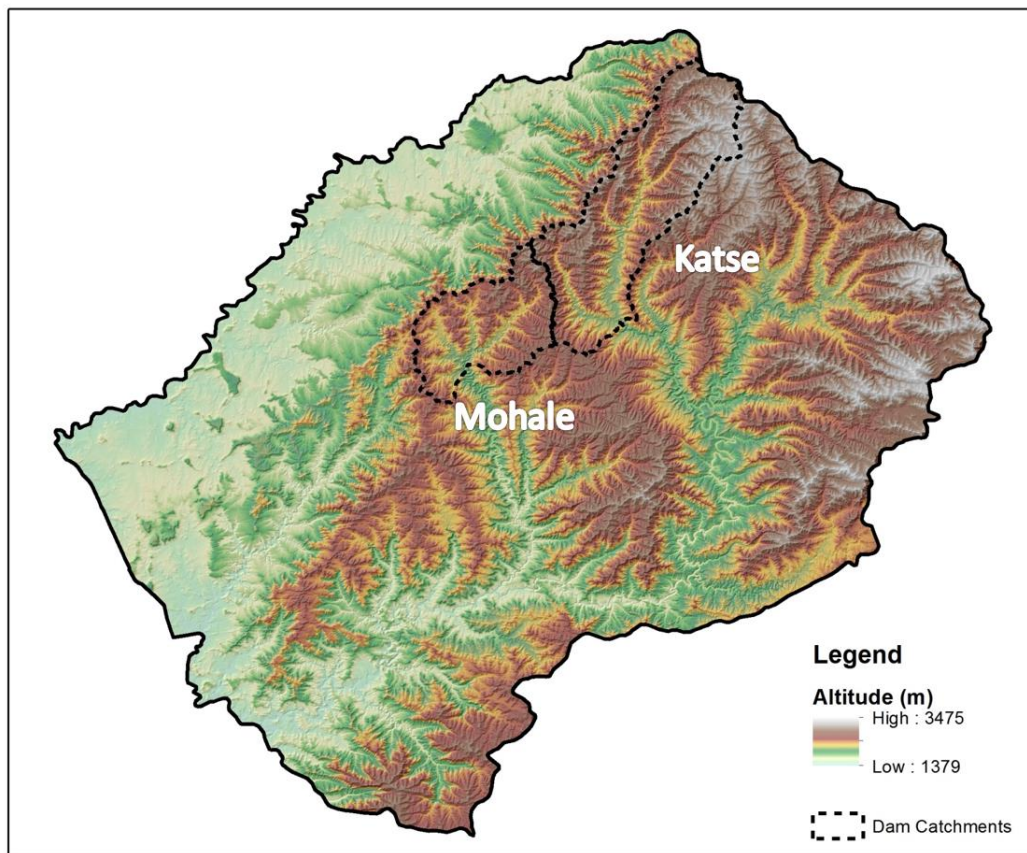


Figure 1.1. Map showing location of the Katse (dotted area, right) and Mohale (dotted area, left) catchment areas in Lesotho. Altitude bands are shown, based on 30 m SRTM Digital Elevation Model.

Both of the dam catchment areas have become increasingly populated, with many households owning livestock which graze throughout the catchment areas. Within the Lesotho's wetlands are a critical grazing resource for local herdsman's livestock (Olaleye *et al.* 2012). These wetland systems support over 300 000 households in Lesotho through agricultural practices and other activities such as fishing (Olaleye *et al.* 2012).

LHDA monitors the ecological health of the catchment areas and their biodiversity, and is responsible for maintaining the ecological health of the catchment in order to minimise negative impacts on the dam such as sedimentation and impacts on water quality. The vegetation cover of the catchments, and the wetlands in particular, are understood to provide important ecosystem services in this regard. However, the catchments have come under increasing anthropogenic pressure. Past monitoring efforts suggest that a large proportion of the catchment's wetlands have become degraded, largely as a result of grazing activities in the catchments. The degradation of the catchment and its wetland systems not only undermines the livelihoods of those directly dependent upon them poses a threat to the water delivery and conservation mandates of the LHDA.

LHDA has thus commissioned Contract 1330: "Development of the LHWP Wetlands Conservation Strategy and Monitoring Plan". The overall aims of the study are to extend the number of wetlands assessed in the catchment areas, and to develop a wetland conservation strategy. It is recognised that the successful rehabilitation of wetlands will not only require immediate physical interventions, but will also require addressing the causes of their degradation. Thus, the study includes the development of a strategy to address the threat posed by grazing to wetlands, on the basis of a review of existing information and consultation with stakeholders in the catchment area (Task 5).

This report is based on the desktop review, including consultation with key informants based in Maseru. It also includes more detail on the proposed approach for field studies to be undertaken.

The previous monitoring studies found that there had been a significant increase in pressures in the catchment areas from subsistence farming, livestock, mining and road development, and introduction of invasive alien species to name a few. It was recognised that a range of interventions were urgently required to reduce a range of pressures on the landscape.

This study focuses on grazing mismanagement and overgrazing, as it is one of the threats most directly linked to the degradation of the catchment and its wetlands, leading to loss of biodiversity and increased sedimentation of the dams. Contract 1273 found significant reductions in ground cover, extensive sheet erosion on hillsides and bush encroachment throughout both catchment areas which were suggestive of severe overgrazing (Turpie *et al.* 2014a.b). Linked to this was evidence of decreased rainfall infiltration, drying of the wetlands, increased erosion of the landscape and reduced capacity of wetlands to ameliorate the transport of sediments into the dams. There are a range of interventions that could be implemented in order to reduce grazing pressure in the dam catchment areas, but their potential design and relative efficacy has not yet been properly investigated. Various measures have been introduced in the past, such as grazing fees, or are in the process of being introduced, such as payments for ecosystem services, but their impacts or potential impacts have not been properly evaluated (Chapeyama 2004).

1.2 Aim of this study

The overall aim of Task 5 was to develop a thorough understanding of why rangelands and wetlands are overgrazed in the study area and to recommend a way forward for rectifying this as part of the overall wetland management strategy.

The objectives of Task 5 were as follows:

- to develop a good understanding of rangeland management in the study area based on available information and discussions with key informants
- to identify the main drivers of unsustainable grazing practices
- to compare the problems in the study area with those in other areas
- to review local and international experience in interventions to address this issue
- to identify what type of interventions might be desirable or feasible in the study area
- to further develop the aims and approach of the stakeholder consultation component of Task 5.

1.3 Study approach

This study was based on a review of available information and literature, from discussions with key informants that have been involved in range management in Lesotho, as well as discussions with key informants and focus groups with livestock owners in order to obtain further understanding of the issues and past experiences in rangeland management. Relevant literature and reports were obtained from internet searches, our own collections and from contacts in Lesotho, including the key informants. See Section A5.8 for the detailed fieldwork itinerary and lists of key stakeholders interviewed.

2 RANGELANDS AND WETLANDS IN LESOTHO

2.1 Rangelands in Lesotho

Lesotho has a total land area of approximately three million hectares. Of this, over half is estimated to be either grassland, shrubland or wetlands (FAO 2017, Table 2.1). Most of the built up areas and croplands are found in the lowlands (Figure 2.1), where the majority of the population resides, and most of the untransformed land occurs in the more mountainous areas.

Table 2.1. Land cover classes across Lesotho (FAO 2017).

Land Cover Class	Hectares	% of Lesotho
Built Up	126 091	4.1
Agricultural Land	578 039	18.9
Trees	38 404	1.3
Shrubs	584 328	19.1
Grassland	1 516 051	49.6
Wetland	32 580	1.1
Water bodies & rivers	28 241	0.9
Barren	151 581	5.0

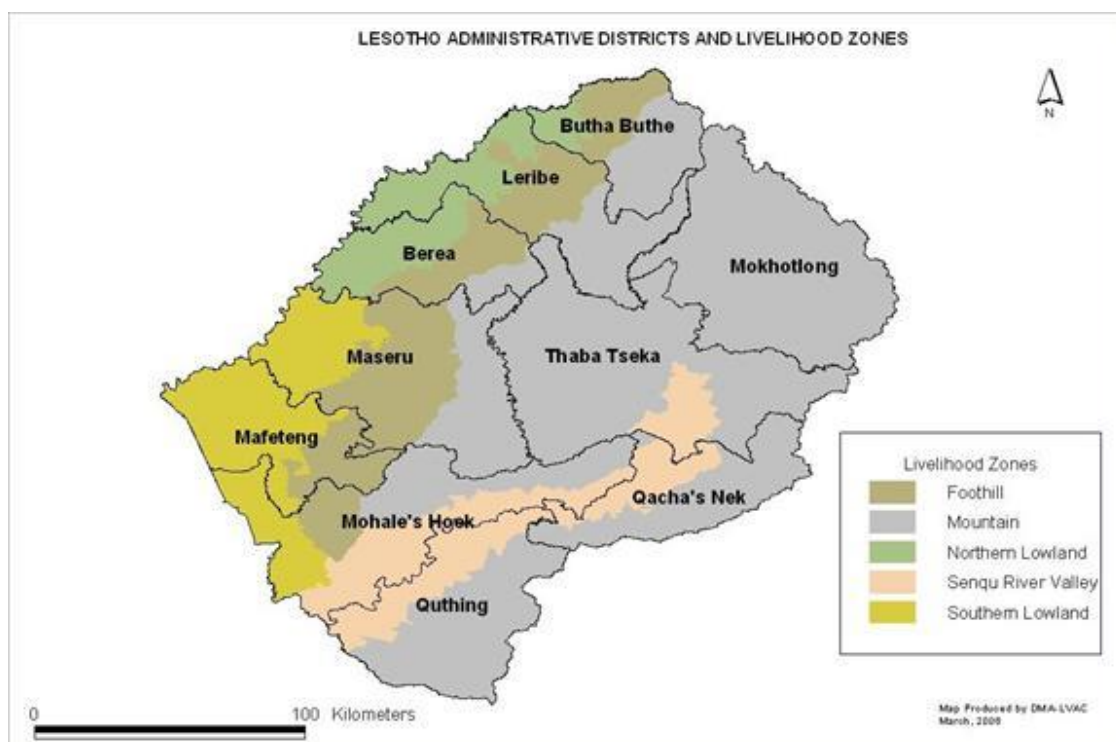


Figure 2.1. Livelihood zones of Lesotho, shown in the context of the Administrative Districts.
Source: FAO 2007.

Lesotho has a population of approximately 2 million people (2012, FEWS NET 2013). More than a quarter of the population is in Maseru District. About 57% of the population live in the lowlands, 6% in the Senqu river valley, 13% in the foothills and 23% in the mountains. While urbanisation is occurring at an annual rate of about 3.4%, some 73% of the population still live in rural areas, relying on agriculture (crops and livestock) for their livelihoods (FEWS NET 2013). The agricultural sector only contributes about 8% of GDP, however, with other sectors having had higher growth in the last few decades (Wade Publications 2015)¹. Agricultural GDP is primarily from crops, wool and mohair.²

Only about 10% of land in Lesotho is arable, and about two-thirds is suitable for grazing. Livestock therefore constitute an important livelihood activity for rural households. Cattle are kept mainly for subsistence, draught power, milk and fuel (dung). There is very little commercial production of meat: about 80% of meat sold at butcheries is supplied by informal slaughter. Sheep and goats are kept mainly for production of wool and mohair, and also contribute to meat production.

There are about 1.2 million sheep, 900 000 goats and 625 000 cattle in Lesotho, with the numbers of cattle and goats having increased whereas sheep numbers have fallen over the last century (Figure 2.2). Overall stocking rates have increased over time (Figure 2.3), while the area available for grazing will have decreased due to population expansion. Estimates of stocking rates suggest that the rangelands are possibly as much as 40-80% overstocked based on the simple assumption of a carrying capacity of 8 ha per animal unit across the country (National Range Management Policy 2014). Other estimates of overstocking in the past have ranged from 50-300% (Marake *et al.* 1998).

2.2 Rangelands within the study area

Grazing areas in the study area are divided into three zones. Those at highest altitudes and furthest from the villages, are denoted as “A” or “summer” grazing areas. These areas are also sometimes called cattle post areas. Rangelands further away from villages, but generally in valleys that are still warmer during winter months are denoted as “B” or “winter” grazing areas. Areas immediately surrounding villages, including areas between agricultural fields as well as fields outside of crop-growing season, are denoted as “C” or “village” grazing areas (Hartley 2001).

¹ <http://www.lesothoreview.com/agriculture-2015.php>

² Bureau of Statistics, <http://www.bos.gov.ls/>

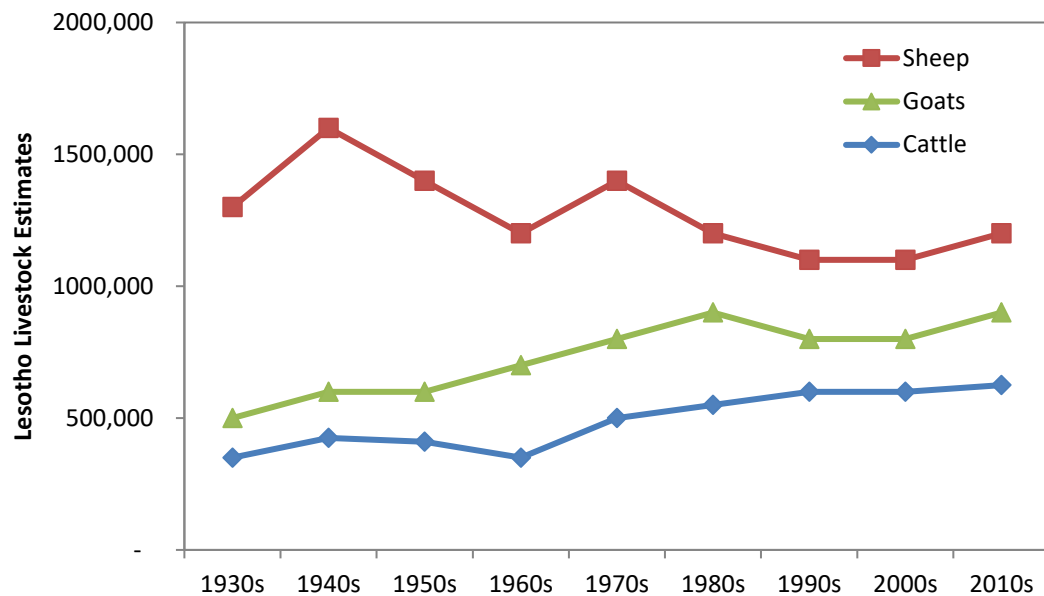


Figure 2.2. Changes in livestock numbers. Based on data presented in Hartley 2001, updated using figures from 2009/2010 Lesotho Agricultural Census, Bureau of Statistics Lesotho 2012.

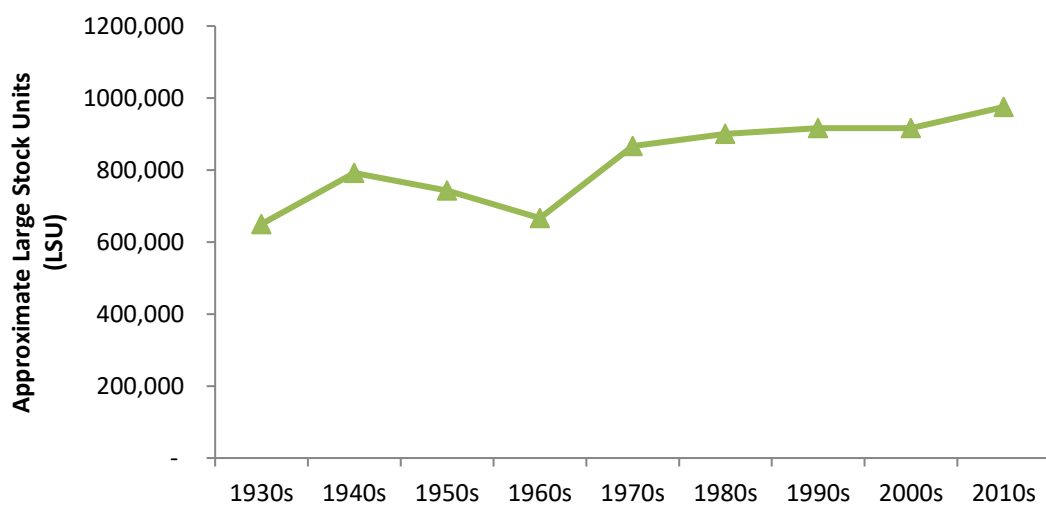


Figure 2.3. Approximate number of Large Stock Units (LSU) within Lesotho from the 1930s to current day. Based on data presented in Hartley 2001, updated using figures from 2009/2010 Lesotho Agricultural Census, Bureau of Statistics Lesotho 2012. LSU calculation using 1 for cattle, 0.167 for sheep and goats.

2.2.1 A grazing areas

Within both catchments residents tend to use A grazing areas under the jurisdiction of the Principal Chief that also resides over the village they live in. As such, we tended to get the most information about the A grazing areas that were within the jurisdiction of the Principal Chiefs of Butha-Buthe, Leribe, Tsikoane, Thabe Bosiu and Matsieng. Less information was gained about A grazing areas under other Principal Chiefs.

In the Katse catchment there are only a few main A grazing areas used by the population within the catchment boundary (Figure 2.4). Most of the villages within the catchment tend to use either the Bokong or Pelaneng A grazing areas, situated to the south and north of Bokong Nature Reserve respectively. Livestock owners from both the east and west side of the dam, as well as down near the dam wall, all use these areas, with a small amount originating from the lowlands of Leribe. These A grazing areas are under the jurisdiction of the Principal Chief of Leribe. In the North of the Katse catchment, in the Butha-Buthe district, is a large expanse of A grazing area. This A grazing area, referred to as Mahlasela (near Afriski) and Khalong-la-lithunya, was one of the main grazing areas for livestock owners at Motete, however, small numbers of livestock owners from Ha Lejone, Ha Theko and Ha Poli also used these areas. Some residents from the lower end of the dam (near Ha Theko) might also be grazing in A grazing areas south of the dam, bordering on the jurisdiction of Principal Chief Matsieng, however, most of these residents also graze in the lower parts of Bokong, which are under the jurisdiction of the Principal Chiefs of Tsokoane, Peka and Kolbere.

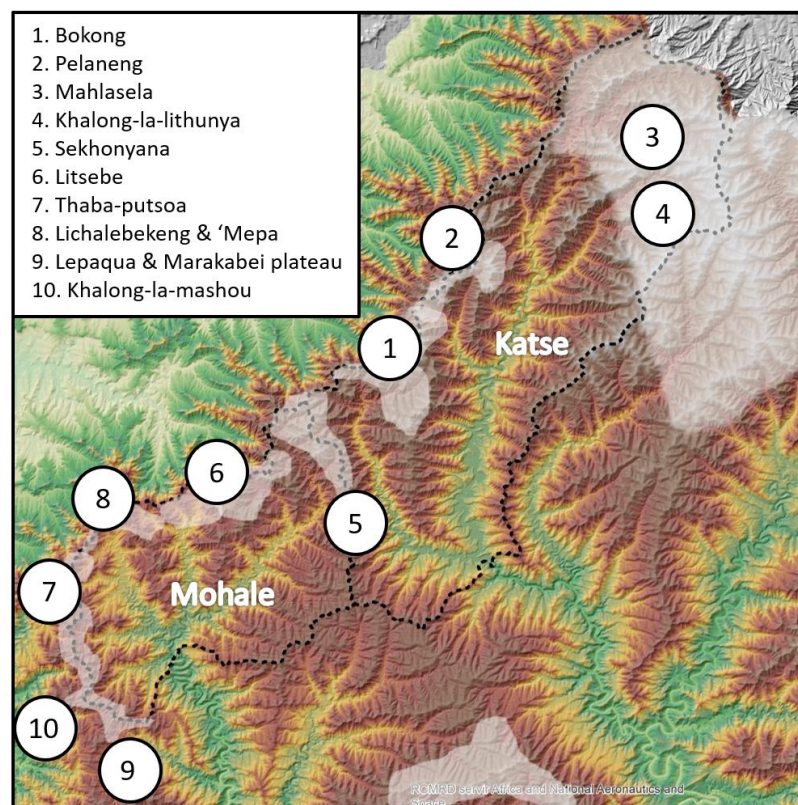


Figure 2.4 Approximate location of A grazing areas within the Katse and Mohale catchment are indicated in white. Names of specific A grazing areas referred to by villages visited are indicated.

Within the Mohale Dam catchment there are a number of different A grazing areas used by livestock owners throughout the catchment (Figure 2.4). The mountains on the eastern edge of the catchment includes jurisdiction from four different Principal Chiefs, namely Thaba Bosiu, Tsikoane, Mats'ekheng and Matsieng, however, the boundaries between these are apparently clear to livestock owners and little conflict was reported. Overcrowding was however reported as a concern in the area. People grazing in this area can originate from the lowlands, as well as outside of the catchment, but still within the Principal Chief of Matsieng's jurisdiction (which is much larger than many of the other Principal Chief's areas).

Other A grazing areas in the catchment are found in the north, as well as to the west and south. In the west of the Mohale catchment the A grazing areas are heavily utilised by residents of the lowlands within the same Principal Chief's jurisdiction (Principal Chief of Thaba Bosiu). This includes wealthier residents from the Maseru district who tend to bring larger herds, with high numbers of cattle. To the south, most A grazing areas are under the jurisdiction of the Principal Chief of Matsieng.

2.2.2 B and C grazing areas

The C grazing areas occur closest to the village and it is within these areas that village fields occur. In the Katse catchment, most of the areas in view from the road between Ha Lejone and the dam wall are C grazing areas. Animals grazing in these areas are kept away from fields and generally return to the village at night. In the Mohale dam these areas are found along the valleys of the Jorotane, Bokong and Senqunyane Rivers. The C grazing areas are smaller than the A grazing areas, but generally larger than the B grazing areas for each village. Much of the C areas were inundated by the dam, shrinking the available area for cultivation, which has resulted in areas on higher slopes being cultivated, extending existing C areas.

The B grazing areas are further away from villages, such that animals in these areas cannot easily reach cultivated fields, but are often only a few hours away from the village itself. In these areas the animals are kept at cattle posts overnight and are tended by herders. These areas are often of higher altitude than the C areas. These areas were often reported to be the smallest of the grazing areas and have shrunk over time owing to the expansion of cultivation.

2.2.3 Livestock numbers and uses within the catchment areas

Most of Lesotho's livestock live in the lowlands and foothills, with only 34% of cattle, 49% of sheep and 54% of goats having been counted in the mountain districts during the 2009/2010 livestock census (BoS 2012). It is important to point out that the numbers counted in mountainous areas (15-24% of the national herd; BoS 2012) do not include animals which are moved from other livelihood zones into the mountain areas for summer grazing. These numbers are unknown, but are potentially significant as transhumance from lowlands to the highlands has been practiced for the past 100 years in Lesotho (Quinlan 1995).

Approximately half of the livestock that are based within mountainous areas across the country are within the mountainous areas of Butha-Butha, Leribe, Maseru and Thaba-Tseka, which encompass the study area. The actual numbers of livestock in the Katse and Mohale Dam catchment areas during summer and winter are unknown.

The vast majority of households within each village own a range of livestock, predominantly cattle, sheep and goats. Cattle are used for milk and draught power, while sheep and goats are predominantly used for income generation from the sale of wool and mohair. The numbers of cattle reported to be owned by individual households did not vary considerably between the two catchments or across different villages (Table 2.2). However, the number of sheep and goats reported to be owned did vary considerably from village to village.

The pressure of increased livestock, extensive cropping and overgrazing has led to loss of vegetation cover and widespread erosion problems throughout Lesotho. Detailed soil analysis in recent years suggest that up to 50 million tons of soil are being lost from Lesotho's landscapes every year (Makara 2013). This highlights the importance of improving rangeland condition in Lesotho, especially considering the economic importance of the LHWP Dams which are threatened by increased sedimentation.

Table 2.2. Average numbers of cattle and small stock owned by different villages in the catchment areas

Catchment	Village	Cattle		Small stock	
		Average (~)	Upper limits (~)	Average (~)	Upper limits (~)
Katse	Motete	10	Few >10	50	1000
Katse	Ha Poli	5	Few >5	100	500
Katse	Ha Theko	10	15	100-200	400
Katse	Ha Lejone	10	30	200-300	900
Mohale	Ha Sekolopata	5-10	30	100	500
Mohale	Ha Rapokolana	10-15	30-40	500-600	1000
Mohale	Ponts'eng	10-15	30	200-300	500
Mohale	Ha Ramohope	10	20-25	100-200	500

2.2.4 Movement of livestock

Timing

The timing of the movement of livestock between the A, B and C grazing areas varies across the two catchments, as well as very slightly between different A grazing areas (Table 2.3). In the Katse catchment (at an altitude of between 2000 and 3400m), the A grazing areas are officially open from December/January through to April and in the Mohale catchment (at an altitude of between 2000 and 2800m) most of the A grazing areas are officially open from March through to August (with one exception where the A grazing area is open from January to August).

Historically, the Mohale region followed the same A grazing area opening date as Katse (December/January) and ran through to August (when the grass breaks dormancy) but the opening date has shifted out for unconfirmed reasons, possibly to allow the A grazing area to rest for longer. The extended period of grazing in these A grazing areas has been attributed to three main reasons, the first being that extended grazing up until August doesn't harm the grass any more than leaving in April because the grass is dormant at this stage, but staying longer in A grazing areas gives B grazing areas additional rest. Secondly, that when there is no-

one in the A grazing areas, there is a higher chance of arson and wildfires, so by encouraging people to stay longer this decreases the chance of fires. Thirdly, the A grazing areas in Mohale are considerably lower in altitude than those in the Katse catchment, which makes it less risky for Mohale-based livestock owners to graze their livestock in the A grazing areas during the colder winter months.

Table 2.3 The proportion of livestock in the A, B and C grazing areas of the Katse catchment (above) and the Mohale catchment (below) during the different months of the year.

Katse	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
A	95%	95%	95%									95%
B				75%	75%	75%	75%	75%	90%	90%	90%	
C	5%	5%	5%	25%	25%	25%	25%	25%	10%	10%	10%	5%

Mohale	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
A			90%	90%	25%	25%	25%					
B	90%	90%			60%	60%	60%	85%	90%	90%	90%	90%
C	10%	10%	10%	10%	15%	15%	15%	15%	10%	10%	10%	10%

The livestock not in A during these periods are at C areas and are typically only lactating cows and breeding rams/buck. At some villages a small proportion may also remain in the B areas, which is often a result of people not following the prescribed system. Livestock in A grazing areas are generally moved to the B areas from 1 April (Katse) or 1 August (Mohale). Some villages reported that a few livestock owners have their animals stay behind in A for a longer period of time, but this was generally only a small proportion when it did occur. In one village (Ha Ramohope), there is a long-standing practice of a few livestock owners not using A grazing areas at all, choosing instead to use B for close on the full year. This was reportedly because of the poor condition of the A grazing areas.

When animals are removed from A grazing areas, the lambs/kids/calves and females ready to breed are moved closer to the villages, into C areas. Occasionally these animals are also brought back from the A grazing areas before the rest of the herd to prevent increased mortality rates during cooler months. In most cases in the Mohale catchment, local livestock owners will remove their livestock from A grazing areas much earlier than the deadline date as a result of increased numbers of 'outside' livestock in A which deteriorate the grazing and deplete water sources, as well as the increased threat of livestock theft. When owners move their animals out of A grazing areas early, they move their livestock to B which puts further pressure on B grazing area resources.

Most livestock stay in B grazing areas for about eight months in Katse and about seven months in Mohale, until it is time to move back to A. Exceptions are when goats and sheep are moved to C areas for shearing, but this is only ever for a matter of days and they are taken back to the B areas directly afterwards. Sheep and goats that are kept for wool and mohair are generally preferred to be kept in B areas to C areas as C areas often have weedy species with

burrs that may lessen the quality of the wool. During the ploughing season (for a couple of months from 1 September), most livestock in C grazing areas, except the cattle used for draught power, a few lactating cows and rams/bucks, are moved to B areas to keep them away from the fields.

2.2.5 Other users of the A grazing areas

Determining the ratio of local to non-local livestock grazing in A grazing areas proved challenging as respondents are not aware of where the catchment boundaries lie. 'Outsiders' were generally understood to be people bringing in their animals from further away and not living within the same valley/area as the village where the focus group was held. 'Outsiders' in the A grazing areas in the lower Katse catchment (Bokong and Pelaneng) are generally from within the catchment but from across a broad area. The areas in the northern parts of Katse were also used by some residents within the catchment, but because of the multiple Principal Chiefs managing these areas, there are also many others coming from a range of different districts and Principal Chiefs.

In the west of the Mohale catchment there tends to be more lowland 'outsiders' from the Maseru District than anywhere else, whereas in the east/south, 'outsiders' were coming from the Thaba Tseka district and in the north they were coming from Berea.

In almost all the villages where focus groups were conducted, the number of 'outsiders' was 3-4 times as many as local livestock in A grazing areas. In a few villages, 'outsiders' were encroaching into B grazing areas too. In only one village was there a case of there being fewer 'outsiders' than locals and this was in Ha Theko where we had the representatives from a number of large villages in the focus group. In this case they were referring to a large collection of villages, which indicates that in the Bokong grazing area it is likely that most of the livestock are coming from within the catchment.

2.3 Degradation of rangelands and wetlands in the study area

Before the completion of Katse and Mohale Dams, the LHDA embarked on a monitoring programme comprising baseline studies and subsequent monitoring studies. Baseline studies of the Katse Dam catchment area were carried out during 1991/92 under Contracts 75 and 83, and monitoring was carried out in 1996-2000 under Contract 615. In 2014, Contract 1273 completed a further stage in the monitoring of the catchment areas upstream of the Katse and Mohale dam (Turpie *et al.* 2014a, b). The latter studies included analysis of satellite data (NDVI data to indicate land cover), field studies of catchment vegetation and field assessments of selected wetlands. In this study, stakeholders were asked to provide their perceptions on rangeland and wetland condition. The results of both studies are summarised below.

2.3.1 Empirical evidence

The Katse and Mohale catchments are mountainous and comprised almost entirely of Lesotho Highland Basal Grassland, with some areas of Drakensberg Afroalpine heathland and small fragments of Lesotho Mires in higher altitude parts of the catchment (SANBI 2012; Figure 2.5).

The vegetation monitoring studies under Contract 1273 found significant changes in species composition in both catchments, all of which were indicative of rangeland degradation and overgrazing. Within the Katse catchment in particular there was evidence of high levels of disturbance near roads and settlements. There was a general shift towards more unpalatable species and increases in woody and poisonous species in the grasslands of both catchments. In addition to shifts on composition, a significant increase in the percentage of bare ground in relation to plant cover was observed in both catchments.

These findings were corroborated by the satellite data analysis, which indicated that there had been a significant loss in vegetative biomass within the catchments over the period 1993-2014, particularly in the areas within 10 km of the dam inundation areas. In contrast, vegetation cover in the protected areas showed slightly positive trends over the same period. Within 10 km of the dam, areas closest to the dam had the lowest vegetative cover, and lower altitudes within the catchment had the fastest rates of decline from 1993-2014.

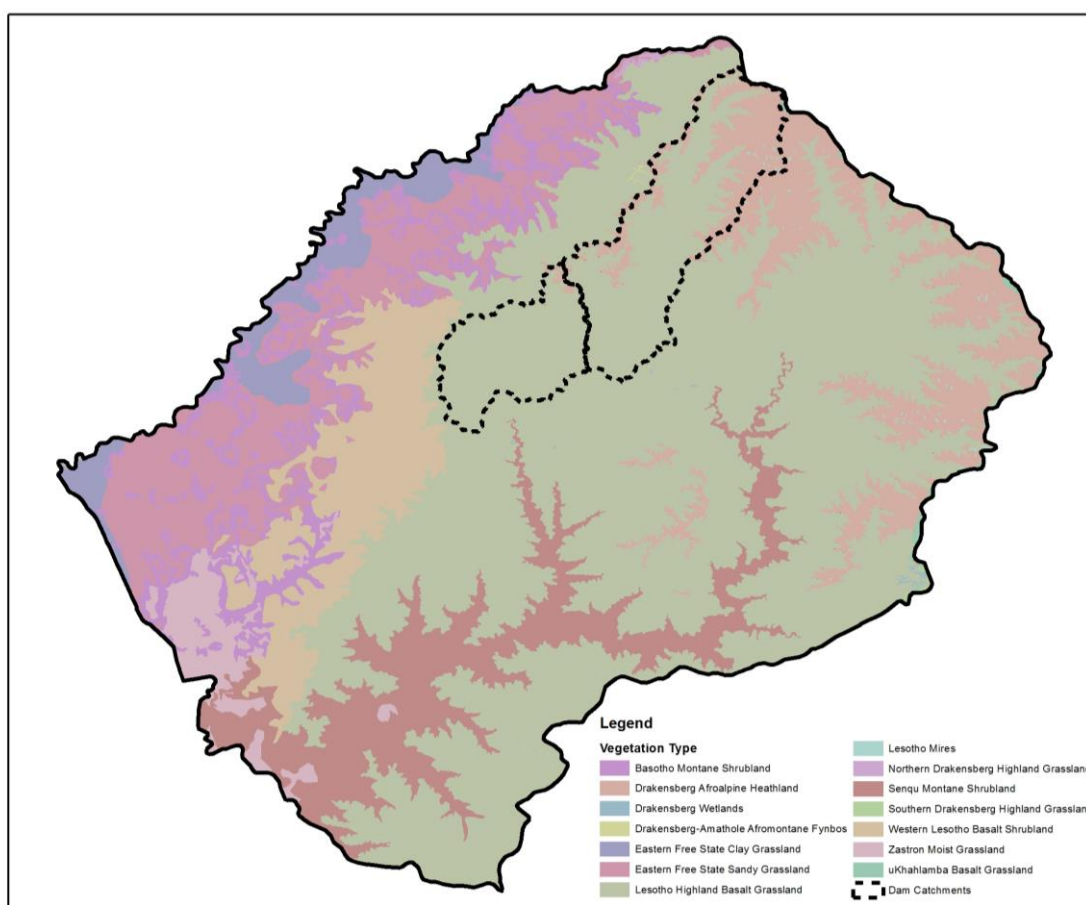


Figure 2.5 Vegetation Types within Lesotho showing the location of the Mohale (bottom left) and Kate (upper right) Dam catchments (VEGMAP South Africa and Lesotho, SANBI 2012).

Over the period from 1993-2013, the two most intact categories of grassland decreased by 6% in the Katse catchment and by 7% in the Mohale catchment, while the percentage area under subsistence farming more than doubled from 3% to 7% in Katse and increased from 1% to 6%

in Mohale. There was also substantial evidence of bush encroachment, which is a consequence of overgrazing (Quinlan & Morris 1994, Turpie *et al.* 2014a, b). The area dominated by *Chrysocoma* shrubs doubled in both catchments to 8% and 9%, respectively. While both altitude and distance influenced land use patterns, and areas closer to the dam are at lower altitudes, statistical analysis showed that proximity to the dam had a significant effect on land use and land cover when the effects of altitude were held constant.

These results presented a clear indication that land cover had changed quite substantially within both the Katse and Mohale Dam catchment since the construction of the dams. Most of the changes were indicative of rangeland degradation and transformation to agriculture. The relative stability of grassland condition in nearby protected areas during the same period suggested that these changes have been the result of human activities in the catchment rather than exogenous effects such as climate change. Furthermore, it appeared that human activities and their impacts were particularly concentrated around the dam.

The assessment of wetlands under Contract 1273 also found that a significant proportion of wetlands were degraded, and that the changes taking place or that had taken place were causing continued deterioration of the systems. Without intervention, a number of systems were expected to be lost in the medium to long term. Based on the assessment, it was suggested that in as little as 20 years there may be no more extensive peatlands remaining in the Highlands of Lesotho if the current rate of degradation continued unabated. A high proportion of the wetlands that had been previously surveyed in the Katse and Mohale catchments had already been lost over by the time of the 2014 surveys. This was thought to be predominantly due to changes in hydrology of the catchments. The biggest concern and immediate threat to the remaining systems was that of overgrazing and trampling by livestock and the resulting drying out and loss of peat. The indirect result of the drying out of the systems is the loss of the vital water storage function of these systems. Peatlands are vital in slowly releasing water to the surrounding landscape over an extended period of time. This function may already be largely lost in the catchments as shown by the apparent change in hydrology to surface flow dominated. This is an issue that was raised in the 1999-2000 reports as a cause for concern. The results of the 2014 field survey would suggest that the changes in the systems were due in most part to the intense and continuous grazing pressure that these wetlands are exposed to combined with hydrological changes emanating from the surrounding catchments. It was concluded that any recommendations for rehabilitation or restoration of these systems would have to include addressing the issue of rangeland management in general, and not just in regard to the utilisation of the wetlands.

2.3.2 Stakeholder perceptions

From the extensive discussions and focus group sessions held in the study area, perceptions pertaining to the condition of specific grazing areas and wetlands within the Katse and Mohale catchments was obtained.

A grazing areas

Of the A grazing areas within the Katse catchment, the Pelaneng A grazing area is reportedly in the best health but, in general, all A areas were reportedly in a very poor condition. Conflicts

over boundaries and Principal Chief jurisdictions exist in the A grazing areas in the north-east of the catchment, where residents from across multiple districts and widespread areas outside of the dam catchments graze their livestock in summer. Recent conflicts in these areas have resulted in violence and injury of livestock herders and owners.

A grazing areas in the Mohale catchment were reportedly in poor condition. In particular, shrub encroachment by *Helichryum*, *Passerina* and *Chrysocoma* bushes was often mentioned, especially in the western side of the catchment. Low productivity, erosion and compromised soil cover, which is being exacerbated by burning, were also mentioned by focus group participants. The poor condition was mainly attributed to climate change and, only occasionally, the high density of livestock grazing in the area.

The condition of not all the A grazing areas were verified on this trip, however, the observed A grazing areas did match descriptions from livestock owners and were in visibly poor condition with low grass cover, heavy shrub encroachment, wetland degradation and erosion. Shrub encroachment was particularly bad in A grazing areas observed in the south of the Mohale catchment.

B and C grazing areas

The C areas were often reported to be in the best condition of all the grazing areas, however, this did differ from village to village. It should be noted that there was visible erosion in many of these areas, especially in the Katse catchment on highly sloped regions. In Katse catchment, one village noted that their A grazing areas were heavily invaded by the invasive species *Rosa rubignosa*., leading to some areas becoming impenetrable to people and livestock. Because this species spreads by runners and seeds, it is very difficult to effectively remove. In addition, erosion due to road construction has been blamed for some of the bad condition in these areas. This erosion was quite obvious and severe and particularly bad for un-tarred roads.

The B areas were more often reported to be in bad condition. Often livestock owners reported that B areas were becoming encroached with *Chrysocoma* and *Passerina*, as well as citing the highly sloped areas being fragile to erosion. Livestock owners were quick to point out that this was because of the high density of livestock in these limited areas, with livestock staying for the longest period of all grazing areas. These areas were not as easily observed on this trip, however some of the areas passed through ranged from good to bad, indicating that it might be area-specific.

Wetlands

Most villagers identified that A grazing areas had the largest number of wetlands and that in general the condition of these are in a bad state. Livestock owners have noticed drying out of wetlands, gully erosion and loss of vegetation cover. Only a few livestock owners attributed this degradation to grazing pressure, while the majority attribute changes in hydrology and condition of wetlands to changes in climate and the recent 2015/2016 drought. This is however unlikely to be the dominant factor as severe changes to wetlands have been noticed prior to this most recent drought.

Wetlands in the B grazing areas were more often reported to be in a better state, however, it was also noted that the wetlands in these lower altitude areas are often seeps which might be more resilient to grazing pressure. It was reported that there are fewer wetlands in B grazing areas than A grazing areas, as well as fewer wetlands in C grazing areas than B grazing areas, with the exception of Ha Rapokolana which was situated in a valley characterised by vast wetlands. Opinions on the condition of wetlands in the C grazing areas differed markedly from village to village.

In many villages the importance of wetlands was well understood in the community. Wetlands are an important water source for most villages and the drying up of wetlands in B and C grazing areas during the most recent drought had sensitised many villages to the importance of the wetlands in the A grazing areas, which communities relied on in the most recent drought. In addition to water supply for both people and livestock, wetlands also provide productive areas for harvesting *Merxmuellera disticha* (wire grass) and other medicinal plants.

2.4 Future threats to high altitude rangelands

The above monitoring studies, as well as the perceptions obtained from stakeholders, suggest that the condition of rangelands and wetlands within the study is on a negative trajectory as a result of increasing human settlement and grazing pressure. Continued overgrazing is likely to result in further encroachment of less palatable grasses and the karroid shrub *Chrysocoma ciliata*, leading to a reduction in the carrying capacity of the rangelands. This may eventually lead to a complete and permanent change in the nature of these areas, making their further use for livestock unviable.

These problems may be further exacerbated by the continued growth of the numbers of people living in the study area, a result of the increased access and the opportunities created by the dam developments. The numbers of livestock grazing in highlands are also likely to increase as a result of the increased population of Lesotho more generally, and their increases in wealth. The population of Lesotho, while still relatively small has increased in size dramatically in the last 100 years (~200 000 in 1986 vs 1.9 million in 2011 Census, Hartley 2001, BoS 2017). While the growth rate did slow in recent decades due to the HIV and AIDs pandemic, population growth rates have since started to rise again (DoE 2014). These impacts could be counterbalanced to some extent by changing cultures away from keeping livestock.

Climate change will also lead to additional pressure on rangeland areas in future. Lesotho is expected to experience higher temperatures, more severe and prolonged droughts and more extreme snow and rainfall events as a result of climate change (DoE 2014). This will impact on the livestock carrying capacity of the rangelands and will increase problems of erosion, which is particularly pertinent for the LHDA.

Droughts will increase the risk of livestock losses and longer-term rangeland damage. These effects have been previously seen in the severe droughts of the 1930s and 1960s (Hartley 2001). During the 1930s livestock numbers (mostly sheep) in the highlands were estimated

to be over a million. Many livestock died during 1933, dubbed the “year of the red dust”. By 2000, sheep numbers had still not recovered to their pre-1930s level (Hartley 2001). The decrease in sheep numbers since 1930s and 1940s has however been offset by increases in cattle numbers across the country and as a result an increase in overall livestock units.

More frequent or severe snow events could also have an effect on livestock numbers, by affecting the survival of younger and weaker animals. Large snowfall events, such as those seen in 1964 (the Sugar Snow – lehloa la tsoekere) and 1987 (the Great Snow – lehloa la koluaa), are believed to have led to large-scale erosion through snow preventing vegetation growth and snow melting when there isn’t sufficient vegetation to retain sediment leading to the creation of many dongas as well as shortages of feed for livestock (Hartley 2001).

Thus rangeland management faces even greater challenges in future, and will need to allow for better long term projections, the ability to effect rapid changes in numbers of livestock and the provision of alternative supplementary food sources.

3 RANGELAND MANAGEMENT IN LESOTHO

3.1 History

In 1868-71, the polity formed under paramount chief Moshoeshoe I in the 1820s, known then as Basutoland, was halved in size under the Convention of Aliwal North and annexed into the Cape Colony as a British Protectorate. With that, a codified system of jurisdiction was introduced. This system mainly centred on where settlements were and, to a large degree, ignored much of the unsettled highlands where only temporary cattle posts occurred (Quinlan 1995). These areas then became the jurisdiction of the District Chiefs (Quinlan 1995). However, since there was little reason for District Chiefs to manage uninhabited and inaccessible areas, their focus was mostly on the villages and their surrounds (Q. Chakela, consultant, pers. comm.). In fact, grazing in the highlands of Lesotho has only been carried out for little over 100 years (Quinlan 1995). During this time a complex transhumance system has developed. Prior to this, the highlands were mainly seen as a refuge for livestock that was used during conflicts with neighbouring tribes and Afrikaners (Quinlan 1995). Some seasonal grazing during summer months occurred in the unsettled valleys of the highlands, whereas for the rest of the year, grazing occurred closer to permanent village settlements once crops had been harvested (Q. Chakela, consultant, pers. comm.).

The Basutoland Council was formed in the early 1900s and the Laws of Lerotholi were first documented in 1903 (Hartley 2001). These outline the customary and traditional laws within Lesotho. Amongst other things, including land ownership, they stipulate that it is the birth right of every Mosotho to access to land to graze their livestock. This fundamental right makes controlling access to grazing areas problematic and is one of the most important factors leading to the issues in rangeland degradation we see today (LNFU 2016).

During the 1920s, a wave of settlement occurred in the highlands as colonial powers supported the placing of chiefs in positions of power with jurisdiction to govern these areas to strengthen the chieftaincy governance across the country (Hartley 2001). Early stock improvement programmes included the introduction of new livestock breeds as well as the promotion of livestock products for export. During this time, livestock production was promoted in Lesotho, with wool and mohair being among the biggest exports (Quinlan 1995).

Despite the absence of a formal system of rangeland management at the national level, there was still informal control at a number of local levels to try and limit over-use and degradation of the rangelands (Q. Chakela, consultant, pers. comm.). In some areas there was abundant grazing surrounding villages and there was little need to move cattle further into the mountains to find grazing. Most grazing control was therefore concerned with areas immediately surrounding villages. Village Chiefs would have advisory committees to advise on different aspects of village management such as rangelands, harvested resources, cropland. The advisors were often individuals with an interest or deeper understanding of the particular issue at hand, often elders within the community (Q. Chakela, consultant, pers. comm.). There would normally be a person in charge of watching over the village rangelands

and making sure that trespassers were chased-off and that areas were not over-grazed. There was less control over grazing areas further away from villages. The choice of where animals grazed (for instance near wetlands or on steep slopes etc.) often came down to the herders themselves. Before being put in control of a large herd, herders were trained informally to understand the needs of both the animals and the grasslands and to therefore be able to select appropriate grazing areas for their herds, based on animal and grassland condition, as well as climate (Q. Chakela, consultant, pers. comm.).

By the 1930s and 1940s, increasing human population and increasing herd sizes saw the emergence of problems such as soil erosion and changes in grass composition in the mountain areas (Quinlan 1995). This led to the first attempts at introducing grazing management systems in Lesotho (Hartley 2001). In 1938 the concept of Leboella was added to the Laws of Lerotholi by the Paramount Chief/King in order to curb land degradation and soil erosion. Leboella is an area set aside for rest by the Chief – either for the regeneration of grass, reeds, tree planting or for rotational grazing. The Basotho tend to take ownership of and accept both the Laws of Lerotholi and concept of Leboella (Hartley 2001). The understanding and acceptance of subsequent laws and regulations have not been as far-reaching in most rural areas. Although formal grazing regulations had not been implemented nationally at this point, some introduction of Leboella and regulations of natural resources, such as fuelwood, had already been implemented by individual chiefs (Hartley 2001).

The livestock industry in Lesotho was dominated by overstocking, low fertility, high mortality yet a very low marketed off-take (Swallow & Brokken 1987). Between 1930 and 1956, livestock auctions were introduced by the government to try and increase outlets for selling surplus or culled animals would lead to reduced stocking rates and increased productivity. Sites for livestock auctions were created throughout the country to assist farmers to off-load animals rather than retaining surplus animals in poor condition or culled animals. In addition, a national destocking programme, came into effect in the mid-1950s that allowed farmers to trade in livestock of poor quality or mixed breed for fewer animals of higher quality (Swallow *et al.* 1987). The national auctions however collapsed in 1956 (Swallow & Brokken 1987).

In the 1950s, it was recognised that the area under cropland was increasing rapidly, and that this was decreasing the area available for grazing and placing additional pressure on the remaining rangelands (Hartley 2001). This led to an increase in the tendency for people to graze their animals in the mountains during the crop growing season, and a concomitant increase in the number of cattle posts in these areas (Hartley 2001).

In 1959, the Basutoland Council approved a resolution for national level grazing control making “controlled rotational grazing” compulsory and final amendments were made to the Laws of Lerotholi (Hartley 2001). In the 1960s, a system was devised to delineate jurisdiction of control over rangelands. This system divided grazing areas into three areas which are now universally recognised and understood across Lesotho, as A, B and C areas (Hartley 2001). Grazing areas within the afro-alpine region, far from villages, were denoted as A or “summer” grazing areas. These areas are also sometimes called cattle post areas. Areas further away from villages, but generally in valleys that are still warmer during winter months were denoted

as B or “winter” grazing areas. Areas immediately surrounding villages, including areas between agricultural fields as well as fields outside of crop-growing season, were denoted as C or “village” grazing areas. These areas were to be the units for national rotational grazing system.

Basutoland gained independence from Britain in 1966 to become the Kingdom of Lesotho. The monarch was constitutional³ (largely ceremonial), and the country had a Prime Minister (Tona-Kholo). The Chieftainship Act of 1968 (No. 22 of 1968) formalised the jurisdiction of different chiefs across the country. This saw the formalisation of the Department of Chieftainship which helps to guide chiefs in the day-to-day execution of their duties. The roles of chiefs specified by this Act include being responsible for the management of natural resources within their area as well as registration of livestock.

The Land Husbandry Act of 1969 (No. 22 of 1969) was introduced to help control and improve and manage agricultural land, soil conservation and water resources. This act gives power to the Minister of Agriculture to make regulations relating to agricultural land and its uses including prescribing how land should be used. This Act, is seemingly in contradiction to earlier Chieftainship Act which gives power of resource management with Chiefs. This legislation, if enacted, would supersede earlier legislation, however moves to reduce the responsibilities of the Chiefs have not always been politically favourable and as such there have only been few attempts at implementation of this Act.

The Department of Agriculture continued to assist the livestock industry by promoting markets for livestock and livestock products even after the collapse of the livestock auctions across the country. In 1971, the Lesotho Farmers’ Produce Marketing Corporation was established and was replaced by the Livestock Marketing Corporation (LMC) in 1973 (Swallow & Brokken 1987). This government controlled company was the only agency through which livestock could be exported within Lesotho. In 1980 LMC was succeeded by the Livestock Products Marketing Service (LPMS). A national feedlot and abattoir were opened the mid-1980s, which together with the LPMS, continued to dominated formal livestock marketing within Lesotho (Swallow & Brokken 1987).

As part of the Land Act 1979 (No. 17 of 1979), Village Development Councils (VDC) were set up to try and help coordinate development at local levels and were responsible for maintaining roads, collecting taxes and spending revenue within the community. These VDCs were the precursors to the present-day Community Councils (see below).

The Range Management and Grazing Control Regulations were first drafted in 1972, but were only gazetted in 1980 with a number of amendments then made in 1986 (LN 39 of 1986 &

³ Constitutional monarchs are bound to exercise their powers and authorities within the limits prescribed within an established legal framework.

LN144 of 1986). These introduced a grazing permit system whereby grazing in “summer” or A grazing areas requires a permit issued by the Principal Chief of the area. These permits were free, and the Principal Chiefs tend not to deny anyone permits, as this would be in contradiction of the Laws of Lerotholi. However, the Principal Chief may denote which areas should and should not be grazed in any given year and can recommend that livestock owners seek grazing outside of their area if they feel the area is overstocked. Even though permits are free, fines can be issued for grazing without a current permit. If fines are not paid, animals can be impounded by the Principal Chiefs and their assistants. “Range riders” (individuals sent out by the Principal Chief’s office) bring in herds to be impounded. A portion of the fees collected (30%) is given to these riders for their efforts (B. Motsamai, consultant, pers. comm). The remaining portion of the fee is meant to be returned to central government. However, poor reporting of fines sees much of this income remaining in the office or with the Chief (B. Motsamai, consultant, pers. comm).

In 1979 the Range Resource Management Division in the Ministry of Agriculture was established and has allowed for assistance to be given with issuance and record keeping of permits as well as in assessing which areas should be rested in any given year (Hartley 2001). Despite this assistance provide by this department, effective control of grazing lands was still not occurring (B. Motsamai, consultant, pers. comm). Recognition of ineffective management, as well as the weakening power of chiefs in some areas, gave rise to the idea of creating supportive institutions to manage grazing resources. This led to the establishment of Grazing Associations (GAs) within Lesotho. The first GA was set up in 1982 (LAPIS 1991). These associations were meant to be groups of stock-owners that would act collectively in ways to limit overgrazing and promote recovery of rangeland for their own self-interest. The GAs are delegated the mandate to manage a designated area (Range Management Area – RMA), and can issue fines for not having appropriate permits (LAPIS 1991). There has been mixed success of GAs across Lesotho, and their structure has evolved over the years. However, all GAs rely heavily on support from extension services from the Department of Range Resource Management (M. Hae, Dept. of Range Management, pers. comm).

From independence until 1993 politics were tumultuous, and a military coup left a Military Council and King Moshoeshoe II in power from 1986, followed by his son King Letsie III in 1987. During this time of military rule, the King was given executive powers. During this time grazing control was very top-down with little grass roots or participatory involvement from communities, contributing to lack of sustainability in many government and donor-run programmes attempting to assist in rangeland management and control (Chapeyama 2004).

In 1991, amendments to the Rangeland Management and Grazing Control Regulations were proposed and brought into effect in brought into effect in 1992 (Rangeland Management and Grazing Control (Amendment) Regulations, 1992: Legal Notice No. 78 of 1992). In addition to the introduction of grazing fees, this amendment also consisted of other measures such as the altered demarcation of rangeland including giving jurisdiction of cattle posts to nearby villages and ending transhumance (Chapeyama 2004). VDCs were delegated some of the responsibilities of Principal Chiefs and were meant to help set aside areas for Leboella and

help issue grazing permits as well as be the agents responsible for collecting these grazing fees and rangeland adjudication (Chapeyama 2004).

In 1993, civilian rule was re-established, leading to national elections. The election campaign used the removal of grazing fees as a means to gain public support and the amended regulations were repealed in 1993 (Rangeland Management and Grazing Control (Amendment) Regulations, 1993: Legal Notice No. 150 of 1993) before they had been implemented. Despite its unpopularity, the ill-fated policy had apparently enjoyed some support at local level, where many livestock owners felt a fee was a good step towards maintaining the sustainability of the rangelands (UNDP 1993). However, the election campaign may have tainted the perception of a national grazing fee to many Basotho, as it was characterised as being similar to the poll taxes levied during colonial times (Chapeyama 2004).

In 1993 the Constitution of Lesotho (Act No. 5 of 1993) was formed. The Constitution does not specifically mention either grazing or range resources, but reiterates that all land in Lesotho is vested in the Basotho Nation and held in trust by the King, and that rights of allocation shall be exercised in accordance with the Constitution and other laws. The King's political powers were removed by the 1993 Constitution, and democracy was restored again in 1998. During this time civil unrest saw the destruction of certain government resources, including much of the data, maps and information resources of the Department of Range Resource Management (B. Motsamai, consultant, pers. comm).

The Local Government Act of 1997 (No. 6 of 1997) created a system of local governance which divided the country into Districts, which were further subdivided into Councils (Municipal, Urban or Community depending on area). These replaced the previous VDCs. This Act gave responsibility for many functions previously enacted by chiefs and then VDCs, to Community Councils. These responsibilities include natural resources, grazing rights, markets, and local administration and development. Following this, and in order to try and empower citizens, promote equitable development and create a more participatory local government, the National Decentralisation Policy was developed in 2014. This policy aims to see Community Councils strengthened to enable better administrative and service delivery to local communities. The current arrangements are described in more detail below.

3.2 Current institutions

3.2.1 Overview

There are currently two parallel layers of regulation and control in Lesotho – that through local government and that through the traditional authorities (the Chieftaincy). There is overlap in jurisdiction between these two systems and their boundaries are not in alignment. There appears to be erosion of chiefly powers with the National Decentralisation Policy (Ministry of Local Government, Chieftainship and Parliamentary Affairs 2014) and other legislation continuing to diminish the roles of chiefs. Within rural areas, however there is still strong acceptance of the traditional system and its authority.

In addition to the local government and traditional authorities, there are a number of other government institutions that have mandates to assist with the management of rangelands within Lesotho. These include other Departments and Ministries within the Central Government that have different levels of control/jurisdiction over parts of study area relating to livestock, rangeland and wetland management. Actions of all of these government agencies are governed by a suite of policies and legislation.

3.2.2 Chieftaincy and local government structures

Chieftaincy

The traditional authority structures within Lesotho were mandated to manage rangelands under the documented Laws of Lerotholi, the most recent amendments to which were made in 1959, as well as the under the Chieftainship Act of 1968 (No 22 of 1968), the Land Husbandry Act of 1969 (No 22 of 1969) and the Range Management and Grazing Control Regulations and Amendments (LN 39 & LN 144/1986).

The Chieftaincy Act of 1968 recognised and formalised the traditional authority structures within Lesotho. This traditional system is widely accepted and respected by local Basotho (Hartley 2001).

Underneath the King there are 22 Principal Chiefs, all descendants of King Moshoeshoe I or Clan Chiefs. Principal Chiefs form part of the Senate in Parliament and are generally based in Maseru, despite their jurisdictions being spread throughout the country. Below Principal Chiefs, Area Chiefs are in charge of a number of villages. Below this, each village has a Village Chief who is in charge of their village and its surrounds. The Area Chief is a Village Chief who has been chosen to represent a group of villages. The hierarchy of authority is presented in Figure 3.1.

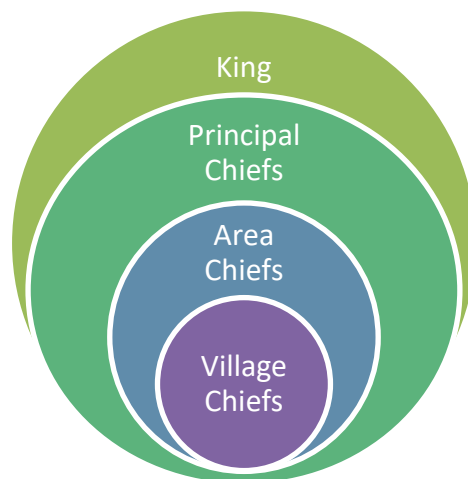


Figure 3.1 Layers of traditional authority through the Chieftainship system in Lesotho.

The areas of jurisdiction of each of the Principal Chiefs are large and despite a general understanding of where the jurisdictions of each Principal Chief begins and ends, official maps of these are not available. However, through stakeholder engagement within the catchment

areas, a rough indication of Principal Chief boundaries was obtained (Figure 3.2). Principal Chiefs are responsible for the issuing of permits and enforcement of rules in the A grazing areas, as well as determining when livestock owners can move into these areas.

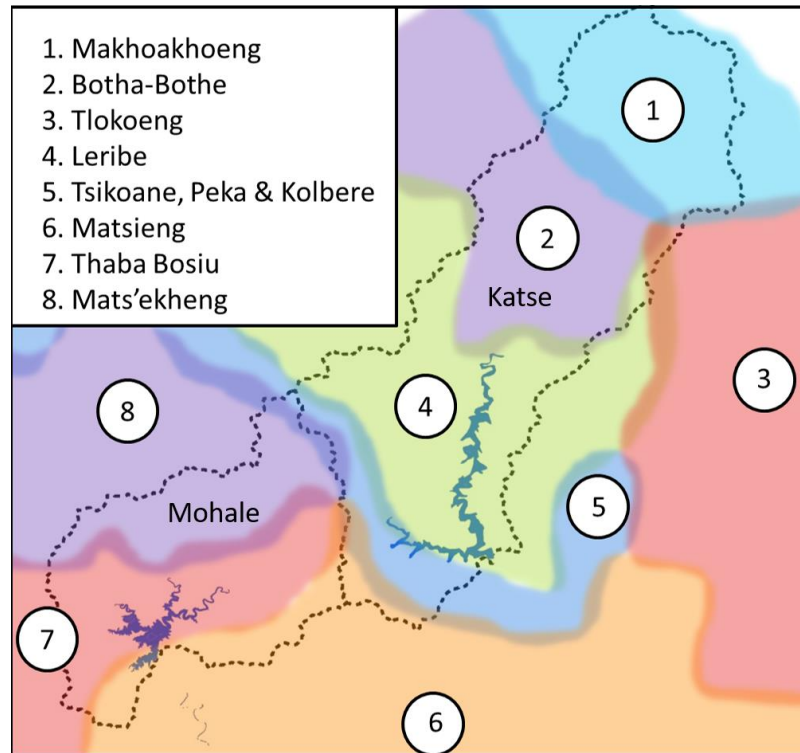


Figure 3.2. Approximate jurisdiction of different Principal Chiefs across the Katse and Mohale dam catchments. These are meant to be indicative only and detailed mapped in consultation with each Principal Chief would be required for further accuracy.

Local Government

The introduction of the Local Government Act (No. 6 of 1997) led to the formation of District Councils and of Community, Urban and Municipal Councils as part of a decentralised local governance system. According to this Act, local government has been assigned the responsibilities relating to control of natural resources and environmental protection, land allocation, minor roads, grazing control, water supply markets and burial grounds (LNFU 2016). These responsibilities were previously mainly under different levels of Chiefs.

There are currently a total of ten administrative Districts and District Councils in Lesotho, and within these, 62 Community Councils, 12 Urban Councils associated with larger towns and two Municipal Councils associated with the capital city Maseru (FAO 2017). The Community Councils tend to be larger in the more sparsely populated areas of the country (Figure 3.3).

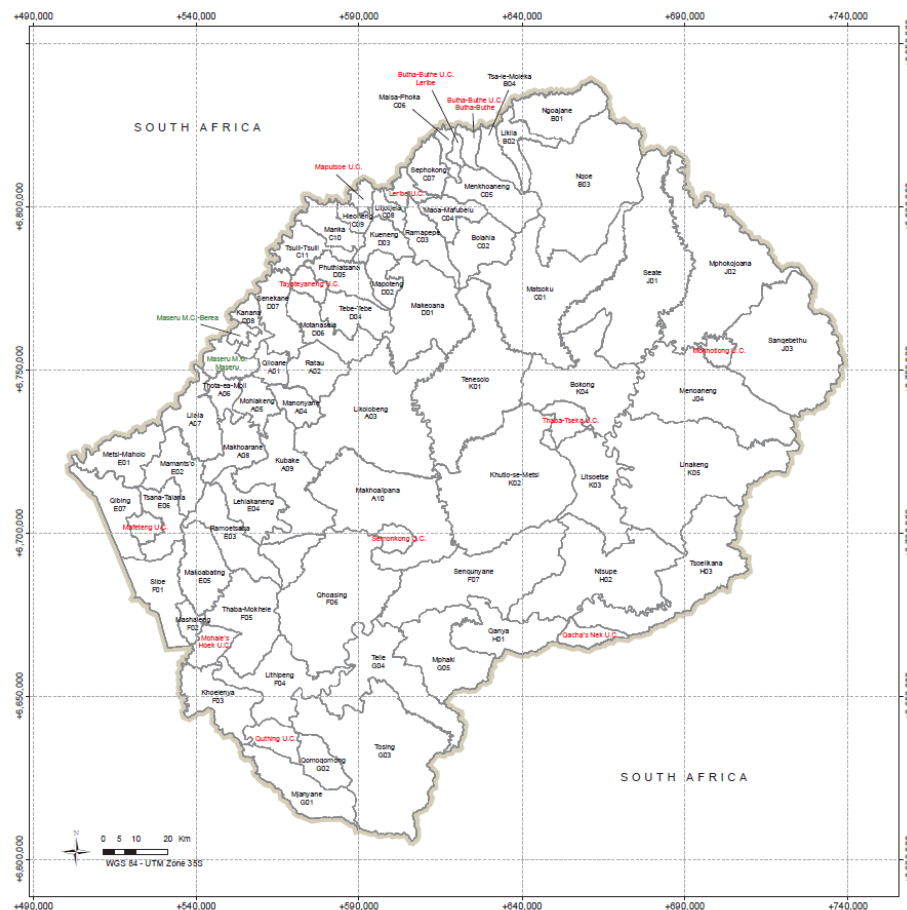


Figure 3.3. Demarcation of Community, Urban (in red font) and Municipal (in green font) Councils across Lesotho (FAO 2017).

District Councils are comprised of representatives from Community Councils and represent Community Councils at the second tier below Central Government. Community Councils are comprised of two elected Village Chiefs and a number of democratically-elected local politicians (Figure 3.4). The total number of people sitting on a council varies, but is generally in the region of 10-20 people.

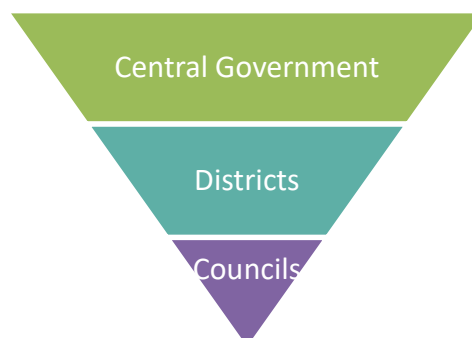


Figure 3.4. Layers of government within Lesotho including the Central Government at a national level down to Councils at a more local scale.

Community Councils generally encompass a number of villages and generally have the support of Village Chiefs. Among other duties, Community Councils should help manage the B and C grazing areas. In previous iterations of the Local Government demarcation, Community Council jurisdictions did not cover the whole of Lesotho, and largely excluded the A grazing areas, which had therefore remained the sole responsibility of the Principal Chiefs. Recent changes (legal Notice No. 1 of 2011), have seen the extension of the Community Council jurisdictions to include all of these areas, so that they now cover the whole of the country. However, the management of A grazing areas still remains with Principal Chiefs. This recent demarcation of Community Council areas has also reduced their total number to just over half as many as there were previously (76 vs. 128, FAO 2017, Matlanyane 2013), so that each council now controls a much larger area. The rationale behind this more was to have a manageable size of local government councils for more cost effective administration to allow better management, monitoring and performance evaluation (Naha 2015).

Funding for local government comes mainly from Central Government grants. However, there are moves to increase the levels of self-sufficiency within the local government structures. This would potentially enable them to create their own regulations with regard to natural resource use and grazing, including the collection and use of grazing fees. However, recent changes to boundaries have led to delays in the Community Councils being able to create and enact their own by-laws.

The catchments of Katse and Mohale Dams span a number of Districts and Community Council areas within Lesotho. Neither of the dam catchments fall solely within any one district, nor does any District or Community Council fall within any one dam catchment (Figure 3.5). The Mohale Dam catchment spans the Maseru, Berea and Thaba-Tseka Districts, and within these, parts of the Likolobeng, Makeoana and Tenesolo Community Councils, respectively (FAO 2017). The Katse Dam catchment also spans three districts, the Thaba-Tseka, Leribe and Butha-Buthe Districts. Within these, it corresponds to a small section of the Tenesolo Community Council (shared with Mohale catchment), and the majority of the Matsoku and Nqoe Community Councils, respectively (FAO 2017).

Problems

Although these chieftainship and local government systems are meant to run in parallel there appears to be poor understanding, even at the levels of Chiefs and Councils on the division of responsibility (Pratchett *et al.* 2008). This has occasionally led to conflict between the government institutions and traditional authorities, as well as confusion among residents as to who they should be seeking permission from for different matters (Matlanyane 2013). An example of this was demonstrated through the Khubelu Sponges Project where stakeholder engagement initially found that approximately half of community members surveyed thought grazing permission was the sole responsibility of Chiefs, whereas the other half thought it was through the Community Councils in conjunction with the Chief (ORASECOM 2008). As a result, local governments can struggle to carry out all of their responsibilities in rural areas where inhabitants still see traditional leaders as the only authority.

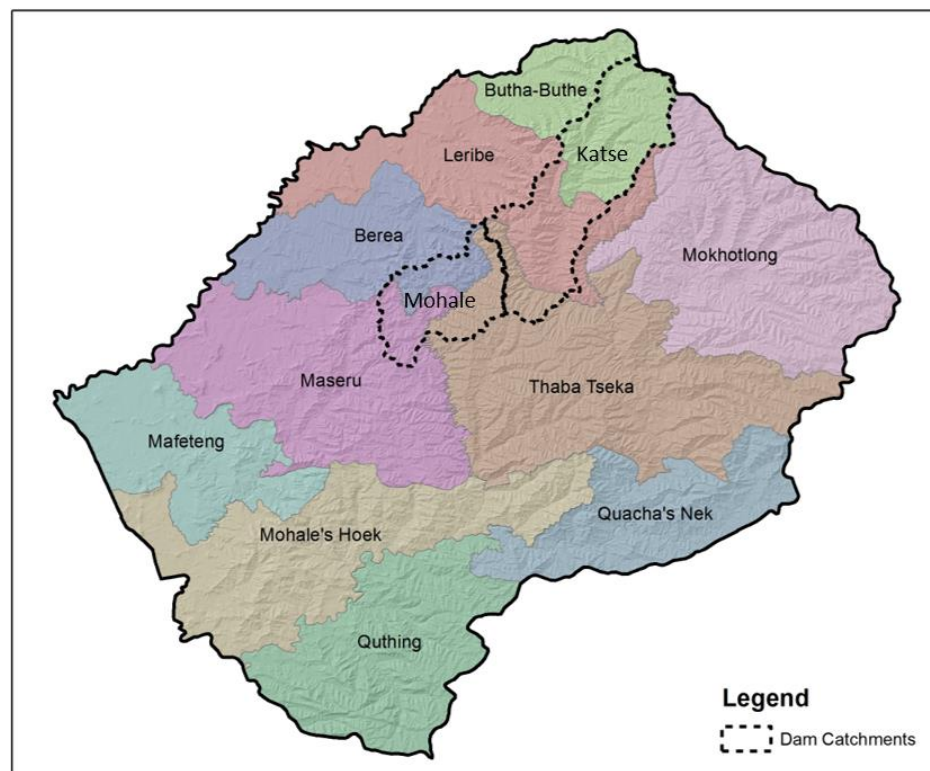


Figure 3.5. Administrative Districts across Lesotho and within the Mohale and Katse Dam catchments (FAO 2017).

In addition to community members not having clarity on roles of each respective governance structure, there has been some conflict between traditional leaders and elected local governments in terms of the understanding of their respective roles and authority (Pratchett *et al.* 2008). Clear demarcation, especially in geographic terms of the extent of different responsibilities is often lacking. Although some Chiefs welcome to support and taking away of burdensome responsibilities by Community Councils (Pratchett *et al.* 2008), others resist the diminishing of their powers.

Grazing associations

Grazing-associations are a voluntary, community-based approach being supported as a method to try and ease the pressure on rangelands. GAs manage Range Management Areas (RMAs) which typically cover 20 000-35 000 ha and 10-15 villages (LAPIS 1991). The formation of these GAs involves intensive community sensitisation, training, workshops and meetings. Once a community shows interest, committee members are elected by the community and a constitution is formed through participatory approaches (MFLR 2014). The constitution and its objectives are based on interests of the specific community. Grazing Associations may have multiple objectives, including some that relate to aspects of rural life other than grazing. These could include supporting diversification of livelihoods, access to animal health services

and access to donor funding for small scale development projects (M. Hae and R. Mating, Department of Range Resource Management, pers. comm.).

Once the constitution is formalized and the GA is registered with the Law Office, the Principal Chief can declare the GA and assign them a Range Management Area in which they have jurisdiction to manage the natural resources. Once formed, quantitative and qualitative methods for surveying rangeland resources are conducted using a standardised Rangeland Inspection data collection forms. Data collection includes degree of soil stability, bare patches and indicators of erosion, species composition, plant species as well as assessment of plant vigour, and presence of seedlings and grass tufts. From these inventories, the rangeland carrying capacity is determined and the assessment of degraded areas can inform identification of remedial actions. These activities require competent technical staff (usually from the Department of Range Resource Management). Following these assessments, a grazing plan is formulated which identifies grazing units and a rotational grazing plan. Permits are issued that stipulate where and when animals should graze according to an annual plan. Infringements of this plan can result in fines and ultimately impoundments if fines are not paid.

Membership to the GA is voluntary and requires the payment of a subscription fee per household (not per livestock). It can include households without livestock that rely on range resources, such as crafters and traditional doctors. GAs must rely on subscription fees and outside sources of funding to finance their initiatives (M. Hae and R. Mating, pers. comm.). Even though GAs can fine and impound animals, these collected funds have to be returned to Central Government (or end up being captured by Chiefs). While membership is voluntary, all inhabitants have access to the RMA, not just members. Thus the benefits of improved rangeland condition are shared by all households using the area. However, some benefits would be reserved for members.

The success of the GAs largely hinges on the administrative ability of the GA committee and executive officers (LAPIS 1991). None of the GAs are self-sufficient and all are heavily reliant upon extension services offered by the Department of Range Resource Management, which itself has limited resources (M. Hae and R. Mating, pers. comm.). Some of the main challenges could be overcome if GAs could have more self-determination and were able to better enforce grazing regulations within the RMAs (LAPIS 1991, MFLR 2014). The new draft Rangeland Management Act aims to give GAs the ability to create their own bye-laws to govern the regulations they place upon RMAs (M. Hae and R. Mating, pers. comm.). This would enable GAs to determine how fines can be implemented which could be specific to local conditions and needs.

Some of the other problems with GAs are the lack of autonomy and perceived lack of authority. In theory, these associations, if endorsed by Principal Chiefs, have the rights to manage their RMAs, including allocating areas for resting, rotational grazing, issuing fines and impounding animals. However, this authority is not always respected by all community members. This is especially the case where there is support on paper from Principal Chiefs, but where this support is not actively and publically promoted (LAPIS 1991, M. Hae and R.

Mating, pers. comm.). It has also been suggested that introducing these new structures without sufficient sensitization, building of social cohesion and incremental change has led to rejection of GAs (Lawry 1987).

The most successful GAs are those where there is enthusiastic participation by community members and adequate support in terms of outside funding and in technical advice and support. This usually necessitates a few local 'champions' as well as widespread buy-in from community members. Often, however, initial enthusiasm for the project often falls away, especially if benefits to members are not seen within a short time period (LAPIS 1991). The fact that benefits in terms of grazing resources are realised by all community members (regardless of whether or not they are in the GA) is another factor that undermines enthusiasm and continued buy-in.

3.2.3 *The Mafisa system*

The Mafisa system was developed as a means for redistributing wealth and providing social protection and assistance. Under the Mafisa system, livestock, such as cattle, sheep, goats and horses, are loaned to a poorer family for looking after. The borrower is entitled to use the livestock for any of the reasons already identified for keeping livestock, such as ploughing, for milk, transport, etc. (Mosito 2014). Furthermore, the borrower is entitled to a proportion of any offspring from the borrowed livestock. Through this system, the lender reduces the risk of the full herd catching a disease as the livestock are distributed over a wider geographic area (Rosenberg & Weisfelder 2013). Furthermore, this is a way for households dwelling in the lowlands to capitalise on the highlands' grazing resources.

3.2.4 *Government Ministries and Departments*

A number of Departments and Ministries have responsibilities relating to rangeland management (Table 3.1). These include those relating to livestock themselves (numbers, registration, health and condition, selling and marketing), governing where owners can graze their animals as well as the protection of important environmental and water resources.

Many of these departments are plagued by lack of funding, limited resources (e.g. cars and people) as well as limited technical capacity (S. Damane, Department of Environment, B. Motsamai, consultant, M. Maseatile, Department of Water Affairs, pers. comm.). Support is often needed from NGOs, sometimes in terms of technical input, but most often in providing support for specific projects. In addition to this lack of resources, there has been a tendency in Lesotho for each of these departments to work independently, without collaboration with or consideration of what other departments are doing, despite overlapping mandates and joint responsibilities (EU 2016, S. Damane, Department of Environment, pers. comm.). Pooling of resources, clarifying roles and avoiding overlapping responsibilities between different departments would help limited funds go further (M. Maseatile, DWA, pers. comm.). Furthermore, frequent changes to upper levels of governments (i.e. Prime Minister as well as Ministers in 2012, 2015 and 2017) have resulted in reluctance of Ministers to enact new legislation until they fully understand the problem and potential ramifications of such legislation.

Table 3.1. Government Departments and their responsibilities relating to rangeland management within Lesotho.

Government Department	Responsibilities relating to range management
Ministry of Local Government and Chieftainship Affairs	Supporting local governance and traditional authority structures
Ministry of Agriculture and Food Security	Livestock management - ensuring unproductive and unhealthy animals are removed from rangelands
Department of Range Resource Management	Range Management – extension services to local government and chiefs in rangeland assessments and recommendations for management, supporting grazing associations, education, fire management teams
Department of Environment	Environmental protection and biodiversity – protected areas and environmental legislation,
Department of Water and Sanitation	Water resources – management of wetlands, rivers within rangelands, integrated catchment management
Ministry of Home Affairs	Livestock registration – livestock numbers and record keeping
Ministry of Trade, Industry, Cooperatives and Marketing	Livestock marketing and cooperatives – promoting markets for livestock products

3.3 Current legislation and the new policy

The policies and legislation that govern rangeland management have undergone a number of developments which are outlined in Table 3.2. They contain quite extensive stipulations some of which, if implemented properly, would be expected to lead to much better rangeland management than is currently observed. Much of the problem seems to be with implementation and enforcement of these regulations, and a mismatch between legislation and the capacity of institutions to carry out their mandated functions. There also seems to be poor knowledge and appreciation of these regulations across the board, including rights, where the authority lies and correct procedures to follow. Even at the level of Chiefs and Community Councils, full understanding of regulations, procedures and their implications is not always apparent (Pratchett *et al.* 2008, Matlanyane 2013).

The Department of Range Resource Management, which falls under the Ministry of Forestry and Land Reclamation (MFLR), has recognized that the current rangeland management policies and practices are ineffective at curbing rangeland degradation. As such, a new National Range Resources Management Policy (NRRMP) was formulated in 2014. This policy creates a legal framework to guide legislation in the future. The overall goal of the policy is to attain sustainable development and management of rangeland resources for enhanced biodiversity, optimum productivity and improved livelihoods of the present and future generations.

Table 3.2. Relevant policies and legislation relevant to the management of rangelands and wetlands within Lesotho.

Policies/Strategies/ Legal Framework	Summary
Laws of Lerotoli 1939	Land and access to grazing is a birth right of every Mosotho. Access to and control of rangelands should be administrated by the Chiefs.
Land Husbandry Act 1969	Allows for the creation of regulations in respect to usage of rangelands by the Minister of Agriculture in order to improve land, soils conservation and water resources. It contains provisions on range management and grazing control for communities to manage range resources in a sustainable manner, guaranteeing equal access.
Range Management and Grazing Control Regulations 1980 (and subsequent amendments)	Chiefs should consult with agricultural officer and set aside special areas within his jurisdiction for <i>Leboella</i> (resting from grazing or use) annually. The original regulations set out how rotational grazing should be organised including determination of carrying capacity, issuing of permits, record keeping, fines for breaches and culling of surplus animals that exceed carrying capacity. There have been multiple amendments as to definitions and small adjustments, but most notably the addition and then the removal of grazing fees.
Livestock and Range Management Policy (1994)	Aims to achieve greater self-reliance for livestock owners though better animal health, productivity and husbandry services. To be implemented through village level institutions.
National Range Resources Management Policy (2014)	Devolves responsibilities for range management from national to local level; advocates introduction of user fees
Long Term Water and Sanitation Strategy & National Wetlands Conservation Strategy (2016)	Mutually re-enforcing strategies from the Ministry of Water. Aim to protect wetlands through strengthening governance, promoting sustainable use, capacity building, develop wetland inventory and establish a national funding mechanism for wetlands.

The NRRMP explicitly devolves responsibilities for range management from national to local level. The policy aims to ensure that local communities are given the legal rights and incentives to be able to manage rangelands effectively, mainly through supporting formation of GAs. The policy advocates a review of current legislation, including:

- removing certain sections in the Land Husbandry Act (No 22 of 1969) pertaining to rangelands and range resources management for incorporation into a new Act;
- reviewing and revoking the current Range Management and Grazing Control Regulations and its amendments; and

- developing new Rangeland and Range Resources Management Regulations based on the new policy.

The key areas in which the National Range Resources Management Policy focuses are:

- Sustainable management of rangeland resources;
- Conservation of biodiversity and maintenance of ecosystems;
- Rangeland monitoring and research;
- Maintenance and protection of wetland areas; and
- Socio-economic dimensions.

Particular strategies that have been outlined under the key areas above include:

- Developing guidelines for establishment of rangeland infrastructure and cattle post areas;
- Promoting education and increasing capacity at multiple levels including communities, grazing associations and herders;
- Implementing user payment mechanisms for rangeland resources (this is incorrectly named a PES scheme in the policy but is actually a requirement for users to make in-kind contributions to the management of rangelands);
- Providing better regulations or guidelines for developments and infrastructure (e.g. mines, roads etc.) which threaten rangelands and wetlands;
- Improving monitoring of rangeland condition and health;
- Increasing awareness of wetland importance, collating better data on wetland status and trends and promoting declaration of protected areas in major wetland catchments; and
- Reviewing and promoting local structures to be equipped with skills for effective management and control of rangeland resources.

The policy envisages multiple layers of Grazing Associations (GAs). These include community-level GAs, District Grazing Association Committees (responsible for providing strategic direction for the range resources programmes at district level) and a National Grazing Association Committee (to advise MFLR on policy and implementation strategies).

3.4 The reality of rangeland management in the study area

The following descriptions were compiled from the discussions held with stakeholders in the study area.

3.4.1 Grazing areas

While every attempt was made to understand the spatial aspects of grazing in the study area, this was very difficult in the absence of existing maps, the lack of familiarity of the stakeholders with reading maps, and without being shown the areas physically. Figure 3.6 shows a very approximate understanding of the distribution of the A, B and C grazing areas in the study area, based on descriptions of the A areas, and an assumption of the C areas being within about 500m of villages and fields. It also shows our understanding of the approximate location

of four grazing associations, based on discussions with villagers. Note that this map is an estimate based on limited information, and that the actual location of these areas and the villages associated with each grazing association need further refinement. Note also that the grazing associations do not have exclusive grazing management areas, and may share the same A areas and possibly also B areas.

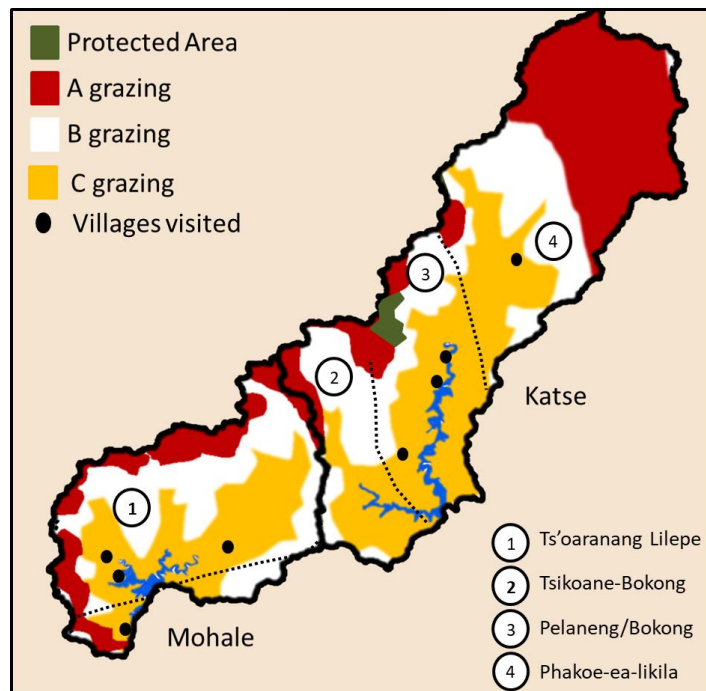


Figure 3.6. Actual location of the Bokong Nature Reserve, and estimated location and extent of A, B and C areas in the study area, based on discussions with key informants and livestock households. Dotted lines separate the villages associated with different grazing associations.

3.4.2 A grazing areas

A grazing areas are managed by Principal Chiefs, however we found little evidence of active management in the catchment areas. For example, the timing of movement into A grazing areas is supposed to be based on rangeland assessments conducted by Principal Chiefs but there was little evidence of this taking place in the study area. The one exception was for areas under Principal Chief Matsieng, where it was reported that regular participatory assessments are conducted for the A grazing area to inform not only the timing of when animals can be moved to the summer grazing areas but also the resting of certain areas within these grazing lands. These types of assessments are, however, based on people's perceptions of different parts of the rangeland and availability of water rather than formal assessments of carrying capacity. This Principal Chief is reportedly known for taking a very active role in the management of the A grazing area in his jurisdiction and for enforcing the rules with strict and severe punishments. However, this seems to be the exception and many Principal Chiefs rather delegate responsibilities to Area Chiefs who are closer to the A grazing areas in terms

of granting permits. Monitoring of A grazing areas apparently takes place, but often just once, after which herders are almost guaranteed to not get caught.

In both catchments, livestock owners indicated that there was a significant proportion of people who do not obtain permits for A grazing areas. Reasons for not obtaining permits included:

- Having to travel very large distances to get permits in the case of Principal Chiefs that only issue permits from their office in an urban centre;
- Objection to having to get permits, since under the Laws of Lerotholi, they should be able to graze freely; and
- Out of resentment for the numbers of outsiders allowed to graze their livestock in areas they thought should be reserved for people living locally.

The latter feelings seemed to be more prominent in areas where there was conflict in terms of which Principal Chief had jurisdiction, and therefore which people had the right to be using those areas.

3.4.3 B and C grazing areas

Area Chiefs, village Chiefs and local government are responsible for issuing permits and enforcement of rules in the B and C grazing areas. Occasionally, Chiefs or councils do not have permits (literally do not have the printed forms) so they are unable to issue permits. No livestock owners are denied permits, nor are they limited in the number of livestock they can graze in any of the grazing areas. Enforcement officers are elected by Area Chiefs and local government officials to monitor the different grazing areas and impound livestock of transgressors. This happens more in B and C grazing areas than in A grazing areas.

Fines and impoundment fees must be paid for the release of animals but the fees are too low to act as a deterrent. According to the Range Management and Grazing Control Regulations (LN78 of 1992 & LN150 of 1992), fines are currently M4 per head of cattle and 60c per small stock and the impoundment fees are currently M1 per head of cattle per day and 50c per small stock per day. The fines that the Bokong Nature Reserve imposes are much higher and this acts as a strong deterrent (fines are M80 per head of cattle and M40 per small stock). Despite this, reserve staff still have to deal with repeat offenders (M. Moiloa, Reserve Manager Bokong Nature Reserve, pers. comm.).

3.4.4 Grazing associations

Grazing associations did not appear to have ownership or control over rangelands, but rather appeared to have the function of co-ordinating grazing activities among groups of villages, such as negotiation of grazing arrangements with principal chiefs. In many villages where grazing associations were present, the village and area chiefs sat on the grazing association committee. Membership uptake, once-off membership fees and annual fees varied from association to association. Once-off membership fees were at most R150 but were generally in the region of R50 while annual fees were at most R60 but were generally in the region of R30. Membership gives livestock owners access to a range of extension services, including

better breeding stock (a bull or ram of superior stock), bush encroachment removal equipment for the community, dipping, veterinary services, etc. Membership is voluntary, and is decreasing, probably due to the reported decline in effective extension service offerings (L. Mats'ela, Pelaneng/Bokong Grazing Association Deputy Chair, pers. comm.). Where grazing associations are still effective, local government will delegate responsibilities to the grazing associations in the area. Some of the grazing associations were set up prior to dams being built, and so were responsible for grazing management before the local government institutions came into being. This has led to some friction and conflict in some areas (L. Mats'ela, Pelaneng/Bokong Grazing Association Deputy Chair, pers. comm. & M. Molapo, Ha Lejone Area Chief, pers. comm.), while others see benefits from having government support (M. Mots'oene, Ha Theko Area Chief, pers. comm.).

3.4.5 Rotation

The concept of rotational grazing seems to be generally understood in both catchments, but the extent to which it is practiced is quite limited. The main form of rotation is between A, B and C grazing areas, but the pattern of rotation and rest is dictated by the weather and cropping practices rather than the condition of the rangelands. Rotational grazing within grazing areas is only really practiced within C grazing areas where enforcement is easier and the practice is to close certain sections for a season or two. No fences are erected but the governing body, whether it be the chief, local government or grazing association, will elect a monitor to police the area. Rotation within A or B areas, when it does occur, follows this same pattern of closing sections where the rangeland is badly degraded to assist recovery. The amount of rotation that occurs within B and C grazing areas differs from village to village depending on the strength of their internal governance, whether that be the chief, local government or grazing association.

3.4.6 Mafisa

The continued practice of the Mafisa system was raised as a problem in a few of the focus group discussions. In two focus groups, where the respondents were prompted about this practice, both groups indicated that the Principal Chiefs had set limits to the number of livestock that could be loaned to highland households. In the case of cattle, the limit is 6 and in the case of small stock, the limit is 15 (Ponts'eng under the jurisdiction of Principal Chief of Thaba Bosiu) or 10 (Ha Ramohope under the jurisdiction of Principal Chief of Matsieng). In Ha Rapokolana (the only village where this question was posed), focus group participants estimated that the Mafisa system led to a threefold increase in the number of livestock in the C areas, and a twofold increase in the B areas. This was in spite of the fact that Ha Rapokolana has the same Principal Chief as Ponts'eng and is therefore likely to be subject to the same limits described above.

3.5 Recent initiatives to address rangeland and wetland degradation in Lesotho

There have been numerous small- and large-scale projects run by various government departments and NGOs throughout Lesotho that relate to the management and conservation of rangeland areas and wetlands. Some of the older initiatives have already been mentioned in earlier sections. More recently, there have been a number of projects centred on integrated management of land and water/wetland resources that are of direct relevance to the current study. Some of these projects have been completed, and others are still ongoing. Some of the purposes, successes, challenges and lessons learnt from these projects are outlined below.

3.5.1 DWA Khubelu 'Sponges' Project 2008-2017

This project was initiated in 2008 under the Ministry of Water following recommendations from the Orange Senqu River Commission (ORASECOM). The overall objective of the project was to create holistic conservation of wetlands in the Khubelu catchment (directly to the east of Katse Dam catchment) and create a methodology that could be used to protect wetlands of the Upper Orange-Senqu catchment area and secure long-term availability and quality of water. Specific objectives of the project were to improve livelihoods of residents within the catchment, restore degraded wetlands, control erosion from road drainage and implement wetland monitoring.

The feasibility study identified that effective management of wetlands within the catchment could not be separated from the general management of natural resources (and especially range resources) within the catchment (ORASECOM 2008). The bulk of the project then ran from 2013 and is expected to wrap up at the end of 2017. Although a final evaluation has not yet been conducted, certain successes and challenges have been brought to light through the feasibility documentation and stakeholder interviews (M. Maseatile, Department of Water Affairs, pers. comm.), as follows:

Successes:

- Extensive stakeholder engagement enabled understanding of the problems affecting wetlands degradation within the pilot area including:
 - Understanding movements and grazing patterns of livestock
 - Identifying the main issues of management of natural resources
 - Defining and mapping jurisdiction at multiple levels;
- A monitoring programme for wetland, groundwater and hydrology.
- Wetland rehabilitation;
- Creation of grazing plans for the catchment;
- Community buy-in as a result of inclusive rather than top-down approaches;
- Initiating pilot study for holistic rangeland management (HRM) that has apparently seen improvements in livestock condition and reproduction; and
- Capacitation of GAs, CC, chiefs, herders and livestock owners to manage rangelands.

Challenges:

- Publicity and coverage to show successes and encourage further buy-in;
- Getting commitment from other stakeholders (government and chiefs);
- Clarification of stakeholder roles for better co-ordination;
- Finding ways to prevent productivity improvements leading to increases in stock numbers;
- Securing a mechanism for long-term funding;
- Programme requires high levels of management and strict adherence to see results;
- There is a danger in spreading message of holistic range management (HRM) without proper training as it could potentially encourage increases in numbers of livestock without proper management.

In addition, some of the findings of the feasibility study may have direct implications for this current study (summarised in Table 3.3). Many of these issues are likely to be similar within the neighbouring Katse and Mohale catchments.

Table 3.3. Problems identified with range management affecting the condition of wetlands within the Khubelu catchment (ORASECOM 2008).

Level of management	Main issues preventing effective management
Central level	• Fragmentation of responsibilities regarding livestock, range management and water resources management. • Calculations of carrying capacity and stocking rates not carried out.
Local government at District level	• Poor coordination of preventative measures to limit wetland degradation through road construction. • Lack of clarity and full understanding of legal and institutional frameworks for wetlands management translated to poor management practice. • On-going decentralisation process lead to Local government not fulfilling their full mandate.
Local government at 36 community/ chiefdom level	• Poor management and law enforcement has made it difficult to control year-round grazing in A grazing areas which has led to some individuals taking advantage of this. • Mandate for control of grazing land not clear in minds of communities (about half believed Chiefs were solely responsible and half believed CC were). • Leniency granted by chiefs to defaulters on rotational grazing. • Low membership to GA, but belief that it is beneficial and generally respected.
Livestock owner and herder level	• Reluctance for owner to correctly report livestock numbers when being issued permits in different zones. Possibly result of fear of introduction of grazing fees and also potential illegal acquisition through stock theft. • Decrease in transhumance from Leribe and Butha-Buthe Districts due to fear of livestock theft. • Year –round grazing in cattle pose areas by many residents. • Lack of training for herders on how to prevent degradation of wetlands.

3.5.2 MCA Lesotho Wetlands Restoration and Conservation Project 2008-2013

The Millennium Challenge Account (MCA) Lesotho funded a number of initiatives including the Lesotho Wetlands Restoration and Conservation Project from 2008-2013 (MCA 2013). The project addressed overgrazing and degradation of wetlands in the highlands, including sites within upper Katse Dam catchment.

Achievements:

- The project was able to demonstrate veld improvement in absence of disturbance through experimental plots;
- Biophysical wetland rehabilitation and erosion control measures were carried out in 10 catchments;
- Existing group structures were supported through capacity building, training and workshops;
- A wetland conservation strategy was developed; and
- An Integrated Catchment Management Plan was developed for Letseng la Letsie.

Challenges:

- Vandalism of monitoring equipment was experienced;
- There was limited active re-vegetation and failure of some of the structures in wetland rehabilitation;
- The training was unsustainable, due to lack of capacity building and resources to enable training of others;
- Training was not always enough to effect necessary changes; and
- There was no encouragement or enforcement of sustainable grazing practices in the pilot catchments.

3.5.3 UN Sustainable Land Management

This initiative was funded by UNDP and GEF and worked with the Ministry of Forestry and Land Reclamation (MFLR). The pilot project was with the Makhoalipana Community Council in the Maseru District (MFLR 2014).

The main purpose of this study was to develop proven, strengthened, participatory, replicable models and techniques that successfully overcome current institutional and governance barriers to sustainable land management (SLM) nationally. The project also aimed to provide adequate local and national capacity for adapting and scaling up proven SLM approaches and techniques as well as awareness, dialogue, understanding and analysis of SLM best practices at various levels reflected in strengthened, synergistic policies, strategies and programmes that achieve an integrated approach to natural resource management.

Successes:

- Mapping areas of jurisdiction for different chiefs and resolving areas of disputes (first time to do so for an entire Community Council area);
- Identifying viable alternate income generating activities for communities; and

- Producing a SLM toolkit which promotes rangeland management through the use of Grazing Associations.

Challenges:

- Lack of funds and availability of resources;
- Resistance to change in community members; and
- Dealing with party politics, lack of respect of and lack of confidence in local authorities.

3.5.4 *EU Integrated Catchment Management*

Integrated catchment management (ICM) is the coordinated planning and management of an area defined by its hydrological boundaries. As of 2014/15, the idea of using this concept had been adopted by most line ministries in Lesotho (EU 2016). The European Union (EU) provided technical assistance to the Government of Lesotho in the field of ICM to help get the project off the ground.

There have been a number of projects run throughout the country under the umbrella of ICM by various stakeholders, including government and NGOs. These projects have generally run in isolation, leading to a lack of any cumulative effect over the entire country (EU 2016). Other projects that relate to concepts within ICM have also been carried out throughout the country, but generally not within the framework of catchments.

Going forward, it is the aim of the Government of Lesotho to adopt a policy of ICM and enhance cooperation between different ministries and departments responsible for management of land and water. The roadmap for national implementation as outlined by EU (2016) included establishment of an inter-ministerial committee and technical secretariats, gazetting of the Long-Term Water & Sanitation Strategy, designation of catchments and commencement of operations in 2016-2017 with the aim to have timed and costed management plans for all of Lesotho's catchments by 2020.

As part of the first steps in initiating effective ICM across Lesotho, its catchments have been delineated, including the Upper Senqu System which includes both the Katse and Mohale Dam catchments (Figure 3.7). These catchments are further divided into micro-catchments of which eight fall within the Katse and Mohale Dam catchments. As this project is still in early stages, it is too early to evaluate the effectiveness of this approach and how well it can be executed across the country.

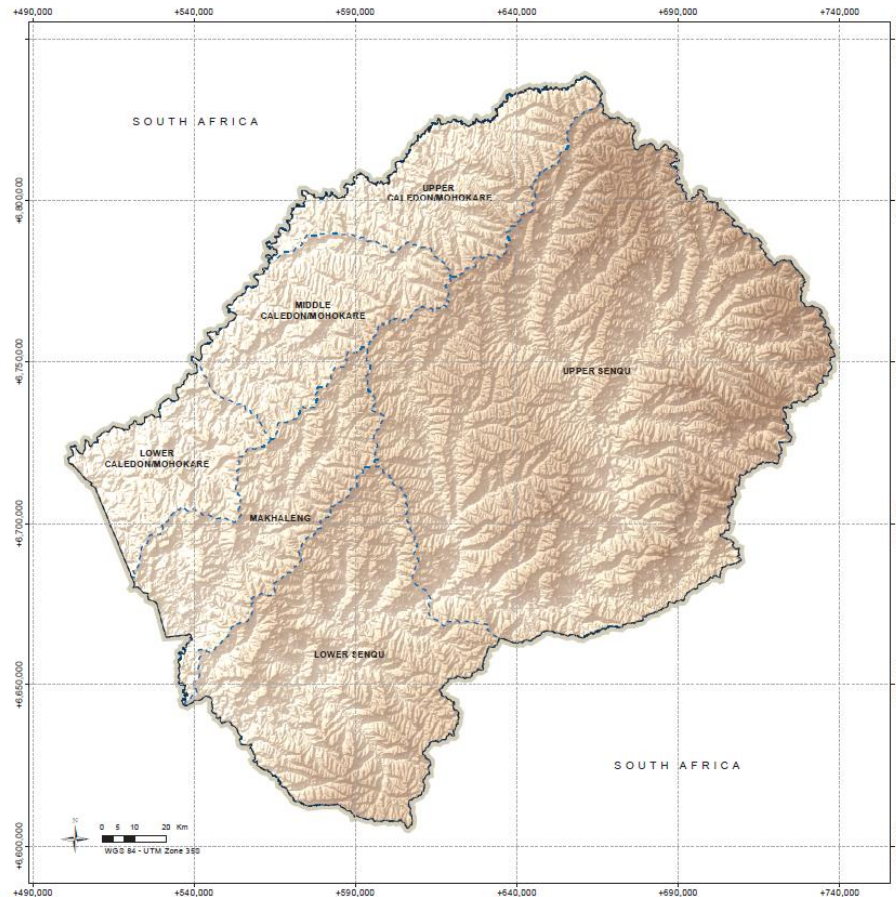


Figure 3.7. Demarcation of (a) major catchments within Lesotho to be used for Integrated Catchment Management (EU 2016, FAO 2017)

3.6 Why overgrazing persists

The National Range Management Policy (2014) summarises degradation as being due to the following factors:

- Encroachment of cultivation and settlements into rangelands;
- Partial breakdown of traditional seasonal grazing patterns due to stock theft;
- Reduced herd mobility due to new settlements;
- Loss of authority of traditional chiefs;
- Confusion about authority concerning land use;
- GOL policy of discouraging transhumance, decreasing fallow periods and decreasing fallow land for fear of traditional rights if not cultivated, uncontrolled burning and excessive livestock numbers;
- Climate change – prolonged winters, droughts, erratic weather and rainfall;
- Poor law enforcement; and
- Institutional arrangements.

Identifying the causes of rangeland degradation is somewhat complicated by the fact that there are different philosophies on sustainable rangeland management. Nevertheless, there are some general principles that apply quite broadly (MAWF 2012):

- Know your resource base;
- Manage for effective recovery and rest;
- Manage for effective utilization;
- Enhance soil condition;
- Address bush encroachment;
- Plan for drought;
- Monitor the resource base; and
- Plan land use infrastructure.

It has long been recognised that carrying capacity is not a static measure, but fluctuates in short and longer term cycles, and can be somewhat unpredictable. Thus knowing your resource base goes a long way to determining how many animals it can support, but one also needs to reduce stocking rates ahead of drought in order to minimise damage. Getting stocking rates right therefore requires regular monitoring of rangeland condition and a means of offloading stock when required. The productivity of a rangeland can be maximised through the effective use of rangelands and in particular by allowing adequate rest, but the latter requires grazing plans and active herding or a system of camps and water infrastructure. Soil conditions and bush encroachment can largely be taken care of by the above measures, but can be augmented with active measures where damage has been done. All of these measures are going to work better under a privately-owned production system than under a traditional system which prioritises stocking rates over production and in which land ownership is communal. It is likely to break down completely where common property institutions are weak and where there is *de jure* or *de facto* unrestricted access to grazing resources. The latter situation is subject to the tragedy of the commons, where the benefits of overstocking are private, and the costs of overgrazing are shared among all users. In this situation, there is no incentive for co-operation.

Examination of the current rangeland management situation in Lesotho suggests that while there are policies and legislation in place to encourage sustainable land use management, a combination of the Laws of Lerotoli, lack of appropriately-defined communal property rights and weak institutions have led to a situation of open access. The result is that rangelands have become severely degraded, leading to soil erosion and bush encroachment, and permanently reducing the carrying capacity of the rangelands. The proximate causes of this degradation are that livestock numbers exceed carrying capacity; that grazing areas are not receiving the rest they require to maintain their resilience; and that sensitive environments such as wetlands are being damaged by inappropriate grazing practices. A variety of other factors have exacerbated this situation. Some of these factors are summarised in Figure 3.8.

Commercially-farmed livestock numbers have suffered worldwide declines as a result of decreasing prices, increased input prices and reduced government subsidies. This trend is also seen in Lesotho, and affects the numbers of sheep farmed for wool in the highland areas. However, the number of cattle, which are mainly kept for non-commercial purposes, have

increased, along with the increasing population in the country. Livestock are kept for a range of reasons, including as a wealth store, as a sign of social status, for draught power, milk and meat for home consumption. In remote areas, they often replace the functions of banking, where they can form an investment (Swallow & Brokken 1987) and they provide the means for easy access to cash (or bartering power) when needed. Thus in many societies, demand for cattle has waned with increasing development, or when access to cash and credit becomes easier. In Lesotho, there is still a fairly strong tradition of keeping cattle, even among wealthier inhabitants who reside mainly in urban areas. These wealthier elements of society in fact own most of the cattle in the country and likely include many of the authorities in charge of rangeland management.

The increasing numbers of livestock, coupled with the shrinking areas available for grazing due to expanding settlements, agriculture and dams have led to livestock numbers exceeding their carrying capacity, at least under the current management systems. This is evident from the condition of both rangelands and wetlands in the highlands where pressures are expected to be lowest, and is almost certainly being exacerbated by climate change.

The unrestricted practice of transhumance means that numbers of livestock using the summer grazing areas must exceed the numbers of cattle that are based in the highlands by a good margin. Because anyone can access highland grazing areas, the numbers are not restricted, and managers are unable to control grazing pressures in their areas. These pressures have increased as the populations in the lowlands have increased, leading to much higher grazing pressures in the highlands than were seen in the past. This has had a major impact on these sensitive areas. In the days before these major influxes from the lower lying areas, livestock owners using the highland areas would have taken care to educate their herders as to good grazing practices, in their own future interest, but in a situation of open access, these efforts fall away because they become futile.

With increasing competition for the highland grazing resources, management and limitations of use is becoming increasingly necessary, but has not kept pace with the growing pressure. Attempts to accommodate both traditional systems and the new democracy have led to confusion, mistrust and ineffective systems of management. This has been exacerbated by the lack of alignment of administrative and traditional boundaries, but possibly also by the fact that neither of these systems of boundaries actually corresponds to patterns of rangeland use or to catchment boundaries. Grazing associations have perhaps remedied this to some extent but still fail to encompass both the summer and winter grazing areas of their constituent households, and have also struggled to gain a foothold due to being layered within an already-flawed institutional system. Until the communal rights systems are defined more sensibly, there is little chance of achieving the stakeholder participation that is recognised to be a key ingredient in successful communal rangeland management. It is only when the institutional (property rights) systems are strengthened that communities will more actively seek technical support for managing their rangelands. Until then, such support will have little consequence in the face of unrestricted access.

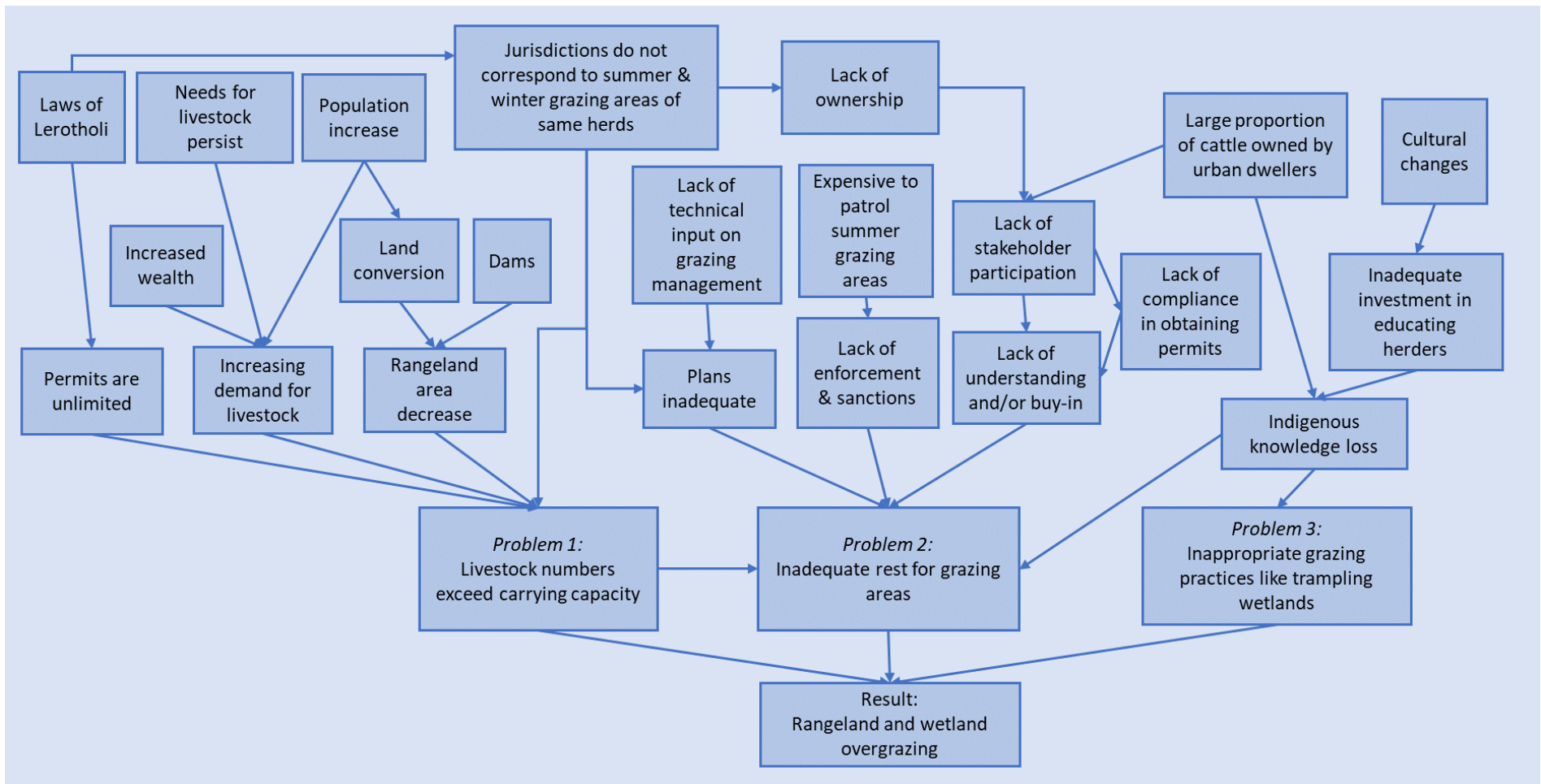


Figure 3.8 Preliminary causal chain diagram of the problems of rangeland and wetland overgrazing in the Lesotho highlands

Ground breaking work has been done in the field of behavioural economics to understand the factors that allow successful self-governance of common property resources. These include (Ostrom 2009):

1. Clearly defined property rights (clear definition of the contents of the common pool resource and effective exclusion of external un-entitled parties);
2. The appropriation and provision of common resources that are adapted to local conditions (sustainable use practices);
3. Collective-choice arrangements that allow most resource appropriators to participate in the decision-making process;
4. Effective monitoring by monitors who are part of or accountable to the appropriators;
5. A scale of graduated sanctions for resource appropriators who violate community rules;
6. Mechanisms of conflict resolution that are cheap and of easy access;
7. Self-determination of the community recognized by higher-level authorities; and
8. In the case of larger common-pool resources, organization in the form of multiple layers of nested enterprises, with small local CPRs at the base level.

In the study area, the first condition is not met, and needs to be addressed. This along with measures to achieve the second point (i.e. limiting stocking rates and ensuring rest for grazing areas), are vital to restoring and managing health rangelands in Lesotho, and will need to be addressed through national scale policy and legislation as well as at a local scale in the study area. The replacement of the current systems of control with appropriately-designated grazing management areas and grazing associations as outlined in the most recent policy will go a long way to achieving this.

4 REVIEW AND EVALUATION OF POTENTIAL INTERVENTIONS

There is a range of policy instruments that are used to limit environmental damage and encourage desirable behaviour, in order to achieve an optimal balance between productive economic activity and maintaining environmental quality. Of these, regulation and enforcement are the most commonly applied measures. Although regulation is important, especially where risks are high, there are many cases in which it can be more efficient and cost-effective to employ incentive measures to achieve management goals. These measures can take a number of forms, and serve to influence the decisions of economic actors by changing the costs and benefits involved in private decisions. The choice of policy instruments is highly context specific, based on both the type of problem and the general policy-making context, such as the nature of the economy and the reliability and effectiveness of relevant institutions.

These instruments have, to certain degrees, been applied in the rangeland management arena. The instruments of notable mention, and to be discussed in more detail, are property rights in the form of privatisation or partial privatisation of communal land, subsidies, payments for ecosystem services, tradable use rights, taxation and charges, and protected areas.

4.1 Protected areas

Protected areas are an example of a command-and-control instrument where an area is demarcated for protection. An area can be protected from unrestricted access, unrestricted natural resource consumption, or in terms of limiting activities. This measure has been successfully implemented in other areas. For example:

- In Tibet, **protected areas are used to protect catchment areas**. Overgrazing on the grasslands located in the upper basin has resulted in degraded wetlands which have resulted in flooding of the lower basin. This has led to a number of policy initiatives including the demarcation of protected areas to keep pastoralists out of upper catchment areas (Richard *et al.* 2004).
- In Mongolia, **protected areas proclaimed to protect rangelands have had both costs and benefits**. Transhumance pastoralists have proliferated since the abolishment of the socialist economy as few alternative livelihood options exist. This has resulted in overstocking and subsequent overgrazing. The protection of large tracts of land protected has reduced the amount of grazing land available and required the relocation of pastoralists in some instances (Bedunah & Schmidt 2004). However, in the Gobi Gurvansaikhan National Park, where grazing is restricted to special use zones within the park, there is no evidence that the establishment of the park has had a

negative influence on the lives of the pastoralists or on the use of communal land. In fact, a few herders are benefiting from the increase in tourism in the area.

- In Kenya, **seasonal reserves were traditionally used for resting rangeland areas**. In a participatory on-farm research study of Kajiado farmers in Kenya, traditional range management methods, which are now largely impossible because of the subdivision of communal lands into group ranches, were explored. Reserves and protected areas have traditionally been used as grazing reserves where utilisation of plant species are either prohibited or only used at particular times of the year. Furthermore, dry season reserves used to be established for each clan and the elders decided on when to open the reserves after monitoring the ecological conditions (Macharia 2004).

Given the condition and level of degradation in key wetland ecosystems within the study area, as well as its importance as a water catchment area, protection of upper catchment areas from overgrazing is considered a necessary measure.

4.2 Securing common property rights

In order for incentives to be effective, the fundamentals need to be in place. In particular, property rights need to be well-defined. In some cases, institutional reform could be sufficient to achieve the desired outcome. Property rights are integral to several of the market-based instruments discussed below.

Much of the work on grazing property rights has centred on whether curbing free movement of livestock is a good or a bad thing. Moritz argues that the most appropriate form of pastoral practice in Africa is between the mobility model and the sedentarisation⁴ model (Moritz 2008). The mobility model suggests that the most effective grazing technique is the ability to traverse far and wide to adapt to climate variability as well as to prevent overgrazing, which requires unfenced rangelands. On the other hand, the sedentarisation model suggests that the settling down and intensification of animal rearing is more effective and less damaging to the land. Owing to the perceived improvement in range condition on commercial farms, rangeland professionals have advocated for the introduction of rotational grazing on privatised or partially privatised communal land in close proximity to settlements. However, sedentarisation of pastoralists, whether forced or spontaneous, has resulted in severe land degradation in semi-arid zones as a result of increased continuous grazing around settlements which increases soil degradation (Niamir-Fuller 1999). The curbing of pastoralist mobility practices also results in a loss of traditional knowledge on land use practices, can negatively impact the traditional adaptation measures of pastoralists, as well as have a large potential for environmental degradation (Beyene 2010; Delgado *et al.* 1999). Furthermore, complexities

⁴ The settling of a nomadic group or practice.

in communal resource ownership as well as weak governing institutions and derelict fences hinder successful implementation of these rotational grazing schemes (Moyo *et al.* 2008). It is argued that effective local institutions are required if an intervention aimed at improving communal area grazing management is to succeed (Moyo *et al.* 2008).

Implementation of property rights in rangelands has been met with mixed success, as seen in the following examples:

- In Tanzania, the restriction of rangeland areas has led to pastoralists breaking the law in an attempt to access grazing and wetlands. Attempts at sedentarisation and the intensification of animal rearing have created an anti-pastoral environment. The government has implemented measures to confine animal husbandry to certain areas but these areas lack sufficient rangeland and water supplies, leading herders to search for resources elsewhere. Furthermore, pastoral access to wetlands is decreasing due to the expansion of agricultural intensification through commercial farming. This has led to pastoralists bribing officials for access to resources and wetlands but the willingness of authorities to accept these bribes is diminishing and resulting in conflict between herders and farmers (Benjaminsen *et al.* 2009).
- In Inner Mongolia, **privatisation and fencing of rangelands has constrained adaptive behaviour and led to increased costs**. In a further example of the impacts of enclosing rangelands, the ability of local herders of the Alxa Left Banner of Inner Mongolia to use traditional solutions (livestock mobility) to rangeland management has been curtailed. Before privatization, most herders followed a traditional nomadic lifestyle in which they moved from lowland areas during the winter to higher-elevation pastures during the summer. However, post-privatisation, rangeland boundaries were clearly defined by fences, limiting mobility. Therefore, herders' traditional adaptive strategies have been severely constrained by the fixed boundaries. Instead, herders have had to adopt high-cost strategies, such as buying more forage and selling more livestock during adverse weather periods (Zhang *et al.* 2013).
- In the far north province of Cameroon, peri-urban pastoralists have **successfully integrated, albeit with increased costs, the mobility and sedentary strategies into one production system**. Peri-urban pastoralists, whose rangelands are being encroached upon by urban sprawl, entrust a portion of their livestock to herders who are permanently on transhumance between watered areas. They feed the animals remaining in the village fodder during the dry summer months to compensate for the lack of natural forage and send them on transhumance during the rainy season. In this way, peri-urban pastoralists pursue both sedentary and mobility strategies to cope with the disappearance of grazing lands in the peri-urban area. As a result, however, input costs have risen drastically (Moritz 2008).
- In Zimbabwe, **privatising rangelands has not reduced overstocking**. Range management interventions have consisted of controlling stock numbers, restricting access to communal rangeland by means of fences, and management by means of

rotational grazing under a system of grazing schemes (Cousins 1987). Evidence shows that the implementation of grazing schemes has not been successful in reducing overstocking in the communal areas and is mostly due to the non-control of cattle numbers on the grazing lands (Guveya 2012).

- In Botswana, **fencing of communal lands has not reduced overgrazing**. In the Kgalagadi district of Botswana, the government promoted the sustainable use of rangeland resources through fencing of communal grazing areas in response to a perceived problem of overgrazing and degradation due to communal tenure (Rohde et al 2006). However, and despite a plethora of subsidies in the region of 50% of production costs, the ranches have failed to produce the anticipated economic gains (Cullis and Watson 2005).
- In Kenya, the **introduction of group tenure** of rangelands helped to exclude outsiders but **was compromised by further subdivision** into areas too small to be resilient. In the Kajiado region of Kenya, the government introduced group ranches which were aimed at addressing the problem of overgrazing and land degradation by converting communal land to group tenure. The intervention was expected to encourage the Maasai nomadic pastoralists to confine their livestock within ranch boundaries and reduce their livestock numbers. Although group ranches in Kajiado failed to meet these expectations, they secured the Maasai's traditional land from non-Maasai pastoralists. Group ranch sub-division followed which has resulted in decreased mobility and reduced carrying capacity of group ranch land which has resulted in further land degradation and interference with traditional wildlife migration patterns (Kimani & Pickard 1998; Rutten 1992).
- In China, **measures to sedentarise pastoral groups have been met with resistance**. In some areas of China, the government has introduced policies aimed at sedentarising pastoral groups by subsidising fodder, irrigation, and veterinary services, privatising the communal land, and making it difficult for transhumance pastoralism to continue (Richard *et al.* 2006). However, local herders are reluctant to adopt the intensification systems promoted by the government in fear of their adaptive capacity being reduced during drought conditions (Squires *et al.* 2010).
- In the Lake Ngami area of Botswana, the impact of commercialisation of livestock farming and privatisation of communal land policies resulted in weaker local, traditional land management institutions which exacerbated the problems the policies were intended to correct (Magole 2009).
- In South Africa, **introduction of a rotational system has proven to produce healthier cattle**. The Meat Naturally Initiative is a Conservation South Africa program that aims to improve the condition of rangelands in the Umzimvubu catchment area of the Maloti-Drakensberg. This is being carried out by clearing aliens as well as through transforming the grazing pattern from one of open access and annual burning to one of controlled seasonal rotation and reduced burning regime. The programme has

already proven to produce healthier cattle, allowing local farmers to access formal markets in which to sell their animals.

- In South Africa, the **introduction of grazing associations has led to conflict**. In some Eastern Cape villages, farmer's associations are involved in the management of grazing lands, which was previously the responsibility of traditional institutions. This has led to conflicts in some villages, as traditional leaders believe they are losing authority (Moyo *et al.* 2008). Some groups have contested their authority by cutting fences, ignoring collective grazing decisions and refusing to pay fees levied on them (Bennett *et al* 2013; Bennett *et al* 2010).

The idea of well managed communal enclosures with rotational grazing has been explored in the study area in order to bring about 'holistic range management' which allows for intensive use followed by long rest periods. However, the costs and maintenance involved make this unrealistic. Rather, strengthening ownership of the rangelands through grazing associations and the sensible demarcation of grazing management areas and an enforced grazing management plan is likely to be a more successful strategy.

4.3 Subsidies

It is possible to subsidise a firm, group or individual to reduce environmental damage, or to encourage this through a tax break or other financial assistance. One has to be careful however, as this violates the 'polluter pays principle' and they can inadvertently lead to unanticipated damages. As seen in the above examples, subsidies have been introduced in many cases to promote sedentarisation. Subsidies are also costly for government, as the funds need to be taken from the general fiscus. Beneficiaries may also be incentivised through access to services or programmes, the provision of technical assistance, direct services such as alien clearing or direct payments. However, subsidies can be costly to government and may not be sustainable if the prices of the subsidised goods and services escalate. This could result in heightened degradation of enclosed land.

4.4 Payments for Ecosystem Services

Payments for Ecosystem Services (PES) has become one of the most popular mechanisms for influencing activities in order to achieve goals such as the preservation of catchment hydrological processes, carbon sequestration or biodiversity conservation. PES systems involve voluntary transactions where a well-defined environmental service is bought from a service provider, and where the sale is conditional on service provision (Wunder 2005). The service providers and users can be any mix of private and public stakeholders, and transactions can be direct or administered by supporting agencies.

PES can work wherever the potential losses to the beneficiaries of the service exceed the opportunity costs to the identified group of ceasing their damaging activities. The beneficiaries can then afford to make a payment to the service providers that will compensate them for

that opportunity cost. It often has the added advantage that while one service (eg water provision) is being bought, the provision of this service involves the conservation of biodiversity more generally.

PES acts as both an incentive and a financing mechanism. It can also be a lot less costly than other conservation approaches. PES systems are normally initiated in one of two ways: (1) the value of a service is recognised by beneficiaries, who initiate trade; or (2) a conservation initiative seeks a financing and/or incentive mechanism and sets up a market. Thus PES takes a number of forms, including private deals, open trading schemes and public payment schemes where government pays resource managers to supply a service.

PES systems can be challenging to set up, especially as it is critical to prove additionality, i.e. that the service would not have been provided otherwise. Like all other environmental management mechanisms, PES can only be successful if the system is closely monitored, in this case to make sure the service being paid for is provided.

There are some international examples of payments made to achieve better rangeland management:

- In China, payments have **had mixed success**. In several north western provinces of China, the government compensates farmers for reducing grazing as well as limiting grazing to certain times of the year, or not at all in particularly degraded areas, under the Reduce Grazing Return Grassland and Grazing Ban and Rest programs. Apart from the ecological improvement of the grasslands, the programs have resulted in the development of alternative livelihoods as the policies have made it more difficult for pastoralists to access rangeland resources which have increased the cost of raising livestock. However, in many instances pastoralists have not been able or willing to change their livelihoods which have resulted in greater communal rangeland degradation (Squires *et al.* 2010).
- In South Africa a feasibility study for the introduction of a PES system in the Maloti-Drakensberg region concluded that the system would be both financially and institutionally viable, based on hydrological and economic modelling (Blignaut *et al.* 2010). The system is envisaged to operate on the basis that the South African Department of Water Affairs and Forestry (DWAF) would legally force water users to pay for the restoration of degraded land (catchment ecosystems) and land use management interventions as a means to improve ecosystem services diminished as a result of overgrazing in two catchment areas, the upper Thukela and Umzimvubu. The Umzimvubu catchment area best represents the socio-economic situation in Lesotho in which both are characterised by communal rangelands and open access grazing practices. The proposed land use management intervention consisted of two measures: (1) a change in the fire regime, and (2) the implementation of a rotational grazing system in the communal areas of the catchment. **The results indicate that state funding for restoration would be required as much of the restoration necessary is on communal and not private land.** The model showed that the market

could cover the cost of management intervention for the upper Thukela region but not for the Umzimvubu and the income from water sales was not sufficient to pay for restoration at either site. This implies that the state has a role to play in implementing restoration of its own lands, and then it becomes feasible to charge users for the upkeep of those lands (Maloti Drakensberg Transfrontier Project 2007).

Arguments against the introduction of PES systems focus on the impact that they have on local, traditional land management structures, arguing that the implementation of such a scheme is a neo-colonial conservation approach that damages the traditional values and practices of societies (Buscher 2012; Van Hecken & Bastiaensen 2010).

Since livestock are the predominant form of wealth accumulation in Lesotho, communities may have the perverse incentive to utilise payments from the PES system to invest in additional livestock. However, non-cash payments could be an option (discussed already). Also, as the study in the Maloti-Drakensberg indicated, the cost of managing the intervention is likely to outweigh the benefits in areas characterised by communal land tenure.

A payment to reduce the number of livestock owned is not likely to be a feasible option under the current institutional arrangements. This is because of the fact that anyone can graze in the highlands, so buying out cattle from one household may encourage rent-seekers to move livestock into the area. However, the introduction of more attractive investment options with competitive interest rates and liquidity may persuade some livestock owners to trade their cattle holdings for shares or bond holdings.

4.5 Buy-outs

Buy-outs have a similar aim to PESS, but are a once-off arrangement in which assets such as cattle (or fishing boats, for example) are purchased in order to reduce the amount of pressure on natural resources. This can also apply to use rights if these are in place. This practice already occurs in Lesotho.

4.6 Tradable use rights

Tradeable rights to the use of resources potentially offer the most efficient mechanism for environmental management. Systems of tradeable permits are geographically defined and include not only the rights to use resources, such as water, grazing or fish, but the rights to pollute, e.g. the air or water. In this type of system, the relevant authority decides what the desired aggregate or total level of use should be, and then distributes permits totalling this amount to different users. These permits can be traded. Their price is determined on the open market, just as for any other economic good. So once the permits are in circulation, this is an effective means of maintaining use within a maximum desired level.

New players can enter the industry, but the amount of use will not change unless the authorities decide to issue more permits. Alternatively, if the authorities feel that the old

standard needs tightening, they can buy some permits back, and hold them out of the market. Permits can also be bought up by environmental organisations or pressure groups. This is an efficient solution in that it is reflecting society's willingness to pay for environmental quality. Usually there are checks in place to prevent any one permit holder from holding too large a percentage of permits. Another advantage is that the price of permits tracks inflation, unlike fines or taxes. The biggest problem with applying the system is usually in deciding the initial allocation of permits.

Tradable permit systems have been proclaimed as the panacea for an ineffective command-and-control system governing federal rangelands in the US (Hess 1995; Nelson 1997; Regan 2016). In light of recent conflict between ranchers and environmental groups, federal rangeland policy is under the spotlight. The system in the US is characterised by a permit system with a fee charged per head of livestock for permit holders. In its current form, permits are restricted in terms of their transferability. Environmental groups have been successful in having grazing rights restricted and more areas declared off limits to grazing, resulting in the amount of grazing authorised on federal land to be half of what it was in 1954 (Regan 2016). These declines in grazing rights impact on the number of permits as well as the number of livestock authorised per permit. This has caused tension between ranchers and environmental organisations and it is argued that conflicts are the product of restrictions on the transferability of grazing permits as environmental groups and other competing user groups often have little or no way to bargain with livestock owners which results in conflict.

For a tradable permit system to be successful, willingness and ability within the community to buy and sell grazing rights is required. In Zimbabwe, a study to determine the feasibility of a tradable grazing rights system indicated that 75% of large herd owning households are willing to pay for grazing rights while 89% of the households with small cattle herds are willing to sell their grazing rights (Guveya 2012). This is relevant to Lesotho as livestock in the communal areas in Zimbabwe are kept as a store of wealth and for subsistence objectives (milk and ploughing), which is the same as in Lesotho. This is largely a result of the cash needs being limited in communal areas.

Tradable grazing permits seems to be a viable intervention for the study area which would allow environmental organisations and other affected parties to buy-out grazing permits in order to remove livestock from the system. However, the willingness to trade grazing rights in Lesotho is unknown and may be impacted by the individual reasons for keeping livestock and the largely cashless society in the villages. The initial permit distribution would have to be designed very carefully so as not to fall afoul of the constitutional rights of Lesotho's population.

4.7 Taxes and charges

Taxes or charges can be put in place to reduce activities that incur environmental damage. Examples of this include charges levied per unit of polluting output. The difference between taxes and charges is that the former is a state fiscal instrument, whereas the latter could be

imposed by local institutions or organisations. In the latter case, these fees are typically paid into a fund that addresses the environmental problem. Taxes and charges are relatively easy to implement, are often effective, and are also a source of revenue. Some effort is required to establish the right level of taxation, since it is difficult to predict the actual response, and they must be constantly updated, otherwise they are vulnerable to decreased effectiveness through inflation.

In South Africa, grazing fees did not have the desired effect because alternatives were available. In Namaqualand the South African government, through the Department of Land Affairs, acquired commercial farms bordering the degraded communal land. These tracts of land were converted into municipal commonages and are operated under management rules stipulating a low carrying capacity, adherence to the camp system and a monthly payment per head of livestock (Rohde *et al.* 2006). The majority of communal farmers did not benefit from opting for the municipal commonages, as perceived benefits of better range management did not outweigh the grazing fees and costs of limited stock mobility. This resulted in farmers and their livestock moving back to traditional communal areas (Salomon *et al.* 2013).

If well managed, the idea of taxing grazing is a useful way to raise the cost of keeping livestock which may incentivise livestock owners to consider other asset forms. The tax or fee should however be on owning livestock which would eliminate the issue experienced in the Namaqualand case study.

4.8 Conclusions: potential strategy for the study area

From the above review of potential interventions and the evaluation of their merits in the study area, we conclude that protected areas would be an efficient and effective intervention option. However, this measure cannot be instituted on its own as it would result in faster degradation of rangelands and wetlands outside of the protected area, as the grazing area is reduced without a commensurate reduction in the number of livestock. It is therefore necessary to secure rights for the rest of the rangeland, so that they can be managed effectively, by introducing a group ranch system. Grazing associations in Lesotho are very similar to these group ranches but appear to lack the necessary demarcated areas which secure rights. These demarcated areas should be large enough that adaptation, through mobility, is achievable during adverse weather events. To this end, they should encompass the A, B and C grazing areas of a single group. These areas would be exclusive to the livestock owners within the grazing association.

Once the protected areas and property rights have been secured, a permit system should be introduced to keep numbers to the sustainable stocking level. The permit secures the rights of the livestock owner to graze their livestock in the demarcated grazing association area, and provides the medium for which a government buy-out can be implemented. Once carrying capacity assessments have been undertaken and stocking rates have been determined, government can exercise the option of buying the permits back from livestock owners which will force owners to sell their livestock to the government, at a fair price. In this way, total

livestock numbers are reduced to carrying capacity estimates and can be further manipulated should adverse weather events, such as droughts, require a further reduction in livestock numbers.

A tax on grazing, through grazing fees, is not advisable as taxes are perceived poorly within Lesotho and livestock owners do not have the means to pay. A PES system is also unlikely to be effective as it lends itself to the perverse incentive of re-investing proceeds from the system into livestock assets. We are therefore suggesting a command and control strategy rather than relying on incentives and taxes to induce behaviour change, with the exception being the incentive provided by having group property rights which will encourage co-operation.

In summary:

1. Establish protected areas in upper catchment areas and/or to protect sensitive ecosystems;
2. Establish grazing area boundaries for each grazing association, encompassing village, winter and summer grazing areas;
3. Assess grazing capacity; issue permits to within this limit to eligible households and buy-out any excess;
4. Avoid taxes, subsidies and payments for ecosystem services at this stage.

5 EVALUATION OF POTENTIAL STRATEGIES

The new National Range Resources Management Policy (2014) aims to develop strategies for proper management of rangeland resources, but these are not yet fully articulated. Nevertheless, they include (a) the strengthening and resuscitation of Grazing Associations, and where necessary, the establishment of new structures, (b) the protection of threatened indigenous vegetation, and (c) the idea of a user fee (worded as “payment for ecosystem services”). This is an improvement on the current system but does not solve the spatial misalignment with grazing systems.

5.1 Unprompted suggestions by stakeholders

During the focus groups and key informant interviews there were a number of interventions suggested by participants, without prompting. These included interventions ranging from restoration activities to improved management and occasionally control of stocking rates. It appears that there is recognition that the current system and condition of rangeland is unacceptable and that something needs to be done to improve the situation. We have grouped the suggestions under relevant headings (Table 5.1).

Table 5.1. Suggestions from stakeholders and livestock owners on how to improve the rangelands and wetlands in the Katse and Mohale catchment areas.

Theme	Suggestions
Governance and management of rangelands	- Carrying capacity assessments need to be performed and the results well communicated to the communities before any action on destocking takes place. Communities need to be involved in the entire process otherwise they will reject the intervention. These carrying capacity assessments should inform not only the timing of opening grazing areas, but also areas that need to be rested (M. Sekolopata, Ha Sekolopata Area Chief, pers. comm.). - Better resting of A grazing areas so they can recover, especially necessary over the growing season to allow grass to set seed (Ha Poli focus group). - Limit the number of livestock that can be owned by each household (M. Mots'oene, Ha Theko Area Chief, pers. comm.). - Destocking will require incentives for livestock owners (M. Hlojeng, Matsoku Community Councillor, pers. comm.). - Stricter enforcement is required for the timing of movement of livestock out of A grazing areas (Ha Poli and Ha Ponto'seng focus groups). - Grazing Association boundaries should be smaller and not include the lowlands (Ha Rapokolana focus group). - Ban the Mafisa system to decrease the number of animals in the catchment (Ha Ramohope focus group).
Enforcement	- Increase impoundment fees and fines for not having permits (M. Molapo, Ha Lejone Area Chief, pers. comm.). Currently these are too low and don't act as a deterrent. - Court proceedings over impoundment of animals need to move faster (Ha Ramohope focus group).

Theme	Suggestions
Restoration	- Support from LHDA to remove encroaching bushes. This could include re-seeding areas as bushes are removed (Ha Theko and Ha Ponto'seng focus groups). - Support from LHDA to restore gully erosion with gabions (Ha Theko and Ha Ponto'seng focus groups).
Increase profits to owners	- Improve the marketing of livestock to get rid of excess animals and lower overall stocking rate (Ha Ramohope focus group). - Improve livestock breeds (either fetching higher prices or having increased hardiness) which will allow destocking because profits will improve or mortality will decrease (M Mots'oene, Ha Theko Area Chief, pers. comm.).
Self determination	- Demarcate A areas for different regions or grazing associations so that each can manage and take responsibility of their areas (M. Hlojeng, Matsoku Community Councillor, pers. comm.). - Revamp grazing associations that used to work well and have exclusive use over areas (L. Mats'ela, Pelaneng/Bokong Grazing Association Deputy Chair, pers. comm.). - Exclude outsiders from grazing areas (most focus groups).
Wetland interventions	- Fence wetlands to keep livestock out (Ha Theko and Ha Sekolopata focus groups). - Cattle posts should be banned from setting up too close to wetlands because of excessive trampling of these areas daily (Ha Theko focus group). - Water points should be set up away from wetlands to prevent trampling (Ha Ponto'seng focus group).
Other	- Limit the amount of mining and other activities that reduce grazing areas and pollute water resources. Government departments need to speak to each other more to align objectives (M. Mokhehi, Nqoe Community Councillor, pers. comm.). - LHDA to pay to fix sedimentation problems as it only positively impacts LHDA, or livestock owners should be compensated for any change in behaviour (Ha Rapokolana focus group).

5.2 Livestock owners' responses to proposed interventions

Protected areas

Respondents were asked to choose the maximum size of protected areas (5%, 10% or 15%) that they would be willing to accept in each of the grazing areas (A, B and C). Respondents were prompted to find a balance between what would help protect wetlands and that would not impact on their livelihoods too significantly. The results between the two catchments differed considerably with the majority of respondents in Katse opting for the smallest size (5%) in both A and B grazing areas, while roughly only a third of respondents in Mohale opted for this option in A and B grazing areas (Figure 5.1). It was interesting to note that in Mohale, two thirds of respondents opted for the largest size (15%) in the A grazing area. A possible reason for the diverging views is that villages in the Katse catchment, especially those that use the Bokong/Pelaneng A grazing area, are familiar with the introduction of a protected area in the form of the Bokong Nature Reserve.

In Ha Lejone, livestock owners had a negative attitude towards protected areas because during initial negotiations in setting up the Bokong NR, they were promised 10% of all revenue generated by the reserve and the disbursement of these proceeds was halted for the past few years. In addition, they were promised that they would be able to graze inside the park boundaries at certain times, which never happened. Furthermore, they were unhappy with the high impoundment fees imposed by the reserve on trespassers.

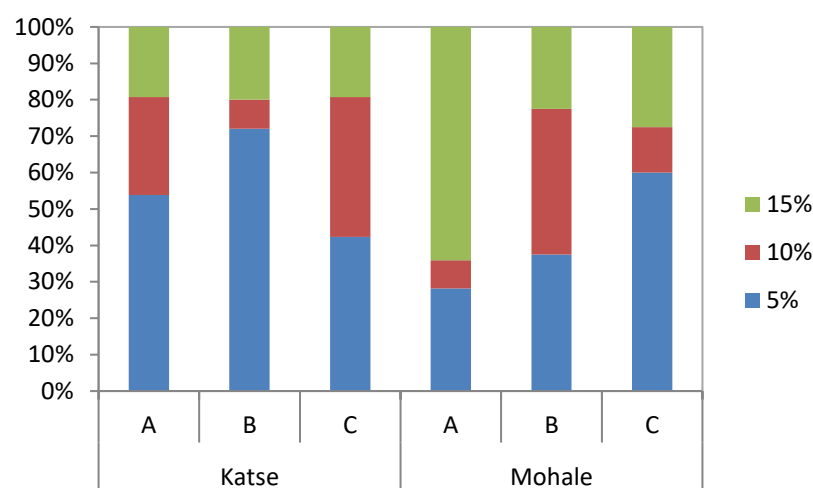


Figure 5.1 The results of the intervention question relating to protected areas for the Katse and Mohale catchments (2 villages and 26 participants in Katse; 3 villages and 40 participants in Mohale). The colours show the proportion of respondents that voted for 5, 10 or 15% of the A, B or C grazing areas, respectively, to be protected from grazing.

Secure property rights to exclusive grazing areas

Respondents were asked to rate a system where a single authority issues long-term permits (10 years) to locals only and excludes all outsiders from grazing areas (this was slightly ambiguous as it was not explicitly stated how locals and outsiders were defined). The results were remarkably similar between the two catchments, with the vast majority of respondents showing their support for such a system (Figure 5.2). It is possible that the respondents that were unhappy with the system derived benefits from outsiders, such as under the Mafisa system.

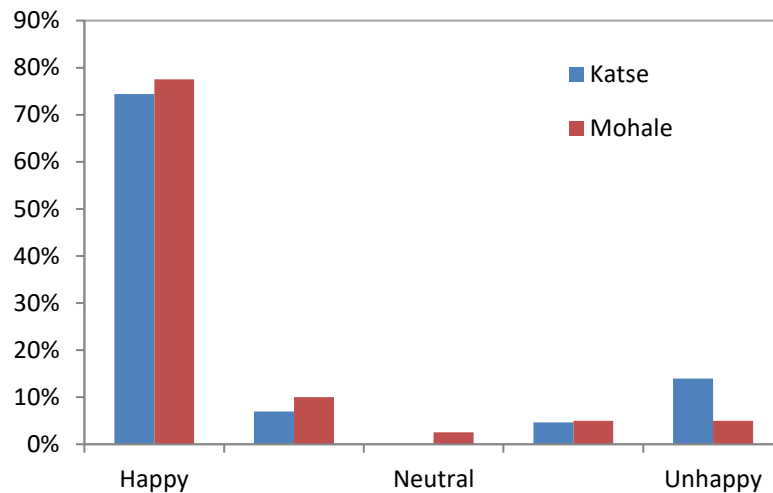


Figure 5.2. Respondents' rating of a proposed system of long-term (10-year) permits and exclusive local community access to grazing areas, on a 5-point scale from happy to unhappy (4 villages and 43 participants in Katse; 3 villages and 40 participants in Mohale).

In addition, respondents were asked about their willingness to pay for such a system (essentially a once-off fee for the permit). Respondents in both catchments were less impressed with this idea, with 28% in Katse and 5% in Mohale stating they would be willing to pay M300 or more (the choice was between M0, M300, a head of small livestock, or a head of large livestock). Nevertheless, more than two-thirds of respondents from both Katse and Mohale were willing to pay a small annual fee (resembling the lower-end of annual grazing association fees, in the region of M10 per year) for monitoring and enforcement of the system.

Based on the discussions, it appeared that people were against paying for grazing-related benefits. This mindset probably relates to the Laws of Lerotholi, but may also be influenced by affordability and by the propaganda surrounding the introduction of the 1981 grazing fee which was labelled a tax. Livestock owners are of the opinion that they are already heavily taxed because of wool and mohair sales taxes. One Chief commented that if fees were packaged rather as needing to pay for a service (such as better grazing), then it might be more popular amongst livestock owners.

Buy-outs with fair price as a management tool

Respondents were asked to rate a system where livestock numbers have to be reduced, but the relevant owners are fairly compensated for the livestock culled. The results between the two catchments differed in that the majority of respondents in Mohale responded positively, while the respondents from Katse were evenly split between happy and unhappy (Figure 5.3). The relatively high proportion of positive sentiments were unexpected, as during discussions, participants appeared to be concerned primarily with increasing their herd size. However, in many cases, discussions were dominated by a few individuals and may not be representative of the entire group.

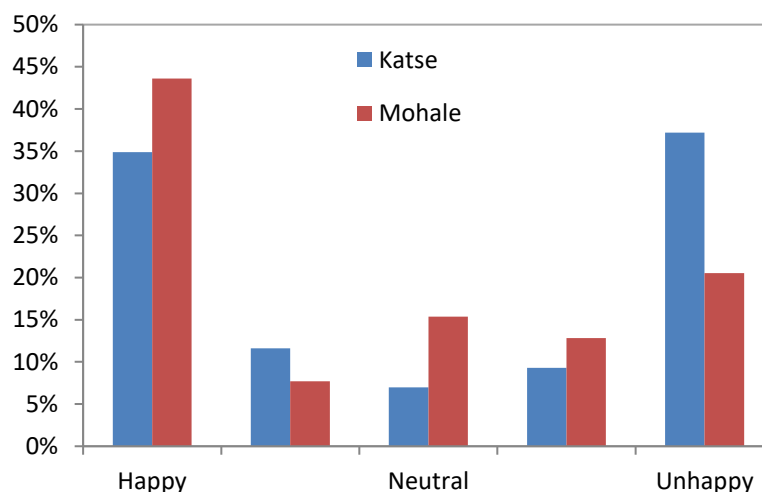


Figure 5.3. Respondents' rating of a proposal to reduce stock numbers by buying out stock at a fair price, on a 5-point scale from happy to unhappy (4 villages and 43 participants in Katse; 3 villages and 40 participants in Mohale).

Preference for different options

Respondents were asked to indicate which intervention option/system they would prefer the most:

1. the introduction of protected areas (the size and location were not explicitly stated);
2. a system of long term permits which excludes outsiders, for which a fee would be charged (no indicative fee was provided);
3. the reduction of livestock numbers by having surplus stock bought at a fair price; or
4. no change, resulting in continued degradation of the rangelands.

The results were fairly consistent across the two catchments, with only 10% of respondents from Katse and Mohale opting for no change (Figure 5.18). This indicates a willingness to adopt some form of intervention measure to improve the condition of the rangelands (and thereby improving the condition of the wetlands too). The most popular choice in both catchments (with roughly half of respondents opting for this intervention in both catchments) was the system of the long term permits that excludes outsiders, even with the proviso of having to pay a fee for this exclusive right. Protected areas were a more popular choice amongst livestock owners from Mohale than Katse, probably largely owing to the experiences of Katse villages with the introduction of the Bokong Nature Reserve. Despite the results of the destocking intervention option question, reducing the number of livestock households through a buy-out arrangement was the least popular option after the no intervention option. This was more in line with the discussions with livestock owners who made it abundantly clear that this was in direct competition with their goal of increasing livestock numbers.

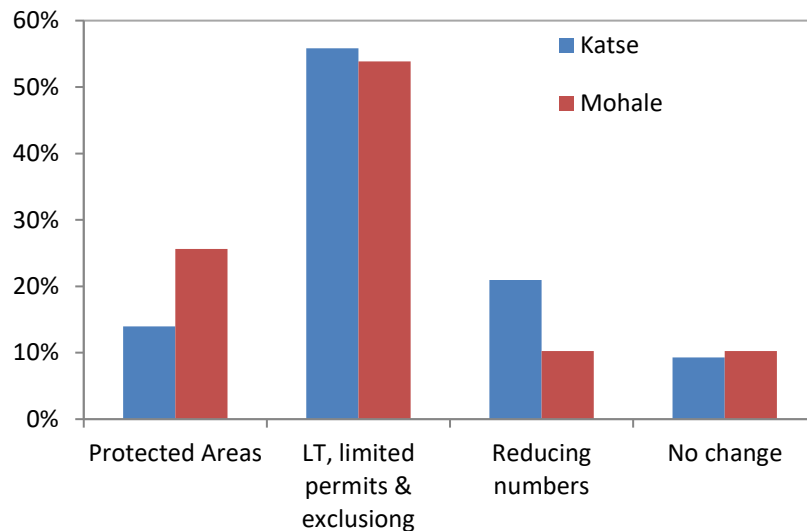


Figure 5.4. Frequency distribution of respondents' top choice among: (1) the introduction of protected areas, (2) long term permits which exclude all outsiders at a fee, (3) buy-out of surplus stock, or (4) no change (4 villages and 43 participants in Katse; 3 villages and 40 participants in Mohale).

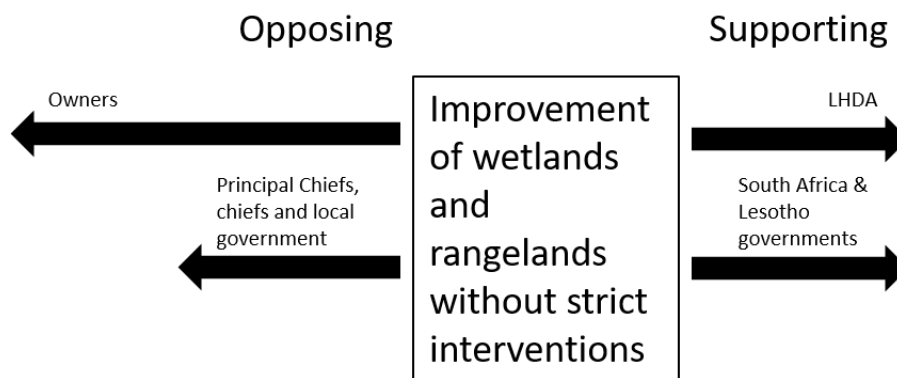
A1.1.1 Overall evaluation of options

In evaluating the possible interventions, every effort was made to be as inclusive as possible in terms of engaging stakeholders. However, we were unable to interview any of the Principal Chiefs in the catchment area or livestock owners living in the lowlands. From these interactions as well as expert opinion, we compiled force-field diagrams (a methodology from change management theory) for each intervention option in order to depict the net or resultant opposing and supporting forces for different stakeholders (see detailed analysis in Appendix 2). In many cases, a stakeholder group will have reasons to support a given intervention while at the same time having reasons to oppose the given intervention. These summary diagrams have been developed to indicate the net or resultant force for each stakeholder type that is affected by a particular intervention.

Change mind-sets to improve co-operation

Although livestock owners are cognisant of the fact that rangelands are in a poor condition, the understanding that the condition is linked to overgrazing eludes them. Sensitisation of the overstocking problem is required before any rangeland management intervention can be introduced. In Ha Lejone, we found FAO material in the community office that spoke directly to the need for destocking and the associated benefits livestock owners stood to receive from doing so. Unsurprisingly, the responses to the destocking intervention survey questions at this village were more in favour of reducing numbers and, when one livestock owner expressed his concern with destocking, the other owners argued that it would improve the rangeland and therefore improve their livestock condition. Further sensitisation needs to be done across the entire catchment.

Apart from the need for a rigorous sensitisation programme, livestock owners seem to be unwilling to sacrifice (either through paying fees or reducing livestock numbers) to achieve any change and will require some form of incentive. If livestock owners are obliged to pay for permits, then this fee should include extension services so as not to be viewed as an additional tax (R. Shasha, Shasha Village Chief, pers. comm.) and if obliged to reduce livestock numbers, then livestock owners should be compensated fairly, either in the form of cash, an alternative investment, or better stock. The current, inherent incentive for livestock owners is to encourage growth in livestock numbers through breeding, as a form of investment, despite the relatively poor returns in terms of wool and mohair sales⁵. Alternative investment options may appear less attractive if it is (incorrectly) perceived that livestock growth can still be achieved in the longer term, especially as the cost of feeding the animals (land ownership and management) is not borne by the owner. Clearly, interventions are required.



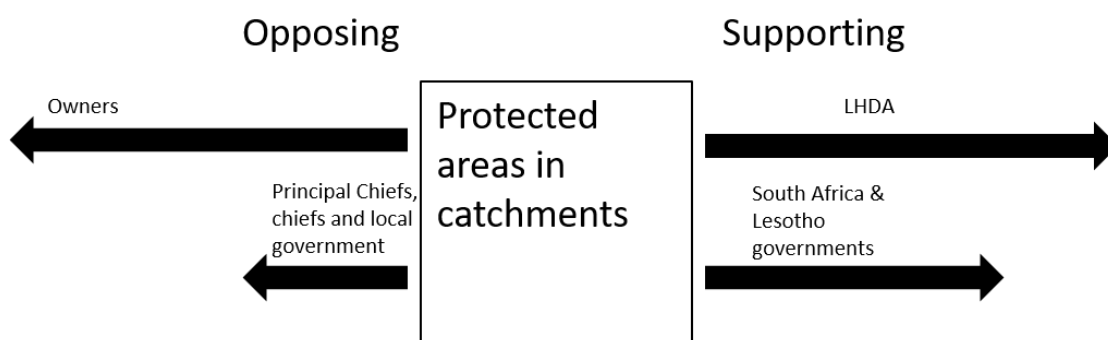
Protected areas in catchments

Introducing protected areas is an efficient way to protect sensitive wetlands in the catchments. Protected areas have the additional benefit of providing the Lesotho government with tourism revenue streams as well as protecting biodiversity. However, there is no direct payoff for livestock owners as it does not improve the condition of the rangelands or provide any other useful benefits (except conserving water supply during droughts). In fact, establishing protected areas without introducing another form of intervention will result in faster degradation of rangelands and wetlands outside of the nature reserve, as the grazing area is reduced without a commensurate reduction in the number of livestock.

From the discussions it was clear that while there was much support for the idea, this was limited to its implementation at a small scale, and the possibility of protecting catchment and

⁵ According to the Department of Range, a sheep will yield on average 2.6 kg of wool each year and a goat will yield on average 0.9 kg of mohair per year. The 2016 price of wool in Lesotho was R55/kg and mohair was R85/kg. Furthermore, sheep and goats could fetch between R700 and R1 000 per head at market and cattle could fetch between R6 000 and R8 000 per head, however, the prices received in the highlands also tend to be lower.

wetland areas in protected areas would therefore be limited. This element of the strategy would have to be reserved for the most sensitive areas that require greater protection.



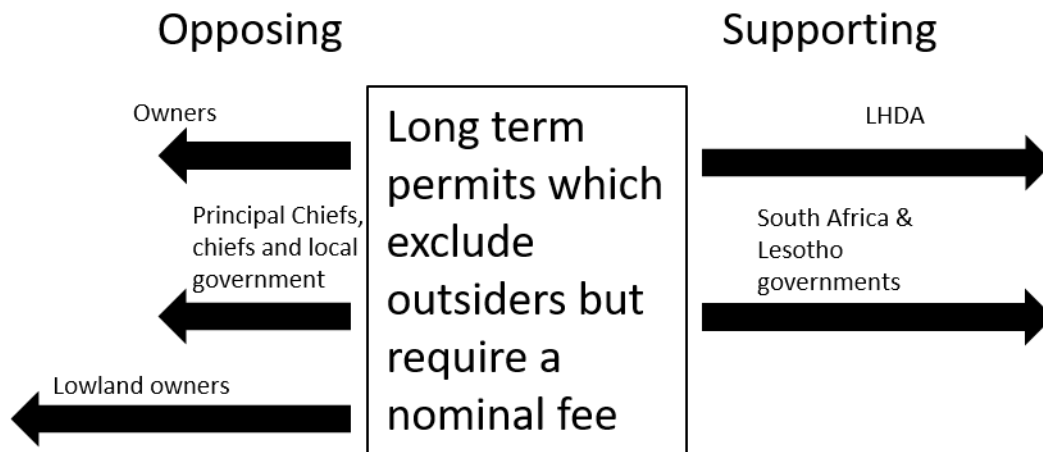
However, to ensure that the protected areas are adhered to, better enforcement in the form of additional monitors is required. The Bokong Nature Reserve only has two monitors (employees on horseback) at its disposal and, when prompted, the reserve manager suggested that 10 monitors would be sufficient to prevent and enforce illegal grazing on the reserve grounds. This additional manpower will come at an expense.

When the Bokong Nature Reserve was established, the plan was to provide some compensation to livestock owners for reducing grazing land, in the form of royalties on tourism revenues. However, these payments were not maintained and the idea proved unviable. Tourism infrastructure within the park is poorly managed and the accommodation facilities have not been used because the Government failed to appoint a service provider. The idea of compensation payments from future parks is also unlikely to be viable and producing minor compensation may only result in dissatisfaction.

We believe that the best way to avoid conflict would be to improve the condition of grazing outside the park in order to reduce the currently very obvious differential in grazing quality which exacerbates animosity and attracts illegal users.

Secure property rights to exclusive grazing areas

A system of secure, long term exclusive access rights to their grazing areas was the most popular choice of livestock owners among the interventions considered, especially if this involves no more than a modest annual management fee. This would be appealing to livestock owners who would benefit from better grazing and livestock health, from chiefs and local government who would have a less complicated situation to deal with, from LHDA who would suffer less sedimentation as a result of better rangeland and wetland condition, and from the regional governments who would benefit from a more secure water supply. The main opponents would be the outsiders themselves. While most livestock owners were opposed to a permit fee of M300 or more, some owners were willing to pay, which suggests that owners of larger herds might be able to contribute slightly more.



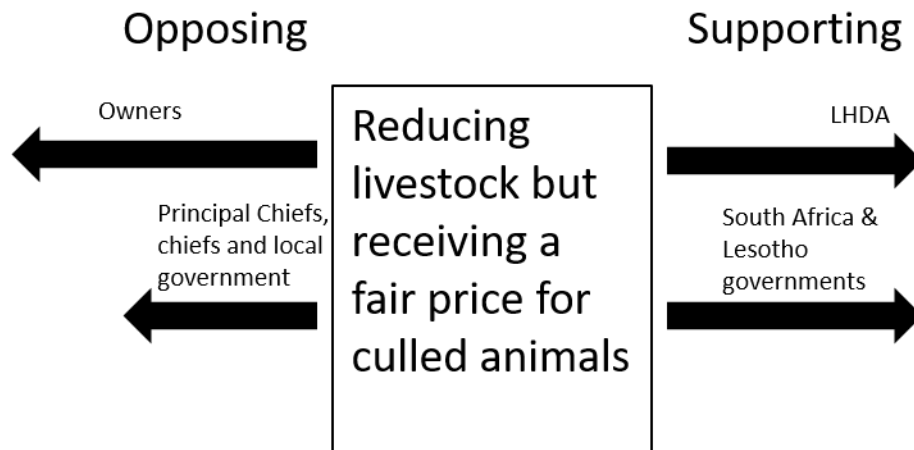
The exclusivity was positioned as 'outsiders' being kept out their grazing areas. However, there is still much uncertainty as to the extent to which outsiders contribute to grazing pressure, and the feasibility of keeping them out, given the Laws of Lerotholi and the practice of Mafisa. If the outsiders were predominantly from the lowlands, then there would be an opportunity for the LHDA to ban transhumance from the lowlands to the highlands. However, the impact this would have on the total numbers of livestock in the different grazing areas is still unclear, largely owing to the lack of knowledge by livestock owners on where the catchment boundaries are situated and whether the 'outsiders' are from within or outside these boundaries. This kind of information should theoretically be available through the permit system. In order to achieve the establishment of grazing areas exclusive to defined sets of permit holders, the Laws of Lerotholi would need to be amended to restrict grazing access to designated areas. Furthermore, the practice of Mafisa between lowland and highland would need to be discouraged. There may be some resistance from powerful stakeholders in the lowland areas.

In addition, it is likely that the B and C grazing areas would not benefit as much from the exclusion of outsiders as the A grazing areas, if at all. Indeed, reduction of overall stocking rates is a necessary, but not sufficient condition. It is critical that the intervention would go hand in hand with better rangeland management. The proposed grazing management areas would have to be well-managed in terms of grazing rotation and securing adequate rest, and would have to span the full range of altitudes (A to C) and be large enough in order to be resilient.

Buy-outs with fair price as a management tool

Given that the catchment areas are currently overstocked, and might still be overstocked when outsiders are excluded, there is a strong possibility that destocking among local herds will be required in order to reach sustainable stocking rates that maximise productivity and minimise impacts on water supply. In addition, there may be drought events in the future that will necessitate occasional buy-outs. It is envisaged that this would involve willing sellers up to a point, but may sometimes require forced expropriation.

The notion of reducing livestock numbers was not completely ill-received when it included fair compensation. Reducing livestock numbers to the carrying capacity of the catchment areas is the most efficient intervention option as it reduces the grazing pressure on all three grazing areas. Furthermore, no change to the governance structure is required to achieve this option, however, it would require a strengthening of current structures.



The obvious drawback of this option is that it could prove very costly for the LHDA and the Lesotho government to compensate all livestock owners fairly for a reduction of livestock. Much thought on the best reduction and compensation strategy is required as compensation in the form of a cash buy-out could result in livestock owners turning to cultivation instead, an equally damaging form of land-use on the steep slopes of the highlands. Furthermore, the interest rates that banks in Lesotho offer for savings accounts would not be sufficient to generate the same returns that livestock ownership offers. A possible solution is for the LHDA to offer compensation in the form of government bond holdings that provide a monthly/quarterly bond dividend, more in line with the returns livestock owners can make from owning livestock. This would alleviate the need for a large initial lump-sum buy-out. An alternative solution would be to reintroduce the animal exchange programme where livestock owners are forced to exchange two/three poor condition animals for one good condition animal which would guarantee better profits or increased longevity. Regardless of what compensation method is implemented, the human resources to perform carrying capacity assessments and to implement one of these reduction and compensation methods will be substantial.

6 RECOMMENDATIONS

It is recommended that some initial sensitisation activities are carried out, along with some further research to inform the next steps. After this, the LHDA should take the necessary steps to establish protected areas, reform grazing area management and reduce livestock numbers to their long-term carrying capacity. All of these activities will require ongoing research, negotiations, sensitisation of stakeholders, communication of plans and capacity building of managers.

6.1 Change mind-sets to improve co-operation

Many of the opposing forces identified in the preceding section speak not only to the specific intervention in question but also to the rangeland management situation and experience in general. Addressing these opposing forces is a first step towards resolving the current rangeland management shortcomings and they are a necessary step before implementing any of the proposed interventions. The following important steps should be taken:

6.1.1 *Soothe any existing animosity between communities and LHDA*

This should take place before any other measures are taken as the base that the LHDA needs to work from should be a place of trust and respect with communities. Communities will not cooperate with any intervention measures if they feel that the LHDA does not or has not had their best interests at heart in all prior endeavours. The sentiment towards the LHDA in the highlands varied with some communities extremely grateful for the progress and development that the LHDA has provided them with, while other communities feel strong animosity towards the LHDA, largely owing to promises made not being met. An active programme of community engagement is required.

6.1.2 *Educate stakeholders on the why's and how's of rangeland management*

The importance of rotational grazing and allowing areas to rest sufficiently (Leboella) needs to be conveyed to communities and governance spheres. This includes the causality between overgrazing, bush encroachment, erosion and long-term productivity. It is not recommended that communities are told to invest in intensive grazing practices involving fenced camps, as failure to do this properly (as would be highly likely) will make the situation even worse.

Communities, including Principal Chiefs and local government officials, need to be sensitised to the importance of wetlands for themselves, the LHDA, and the entire Lesotho nation. The link between overgrazing and the condition of wetlands needs to be stressed through knowledge-sharing platforms. This should include getting across a firm understanding of the need for protected areas and a realistic assessment of the local sacrifices that need to be made for this rather than promises of benefits. Along with this, the need for compensating for this through turning around the condition of rangelands will have to be understood.

6.2 Quantify existing use and management in more detail

Further field studies should be carried out to improve on the estimates made in this study. This should involve firming up in explicit detail on:

1. the mapping of grazing areas and the individuals and organisations responsible for managing them, including further detail on where there is confusion regarding Principal Chief jurisdictional boundaries;
2. the membership and activities of the grazing associations; and
3. who grazes where (their origins), when and with what number of animals;

This will provide an important basis for devising a more detailed plan for refining the division of grazing areas, their users and management responsibilities.

6.3 Expand the protected area system

It is strongly recommended that the area under protection in the upper catchment areas is increased. This should be regarded as very urgent, given the dire condition of important wetlands. There should be no access allowed for livestock grazing whatsoever, and this should be strongly enforced with high penalties. The area could, however, be managed to recover and sustain natural wildlife populations and allow environmentally-sensitive tourism development.

The implementation of protected areas will involve:

1. Deciding on the important wetlands that need protection (this will be addressed in the forthcoming wetland conservation strategy). Consideration of other biodiversity may also be worthwhile in this planning exercise.
2. Negotiating with Principal Chiefs and the Department of Tourism, Environment and Culture on the placement and size of the protected areas.
3. Designing an enforcement plan that builds on what is being done at Bokong Nature Reserve but increase the number of rangers or introduce technology such as drones.
4. Sensitising affected communities on where the protected areas will be established, the reason for having them and the fines that will be imposed on transgressors.

If compensation has to be considered, avoid a payment system. Rather, find an in-kind option such as the development of watering points, possibly without directly stating the favours given as being compensation for the protected area.

6.4 Reform grazing management

6.4.1 *Devise suitable, mutually-exclusive grazing management areas*

This step should involve mapping the long-term carrying capacity of the whole area taking seasonal use into account, establish the proportional relationship between village, winter and summer grazing areas. Using this information, mutually exclusive Rangeland Areas should be devised that accommodate all the livestock from a defined set of villages across all seasons.

The proposed Rangeland Areas would each incorporate some A, B and C grazing areas. They would have to be large enough to maintain adaptive capacity and long-term resilience of the grazing system. Based on current understanding, this could end up as one area for Mohale, and two or three for Katse. Each Rangeland Area would ultimately be given a name and boundaries would follow easily-recognisable landmarks or be very simply marked, e.g. by cairns.

6.4.2 Clarify and empower management institutions and authority

A suitable arrangement needs to be made for the management of grazing areas, that has the approval of the chiefs, local government and existing grazing associations. Ideally, this should be in the form of a Rangeland Management Authority ⁶ which has a specified relationship with all of these institutions.

The Rangeland Management Authority should have an office within each Rangeland Area. This office will be in charge of issuing permits and managing rangelands in their specific area, based on a Rangeland Management Plan that has been approved by the relevant authorities. Each Rangeland Area office would need to employ skilled personnel that can handle financial aspects (proceeds from fines, membership fees, etc.), scientific assessment, issuing of permits, record keeping and liaison with a livestock households and stakeholders in general.

The steps below should be developed together across all the areas by the overarching authority, so as to avoid different systems of management for different Rangeland Areas. Only the details of the permit numbers and rotational areas should differ between Rangeland Areas.

6.4.3 Determine the desired long-term sustainable stocking rate

Recognising that individual households seek to maximise their individual stock holdings or production (rather than maximise overall community production), determining the limits to stock numbers should focus on ecological capacity and the objective of maintaining healthy vegetative cover and maximising productivity in the catchment as a whole.

6.4.4 Devise a permit system

Permits should be issued locally. The permits should allow for a specific number of adult animals in a clearly defined way, and permit conditions will specify the grazing rotation system and sanctions for disobedience. Permitted animals should be tagged or marked in such a way that they can be identified to their owner and to their Rangeland Area.

⁶ We hesitate to use the term “Grazing Association” here, because these do not necessarily devise and execute rangeland management plans, and use of the term may therefore not get the full sentiment of these suggestions across.

A very modest annual fee should be levied on a per-animal basis, as a contribution to protecting the exclusivity of the rangelands. This will help to engender a sense of ownership. These fees could also be waived e.g. in return for services such as participating in patrols. This would be in line with the “in-kind user fee” being considered in the rangeland policy. However, it is important to keep the rules simple.

Very clear rules will need to be made on who is eligible for permits in the Grazing Area. This might include something on the Mafisa system.

Note that if all permits are demanded in the initial allocation, then there will be no room for an individual to grow their herd unless they can acquire additional permits from someone who wishes to sell. Thus the permits should be tradeable, under the condition that the trade is brokered by the managing authority and is therefore registered. This practice can also be limited to avoid a few people taking advantage of poor households and acquiring an excessive proportion of the permits.

6.4.5 *Devise a stock rotation and watering plan*

The Rangeland Area will need to be divided into zones which are rested in rotation. The rotation plan will need to be devised with rangeland management experts. It is recommended that a system of marking the rest area is devised, as well as a system for notifying permit holders when the rest areas are rotated.

Watering points need to be limited and should be located away from areas sensitive to trampling such as wetlands.

6.4.6 *Devise a compliance monitoring plan and sanctions*

A compliance monitoring system should be developed. This will include determining how transgressors are dealt with – e.g. non-permit holders found grazing livestock in the area, and anyone found grazing in areas that are set aside for resting, or allowing animals into flagged wetlands.

Bear in mind that once this management system is working, if it is not applied throughout Lesotho, there will be increasing pressure from outsiders trying to access the improved rangelands, and this will require much higher compliance effort than at present. Given the difficult terrain, the use of cost-effective technology such as drones may prove useful in this regard.

Sanctions (e.g. fines, impoundment fees) should be severe enough to act as a real deterrent but not to lead to destitution, and should include the option of payment with animals.

6.4.7 *Devise a rangeland monitoring and response plan*

Rangeland condition will need to be monitored on a regular basis with a view to adjusting all of the above over time. In addition, a plan will need to be made on how to deal with necessary adjustments.

6.5 Reduce livestock numbers

It is likely that the number of potentially eligible animals in each Rangeland Area will exceed the limits that have been set. Thus there will need to be an initial buy-out of stock. The communities will need to be carefully sensitised on the necessity of reducing livestock numbers and the benefits that they will see, such as improved rangelands and therefore better condition stock with greater longevity.

The first step will be to determine how many animals there are in each area, and the numbers that need to be culled. As an initial step it is recommended that an offer is made to purchase this number of stock at a higher than market price, and to do this on a first-come-first served basis over a defined limited period. Following this, it may be necessary to achieve further reductions by other means. This could be in the form of expropriation, or through something like an animal exchange programme (e.g. 2 good for 1 poor animal). The secondary measures should be less attractive than the initial buy-out conditions, for obvious reasons, and should be known up front.

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Appendix 1 - Fieldwork itinerary

Initial stakeholder engagement

Semi-structured interviews were held during November 2017 with the following individuals:

- Professor Qalabane Chakela – Independent consultant, Emeritus Professor of Geography University of Lesotho
- Mr Stanley Damane – Director Department of Environment
- Mr Bore Motsamai – Independent consultant, former Director of Range Management
- Mr Remaketse Mochochoko – Department of Landuse planning
- Mr Motoho Maseatile - Director of Water Affairs
- Mr Tente Masia – Department of Chieftainship
- Ms Regina Mating - Department of Range Resource Management
- Mrs 'Malipholo Hae - Department of Range Resource Management

Further stakeholder engagement, including livestock owners

Fieldwork was undertaken from the 28th of February to the 8th March in the Katse and Mohale Dam catchments. Focus group meetings were held at 4 villages in each of the two catchments. The discussions focused around understanding different trends in livestock ownership, grazing practices, condition of their respective rangelands and wetlands as well as their reactions to potential interventions to improve rangeland and wetland condition.

Day	Date	Village	Activity
Monday	26-Feb	Maseru	Organise work permit
Tuesday	27-Feb	Hlotse and Butha-Buthe	Courtesy calls
Wednesday	28-Feb	Motete	Focus group with livestock owners Interview with Chief's rep. and community councillor
Thursday	01-Mar	Ha Poli	Focus group with livestock owners Interview with Chief's rep. and community councillor
Friday	02-Mar	Ha Theko	Focus group with livestock owners Interview with Chief Interview with deputy chair of Pelaneng GA
Saturday	03-Mar	Ha Lejone	Focus group with livestock owners Interview with Chief
Sunday	04-Mar		Drove to Mohale Village
Monday	05-Mar	Ha Sekolopata	Focus group with livestock owners Interview with area Chief, community councillors and village Chiefs

Tuesday	06-Mar	Ha Rapokolana	Focus group with livestock owners Interview with community councillor
Wednesday	07-Mar	Ponts'eng	Focus group with livestock owners Interview with Chief
Thursday	08-Mar	Ha Ramohope	Focus group with livestock owners

Dam Catchment	Village Name	District	Community Council	Principal Chief Jurisdiction
Katse	Ha Motete	Butha-Buthe	Nqoe	Butha-Buthe
Katse	Ha Poli	Leribe	Matsoku	Leribe
Katse	Ha Theko	Leribe	Matsoku	Leribe & Tsikoane
Katse	Ha Lejone	Leribe	Matsoku	Leribe
Mohale	Ha Sekolopata	Thaba-Tseka	Tenesolo	Thaba Bosiu
Mohale	Ha Rapokolana	Maseru	Likolobeng	Thaba Bosiu
Mohale	Ha Ponts'eng	Maseru	Likolobeng	Thaba Bosiu
Mohale	Ha Ramohope	Maseru	Likolobeng	Matsieng

In addition to spanning multiple districts and Community Councils, within the study area there are eight Principal Chiefs that have partial jurisdiction, though only villages in five of these jurisdictions were visited. Some Principal Chiefs only have jurisdiction over A grazing areas and do not have villages within their ward within the catchment areas. Some Principal Chiefs such as Tlokoeng only have jurisdiction over boundaries of the catchment. A map of the exact boundaries of Principal Chiefs does not exist within Lesotho and therefore the map in the figure below is only meant to be indicative and based on conversations with people in the study area and key informants. Further detailed mapped would need to be done in consultation with each Principal Chief to ensure accuracy.

Focus group discussions included livestock owners, both part of and outside of any grazing associations in the area. Grazing associations for which members were present included:

- Phakoe-ea-likila Grazing Association (near Motete)
- Pelaneng/Bokong Grazing Association (Ha Lejone, Ha Poli)
- Wool and Mohair Growers Association Motete
- Malibamats'o-Matsoku Grazing Association (Ha Theko)
- Tsikoane-Bokong Grazing Association (Ha Theko)
- Ts'oaranang Lilepe Grazing Association (Ha Sekolopata)
- Ts'oaranang Lilepe Grazing Association (Ha Rapokolana and Ha Ponts'eng)
- Ke-llela-khomo Livestock Association (Ha Ramohope)

In addition, discussions were held with the following key stakeholders on similar topics, but with more emphasis on jurisdictions, management and enforcement.

- Ms Mantoa Moiloa, Reserve Manager Bokong Nature Reserve

- Rannate Shasha, Village Chief Shasha near Motete (on behalf of Chief Teboho Mopeli, Area Chief of Motete)
- Councillor Mots'oane Mokhethi, Nqoe Community Council
- Chief Representative 'Malesitsi Poli, Ha Poli
- Councillor 'Mamotsotehi Hlojeng, Matsoku Community Council
- Chief 'Matheko Mots'oene, Area Chief, Ha Theko
- Mr Leronti Mats'ela, Pelaneng/Bokong Grazing Association Deputy Chair
- Chief 'Mamphole Molapo, Area Chief, Ha Lejone
- Chief Mahlatsi Sekolopata, Area Chief Ha Sekolopata
- Chief Lekhetho Nteso, Village chief Ha Lempe
- Chief Khotso Khere, Village chief, Khubetsoana
- Councillor Neo Hari, Denizulu Community Council (Sekolopata)
- Councillor Motipi Monyaka, Denizulu Community Council (Sekolopata)
- Councillor Mofolo Lecheko, Likolobeng Community Council
- Chief Khotso Khophoche, Village chief Ponts'eng
- Chief Masheane Motemekoane, Village Chief Ha Ramohope
- Councillor Moeketsi Phohleli, Likolobeng Community Council
- Ms Ntsatsi Sefali, LHDA Mohale

Appendix 2 - Force field analyses

In an attempt to group the opposing and supporting forces that came up more than once, the following categories have been defined (Table 5.8). The specifics relating to the cause for the specific intervention in question is found in parentheses in the tables below.

The categories of opposing and supporting forces for the different intervention options.

Animosity	This category captures the ill-feelings towards the LHDA for historical reasons.
Livelihood impact	This category captures the negative or positive impact of the proposed intervention on the livelihoods of the livestock owners.
Compliance/participation	This category captures the willingness of livestock owners to either participate in the intervention or to comply with the rules.
Enforcement	This category captures the current enforcement constraints or enforcement requirements to make the intervention work.
Sensitisation	This category captures the sensitisation required to make the intervention work.
Governance	This category captures the current governance constraints or changes to governance that would be required to make the intervention work.
Incentive	This category captures whether the intervention elicits an incentive for livestock owners to adopt and reinforce the intervention.
Financial	This category captures the finances required to implement the intervention option.
Water sales	This category captures the positive impact that the intervention will have on water sales.
Biodiversity conservation	This category captures the direct impact of the intervention on biodiversity conservation, not the indirect impact of reduced grazing on biodiversity.
Sediment reduction	This category captures the positive impact that the intervention will have on reducing sediment.
Tourism potential	This category captures the potential contribution to tourism in the highlands from the implementation of the intervention.

Change mind-sets to improve co-operation

Opposing forces	Score	Stakeholders	Supporting forces	Score	Stakeholders
Animosity (mistrust of LHDA in certain areas)	3	Chiefs, council and owners	Sediment reduction	5	LHDA
Livelihood impact (livestock ownership as a cash producing activity, limited employment and savings opportunities)	5	Owners	Compliance/participation (livestock owners want to see change but are unwilling to sacrifice for it)	3	Owners
Compliance/participation (grazing seen as a right so some livestock owners would be unwilling to participate)	5	Owners	Water sales (reduce siltation)	3	SA and Lesotho governments
Enforcement (weak jurisdictional boundaries, low enforcement fees)	5	Principal Chiefs, chiefs and council			
Sensitisation (lack of understanding of importance of wetlands and impact of grazing)	5	Owners			
Governance (communal resource and reporting to different authorities)	5	Principal Chiefs, chiefs, council, owners and non-owners			
Total	28			11	

Protected areas in catchments

Opposing forces	Score	Stakeholders	Supporting forces	Score	Stakeholders
Animosity (mistrust of LHDA in certain areas and disbursement of Bokong NR royalties halted)	4	Chiefs, councils and owners	Sediment reduction	4	LHDA
Livelihood impact (limits already limited grazing areas)	3	Chiefs and owners	Water sales (reduce siltation)	5	SA and Lesotho governments
Compliance/participation (repeat offenders in Bokong NR)	2	Owners/herders	Biodiversity conservation	5	Lesotho government
Enforcement (limited monitoring capacity by NR management)	3	Lesotho government	Tourism potential	5	Lesotho government
Sensitisation (importance of protected areas)	3	Chiefs, councils and owners			
Incentive (no payoff as not improve rangeland condition, therefore requires alternatives)	4	Chiefs, councils and owners			
Total	19			19	

Long term permits which exclude outsiders but require a nominal fee

Opposing forces	Score	Stakeholders	Supporting forces	Score	Stakeholders
Animosity (mistrust of LHDA in certain areas)	4	Owners	Water sales	3	SA and Lesotho governments
Livelihood impact (excluding lowland owners)	5	Lowland owners	Incentive (excludes outsiders)	5	Chiefs and owners
Compliance/participation (grazing considered a right, permits considered a tax and potential for finding loopholes – Mafisa, etc.)	2	Owners	Biodiversity conservation	3	LHDA and Lesotho government
Enforcement and finances (will require paid monitors)	2	Owners and LHDA	Sediment reduction	3	LHDA
Sensitisation (will require catchment boundary understanding)	2	Principal Chiefs, chiefs, council and owners			
Legislation (will require changes to laws, incl. Mafisa system, laws of Lerotholi)	5	LHDA and Lesotho government			
Governance (depending on structure, some will win and some will lose)	2	Principal Chiefs, chiefs, council and GAs			
Total	22			14	

Reducing livestock but receiving a fair price for culled animals

Opposing forces	Score	Stakeholders	Supporting forces	Score	Stakeholders
Animosity (mistrust of LHDA in certain areas and being forced to change behaviour for LHDA problems)	3	Chiefs and owners	Water sales (reduces siltation)	5	LHDA, SA and Lesotho governments
Financial (LHDA have to pay for buy-out)	3	LHDA and Lesotho government	Livelihood impact (receive a fair price for culled animals)	5	Chiefs and owners
Incentive (there is a perverse incentive to use compensation to finance cultivation)	5	Chiefs and owners	Compliance/participation (difficult to cheat this system)	5	LHDA
Enforcement (will require resources to gather data and implement)	5	LHDA and Lesotho government	Sediment reduction	5	LHDA
Sensitisation (understanding of impact of many animals on rangelands and wetlands)	5	Owners			
Legislation (will require changes to laws)	5	Lesotho government			
Total	26			20	