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Pastoralism and Land Tenure Transformation in Sub-Saharan Africa: Conflicting Policies and Priorities in Ngamiland, Botswana

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Abstract: In dryland Africa, access to land and water resources are central to pastoral livelihood activities. Policy intervention in these regions represents the outcome of concerted post-independence processes in which countries have committed to land tenure transformation as a policy objective. This was meant to create private, liberal property rights to replace communal customary tenure systems which were considered to be a constraint to development. Despite these efforts, decades of scientific research indicate that countries are still struggling to meet environmental sustainability objectives. Land degradation where it existed has not been halted and traditional pastoral livelihoods have been disrupted. The overall evidence base for policymaking remains weak as deficiencies in data or information on which management decisions were based led to poor policy performance. In a bid to strengthen understanding in this area, this study has a dual aim: 1. Using a systematic review of the literature, we examine the impact of land tenure transformation in pastoral areas in sub-Saharan Africa; 2. We analyse user-perspectives on land tenure transformation and pastoralists' rights in Ngamiland, Botswana, so as to draw out the salient issues that must be addressed in order to reconcile pastoral tenure conflicts and land management in sub-Saharan Africa. Results from meta-analysis and case study show that land tenure transformation policies across pastoral areas are subject to similar challenges and consequences. Protecting pastoral land rights requires deliberate policy interventions that recognise pastoralism as a productive and efficient use of resources. Policymakers need to overcome anti-pastoral prejudice and focus on Sustainable Land Management goals. This entails establishing negotiated and flexible tenure frameworks that strengthen pastoralists' participation in decision-making arenas by working with pastoral communities on the basis of understanding their livelihood system.

Keywords: communal rangelands; property rights; environmental impacts; policy implementation; drylands

1. Introduction

In drylands, access to grazing and water resources are central to rural pastoral livelihoods activities. In these environments, pastoralism is one example of a resource use system that is highly dynamic and uncertain. For rural community dwellers, communal lands and their resources are the mainstay of most economic activities and rural livelihoods, including farming, hunting and the day to day gathering of natural resources such as veld products [1,2]. However, concerns over the demise of traditional pastoral resource use systems due to rangeland degradation, impacts of climate change, impacts of land tenure policies, expansion in commercial agricultural activities and conservation areas continue to occupy the central agenda in pastoralism literature [3–5]. Many pastoral communities are faced with challenges of shifts in land tenure as their communal rights are considered by development practitioners as a constraint that hinders development with a need to be modernised [6]. Moreover,

climate change, population growth and land use policies that focus on sedentarisation of pastoral communities continue to cause accelerated pressure on natural resources leading to rangeland resource degradation, wildlife declines and pastoralists vulnerability [7,8]. As drylands are characterised by low and spatiotemporally variable precipitation [9], sustainable land and livestock management are dependent on adaptive mobility and pastoralists' flexibility to make use of the highly variable rangeland resources [10]. Historically, pastoralists have been able to follow rainfall or specific pasture resources through space and time in order to meet the needs of their animals and prevent rangeland degradation caused by the concentration of animals in smaller territories [11,12].

In sub-Saharan Africa (SSA), competition over land has intensified over the last few decades due to urbanisation, agricultural intensification, conservation initiatives and privatisation of communal lands through rangeland policies that have sought to create private, liberal property rights to replace communal customary systems [13]. The two opposing views in this debate are focussed on either supporting tenure reform through the registration of land to individuals, state or strengthening customary tenure. The proponents of tenure reform have received support since Hardin's argument that communal tenure arrangements fail to regulate irrational behaviour, leading to overexploitation of communal resources [14]. Hardin's thesis also provided the rationale for World Bank programs calling for privatisation of communal grazing lands so as to commercialise the livestock sector in developing countries [15]. De Soto's [16] support has been singled out with his theoretical argument stating that the conditions and terms of negotiation under which land is held under customary tenure only encourage low rates of productivity-enhancing investments. De Soto refers to land held under customary tenure as 'dead capital' because it cannot be used as collateral in a formal banking system.

However, these views have been widely contested as not representing customary land rights and management systems that were in place for African rural communities [17,18]. Ostrom [19] and others have argued against solutions that are imposed on users by external authorities, arguing that traditional group property regimes are able to self-organise, that local users are capable of designing and changing their own rules, implementing the agreed upon rules and most importantly draw on inherited skills to learn strong locally crafted rules as well as evolved norms of behaviour [19,20], especially reciprocity [21]. Ostrom further argues that undermining local resource users through privatisation or rangeland enclosure schemes increases the vulnerability of resources to degradation including the increased vulnerability of their users [19]. In SSA, land use policies have ignored the multi-purpose goals of traditional group property regimes as practiced in communal lands and emphasised rangeland enclosures, privatisation of communal grazing lands and commercialisation of the livestock sector, leading to weakening and marginalisation of traditional land and pastoral management regimes [11,22]. Mobility and flexibility have diminished as land ownership has become more rigid and fixed, with different land uses separated by fences and other administrative barriers [23]. In Kenya's Maasailand for example, researchers describe the impact of government enclosure policy in which rangeland development schemes have not only privatised the best land but have also led to overgrazing, violent conflicts and increased wealth inequalities [3,24].

Implementing property rights that are equitable and can enhance the sustainability of both pastoral livelihoods and resources has remained a challenge for public policy across Africa's drylands [25]. The performance of land tenure policies has had mixed results and issues of impacts and implementation of such policies for sustainability remains debated in the research literature. The overall evidence base for policymaking remains weak and insufficient as deficiencies in the data or information on which planning and management decisions are based often leads to poor performance of different policies. In a bid to strengthen understanding in this area, this study has a dual aim: 1. Using a systematic review of the literature, we examine the impact of land tenure transformation in pastoral areas in SSA; 2. We analyse user-perspectives on land tenure transformation and pastoralists' rights in Ngamiland, Botswana, to draw out the salient issues that must be addressed to reconcile pastoral tenure conflicts and land management in dryland areas.

2. Materials and Methods

2.1. Systematic Literature Review on Pastoralism and Land Tenure Discourse

Data for this study were collected from primary and secondary sources. Data from secondary sources were obtained through a systematic procedure (Figure 1). This was developed using keywords and other search options such as Boolean operations (AND, OR), using methods described by Waddington et al. [26]. Resources available through databases: Web of Science, SCOPUS, Springer Link, JSTOR, Google Scholar and other library resources were used. We used both published literature (Journal articles and books) and grey literature in the form of government policies and legislative documents, technical reports, land use and land management plans obtained from government departments and government printing and publishing agencies.

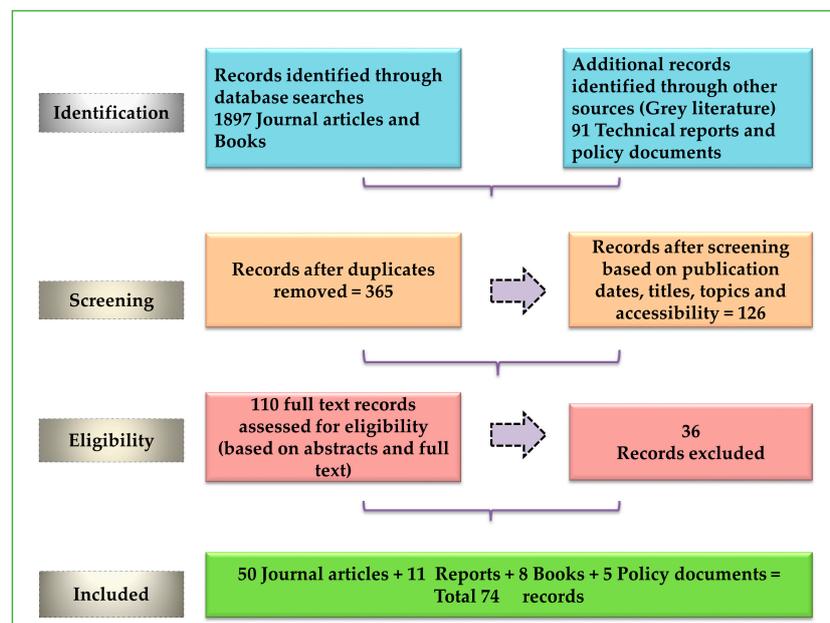


Figure 1. Flowchart of literature search, process and results.

2.1.1. Eligibility

For eligibility, we considered articles that examine land tenure, property rights and pastoralism in SSA or other developing country contexts. We considered empirical studies published between 1990 and 2017. Specifically, the eligibility criteria based on abstracts and full text were as follows;

- Articles that have the words: land tenure AND/OR communal land privatisation, pastoralism AND/OR property rights in abstracts.
- Publications based on outcomes of land tenure transformation in SSA.
- Publications that study a clearly defined policy intervention in drylands pastoral areas.
- Publications that provide adequate methodological information.
- Publications that assess the outcome at an appropriate level of analysis, specific case studies, e.g., district or village level.

2.1.2. Exclusion Criteria

- Publications whose methodologies were considered difficult to assess in a systematic manner.
- Nonrelated articles, e.g., commentary, simulations and modelling.
- Review papers.
- Articles whose main focus is in developed countries.

- Research articles (not policies) published prior to the year 1990.
- Publications that were produced in a language other than English.

2.1.3. Data Extraction

A data extraction template was developed and study variables and characteristics systematically collected were as follows (1) Document type e.g., Journal, Book, Policy; (2) Title of the study; (3) Research category/field; (4) Study geographical area e.g., country, region; (5) Keyword and meaning from the abstract e.g., pastoralism, land tenure, property rights, commons, communal land privatisation and (6) Date of publication.

2.2. Mixed Participatory Methods

Empirical data from six study villages in Ngamiland (Sehithwa, Toteng, Bodibeng, Bothatogo, Makakung and Semboyo) were used to understand the policy impacts of land tenure transformation on pastoralism and provide comparisons with issues emanating from the wider literature. A mixture of qualitative participatory rural appraisal methods were used to allow pastoral communities to share their experience and knowledge with regard to pastoralism, livelihoods and land tenure transformation. This included focus group discussions, key informant interviews and semi-structured interviews. A total of 6 focus group discussions, 26 key informant interviews and 97 semi-structured interviews were undertaken in the 6 villages. Purposive sampling and snowballing techniques [27] were used to identify key informants. Farmers' committees, village leadership and village development committees were used to solicit names of participants for focus groups. Key informants were selected based on their pastoral and local environmental knowledge. For semi-structured interviews, a structured sampling procedure was employed and participants were taken from a cross-section of the pastoral community and included both males and females (Table 1). The qualitative data were coded and analysed through iterative content analysis [27] in order to identify major themes. Structuring themes permitted the comparison of the responses with themes identified through the systematic literature review.

Table 1. Study villages and demography.

Village	Human Population	Total Numbers in Semi-Structured Interviews	Male (Semi-Structured Interviews)	Female (Semi-Structured Interviews)
Sehithwa	2748	28	18	10
Toteng	909	19	12	8
Bodibeng/Bothatogo	1333	28	11	17
Semboyo/Makakung	691	22	10	11
Total	5681	97	51	46

Data source: Central Statistics Office, Botswana, 2011 census report and authors' interview transcripts.

3. Results and Discussion

3.1. Pastoralism and Land Tenure Discourse in Sub-Saharan Africa

Most of the literature from the systematic review e.g., [22,28–31] identifies the complexity of land tenure and pastoralism in SSA. Many SSA governments have committed to land tenure transformation as a policy goal [22,32–34]. Most policy documents and official reports have depicted pastoralists as unable to manage communal resources in a rational way, thus providing a strong justification for privatising communal pastures and controlling pastoralists' movement, stocking rates and access [35,36]. Almost two third of the papers (63%) assessed the impacts on pastoral livelihoods and how the individual tenure transformation policies in pastoral areas had failed to meet their environmental objectives. The remaining papers investigated issues related to implementation, policy conflicts and priorities. The issue of land tenure in SSA has been mentioned as of significant importance for agricultural development and food security in documents such as the UN Millennium Project [37],

NEPAD's Comprehensive Africa Agriculture Report [38] and a significant number (37/50) of the journal articles point to the challenges of land tenure transformation in dryland Africa. Priority issues in land tenure policies and implementation in pastoral areas consisted of:

- A decline in land productivity—reduction in communal managed grazing, constriction in livestock mobility (53% of the papers).
- Loss of critical common property management regimes—reduced coping mechanisms (49%).
- Implementation challenges—actors' priorities and inadequate resources to support policy implementation (39%).
- Increased inequality and social conflicts, breakdown of social networks and safety nets (33%).
- Limited coping mechanisms and adaptive capacity by pastoralist remaining in communal areas (29%).
- Lack of accountability by local level institutions and authorities (26%).
- Low level of economic development and deficiencies in markets (23%).
- Wildlife management areas and traditional use of rangelands in conflict (19%).

With respect to pastoralism, most of the papers (77%) highlight land tenure security and land expropriation as key problems in pastoral land development. Expansion of competing land-uses, land tenure transformation, individualisation and enclosures have reduced the net availability of rangeland resources, often with significant consequences for pastoral livelihood and the environment. For example, in Kenya, the group ranch concept is said to be in its fourth decade, but there is general consensus among scholars and researchers, including policymakers, that the policy has failed to meet its objective (of commercializing production, improving pastoral wellbeing, improving environmental management) and has also jeopardised the socio-economic welfare of the Massai community [23,39,40]. The group ranch concept, a world bank-sponsored Kenya livestock development project, allowed for the setting aside of certain areas of land to be collectively owned by a group of people legally registered as members of a particular ranch for collective management [40]. Analysts point out that the positive aspects of the concept were overshadowed by problem such as continued trespassing of ranch boundaries, loss of land to elites' members, refusal to control stock numbers and that no real transformation to a market-oriented livestock production system was made [23,40,41]. Inequitable access to land and socio-political factors were identified in 33% of the articles analysed. Galaty [41] found that the group ranch subdivisions in Kenya have benefited elites and outside investors, undermining the traditional livelihoods of poorer Massai pastoralists.

In Ethiopia, according to Tache [42], the practice of reserving some pastures for drought was widely practiced by Borana, Guji and Gabra Oromo communities long before the arrival of externally/donor founded land tenure and pastoral development projects. Tache argues that these reserved areas were not fenced, but word of mouth was enough to restrict access. Over the years' pastoralists in Ethiopian drylands have experienced a shrinkage in available dry season grazing, a reduction in communally managed grazing reserves and growing individualisation of land use rights through privatisation. Similarly, in Sudan, Babiker [43] found that the process of land resource individualisation has severely fragmented the Central Sudan rangelands as land is expropriated for large-scale commercial farming and wildlife conservation.

While the formalisation of the commonage under the Transformation of Certain Rural Areas Act of 1998 (TRANCRAA) in South Africa's rural Namaqualand has increased tenure security for individual plot holders, in respect to de Soto's hypothesised benefits of formalisation and privatisation, tenure security for users of the commons, especially pastoralists, has decreased [44]. Formalisation has led to privatisation, increased fencing, reduced communal rangelands and closed corridors so undermining local grazing patterns [45].

Lack of accountability and conflicting policy priorities and objectives were also cited as an implementation challenge in 26% of the papers. Often economic development objectives were prioritised over environmental concerns or pastoralists wellbeing. Another deficiency discussed was

the low level of economic development and deficiencies in markets which make it almost impossible to achieve environmental sustainability objectives (23%).

In summary, the meta-analysis shows that in SSA, land tenure transformation policies were based on western, classical rangeland ecological models [22,46], economic theories [47], rangeland degradation narratives and tragedy of the commons theory [14,22], rather than the socio-ecological realities of drylands' rangelands dynamics. Consequently, traditional grazing territories have been shrinking while pastoralists dependent on rangeland resources and ecosystem services were displaced and exposed to incremental risks; poverty, livestock diseases and a breakdown of social networks and safety nets as well as a decline in rangeland productivity. This compression has suppressed the flexibility and spatial extent necessary for pastoralism in dryland environments. Evidence from the review suggests that the perceived benefits of tenure transformation has acted as a justification for the concentration of land in the hands of a few individuals, exacerbating insecurity of land tenure for the rural poor.

3.2. Reviewing Botswana's Rangeland Policy

Botswana is a semi-arid country whose rural population depends largely on livestock production. Botswana's rural people are mostly rural village dwellers and their pastoral activities assume the form of transhumance under a three-tier settlement system, whereby rural village dwellers commute between villages, land areas and temporary, encampments known as cattle posts, where livestock are kept [48]. Traditionally, communal rangelands have been managed by traditional institutions which allow for inter-territorial grazing between unfixed tribal boundaries so that animals can access forage and water even in times of stress, such as drought years [49]. Change in environmental conditions has always influenced pastoral livelihoods in Botswana [2]. Unfavourable ecological conditions and pastoralist's vulnerability have increased since the 1980s due to increased fragmentation of landscapes as a result of rangeland policies [50]. The literature on Botswana's rangeland transformation policies points to a situation where the design and implementation of rangeland policy were based on an insufficient or poor understanding of the problem [50–53]. Deficiencies in the data or information on which planning and management decisions were based means the policy assumptions were not supported by concrete scientific evidence.

Botswana registered its concern for rangeland degradation and what was termed 'unsustainable livestock keeping' in 1975 through the Tribal Grazing Land Policy (TGLP) [35]. Hardin's "The Tragedy of the Commons" [14] theory was widely used to blame communal grazing for land degradation. TGLP had three objectives: (1) to stop overgrazing and degradation of the range, (2) to promote greater equality and incomes in the rural areas and (3) to allow growth and commercialisation of the livestock industry on a sustainable basis [41]. Through this policy, the government hoped that pressure in communal lands would be alleviated through demarcation of ranches and allowing large herds owners to transfer their cattle to these ranches, thus leaving the communal lands for communal subsistence pastoralists [51]. According to the White Paper on the TGLP and feasibility reports by the Ministry of Agriculture, development had to start with granting exclusive rights and fencing of specific areas. Land Boards and Land Use Officers in the Ministry of Agriculture were given the responsibility of surveying the Tribal areas of Botswana (making up 71% of the total area of the country at that time) and zoning them into three categories: (1) commercial areas where exclusive rights would be granted to individuals and groups with a minimal rental payment, (2) Communal areas, where the land tenure system would remain the same but stock limitations would be imposed and (3) reserved areas which would not be allocated to anyone but rather set aside for the future, thus ensuring 'safeguards for the future generation and poor members of the population' [54].

The planning stage of TGLP focussed on economic gains and administrative initiatives [55]. In spite of complaints from local people at the consultation stage of the uncertainty of potential benefits [51], the policy was implemented without proper mapping to provide the necessary spatial baseline information on how much land would be available for the policy's different objectives.

In addition, there was no plan to monitor the progress of activities in the different zones stated above [56].

Lack of spatial information and a good monitoring plan made implementation in its original form difficult. The zoning process revealed that many parts of the country which were assumed to have been unutilised actually contained a substantial number of people [55]. Some areas were used by migratory pastoralists during drought years or wet seasons because they had natural water ponds [50,56]. Most of the smallholders, including hunter-gatherers, lost the rights to utilise the land. Communal land privatisation and creation of wildlife management areas illustrate how conflicts have arisen in the interface between customary and formal statutory tenure [51]. As zoning was done, it was found that in most districts there was too little land available to permit reserved areas to be set aside, so the reserved category was dropped and the establishment of commercial ranches became the major focus of attention on the part of land use planners and development personnel. This was in spite of the TGLP's original emphasis on ensuring 'safeguards for the future generation and poor members of the population' [54]. Large-scale cattle owners, especially those with boreholes, were allocated ranches and were encouraged to transfer their herds into ranches and leave the communal grazing land to subsistence farmers [35,51]. However, no legislation was put in place to enforce this as those allocated ranches continued to enjoy dual grazing rights by keeping their livestock in communal areas and ranches. This led to environmental threats through concentration of livestock in reduced areas [50]. Such problems are not unique to Botswana as 53% of the articles in the systematic review mentioned reduction in communal managed grazing, constriction in livestock mobility and decline in land productivity as of particular challenge in tenure transformation in pastoralists' areas.

In spite of difficulties in implementation of TGLP [57], Botswana continued with communal land privatisation in the subsequent National Policy on Agricultural Development (NPAD) issued in 1991 [36], prompting fears that the concentration of rural poor on the diminished communal lands may cause further social and environmental problems [51]. NPAD included a wide range of objectives for the development of the agricultural sector in Botswana. As regards to fencing and privatisation of communal lands, NPAD emphasized that TGLP would be intensified and expanded into all communal areas. Under NPAD, the ranches would not have a fixed size as originally stated in the first stage of TGLP (8 km × 8 km); the size of the ranch would depend on the number of cattle the applicant for a ranch owned, the availability of land and its carrying capacity, and most importantly individuals could apply to fence areas within the vicinity or around boreholes, regardless of their location in communal areas [36]. This policy implied a major land tenure change since the zones that were originally identified as communal lands (notably grazing lands around cattle post areas) in the earlier TGLP zoning process would gradually be privatised [36]. The policy recommended the fencing of a significant part of the communal areas as commercial leasehold ranches or privatised land and the consequences for pastoralists' tenure security, livestock mobility and flexibility would later prove to be significant.

3.3. Experiences of Land Tenure Transformation from Ngamiland District, Botswana

Ngamiland District is situated in North Western Botswana and includes the Okavango Delta. This makes it an important ecosystem characterised by both drylands and water bodies, abundant wildlife and enthralling traditional cultures. The district's major economic activity is substance pastoralism, with limited arable agriculture on drainage plains [48]. The district was selected for this analysis because previous studies by Basupi et al. [50,56] identified the region as characterised by land use competition, conflicts and environmental problems, some of which are attributed to animal health and land tenure transformation policies. The case study provides critical lessons on crucial issues such as the interplay between pastoralists' interests and larger national conservation goals.

In communal areas south of the Okavango Delta, blocks of commercial ranches were demarcated and allocated under both TGLP and NPAD policies [50]. Wildlife Management Areas (WMAs) emerged in the 1980s as a result of a national land zoning exercise following the introduction of the TGLP [48].

As such, land is broadly zoned into distinct uses consisting of communal areas, National Parks, Game Reserves, Conservation areas (operated as tourism concession areas), privatised ranches and Wetlands (Figure 2). However, land use allocation and overlaps of different land use types create a complicated system resulting in pressure and conflict among people, wildlife and livestock [50]. With an average annual rainfall of 350 mm, the area falls into the semi-arid or dryland transition zone. Surrounded by fences, the remaining communal area south of the Setata veterinary cordon fence is about 7500 km² in extent. The livestock numbers are high (at 203,269 cattle; 27,552 goats; 10,148 sheep; 5432 horses and 5644 donkeys (Department of Veterinary Services, Botswana, 2016 livestock statistics report)) which makes the regulation of grazing areas difficult. Although some members of the population are involved in arable farming, it is usually flooded recession agriculture in riverbeds and Lake Ngami floodplains because the soils are too poor elsewhere to support meaningful agricultural activity. As a result, pastoralism remains the main economic activity. The case study, therefore, offers an ideal setting for studying user-perspectives on land tenure transformation and pastoralists’ rights. Owing to the district’s unique ecological and socio-cultural variation, land tenure transformation and landscape fragmentations has resulted in a new generation of social, economic and environmental challenges; livestock diseases which are difficult to control in crowded areas, limited adaptive capacity and conflicting policies and actor priorities. Table 2 summarises the key issues/themes that emerged from the review of the wider literature and shows how these issues manifest in Ngamiland. Figure 2 shows the current land use zones and the case study area/villages while Figure 3 shows the livestock and wildlife spatial distribution patterns and density.

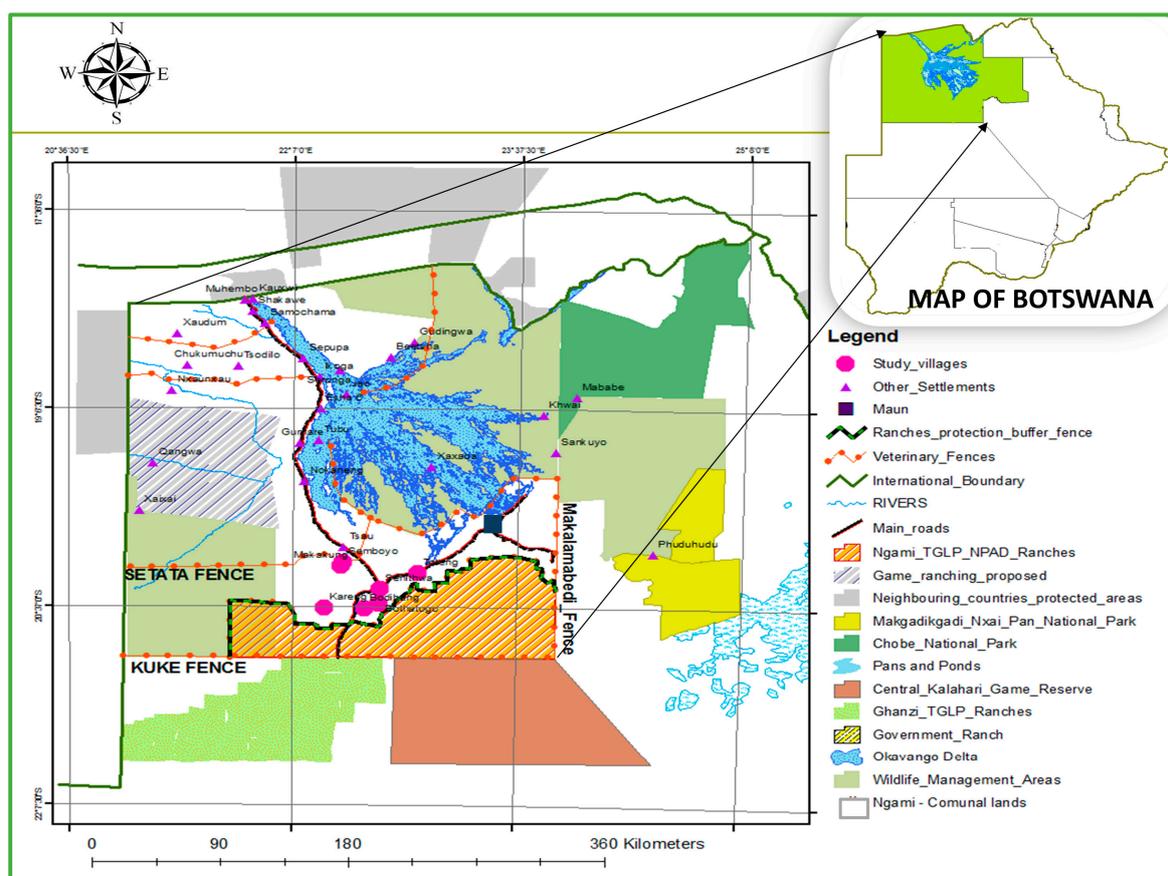


Figure 2. Map showing land use and tenure transformation in Ngamiland, Botswana; increased landscape fragmentation due to rangeland enclosures, privatisation and veterinary fences.

Table 2. Summary of key issues/themes that emerged from the systematic review and how the issues manifest in Ngamiland.

Key Issues That Emerged from the Wider Literature	Example from the Wider Literature in Sub-Saharan Africa	How Do These Issues Manifest in Ngamiland? Data from Semi-Structured Interviews (<i>n</i> = 97) & Except Interviews	Central Findings (Issues That Must Be Addressed in Order to Reconcile Pastoral Tenure Conflicts and Land Management in SSA)
A decline in land productivity—reduction in communal managed grazing, constriction in livestock mobility	Perkins [52]; Bassett [58]; Bennett et al. [29]; Basupi et al. [50]; Fernandez-Gimenez and Le Febre [59]; Benjaminsen et al. [28]; Rohde et al. [22]	77 (79.6% of respondents pointed to a decline in land productivity). Figure 1: continued land scape fragmentation, pastoralists squeezed between fences, livestock biomass indicates cattle concentration in the reduced communal area and around water resources	<p>Environmental impacts</p> <ul style="list-style-type: none"> • Little consideration of environmental dynamics during policy planning and implementation • Conversion of rangelands to other uses, including game ranches • Current tenure systems causing significant land use pressures and conflicts • Bush encroachment and invasion of alien species observed in communal lands together with some privatised ranches-congestion around water points <p>Social and Economic Impacts</p> <ul style="list-style-type: none"> • Lack of resources means majority of pastoralists were seen to be unable to use land effectively which resulted in their marginalisation and vulnerability • Countries have yet to reap any significant economic benefits from the process of tenure transformation • Loss of pastoral identity—gains from land privatisation remain mostly theoretical • Inequalities in access to communal lands as elites have taken over and control access
Increased inequality and social conflicts, breakdown of social networks and safety nets	Peters [60]; Lesorogol [61]; Thebaud and Batterbury [62]; Benjaminsen et al. [28]; Perkins [52]	51 (53.1%) Complex ranch allocation processes exclude poor communal area pastoralists [56]	<p>Social and economic impacts</p> <ul style="list-style-type: none"> • Little support and insecure property rights means opportunities are limited • Lack of political will to address pastoralists problems at marginal areas • Inadequate institutional, human and financial resources to build capacity at the local level • Increased labour costs as labour is reallocated to more productive pursuits
Limited coping mechanisms and adaptive capacity by pastoralist remaining in communal areas	Goldman and Riosmena [63], Greiner and Mwaka [64], Headey et al. [65], Herrero et al. [66]	33 (34.4%), Remoteness, lower levels of literacy, limited infrastructural development, limited access to resources and productive lands, inadequate policy support and lack of alternatives limits pastoralists adaptive capacity	<p>Environmental and social impacts</p> <ul style="list-style-type: none"> • Loss and fragmentation of habitats-land cover and wildlife declines • Decreased diversity of vegetation patches, increased pastoralists vulnerability • Change in behaviour and movement of wild animals, e.g., elephants • Human-wildlife conflicts • Changing patterns of livestock diseases <p>Implementation</p> <ul style="list-style-type: none"> • Community consultation only focused on the related benefits but very little on the perceived impacts • Pastoralists participation in local decision making lacking • Pastoral production system has been disrupted by the land privatisation and tenure systems
Wildlife management areas and traditional use of rangelands in conflict	Mulale et al. [67], Homewood [68], Western et al. [7], Basupi et al. [56]	63 (65.6%) Fences have bisected ungulates migratory corridors and fragmented habitats, increasing conflicts with bigger game especially elephants as fences have diverted elephants from their traditional migratory corridors into cattle posts and arable lands	<p>Implementation</p> <ul style="list-style-type: none"> • Weak institutions making implementations problematic, lack of enforcement of legislation remains commonplace leading to increased conflicts and resource degradation e.g., dual grazing by ranchers • Challenges of developing and implementing policies for people whose livelihoods depend on access to the remaining communal rangelands • Lack of integrated planning and coordination between sectors • Failure to communicate effectively with affected pastoral communities • Inability to enforce rights to grazing resources and competing claims and conflicts
Loss of critical common property management regimes-reduced coping mechanisms	Swallow and Bromley [69], Wily [70], Lesorogol [71]	65 (67.7%) Pastoralists have relinquished their control of the management of communal areas and they do not regard themselves as responsible	
Conflicting policy objectives, actors' priorities and inadequate resources to support policy implementation	Bennett et al. [72]; Toulmin [73]; Nelson and Agrawal [74]; Mulale et al. [67]. Bennett et al. [29], Adams [33]	31 (32.2%), Increasing demand for tourism land, Conversion of ranches to game farms, Figure 3. Encroachment of privatised areas in communal lands especially village grazing areas exacerbate land use competitions and conflicts	

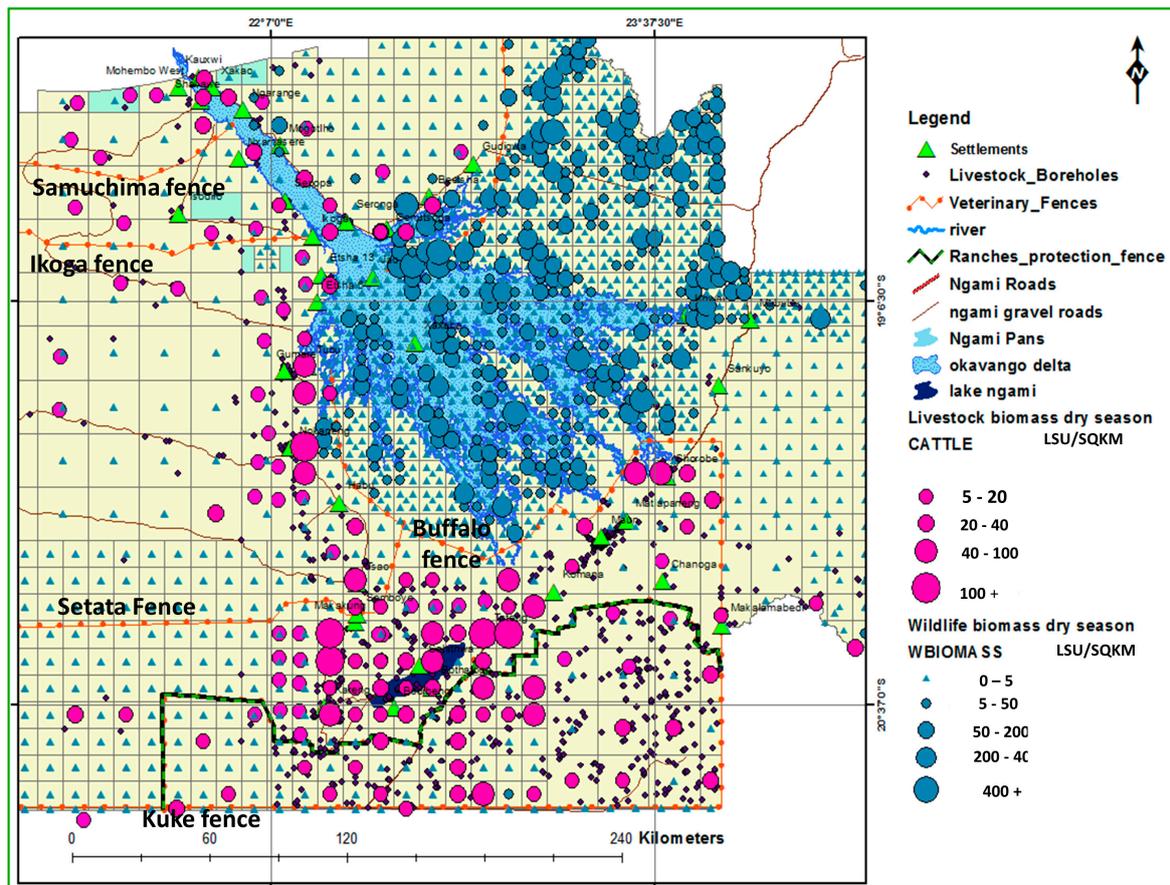


Figure 3. Dry season wildlife and livestock biomass in Ngamiland (based on wildlife aerial survey counts by the Department of Wildlife and National Parks)—livestock distribution pattern shows a high density in communal areas especially around water resources such as Lake Ngami.

3.3.1. Livestock Diseases, Pastoralists’ Vulnerability and Limited Adaptive Capacity

Pastoralists’ livelihoods are heavily dependent on the availability and access to natural resources [75]. In Ngamiland, respondents reflected on a stark decrease in availability of quality pastures, restricted access to traditional water resources, land use conflicts and livestock diseases. Pastoralists have in recent time’s experienced continuous and severe livestock disease outbreaks especially Foot and Mouth Disease (FMD) [55], at a time when communal management institutions and pastoral landscapes are least structured to cope with such crises. In Ngamiland, veterinary disease control fences have formed an integral part of the land use system and have led to increasingly fragmented parcels of land. Such zonal methods of disease control aim to prevent and contain disease outbreaks. These fences have since resulted in several kilometres of fences that aim to separate livestock from wildlife (particularly buffalo as carriers of FMD). Despite increasingly fragmented and fenced landscapes, the period since 2007 has seen the frequency and duration of FMD outbreaks increasing significantly [56]. This terminated beef exports from Ngamiland since 2007. This reality shows that existing disease control practices are failing in the face of constrained livestock mobility, diminishing communal lands and human-wildlife conflicts.

During the interviews, the overwhelming majority of households (73%) stated that a lack of cattle sales is making their lives difficult. The new pastoral environment where a complex sectorial based institutions are used to manage livestock and land resources is such that pastoralists have relinquished their control of the management of communal areas and they do not regard themselves as responsible which in turn has created a liability gap in communal resource management and fight against livestock diseases. Pastoralists do not believe themselves to be responsible for range management or fight against diseases instead blame the government departments for problems in communal areas. While a combination of external factors can also be attributed to the increase in livestock diseases such as climate change [76,77], respondents argued that the increasing vulnerability is a result of weakened coping mechanisms especially decreased mobility resulting from rangeland enclosures and concentration of livestock in reduced lands.

Virtually all the households interviewed (89%) stated that the need for alternative livelihood was increasing. As such, some households have diversified their activities into fishing, flood recession cultivation, wage labour and small businesses in the form of petty trade. The increase in petty trade and diversion into waged labour, including migration to towns, can benefit some pastoralists' households but it also leaves general pastoralism and care of livestock exposed as critical labour is lost. With a reduction in labour availability, many households struggled to round up their cattle for vaccination and some interviewed households reported that they now preferred to leave their cattle to roam unattended. This has contributed to a decline in the quality of herding practices and also increasing environmental stress around water resources and villages.

Under these semi-arid conditions, temporal and spatial fluctuations and the scale of the assessment are critical in assessing the impacts associated with rangeland and tenure transformation policies. It is evident that there are some serious ecological and land use pressures between the ranches and veterinary fences that arise from the current land use practices. This was revealed by studies using participatory research methods and GIS mapping techniques [50]. Out of these studies emerged maps that show the concentration of livestock activities between the ranches and the veterinary fence and around Lake Ngami. In Botswana, rangeland degradation is evident and spreading [78]. However, there are widely contrasting views as to its severity [51]. Some studies emphasizes that large tracts of the Kalahari sandveld are severely degraded, with indicators of declining productivity such as soil erosion, loss of vegetation cover, and a declining groundwater table evident in communal areas [79]. Others emphasize the localised nature of range degradation around livestock water points and settlements [52]. A recent drought (2016) killed more than 16,000 cattle in Ngamiland (according to the Ministry of Agriculture) of which 14,000 were in communal areas between the ranches protection fence and the Setata veterinary fence. This occurrence raises the fear that the depleted grazing pastures in these communal areas will not cope with increasing grazing pressures. Respondents acknowledged facing increasing resource depletion and indicated diminishing communal grazing land as the main cause. The resilience of this semi-arid rangeland system is being damaged, and if continuously stressed could lead to increased declines in ecosystem services such as production of grazing pastures, ground water recharge and carbon sequestration.

3.3.2. Conflicting Policies, Priorities and Implementation Gaps

Some 39% of the reviewed articles mentioned issues related to policy implementation as an issue in land tenure policies in SSA. It is argued that structural defects in how policies are formulated, especially policies formulated through external influence with limited involvement of local level structures fail to reflect the complexity and necessary flexibility of customary tenure arrangements.

In Ngamiland, pastoralists' perceptions reflected on government policy and their priorities including interactions with government officials in the management of land resources and fight against livestock diseases. Land use conflicts including those between traditional pastoral land rights, human-wildlife conflicts, livestock predation and crop losses were attributed to conflicts in policies and priority of actors. Demarcation of ranches and the provision of veterinary cordon disease control fencing were said to have exacerbated conflicts, particularly when the fence alignments have bisected key pastureland, wildlife habitats and movements, rather than strengthened existing land uses. These conflicts manifest themselves in encroachment of land uses such as settlements into arable land, arable into communal grazing lands, commercial ranching into communal grazing lands and grazing into wildlife areas. Land use competitions are a problem in that where they are left to market forces, essential land use perhaps with lower economic rent run the risk of being out-competed and relegated to less suitable areas. Expansion of competing land-uses has reduced the net availability of rangeland resources. Wildlife conflicts especially elephants are viewed as a permanent threat to pastoralism as they compete for available water resources, and also destroy veterinary fences that separate livestock from diseases carrying animals such as buffaloes. Some respondents (65%) blamed the elephants threats on blockage of ungulates migratory corridors by fences, especially where fences have bisected ungulates migratory corridors and fragmented habitats. The concern for pastoralists is that while wild animals are protected by national and international laws including enjoying long-term security in wildlife management areas, game farms, national parks and game reserves, pastoralists do not enjoy such security.

Both TGLP and NPAD represent policies whose poor results could be attributed to structural defects that characterised their formulation and implementation. Numerous reviews and studies associated with the TGLP shows that after more than three decades the policy has not yet realised its objectives, especially of reducing pressure on communal grazing land or promoting equality and incomes in the rural areas [50,51,57], with some arguing that the policy has reduced environmental and societal resilience to environmental variability [80]. The idea that there was ample empty land that could be reserved for future use was misleading [55]. During the planning phase of TGLP, Potential conflicts in accessibility to grazing resources between ranch owners and communal land dwellers were identified and a regulation was imposed to protect villages with a 20-km buffer zone within which no ranch would be allocated. This was done to prevent the ranches from encroaching into village grazing areas so as to reduce land use pressure and conflicts [35]. This was reiterated by the NPAD and subsequent feasibility studies which stated that to safeguard the interest of the poor households, the village grazing area should cover a radius of 20 km. However, with an emphasis on rangeland enclosures and commercialisation and without the use of a proper spatial technique to monitor the expansion of the demarcation of ranches the buffer zone was difficult to enforce and some ranches are now less than 10 km from the villages. Figure 4 shows some 20 km wide buffer zones generated around each study village using ArcGIS spatial analyst tools (buffering or proximity analysis) and encroachment of ranches into these buffer zones. With no proper monitoring mechanism, commercial ranches continued to encroach onto village grazing areas in spite of the TGLP's original emphasis on ensuring 'safeguards for the poor members of the population'. The encroachment has restricted livestock mobility and increased livestock congestion creating a zone of conflict and pressures between villages and the ranches leading to rangeland degradation.

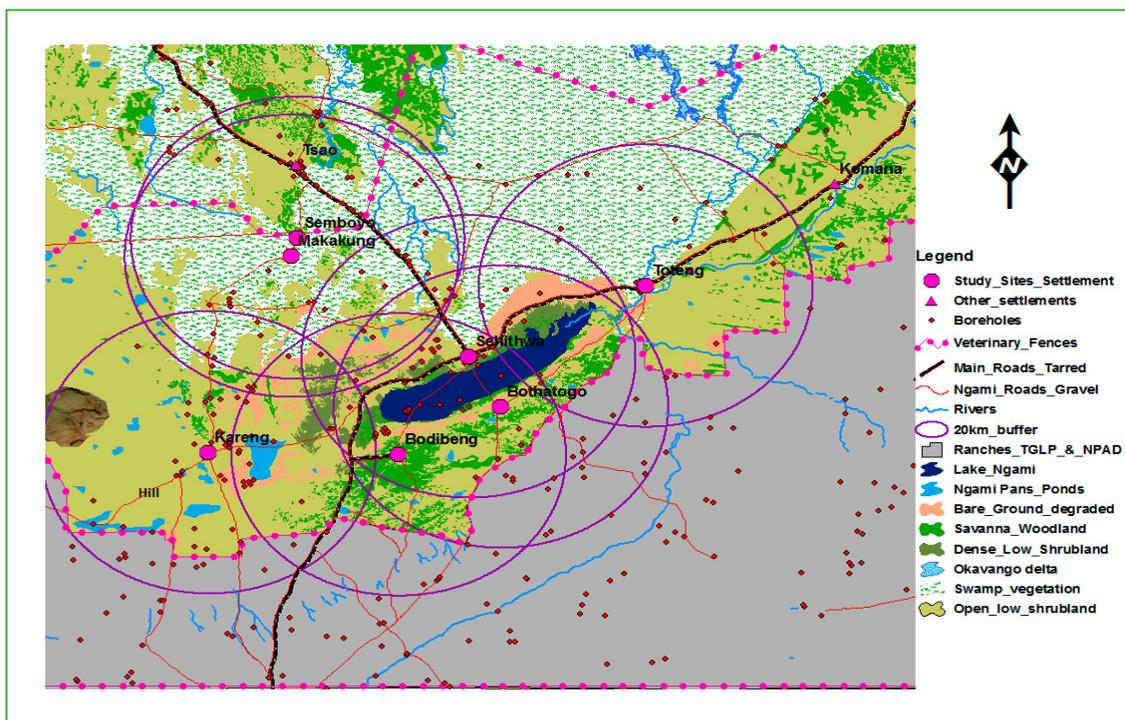


Figure 4. 20 km buffer zones around study villages and the encroachment of ranches in village grazing areas.

4. Conclusions and Recommendations

Our meta-analysis and case study both show that most land tenure transformation policies in pastoral areas have not yet yielded the intended benefits, with rangeland degradation remaining a significant problem. Most of these policies lacked a firm understanding of traditional sociological as well ecological basis of pastoral production systems. In most cases traditional management institutions have been disrupted and pastoralists are increasingly squeezed into smaller territories, so undermining livestock management systems of transhumance and coping mechanisms.

The paper contributes to the land tenure discourse by providing empirical evidence and comparative analysis to deepen our understanding of the challenges of land tenure transformation on pastoralism in SSA. Many of the issues identified in our case study relate to those identified in the systematic review. However, owing to its unique ecological and socio-cultural variation and abundant wildlife, the case study area presents new land management issues and challenges such as the uncontrollable livestock diseases especially FMD. Human-wildlife conflicts and the increasing demand for game ranches (including the conversion of some livestock ranches to game ranches) has introduced complexity in solving the land tenure problem. Control of diseases in the diminished and crowded communal lands has proved to be problematic despite efforts made through the creation of veterinary cordon fences and vaccination campaigns. As a result, markets are severely restricted putting pressure on communal pasture resources as there is no offtake. The complexities in resource management policies and stakeholder/actors interests and priorities also come to play.

Analysts agree that no one range management intervention can be recommended as a 'blanket solution' in pastoral areas, but rather adaptive management and flexible decision making through learning, stakeholder engagement and a bottom-up approach are necessary prerequisites for sustainability. Protecting pastoral land rights and migratory corridors requires deliberate policy interventions that recognises pastoralism as a productive and efficient use of resources. Land use planning should support and provide for economic mobility for pastoralists. The spatial relationship between local communities and the natural environment in which they make their living is often

poorly understood and misrepresented in rangeland policies. Geospatial technologies such as Geographic Information Systems (GIS) have the potential to become an information technology enabling decision makers in pastoral areas to sustainably plan and monitor pastoral regions and pastoralists spatiotemporal land rights [50]. Spatiotemporal land rights in this case entails pastoralists seasonal movements, distance that pastoralists travel and areas covered. Moreover, policymakers and government land managers need to reorient relationship with pastoralists so as to overcome anti-pastoral prejudice and focus on Sustainable Land Management goals in communal areas by establishing participatory negotiating and flexible frameworks that strengthen local communities' participation in decision-making arenas by working with pastoral communities on the basis of understanding their livelihood system. There is a need for an appropriate communication programme in pastoral areas where key stakeholders including those that represent pastoralists will share information about pastoral system functionality including mutual understanding of strategic choices for conservation and sustainable use.

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