

LAND COVER CHANGES, PROTECTED AREAS AND AGRO-PASTORAL CONFLICTS IN MENCHUM, NORTH WEST CAMEROON

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ABSTRACT: Agriculture, particularly crop cultivation and livestock farming are amongst the main activities sustaining the lives of a cross-section of rural people across the world. Whilst these are both important economic activities destined to coexist within the same geographical entity, the smooth functioning of this mixture has been weakened in the past decades across Sub-Saharan Africa. The competition for scarce land resources by farmers and mobile pastoralists is now creating a new wave of conflicts in and around protected areas. The new paradigm today across Africa is not only wildlife attacking farmers and livestock but rising depletion of biological resources linked to encroachment of protected areas by farmers and mobile pastoralists. The study sought to evaluate the contributions of land cover/use changes and changing land rights as a result of protected areas creation to the recurrent agro-pastoral conflicts in Menchum. In its research methods, the study used a spatial analysis approach including remote sensing data acquisition for land cover/use classification and GIS-based overlay analysis to visualise land cover/use dynamic zones and farmer-graziers conflict hotspots in the study area. The results showed that changing land cover/use and the carving of protected areas have partly contributed to the ceaseless land conflicts between farmers and graziers, graziers and graziers, as well as between farmers in the zone. This was very visible in the Wum-Esu-Subum farming-grazing triangle and in the north east of the newly carved Kimbi-Fungom National Park. Only a bottom-up conservation strategy can help conserve the rich biodiversity of the zone and partly reduce conflict recurrence and biodiversity loss in and around protected areas.

Keywords: Changing land cover and tenure rights, protected areas, agro-pastoral conflict hotspots, Menchum, Cameroon

I. INTRODUCTION

Worldwide, the economic importance of rangelands varies significantly according to the socio-economic system in which they are embedded (FAO, 2001). Pastoralism is the main livelihood of an estimated 268 million people (FAO, 2018). It represents one of the most viable – and sometimes the only suitable – livelihood options in the drylands (FAO, 2018). Recent estimates put the total number of pastoralists and agro-pastoralists worldwide at 120 million, of which 50 million reside in Sub-Saharan Africa (World Bank, 2014). In Africa and Central Asia, rangelands are essential to the subsistence of pastoralists, foragers and farmers who are dependent on rainfed crops (FAO, 2001). Across Sub-Saharan Africa, pastoralists face daunting challenges compounded by the vagaries of climate, animal disease, dwindling access to water resources and grazing lands, poor market infrastructure and lack of early warning systems for drought to name just a few (World Bank, 2014). Fulani pastoralists are widely distributed across West Africa and represent the largest migratory ethnic group in the world (Ducrottoy et al, 2018). While West African herders and farmers have long coexisted in symbiotic relationships that endure both peace and contentious engagements, reports of violent clashes between these two groups are becoming more frequent (Moritz, 2010). Increasing land use and associated competition for natural resources in the wake of high human and livestock population pressures have been major challenges confronting pastoralists of West Africa (Ducrottoy et al, 2018). The wave of farmer-herders conflicts is rising all across Africa and West Africa in particular. In Ivory Coast, violent intercommunal clashes in March 2016 between pastoralists and farmers in Bouna, in the northeast, left at least 27 people dead and thousands more

displaced (Nnoko-Mewanu, 2018). In Nigeria, violent clashes between herders and farmers is said to have resulted in the death of more than 1300 people. Increased frequency of violent conflict has been linked to intense pressures on land because of expansion of commercially cultivated areas, corporate mining activities, and competitive overuse of common resources, such as forests, pastoral rangelands, and water sources, exacerbated by climate change (Nnoko-Mewanu, 2018).

Pastoralists and wildlife have coexisted in African rangelands for hundreds of years (Selemani, 2014). Numerous protected areas (PAs) have been created in Africa to safeguard wildlife and other natural resources (Tranquilli et al, 2014). However, significant threats from anthropogenic activities and decline of wildlife populations persist, while conservation efforts in most PAs are still minimal (Tranquilli et al, 2014). The marginal lands that were previously the province of pastoralists are increasingly coming into focus as reserves of biodiversity (FAO, 2001). The advent of protected areas has become a real threat to the lives and livelihoods of mobile pastoralists in many parts of the world (Yilmaz, 2019). Historically, protected areas have been established as part of broader processes of expropriation of community lands, and have therefore been a flashpoint for conflict between conservation agencies and organizations and traditional peoples (Springer and Almeida, 2015). Of recent, there have been paradigm shifts on the functionality of protected areas across the globe as reiterated. This new paradigm is that of increasing participation of indigenous people in the exploitation and management of the protected areas. However, this new paradigm is not enhanced in most cases especially in developing countries. The failure to fully incorporate local communities in protected area management has intensified a wave of land conflicts across West Africa. Land reforms and changing land rights linked to the creation of protected areas, of which on the one hand helps to conserve the biodiversity and on the other reduces the communal rangeland and land for crop farming. The new paradigm has been a shift from human-wildlife conflicts to a trilogy of land use conflicts; conflicts between farmers and conservationists/park managers, between mobile and sedentary pastoralists and conservationists/park managers, and conflicts between farmers and graziers over scarce land resources and/or between pastoralists themselves over reduced rangeland. This situation has exacerbated the land degradation problem, biodiversity loss and will jeopardise the livelihood of a handful of rural communities dependent on rainfed agriculture and pastoralism. This has raised debates over biodiversity conservation concerns and the sustainability of agro-pastoral systems under changing climates and global economic shift. There is therefore the need to reconcile the three sectors; wildlife conservation, crop farming and pastoralism across Sub-Saharan Africa.

1.1. LAND CONFLICTS AND MANIFESTATIONS IN THE NORTH WEST REGION REVISITED

Conflicting claims over access to and ownership of land have led to interethnic conflicts and disputes that have a bearing on agricultural performances and aggravate the poverty situation of most communities in the North West Region (Amungwa, 2009). Many researchers have over time documented conflicts over land in the North West Region of Cameroon including (Ngwoh, 2006; Ndenecho & Balgah, 2007; Ngwa et al., 2007; Nkwi, 2007; Lambi et al., 2008; Amungwa, 2009; Lambi & Canute, 2009; Ndi, 2009; Suiven, 2009; Sone, 2012; Angwafo, 2014; Manu et al., 2014; Balgah & Zeh, 2016; Tellen et al., 2016; Kimengsi, 2017; Ngwoh, 2017; Ntangti et al., 2019). Balgah & Zeh (2016) assessed the recurrent land use conflicts within the Menchum Division. Among these conflicts, farmer-grazier conflicts have become perennial in the past decades and farmers are always found in the midst of court cases which at time do not favour them (Balgah & Zeh, 2016). Information on land use conflicts in North West Cameroon is replete in literature spanning from inter-village and intra-village skirmishes over land boundaries or limits to potential clashes within villages between the opposing farmers and the mobile pastoralists. This has transformed some areas of the long known Grassfields into conflict-ridden zones with paradigm shifts in conflict manifestations and recurrence between the different land users and competition over scarce land resources. The Grassfields have long been a zone of conflicting interest between mobile and sedentary pastoralists and the dominant arable farmers. Land conflicts are no new stories in the Menchum Division. Of recent, there have been momentous swings in the number of agro-pastoral clashes as quantified by (Ngwoh, 2006; Ngwa et al, 2007; Angwafo, 2014; Balgah & Zeh, 2016; Ngwoh, 2017; Kimengsi, 2017; Ntangti et al, 2019). There have been recent shifts to violent confrontations between the two opposing stakeholders at times resulting to dead. There have also been changes in the nature and type of the underlying causes responsible for such confrontations in the zone. The competition over scarce land resources is increasingly posing a challenge to agricultural activities in the Grassfields as farmers and herders struggle for land for cultivation and grazing practices respectively (Manu et al., 2014).

Despite the intensive documentation regarding farmer-graziers conflicts in the North West Region in general and Menchum Division in particular, little research has been focused on the impacts of land cover/use changes and changing tenure rights through the creation/demarcation of protected areas prohibiting farming and grazing on recurrent agro-pastoral conflicts. Studies on land use dynamics and agro-pastoral conflicts were done by Balgah & Zeh (2016) for the zone, but refined details as to how changing dimensions of land cover and tenure reforms (carving out of protected areas) have promoted land use clashes is still to be overemphasized upon. Land under public tenancy on the one hand occupies a significant portion of the study area designated as

protected areas, either as national parks (Kimbri-Fungom National Park) or forest reserves (Lake Benakuma, and Kom-Wum forest reserves) (Ntangti et al., 2019). This study seeks to sort the link that exists between such changing land cover/use and tenure rights (protected areas creation) and the recurrent nature of agro-pastoral conflicts within the zone.

1.1.1. LOCATION OF THE STUDY AREA

The study area lies between latitude 6°15'0" and 6°45'0" North and longitude 9°45'0" and 10°18'0" East. The natural environment of the area is varied and rich. Besides so many lakes of volcanic origin (Lakes Nyos, Kuk, Ilum, Benakuma, and Wum), the land cover is made up of montane and gallery forest, savanna woodland and grassland savanna with varied wildlife (Ntangti et al., 2019). Figure 1 shows the location of the study area.

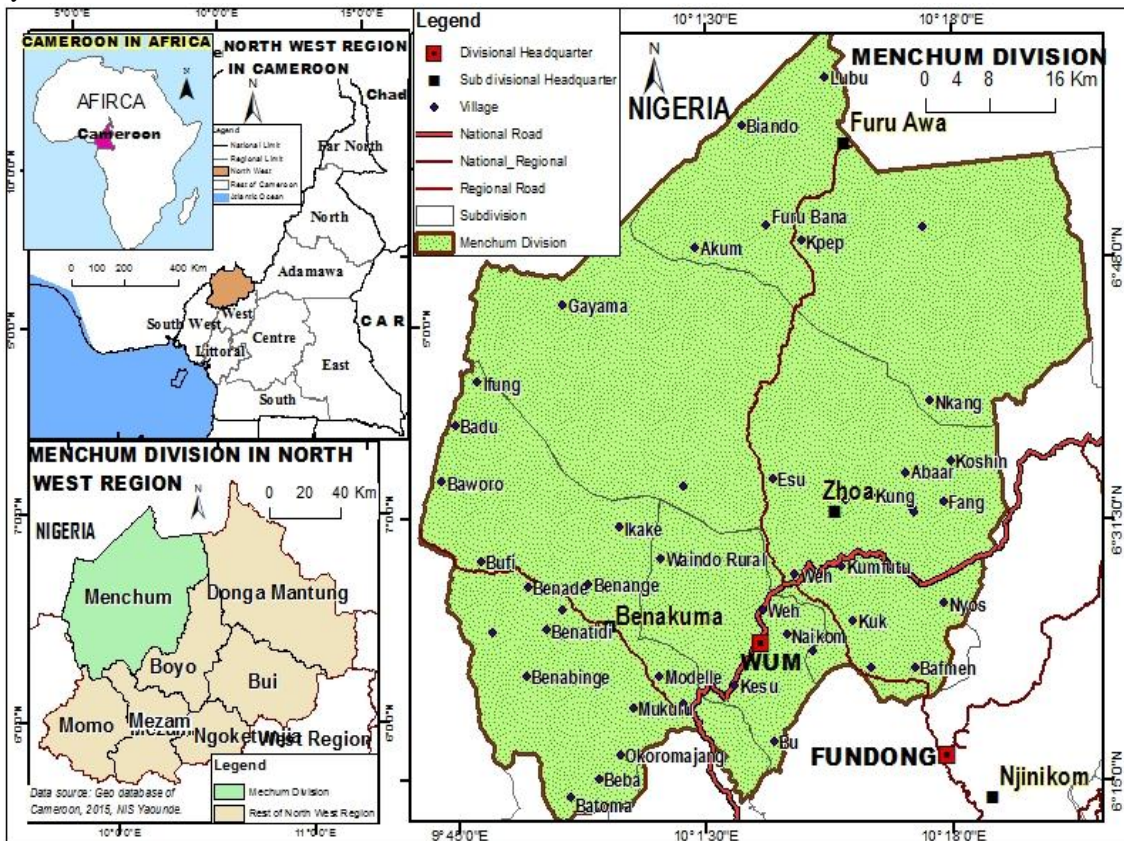


Fig. 1: The Location of the study area
Source: Ntangti et al (2019)

The indigenes live alongside the Fulani who are in majority sedentary. The population of the area as estimated by BUCREP (2005) census stood at 161998 inhabitants.

II. MATERIALS AND METHODS

The study adopted a three-fold methodology. Remote sensing and geospatial data acquisition, GIS-based overlay analysis and field inventory. Table 1 presents remote sensing data used in the study.

Table 1: Spectral remote sensing data used in the study

S/N	Spacecraft	Sensor	Cell size	Projection	Acquisition date	Acquisition source
1	LANDSAT 5	TM ¹	30m	UTM_Zone_32 N	1987	USGS
2	LANDSAT 7	ETM+ ²	30m	UTM_Zone_32 N	2003	USGS
3	LANDSAT 8	OLI_TIRS ³	30m	UTM_Zone_32 N	2017	USGS

¹Thematic mapper, ²Enhanced ²Thematic Mapper, ³Operational Land Imager_Thermal Infrared Sensor

Three image scenes were acquired from the Landsat Satellite Spacecraft Mission (Landsat 5, 7 and 8) for the periods of 1987, 2003 and 2017 respectively. These image scenes were later on stacked in a GIS environment to

create composite image for classification then later on mosaic to one composite image for each study period. In addition, spatial overlay analysis of geospatial data (classified satellite images, geo-referenced conflict villages and protected areas shape files (from WDPA¹, 2016) helped in the drawing of partial conclusion of the spatial pattern of agro-pastoral conflict manifestation in the zone (see figure 2). Previous research on the area and complimentary field observations permitted concrete generalisation on the GIS-based analysis.

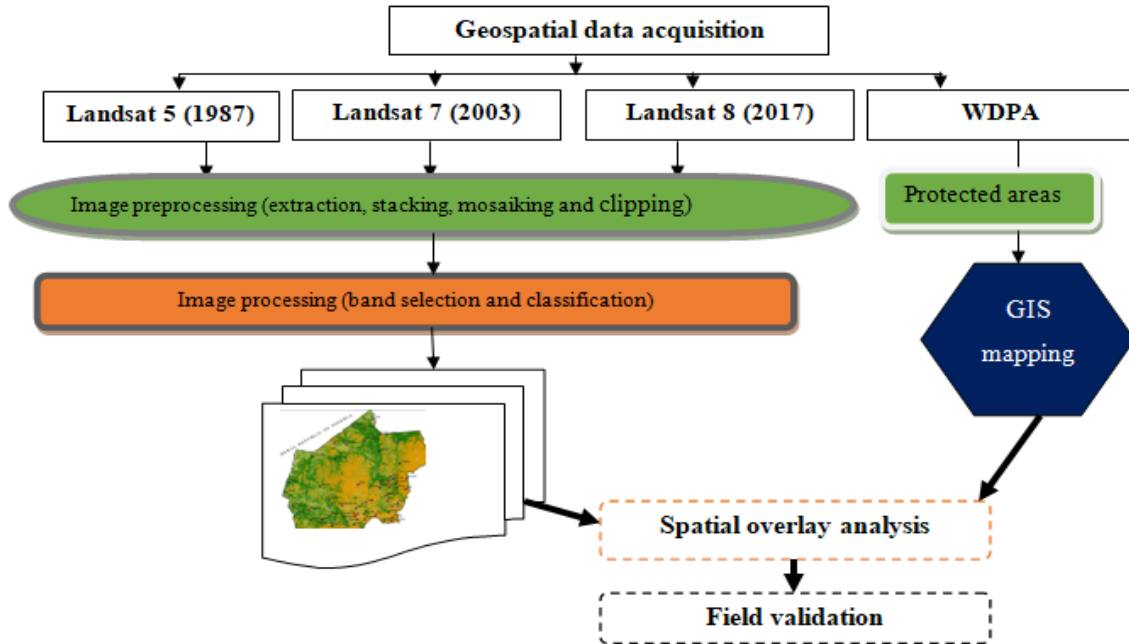


Figure 2: Flowchart of methodology of the study

Land cover/use classes were attributed during image classification based on ancillary data (topographic maps covering the area), previous research, historical and real-time Google Earth imageries and field observations. This permitted the identification of six (06) main land cover/use types with subclasses as in table 2.

Table 2: Land cover/use classification typology adopted in the study

Land cover/use types	Subclasses/description
Built-up area	Settlement: including paved surfaces and housing construction
Farmland	Agriculture: including spaces covered with seasonal and perennial crops and areas covered by paddy field like in the Menchum Valley.
Grassland	Savanna vegetation: including land covered with woody shrubs, sparse grass savanna, and open spaces with bare soils as a result of vegetation degradation by livestock.
Forest	Forest vegetation: including montane and gallery forest formations, forest remnants on the landscape, sacred forests and isolated tree formations.
Secondary forest	Degraded forest: forest savanna-mosaic, woodland and tree savanna derived from prolonged human intervention in the area through agriculture and settlement related activities
Water bodies	Surface hydrology: areas covered with surface water like lakes, rivers and marshy zones in the Menchum flooded valley

III. RESULTS AND DISCUSSIONS

3.1. LAND COVER/USE CHANGES AND AGRO-PASTORAL CONFLICTS

Over decades, there have been marked changes in land cover/use in Menchum. Post classification results of satellite imageries revealed six main types of land cover/use (built-up area, farmland, grassland, forest, secondary forest and water bodies). Tables 3 and 4 show detailed statistics of the classified Landsat satellite images.

Table 3: Land cover/use change statistics for Menchum

Land cover/use	1987		2003		2017	
	(ha)	%	(ha)	%	(ha)	%

¹ World Database of Protected Areas

Built-up	1804.55	0.40	2426.956	0.51	4797.965	1.05
Farmland	85570.28	18.84	71225.44	15.11	106037	23.27
Grassland	162148.5	35.70	229809	48.75	160793.9	35.28
Forest	203268.8	44.76	164907.2	35.15	100793.6	22.12
Secondary forest	-	-	-	-	74243.83	16.29
Water bodies	1344.39	0.30	2144.4	0.45	9042.2	1.98
Total	454136.5	100	454136.5	100	454136.5	100

Source: GIS-based estimations from classified Landsat images (2019)

Table 4: Land cover/use changes in Menchum from 1987-2017

Land cover/use	1987-2003	2003-2017
	%	%
Built-up	0.11	0.54
Farmland	-3.73	8.16
Grassland	13.05	-13.47
Forest	-9.61	-13.03
Secondary forest	-	-
Water bodies	0.15	1.53

Source: GIS-based estimations from classified Landsat images (2019)

The most dynamic land uses include grassland and farmland. These constitute the two most competing land uses in the area due to the predominance of farming and grazing as the main economic activities (figures 3, 4, and 5). Forest has long been converted to these two land uses. Forest cover shows a continuous decline from 44.76% (either 203268.8ha) to 22.12% (either 100793.6 ha) from 1987-2017 (tables 3 and 4 and figures 3, 4 and 5). This dynamic in grassland and farmland is also a reflection of the competition for land resources by farmers and graziers in the area. The Grassfields represent an area of arable farming and grazing often competed for by farmers and graziers of its scarce resources. This has intensified agro-pastoral clashes in most localities with limited land or restricted land for grazing and farming like in the localities of Wum, Esu and Furu Awa (figures 3, 4, 5, and 6).

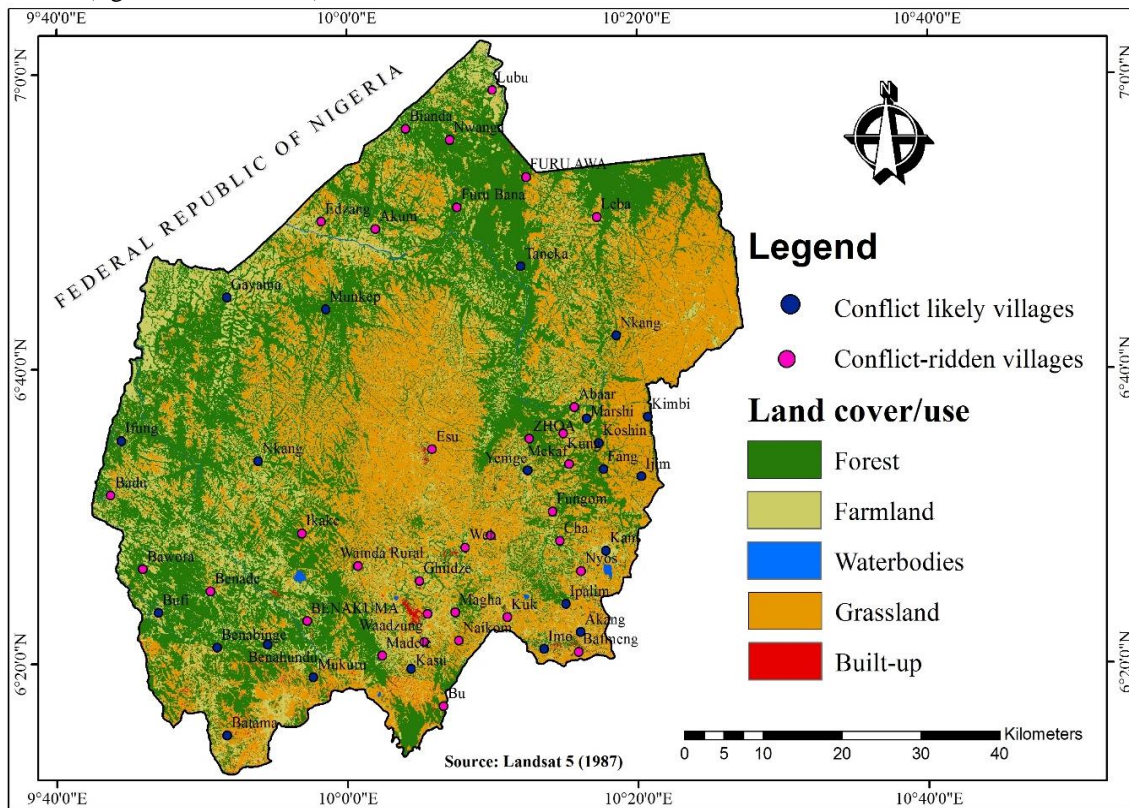


Figure 3: Land cover/use in 1987

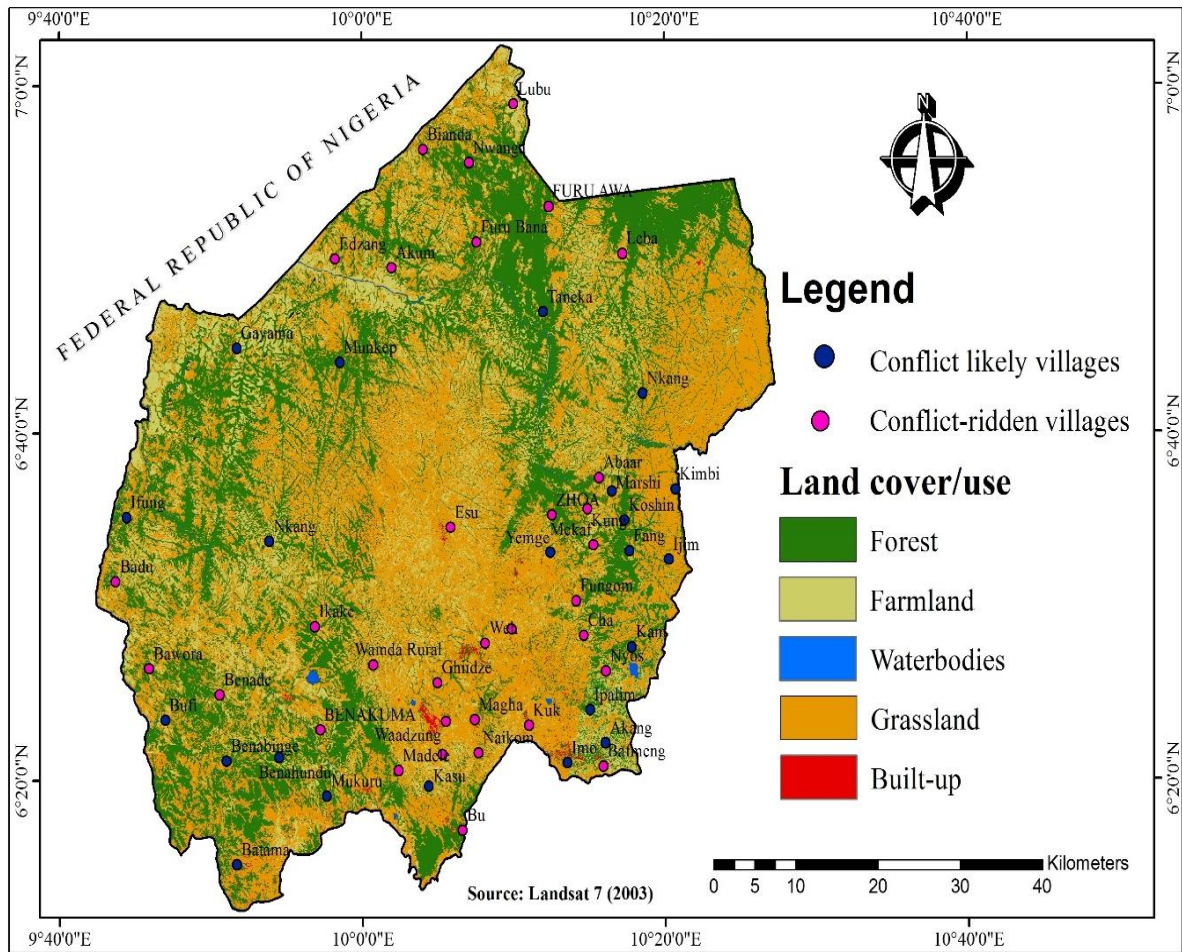


Figure 4: Land cover/use in 2003

Balgah & Zeh (2016) estimated that there are 123,000 cattle in Menchum and the number of farmer-grazier conflicts stood at 2521 and this has increased the damages caused by farmer-grazier conflicts (table 5).

Table 5: Recorded farmer-graziers conflicts and damages in Menchum (1982-2012)

Period	No. of conflict cases	Damages
1982-1984	680	About 320 farms destroyed, displaced about 240 farmers and about 78 cattle killed
1985-1987	840	Destruction of 450 bambara groundnut farms in Esu and displacement of 120 farmers, 101 in Weh, 320 in Mmen and 156 in Wum. 250 cattle mutilated, and about 230 goats and 200 pigs were killed
1988-1990	1051	Forceful displacement of 300 farmers in Esu, destruction of 890 maize farms in Fungom, 240 in Wum and killing of 254 cattle
1991-1993	1395	Countless maize farms, groundnut, cassava, potato and beans destroyed. 58 cattle killed
1994-1996	1397	Over 670 farms were damaged worth over 5 million Francs
1997-1999	1660	Destruction of 45 houses at the Ranch area hosting about 125 farmers, displacement of 200 farmers at Sangwa, 121 at Kedzong. Damages worth over 9 million FCFA
2000-2002	2010	Displacement of about 35 farmers at Torkisong, destroyed over 540 maize farms, 870 groundnut, beans bambara groundnut farms in Fungom, 640 in Wum and 43 in Menchum Valley
2003-2005	2104	Destruction of about 500 maize farms in Fungom, forced 75 farmers to abandon their farmsteads in Esu. Invasion of about 100 farms in Wum leading to a sit down strike. Displacement of 8 graziers in Wum. Damage estimated at 13 million Francs
2006-2008	1999	Invasion of 345 vegetable farms, 230 groundnut farms and 132 bambara groundnut farms
2009-2012	2521	Destruction of 689 maize farms in Fungom, invasion and displacement of 540 farmers in Wum, killing of about 750 cattle

Source: Balgah & Zeh (2016)

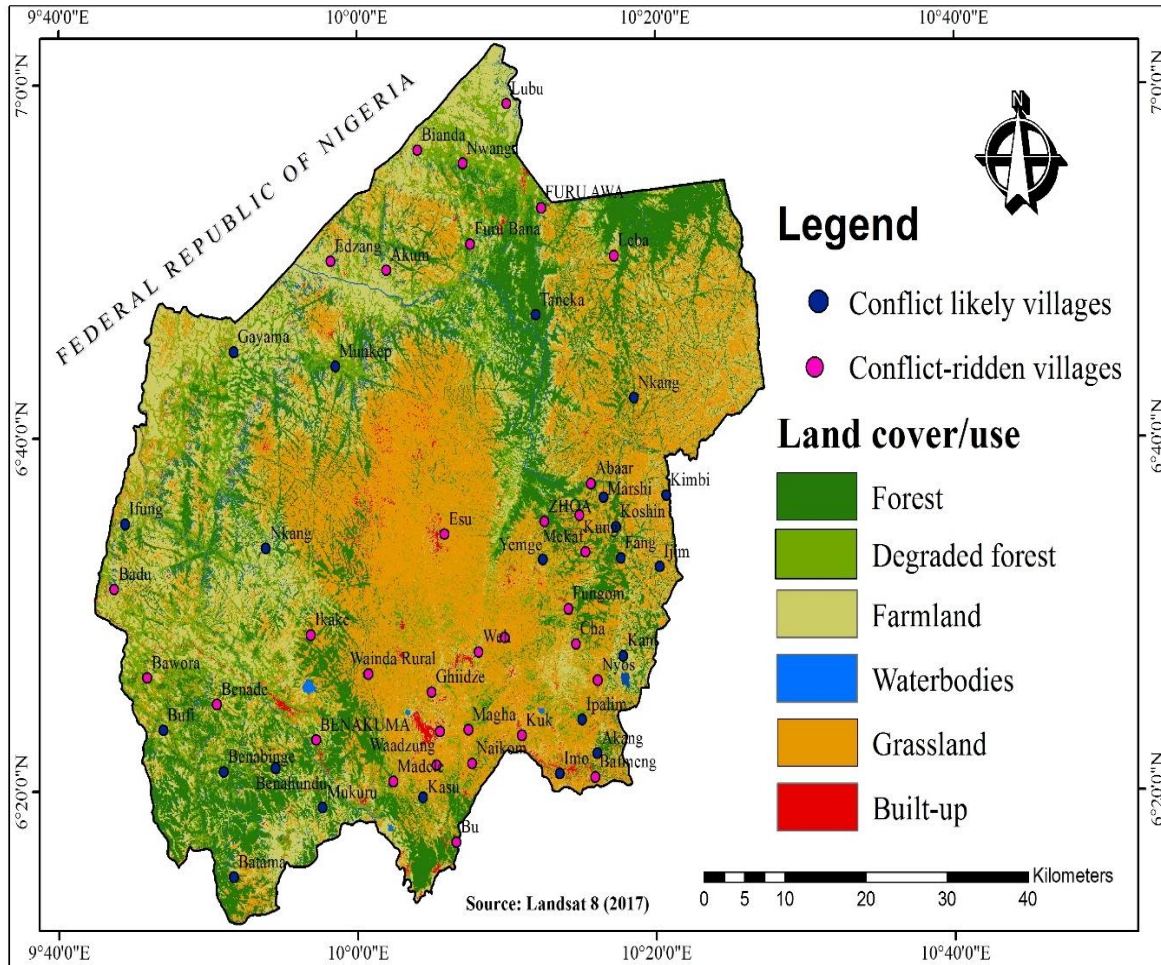


Figure 5: Land cover/use in 2017

Besides farmer-grazier conflicts, there is also increasing grazier-grazier conflicts within the area. This new wind of change has been exacerbated by the creation of the Elba Ranch in 1987 which led to increase restriction of community rangeland. The ranch occupied an estimated 10,000 hectares of land which was expropriated from earlier graziers and local cultivators (Balgah & Zeh, 2016). According to Balgah & Zeh (2016) resource depletion and the political set up of Menchum have called for the high frequency of conflicts. Besides the advancement of cattle grazing into arable farmland on the one hand, there is on the other hand the mutual encroachment into land by arable farmers (Kimengsi, 2017). In the quest for more grazing land especially at hollow frontiers (which provides a significant pull to livestock farmers), cattle often destroy crops along their routes (Kimengsi, 2017) leading to potential clashes between the competing stakeholders. A review of research findings by Ngwa et al (2007) show a time series analysis of conflict manifestations in some conflict hotspots of the zone spanning across 1966, 1973, 1981, 1988, 1993, 2003, 2005 with recorded conflicts at Esu (150), Wum (150), Wum (175), Esu (210), Esu (195), Wum (180) and Menchum Valley (1750) following the respective time series chronology. The eastern (Wum-Esu-Subum zone) and north western (Furu Awa) parts represent the main conflict hotspots in the area with dynamic land uses and changing tenure rights linked to the creation of protected areas (see figures 3, 4, 5, and 6). This is a reflection of land resource scarcity and encroachment to land resource frontiers or hollow zones by both farmers and graziers. Homer Dixon (1999; cited in Kimengsi, 2017) and Ndenecho & Balgah (2007; cited in Kimengsi, 2017) all emphasized the fact that pressure on natural resources, especially land that is finite, is a potential source of land degradation, land use intensification and fragmentation, marginalization of weaker segments of the population and migration and conflicts, which are very much evident in the North West Region.

3.2. PROTECTED AREAS AND AGRO-PASTORAL CONFLICTS

The government in a bid to conserve the rich biodiversity in the area has resorted to the creation of forest reserves and national parks. Though a welcome initiative to biodiversity conservation, its top-down approach has not contributed much to addressing the conflict situation of the area which remains unabated. It

has been estimated that areas designated as protected areas wrap up to 105973 hectares engulfing former rangelands and potential farming lands (figure 6 and table 6).

Table 6: Protected Areas in Menchum

S/N	Name	Description	Area (ha)	Creation date
1	Kimbi-Fungom	National park	95380 ^a	2015
2	Lake Benakuma	Forest reserve	2564 ^g	-
3	Kom-Wum	Forest reserve	8029 ^a	1951

^ais administrative surface area, ^gis GIS-based estimated surface area

Source: MINFOF² & WRI³ (2016)

Of these is the recently demarcated Kimbi-Fungom National Park, an extension of the Kimbi Game Reserve now covering 95380 ha of land in the Furu Awa and Fungom Subdivisions (figure 6). This has gone a long way to limit access to land resources by both graziers and farmers since such areas are often prohibited from exploitation thereby intensifying land use clashes (Ntangti et al., 2019). This situation is made worse by more restrictions to free grazing by mobile pastoralists imposed by the Elba Ranch in Esu midway the Kimbi-Fungom National Park and the Kom-Wum Forest Reserve. This partly explains why the Wum-Esu-Subum farming-grazing triangle has been conflict-ridden in the past decades (figure 6). It is against this backdrop that it is now clear that changing land cover and tenure rights is partly responsible for making the Menchum Division a conflict-ridden hotspot in the Grassfields.

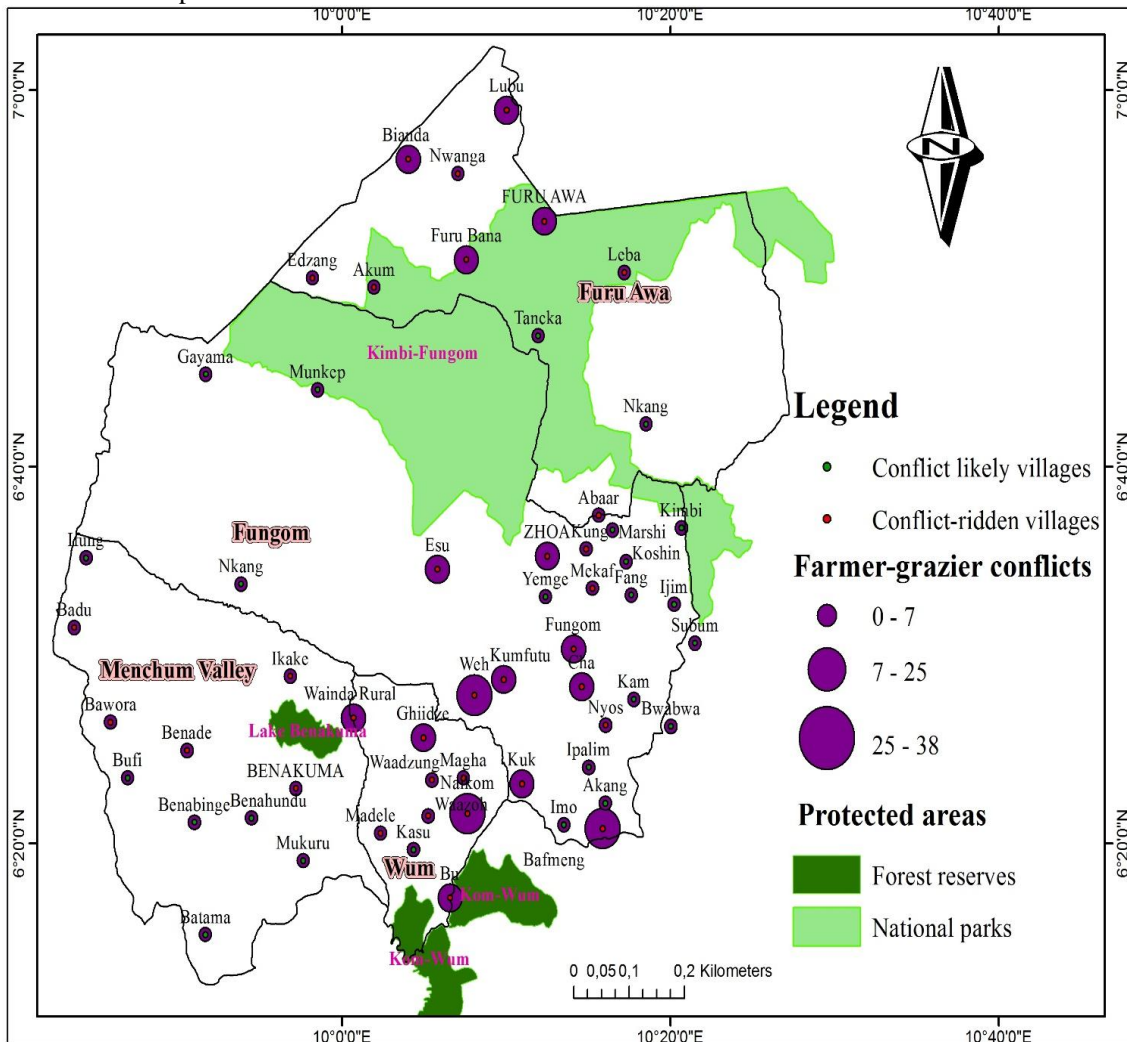


Figure 6: Protected areas and spatial distribution of agro-pastoral conflicts in Menchum

² Ministry of Forestry and Wildlife

³ World Resource Institute

It will be important for conservationist to adopt a tripartite approach to biological diversity conservation in dominantly grazed areas. This involves the incorporation of the three parties (farmers, pastoralists and wildlife) in conservation and park management planning. The failure to implement this approach has shown rising conflicts in and around protected areas across Africa. It is in this regards that Hall & Blench (undated) stipulated that protected areas will only be adequately conserved if the conflicting demands of environmental managers and the people who exploit the resources of the area are resolved. There are many examples in Africa of national parks and other protected areas being compromised through the existence or establishment of villages and cultivation within them, through incursions by hunters, and through more or less intensive exploitation by livestock owners (Hall & Blench, undated). Mbanga & Gonne (2013) pointed out that grazing in protected areas leads to the destruction of flora, to the destruction of the habitats of fauna, attacks on animals as well as the risk of transmission of diseases like malaria. These were also the views shared by Toutain et al (2004) for West Africa. Biru et al (2017) revealed that pastoral livestock share grazing areas and watering points with wildlife around the protected areas in Eastern Africa. This explains the rising demands for rangeland across Africa.

IV. CONCLUSIONS

Whatever the future of pastoralism, its present shape has evolved under pressure from very distinctive twentieth-century influences, making it impossible to return to some imagined golden era (FAO, 2001). Of the main factors identified by FAO (2001) to have shaped twentieth-century pastoralism, conservation lobby and encroachment on rangeland are amongst the greatest threats to the sustenance of this system. This has reduced rangeland for the pastoralists with their ever increasing herds and exacerbated violent clashes between herders and other land users. Evidence as to the future of pastoralism is generally discouraging; throughout Africa and the Near East, pastoralists are being driven into ever-more marginal areas through the gradual expansion of arable terrain (FAO, 2001). Violent intercommunal clashes between herders and farmers can be avoided if African governments recognise the complexities that exist in these conflicts and to remove barriers to accessing land for pastoralists without compromising the rights of farming communities (Nnoko-Mewanu, 2018). In Menchum, steps have been taken towards this direction following the creation of farmer-grazier conflict committee to address conflict situations between the opposing pastoralists and farmers, though much is still needed to completely beat out tensions and enhance harmony of these agricultural systems for peaceful coexistence.

REFERENCES

- [1] Angwafo, T. P. (2014). Contesting land and identity: the case of women cultivators and Fulani cattle herders in Wum, North West Region of Cameroon. M.A Thesis in African Studies, Leiden University.
- [2] Balgah, S. N., & Zeh, A. F. (2016). Land use dynamics and agro-pastoral conflicts in Menchum Division, Cameroon. *Landscape Architecture and Regional Planning, (1)1*, 1-12. doi: 10.11648/j.larp.20160101.11.
- [3] Biru, Y., Tessema, Z. K., & Urge M. (2017). Perception and attitude of pastoralists on livestock-wildlife interactions around Awash National Park, Ethiopia: implication for biodiversity conservation. *Ecological Processes, (6) 13*. doi.org/10.1186/s13717-017-0081-9.
- [4] BUCREP (2010). Répertoire actualisé des villages du Cameroun. Volume IV-Tome 7.
- [5] Ducrotoy, M. J., Majekodunmi, A.O., Shaw, A.P.M., Bagulo, H., Bertu, W. J., Gusi, A. M., Ocholi, R., & Welburn, S. C. (2018). Patterns of passage into protected areas: drivers and outcomes of Fulani immigration, settlement and integration into the Kachia Grazing Reserve, northwest Nigeria, *Pastoralism 8 (1)*. doi.org/10.1186/s13570-017-0105-1
- [6] FAO (2018). Pastoralism in Africa's drylands. Rome. 52 pp.
- [7] Hall, S., & Blench, R. (undated). Conflicts in protected areas in Africa: livestock and the conservation of the Rwenya wildlife management area, North East Zimbabwe. Agricultural Research and Extension Network paper 82.
- [8] Kimengsi, J.N. (2017). Developing a tri-phase model for land conflict resolution in some conflict-ridden parts of the North West Region of Cameroon. In Tukumbi L-K (Ed), Land reforms and natural resource conflicts in Africa: new development paradigms in the era of global liberalization, 1st edition, pp. 160-190. *Routledge African Studies*,
- [9] Lambi, C. M. (2001). 'The impact of human activity on land degradation in some highland regions of cameroon: implications for development,' in C. M. Lambi (Ed.), *Environmental Issues: Problems and Prospects*. Bamenda: Unique Printers.
- [10] Lambi, C. M., & Canute A. N. (2009). 'Conflictual wetland utilisation in ngoketunjia division, the upper nun valley of cameroon,' proceedings of the second post graduate seminar on conflict prevention management and resolution Faculty of Social and Management Sciences, University of Buea, Cameroon.

- [11] Lambi, C. M., Ndenecho, E.N., & Yenshu, E. V. (2008). Environment and intercommunity conflict in the north west province of cameroon. *Journal of Applied Social Sciences*, (7), 1.
- [12] Manu, I.N., Bime, M-J., Fon, D.E., Ajaga, N. (2014). Effects of farmer-grazer conflicts on rural development: a socio-economic analysis. *Scholarly Journal of Agricultural Science*, 4 (3), 113-120.
- [13] Manu, I.N. (2008). The Effects of farmer-grazer conflicts on rural development in Mezam division in the North-West Region, Cameroon. Ph.D Dissertation, University of Calabar-Nigeria.
- [14] Mbanga, L. A., & Gonne, B. (2013). Rethinking biodiversity conservation strategies: an analysis of transhumance and grazing in the Benue, Faro, Bouba Ndjidda Complex, (FBBNC) in the North region of Cameroon. *Annals of the Faculty of Arts, Letters and Social Sciences* 15 (1), 246-292.
- [15] MINFOF & WRI. (2016). Interactive Forest Atlas of Cameroon.
- [16] Moritz, M. (2010). Understanding herder-farmer conflicts in West Africa: outline of a processual approach. *Human Organization*, (69), 2, pp. 138-148.
- [17] Ndenecho, E. N., & Balgah, S.N. (2007). The Population-Resource Scarcity and Conflict Trinity, North West Cameroon. Bamenda: Unique Printers.
- [18] Ndi, H. N. (2009). 'Economic and political conflicts in water resource management in the Nkambe municipality, North West Region of Cameroon.' Proceedings of the second post graduate seminar on conflict prevention, management & resolution, University of Buea, Cameroon.
- [19] Ngwa, C. A., Ngalim A. N., Kum V. (2007). Farmer-grazier crises and conflict resolution in Menchum Division of the North West Province of Cameroon. *Journal of Applied Social Sciences*, 6 (1-2).
- [20] Ngwoh, K.V. (2017). Cameroon: Endemic agro-pastoral conflicts in Menchum. *Conflict Studies Quarterly Issue* 19, 23-42.
- [21] Ngwoh, V. K. (2006). 'Farmer-grazier conflicts in Menchum Division, 1943-2005: A study of contested hegemony over land,' MA thesis, University of Buea, Cameroon.
- [22] Nkwi, W. G. (2007). Boundary conflicts in Africa: A case study of Bambili and Babanki-Tungoh (North West Province of Cameroon), c. 1950-1995). *Journal of Applied Social Sciences*, 6 (1-2), 6-41.
- [23] Nnoko-Mewanu, J. (2018). Farmer-herder conflicts on the rise in Africa. <https://www.hrw.org/news/2018/08/06/farmer-herder-conflicts-rise-africa>.
- [24] Ntangti, F. C., Angwafo, E. T., Gam, A.T., Fokeng M. R. (2019). Spatial, typology and cause-effect analysis of recurrent agro-pastoral conflicts in Menchum, North West Cameroon. *International Journal of Research and Innovation in Social Science (IJRISS) III, VI*, 217-226.
- [25] Selemani, S.I. (2014). Communal rangelands management and challenges underpinning pastoral mobility in Tanzania: a review. *Livestock Research for Rural Development* 26 (5).
- [26] Sone, M.P. (2012). Conflict over land ownership: the case of farmers and cattle grazers in the Northwest Region of Cameroon.
- [27] Springer, J., Almeida F. (2015). Protected areas and the land rights of indigenous peoples and local communities. Current issues and future agenda.
- [28] Suiven, J.P.T. (2009). Incompatible land uses: a source of conflict at the watershed scale on the Bui Plateau, North West Region of Cameroon. Proceedings of the second post graduate seminar on conflict prevention management and resolution, University of Buea, Cameroon.
- [29] Tellen, A.V., Anchang, A.J., Shu, M. (2016). Conflict over land and pasture in the Northwest Cameroon: Listening to the voices of farmers and graziers.
- [30] Toutain, B., De Visscher, M-N., Dulieu, D. (2004). Pastoralism and protected areas: lessons learned from Western Africa. *Human Dimensions of Wildlife*, 9:4, 287-295. doi: [10.1080/108071200490505963](https://doi.org/10.1080/108071200490505963).
- [31] Tranquilli, S., Abedi-Lartey, M., Abernethy, K., Amsini, F., Asamoah, A., et al. (2014). Protected areas in Tropical Africa: assessing threats and conservation activities. *PLoS ONE* 9(12):e114154. doi:10.1371/journal.pone.0114154.
- [32] WDPA (2016). Protected areas shape files for Cameroon. Available at www.protectedplanet.net
- [33] World Bank (2014). World Bank Boosts Support for Pastoralists in Horn of Africa. [https://www.worldbank.org/en/news/press-release/2014/03/18/world-bank-pastoralists-horn africa](https://www.worldbank.org/en/news/press-release/2014/03/18/world-bank-pastoralists-horn-africa). accessed on 16th August 2018
- [34] Yilmaz, E., Zogib, L., Urivelarrea, P., Semiha, D. Ç. (2019). Mobile pastoralism and protected areas: conflict, collaboration and connectivity. *International Journal of Protected Areas and Conservation (Parks)* 25.1.