

## CONFLICTS AND ENVIRONMENTAL PROBLEMS AFFECTING CATTLE GRAZING AND THEIR MANAGEMENT STRATEGIES IN NONI SUB-DIVISION, CAMEROON

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**Abstract:** *Cattle grazing is an invaluable economic activity in the Western Highland of Cameroon and Noni-Sub Division in particular. The activity is a source of revenue, livelihood, organic manure and employment of many people in Noni Sub-Division (NSD). Unfortunately, this important economic activity is plagued by conflicts and environmental problems. The aim of this study was to investigate, evaluate, and improve on strategies that have been put in place to ensure the sustainability of this activity in the area. The methodology used to collect data was based on qualitative and quantitative techniques. Primary data were gotten through field observation, administration of questionnaires, focus group discussion and interviews. A total of 134 questionnaires were administered amongst 1000 stakeholders; graziers, crops farmers and administrators in NSD in 2019. Secondary data on the other hand were collected from published and unpublished documents and internet sources. The findings of this study revealed that the main problems affecting cattle grazing in NSD are farmer-grazier conflicts, destruction of vegetation, soil erosion and water pollution. It was also revealed that agro-pastoral commission and judiciary means are the main ways of resolving conflicts. The environmental problems have been given less attention. This study recommends the empowerment of the agro-pastoral commission, dialogue platforms, creation of forest reserves and agro-sylvo-pastoralism.*

**Key words:** *cattle grazing; farmer-grazier conflict; environmental problems; agro-pastoral commission; dialogue platform; agro-sylvo-pastoralism.*

### 1. Introduction

Cattle grazing is an emerging economic activity that has sustained livelihoods of pastoralists in several parts of the world (Nkwemoh *et al*, 2017). It is a major economic activity in Fulani communities in West, North and North East Africa (Abiola *et al*, 2005). Cattle grazing are practiced mostly in grassland regions of the world. Grazing is a method of feeding in which livestock such as cattle; sheep, goats and horses feed on grasses. This activity serves as a source of revenue to the graziers, local governments, employment and poverty reduction.

In Cameroon, cattle grazing are mainly practiced in the Far North, North, Adamawa, West and North West Regions. The grazing is dominated by the Fulanis that use semi-pastoral nomadism and transhumance as main methods of grazing. Graziers generally move around daily in search of pasture and water. In some cases, there is organized seasonal movement of graziers with cattle from one ecological zone to another and back. Extensive grazing and rapid population growth have led to conflicts in the Diamare Division and around the Lake Chad (Dongmo 2009). In the Western Highlands of Cameroon, the Ndop plain, Noun Valley, and Mbaw plain are target areas during the dry season transhumance. These movements are often accompanied by problems such as cattle straying into crop farms leading to conflicts with crop farmers. Extensive grazing and rapid population growth have led to conflicts in the Savanna areas of the West, North West and South West Region of Cameroon (Ojuku, 2017).

In Noni Sub-Division, cattle grazing has been practiced mainly by Fulanis while the indigenes concentrated on crop cultivation. However, today, cattle grazing has gained more grounds in the area attracting many residents of the area to be actively involved. This is due to the economic value of the activity. As many people get involved in cattle grazing, the numbers of conflicts have been increasing. Besides conflicts, poor grazing methods characterized by rampant burning and encroachment into water catchment areas have exacerbated environmental problems in NSD. Forest is being replaced by grass, water source are polluted while accelerated soil erosion is increasing. The increasing trend of these problems in NSD thus justifies the need for this study. This study holds that there are problems plaguing cattle grazing in NSD which are poorly managed. The aim of this study is to evaluate the existing mitigating measures to these problems and make recommendations based on field data in order to ensure sustainability of this activity in the area.

## 2. Regional Setting

Noni Sub-Division is located in Bui Division, North West Region of Cameroon. Noni is situated between Latitudes 6°38' and 6°48' North of the Equator and Longitudes 10° 49' and 10° 69' East of the Greenwich Meridian. The relief of the area is characterised by a configuration of highlands and lowlands. There are plains, deeply grooved valleys and rolling hills, giving a distinctive relief feature to the area, interrupted by highlands. There are areas as high as 2400 meters around the Nyuyi hill in Dom village, and as low as 1160 meters above sea level around Bamti and Mii area. Noni falls under the tropical climate domain of the Aw type on Koppen's classification. This climate is characterised by dry and rainy season within a year. The dry season runs from October to March and is characterised by high temperatures and dusty conditions, a major trademark of the North East Trade Winds. The rainy season begins from March and ends in October with its peak periods in July and August. It is characterised by low temperature and moist conditions, a peculiarity of the South East Trade Winds that is associated with rainy season. Besides these, the hydrology of the area reveals that Noni has large water sheds such as Bui-Mbim, Kilum and Ijim Mountain ranges. Some rivers in the area include River Mbem, River Mii, River Chau-Chau, River Kiwawah, River Ntaan, River Mii, River Montfui and River Sunka. These rivers flow and empty into River Kimbi. Furthermore, the relief, climate and hydrology of the area has favoured the growth of Montane, Sub-montane forest and domesticated sub-montane vegetation types. The montane forest has tree species namely; *Prunus Africana (pygeum)*, *Nuxia congesta*, *Schefflera*, *Maesa Lanceolata* and *Guidia glauca*. The domesticated sub-montane landscape, which now looks like grassland, is occupied mainly by herders for the rearing of cattle, sheep, goats and horses. This landscape gives a beautiful green touristic view during the rainy seasons. Noni is inhabited by an estimated population of 63487 who are mainly peasant farmers, (Nkor Council Development Plan, 2012). Given an annual population growth rate of about 2.5%, the population of Noni Sub-Division is projected at about 77,700 inhabitants in 2020. The population is composed of two sets of races; the native of Tikari origin that carryout subsistence arable farming and little cattle grazing. The second group is Mbororos of Aku origin that migrated into the area from Adamawa and Nigeria. Their main economic activity is extensive subsistence cattle grazing. The Mbororos and natives rear Bunaji and Zebu cattle type.

### **3. Methodology**

A detailed qualitative and quantitative method was used to collect data from graziers, farmers, and the administration from June 2017 to August 2020. This data was on the motives and how cattle grazing is carried out, the challenges faced, and possible solutions. This data was collected through use of questionnaires, interviews, observation, snap shots and compilation of statistics from relevant offices over the years. The interviews and questionnaires were administered based on systematic random sampling approach with interest being on experience gain on the theme of this study. Out of the six villages in Noni NSD, 134 questionnaires were administered structured into sub themes. Data was analyzed using Statistical Package for Social Science 17.0 (SPSS) Widows version by Center for Disease Control Atlanta (CDCA), Georgia, U.S.A. Descriptive statistics was used to summarize participant socio-demographic and other categorical data for continues variable and percentages. In order to assess the changes in the landscape of NSD over the years, satellite images of the area for the year 2000 and 2019 were obtained from United States Geologic System using the website [www.usgs.com](http://www.usgs.com). The principal software used in treatment of satellite images were ERDAS IMAGINE 2014 and ARCGIS 10.2.1. The images were each clipped to correspond to their areas of interest. This was followed by a supervised and an unsupervised classification. Four groups of clusters were created from each Land Sat Image. This was followed by field work to verify the characteristics of the features with respect to ground reality. Based on the characteristics of these features, a supervised classification was carried out using a false colour composition of the images into four classes of interest in terms of land cover and land use variability. This was done by selecting training sites with respect to different land use elements. The results of classification were later exported to ArcGIS 10.2.1 for treatment. This was followed by the calculation of surface areas of these land uses to produce maps and graphs.

### **4. Findings and Discussion**

#### **4.1. Findings**

The study revealed that there are social and environmental problems affecting cattle grazing in Noni Sub-Division. The main social problem found in the field is farmer-grazier conflicts. The conflicts are caused by a number of circumstances with many resulting consequences. The main environmental problem found in the area is destruction of vegetation, soil erosion and destruction of water sources for domestic use. The study also revealed that cattle rearing stakeholders such as the graziers, farmers, traditional rulers, Nkor Council the Divisional Officer use three major ways of solving farmer-grazier conflicts and few strategies in handling environmental problems. The three ways include use of agro-pastoral commission, traditional and judiciary means.

#### **4.2. Discussion of the Findings**

Farmer-grazier conflict is the main social problem affecting cattle grazing NSD. The agro-pastoral commission registers at least 400 cases annually (table 1). Farmer-grazier conflicts are characterized by violence, abuses, threats, power wrangling, mistrust, accusation and counter accusation, and antagonism. Farmer-grazier conflicts emanate from a number of sources and have led to several consequences on the population and disputing parties. The hot-spots of farmer-grazier conflicts are: Chaw, Enkowe, Karatu, Mii, Mukeiye, Chinin and the Mbinon area, (figure 1). It can be observed on figure 1 that Lassin, Mbinon, Dom-Djottin, Din, Karatu and Enkowe are

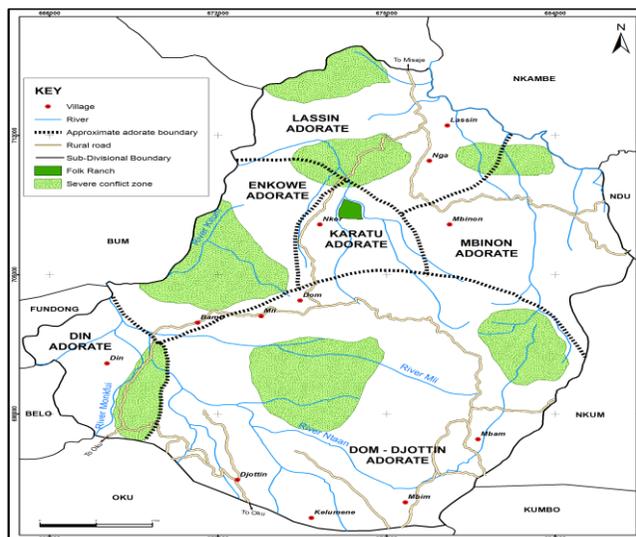
Adorates in which cattle are grazed. These Adorates coincide with the major areas of farmer-grazier conflicts in Noni. It should be noted that most of the Adorates have rivers which are at their lower stages. The banks of these rivers such as River Ntaan in the Dom-Djottin Adorate and River Monkfui in the Din Adorate are target zones in the dry season by graziers during transhumance. There are crop farms around these rivers. Cattle are at times directed to the banks of these rivers while crop farmers have not yet harvested their crop. The destruction of crops by cattle in these areas partly explains why farmer-grazier conflicts are common in the Adorates.

**Table 1: Farmer-Grazier conflict situation in NSD**

Year	Number of conflicts	Percentage (%)
2008	492	12.29
2009	481	12.02
2010	499	12.47
2011	415	10.37
2012	433	10.82
2013	439	10.97
2014	426	10.64
2015	401	10.02
2016	417	10.42
Total	4,003	100

Source: Compiled in DO's office, Nkor, 2018

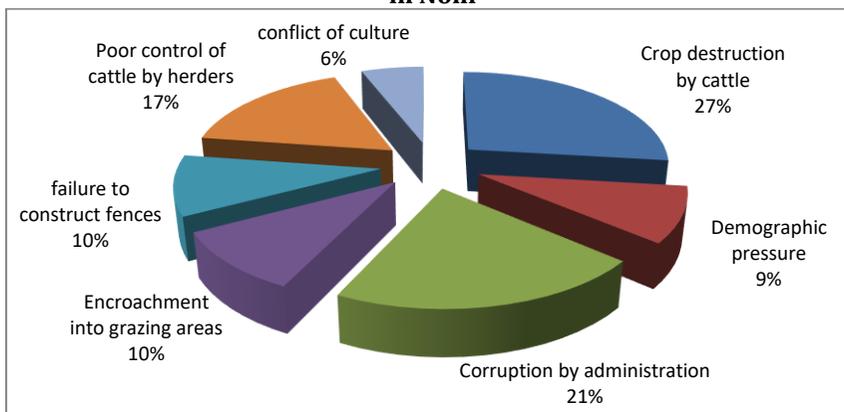
**Figure 1: Adorates and farmer-grazier conflicts areas in Noni Sub-Division**



Source: National Institute of Cartography/field survey November 2019

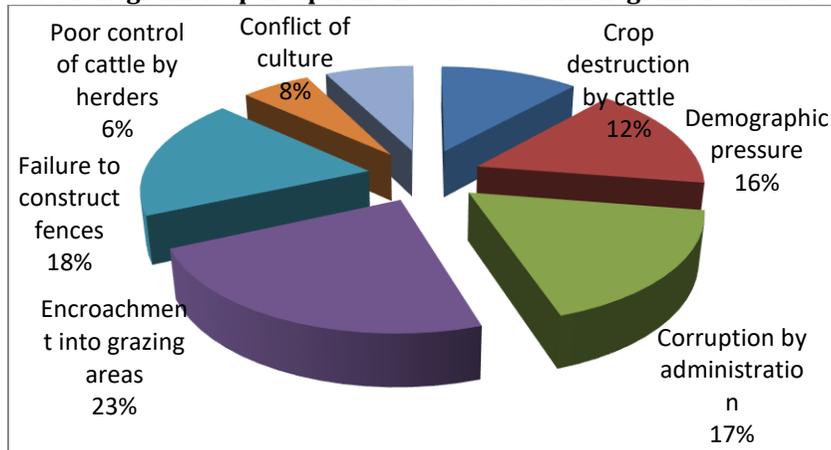
Causes of farmer-grazier conflicts in Noni abound but weighted differently by arable farmers cattle graziers. The causes include; crop destruction by cattle, encroachment into grazing areas by crop farmers, corruption by administration and demographic pressure just to name a few. These causes are seen on figures 2 and 3 based on perception of crop farmers and graziers. It can be observed on figure 2 that crop destruction and corruption by the administration are the major causes of farmer-grazier conflicts in Noni according to the crop farmers. The crop farmers consider crop destruction as the main reason because about 95% of population of this area are peasant farmers. The crops are not only a source of food but the main source of income to arable farmers in Noni. Crop destruction by cattle is thus considered as an attempt to destroy the main source of livelihood. Faced with crop destruction, the crop farmers often seek the intervention of the administration led by the DO for compensation and long lasting solutions. However, crop farmers are often frustrated by high corruption within the Agro-Pastoral Commission. Over 80% of crop farmers interviewed during field investigation revealed that they do not have confidence in the Commission due to corruption. As a result of this, crop farmers prefer other channels of solving farmer-grazier conflicts.

**Figure 2: Arable farmers' perception on causes of farmer-grazier conflicts in Noni**



Source: Field work, 2019

On the other hand, graziers weight the causes of farmer-grazier conflicts in Noni different. It can be observed on figure 3 that the main causes of farmer-grazier conflicts according to cattle graziers include encroachment by crop farmers into grazing zones, failure to construct fences by crop farmers who cultivate crops near grazing zones, corruption and demographic pressure due to rapid growth of population in Noni leading to scarcity of land.

**Figure 3: Cattle graziers' perception on causes of farmer-grazier conflicts in Noni**

Source: Field work, 2019

Farmer-grazier conflicts have led to a fall in income of graziers and crop farmers, food insecurity due to crop destruction, insecurity due to mistrust between graziers and crop farmers, force displacement of graziers out of Noni to more favourable grazing areas such as Dumbo and poor quality of cattle grazed in Noni and in some cases deaths of graziers or crop farmers are registered. This was the case in Mngongheli, a locality in Din in which a crop farmer was beaten to death by graziers in 2008. The problem degenerated leading to displacement of several graziers from the locality for their safety.

Cattle grazing has led to the destruction of vegetation in Noni. The forest cover in Noni has reduced due to grazing. Forest is being replaced by savanna vegetation in several areas as a result of rampant use of fire to regenerate pasture and ticks eradication. As the pasture dries in hilly areas in the dry season, the graziers migrate in search of fresh pasture in the valleys. This down-hill movement into the valleys in the dry season is accompanied by burning of grass on the hills in preparation for the first rains to regenerate pasture. Sometimes fire extends into areas covered by tree vegetation. The forest in Mbinon has been reduced to less than half of its original surface area especially due to rampant bush fire by graziers and encroaching arable farmers, CDP (2012). The vegetation is burned yearly for grazing. Hilly areas that were previously covered by tree vegetation are today covered by savannah vegetation. Remnants of tree vegetation are found mostly in the valleys today where the impact of bush fire is minimal. The traces of tree vegetation dotted on the hilly areas today are fire resistant trees, see plate 1.

Destruction of vegetation is also linked to demand for sticks and bamboos for fence construction. Several fences are constructed in Noni in order to limit the straying of cattle into farms. Fences are also constructed by graziers around their residents in which their cattle spend nights. The construction of fences is intensified with the proliferation of cattle ranching in Noni; though on a minute scale.

In order to verify reduction in the area covered by vegetation Noni over time, a period of 18 years was chosen and the vegetation cover compared. To assess the changes over this period, Landsat MSS for 2000 and 2019 were used. The satellite images were classified and four vegetation cover classes were identified (forest, shrub/grassland, farmland and settlement). See figure 4. Figure 4 reveals that in the

year 2000, over 70% of Noni was covered by vegetation. Following the data obtained from the satellite image used to realise figure 6, forest covered 6234 m<sup>2</sup>; the grass land was 22026 m<sup>2</sup>, built-up area 1278 m<sup>2</sup> while farm land stood at 1528 m<sup>2</sup>. In 2019, little changes were observed in the land cover of the area in comparison to the situation in 2000. See figure 4. From figure 5 one observes that, in the year 2019, the forest covered 6033 m<sup>2</sup>, a reduction of 201 m<sup>2</sup> from the 6234km<sup>2</sup> in the year 2000. The grassland on which the cattle grazing is carried out covered 21704km<sup>2</sup> in 2019 representing a reduction of 322 km<sup>2</sup> from the 22026 m<sup>2</sup> in the year 2000.



**Photo A: Pasture land in the dry season**

**Note on this photo;**

- (1) Fire resistant plants.
- (2) Undesired grass species by cattle
- (3) A grazier controlling cattle to desired direction.
- (4) A herd of cattle on the move

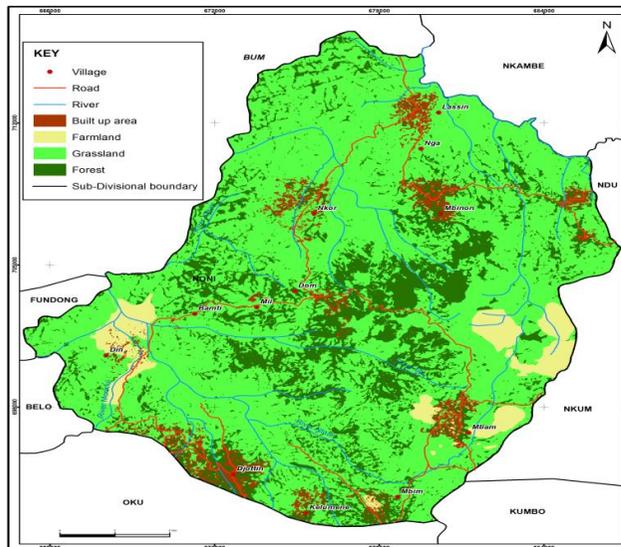
**Photo B: A partial view of grazing land**

**Note on this photo;**

- (1) Shrubs dominate vegetation on the hills
- (2) Crop farms in the valley
- (3) Some trees mixed with shrubs in valleys
- (4) Partial view of Nkor town from Dom

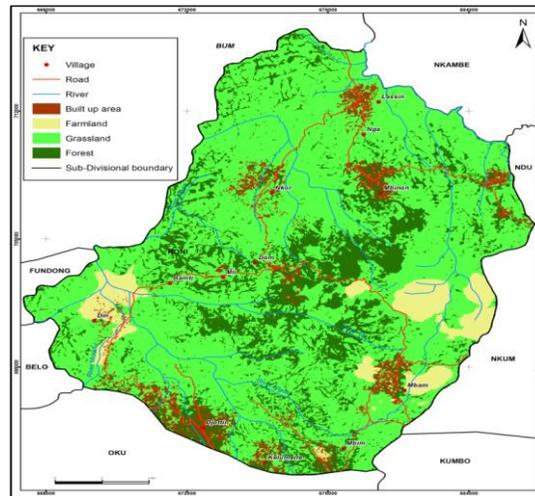
**Plate1: Effect of cattle grazing on vegetation in Nkor**

**Figure 4: Vegetation cover of NSD in 2000**



Source: Generated from Landsat TM, February 2000/ NIC

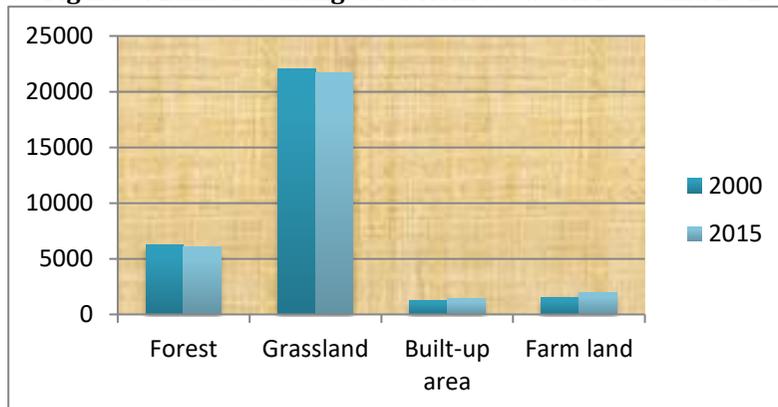
**Figure 5: Vegetation cover of NSD in 2019**



Source: Generated from Landsat ETM, February 2015/NIC

The farm land which was earlier noted has been on the increase due to encroachment into grassland (grazing land). The analysis of the satellite image revealed that farmland covered 1922m<sup>2</sup> in 2015 representing an increase in farmland cover of 394 m<sup>2</sup> from the 1528 m<sup>2</sup> the year 2000. The built-up area which is also increasing as the population grows also reduces the vegetation. In the year 2015, the built-up area covered 1406; an insignificantly increase of 128km<sup>2</sup> 15 years from 2000. The changes that have been experienced in Noni for the 19 years selected in this study are shown on figure 6. It can be observed on figure 4 that generally there have been minimal changes in the land cover of the study area. This situation linked to slow rate of socio-economic development in Noni. However, one notes that grass land and farm land witnessed the greatest changes over the period of study. The size of the grass land is reducing partly due to encroachment into these areas by crop farmers while the build-up area is increasing due to population growth.

**Figure 6: Land use changes for Noni between 2000 and 2015**



Source: Derived from figures 4 and 5

Cattle grazing has led to accelerated soil erosion of different forms in some particular areas in Noni. The soil erosion is not wide spread; it is limited to some parts where grazing activities are so intense. The main cause of the erosion is removal of vegetation exposing the soil to direct impact of rainfall and wind especially in the dry season when the Hamattan winds are stronger. The major forms of soil erosion observed in the field include the following:

*Splash erosion* refers to erosion resulting from the direct impact of raindrops on the soil. It occurs in areas where vegetation has been degraded and there is a direct contact of rainfall with the soil. The soil particles are lifted and displaced by raindrops via saltation on an average distance of 18-28cm, Hudson (1965). Splash erosion is visible around fences constructed for cattle. This type of erosion is wide spread in Noni given that there are several fences that inhabit cattle in the area. The indicator of splash erosion is the presence of soils on the leaves of crops such as ground nut, maize and beans under germination. Splash erosion is marked by particles transported by surface runoff. Trampling of the soil by cattle accelerates this type of soil. The transhumance tracks and areas where night paddocking is practiced in Noni are susceptible to this type of soil erosion.

*Sheet erosion* refers to the detachment of soil particles by raindrop impact and their removal by surface runoff. The washing away of the particles does not occur in definite channels like in rill erosion. Sheet erosion occurs where surface runoff washes away the top soil in a uniform depth over extensive low land. In Noni, sheet erosion is common in valleys that are occupied by cattle on transhumance in the dry season. Areas such as Mii-Dom, Mii-Enkowe, Bamti-Mii, Mukeye, Chaw and Nchinin are highly affected by this type of soil erosion. *Rill erosion* occurs when surface runoff forms small channels on slopes along which soil particles are detached and carried. This type of erosion occurs where impermeable and less resistant surfaces develop micro channel of about 4-10cm on slopes with 8°. These micro channels are known as rills and thus the appellation rill erosion. The rills have incision resulting from concentrated runoff as it paves its way down slope, (see photo7). In the study areas, rill erosion is common in areas affected by sheet erosion and trampling of the surface by cattle.

Photo 1: A cattle grazing area affected by rill erosion in Egow, Djottin.



In this photo, one observes;

(A) Rills produced along cattle track, (B) Pasture mixed with fire resistant shrubs, (C) Crop farm and (D) *Raffia palm*

Source: Field survey, November 2019

*Gully erosion* is the removal of soil particles along drainage lines by surface runoff. It is common in areas that have been affected by rill erosion. Gully erosion occurs when the size and shape of the rills are incised by surface runoff. As the rills widens, deeper grooves called gullies are developed along which soil particles are

washed away. When cattle use gullies as tracts during the transhumance process, erosion is accelerated as cattle trample over the soil periodically.

One notes that soil erosion in Noni is partly caused by cattle grazing. This results from the degradation of vegetation and exposure of the soil to agents of erosion such as water and wind. Soil erosion generally reduces soil fertility and thus agricultural output in affected areas. In some cases, the eroded soil particles end up in river channels leading to floods. This is situation is common in the study area such as Mii-Ekowe. The four types of erosion discussed in this section are some of the consequences of cattle grazing in Noni Sub Division.

Cattle grazing has also affected the quantity and quality of water in Noni. Catchment areas encroached by cattle breeding activities have experienced a reduction in the volume of water produced. When graziers encroach into the catchments and burn down dry grass to regenerate fresh pasture, the water table is affected. The rampant bush fires set by graziers in the dry season has reduced the vegetation around these catchment areas where portable water tapped in the villages is affected. Forest destruction leads to excess evapotranspiration which reduces volume of water for domestic consumption, agricultural activities and other purposes. The quality of water has also been affected by cattle grazing activities in Noni Sub Division. Streams used by the local population for domestic needs, irrigation and other purposes are also used by graziers for their cattle. The cattle graziers take their cattle to these streams regularly for the cattle to drink water. See photo 2.

**Photo 2: A herd of cattle in a stream in Nkor**



**In this photo, one observes;**

- (A) Cattle in a stream after drinking water.
- (B) A lady and child fetching water from the stream.
- (C) Traces of trampling by cattle that descends to drink water.

Source: Field survey, November 2019

These livestock contaminate these streams through soil trampling, urinating and defecating in the streams. The outcome of this situation is emergence of diseases such as *anthrax*, *brucellosis*, *cryptosporidium* and *giardiasis* that affect the population in this area. The quality of from the streams is thus unhealthy when consumed without treatment

## **5. Assessment of Existing Strategies in Resolving Famer-Grazier Conflicts and Environmental Problems in Noni Sub-Division**

### **5.1. Agro-Pastoral Commission**

Agro-Pastoral Commission is the official and legal medium of resolving farmer-grazier conflicts in Cameroon set up in each sub division following the law of 1978 regulating farmer-grazier conflicts in the country. The Commission consists of SDO or DO, Delegates for MINEPIA and MINADER at the sub divisional level, and the village head (Fon) the head of pastoral communities (Ardo) and the farmer and grazier

concerned in a conflict at the village level. The Commission performs four main functions. These functions include:

- It allocates and demarcates farmland and grazing land in rural areas according to the needs of the population. This allocation and subsequent modifications must be ratified by the Governor of the Region concerned
- It defines the conditions for the use of mixed farming zones. They cannot be allocated permanently to anybody, but are used alternatively by farmers and graziers on seasonal bases. The Agro-Pastoral commission determines the period of the year when crop farming and grazing should take place, taking into account the climatic conditions and crop cycle of the area.
- It controls the use of the land allocated for farming and grazing and to ensure that the farmers and graziers respect the boundaries.
- It examines and settles conflicts between farmers and graziers. It may also handle civil matters (when no serious criminal offence has been committed). Criminal offences are handled only by the Law Court. For instance, poisoning of or wounding of animals by an arable farmer, breaking of a farmers' fence by graziers' animal are all criminal offences.

Though this is the legal means of resolving farmer-grazier conflicts, it is not well trusted by most of the crop farmers and graziers in Noni. Even though it receives over 300 cases per year in Noni, several other cases are managed by other means due to mistrust. The farmers and graziers are discouraged channelling cases to this Commission because of the long procedure and time taken for conflict resolution to occur. It takes time for the DO to set up the subcommittee that goes to the field to establish a base for the Commission before the final decision is taken. Thus impatience exercise by the farmers does not favour the smooth functioning of this Commission. Besides the time, it is very costly resolving farmer-grazier conflicts via this Commission according to the crop farmers and graziers interviewed. Over 90% of the crop farmers and graziers testified that a lot of money is collected by the Commission.

Apart from these two weaknesses, the Commission does not have a running budget which limits its ability to perform its functions fully. This partly explains why the Agro-Pastoral Commission limits itself to the fourth function neglecting the first three that requires a lot of finance to realise them. In a nutshell, this commission could have been the best medium of resolving farmer-grazier conflicts if it was not plagued by the three problems identified. As such, its functions are highly handicapped and as a result, farmer-grazier conflicts continue to occur in Noni despite its existence there.

## **5.2. Traditional Council**

The Traditional Council concerned with resolution of farmer-grazier conflict is composed of the village head (Fon), some traditional notables, the representative of the pastoral communities (Ardo) and the disputing parties. Traditional Councils exist at Fondom level. There are ten traditional councils in Noni given that there are ten Fondoms in Noni. These councils are highly encouraged by the DO to exist in order to limit the number of crisis reaching the Agro-Pastoral Commission.

However, the traditional council is not a legally recognised body for the resolution of farmer-grazier conflicts. In effect, it is just an attempt at the grass root to solve problems of this nature. In case the decision of the traditional council is contested by a disputing party, the case is then forwarded to the Agro-Pastoral Commission which is the legal body concerned with such crisis. It should be noted that the traditional council has helped a lot in curbing or mitigating farmer-grazier conflicts in Noni but its major limitation is the lack of legal backing. Coupled with this is the resentment of the

pastoralists to take cases to the councils. They believe decisions are taken most often favour crop farmers and thus at times prefer the Agro-Pastoral Commission. This partly explains why the councils are gradual losing value in settling farmer-grazier conflicts in Noni.

### 5.3. The Judiciary

The judiciary is the final farmer-grazier mitigating opening that handles criminal matters such as killing of cattle, rape, intimidation, physical attack and illegal retention resulting from farmer-grazier conflicts. This channel is not considered as the best means of handling farmer-grazier conflicts according to many experts and researchers. In conflict situations, mediation should be the first thing despite the fact that different legal opinions may be expressed. The judiciary means of resolving farmer-grazier conflicts is the least exploited means in Noni. This is because most crop farmers and graziers are less educated and thus are not well enlightened on the procedure in using the judiciary. This method is also time consuming and expensive. Farmers and graziers are encouraged to use dialogue platform which is less complicated and economically, Nchinda (2013).

### 5.4. Creation of Forest Reserves

Forest protected areas have been created in Noni Sub Division to conserve forest that is fast disappearing in the area and maintain steady water supply. These forest reserves are mostly created in areas where the impact of bush fires on forest has been severe. There is one major forest reserve in Noni extending from Dom to Mbinon known as the Dom/Eteh Forest Reserve. This forest reserve is found in two major cattle grazing villages. The forest reserve was an initiative of the Nkor Council but it is today jointly controlled by the council and the ministry of forestry and nature protection in Cameroon. Graziers and local population are prohibited from carrying out agricultural activities in the forest reserve. It should be noted that Dom and Mbinon are hilly villages where erosion and landslides have been common partly due to forest degradation. This is because as the forest is degraded, soil particles are loosen and made more susceptible to erosion and landslide. The soil becomes more vulnerable to erosion and landslide because the matting-effect of tree roots is absent following the destruction of the vegetation. The creation of this forest reserve has thus helped to reduce soil erosion and landslide in Mbinon and Dom villages.

Small scale forest reserves are also created around water catchment areas in Noni Sub Division. The forest reserves around the catchment areas have helped to reduce soil erosion and also maintain steady water supply. Temporary water experts recruited by the Nkor Council have helped to plant environmental friendly plants around the catchment areas in Noni. These plants species include; *hydel plant*, different *acacia pants species* such as *nilotica* that does well in alluvial soils, *spp* that maintain water in dry areas and *segal* that does well in valleys. These plant species are planted in the catchment areas such as Kigem and Kilumen in Djottin. When these plants are planted, barb wires are used to fence the catchment area to avoid stray animals such as cattle from destroying the plants. Grazing and crop cultivation is generally prohibited around catchment areas in Noni in order to maintain these environmental friendly plants.

Despite the above efforts and plans to maintain forest in Noni, the forest cover in Noni has been reducing. Results from the analysis of satellite images for Noni in the year 2000 and 2019 revealed that forest cover has reduced over the years by 4.22 %. (See figure 6). The reduction in forest cover in this area is an indicator that the

strategies used to fight forest degradation are ineffective. The ineffectiveness of these strategies is because of population pressure, rapid growth of cattle population, poor farming methods (use of Ankara system), poor sensitization of the local population on the need for forest conservation and lack of follow up measures to implement plans on forest conservation.

### **5.5 Improvement on Soil Fertility**

The local population and the administration in the study area have put in place a number of strategies to conserve and improve on soil fertility. The impoverishment of soil in Noni due to cattle grazing affects directly peasant farmers. This explains why the peasant farmers are one of main stakeholders fighting against soil impoverishment in the area.

At individual level, crop farmers apply organic manure in their farm to improve on soil fertility and enhance agricultural productivity. The organic manure is gotten from household refuse and the droppings of livestock such as cattle, pigs, goats and birds. This method of improvising soil fertility is environmentally beneficial. This is because the method preserves macro and micro soil organisms such as termite, earth worms, bacteria and fungi. These organisms decompose litter naturally thereby providing humus that enriches the soil. However, this method of improving soil fertility in Noni is less effective and practiced on a small scale. The crop farmers practice extensive subsistence farming system that involves the cultivation of large hectares of land using crude tools such as cutlasses and hoes. This farming system has made it difficult to adequately apply the organic manure throughout the farms since farms are too large. As a result of this difficulty, agricultural outputs continue to reduce as the soil fertility is not replenished.

Furthermore, crop farmers fight against soil infertility in Noni by forming crop farmers associations in order to easily acquire farm inputs especially chemicals such as fertilizers, insecticides and herbicides. Several crop farmers associations exist in all the villages in Noni Sub Division. Some of these farmers associations are; Nkor Jolly Mixed Farming Group, Nkor Farmers Men Union, Nkor Progress Mixed Farmers Group, Nkor-Djottin Mixed Farmers Common Initiative Group (C.I.G), Nyalin-Enkowe Maize Farmers C.I.G Nkor and Kichia Mixed Farmers C.I.G. Through these groups, farmers buy farm inputs and market their produce easily. Furthermore, some large scale agricultural organizations are able to train the peasant farmers and supply them with inputs easily when they are in groups. An example of this large scale agricultural organization operating in Noni is OLAMCAM that deals with coffee production and exportation. Most of the farmers groups in Djottin, Din and Mbinon are formed through the guidance of OLAMCAM. Although OLAMCAM encourages the formation of these groups to cultivate and market coffee, the activities of the groups have been extended to the crop cultivation in Noni.

Despite the above strategies to preserve and improve on soil fertility in Noni so as to enhance agricultural productivity, outputs are still far below expectation. This is another indicator of ineffectiveness of the strategies currently applied in the area to fight against soil impoverishment due to cattle grazing. The main reasons for this ineffectiveness are; high level of illiteracy amongst the farmers, conservatism of the farmers, high poverty level amongst the farmers, introduction of methods without considering the ability of the farmers to apply them and poor methods of enlightening the farmers.

## 6. Recommendations

The following recommendations and suggestions based on field investigation are made in order to redress the negative impacts of cattle grazing in Noni. These recommendations are night paddocking dialogue platform, empowerment of agro-pastoral commission, alliance farming, pasture improvement and agro-silvo pastoralism.

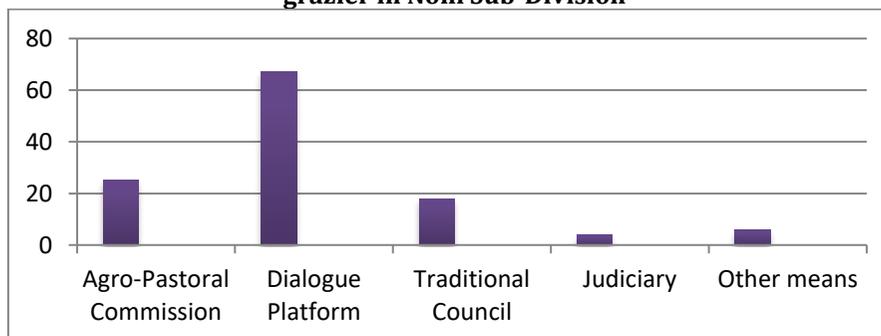
### 6.1. The Dialogue Platform

Dialogue platform is a forum where by crop farmers and graziers are brought together to exchange ideas on issues of farmer-grazier conflicts in order to arrive at peaceful settlement, (Nchinda, 2013). It is one of the most efficient ways of handling farmer-grazier conflicts in the area. The forum brings together crop farmers and graziers to discuss their problems. Dialogue platform is also referred to an amicable settlement of dispute between crop farmers and graziers via a win-win approach of conflict resolution. It reduces tension between the crop farmers and graziers. Dialogue platform usually result to *alliance farming* (see point 3 below) that benefits both the crop farmers and graziers. Graziers consider crop farmers as partners for access to crop residues after harvest. Farmers also consider graziers as those they can benefit from by having of access to cattle dung which improves on soil fertility. Organic crop production could thus be encouraged in Noni through this system of integrated crop-livestock farming generated from the dialogue platform.

Though the dialogue platform was observed as the best method of solving of farmer-grazier conflicts in NSD, it is rare to come by due to difficulties in bringing the two disputing parties together. However, where ever the disputing parties are brought to the same table for dialogue the results are significant and more sustainable. It was realised that areas where farmer-grazier dialogue platforms have been organised in NSD, farmer-grazier conflicts are on the decline. The case in point is the farmer-grazier dialogue platform organised by Ghenghan Elfrida the MINADER Officer for the Banti Agricultural zone. She invited Kumbo Diocese Commission for Justice and Peace to pacify the farmers from Friday 5<sup>th</sup> to Saturday 6<sup>th</sup> October 2012 in Vun, a locality in Din.

Responding to what is the preferred method of resolving farmer-grazier conflicts by graziers and arable farmers, the dialogue platform had the highest weight and judiciary procedure the least. See figure 7.

**Figure 7: Preferred means of resolving farmer-grazier conflict by famers and grazier in Noni Sub-Division**



Source: Field data, 2019

## **6.2. Empowerment of Agro-Pastoral Commission**

As seen earlier, the Agro-Pastoral Commission is the legal body in charge of the demarcation of grazing land from cultivable land, ensuring the respect of the boundaries by graziers and arable farmers and resolving farmer-grazier conflicts in Cameroon. One of the major causes of farmer-grazier conflicts and other associated ills of cattle grazing in Noni is the non-demarcation of grazing zones from crop farms. This has led to easy infiltration of cattle into arable zones as is the situation of arable farmers that rapidly encroach into areas previously considered as grazing land. This demarcation is just one of the functions of the Agro-Pastoral Commission amongst the other three earlier discussed. Thus, if the Commission is funded financially (provision of running budget), empowered with personnel and other tools needed to monitor the activities of the graziers and arable farmers, it will significantly mitigate farmer-grazier conflicts in this area.

Even though farmer-grazier conflicts still exist in some areas in Cameroon where grazing land have been demarcated such as Bum Sub-Division, the conflicts are associated to the non-implementation of the other functions of the commission. All functions of the Commission should be diligently implemented rather than waiting for severe damages to be inflicted property before the Commission goes into action. Also, the government should ensure that anti-corruption agents are installed Noni Sub-Divisions. This will help to reduce corruption. Majority of the graziers and arable farmers do not like the resolution of their conflicts by the Commission due to high corruption practices. By fighting corruption within the Agro-Pastoral Commission, it will directly enhance confidence in the population and the desire to attend to them for conflict resolution in Noni.

## **6.3. Extension of Night Paddocking to all Villages**

Field observation revealed that areas where night paddocking is practiced experience few farmer-graziers conflicts. Din and Djottin for instance recorded the least number of farmer-grazier conflicts between 2005 and 2013 in the localities where night paddocking is practiced. Night paddocking as observed was introduced in these areas in 2005. It is deduced that night paddocking has reduced the tension existing between arable farmers and graziers over the years. If night paddocking is extended to other villages such as Nkor, Lassin, Dom and Mbinon where farmer-grazier conflicts are recurrent with negative outcomes, these problems will reduce.

Night Paddock will not only reduce the farmer-grazier conflicts, but will also improve on the soil fertility. It should be recalled that one of the major causes of farmer-grazier conflicts is soil infertility that leads to encroachment by crop farmers into grazing areas. The authorities in Noni Sub-Division could promote night paddocking through mediation arrangement between the graziers and the farmers.

## **6.4. Introduction of Alliance Farming**

Apart from night paddocking, the adoption of alliance farming can contribute to reduce farmer-grazier conflicts and also improves on soil fertility. Alliance farming involves arrangement between arable farmers and graziers in which both farmers benefit. As crop farmers harvest and evacuate their crops, graziers move into the farm with their animals on well-defined deal. The arable farmers and graziers consider each other in this method as brothers. In effect, this will reduce if not end completely the psychologically trauma the Fulanis are subjected to through stigmatization such as "foreigners", "strangers" and "bush men". Alliance farming can act as a uniting factor between the arable farmers and graziers. It can aptly be described as a wind-wind

approach of handling farmer-grazier conflicts. The farmers benefit the cow dung which improves on the soil fertility thereby enhancing high output. The graziers on the other hand will use the farms for their grazing. Consequently *an alliance farming system* will be formed which will be beneficial to both farmers. This system reduces farmer-grazier conflicts and improves on soil fertility at the same time.

### **6.5. Agro-Silvo-Pastoral System**

Agro-Silvo-Pastoralism involves integration of animals, crops and trees as a sustainable way of land use and diversification of farm. According to Ibrahim et al 2011, agro-silvo-pastoral system improves food security and alleviates poverty. Agro-Silvo-pastoral System is a land that combines woody component (trees or shrubs) with cattle in the same site. It is good in areas where cattle grazing is extensively practiced. It supports cattle grazing at the same time with the growth of trees and shrubs that could be used as fuel wood, poles and timber. These products provide immediate domestic needs of the population and reduce pressure on natural resources. These trees when introduced could also be exploited in the long run to construct the fences that protect farmlands against straying cattle.

This method guarantees pasture forage, restores soil fertility and also improved grazing land. Overall, ecosystem productivity is encouraged and it can be realized through planting or reseeding. Reseeding or replanting of rangeland is a very efficient and most effective way of improvement rangelands. Government should provide botanists in the study area to educate the graziers and encouraged the planting of multipurpose trees or legumes that can be used in the dry season to supplement pastures. A variety of rangeland forage has been developed by plant geneticists and breeders. They are suitable in several climatic and soil conditions. This forage varies in quality depending on the physical characteristics of the area where it is planted. The introduction of agro-silvo-pastoral system will reduce transhumance and overgrazing as this innovation will supplement pasture in the dry season.

The benefits of these practices are real. Production per hectare for growing animals would increase up to six times if animals had access to rehabilitated pastures and up to ten times if fodder banks were used to supplement grazing in the rehabilitated pastures during the dry season. This also yields a positive internal rate of returns, World Bank, (2012). The World Bank innovation transfer initiative funded project in Tugi of the North West region of Cameroon was complemented by capacity building based on a Farmer Field School Approach. In this manner, not only the farmer-grazier conflicts will be reduced or solved but the environment will be properly protected in NSD

### **7. Conclusion**

Generally, from the findings on problems affecting cattle grazing and the management strategies in Noni Sub-Division presented here, one can note that cattle grazing is an evaluable activity that has gained prominence today. Cattle grazing was considered in the past as an activity practiced mainly by some ethnic groups in the world such as Fulanis. The increasing involvement of non Fulanis in the activity is an indication that cattle grazing has become a lucrative activity for investment today. However, cattle grazing are plagued by a number of problems which include farmer-grazier conflicts and environmental problems. Extensive literature on these problems and attempted solutions in different parts of the world reveals that these problems are not new today but also that the strategies proposed still have some lapses. Given the increasing prominence of cattle grazing today, the solutions to the problems facing the

activity therefore lies in a collective action by all stakeholders involved in the activity. This collective action could be guided by individual conscience, dialogue and trust before the role of law. The application mitigating strategies depends on the peculiarity of a given area. Thus field data determine the most suitable method to be adopted in a given area.

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