

## LIVESTOCK GRAZING AND CONSERVATION OF BIODIVERSITY IN IKOM FOREST ZONE OF CROSS RIVER STATE, NIGERIA

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### Abstract

This study examined the relationship between livestock grazing and biodiversity conservation in Ikom forest zone of Cross River State. The Ex-post facto research design was adopted for the study. One hypothesis was formulated to give the study a direction. Through the stratified and purposive sampling techniques, 484 respondents were sampled for the study. The questionnaire was the main instrument utilized for gathering of data. Data collected were subjected to Pearson Product Moment Correlation (PPMC) analysis. Finding from analysis of the hypothesis unveiled that there was statistical significant negative relationship between livestock grazing and biodiversity conservation in the study area. By this result, it was concluded that, as live stock grazing increased, biodiversity conservation decreased. Conversely, as live stock grazing decreased, biodiversity conservation increased. It was therefore recommended that sustainable grazing methods like shifting grazing should be adopted by herdsman and pastoralists in order to give plants the opportunities to recuperate and regenerate.

**Key words:** Livestock grazing, Biodiversity, Conservation.

### Introduction

Recently, the loss of variety of plants and animals specie existing on earth remains part of the greatest challenging issues of our environment. Biodiversity in this way harbours 70-80% of feeding necessities of 70% of the population in Nigeria as a country. Also, around 30 – 50% of cities and semi-cities have placed their hopes on biodiversity for nutritious benefits (Convention on Biodiversity, 2013). Ikom forest zone occupies the Central Senatorial District (CSD) of Cross River State and the state is located in the South-South region of Nigeria. Nigeria as a country has been ranked as one of the wealthiest nations of Africa because it is blessed with substantial zones of tropical rain-forest and is an extremely rich biodiversity hot spot.

Ikom forest Zone houses the richest forest type. Amongst all forest types, the one situated within the study area, generally known as tropical rainforest is the most endowed. Biodiversity in this way harbours 70-80% of feeding necessities of 70% of the population in Nigeria as a country, also around 30 - 50 of those in cities and semi-cities have placed their hopes on varieties of plants and animals for nutritious benefits (CBD, 2013). Aside the common environmental and ecological forest functions (climate mitigation, source of natural oxygen, air and water purification, soil and water conservation, flood regulation, natural habitat provision for fauna and flora species, etc), it houses a little more than 50% of all the world's biodiversity; it

houses about 67% of the world's fauna and flora species; it stores about 50% of the world's terrestrial carbon; it has a variety of highly valued and exotic flora and fauna endemic to the forest' habitat; it is known as the "world's largest pharmacy" as many of its plants have been found to be effective against diseases such as malaria, HIV/AIDS, bronchial and skin ailments etc; it is estimated that only 2% of its plants' potentials have been discovered in terms of herbal/medicinal value; its Non-Timber Forest Products (NTFPs), logging and ecotourism services are valued in excess of \$500bn annually (the highest amongst all forest types), and; it is the source of livelihood for more than 2.5 billion rural people (also the highest of all forest types) (United Nations Environment Programme (UNEP, 2000; Ajake & Enang 2012, Takon & Amalu, 2013; Philip, Akintoye, Olorundami, Nkpena, Ukata & Harrison, 2014).

Over the years, research articles have accused man as the major cause of loss of biodiversity in the environment. These accusations are connected to the relationship between man and the environment, man's desire for improvement, enhanced personal satisfaction from life coming about as a result of industrialization, improvement in technology and quick growth in human population in cities, semi-cities and rural areas. More than 65% of people in Ikom Forest Zone are involved in variety of plants and animals specie activities and employments, for example, live stock grazing, hunting, fishing, wood exploitation, animal husbandry, forest resource marketing, saw milling, wood processing and so on.

The common view of man considers livestock grazing as a disturbance factor to the natural ecosystem and, therefore, should not be practiced within forest zones. Recently, this common perception has been challenged in Nigeria and it was suggested that, since livestock grazing has been part of these system for millennia, it cannot be avoided totally. Hence, the concern of government toward the issue brought about the introduction of a draft bill to the National Assembly in 2017 for an Act establishing a National Grazing Reserves Commission; with powers to acquire and develop land for grazing and livestock routes in any part of the country. However, this bill which is very controversial is yet to be approved by the national assembly.

Grazing occurs by the introduction of many animals on a piece of land and by not legitimately controlling their feeding cycle. In Nigeria, the territory dedicated to grazing ascended from 166, 326 km<sup>2</sup> in 1978, to 187, 236km<sup>2</sup> in 1995 and 220, 324km<sup>2</sup> in 2013 and Nigeria, Africa's most crowded nation, loses 867, 000 Hectare of range land and crop land to desertification every year, on the grounds that increase in man and animal population, herders and farmers seek for the limited land for cultivation and grazing (Convention on Biodiversity, 2013).

In spite of the massive and immeasurable benefits of biodiversities, biological resources are under threat of mass elimination of species and genetic resources through the impact of live stock grazing. Efforts have been made by government to strongly address issues of biodiversity depletion. Among these efforts is the reservation of tracts of forest areas and their biotic components, but these reserves have been seriously neglected and received little or no improvement as it concerns investment and management. Nigeria has participated in all major international initiatives and is signatory to many international treaties, protocols and conventions. These include the framework convention on climate change and the

Biodiversity Convention signed at Rio in 1992, the Convention on Drought and Desertification of 1998, the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), The Conference of Party (COP 24) Katowice Climate Change Conference held in November, 2018 and Organized by the United Nation Climate Change etc.

Illegal grazing of livestock in game reserves constitutes a threat to wild life itself and other biodiversity. Nigeria is considered one of the most bio-diverse countries in Africa. It is home to 889 species of birds, 109 amphibians, and 648 fish, and is a global hotspot for primate species (FGN, 2010). Nigeria suffers from high rates of over grazing and biodiversity extinction. However, drivers such as conversion for large scale agriculture, uncontrolled logging, unsustainable harvest of fuel wood, overgrazing, and incessant bush burning contribute towards the loss and degradation of more than 3,500 km<sup>2</sup> of forest and biodiversity annually (Ravilious, Kapos, Osti, Bertzky, Bayliss, Dahiru & Dickson, 2010).

Albeit tropical forests cover just around 7 percent of the World's dry land, they likely harbour about half portion of all species on Earth (Federal Government of Nigeria, 2010). Numerous species are so particular to micro- habitats inside the forests that must be found in little areas. Their specialization makes them vulnerable to extinction. Notwithstanding the species lost when a territory is absolutely overgrazed, the floras and faunas in the sections of forests that remain, likewise turn out to be progressively vulnerable. The edges of the fragments dry out and are slammed by hot winds; rainforest trees that are matured regularly kick the bucket. According to the Federal Government of Nigeria (FGN, 2010), there are 22,000 vertebrates and invertebrates species. These species include about 20,000 insects, about 1,000 birds, about 1,000 fishes, 247 mammals and 123 reptiles (FGN, 2010). Among these animals about 0.4% is threatened while 0.22% is endangered (Adeyinka, 2012).

Solid proof of field overgrazing was seen throughout the winter and spring of 2010, when about 3 million residential creatures passed on attributable to an absence of adequate field. Past research has generally centered around land use and the social and monetary parts of grazing land (Gimenez, Maria, 2006; Chuluun and Ojima (2011) and the effect of grazing on vegetation (Kakinuma, 2008). Degradation of biodiversity coming about because of overgrazing is still ineffectively comprehended and has been the subject of few researches (Batkishig, 2000, Retzer, Mieke, 2005 & Baasandorj, 2010). In like manner, strategies for looking at field biodiversity debasement require further investigation. Specifically, solid information is required to help decide the seriousness of the issue of biodiversity degradation (Dregne, 2002).

Extinction of biodiversity is not new to the environment. It has happened constantly since life started, and there have been various troubles of extinction previously. In any case, the current pressing issue is the first great extinction as a result of activities of agriculture. The biodiversity of plants and animals are very important to human development. It is in recognition of this that the United Nations declared the year 2010 as the International Year for Biodiversity. Over the years many countries of the world have been experiencing loss in biodiversity especially due to overgrazing. This biodiversity loss is among the most serious environmental problem facing the world today. United Nation Food and Agricultural Organization (UNFAO, 2008).

According to UNFAO (2008) overgrazing reduces biodiversity by destroying natural surroundings, by isolating most zones of vegetations from the other and also relating with flora generation and uncovering biodiversity of beneath forests to large impacts. This does not just expel (remove) a couple of grasses from the forests. At the point when trees that have shades are cut down, numerous little vegetation grasses and floras rely on these species of trees for covering else the moisture vanish. Creatures subordinate on trees or other vegetation for nourishment, haven, water, and reproducing locales likewise vanish. Just those creatures (by and large the bigger ones) which can relocate to contiguous forest zones survive. Plants in cut-over territories frequently cannot be pollinated, or in the event that they find themselves, their seeds fall upon unacceptable open regions where they cannot survive. Moreover, numerous rainforest species are confined to little territories which are discovered in no place. At the point when the zones or areas in which these species live are logged, burned or grazed, they will disappear and some biodiversity go into extinction which will not protect biodiversity.

Numerous individuals associate livestock grazing with overgrazing, soil debasement and deforestation. To man, live stock keeping in rain forest areas incites images of dust storms, faded cow skeletons and a propelling desert. Oldeman, Hakkeling and Sombroek (2011) stated that 680 million hectares of rangeland have turned out to be debased since 1945, and Dregne, Kassas and Rozanov (2011) who contend that 73 percent of the world's 4.5 billion hectares of rangeland is tolerably or seriously destroyed. In most regions, domesticated animals are related with encroachment into ranch and deforestation of tropical rainforests and rivalry with natural life.

According to Habib, Basit, Wahidullah, Jabbar and Ghufuranullah (2011) delayed substantial grazing without a doubt adds to the vanishing of attractive species and the consequent strength by other, less tasteful, herbaceous plants or shrubs. Such loss of plant and, in result, biodiversity can require a long regenerative cycle (30 years in savannas, 100 years in rainforests). In temperate animals grazing likewise causes soil compaction and disintegration, diminished soil ripeness and water invasion, and a misfortune in natural issue substance and water stockpiling limit. Then again, all out nonattendance of brushing additionally diminishes biodiversity in light of the fact that a thick shelter of bushes and trees creature which captures light and dampness and results in overprotected plant networks which are powerless to catastrophic events (Ledec, 2012).

United Nation Environment Programme UNEP (2010) has recommended that if the numerous threats to biodiversity in Africa are to be tackled effectively, it is essential to integrate biodiversity into national development planning and policies. They added that current trends reaffirm the need for an ecosystem approach to biodiversity conservation, its sustainable use and the fair and equitable sharing of its benefits. However, other activities that can contribute to the halting of biodiversity loss to include efforts to reduce the impacts of agriculture and extractive industries; the restoration of destructed environment; the improvement of other livelihoods for indigenous communities; and more synergy with the private sector, and also with non-governmental organizations working on conservation (UNEP, 2010).

The way most dry land ecosystems are traditionally used explains, to a large extent, their resilience. Arid rangelands have traditionally been used under a communal property regime by nomadic producers who move their stock in search of

pasture according to season. From the wet season grazing they will move their animals to higher-potential river valleys, cropland or mountain meadows (the "key resources") for the dry season (Jansen & de Wit (2016). With highly variable rainfall (both in time and space), pastoral economies are typically of the "bust and boom" type: a "boom" when rainfall is plentiful and herds and flocks grow, and a "bust" when drought (or late winter storms in Central Asia) occurs and animals die. Thus, abiotic factors such as rainfall, rather than livestock density, determine long term primary production and vegetation cover (Mearns, 2016).

This continuous dis-equilibrium conserves soil and vegetation, especially annual vegetation in more arid areas, because grazing pressure has to adjust to the quantity of feed available. The theoretical bases for range management under those conditions ("opportunistic range management") have recently been well described by Behnke, Scoones and Kerven (2014) and Scoones (2014). A substantial body of evidence from the last decade Thomas and Middleton (2014), shows that arid regions contain dynamic and highly resilient ecosystems, with a strong capacity to regenerate rapidly when the rains return. Similarly, traditional pastoral systems have conserved biodiversity because pastoralists have a direct interest in preserving a wide variety of plants and animals. Gathering range products, such as medicinal plants, gums and resins, is an important part of the pastoral way of life.

Sterenber, Gutman, Perevolotsky, Ungar and Kigel (2010) stated that under local conditions, excluding grazing for long periods results in low species richness and the community becomes dominated by tall plants. Continuous grazing, under the recommended regime, maintains species richness. Doubling the grazing pressure generates no change in species richness. A change of the grazing regime into a more concentrated and seasonal, lowered species richness to 47 in early grazing and 36 in the late treatment. Doubling grazing pressure has no additional effect. The pattern of change in species richness in all treatments seemed to follow strongly the specific year conditions and no trend of change over the study period is observed. Timing of grazing appears to affect community structure, most likely through the removal of tall species, thus enabling short species to become established. Actual grazing pressure appears to be of little significance in determining grassland diversity.

### **Methodology**

Ex-post facto research design was considered most suitable for the study. Ex-post facto literally means 'after the fact'. It basically studies phenomenon after they have occurred. The area of the study is Ikom Forest Zone. The population of the study is Ikom Forest Zone of Cross River State. The sampling techniques used in this study were stratified random sampling technique and purposive sampling technique. A total sample of 484 respondents was used in the study. The instrument for data collection was a questionnaire. Each item in the instrument elicited information from respondents on a four point rating scale of Strongly Agree (SA) 4 points, Agree (A) 3 points, Disagree (D) 2 points, and Strongly Disagree (SD) 1 point. the reliability of the instrument was tested using Crombach Alpha reliability method. And the hypothesis was tested using Pearson Product Moment Correlation at 0.05 level of significance.

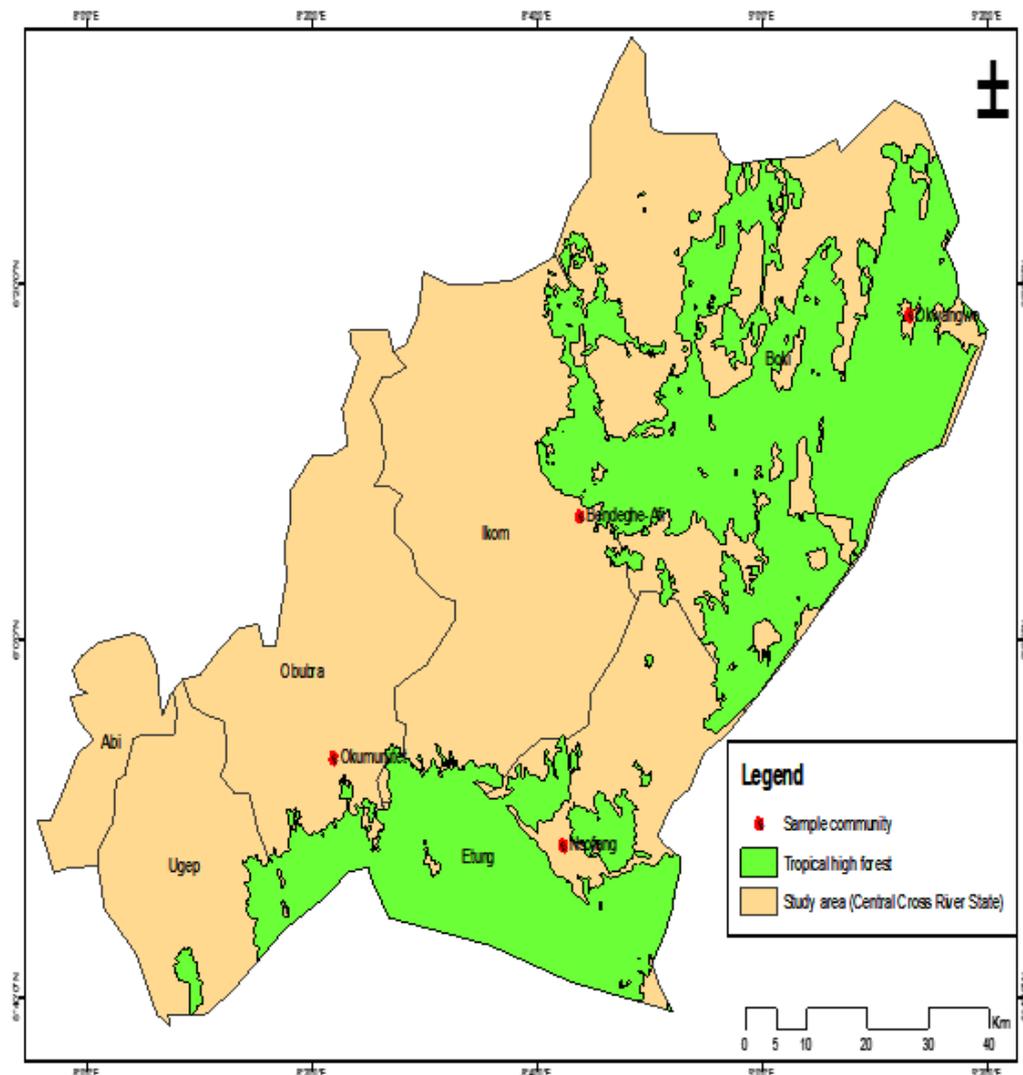


Fig. 2 Map of the study area showing tropical high forest

Map projection:  
UTM Zone 32N (WGS84)

Data Source:  
Forest Monitoring, GIS Mapping Unit  
CRS Forestry Commission, Calabar  
(Nile, Bridget, 2018)

### Result and discussions

There is no significant relationship between grazing and biodiversity conservation. The independent variable in this hypothesis is grazing while the dependent variable is biodiversity conservation. Pearson product moment correlation coefficient was used for data analysis. The result of this analysis is presented in Table 1.

Table 1: Pearson product moment correlation of overgrazing on agricultural land and biodiversity conservation

Variable	N	Mean	SD	r-value	Sig.
Overgrazing on agricultural land	484	15.47	3.20		
Biodiversity conservation	484	15.79	2.57	-0.285**	.000

\*significant at 0.05 level; df = 482; critical r value = 0.098

The result in Table 1 revealed that, grazing appears to be negatively related to biodiversity conservation, the calculated  $r$  – value of  $-0.285^{**}$  is greater than the critical  $r$ -value of 0.098 at 0.05 level of significance with 482 degrees of freedom. By this result, the null hypothesis which stated that, there was no significant relationship between grazing and biodiversity conservation is rejected while the alternate hypothesis is accepted. The correlation coefficient is a standardized measure of an observed effect, it is a commonly used measure of the size of an effect and that values of  $\pm .1$  represent a small effect,  $\pm .3$  is a medium effect and  $\pm .5$  is a large effect.

The squared correlation ( $R^2$ ) known as the coefficient of determination, which is used as a measure of effect size indicates the proportion of explained variance on the dependent variable. Therefore, 8.1% of the variance in biodiversity conservation is accounted for by grazing. The magnitude of effect is small. By this result, we can conclude that, as grazing increased, biodiversity conservation decreased. Conversely, as grazing increased, the destruction of biodiversity increased. There is statistical significant negative relationship between grazing and biodiversity conservation in the study area.

This result is in agreement with Ravilious, Kapos, Osti, Bertzky and Dickson (2010) who posited that the nation Nigeria experiences serious pressures from over grazing and biodiversity extinction. However, causes like converting pieces of land for intensive agriculture, uncontrolled logging, unsustainable felling down of fuel wood, grazing, and unnecessary setting of forests ablaze also leads to the disappearance and depletion of greater than 3,500 km<sup>2</sup> of vegetation and biodiversity yearly. The result of this study is in tandem with the result of UNFAO (2008) which revealed that overgrazing reduces biodiversity by destroying natural surroundings, by isolating most zones of vegetations from the other and also relating with flora generation and uncovering biodiversity of beneath forests to large impacts. This does not just expel (remove) a couple of grasses from the forests. At the point when trees that have shades are cut down, numerous little vegetation grasses and floras rely on these species of trees for covering else the moisture vanish.

However, the result of this study contradicts the result of Sterenberg, Gutman, Perevolotsky, Ungar and Kigel (2010) which found that under local conditions, excluding grazing for long periods results in low species richness and the

community becomes dominated by tall plants. Continuous grazing, under the recommended regime, maintains species richness. Doubling the grazing pressure generates no change in species richness. This assertion was supported by Osem, Perevolotsky and Kigel (2012) who concluded that livestock grazing reduces the competitive effects of tall species in the dense stands of the productive sites and provides space for more species to become established, while causing no significant impact on the herbaceous community in the less productive habitats.

### Conclusion

In line with the results obtained from this study, it was therefore concluded that: Grazing has a negative relationship with biodiversity conservation. The implication of this is that the pressures and unsustainable feeding of animals on vegetations, on animal reserves and ecosystems constitute trouble to biodiversity. All these are factors which precipitate loss of varieties of plants and animals which hamper the conservation of biodiversity in Ikom Forest Zone.

### Recommendation

Based on the findings of the study, it was recommended that sustainable grazing methods like shifting grazing should be adopted by herdsman and pastoralists in order to give plants the opportunities to recuperate and regenerate.

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