

**OPEN GRAZING AND NATURAL RESOURCES DEPLETION:  
THE CASE OF CATTLE REARING IN DELTA NORTH SENATORIAL DISTRICT  
OF SENATORIAL DISTRICT**

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**Abstract**

Open grazing is the management practice whereby herders move from place to place with their animals in search of pasture for their animals. The practice of open grazing is a way of life of the Hausa-Fulani group in Nigeria with consequences on the environment. The aim of this study is to examine the impact of open grazing on natural resources depletion in the Delta North Senatorial District of Southern of Nigeria. Open grazing by cattle poses significant environmental and socio-economic challenges in the area. To achieve this, the research adopted the quasi-experimental, observational and ex-post-facto research designs, which dealt with the retrieval primary materials such as group discussion, vegetation sampling, direct observation and sampled community leaders and secondary sources such as textbooks, journals, newspapers and internet materials on the subject under investigation. Thus, in the course of research, it was discovered that open grazing leads to environmental pollution, degradation, soil erosion, wildlife extinction and deforestations. Consequently, the practice of open grazing is a major driver of transhumance migration of herders and cattle from the north to the south of the country, with grave consequences on the environment. The paper recommends that laws be enacted to regulate the practice of open grazing. Also, there should be controlled grazing in order to enhance environmental protection and sustainability. The paper is of importance to the Ministry of Agriculture, Ministry of Water Resources and the Ministry of Urban and rural development as the findings of this research will be of immense benefit to the people of Delta North Senatorial District and Nigeria in general.

**Keywords:** Open grazing, Natural Resources, Depletion, Livestock, Cattle, Transhumance.

**Introduction**

Grazing is the method by which animals such as the herbivores feed on plants and algae for a living (Igbokwe - Ibeto, Nnaji & Ozigbo, 2021). It is the method whereby domestic animals feed on grasses and other forage for food (Chukwuemeka, Alloysius & Eneh, 2018). Open grazing is therefore the act of roaming livestock within the environment in search of pasture or foliage. It takes place anywhere that is accessible to the cattle rearers or herders, especially pasture or rangeland. Open grazing is widely carried out among the Fulani herdsmen of northern Nigeria. It is seen as their normal way of life with its attendant consequences (Olugbenga, 2017). The history of open grazing dates back to the pre- 20th Century era, when cattle rearing was carried out mostly in the savanna region of northern Nigeria with vast areas of grassland as pastures. Today, the quest for greener pastures by the herders for their cattle has forced the herdsmen to the southern parts of the country. This migration from the north to the south by herdsmen has resulted in the destruction of farmlands, crops and agricultural products by livestock through their grazing or trampling. It has also caused severe environmental degradation resulting in desertification, deforestation, biodiversity loss, land, and, and water pollution, global warming and soil erosion. This here raised public health concern and serious

national security issues in Nigeria, including socio-cultural conflicts between herders, farmers and inhabitants of the area (Oli, Ibekwe&Nwankwo, 2018).

In Nigeria, the Fulani herdsmen are well known for cattle rearing, both on a commercial basis and for subsistence. They keep herds of cattle in great commercial quantity and may not have enough land for grazing, hence they are forced to move southwards for pastures (Chukwuemeka & Alloysius & Eneh, 2018).

The Fulani ethnic group owns over ninety percent of Nigeria's livestock population, thus accounting for one-third of Nigeria's agricultural Gross Domestic Product (GDP) and 3.2% of the country's GDP (Chukwuemeka & Alloysius & Eneh, 2018). They are therefore a major contributor to the nation's food security efforts. The Fulanis are one of the largest pastoral nomadic groups in the world for their goats, sheep, camels, mules, horses and cattle, which they reared. They are predominately found in the Sahel region of West Africa including Nigeria.

The Fulani's sustain their livestock through the open grazing system (Michael, 2016); due to the large number of livestock they keep; hence their constant movement from place to place. They graze their livestock in the uncultivated wetlands dry season. However, with the increase in population, urbanization, agricultural development and climate change, the herders were forced to move southwards with their livestock in search of greener pastures (Nnoruga, 2021).

The migration of herders with their livestock can be traced to the Transhumance Protocol of the Economic Community of West African States, which allows the free movement of herders and Livestock across the West African sub-region (ECOWAS, 1998), hence foreign herders, and their livestock migrate into Nigeria. This migration is greatly aided by the country's porous borders which are not well secured, hence free entry and exit of herders and their livestock, leaving to open grazing. Open grazing is a major contributor to pollution and degradation of the environment. This paper calls for better environmental protection policies in Nigeria and the need to safe-guard the environment through satisfactory livestock management practices. Open grazing leads to depletion of the Environment and contributes to global warming and climate change and is the root of herders-farmers clashes in most parts of Nigeria. Therefore, the need to ensure environmental sustainability and address the challenges and problems of open grazing led to this research, with the hope that its findings will help to ameliorate the impact of open grazing on environment.

### **Prevailing trend**

The Delta North Senatorial District of Southern Nigeria is faced with issues of pollution and environmental degradation and other challenges threatening the peaceful co-existence of the people as a result of open grazing of livestock. These problems emanated because of the lack of proper framework for the regulation of open grazing in Nigeria (Ogboru&Adejonwo - Osho, 2022). Thus, the migration of herders and livestock can be traced to the transhumance Policy of the Economic Community of West Africa States, which aided their movement in the sub-region for the purpose of open grazing of their livestock. The North-South transhumance of cattle and other livestock coupled with the lack of proper regulation and management has imposed problems of degradation, depletion and poor resources utilization of land, water and

ecosystematic mismanagement. Apart from this, it has also resulted in conflicts between herders and farmers and a threat to food security in the country. Environmental sustainability and economic growth are negatively affected. Open grazing is one of man's anthropogenic activities, whose impact on the environment is increasingly becoming endemic at the local, regional, national and international levels. It has contributed to land degradation, soil, air and water pollution loss of biodiversity, global warming and other environmental problems. It is on this basis that study open grazing and natural resources depletion in the Delta North Senatorial District Southern Nigeria is carried out to identify open grazing as a major cause of environmental degradation and driver of transhumance migration with serious consequences on the environment with a view to minimizing its impact on land and other resources in the area, hence this study.

### **Area of Study**

The study area is Delta North Senatorial District of Southern Nigeria. It is located within latitudes 5°00 and 6°30 north of the Equator and longitudes 5°00 and 6°45° east of the Greenwich Meridian. Delta North Senatorial district comprises nine local government areas of Anocha North, Aniocha South, Ika North East, Ika South, Ndokwa East, Ndokwa West, Oshimili West, Oshimili North, Oshimili South and Ukwuani local government areas. It occupies a total land area of approximately 4,362 Square Kilometres. It has a lowland plain of about 10-30 metres above sea level.

The climate of the area is of two distinct Seasons of wet (March-October) and dry (November-February). The temperature ranges between 20°-35°C with heavy rainfall of 1,500 - 2500 mm/years. Delta North Senatorial District is characterized by tropical rainforest vegetation, freshwater swamp forest and lowland shrubs and grasses.

Cattle rearing predominantly of the local breeds such as the Nigerian dwarf, red bororo and white Fulani cows, including the exotic breeds introduced for cross breeding. The traditional open grazing method for free-range grazing in forests and grasslands is practiced by the herders. Semi-intensive with supplementary feeding is still carried out on a small scale. Limited grazing areas due to agricultural expansion and insufficient pasture and water during the dry seasons are challenges faced by the livestock rearers in the area coupled with competition for land and resources resulting conflicts between the herders and farmers

### **Materials and Methods**

The research adopted the mixed methods, quasi-experimental, observational study and ex-post-facto research design. The methods involve the use of primary and secondary sources of materials dealing with open grazing impacts on the environment and socio-economic consequences. The primary sources of data include observational traps, to monitor cattle movement and grazing patterns, vegetation sampling for plant diversity and density assessments, focus group discussion for in-depth discussion with farmers, herders and sampled community leaders, Key informant interviews with agricultural extension agents and environmental experts, field observation, which is the direct observations of grazing practices and environmental conditions and primary survey data, which involves data collected through

surveys administered to farmers and herders while the secondary sources include journals, books, newspapers, government reports, magazines, processed information, internet based materials, research articles and expert opinions in the field. The research designs will thus provide a comprehensive framework for investigating the impacts of opengrazing on the environment and natural resources depletion in the area. The expost-facto research design combined with mixed methods approach ensures a rigorous and nuanced exploration of the topic under investigation.

**Impact of Open Grazing on Natural Resources Depletion** Open grazing of livestock has resulted in soil erosion, deforestation and desertification, due to long period of grazing on the land; particularly in semi-arid and arid regions as a result of vegetal loss (Ogboru, & Adejonwo-Osho, , 2022). Open grazing puts pressure on the available water resources in the environment with dare consequences, such as surface water pollution through animal dung and other waste that finds themselves into the water body. It has been reported that the Lake Chad in the Sahel region as receding is a resulting of too much pressure posed on it by migrant herders and livestock (Ekanem, 2022). Water is critical to livestock production and as a determinant of green pasture in an area. Livestock are known to congregate in areas where there is water thereby putting pressure on the water and on the land.

In order to improve the quality of their pasture, pastoralists and herders from time to time set fire, to the grasses, resulting in bush burning culminating in the destruction of farmlands and agricultural crops. The smoke, heat and carbon from this burning activities pollutes the air and increases the environmental temperature. Bush burning reduces the vegetative cover of the land, exposes it to wind and soil erosion destroys wildlife habitat and loss of biodiversity. The excessive heat from the fire destroys soil micro-organisms resulting in soil infertility. Open grazing as a result of excessive bush burning contributesto global warming and climate change by increasing the Green House Gases (GHG) and carbon dioxide the atmosphere (Chukwuemeka, Aloysius, & Eneh, 2018).

The impact of open grazing on the environment has resulted in the following:

#### **Land Water and Air Pollution**

Open grazing through the release of animal dung and waste helps nourish the soil by increasing the nutrient density and promoting the growth of plants thus encouraging forage production. Animal dung increases the soil fertility as it acts as organic fertilizer for the soil. This increases plant growth and soil microorganisms. However, open grazing has significant negative impact on the environment, such as the destruction local vegetation, loss of biodiversity, increased soil erosion, pollution of streams and covers through surface run-off and contamination of the waterways with fecal matter and waste including degradation of the land and other natural resources. Furthermore, open grazing can reduce streams and riparian forests to dry wastelands; and rich top soil turned to dust leading to stream sedimentation and death of aquatic organisms (Mrabrure of Awhefeada, 2020). Open grazing of livestock leads to the contamination and pollution of water bodies, such as streams and rivers, which serve as sources water supply for the leal community. Animal dung fromthe livestock contribute to the poor sanitation of the

community resulting in stench and flies in the area. Open grazing of livestock also results in the spread of diseases arising from the cow's ectoparasites of ticks, flies and lice.

Open grazing of livestock hinders traffic flows and creates lockjams on roads and highways thus exacerbating city congestion, endangering human lives, hinders vehicular movement and equally causes road accidents (Taiye Duada & Emmanuel, 2017). The burning of bushes by herders for greener and fresh pasture for their livestock are sources of carbon and smoke which pollutes the environment, especially land, water and air. The emission of carbon dioxide and methane gases lead to global acidity of the oceans which can adversely affect marine ecosystems (Eneh, 2011). Thus, increased levels of greenhouse gases such as methane and Carbon IV oxide caused by livestock processes can lead to ozone layer depletion, which can negatively affect the air quality and in turn leads to death people and other living organisms.

### **Desertification**

According to Article I of the United Nations Convention on Combatting Desertification defined desertification as the degradation of land in arid, semi-arid and sub-humid areas of the world due to climatic variations and human activities. It is described as the manifestation of biodiversity loss in arid and semi-arid regions of the world (Reynolds, 2011). Desertification affects the lives and the economy of nations. It has been reported that about one billion people are at of desertification and 250 million others are negatively affected by desertification (Ukhurebor & Adetunji, 2020). It occurs in fragile environments and could lead to drought especially through the practice of open grazing (United Nations Conventions to Combat Desertification, 1997). Desertification poses a major environmental challenge, both locally and globally. These challenges can be traced to the interactions of man with the physical, biological and the social environments which have implications on the local, regional, national and global landscapes. It has been reported at the United Nations Conference on Environment and Development (1997) that Nigeria is losing about 351,500 kilometers land mass to desertification, and it is advancing southwards at an annual rate of 0.6 kilometers. This has led to a change in the vegetation of these frontline states from grasses, shrubs and short trees to extensive areas of sand (United Nations Commission on Sustainable Development, 1997). The effects of desertification on the environment is enormous, ranging from soil erosion to drought, deforestation to bush burning and loss of vegetal matter culminating in poor harvest, hunger and starvation. Thus, open grazing of livestock is one of the factors identified as hindering food security by contributing negatively to the agricultural sector, thus affecting sustainable agricultural development in Nigeria. In the Sahara and Sahel regions of Africa, countries like Chad, Egypt, Libya, Mali, Mauritania, Niger, Sudan, Senegal and Nigeria, desertification is a major environmental challenge that has threatened the habitat of these countries (Aigbokhaevbo, & Aniekwu, (2013). This resulted in adverse socio-economic and environmental problems in these countries. Desert encroachment is a threat to the survival of the people of Nigeria even as efforts made by government failed to check the excesses of the herders. The transhumance activities of the herders continued to hinder programmes of reforestation as the animals continue to graze on reforested lands and interfere with efforts

made at reforestation and rehabilitation of rangelands in Nigeria. This has further led to soil degradation, soil erosion, and loss of arable lands for farming.

### **Soil Erosion**

Soil erosion is the process of wearing away the topsoil from the earth's surface typically due to natural or man-induced factors of deforestation, overgrazing, intensive farming, urbanization and climate change, leading to soil degradation water pollution, land degradation, increased flood and biodiversity loss. Overgrazing plays an active part in the process of soil degradation, which in turn has direct consequences on the crop productivity and environmental sustainability (Ukhurebor&Adetunji, 2020). Vegetation and its root structures help to bind the soil particles together and play active part in interception of rainfall, slows down surface runoff and increase soil infiltration capacity. Thus, there is a relationship between plant cover and soil loss due to soil erosion. Soil erosion increases rapidly as plant cover fall (Mrabrure of Awhefeada, 2020). Erosion either by wind or rain is much more severe on bare ground than on grassland. Overgrazed lands greatly affect soil organic matter, soil moisture and has high rate of evaporation (Watson, 2021).

It has been reported that open grazing is one of the major causes of soil erosion in northern Nigeria, where about 30 percent of the agricultural lands in Katsina State has been improved by soil erosion (Ukhurebor & Adetunji, 2020). This has led to the destruction of the soil structure and soil nutrient. Open grazing leads to soil exposure, loss of vegetation cover, deforestation and soil erosion.

Open grazing is further exacerbated by the pressure on the land by the number of increases in the number livestock in relation to the land area S. (Igbokwe - Ibeto, Nnaji & Ozigbo, 2021). Soil erosion is also aided by bush burning, as it reduces the vegetal cover of the soil, destroys the microorganisms and creates room for soil erosion (Ukhurebor&Adetunji, 2020).

In Delta North Senatorial District of Southern Nigeria, soil erosion threatens agricultural productivity and the quality of surface water as a result of overgrazing, intensive farming, deforestation and urbanization. The overgrazed lands are as a result of the removal of vegetation cover through excessive grazing which reduces the plant cover and soil compaction caused by the trampling of livestock, which destroys the soil structure and loss of soil organic matter in the area. Overgrazing is the area led to increased runoff due to reduced vegetation cover that allows rainwater to flow freely and unprotected soil particles to be easily eroded. Soil erosion in the area created concentrated runoff channels (gullies) and soil nutrient depletion. The negative effects created soil degradations through reduced fertility structure, sedimentation and nutrient runoff, degradation, increased flood risk and habitat destruction.

### **Deforestation**

One of the major anthropogenic activities of man which has degraded the environment and forest ecosystem, is deforestation. Deforestation is the act of cutting down clearing away of forests (Ogunwale, 2015). A deforested is therefore one that is deprived of its existing natural forest vegetation and resources, it is the systematic logging or clearing of existing vegetation for farming or for industrial purposes (Adebayo, 2010). Deforestation is a major issue and an

important long term environmental challenge facing, Nigeria. The exploitation of forest resources in Nigeria continues unabated with increasing appetite for more (Etuonovbe, 2009). In the 1990s according to the Food and Agricultural Organisation, an estimated 94,000 square kilo- metres of forest was loss to deforestation. Most of these forests were cleared, burnt and converted to farmlands for agricultural purposes and grazing of livestock. The conversion of forests to pasture lands for raising and grazing of livestock has serious consequences on the environment, vis-a-vis emission of carbon IV oxide, methane and other greenhouse gases into theatmosphere contributing in no small measure to global warming and climate change, biodiversity loss, water pollution and land degradation.

In Delta North Senatorial district, logging and fuel wood are major activities of deforestation in the area. This takes place in both unprotected and protected forests. The rural populace are poor and still make use of fuel wood as their major source of energy for cooking. They depend on the forest for this cooking energy through deforestation. The trees are felled and used as fuel wood and or used by livestock animals through the practice of open grazing. Open grazing by livestock animals lead to loss of vegetation cover, thus making the land prone to soil erosion (FAO, 2010). According to the FAO (2010), five to ten years of overgrazing and nutrient loss on land can turn a rainforest region into an ended wasteland (FAO, 2010). Thus, open grading is one of the factors contributing to deforestation and environmental degradation in the area.

#### **Global Warming and Climate Change**

Global warming and climate change are interrelated phenomena shaping the earth's climate today. The rise in temperature and environmental changes accompanying it, such as hurricanes, cyclones, typhoons, floods, drought amongst others are due to the rise in the atmospheric levels and concentration of greenhouse gases (Howard-Greenville, Buckle, Hoskins & George, 2014). A rise in global temperature by 0.7°C caused the level of the sea water to rise by approximately 25 centimetres with catastrophic consequences on the immediate environment (Igbokwe - Ibeto, Nnaji & Ozigbo, 2021). .Accordingly, greenhouse gases, such as carbon dioxide, methane, nitrous oxide and halocarbons are responsible temperature increases since the middle of the twentieth century (Ukhurebor & Adetunji, 2020). Livestock production as its industry have been identified as accounting for about 9 percent of carbon dioxide emissions from human related activities and 37 percent of methane emissions from the digestive system of livestock and other ruminant animals (Aigbokhaevbo, & Aniekwu, (2013).

The impact of climate change will result in a rise in sea level, resulting in floods and lead to more heat waves, drought and changes in precipitation rate which will negatively affect food production. The African continent and Nigeria particular will be worst hit by food shortages and water scarcity as a result extreme weather events arising from global warming and climate change (UNDP, 2008). The rise in temperature has significantly affected the ecosystem leading to species extinction, decrease in population, ecosystematic imbalance, reproductive changes, migrations of animals, increase in diseases and other weather events (Watson, 2021).

Livestock production have been identified as a major problem and casualty of climate change as it is the largest consumer of natural resources and contributes less than 20 percent of the

Gross Domestic Product globally and about 18 percent of the Greenhouse gases globally (Watson, 2021). Climate change has serious negative consequences on food production, including livestock dairy, meat and wool production as a result of its impact on grassland and rangeland (Salem, et al, 2001). The frequency of drought and water Scarcity leaps to loss of grasses, shrubs for livestock, food insecurity as a result of poor growth and harvest from agriculture and conflicts from scarce resources (Steinfeld et al, 2006).

The loss of vegetation cover in an area increases the level of carbon in the atmosphere, leading also to global warming. Thus, the movement of herders from place to place with their livestock for grazing contributes to global warning.

This is particularly evident in Delta North Senatorial district of Southern Nigeria, where herders are seen with their cattle moving from one parcel of land to another in search of greener pasture for their cows. This not only destroys the vegetation but adversely affects the natural environment and leads to instability in the ecosystem. There is therefore the need to appreciate the relationship between climate change and sustainable development and to put in place mitigating measures to control overgrazing in the area.

### **Wildlife Extinction and Loss & Biodiversity**

Biodiversity is the total expression of life on the planet and it includes genetic diversity, which is the total genetic information found in the genes of individual plants animals and microorganisms, species diversity, which includes the different types of living organisms found on the earth's surface and ecosystem diversity which refers to the different types of habitats and all the ecological processes going on the earth's surface including the atmosphere which planks and animals live (United Nations Convention on Biological Diversity, 2006). The genes, species and ecosystems dimensions of biodiversity are interconnected and tend to influence one another as they impact on the environment. Thus, a reduction in genetic diversity can lead to extreme extinction of one species, can lead to unbalance in the ecosystem between the different populations of wildlife species which inturn influence the functioning of the ecosystem (Steinfeld et al, 2006).

Man has benefitted from the exploitation of his environment, just as his activities have threatened the existence of the biodiversity. Man's economic activities such as agriculture, mining, fishing, forestry, have put enormous pressure on biodiversity, hence depletion of environmental resources. Open grazing is a major contributor to biodiversity loss as it helps to modify the land and destroy habitats. It affects biodiversity by leading to overgrazing of pasture and loss of vegetal resources. It is also one of the main causes of rangeland ecosystem degradation through reduced productivity as a result decrease in vegetation cover, increase in the amount of unpalatable species, decrease species diversity and a consequential effect on the soil structure.

Delta North Senatorial District of Southern District is a region greatly endowed with biodiversity ranging from mangrove swamp forest to tropical rainforest to savanna grassland and wildlife, which is used by the rural dwellers in the area for fuel, wood and food, including medicine (Steinfeld et al, 2006). The exploitation of these forest resources with great loss to

biodiversity go on unabated, with so much harm done to the environment. This has become a challenge to sustainable development in the region. The need to address this ugly trend and to sustain the environment is the main thrust of this paper

### **Conclusion**

Open grazing as a long-time practice among the Hausa-Fulanis has evolved over time to one that has serious consequences on the environment. Open grazing leads to environmental degradation vis-a-vis deforestation, desertification, soil erosion and wildlife extinction and loss of biodiversity due to the loss of vegetation cover on the land surface. This has contributed to ecosystem imbalance land, water and air pollution and has contributed to global warming and climate change, resulting in extreme weather events such as hurricane, cyclone, drought, wildfire and flooding.

Open grazing also affects the environment negatively through unsustainable agricultural practices that threaten food security, employment and human development in the country. It is the major reason for the north-south transhumance of herders and cattle Nigeria; thus, creating pressure on the available natural resources. The practice of open grazing as a result of inadequate laws continued unchecked on the part of the federal, state and local governments, hence open grazing continues to thrive leading to environmental degradation. Therefore, the challenges of open grazing in Nigeria and Delta North Senatorial District underscores the need to address and regulate the practice of open grazing in order to deal with the challenges of environmental degradations, pollution, global warming and climate change, wildlife extinction and biodiversity loss and to further ensure that the principle of sustainable development are upheld in the case of cattle rearing in the area.

### **Findings**

The study sets out to examine the impact of open grazing on natural resources depletion in Delta North Senatorial district of Southern Nigeria. Consequent upon the above, the following findings emerged:

- Open grazing of cattle and their movement from one place to the other has negatively affected the environment resulting in environmental degradation, such as pollution, soil erosion, wildlife extinction and loss of biodiversity.
- The movement of cattle by herders from the north to the south of the country (transhumance) search of fresh and greener pasture, especially during the dry season underscores the principle of environmental sustainability, thus responsible for environmental degradation and unsustainability in Nigeria and Delta North Senatorial District in particular.
- The study discovered that there is a relationship between open grazing of cattle and global warming and climate change. Thus, open grazing contributes to temperature variations leading to loss of vegetation and a consequent on the climate. This in turn affects the animals due to the sparse nature of the vegetation.

## Recommendations

The following are recommendations, suggestions, strategies, alternatives and policy implications presented as additional precautionary measures for maintaining and improving on the present status of the environment caused by open grazing in order to safeguard the environment for today and future generations.

1. The practice of open grazing should be banned and environmentally friendly sustainable livestock management practices encouraged.
2. There should be the enactment of anti-open grazing laws to guide against the free movement of herders and cattle from one place to another.
3. The contribution of the livestock sector to the environment be checked in order to minimize the problems of global warming and climate change caused by the livestock.
4. Enlightenment campaigns and education on the challenges of open grazing be carried out from time to time to create awareness on the dangers of open grazing on the environment.
5. Open grazing should be restricted to certain areas, where cattle are kept (rangeland) and fed from time to time

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