

Assessment of Existing Indigenous Practices Employed that Promote Sustainable Grazing in Grazing Reserves of Northeastern Nigeria

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Abstract

The study assessed existing indigenous practices employed that promote sustainable grazing in grazing reserves of northeastern Nigeria. The method used include: Semi-structure interview, field inventory and observations. The major findings of the study revealed that the indigenous practices employed in the grazing reserves by herders are sustainable in livestock. Among the problems encountered in livestock production in region are; inadequate water resources, inadequate pasture, shortage of land, annual occurrence of conflict, improper bush fires, farming intensification leads to encroachment, lack of security during mobility to some places, lack of funding and high cost in buying hay, competition of important grasses for livestock feeding and lack of fodder banks. In conclusion, there is lack of proper attention and inability of the responsible government agencies to provide effective management programmes, coupled with dilapidated and non-functioning infrastructures revealed during field survey. It is recommended that, for the reserve to achieve its mandate, all dilapidated infrastructures (tools and facilities) should be revamped and construction of new ones by both government and non-governmental organizations.

Keywords: Indigenous Practices; Sustainable; Grazing Reserves; Northeastern; Nigeria

INTRODUCTION

Pastoralism is an age old system of livestock husbandry practiced in West Africa (Daodu *et al.*, 2009; FAO 2011). Despite its dominance in the region, the traditional pattern of transhumance has been affected in recent years by high rate of degradation of pastureland due to over-stocking, poor nutrition, inadequate water supply, breed and breeding problems,

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poor diseases control and herd health management (Ducrotoy *et al.* 2018). Due to these constraints in the traditional system, Nigerian Government came up with a National Grazing Reserves Law in 1965 (Shehu, 2018).

In Nigeria, grazing reserves are governments' creation whereby land is acquired, developed and released to the herders for grazing purpose. State and the local governments have gazetted grazing lands covering 2.82 million hectares. The development of grazing reserves is a shared responsibility among Federal Government (70 %), the State Government (20 %) and the Local Government (10 %) (Iro, 2014; Aidonojie *et al.*, 2021). The system is intended to encourage investment in land and to ensure its conservation through controlled grazing by limiting the number of animals entering a grazing land. The government gives each pastoralist in the grazing reserve a piece of land depending on the herd size and the carrying capacity of the land. The pastoralist in turn pays an annual rent to the Government as revenue for managing the reserve (Osano *et al.* 2013; Li *et al.* 2018).

Grazing management has two overall goals, each of which is multifaceted: protecting the quality of the pasturage against deterioration by overgrazing or to maintain the sustainability of the pasturage and protecting the health of the animals against diseases. Proper land use and grazing management technique balances maintenance of forage and livestock production, while still maintaining biodiversity and ecosystem services (Bullock *et al.* 2011).

The practice of proper grazing management dwells on the number of animals allowed to graze on a given reserve. The duration and season of their grazing ensures the wellbeing of animals within the reserve, and reduces water shortage and provides veterinary services. The stocking of the reserve is carefully regulated so that the existing vegetation is not depleted by overgrazing. Overgrazing of the vegetation reduces the production of forage, leads to soil sealing, reduced infiltration, high runoff, floods and erosion. These processes induce unfavorable changes in the botanical composition of the vegetation (Paul & Joseph, 2003). The potential for grazing reserve management depends on environmental factors such as, soil, topography, vegetation, location of the reserve, water availability and socio-economic characteristics of the local community (Hassan, 2016).

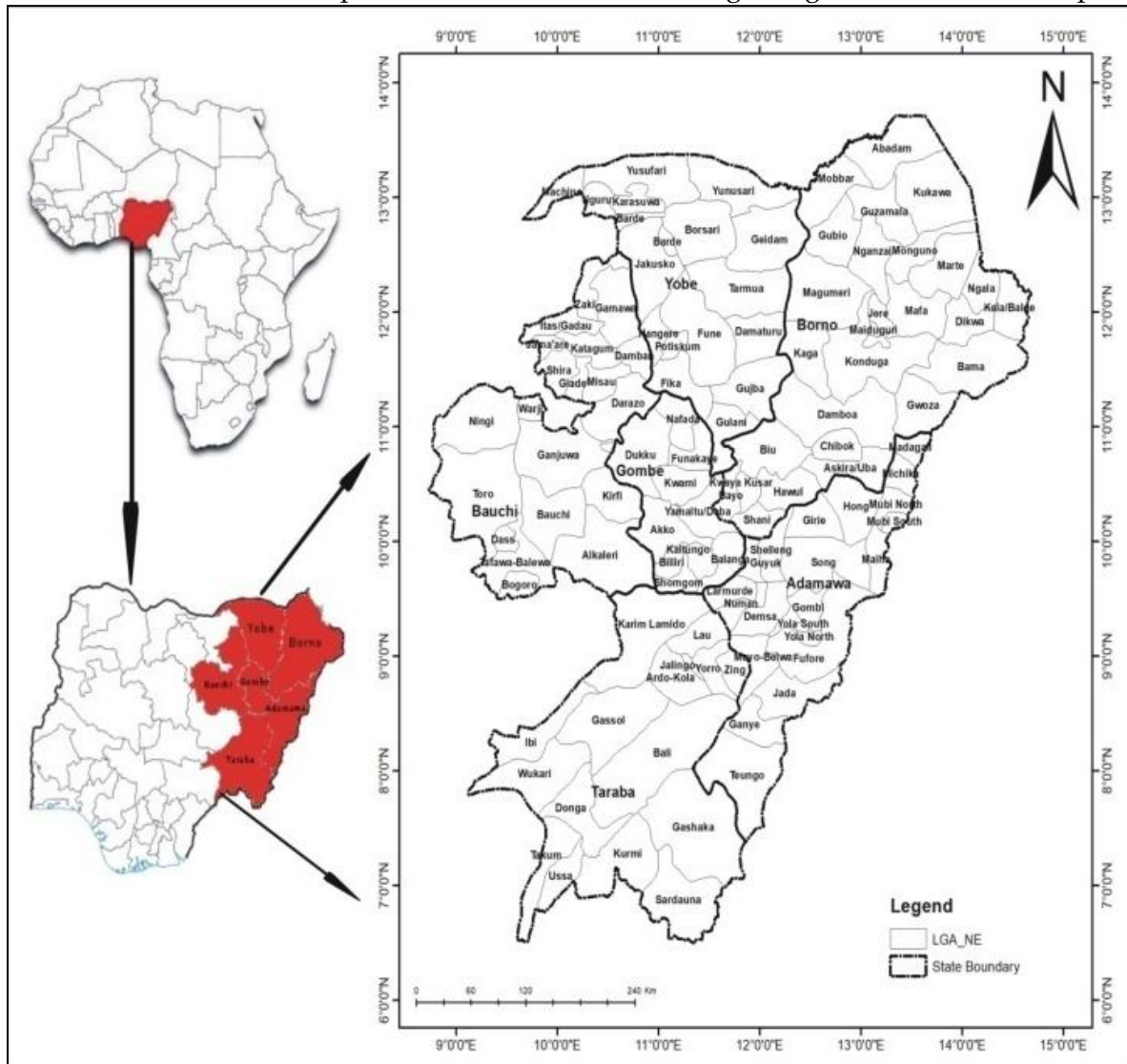
Studies on existing indigenous practices that promote sustainable grazing in grazing reserves of northeastern Nigeria where traditional grazing is still the most dominant practice have not been studied adequately. Particularly in the current discuss concerning remodeling of the grazing reserve system to Ranching and Non-Ranching System. This study is aimed to evaluate existing indigenous practices that promote sustainable grazing in grazing reserves of northeastern Nigeria, with a view to examine indigenous practices employed and problems encountered in livestock production.

MATERIALS AND METHODS

Study Area

Northeastern Nigeria, is located between latitudes 7°50' to 13°30' N and longitudes 9°50' to 15°00' E. It shares international boundaries with Niger and Chad Republic in the North and Cameroon in the East. It encompasses the states of Yobe, Borno, Bauchi, Adamawa, Gombe and Taraba (Figure 1). It covers an approximate land area of 208,105 km² representing about 22.53 % of Nigeria's total land area of 923,768 km². The region has an estimated population of over 26 million in 2016 (National Bureau of Statistics, 2017). For effective coverage of the study

area, sample areas were selected for detail studies with each representing different ecological zones of the area. The sample areas were selected based on the ecological zones of the area and these forms the basis upon which the resources of the grazing reserves are based upon.



Source: Department of Environmental Management, BUK (2020).

Figure 1: Study Area

METHODS

Sampling design

All grazing reserves (GRs) in northeastern Nigeria form the sample population from which sample sites (grazing reserves) were selected. At the first level of sampling, the whole of northeastern Nigeria was sub-divided into ecological zones. At the second level of sampling, six GRs (two in each ecological zone) were selected at random for convenience with each sampled area representing the different ecological, socioeconomic, resource availability and conflict prone area of the region (Table 1), were selected for detailed semi-structured interview to herders.

Table 1: Selected GRs and size in each Ecological Zone

S/No	Ecological Zone	Grazing Reserves	Size (km ²)	S/No	Ecological Zone	Grazing Reserves	Size (km ²)
1	Sahel	Jakusko/Nasari	496	3	Guinea	Kirim	16
		Badegana	190			Mallum	26
2	Sudan	Kimba/Ritawa	278			Total	1,416
		Yautare	410				

Source: Bauchi State Ministry of Agriculture and Rural Development (MAR&D), (2020); Borno State Ministry of Animal Husbandry and Fisheries Development, (2020); Nyako, (2009); Taraba State MAR&D, (2020) and Yobe State MAR&D, (2020).

Semi-Structured Interview

Semi-structured interview was administered to herders, to source information pertaining existing indigenous practices employed that promote sustainable grazing in the northeast Nigeria. Using Yamane (1967) method, sample size of 30% is sufficient, that makes 506 respondents in six GRs. Hence, these respondents were distributed proportionately in the study areas and were selected using purposive sampling (Table 2).

Table 2: Number of Respondents for Semi-Structured Interview

S/N	Grazing Reserve	Current Number of Herders	Number of Respondents ~ (30%)
1	Jakusko/Nasari	471	141
2	Badegana	290	87
3	Kimba/Ritawa	324	97
4	Yautare	320	96
5	Kirim	127	38
6	Mallum	156	47
	Total	1,688	506

Source: Field Survey, (2020).

Data Analysis

The data obtained in semi-structured interview were analyzed using percentages. Descriptive statistics was carried out to obtain percentages in semi-structured interview conducted to herders on existing indigenous practices employed that promote sustainable grazing in the northeast Nigeria.

RESULT AND DISCUSSION

Indigenous Practices Employed

Grazing reserves were been subjected to inadequate management practices from the agencies handling grazing reserves in the study sites. Due to this issue herders indigenous practices employed in the reserves were presented in Table 3. These were carried out using semi-structured interview to 506 herders across the study area.

Table 3: Indigenous Practices Employed

Issues	Most Important	Important	Least Important	Sub-Total	Not Important	Total (%)
Reduction of livestock population	11.7	52.9	11.7	76.3	23.7	100
Selection of faster growing breeds	35.2	17.6	0	52.8	47.2	100
Improved livestock feeding management	27.4	54.8	0	82.2	17.8	100
Improved management of water resources	100	0	0	100	0	100
Protection against bush fires	11.7	52.9	0	64.6	23.7	100
Protection from illegal users/grazers	0	43.2	21.6	64.8	35.2	100
Local veterinary services	88.1	0	0	88.1	11.7	100

Source: Fieldwork, (2021).

(N=506)

Based on responses from herders, 76.3% practice reduction of livestock population as a strategy to promote sustainable grazing. With adequate number of livestock there will be healthier and productive herd and no high demand for fodder consumption; this is practiced to enhance their capacity to support optimal long term sustainable livestock production. Dick *et al* (2008) believed that with adequate number of livestock, pasture recovers quickly after being grazed, pasture remains productive for a longer period of time and livestock will remain healthy and productive. According to Paul and Joseph (2003) the stocking rate in most Nigerian grazing reserves are not carefully regulated and as such, the existing vegetation is depleted by overgrazing. Overgrazing of the vegetation reduces the production of forage, leads to soil sealing, reduced infiltration, high runoff, floods and erosion.

Herders (52.8%) select faster growing breeds for sustainable livestock grazing. Ducrotoy *et al.* (2018) revealed breed and breeding problems as one of the constraints in traditional system of grazing. Livestock production systems globally are changing rapidly, as an investment process, faster growing livestock will reduce the length of time pasture is needed, less labor intensity in terms of diseases, high quality dairy product, cost effective, high market value and profit generation.

Improved livestock feeding management was seen as most important by more than half (82.2%) of herders responses in promoting sustainable livestock grazing. According to Sikiru (2020) and Sollenberger *et al* (2020) livestock provided with essential feeding nutrients has many advantages to the owner, these will; prevent malnutrition, deficiencies and diseases, improve breeding (reproduction performance) and high yield in dairy products.

Surprisingly, all the herders (100%) are of the opinion that improved management of water resources as most important aspect in promoting sustainable livestock grazing. Studies such as; Barnett and Adger (2007) and Gefu (2008) trace lack of adequate water resources due to blockage of water points as one of the major causes of farmer-herder conflict. The scarcity arises due to competition among different occupational groups over scarce resources further exacerbates the tension. Such competition tends to pitch different communal groups into deadly confrontations.

Findings from this study revealed that 64.6% of herders' argued that protection against bush fires is an important way of promoting sustainable grazing. According to Ibrahim and Usman (2021) and Tchoupou *et al.* (2021) control of bush firing plays a key role in shaping ecosystems

by serving as an agent of renewal and change. On the other hand, uncontrolled bush fires can be deadly and destroying soil fertility and other natural resources in the grazing reserves. Protection from illegal users/grazers to promote sustainable livestock grazing was received 64.8% responses by herders. Findings from studies carried out by Otte Chilinda (2002) and Hassan *et al.* (2018) revealed that grazing permit is issued to any herder coming into the reserve legally and government tends to collect revenue annually from these herders in the grazing reserves. Some of the problems affecting the grazing reserves arise from the fact that illegal users or grazers run away from the token amount paid to the government, which leads to an increase in stock rate and deterioration of the fodder.

Herders 88.1% of the respondents revealed that they receive the services of local veterinary facilities for any ailment affecting their livestock. Every urban area depends on rural areas for dairy products, and as such, there is the need for efficient veterinary services and facilities as rampant severe diseases due to environmental changes are manifesting in these areas. Techniques used by herders to control livestock diseases in the grazing reserves are through control of immigrant livestock. It is known and accepted among herders to go on quarantine by arriving every grazing reserve during the period of mobility. This practice was to curtail infection and transmission of diseases among livestock.

Major Problems Encountered

Due to the existing indigenous practices which is not the conventional method of rearing animals in the grazing reserves. Table 4 presents major problems encountered in the grazing reserves from responses of 506 herders using semi-structured interview.

Table 4: Major Problems Encountered in the Grazing Reserves

Issues	Most Severe	Very Severe	Severe	Sub-Total	Not Applicable	Total (%)
Inadequate water resources	25.5	51	0	76.5	23.5	100
Inadequate pasture	44.5	22.2	0	66.7	33.3	100
Shortage of land	0	41.1	11.7	52.8	47.2	100
Conflict with farmers	0	29.8	0	29.8	70.2	100
Bush fires	0	23.3	0	23.3	76.7	100
Animal diseases	0	23.7	11.7	35.4	64.6	100
Inadequate immunization to livestock	0	88.9	0	88.9	11.1	100
Human diseases	6	23.3	0	29.3	70.7	100

Source: Fieldwork, (2021).

(N=506)

In Table 4, 76.5% of the respondents identified water scarcity as a serious problem facing them. Hassan *et al.* (2018) reported 60.5% inadequate water supply in Janga Grazing Reserve. Similarly, Momale (2014) reported 91.6% grossly inadequate for livestock use in grazing reserves of northwestern Nigeria and water remain the major constraint in the region. It was revealed in the field that Kirim, Kimba/Ritawa, Jakusko/Nasari and Badegana have no any borehole provided for livestock. Herders have to go far to river banks and hand dug earth dams to feed their livestock. Yutare and Mallum grazing reserves have one functional and one non-functional borehole which the supplies are not adequate (Plate 1a-f).

According to Paul and Joseph (2003) the basic ecological services rendered in a reserve are; water and vegetation. Water is the most important, but often the most overlooked nutrient or management tool and also serves as critical component to be satisfied in the ecosystem. Hassan *et al.* (2018) and Ducrotoy *et al.* (2018) revealed that lack of adequate water and poorly

placed watering facilities are the usual problems encountered in some grazing reserves in Nigeria.

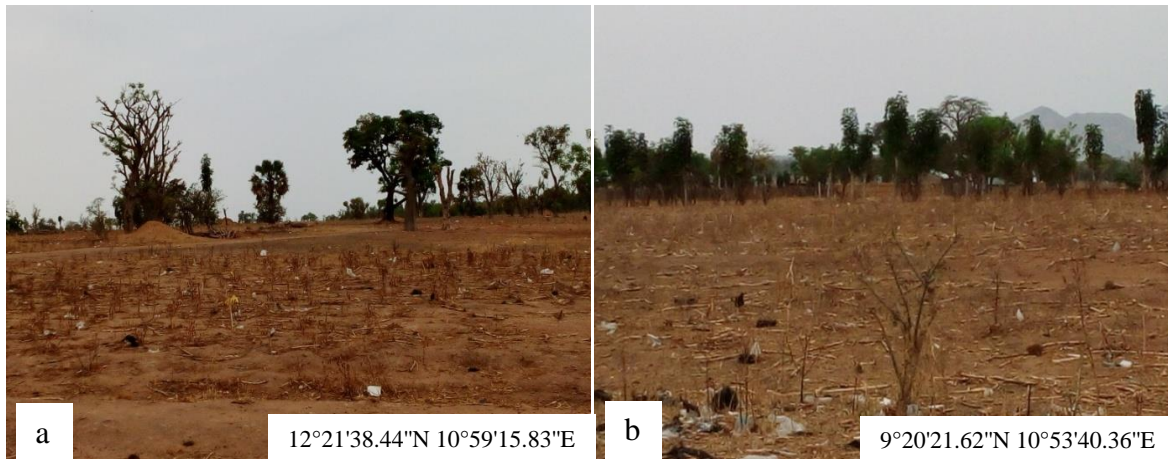


Source: Fieldwork, (2021).

Plate 1a-f: (a) & (b) Watering Point of Livestock in Kimba/Ritawa Grazing Reserve
 (c) Watering Point near Kirim Grazing Reserve
 (d) Watering Point in Jakusko/Nasari Grazing Reserve
 (e) Abundant Watering Facility in Yutare Grazing Reserve
 (f) Non-Functioning Borehole Facility in Mallum Grazing Reserve

Respondents in the field (herders) lamented deteriorating decreasing conditions of the grazing reserves and this condition is said to occur due to overgrazing and shift in agricultural practice as revealed in Jakusko/Nasari and Kirim grazing reserves (Plate 2a & b). Out of the 506 herders, 66.7% of the respondents identified pasture scarcity as a serious problem facing them. Mandi *et al.*, (2020) opined that inadequate pasture or fodder for livestock feed causes a lot of downfall and reduced size of the livestock. He revealed that the effects of such inadequacy are; poor livestock performance, poor production per acre, poor milk production,

still birth, stunted growth in young livestock, poor calving period, starvation, diseases outbreak and sudden death.



Source: Fieldwork, (2021).

Plate 2a & b: Cultivated Land in Jakusko/Nasari and Kirim Grazing Reserves

More than half 52.8% and less than three quarter (29.8%) of herders have responded severe shortage of land and annual occurrence of conflict with farmers as one of the major problems encountered in the study sites. It was revealed during the field exercise that the grazing reserves lack entire management practice as crop farming activities exist. Studies of Ogboru and Adejonwo-Osho (2018) opined that over point in time, there had been an encroachment of the grazing reserve areas by urban and rural inhabitants. This is because the federal and state governments were laid-back in gazetting the grazing reserves as provided by the Grazing Reserves Act. Moreover, there is no long term plan of taking care of the grazing land for effective grazing. Shortage of land is one of the challenges faced by herders in the grazing reserves as more lands were converted to cultivation fields.

Few numbers of herders have lamented problems of improper bush fires (23.3%) in the study sites. As revealed during field survey in Yautare and Jakusko/Nasari grazing reserves are facing some damages to the grazing land with serious ongoing bush fires and cutting of herbaceous vegetation. Little was revealed in Mallum grazing reserve to clear the path of passage in the grazing reserve (Plate 3a-c).

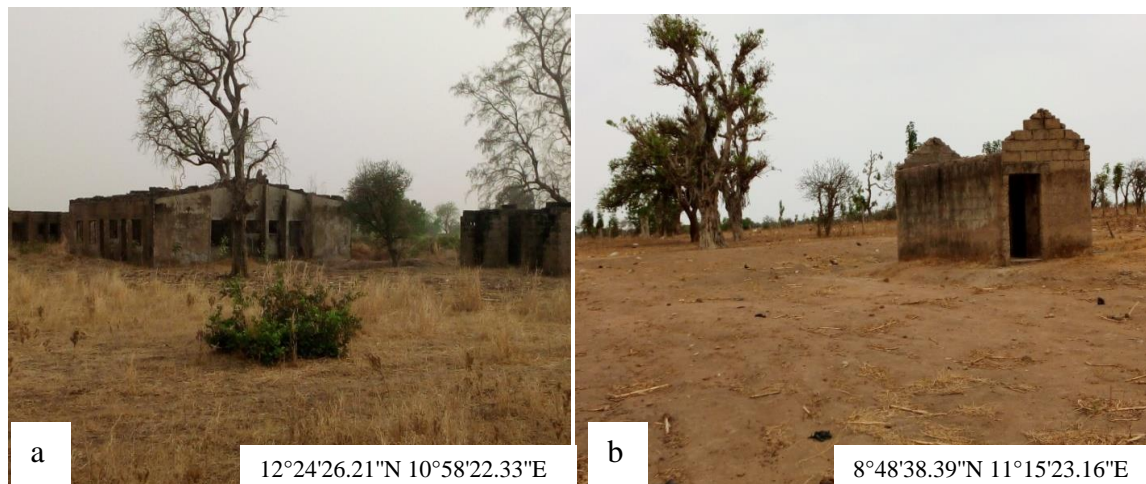


Source: Fieldwork, (2021).

Plate 3a-c: (a) Bush Fires in Yautare Grazing Reserve (GR)
(b) Cutting and Damaging of Herbaceous Vegetation in Jakusko/Nasari GR
(c) Bush Clearing for Path of Passage in Mallum GR

Herders reported 35.4% severe cases of livestock diseases and 88.9% lamented inadequate immunization to livestock. This finding revealed that there is no any veterinary service rendered in the GRs and the annual campaign on immunization for livestock was not extended to reach far more rural areas. The team for the livestock immunization includes veterinary doctors, animal health workers and security agencies. They do not go far into the reserves rather, they camp near urban areas. Annually only few livestock were immunized due to the following constraints; lack of veterinary centers and those present were dilapidated (Plate 4a & b), security issues proliferating the northeastern region, absence of good communication network noticing the herders for the period of immunization.

According to herders in the interview schedule 29.3% responded severe problems encountered due to human diseases. Findings in this research revealed no any human clinic in the GRs. The minimum tracking distance to human clinics by herders is 5km. The present health centers were situated in farming communities and herders trek such far distant areas to be attended. Human clinic equipped with adequate staff and drugs is one of the infrastructures needed for immediate response to human health.



Source: Fieldwork, (2021).

Plate 4a & b: Dilapidated Veterinary Centers in Jakusko/Nasari and Mallum GRs

CONCLUSION

From the findings of this research, the indigenous practices employed in the Grazing Reserves of Northeastern Nigeria are sustainable for livestock rearing. The major problems encountered by the herders in livestock production need urgent attention of the policy makers in livestock section. More especially dilapidated and non-functioning infrastructures revealed during field survey should be revamped to promote sustainable livestock production in the region by the formal and non-formal organizations.

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