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# Response of Local Communities to Open Cattle Grazing in Niger Delta, Nigeria

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*Abstract:* **The study examined the response of local communities to open cattle grazing in Niger-Delta, Nigeria. The research was conducted in three study areas namely Rivers, Abia and Imo State. Surveys were used to incorporate the views of the respondents. Data were statistically analysed using IBM SPSS Statistics and simple descriptive statistical tools. Results from the study shows that the majority (64.77%) of the study participants were males with 35.23% females making up for 298 participants that undertook the survey. 32.21% participants were within the age grade of 26-35 years which constituted the majority. Over 50% of the respondents that participated in the survey had obtained at least a tertiary education. Majority (48.99%) of the participants were engaged in one form of business/ or trade. Responses showed that herders activities (87.9%) were noticed in all study areas and land fertility (96.3%) is the most affected by open cattle grazing. Major causes of open cattle grazing were identified to be illiteracy (48.9%), followed by beliefs (44.6%). About 62.1% of the respondents reacted that the do not foresee continuous open cattle grazing in the future. Ranching and building of kaals were recommended to arrest the herders-farmer crisis in Nigeria.**

*Keywords:* **Open Cattle Grazing, Local Communities, Response, Niger-Delta.**

## 1. INTRODUCTION

Cattle and other livestock graze more than a quarter of the planet's total land surface, making livestock grazing the most ubiquitous human activity on earth in land area used (Steinfeld *et al.*, 2006, Robinson *et al*., 2014). In some regions of the world, overgrazing has indeed reduced the density and biomass of plant and animal species, reduced biodiversity, and altered ecological succession, nutrient cycles, and landscape heterogeneity (Kauffman and Pyke, 2001). Livestock grazing in natural ecosystems also results in changes in vegetation structure and composition (Stern *et al*., 2002). For instance, changes in vegetation composition from palatable grasses and sedges to less palatable forbs resulting from heavy grazing have been reported in northwest China (Sun *et al*., 2011), Libya (Zatout, 2014), North America (Bakker *et al*., 2003; Koerner and Collins, 2014), South Africa (Koerner and Collins, 2014) and Argentina (Cingolani *et al*., 2013). It has been observed that response of plant species richness varies according to grazing intensity. For example, in grassland ecosystem, Deng *et al*. (2014) reported that plant species richness increased with decreasing grazing intensity. The author observed the highest plant species richness at light and moderate grazing intensities. Random grazing patterns can lead to spatial heterogeneity in light availability, soil nutrient availability and vegetation community dynamics. This can reduce plant competition for environmental resources because the vegetation exists in patches (Bakker *et al*., 2003).

A number of studies have found that open grazing can sometimes have positive effects on wildlife. In contrast to intensive crop production agriculture, grazing lands are also considered critical to conservation because they provide vital habitat for

wildlife outside of formally protected areas and preserve open space and connectivity in ecosystems (FAO, 2017, du Toit *et al.*, 2010). In a number of systems, conservation efforts are increasingly aimed at managing land for livestock–wildlife coexistence.

The effects of cattle grazing on vegetation and soil dynamics have been extensively studied (Milchunas and Lauenroth, 1993, Belsky and Blumenthal, 1997, Holechek *et al*., 1999, Stahlheber and D'Antonio, 2013). They have also been the subject of much controversy due to conflicting results or limitations of small-scale experiments. Recent reviews have concluded that, in general, managed livestock grazing at light to moderate intensities can have positive impacts on rangeland vegetation compared with grazing exclusion (Holechek et al., 2006), though uncertainties remain concerning how spatial movements of livestock influence these processes (Briske et al., 2008).

Livestock impacts on wildlife are perhaps even less well resolved. Impacts can be direct, such as interference competition as a result of the physical presence of livestock on shared rangelands, or indirect through changes they create in vegetation. These changes include primary influences like herbage removal or trampling and higher order effects such as changes in vegetation structure, productivity or composition (Kauffman and Pyke, 2001). Small-bodied species are vulnerable to a range of predators and influences on cover may be more important to them than to large-bodied species which have fewer predators or do not use crypsis to hide from them (Sinclair et al., 2003). Grazing by livestock generally reduces quantity, but sometimes improves quality of vegetation by removing old forage and stimulating new growth (Georgiadis et al., 1989). Therefore, the effect of livestock grazing on native herbivores can be negative, through exploitative competition, or positive, as a result of facilitation. Wild herbivores of differing body sizes are predicted to respond differently to this trade-off between forage quantity, quality, and predation (Hopcraft et al., 2010, 2012). Research has also found that for some plant species, grazing can stimulate net primary productivity, with the maximum stimulation at intermediate grazing intensities (McNaughton, 1983, 1985). If this holds true for the plant community in any given site, the wildlife communities that depend on these plants may also show similar patterns and be found in greatest diversity or abundance at intermediate grazing intensity. This response may be habitat-specific, however, and depend on factors such as environmental moisture and evolutionary history of grazing (Milchunas and Lauenroth, 1993). Many individual studies have been conducted on the responses of select wildlife species to livestock grazing and a number of reviews have targeted certain taxa of wildlife in specific habitats or geographic locations. Reid et al. (2013) provides a good narrative review of the many issues surrounding global livestock impacts on biodiversity. Reviews by Prins (1992, 2000) provide additional discussion of competition between wildlife and humans with livestock, particularly in Africa.

According to Mligo (2006) and Stern et al. (2002), livestock grazing leads to changes in floristic composition and structure within grazed areas. Most studies have documented the impacts of livestock grazing on vegetation in woodlands and grasslands (Hardy et al., 1999; Mligo, 2006; Sun et al., 2011; Cingolani et al., 2013; Deng et al., 2014; Koerner and Collins 2014).

In Nigeria, Open Cattle Grazing is common. It presents major threats to peace between pastoralists and local farmers. This study intends to investigate the response local communities to open cattle grazing in the Niger Delta, Nigeria by determining the response of indigenes/ farmers to open cattle grazing and its effect on the ecosystem.

## 2. MATERIALS AND METHODS

Data were collected using structured questionnaires and oral interviews. A total of 400 questionnaires were distributed in all the three (3) study areas as follows;

- Abia State 133
- Imo State 133
- Rivers State 134

This was arrived at by dividing the sample size of 400 by the three (3) study areas. The sample size in this study was determined using Yamane Taro's statistical method. This method for sample size population was formulated by the statistician Taro Yamane in 1967 to determine the sample size from a given population using a confidence level of 95% and 5% margin error. The formula presented mathematically is thus;

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n =

$$n = \frac{N}{1+N(e)^2} \qquad equation\ (1)$$

where;

n = sample size

N = population size

e = marginal error (0.05)

The 2006 National Population Census estimated the population of Imo, Rivers and Abia State to be

- 3,927,563;
- 5,198,716 and
- 2,845,380 respectively.

Therefore, the study target population was a total of 11,971,716 people. The sample size is thus calculated as below:

$$n = \frac{11{,}971{,}659}{1 + 11{,}971{,}659\ (0.05)^2} = \frac{11{,}971{,}659}{29{,}930.1475} = 399.99$$

Therefore, 400 questionnaires were printed and distributed among the indigenes of Imo, Rivers and Abia States. Random sampling technique was used in collecting data.

Rivers State was given the highest number because it has the largest population. This was done to ensure proper representation. In Abia, the State capital Umuahia was used as the sampling location. In Rivers State, Etchie was used whereas in Imo State, Owerri was used for our sampling. The questionnaires were shared randomly amongst the respondents in each sampling location. The filled questionnaires were later collected and the responses were collated together for the purpose of analysis. Informal Interviews were conducted to validate some of the items on the questionnaire. Observations were also made. Both qualitative and quantitative techniques were used in data analysis. Data obtained from the field were analysed using Microsoft Excel, simple frequency tables and descriptive tools like bar and pie charts were used in the presentation of results. Other instruments used in collection of data include; Garmin limited GPS 72H device, laptop, camera, Pen, and Notepad, etc.

**Number of Questionnaire Distributed and Retrieved**

The study sample size was determined to be four hundred (400) to whom questionnaires were delivered manually to all the study locations. Both the distributed and retrieved rate are statistically represented in Table 1

**Table 1: Number of Questionnaire Distributed and Retrieved**

| States | Distributed | Retrieved | Rate |
|---|---|---|---|
| Imo State | 133 | 116 | 87.2% |
| Rivers State | 134 | 121 | 90.3% |
| Abia State | 133 | 99 | 74.4% |
| Total | 400 | 336 | 84% |

**Source: Field Survey (2020)**

**Study Area**

Three study areas were considered in the study as shown in Figures 1-3. Imo, Rivers and Abia State were used as case studies for assessing the response of local communities to open cattle grazing in the areas and it impacts on ecosystem. The Garmin limited GPS 72H device was used to determine the coordinates of the study locations as presented in table 2

**Table 2: GPS Coordinates of the study areas**

| States | Study Locations | Longitudes | Latitudes |
|---|---|---|---|
| Abia | Umuahia | 7° 28' 59.99" E | 5° 31' 59.99" N |
| Imo | Owerri | 7° 1' 33.0708" E | 5° 28' 34.7160" N |
| Rivers | Etche | 7° 03' 16.00" E | 4° 59' 27.00" N |

**Source: Field Survey (2020)**

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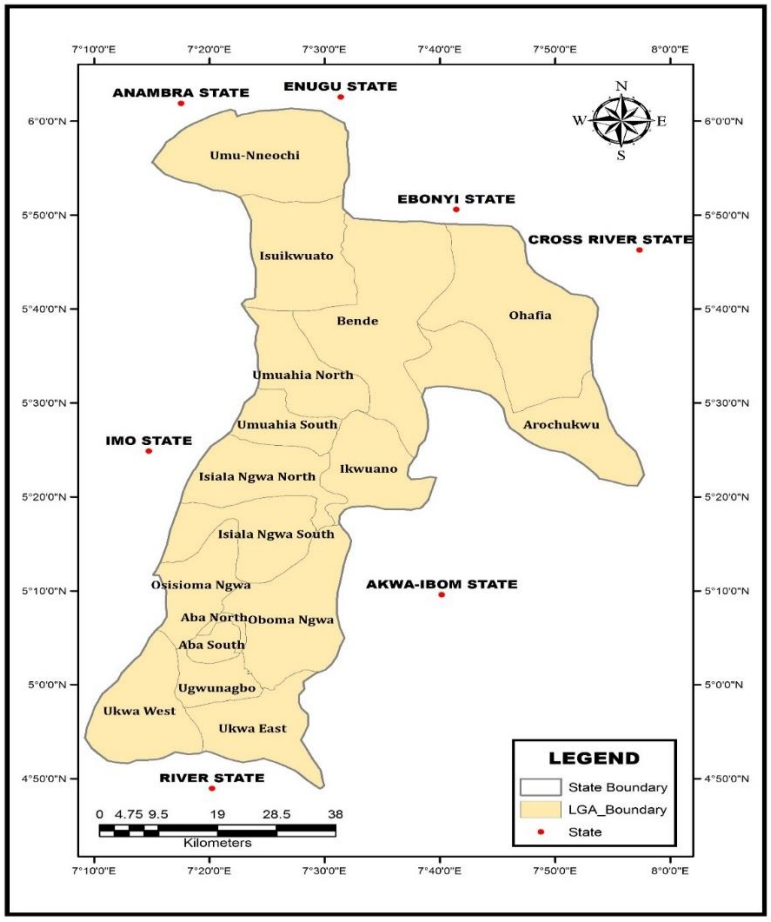


**Fig 1: Map of Abia State (Source: National Space Research and Development Agency, 2011)**

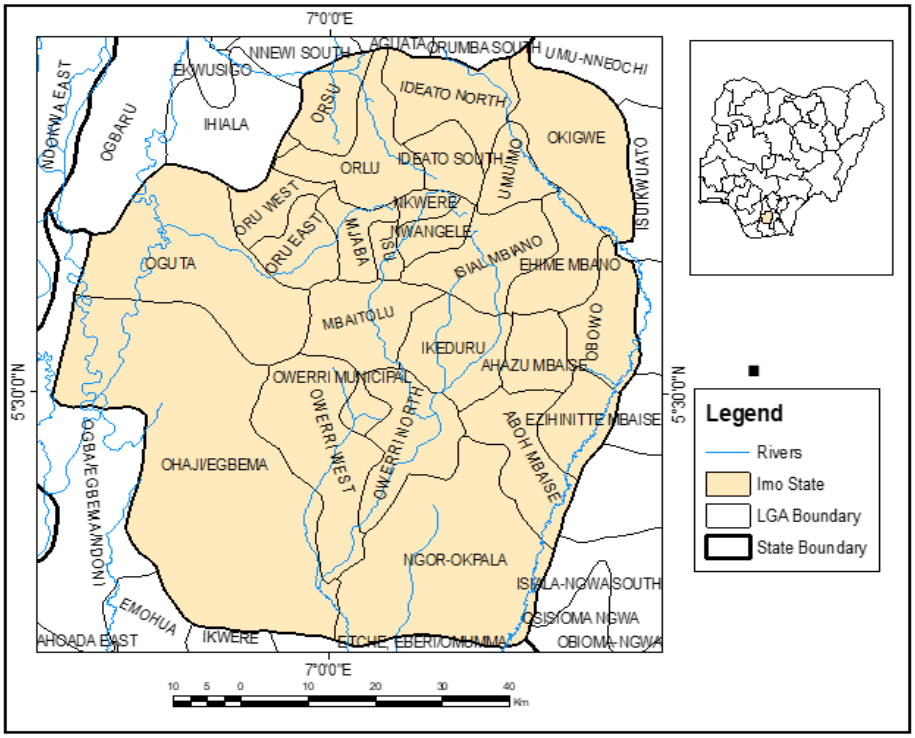


**Figure 2: Map of Imo State showing the Local Government Areas (Source: National Space Research and Development Agency, 2011)**

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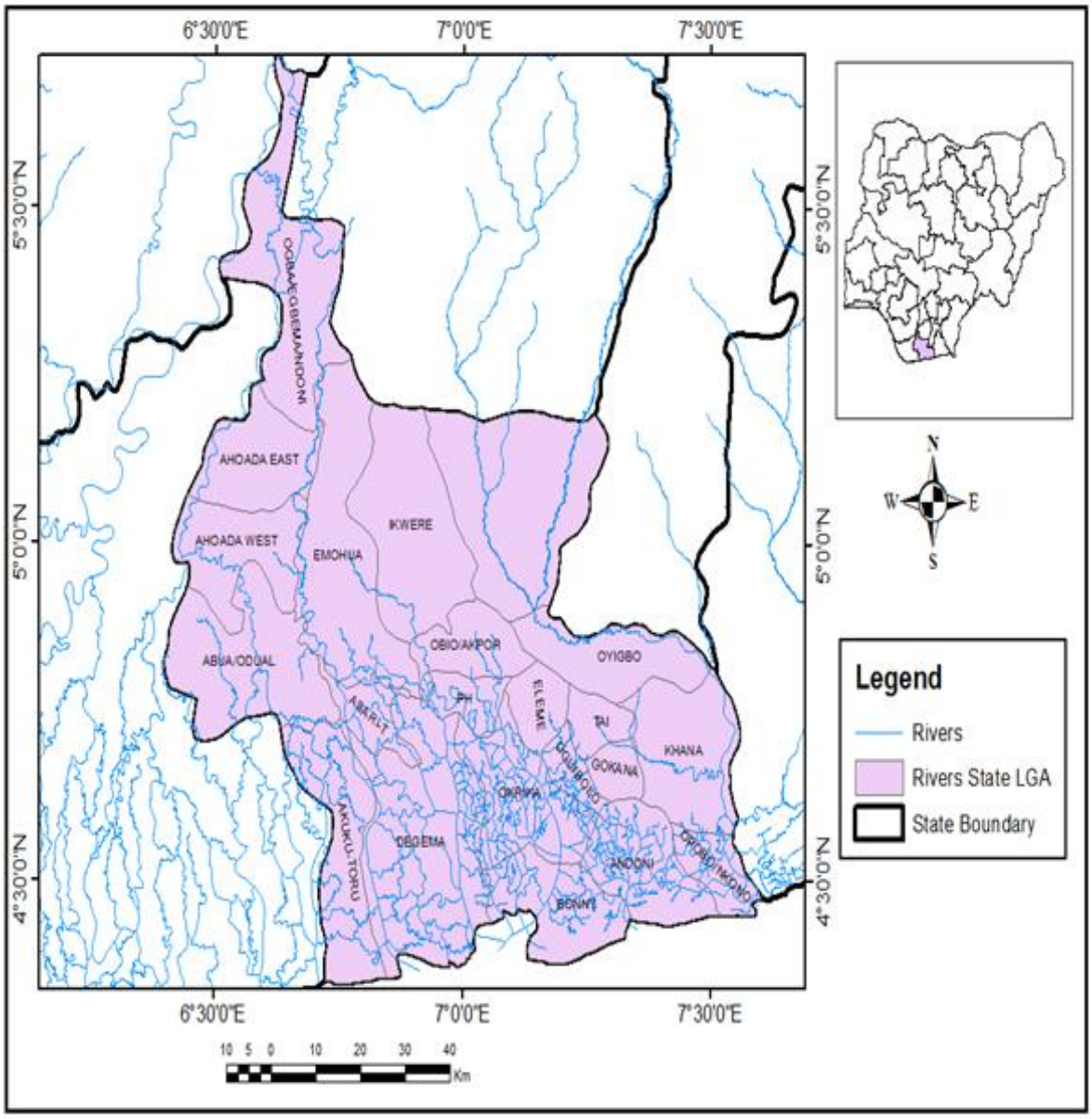


**Figure 3: Map of Rivers State showing the Local Government Areas (Source: National Space Research and Development Agency, 2011)**

## 3. RESULTS AND DISCUSSIONS

**Respondents' Socio Demographic Characteristics**

The result in Table 4.1 depicted that the majority (193) of the study participants were males with 105 females making up for 298 participants that undertook the survey. Also, the result showed that 96 participants were within the age grade of 26-35 which constituted the majority whereas 88, 61 and 53 participants were well within the age bracket of 36-45, 18-25 and 46 and above respectively. Meanwhile the result of the survey also showed that over 50 percent of the participants that participated in the survey had obtained at least a tertiary education while just about 77 participants has had a secondary learning and 68 participants has had at least a primary education. Lastly, the information obtained regarding the study sample showed that a massive 146 of the participants were engaged in one form of business/trade or the other, 96 participants had paid jobs as at when this study was conducted while 56 participants were involved in one form of fishing/farming or the other.

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The demography information collated on the study participants are graphically presented in Figure 4

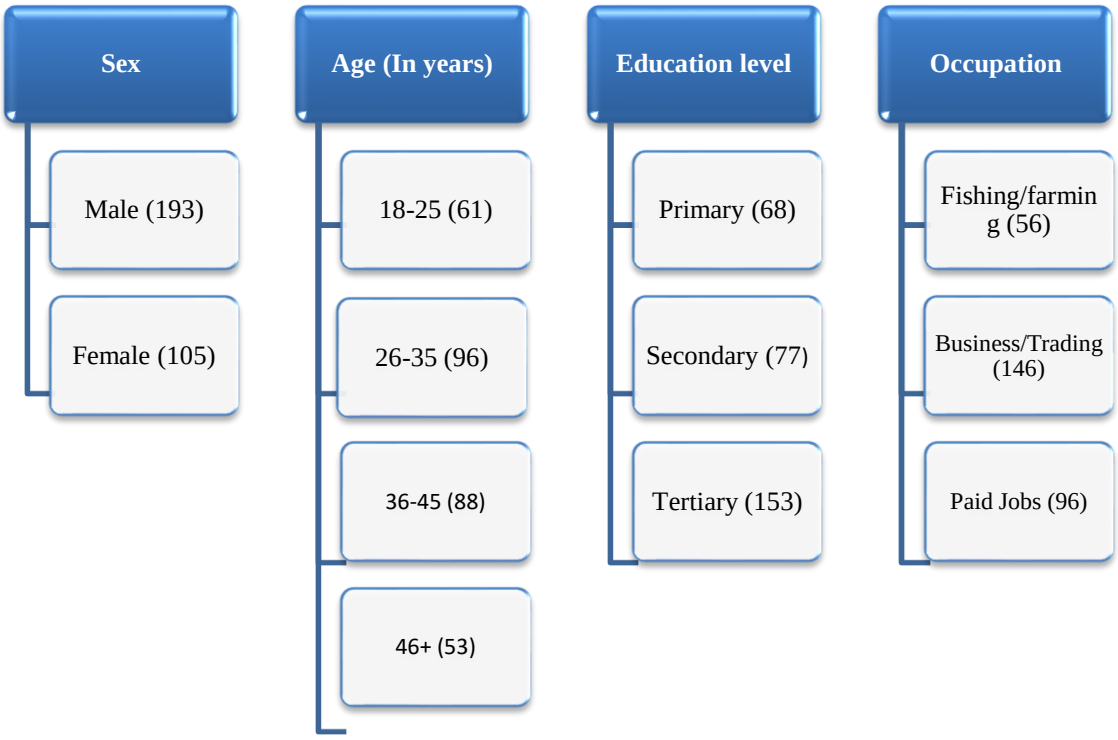


**Figure 4: Social Demographics of Respondents**

**Table 3: Socio-demographic characteristics of respondents**

| S/No. | Variables | Frequency | Percentage (%) | Cumulative percentage (%) |
|---|---|---|---|---|
| 1. | Age (years) | | | |
| | 18 – 25 | 61 | 20.47 | 20.47 |
| | 26 – 35 | 96 | 32.21 | 52.68 |
| | 36 – 45 | 88 | 29.53 | 82.21 |
| | 46 and above | 53 | 17.79 | 100 |
| 2. | Gender | | | |
| | Male | 193 | 64.77 | 64.77 |
| | Female | 105 | 35.23 | 100 |
| 3. | Education | | | |
| | Primary | 68 | 22.82 | 22.82 |
| | Secondary | 77 | 25.84 | 48.66 |
| | Tertiary | 153 | 51.34 | 100 |
| 4. | Occupation | | | |
| | Fishing/Farming | 56 | 18.79 | 18.79 |
| | Business/Trading | 146 | 48.99 | 67.78 |
| | Paid Jobs | 96 | 32.21 | 99.99 |

**Source: Field Survey (2020)**

The result from table 3 depicted that the majority (64.77%) of the study participants were males with 35.33% females. Also, the result showed that 32.21% of the participants were within the age grade of 26-35 which constituted the majority whereas 29.53%, 20.47% and 17.79% participants were well within the age bracket of 36-45, 18-25 and 46 and above respectively. Meanwhile the result of the survey also showed that over 50% of the respondent that participated in the survey had obtained

at least a tertiary education while just about 25.84% participants has had a secondary learning and 22.82% participants has had at least a primary education. Lastly, the information obtained regarding the study sample showed that a massive 48.99% of the participants were engaged in one form of business/trade or the other, 32.21% participants had paid jobs as at when this study was conducted while 18.79% participants were involved in one form of fishing/farming or the other.

**Determining the responses of the local communities to open cattle grazing and its effect on the ecosystem**

The determination of responses of study participant to open cattle grazing were captured as the likely causes of open cattle grazing, its effects on the ecosystem and the response of the indigenous people to open cattle grazing in the three study areas. These were statistically presented and further analyzed as seen in Figure 5, 6, 7 and Table 4.

**Table 4: Responses to the likely causes of open cattle grazing**

| S/N | Causes | Frequency | Percentages |
|---|---|---|---|
| i. | Illiteracy | 146 | 48.9% |
| ii. | Religious belief | 133 | 44.6% |
| iii. | Poverty | 19 | 6.4% |

Source: Field Survey (2020)

From table 4, it is obvious that the cause of open cattle grazing as perceived by respondents in the study area is illiteracy (48.9%), followed by beliefs (44.6%) and poverty (6.4%). This is further presented in figure 5

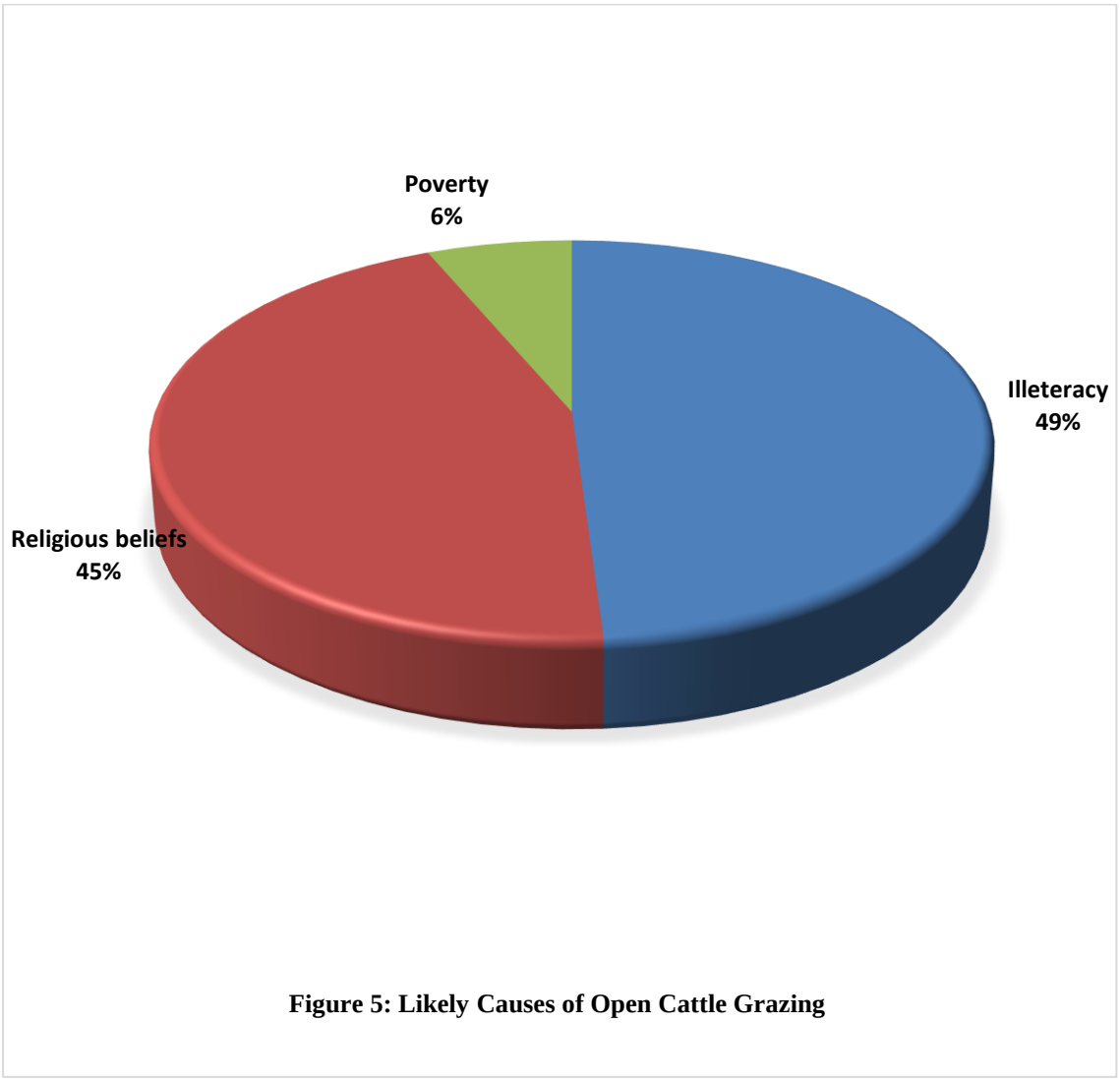


**Figure 5: Likely Causes of Open Cattle Grazing**

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**Effect of Open Cattle grazing on the ecosystem of the study areas**

The chart below shows the response to the effect of open cattle grazing on some selected parameters of the ecosystem in the study area

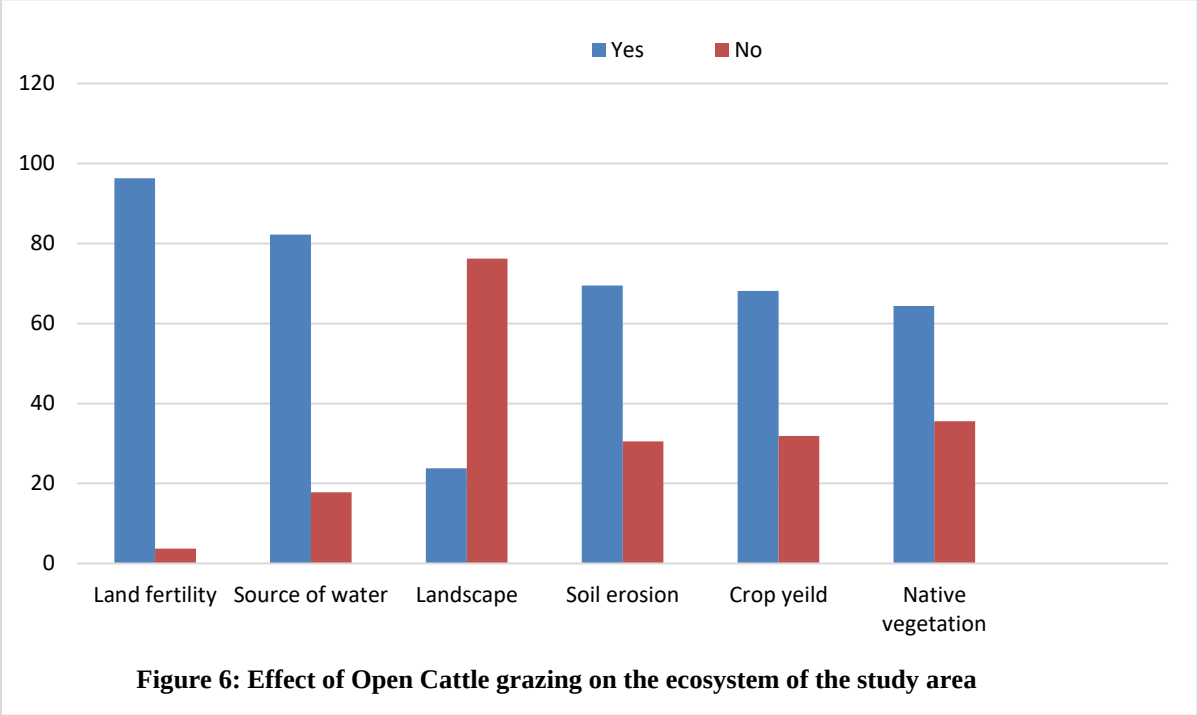


**Figure 6: Effect of Open Cattle grazing on the ecosystem of the study area**

From figure 6, responses from the study areas showed that land fertility (96.3%) is the most affected by open cattle grazing. This is followed by contamination of water sources (82.2%), soil erosion (69.5%), crop yield (68.1%) and native vegetation (64.4%) respectively. On the other hand, responses from the study area depicts that open cattle grazing does not contribute to preserving the landscape (76.2%).

**Response to open cattle grazing in the study areas**

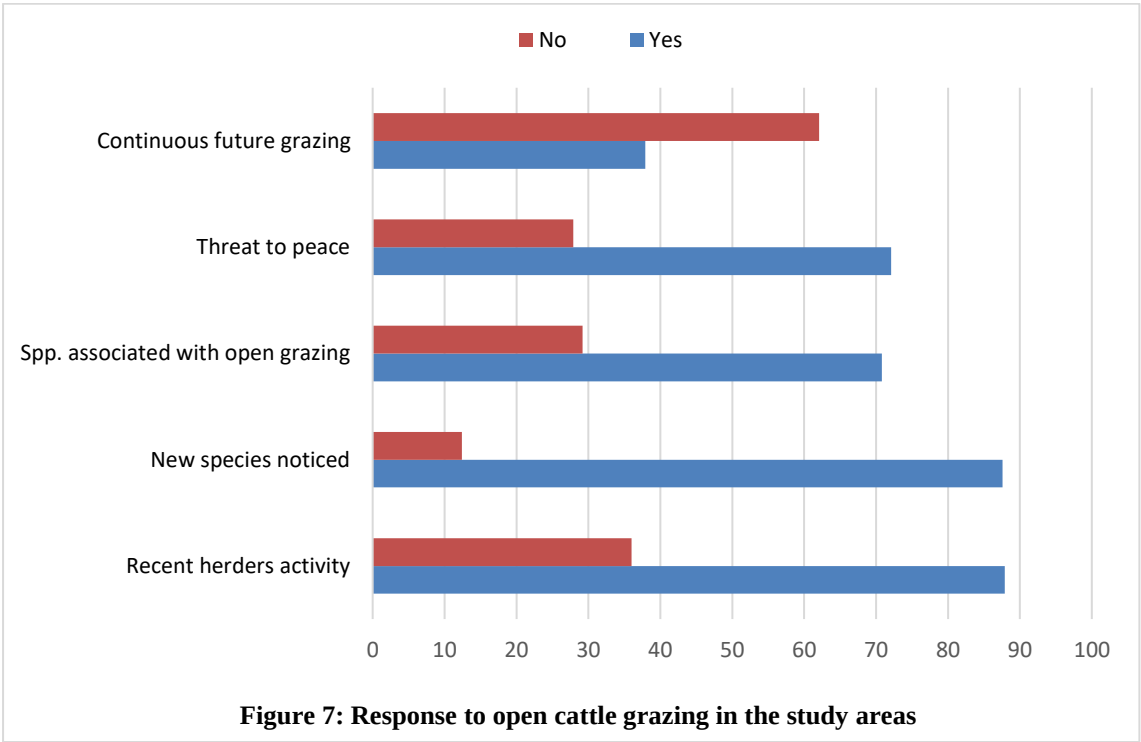


**Figure 7: Response to open cattle grazing in the study areas**

Responses from the survey in figure 7 revealed that herders' activities (87.9%) were seen in the study areas. This explains the submission of 87.6% respondents that new species of plants were noticed recently. Most respondent (70.8%) agree that the new species were associated with open cattle grazing activities. 72.1% of the study survey further revealed that open cattle grazing threatens the peace in the study areas. This could be due to the farmers-herders crisis often experienced as reported recently in some quarters. Also, most respondents (62.1%) reacted that the do not foresee continuous open cattle grazing in the future.

An overview of the respondent opinion on the subject of open cattle grazing and its effect on the ecosystem reveals the following:

i. The likely causes of open cattle grazing include illiteracy, religious beliefs and poverty. Although the possible causes could be more but these were the recognizable ones associated with the study areas.

ii. Open cattle grazing poses more negative impacts on the biosystem, economy, human and plants lives at large.

The findings from the present study, with respect to the response to the impact of open cattle grazing on the ecosystem is similar to that of (Knowler and Barbier, 2000). According to Knowler and Barbier (2000), invasive plant species cause the following:

- Displacing native species, which causes changes in the ecosystem functioning.
- Causing extinctions, which may have "cascade" effects and cause further extinctions.
- Degrading ecosystem services (such as reducing river runoff volumes or water quality or destroying fisheries).
- Altering environmental conditions such as increasing erosion or changing natural fire regimes.
- Disturbing ecological processes and thereby facilitating invasion by other alien species.
- Altering of the food web and nutrient cycles.

## 4. CONCLUSION

Based on the findings from this study, it was concluded that Open Cattle Grazing is not only a threat to peace between herders and the local communities but also to the continuous survival of the ecosystem and its services, hence, decision makers will find relevant data for appropriate action in this study. Ranching and building of kaals were therefore recommended as a long-lasting solution to ending the feud between communities and herders going forward.

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