

## Animal Species and Trees that are Commonly Exploited in Gujba Forest Reserve Yobe State Nigeria

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### ABSTRACT

This study assessment of poaching activities and tree exploitation in the Gujba Forest Reserve, Yobe State, Nigeria, identifying them as major threats to biodiversity. The research aimed to identify animal species and trees that are commonly exploited in the Study area. Primary data was collected via 400 structured questionnaires randomly administered to hunters, bushmeat sellers, forest guards, firewood sellers, civil servants, and residents across six surrounding wards. Secondary data came from relevant literature. Descriptive analysis of the responses revealed that most respondents were married (75.5%), with 35.5% having Arabic education. A significant proportion (34%) were aged 31-40, and 28.25% had a household size of 4-6. Notably, 22.25% were civil servants. Among poachers, 12.5% reported earnings of ₦11,000–₦15,000 weekly. An overwhelming 89% of respondents were aware of the reserve due to massive tree exploitation for firewood and charcoal by both poachers and local communities. The study documented tree species heavily impacted by deforestation, including *Pakia oliveri* (Dorawa), *Adansonia digitata* (Kuka), *Khaya senegalensis* (Madachi), *Balanite aegyptiaca* (Aduwa) and *Tamarindus indica* (Tamiya). Animals commonly hunted for bushmeat included duikers and Hare, while rare species like Baboon, Porcupine, leopards and elephants were also reported in the reserve. The findings underscore an urgent need for enhanced conservation strategies. The study concludes by calling for collaborative efforts among government agencies—such as environmental protection bodies—local communities, and conservation organizations to implement sustainable management practices. This holistic approach is vital for ensuring the reserve's ecological health and supporting the well-being of dependent communities.

**Keywords:** Poachers, Forest Reserve, Habitat, Communities

## INTRODUCTION

Protected area by definition is a selected large area of land suitable for the conservation point of view for effective management of natural resources that includes both Flora and Fauna and the entire ecosystem, is also a large area where human presence or exploitation of natural resources (eg Firewood, Non timber forest products, and Poaching etc) is limited. (Lele *et al.*, 2010). It is one of the most efficient ways to reduce the impact of human on biodiversity globally to the barest minimum. These include the forest reserves, strict nature reserves, biosphere reserve, game reserves/sanctuaries, Fish parks, National Parks and Ramsar sites (Adetola and Adetoro, 2014). However, most of these are plagued with various challenges ranging from poaching, logging, illegal grazing, and Bush burning (Jacob *et al.*, 2015). Studies have revealed that in spite of the high level of commitment by government to increase the global number and enhance the effectiveness of protected areas, wildlife population keep decreasing at an alarming rate (Jacob *et al.*, 2015). Poaching is still a serious threat to many game species and causes depleting of the resources God entrusted to man's care for the benefit of the past, present and future generations.

Forest reserves are areas of forest designated by the government for the protection of trees growing or planted for the purpose of their ecological benefits among others (Osman and Khan Towhid, 2014). Forest reserves are areas of land that are protected and managed in order to preserve a particular type of habitat and its flora and fauna which are often considered rare or endangered (Osman and Khan Towhid, 2014) Species that are commonly poached include, African Elephants (*Loxodonta africana*), Lions (*Panther leo*), Greater kudu (*Tragelaphus strepsiceros*), Elands (*Taurotragus oryx*), Impala (*Aepyceros melampus*), Red forest Duiker (*Cephalophus natalensis*), Reedbuck (*Redunca arundinus*), Cape Bushbuck (*Tragelaphus sylvaticus*), Bush Pig (*Potamochoerus larvatus*), Common Warthog (*Phacochoerus africanus*), Chacma Baboon (*Papio ursinus*) and Greater Cane Rat (*Thryonomys swinerianus*). They are illegally hunted for the bush meat trade in Mozambique, while African Elephants (*Loxodonta africana*) are being poached for their Ivory (Tusks) the heaviest teeth of any animal alive (Wildaid, 2021; Lindsey and Bento, 2012). In October 2013 poachers were reported in the press to have poisoned more than 300 African Elephants in Hwange National Park in Zimbabwe (Thornycroft and Peta, 2013). African Elephants will be extinct in 50 years in the wild, if no action to halt their over exploitation (George Wittemyer, 2025; Elephant Massacre, 2013). African Elephants (*Loxodonta africana*) have experienced a 60-70% decline in population in two decades, 1979–2002 (Goldenberg and Suzanne 2013). Bushmeat is a meat from wildlife species that are hunted for human consumption. Bush meat represents a primary source of animal protein and a cash-earning commodity for inhabitants of humid tropical forest regions in Africa, Latin America and Asia (Nasi *et al.*, 2008). The term 'bushmeat' is originally an African term for wildlife species that are hunted for human consumption (Bennett *et al.*, 2007), and usually refers specifically to the meat of African wildlife (Hall and Jani 2019). Despite the number of forest guards and law enforcement agents that Yobe state has, the trend in biodiversity reduction still persist in the state, (Ministry of Environment, 2021). Poaching activities and woody plants exploitation are the most serious threats to the survival of plants and animals populations, therefore, it has a detrimental effect on biodiversity both within and outside protected areas (Forest reserve), as wild animal populations decline, species are depleted locally, -and the

functionality of ecosystems is disturbed (MOE 2021). The study aims to assess poaching activities and trees exploitation in Gujba Forest Reserve, Yobe State, Nigeria. While the specific objective are to: Identify animal species and trees that are commonly exploited in the Study area. Wildlife is an integral part of any ecosystem and a part of Nigeria's tourism sector as well as part of the country's natural ecology. Therefore, it must be protected from harm and possible extinction. A number of endangered and unique species (Roan antelope, Red fronted gazelle, *Python saba*e, etc) live in the areas of study while poaching and trees exploitation exists as one of various threats to these plants and animals (MOE, 2021). Gujba Forest Reserve is under increasing threat from natural hazards, such as Drought, and Human activities. There are already certain threatening problems with the reserve and visible scars associated with the destruction of the natural resource base (Trees exploitation, Land degradation, Poaching etc) upon which all life depend on. Rapid deforestation, resulting from multiple uses of forest resources for human survival, is a major contributing factor to land degradation. The end result of deforestation and other agricultural activities, including intensive grazing, over-cultivation etc, is severe land degradation, usually referred to as desertification, particularly in Gujba forest reserve.

## **MATERIALS AND METHODS**

### **Study Area**

#### **Location**

Yobe is a State located in Northeast part of Nigeria. A mainly agricultural state, it was created on August 27, 1991. Yobe state was carved out of Borno State. The capital of Yobe State is Damaturu. It lies on longitude 12°00E and latitude 11°30N, and longitude 1200°E and latitude 11°500N. It has a total land area of 45,502km<sup>2</sup> (17,568sqml) with population of 2,321,339 according to 2006 census and projected to 4,070,481 as at 2025 using Krejcie and Morgan (1970). (Figure 1). The study was carried out in Gujba Forest Reserve, Gujba local Government area of Yobe state. Gujba is located at Latitude 11°16'08"N and Longitude 11°55'49"E and Longitude 11°26'88"E and Latitude 11°93'02"N. it has a total land area of 3,239km<sup>2</sup> (1,251sqml) with a population of 130,088 according to 2006 census and projected population of 221,466 as in 2025, using Krejcie and Morgan (1970). The town of Gujba lies in the north part of the Forest Reserve The reserve has a total land area of 410km<sup>2</sup> (158.3sqml) with latitude 11°10'N and Longitude 11°50E and latitude 11°30N and Longitude 12°10E. Gujba was traditionally part of the Bornu Empire, and was noted as a center of commerce and learning. (Hamza, 2009)

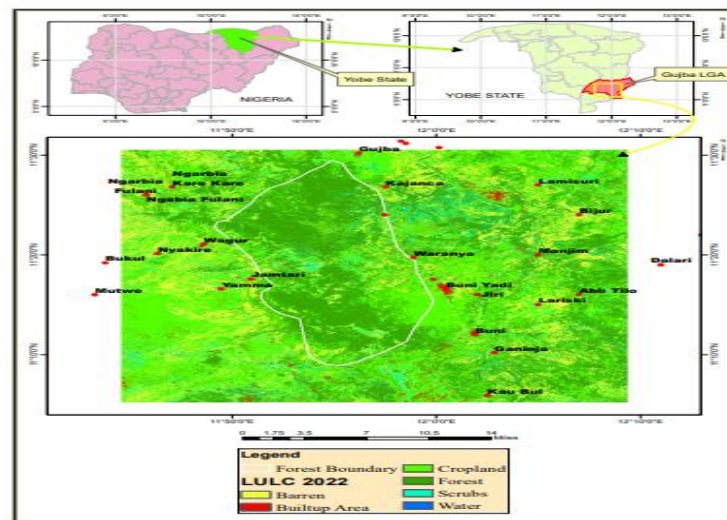


Figure 1: Map of Nigeria showing Yobe State, Gujba Local Government and Gujba Forest Reserve. Source: ArcGIS Analysis 2025

## METHODOLOGY

The research was conducted in and limited to Gujba Forest Reserve, Yobe State, Nigeria and the period of data collection was twelve (12) Months.

### Study design and data collection

To achieve the objectives of this study, social survey involving the use of participatory rural appraisal (PRA) and structural questionnaire as well as assessment of satellite imagery from Google earth engine were adopted. The PRA and the structural questionnaire were used to elicit information from groups and individuals who are either stake holders or are residing within the support zone of Gujba forest reserve. The assessment of the satellite imagery from the Google earth engine for the Year 1992 to 2022 provided comprehensive assessment of land cover changes in Gujba forest reserve. Data collection was carried out within a period of one year (12 months)

### Data collection tool for social survey

The data collection tools for the social survey were structural and semi structural questionnaire. The questionnaire were pre tested before administering them.

### Data Collection Technique

The data collection technique was purposive for key information using semi structural questionnaire while simple random sampling technique was used to administered structure questionnaire on the respondent who include firewood sellers, bushmeat sellers, hunters, timbers dealers, farmers, pastoralists, traders, civil servants, and traditional medicine dealers.

### Sampling Procedure

The semi structural questionnaire was used to conduct oral interview with key information's, including forest guard , staff of ministry of environment and focus groups

draw from the communities within the support zone of the forest reserve. The questionnaire were designed to elicit information on socio economic characteristic, animal species and trees exploited, method of poaching and tree harvesting and management effort to check illegal exploitation. The structural questionnaire was randomly administered on respondents in each of the six communities based on their sample sizes. Information gathered from the respondents include animal and tree species exploited from Gujba forest reserve etc.

### **Sample Size Determination**

Yamane (1967) formula for sampling technique was used in the study. Six (6) wards were randomly picked from Gujba local government to represent the whole of the study area and 400 copies of questionnaire were administered to the wards. The Sampling size was determined Using Yamane (1967) formula below

$$n = N / (1 + N(e)^2)$$

Where

n is the require sample size from the population under study

N is the whole population that is under study

e is the sampling error which is 0.05

According to National Population Commission, Yobe State has a Population of 2, 321 339, using a growth rate of 3% and projected population of 4,070,481 as at 2025. The study area has a population of 130,088, (2006) census and projected to 228,110 as at 2025. Using Krejcie and Morgan (1970) Method, the questionnaire was administered based on the population size (the higher the population the higher the number of copies of questionnaire allocated to the selected wards within the study area. Due to the absence of reliable population data/figure, the number of copies of questionnaire that was allocated to Gujba local Government was based on value percentage of projected population of 2025. National population recommends the use of population projection due to the fact that, Nigeria census data suffer inadequacy. The formals for determination of projected population is as stated below:

$$Pt. = Po (1+r)^n$$

Where: Pt. = Population of the Year i.e. 2025

Po = Previous Population i.e. 2006

r= Growth rate i.e. 3%

n= Interval between Pt. and Po i.e. 19 Years

**Table 1: Sampling Size**

<b>Sample size from Gujba, Buni Yadi, Wagir, Buni Gari, Ngurbuwa and Mutai ward Area of Gujba Local Government, Yobe State</b>				
Study area	Population 2006	Projected Population 2025	Sample size	Sample %
Wagir	4 546	7,971	51	13
Gujba	6419	11,255	73	18
Mutai	3344	5,863	38	10
Buni yadi	16359	28,685	187	47
Buni gari	2961	5,192	34	8
Ngurbuwa	1435	2,516	17	4
<b>Total</b>	<b>35,064</b>	<b>61,482</b>	<b>400</b>	<b>100</b>

Source: Field Survey 2025

### **Statistical Analysis of Data**

Descriptive statistics was used to analyze the result obtained from objective 1-5. The result were presented in the following statistical tables: Frequencies, Percentage, Tables and Chart. Chi square was used to analyze income generated from Hunting, tree species and other domestic income of the respondents

#### Chi Square Method

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

E

Where: O = Observed scores

E = Expected scores

$\Sigma$  = Summation Sign (Adesoye 2004)

## **RESULTS**

### **Animal and Trees Species that are Commonly Exploited in Gujba Forest Reserve**

The result from Table 2 show that 70.5% of the respondents agreed that wild animal species are mostly hunted from the study area for bush meat as shown in plate 1, 2 and 3 while their skin are used for medicinal herb as show in plates 4. Many animals like Hare (*Lepus saxatilis*), Mongoose (*Mongus mungo*), Francolin (*Francolinus bicalcaratus*), Monitor black (*Verus exanthematicus*), Monitor lizard (*Veranus niloticus*), etc were also hunted from the study area. However 29.5% of the respondents indicate lack of knowledge about hunting for bushmeat from the study area.

**Table 2: Animal Species Mostly Hunted from the Reserve for Bush Meat**

<b>English name</b>	<b>scientific name</b>	<b>Hausa name</b>
Jackal	<i>Caris auroe</i>	Dila
Spotted hyena	<i>Crocuta - crocuta</i>	Kura
Red fronted gazelle	<i>Gazelle rufifrons</i>	Barewa
Porcupines	<i>Hystrix cristata</i>	Baguwa
Hare	<i>Lepus saxatilis</i>	Zomo
Mongoose	<i>Mongus mungo</i>	Dage
Warthog	<i>Phacochoerus Africana</i>	Mugun dawa
Lungfish	<i>Protopterus annectues</i>	Gaiwa
Python	<i>Python sabae</i>	Mesa
Duiker	<i>Syfvicapra grimmia</i>	Gada
Francolin	<i>Francolinus bicalcaratus</i>	Fakara
Black horn bill	<i>Tuckucs nasutus</i>	Zabuwa
Monitor lizard	<i>Veranus niloticus</i>	Guza
Monitor black	<i>Verus exanthematicus</i>	Damo
Squirrel	<i>Xerus erythropus</i>	Kurege

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Source : Field Survey 2025



Plate 1: Poacher Burning the Skin of his Bushmeat

Source: Field Survey 2025



Plate 2: Different Species of Animals Killed by Poacher

Source: Field Survey 2025



Plate 3: Bushmeat from the Study Area  
Source: Field Survey 2025



Plate 4: Researcher Hold the Skin of Animal killed by Poacher  
Source: Field Survey 2025

**Table 3: Wild animal Species being Poached and Commonly Sold in the Market from the Study Area.**

English name	scientific name	Hausa name
Hare	<i>Lepus saxatilis</i>	Zomo
Red fronted gazelle	<i>Gazelle rufifrons</i>	Barewa
Duiker	<i>Syfvicapra grimmia</i>	Gada
Francolin	<i>Francolinus bicalcanatus</i>	Fakara
Black horn bill	<i>Tuckucs nasutus</i>	Zabuwa
Monitor lizard	<i>Veranus niloticus</i>	Guza
Monitor black	<i>Verus exanthematicus</i>	Damo
Squirrel	<i>Xerus erythropus</i>	Kurege

Source: Field Survey 2025

**Table 4: Some Flora Species Identified from Gujba Forest Reserve**

Scientific name	Hausa name	Family	Product	Uses
<i>Azadirachta indica</i>	Maina	Bursersceae	Leaves and Root	Medicine
<i>Pterocarpus erinaceus</i>	Madubiya	Leguminoceae	Bark,/Fruits	Food/Medicine
<i>Ziziphus mauritiana</i>	Magarya	Ramnaceae	Fruit, Leaves	Food, Medicine
<i>Vitellaria paradoxum</i>	Kadanya	Sapotaceae	Root and Bark,/Fruits	Medicine/Food
<i>Acacia nilotica</i>	Gabaruwa,	Leguminocae	Fruit	Medicine
<i>Adonsonia digitata</i>	Kuka	Bombacaceae	Fruit, Leaves	Food, Medicine
<i>Tamarindus indica</i>	Tsamiya	Leguminocae	Fruit, Leaves,	Drinks
<i>Pilostigma spp</i>	Kargo	Leguminocae	Leaves	Medicine
<i>Leiocarpus aegytiaca</i>	Marke	Combretaceae	Leaves, Bark	Medicine
<i>Ziziphus spina Christi</i>	Aduwa	Balaniticeae	Fruit, Leaves	Food,Medicine
<i>Parkia oliveri</i>	Kurna	Ramnaceaes	Fruit, Bark	Food, Medicine
<i>Cassia hirsula</i>	Dorawa	Leguminocae	Root, Fruits	Food/Medicine
<i>Annona senegalensis</i>	Gamafada	Annonaceae	Leaves, Root	Medicine
<i>Boswellia odorat</i>	Gwandan daji	Bursraceae	Bark, Roots	Medicine
<i>Calotropis</i>	Ararrabi	Bursraceae	Bark, Roots	Medicine
<i>Combretum glutinosum</i>	Tunfafiya		Leaves	Medicine
<i>Diospyros</i>	Wuyan damo	Combretaceae	Bark, Leaves	Medicine
	Kanya	Ebenaceae	Fruits	Medicine

Faidherbia albida	Gawo		Bark, Root	Medicine
Fiscus platyphyla	Gamji	Moraceae	Stem, Bark	Medicine
Fiscus sycomorus	Baure		Fruit	Food
Fiscus sycomorus	Chediya	Moraceae	Bark,	Food
Gueira senegalensis	Sabara	Combretaceae	Bark, Leave, Roots	Medicine
Khaya senegalensis	Madacci	Meliaceae	Bark	Medicine

Source: Field Survey 2025

**Table 5: Flora Species that are Mostly Exploited in the Study Area**

Scientific name	Hausa name
<i>Pterocarpus erinaceus</i>	Madubiya
<i>Parkiya biglobosa</i>	Dorawa
<i>Khaya senegalensis</i>	Madacci
<i>Fiscus sycomorus</i>	Chediya
<i>Fiscus sycomorus</i>	Baure
<i>Fiscus platyphyla</i>	Gamji
<i>Faidherbia albida</i>	Gawo
<i>Combretum glutinosum</i>	Wuyan damo
<i>Balanites</i>	Aduwa
<i>Boswellia odorat</i>	Ararrabi
<i>Cassia hirsula</i>	Gamafada
<i>Ziziphus spina Christi</i>	Kurna
<i>Detarium macrocarpum</i>	Taura
<i>Anogeissus Leiocarpus</i>	Marke
<i>Tamarindus indica</i>	Tsamiya
<i>Adonsonia digitata</i>	Kuka
<i>Acacia Senegal</i>	Dakwara
<i>Acacia nilotica</i>	Gabaruwa
<i>Acacia seyal</i>	Farin kaya
<i>Ziziphus spina –Christi</i>	Kurna

Source: Field Survey 2025



Plate 5: Stump of Madrid from Gujba Forest Reserve

Source: Field Survey 2025



Plate 6: Forestry Officer with His Culprit Carrying Firewood from Gujba Forest Reserve

Source: Field Survey 2025



Plate 7: Researcher Found a Jega Carrying Firewood from Bujimirum, Gujba Local Government  
Source: Field Survey 2025

## DISCUSSION

### Animal Species commonly Cunted from GujbaForest Reserve

Findings in table 2 revealed some name of Animal species mostly Hunted from the reserve for Bush Meat, 70.5% of the respondents agreed that wild animals species are hunted for bush meat as show in plate 1,2 and 3 while their skin are used for medicinal herb as show in plates 4, this result agreed with Scheffers *et al.*, (2019) that says, Wild animals like Zebra (*Equus quagga*), Lions (*Panther leo*), Hippopotamus, Elephants (*Loxodonta*), Gazelles, Snake, Giraffe are hunted for their meat, known as 'Bush meat'. Many animals like Rabbit (*Lepus capensis*), Mongoose (*Mongus mungo*), Francolin (*Francolinus bicalcaratus*), Monitor black (*Verus exanthematicus*), Monitor lizard (*Veranus niloticus*), etc were also hunted and killed from the study area. While 20.5% of the respondents disagreed because they lack of knowledge about hunting for bushmeat from the study area. This result agreed with, Lindsey and Bento (2012) who reported that, African Elephants (*Loxodonta africana*), Lions (*Panther leo*), Greater kudu (*Tragelaphus strepsiceros*), Elands (*Taurotragus oryx*), Impala (*Aepyceros melampus*), Red forest Duiker (*Cephalophus natalensis*), Reedbuck (*Redunca arundinus*), Cape Bushbuck (*Tragelaphus sylvaticus*), Bush Pig (*Potamochoerus larvatus*), Common Warthog (*Phacochoerus africanus*), Baboon (*Papio ursinus*) and Greater Cane Rat (*Thryonomys swinerianus*) were illegally hunted for bush meat trade in Mozambique. Table 3 show Name of some poached animals sold more in the market as in plate 1, 2, and 3 while skin are used for traditional medicine as in plate 4. Findings regard to how species and environment are affected by hunting show that the population of animals and plants from the reserve decline, 77.5% of the respondent's agreed that poaching affect the availability of animals and plant species as show in plate 5, 6 and 7. Table 4 show names of Some Flora Species Identified from the study area while table 5 show Flora Species that are Mostly Exploited in the Study Area. Species of animals like hyena, elephant, leopard, baboon etc are now rare in the study area. This finding agreed with Milliken and Shaw, (2012) who said that, Wild Animals species which are threatened by poaching in Africa include Amur leopard (*Panthera hanensis*), African elephant (*Loxodonta africana*), Amur tiger (*Siberian tiger*) Black rhinoceros (*Diceros bicornis*), Hawksbill turtles (*Eretmochelys imbricate*), Green turtles (*Chelonia mydas*), Elephants (*Loxodonta africana*), Leatherback turtle (*Dermochelys coriacea*), Orangutan (*Pongo*), Malayan tiger (*Panthera tigris tigris*), Sumatran tiger (*Panthera tigris sondaica*), White rhinoceros (*Ceratotherium simum*) etc in Africa.

## CONCLUSION

The study revealed that poaching is one of the major threats to species of wild animals and plants survival in the study area, it is responsible for decline of wild Animals populations and species extinction, habitat loss, and economic loss. Poachers hunted wild animal for bush meat while skin and other part of their body were used for Traditional Medicine. Poachers and some community around the reserve also engage in cutting down trees for fire wood and charcoal often linked to energy poverty in surrounding communities. While the Yobe State government has initiated measures by free seedling distribution to communities for plantation within the state so that the remaining wild plants and animals will not be extinct. They should be need for underscores collaborative efforts among stakeholders, including government agencies, local communities, and conservation organizations, to protect and sustainably manage

the Gujba Forest Reserve. By adopting a holistic approach to land management and conservation, this can ensure the long-term health and vitality of the reserve's ecosystems while supporting the livelihoods and well-being of its inhabitants.

## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

## REFERENCE

- Adesoye P.O. Practical guide to statistical analysis for scientist. A primer edition. 2004; p 89
- Adetola, B. O., and Adetoro, A. O. (2014). Threats to biodiversity conservation in Cross River National Park, Nigeria. *International Journal of Conservation Science*, 5(4).
- Bennett, E. L.; Blencowe, E.; Brandon, K.; Brown, D.; Burn, R. W.; Cowlshaw, G.; Davies, G.; Dublin, H.; Fa, J. E.; Milner-Gulland, E. J.; Robinson, J. G.; Rowcliffe, J. M.; Underwood, F. M. & Wilkie, D. S. (2007). "Hunting for consensus: reconciling bushmeat harvest, conservation, and development policy in West and Central Africa". *Conservation Biology*. 21 (3): 884–887. doi:10.1111/j.1523-1739.2006.00595.x. PMID 17531066. S2CID 38428707.
- Elephant massacre (2013) a battle is being fought against poachers to save them from extinction". Express.co.uk. 2013.
- George w. (2025), African elephant have been in dramatic decline for 50 years what can be done to save them
- Goldenberg, S.; Correspondent, US Environment (2013). "US to destroy ivory stocks in effort to stop illegal Elephant poaching.
- Hall and Jani (2019). "Bushmeat, explained". *National Geographic*. Archived from the original on April 10, 2021. Retrieved 2024-05-18
- Hamza I. (2009). Behold the new Dan masanin Gujba Daily trust 2010-09-02
- Jacob, D. E., Nelson, I. U., Udoakpan, U. I., and Etuk, U. B. (2015). Wildlife poaching in Nigeria national parks: A case study of Cross River National Park. *International Journal of Molecular Ecology and Conservation*, 5. Kainji
- Krejcie, R.V; and Morgan, D.W; (1970) Determining Sample Size for Research activities. Education and Psychological Measurement.
- Lele, S.; Wilshusen, P.; Brockington, D.; Seidler, R.; Bawa, K. (2010). "Beyond exclusion: alternative approaches to biodiversity conservation in the developing tropics". *Current Opinion in Environmental Sustainability*. 2 (1): 94–100. Bibcode: 2010COES....2...94L. doi:10.1016/j.cosust.2010.03.006. ISSN 1877-3435.
- Lele, S.; Wilshusen, P.; Brockington, D.; Seidler, R.; Bawa, K. (2010). "Beyond exclusion: alternative approaches to biodiversity conservation in the developing tropics". *Current Opinion in Environmental Sustainability*. 2 (1): 94–100. Bibcode: 2010COES....2...94L. doi:10.1016/j.cosust.2010.03.006. ISSN 1877-3435.
- Lindsey, P. and Bento, C. (2012). Illegal Hunting and the Bush meat Trade in Central Mozambique. A Case-study from Coutada 9, Manica Province. Traffic East/Southern Africa, Harare, Zimbabwe
- Milliken, T. and Shaw, J. (2012). The South Africa – Viet Nam Rhinoceros Horn Trade Nexus: A deadly combination of institutional lapses, corrupt wildlife industry professionals and Asian crime syndicates. TRAFFIC, Johannesburg, South Africa.

- Ministry of Environment (MOE), (2021), Damaturu Yobe State, Nigeria, Office, Memo File Vol. I
- Nasi, R.; Brown, D.; Wilkie, D.; Bennett, E.; Tutin, C.; Van Tol, G. & Christophersen, T. (2008). Conservation and use of wildlife-based resources: the bushmeat crisis (PDF). CBD Technical Series no. 33. Montreal and Bogor: Secretariat of the Convention on Biological Diversity and Center for International Forestry Research (CIFOR). pp. 1–50.
- National Population Commission (2006), Population Census Data Yobe State, Nigeria. Federal Republic of Nigeria official Gazzete, National and State Provisional totals census. Printed and published in 2007 by the Federal Government printer. *Lagos, Nigeria. No 21, vol. 94 PP 175-198*
- Osman, K. T. (2014). Soil Degradation, Conservation and Remediation. *Doi: 10.1007/978-94-007-7590-9. ISBN 978-94-007-7589-3. S2CID 133025778.*
- Scheffers, B.R., Oliveira, B.F., Lamb, L., and Edward, D.P. (2019), *Global wildlife trade across the tree of life. Science, 366(6461), 71-76*
- Thornycroft, P. (2013) "Poachers kill 300 Zimbabwe Elephants with cyanide". London: Telegraph.co.uk.
- Wildaid report (2021), understanding urban consumption of bushmeat in Nigeria; a bushmeat consumption survey report [www.wildaid.org](http://www.wildaid.org)
- Yamane, T. (1967), Statistics an Introductory Analysis, 2<sup>nd</sup> Edition New York: Harper and Ro