



Survey and Assessment of the Human Activities in Chingurmi Duguma Sector of Chad Basin National Park, North – Eastern Nigeria

Mohammed Lawan Shettima¹, Gwana Adamu Mohammed^{2, *}, Mohammed Waziri³, Mu'azu Abdullahi Kofan Na'isa⁴, Abubakar Aliyu¹, Hauwa Lawan Badawi⁵, Bassey Effiong Edet⁶, Malah Alhaji Musa⁷

¹Department of Forestry Technology, Mohamet Lawan College of Agriculture, Maiduguri, Nigeria

²Laboratory Unit, Department of Animal Health and Production Technology, Mohamet Lawan College of Agriculture, Maiduguri, Nigeria

³Department of Geography, Faculty of Social Management, University of Maiduguri, Maiduguri, Nigeria

⁴Department of Planning, Research and Development, Nigerian Institute of Science Laboratory Technology, Ibadan, Nigeria

⁵Heritage Unit, Department of Heritage and Monument Sites, National Commission for Museums and Monuments, Maiduguri, Nigeria

⁶Department of Applied Microbiology and Brewery, Nnamdi Azikwe University, Awka, Nigeria

⁷Department of Basic Science and Technology, Mohamet Lawan College of Agriculture, Maiduguri, Nigeria

Email address:

mlawanshettima@gmail.com (M. L. Shettima), admuwana@yahoo.com (G. A. Mohammed), moduwaziri@gmail.com (M. Waziri), naslton2002@yahoo.com (M. A. K. Na'isa), abbualiyu@yahoo.com (A. Aliyu), elbadawis1@yahoo.com (H. L. Badawi), edetbassey69@gmail.com (B. E. Edet), babamalah@gmail.com (M. A. Musa)

*Corresponding author

To cite this article:

Mohammed Lawan Shettima, Gwana Adamu Mohammed, Mohammed Waziri, Mu'azu Abdullahi Kofan Na'isa, Abubakar Aliyu, Hauwa Lawan Badawi, Bassey Effiong Edet, Malah Alhaji Musa. Survey and Assessment of the Human Activities in Chingurmi Duguma Sector of Chad Basin National Park, North – Eastern Nigeria. *International Journal of Environmental Protection and Policy*. Special Issue: The Role of SLT: Environmental Impact Assessment And Statement Concept. Vol. 5, No. 6-1, 2017, pp. 50-70. doi: 10.11648/j.ijepp.s.2017050601.17

Received: October 28, 2017; **Accepted:** October 30, 2017; **Published:** November 24, 2017

Abstract: This study was conducted on the survey and assessment of the human activities in Chingurmi Duguma sector of Chad Basin National Park, north – eastern Nigeria. Primary and secondary sources of information were used. Data were collected by using compound structured open and ended questionnaires, served in 12 villages' communities on 10 selected individuals in each village, totaling 120 respondents and a separate questionnaire on 15 park officials. The data collected were analysed statistically. Eight well known national parks located within the eight states in Nigeria, their locations, area land marks with percentage of each park occupied were stated. Surveyed and identified different 15 fauna and 26 Flora species at interval of every 5 km from point A to E in the sector. 69% males and 31% females of the respondents were involved, 41 above years old were 44 the highest (37%), and least were 31 – 35 and 36 – 40 years old (18%) each involved actively in human activities, 80% were enlightened on the relevance of the park to the surrounding village communities, 31% were educated on the risk of farming in the park, 47% of the respondents were 6 – 10 years leaving in surrounding the park, relationship between the park officials and the communities were 67%, 33% benefit from the resources of the sector, 20% for communication gap, 75% said wildlife (animals) appears in the night, 33% for day time. 50% usually go into the park for grazing/ poaching and hunting, 25%t for hunting of birds, 23% agreed on felling trees, 100% of park officials agreed to have seen people tempering with the resources in the park, and 42% agreed on poaching and hunting of animals resources in the Chingurmi Duguma sector of the park. Findings reveal that the park is being tempered with and that the human activities are on the high side. It is advised that the government should come to its aid.

Keywords: Fauna, Flora, Chingurmi – Duguma, Conservation, Chad Basin, Deforestation, Desertification, National Park

1. Introduction

Mankind and his activities on the earth and the world in which he live, naturally or artificially, through the application of knowledge and craft skills has a better benefit and negative impact or effect on him and other species' environment. An environment is the natural world in which people, animals and plants live, e.g. terrestrial, aquatic, arboreal, climate environment, e.t.c. The sum of all the different species of animal, plant, fungi, and microbial organisms living on earth and the variety of habitats in which they live is called Biodiversity. Scientists estimate that upwards of 10 million or more than 100 million of different species inhabit the earth. Each species is adapted to its unique niche in the environment [1]. It underlies everything from food production to medical research. The array of living organisms found in a particular environment together with the physical and environmental factors that affect them is known as Ecosystem. Healthy ecosystems are vital to life. Ecosystems, in turn, depend on the continued health and vitality of the individual organisms that compose them. Removing just one species from an ecosystem can prevent the ecosystem from operating optimally [1, 2]. An environment is the total sum of conditions which summon human beings on the surface of the earth; therefore it implies that environment is that part of the earth where human activities take place. However, the environment has three basic components physical, biological and socio-economic components, while an impact is the effect of one thing upon one another [3, 4, 5, 6].

Parks are as old as civilization, the old French word "Parc" referred to an enclosed area for keeping wildlife to be hunted, e.g. Donana National Park, on the southern coast of Spain, one of the most important natural resources areas of Europe, used by 50% of birds migrating between Europe and Africa [4, 5, 6, 7]. The first major public park of the modern era was Victoria Park in Great Britain, authorized in 1842. The concept of a National Park, whose purpose includes protection of nature as well as public access, originated in North America, in the nineteenth century. In the twentieth century, the purpose of National Park was broadened to emphasized biological conservation and the idea was applied worldwide. The first designated National Park was Yosemite National Park in California. In recent years, the number of National Parks throughout the world has increased rapidly. The first law that established National Park in France was enacted in 1960. Taiwan had no National Park prior to 1980 but now has four [8, 9]. According to World Bird Watch [8] Chu Yang-sin Natural reserves in Vietnam Central highland was designated a National Park by the Vietnamese. The 59,000 - hectare reserves are home to almost 1,000 species of plants 54 of them listed in the Vietnam red book for endangered species.

National Park is defined by the World Conservation Union (WCU) as a natural area of land or sea, designed to protect the ecological integrity of one or more ecosystem for present

and future generation. National parks are designated areas to provide a foundation for spiritual, scientific, educational, and recreational and visit opportunities, all of which must be environmentally and cultural compatibles [10, 11, 12, 13]. It is a place where plants and animals species, geomorphologic sites and habitats, are preserved for special scientific, educational and recreational interest [14, 15, 16, 17]. Playing special roles to National and even regional well-being. National Park, enhance ecological processes and life support, system. For example promoting soil regeneration, and protecting nutrient cycles cleansing which contains a natured landscape of great beauty [14, 18]. Natural reserves (game and forest) are areas under public control, against any form of hunting / poaching or fishing, any undertaking connected with forestry, agriculture, or mining, or any excavations or prospecting, drilling, leveling of the ground, or construction [16, 19, 20, 21].

In Nigeria, National Parks were established by decree No. 36 of 22nd August 1991, later amended by decree No. 46 of 26th May 1999. The objectives of the National Park among others are to maintain the scientific ecosystem, enhance conservation and improve the management of man-made systems, the flora and fauna and general environment from total distraction by man through inappropriate activities and to achieve self sufficiency for Nigeria in food fibre and medicine. Also to maintain genetic diversity in order to ensure supply to satisfy basic human needs and thus improve the well being of Nigerians [14, 16]. There are seven National Parks and over sixty game reserves and forest reserves includes; Chad Basin National Park was established to protect the environment in order to enhance water resources and check soil erosion and prevent the environment from the loss of rare genetic material, stabilize the general ecosystem and the soil against erosion, policed by game guards, parks rangers and forest guard against all form of irrational exploitation backed by Federal and States statutes and legislation where applicable [14, 16, 22, 23].

Chingurmi Duguma Sector of Chad Basin National Park has as its main objective of maintaining the ecological balance through the preservation and protection of soil, fauna and flora, water and other energy sources of the environment within the area it is established. Chingurmi Duguma is unique in its environment because it serves partly as an international boundary between Nigeria, Chad and Cameroon [24, 25, 27].

Mamza [22], Adeyanju [25], Adeola [26], IUCNN [2]8, also stated that although the park possesses a dividing line that breeds cross - border disputes and clashes, The Park on the other hand stands out as a unifying force or factors for inter-regional and international cooperation as observed by some researchers such as Marguba [27], Faniran [29], Faniran [30], Ayoade and Oyebande [31] oted that man has a history of altering natural ecosystem to suit his needs and fire is used as a tool in the exploitation of natural resources. Chad Basin National Park will not be different, faces a lot of problems mainly as a result of human influence and activities

such as, cultivation, grazing, poaching / hunting, deforestation, etc. In light of the above challenges, the study intends to assess the impact of human activities, in order to address issues of human activities in Chingurmi Duguma sector of Chad Basin National Park. The objectives of this study include identifying the faunal and floral of the ecosystem, study the resources management techniques and methods used by the park, understand the relationships between the park and the communities of the villages surrounding the park, and investigate the human activities in the park.

2. Materials and Methods

2.1. Study Area and Location

Chingurmi Duguma sector of the Chad Basin National Park is one of seven National Parks in the country, Nigeria. It is controlled and managed by the Federal Government of Nigeria. Chad Basin National Park is located in the Sudano – Sahelian ecological zone of the North – Eastern part of Nigeria covering Borno and Yobe states. It covers a total area of 2,258 square kilometers (2,258²km), geographically located between latitude eleven degrees zero minutes to thirteen degrees zero minutes (11° 00' to 13° 00' N) and longitude thirteen degrees zero minutes to fifteen degrees thirty minutes (13° 00' – 15° 30' E), which comprises of 3 sectors namely; Chingurmi Duguma, Bulatura Oasis and Bade – Nguru wetland dotted across Borno and Yobe states respectively. While the specific area of the study; Chingurmi Duguma geographically lies between latitude 11° 42' – 11° 46' N and longitude 14° 19' – 14° 25' E. This sector is the largest, which covers an area of 1,228 km². It is situated in Gulumba districts of Bama Local Government of Borno state, Nigeria. Ecologically considered an extension of the Sahelian zone, the sector is contiguous with Waza National Park in Republic of Cameroon [32].

2.2. Material Used

Field experiment visitation and observation of the fauna and the flora to be captured with help of motorcycle with functional speedometer and GPS instrument, Compound structured closed and opened ended questionnaires and verbal interview, writing material and record books, Map of the area concerned were used for the purpose of information and data collection on the human activities to be assessed.

2.3. Method Used

The methods used in this environmental survey research study, were purposive sampling methods, source of information (data) collected were through the primary and secondary source. First of all, the secondary source was obtained through the internet, journals, text books and information media. The primary source was through the distribution questionnaire to the respondents who were the inhabitants of the villages surrounding the park were 15 in number; 12 (Duguma, Kash kash, Huria, Chingurmi, Aka

Kime, Jamusa, Aka Dabanga, Amchaka, Sharaba, Sawa, Yobe, Gazalful), villages were considered for this study, and the remaining 3 (Mboro, Madda and Sale) villages' communities were been migrated out of the villages due to lack of water and unrest of mind caused by the armed bandit as shown in the map, figure iii.

2.3.1. Field Experiments

In the field experiments, the techniques used were the field observations.

i. The scale used on the study area map was 1:250 000 (considered in cm) as well as the points at which the species were been found, i.e. between each point is 5 kilometer (e.g. from points A to B to C to D = 15 kilometer). Keys used for the number of trees (plant) species captured during the field observation were; + = spares, ++ = many, +++ = highly abundant, ++++ = dense respectively. Following the location from the coordinate from left to right, the distance used at kilometer, the types of animal's species found within the range, as well the frequencies used and the faunal species found during the field observation. The faunal and floral were captured in the field experiment, with the help of motorcycle with functional speedometer and GPS instrument. The floral species captured with considering to the coordinate, the distance by kilometer, the types of plant species found within the range.

ii. Also, considered the scale on the study area map was 1: 250,000 cm. The frequencies used are the number of species discovered, the number of species found as well as the point at which the species were captured, e.g. A to B to C to D to E = 20 Kilometer, i.e. between each point is 5 kilometer. Also the key used for the faunal species captured during the field work are; + = few, ++ = many, +++ = abundant, ++++ = highly abundant respectively. The Park officials were equally subjected in this study, because on the basis of their proximity with the park.

2.3.2. Distribution of Questionnaires

This study further considered 10 respondents in each of the village's surroundings of the park, making a total of one hundred and twenty (120) and together with fifteen (15) officials of the park in the department of park protection and conservation, totaled to 135 respondents. These village's communities and the officials of the park were served with the structured compound closed and opened ended questionnaires to both male and female aged 25 years and above were involved and interviewed. This age range is believed to have concrete ideas on environmental issues in the park and could give reasonable answers on various issues of the study area. However, general consensus or ideas were adopted as their perceptions on various issues. However, the research work is also involved the officials of the Park especially the (rangers and others). This is because some of the faunal species will not be found in the day time (diurnal) and early night (nocturnal) period. Since the rangers and the other officials of the park are punctual, current and better in position in capturing the main routes of such species (faunal and floral) of the park.

2.4. Data Analysis

The data obtained from this research study were subjected to statistical tools of analysis using percentage, mean for the measurement of central tendency, and standard deviations for measurement of dispersion and or discrepancy within the variables being obtained and its' significance, as described by Stroud and Booth, [33].

3. Results

The results and its findings obtained from this study; which include the socio economic characteristics of the people surrounding the Park, the fauna and flora available in the study area, the techniques being employed by the National Park in the management of the resources available in the Chingurmi Duguma sector of the Chad Basin national park, the relationships between the Park and the communities surrounding the Park, and the major problems affecting the management of the Chingurmi Duguma sector were revealed as shown in the tables below as follows: -

Table 1 showed the of names of the eight well known national parks in Nigeria, their locations, area land marks per kilometer square with percentage of area land marks of each park occupied; Chad Basin located in Borno and Yobe states with area land marks of 2,250 km² had 9.17%, Gashaka – Gumti (Adamawa state) 6,402 km² had 26.08%, Cross River (Cross River state) 4,000 km² had 16.30%, Old Oyo (Oyo state) 2,512 km² had 10.23%, Okomu (Edo state) 181 km² had 0.74%, Kamuku (Kaduna state) 1,121 km² had 4.57%, Kainji (Niger state) 5,830 km² had 23.75% and Yankari (Bauchi state) 2,250.10 had 9.17% and with the total area land marks of 24,546.01 (3,068 ± 2184) per Km².

Table 2 showed the surveyed and identified Floral (Plants) species in Chingurmi – Duguma Sector of the Chad Basin National Park at interval of every 5 kilometers from point A to E. Locations (from and to), with distance in km and coordinate from left to right, scale on map (1:250,000 cm) of the area visited and covered; Amchaka to Garasulum Dam, Sharaba to Bushkur Dam, Sawa to Garasulum Dam, Sawa to Razafu, Sharaba to Garasulum Dam, Aka Dabanga to Ngatada Pond, Chingurmi to Ngatada Pond, Amchaka to Bushkur Dam, Duguma to Bushkur Dam, Duguma to Garasulum Dam, Kash kash to Duguma, Kash kash to Garasulum, Kash kash to Bushkur Dam and Duguma to Mboro Dam were the villeges surveyed. The type of plants species and their numbers found; *Azadiracta indica*, *Acacia species*, *Adansonia digitata* and *B. aegyptiaca* were amongst the plants found with densely populated.

Table 3 showed the surveyed and identified Fauna (Animals) species in Chingurmi – Duguma Sector of the Chad Basin National Park at interval of every 5 kilometers from point A to E. Locations (from and to), with distance in km and coordinate from left to right, scale on map (1:250,000 cm) of the area visited and covered; Amchaka to Garasulum Dam, Sharaba to Bushkur Dam, Sawa to Garasulum Dam, Sawa to Razafu, Sharaba to Garasulum Dam, Aka Dabanga to

Ngatada Pond, Chingurmi to Ngatada Pond, Amchaka to Bushkur Dam, Duguma to Bushkur Dam, Duguma to Garasulum Dam, Kash kash to Duguma, Kash kash to Garasulum, Kash kash to Bushkur Dam and Duguma to Mboro Dam were the villeges surveyed. The type of animal species and their numbers found; Roan antelopes, Monitor lizards, giraffes, elephants, idiot, Guinea fowls, alligators, Red monkeys, various species of snakes, Cattle egrets, tortoise, ostriches, mangoose, rats, squirrels were amongst the animals found with highly abundant populated.

Table 4 showed the distribution of respondents from the community according to gender – group.

Male were 83 persons with a percentage of 69% and the female were 37 persons in respect with 31%.

Table 5 showed the age distribution of the respondents from the community according to their age – group age. Those that are within age – group of 25 to 30 years old were found to be 34 in number with 28.3%, age – group of 31 to 35 years old were 21 (17.5%), 36 to 40 years old were 21 (17.5%), while those within the age – group of 41 and above were 44 had 36.7% with a mean total of 120 (30 ± 11.2) respectively.

Table 6 showed the response given by the respondents from the community on period lived and reasons for relocation surrounding the park area. Those that lived in the villeges for the period of since birth were 31 persons in number had 25.8%, 5 – 10 years were 8 (6.7%), 11 – 20 years were 16 (13.3%), 21 – 30 years were 20 (16.7%), and 31 – 40 years were 45 (37.5%) with a total mean of 120 (24 ± 14.4). Those that changed location were 99 (82.5%) and those that did not were 21 (17.5%), total mean of 120 (60 ± 55.2). Within those that did with reasons are; for in search of food and water purpose were 29 (29.3%), in search of resources were 30 (30.3%), because of dispute over resources were 20 (20.2%) and because of other crises e.g. arm banditry, etc. were 20 (20.2%), with a total mean of 99 (24.8 ± 5.5) has been reflected in table.

Table 7 showed the benefit of living in the Chingurmi Duguma sector of the Chad Basin National Park by the respondents. Those who said that they derived certain benefits by living around the park were 92 (76.7%) and those did not were 28 (23.3%), had the total mean of 120 (60 ± 45.2). Among those said that they derived certain benefits by living with reasons used; animal species as a source of food were 20 (21.7%), plant species as a source of fire wood were 22 (23.9%), fauna and flora for money income were 30 (32.6%), plants for medicinal use were 10 (10.9%), water for consumption by both human and animals were 8 (8.7%) and land for farming activities were 2 (2.2%), with a total mean of 92 (15.3 ± 10.4) respectively.

Table 8 showed the relevance of Chingurmi Duguma sector of the Chad Basin National Park to the surrounding communities of the respondents, and if received any enlightenment on the park's biodiversity - ecosystem and its relevance from the park managers and the traditional leaders. Those who said that they had being enlightened on the relevance of park were 92 (76.7%), and did not received any

enlightenment were 28 in number with 23.3% and had a total mean of 120 (60 ± 45.5). Amongst the respondents received enlightenment on relevance of the park was for the; importance of the plants species in the park were 56 (60.8%), importance of the animals species in the park were 10 (10.8%), risk of the wild animals in the park were 12 (13%), and law protecting encroachment in to the park were 14 (15.2%) with the total mean of 92 (23 ± 22.1). Within this number, some suggest ways of activities can be stopped or be minimized in sector of the park through the; enlightenment on the importance of the park to the communities and entire were 96 (80%) and employ more rangers and guards were 24 (20%) with a total mean of 120 (60 ± 50.9).

Table 9 showed the response of the respondents interviewed on enlightenment on the relevance of the park to the surrounding villages' community, whether they have, there been public enlightenment on the importance of the park by the management of the park; those said yes, they had were 96 in number with 80%, and those said there was no such any were 24 with 20% had a total mean of 120 (60 ± 50.9). Amongst those who said yes with what they gained from the enlightenment campaigned was that; education on the importance of fauna species were 20 (20.8%), education on the importance of the flora species in the park were 20 (20.8%), education on the risk of farming activities in the park were 30 (31.2%), and education on any law encroachment in to the park were 16 (16.7%), and educating on general objectives of the park were 10 (10.4%) with a total mean of 96 (19.2 ± 7.3).

Table 10 showed the response of the respondents on the time of the animals appear in the park and observed by the surrounding communities. The time or period that the wild animals usually seen in the field premises sector of the park; those respondents that said the wild animals appeared during day time (Diurnal) were 30 in number and had 25%, while those that said the wild animals appeared during the night time (Nocturnal) were 90 (75%) with a total mean of 120 (60 ± 42.4). The type of the wild animal specie that usually appears at day (diurnal) time said by respondents were that; Elephant had 10 (33.3%), Hyena had 3 (10%), Lion had 1 (3.3%), Tiger had 5 (16.7%), Giraffe had 2 (6.7%), Jackal had 7 (23.3%) and Ostrich had 2 (6.7%) with a total mean of 30 (4.3 ± 3.3). With respect to those wild animal species that usually appears at the night period (nocturnal) were those; Elephant had 30 (33.3%), Hyena had 15 (16.7%), Lion had 7 (7.7%), Tiger had 3 (3.3%), Giraffe had 15 (16.7%), Jackal had 5 (5.6%) and Ostrich had 15 (16.7%) with a total mean of 90 (12.9 ± 9.1) respectively.

Table 11 showed the type of human activities on fauna and flora in the Chingurmi – Duguma sector of the park stated by the respondents interviewed. The type of activities been practiced by respondents were that; Bush burning had 10 (8.3%), Deforestation had 30 (25%), Collection of gum Arabic had 20 (16.7%) and over Grazing and or poaching and hunting had 60 (50%) with total mean of 120 (30 ± 21.6). Those that said they practiced poaching and hunting of the wild animals and the type of the animal species were for;

both elephant, giraffe and ostrich had 5 (8.3%) each, both roan antelope, rabbit and red monkey had 10 (16.7%) each, and birds had 15 (25%) with a total mean of 60 (8.6 ± 3.8). Those that said they practiced deforestation and the type of plant they deforested were that; *Balanite aegyptiaca*, *Acacia senegal*, *Acacia seyal*, and *Ziziphus spinachristii* both had 4 (13.3%) each, *Azadiracta indica* and *Diospyros mespiliformis* both had 2 (6.7%), *Acacia nilotica*, *Tamarindus indica* and *Zizyphus mauritaniana* both had 1 (3.3%), while *Acacia albida* had 7 (23.3%) with a total mean of 30 (3 ± 1.9).

Table 12 showed the level of tempering with the resources (fauna and flora) of Chingurmi – Duguma sector of the park stated by the respondents interviewed. All of respondents involved in this research and survey studies, said that they had ever saw and witnessed some people tempering with the resources of the park, and were 120 (100%), and with a total mean of 120 (60 ± 85). The types of tempering and human activities they had witnessed by the respondents in sector of the park were; bush burning in the park had 20 (16.7%), deforestation in the park had 17 (14.2%), collection of Arabic gum in the park had 13 (10.8%), grazing and farming activities in the park both had 10 (8.3%) each, and poaching and hunting of animals had 50 (41.7%) with a total mean of 120 (20 ± 15) respectively.

Table 13 showed the response gave by the management or park official on time of service and the militating factors affecting Chingurmi – Duguma sector of the park. The years of service in the park were that; those that served for 1 – 5 years and 11 – 15 years old were both 3 (20%) each, 6 -10 years old were 7 (46.7%), 16 – 20 years old had 0 in number with 0%, both 21 – 25 years old and 26 and above had 1 (6.7%) each with a total mean of 15 (2.5 ± 2.5). The types of skills adapted by the management in the park were that; Anti poaching and patrol had 4 (26.6%), both community enlightenment, construction of dam and habitant manipulation had 3 (20%) each and conservation education dispensations had 2 (13.3%) with a total mean of 15 (3 ± 0.7).

Table 14 showed the relationships between the park officials and the surrounding communities. Some of the park officials said that, there was mutual relationship between the officials and the surrounding communities within the park were 10 (66.7%) and those that said there was no mutual relationship between the officials and the surrounding communities within the park were 5 (33.3%) with the total mean of 15 (7.5 ± 3.5). Amongst those officials of park that said, there was mutual relationship between the officials and the surrounding communities within the park and types of benefit derived from each other communities were; benefits from the resources in the park had 5 (33.3%), communities gain knowledge on the reservation of natural resources had 1 (6.7%), and the management gain the confidence of protection of natural resources had 4 (26.7%) with a total mean of 10 (3.3 ± 2.1). Among those that said there was no mutual relationship between the officials and the surrounding communities within the park and gave reasons were that; communication gap had 3 (20%) and nonchalant attitude

from both side had 2 (13.3%) with a total mean of 5 (2.5 ± 0.7) respectively.

Table 15 showed the response of the park official on the noticing any resources (wild animal and plant) available in the Chingurmi – Duguma sector of Chad Basin National park. The types of animal (Fauna) species were; Roan antelope had 2 (13.3%), both Elephant and Rabbit had 3 (20%) each, Giraffe, Lion, Hyena, Tiger, Jackal, Toffee and Guinea fowl had 1 (6.6%) with a total mean of 15 (1.5 ± 0.8). The types of plants (Flora) species were; both *Acacia albida* and *Tamarindus indica* had 2 (13.3%) each, both *Acacia senegal*, *Acacia nilotica*, *Adansonia digitata*, *Ziziphus mauritiana*, *Diospyrus mespiliformis*, *Acacia seyal* and *Azadiracta indica* had 1 (6.6%) and *Balanite aegyptica* had 4 (26.6%) with a total mean of 15 (1.5 ± 1) respectively.

Figure 1 showed the map of the study location area (Chingurmi – Duguma Sector of the Chad Basin National Park) which is in Bama Local Government, Borno state, the north – eastern part of Nigeria.

Figure 2 showed the map of Bama Local Government, Borno state of Nigeria showing the study location and area. Figure 3 showed the map of Nigeria showing Borno state and showing Bama Local Government Area as well.

Figure 4 showed Bush burning in the Chingurmi – Duguma sector of the Chad Basin National park as a result of human activity.

Figure 5 showed the footpath of Elephant in the deforested open land as an indication of human activity do occurred this area.

Figure 6 showed one of the species of fauna (Red Monkey) displaced in Gulumba village market (one of the surrounding community) for sale as a result of human activities.

Figure 7 showed the extracted fire wood in the Chingurmi – Duguma sector of the Chad Basin National park brought for sale in Gulumba village market as a result of the human activity.

Figure 8 showed extraction of fire wood, deforestation due to tree felling by human activities within the park.

Figure 9 showed Cattle rearing in the Chingurmi – Duguma sector of the Chad Basin National Park as a result human activities.

Figures 10 to 12 showed farming activities (sorghum, millet and okro farming) have taken placed in the Chingurmi – Duguma sector of the Chad Basin National Park as a result human activities.

Table 1. Renown National Parks in Nigeria.

Name of Park	Location (States)	Area Land Mark / Km ²	Percentage (%)
Chad Basin	Borno and Yobe	2,250	9.2
Cross River	Cross River	4,000	16.3
Gashaka – Gumti	Adamawa	6,402	26.1
Kainji Lake	Niger	5,830	23.8
Kamuku	Kaduna	1,121	4.6
Okomu	Edo	181	0.7
Old Oyo	Oyo	2,512	10.2
Yankari	Bauchi	2,250.01	9.2
Total (Mean \pm StDev,)	8 States	24,546.01 (3,068. \pm 2184)	100 (12.5 \pm 8.9)

Source: Adopted from NNPS, (1994).

Table 2. Identified Floral (Plants) Species in Chingurmi – Duguma Sector at Interval of Every 5 Kilometer.

Locations (From – To)	Distance	Co-ordinate (in km)	Scale on Map (Left - Right)	Species Types (1:250,000 cm)	No. found (Plants)	Points (Populations)
Amchaka – Garasulum Dam	20	N 110 44' 18.5 - N110 44' 18.6 E 140 21' 39.2 - E 140 21' 39.1	8	<i>Acacia albida</i> <i>Azadiracta indica</i>	++ ++++	A – E
Sharaba - Bushkur Dam	16.75	N 110 44' 41.9 - E 110 44' 41.1 E 140 21' 32.1 - E140 21' 42.9	6.7	<i>Acacia Senegal</i> <i>Acacia nilotica</i> <i>B. aegyptiaca</i>	+++ ++ ++	A – D
Sawa – Garasulum Dam	16.75	N 110 44' 35.1 - N 110 44' 43.7 E 140 21' 45.3 - E 140 21' 41.3	6.7	<i>Acacia nilotica</i> <i>Acacia senegal</i> <i>Acacia seyal</i>	+ ++ ++	A – D
Sawa – Razaful	15.75	N 110 44' 47.8 - N 110 44' 43.3 E 140 21' 39.8 - E 140 21' 41.	6.3	<i>Acacia seyal</i> <i>Acacia nilotica</i> <i>Adansonia digitata</i>	+ ++ ++	A – D
Sharaba – Garasulun Dam	18	N 110 44' 41.9 - N 110 44' 41.2 E 140 21' 32.1 - E 140 21' 42.9	7.2	<i>Acacia seberiana</i> <i>Anona senegalensi</i> <i>Acacia senegal</i>	+ + +	A – D
Aka Dabanga – Ngatada Pond	8.5	N 110 37' 24.3 - N 110 37' 25.1 E 140 23' 47.4 - E 140 23' 42.5	3.4	<i>Adansonia digitata</i> <i>Azadiracta indica</i> <i>Calatropis procera</i>	+ ++ +++	A – C
Chingurmi – Ngatada Pond	17.5	N 110 34' 32.3 - N 110 34' 36.1 E 140 21' 36.4 - E 140 21' 38.2	7	<i>Anona senegalensi</i> <i>Acacia nilotica</i> <i>B. aegyptiaca</i>	++ + +++	A – D

Locations (From – To)	Distance	Co-ordinate (in km)	Scale on Map (Left - Right)	Species Types (1:250,000 cm)	No. found (Plants)	Points (Populations)
Amchaka – Bushkur Dam	20	N 110 44'18.5 - N 110 44' 18.6 E 140 21'39.2 - E 140 21'39.1	8	Acacia seyal Anogeissus spp. Leicapus Acacia nolitica Azadiracta indica	++ + ++ ++ ++++	A – E
Duguma – Bushkur Dam	15	N 110 35'47.6 - N110 35' 45.1 E 140 22'26.7 - E 140 22' 28.2	6	Balanite B. aegyptiaca Calatropis procera Acacia nolitica Celtis intergrifora Diospyros spp	+ +++ ++++ ++ ++ +	A – D
Duguma – Garasulum Dam	17.5	N 110 35'47.6 - N110 35' 45.1 E 140 22'26.7 - E140 22'29.2	7	Mespiliformis spp Guerra spp A. senegalensis Acacia senegal Jotropha cureas	++ + ++ +++ ++	A – D
Kash kash – Duguma	26.25	N 110 34'39.1 - N 110 34'37.5 E 140 22'31.2 - E 140 22' 28.4	10.5	Lowsonia inermis Azadiracta indica Pillostigma spp	++++ +++ +	A – E
Kash kash – Garasulum	26	N 110 34'39.1 - N 110 34'37.5 E 140 22'31.2 - E 140 22' 28.4	10	Reticulate spp Lowsonia inermis Acacia nilotica Tamarindus indica	++ ++ + ++	A – E
Kash kash – Bushkur Dam	21.75	N 110 34'39.1 - N 110 34'37.5 E 140 22'31.2 - E 140 22' 28.4	8.5	Calotropis procera Zizipus mauritiana Spinachristi spp Zizipus mauritiana	+++ ++ + ++	A - E
Duguma – Mboro Dam	26	N 110 32'26.8 - N 11032'21.7 E 140 21'48.8 - E 140 21'39.6	10	Calatropis procera Zizipus spp Spinachristi spp	+++ +++ +++	A - E

Keys: Km = kilometre, cm = Centimetre, No = number, + = sparse, ++ = many, +++ = highly abundant, ++++ = densely
TABLE 3: Identified Fauna (Animals) Species in Park Sector at Interval of Every 5 Kilometer

Table 3. Identified Fauna (Animals) Species in Park Sector at Interval of Every 5 Kilometer.

Locations (from – to)	Distance	Co-ordinate	Scale on Map	Species Types	No. found	Points
(in km)		(Left -	Right)	(1:250,000 cm)	(Plants)	(Populations)
Amchaka – Garasulum Dam	20	N 110 44' 18.5 - N110 44' 18.6 E 140 21' 39.2 - E 140 21' 39.1	8	Alligators Cattle Egrets Red Monkey	++ +++ ++	A – E
Sharaba - Bushkur Dam	16.75	N 110 44' 41.9 - E 110 44' 41.1 E 140 21' 32.1 - E140 21' 42.9	6.7	Cattle Egrets Guinea Fowl Idiot Elephant	+++ ++ +++ ++++	A – D
Sawa – Garasulum Dam	16.75	N 110 44'35.1 - N 110 44' 43.7 E 140 21'45.3 - E 140 21' 41.3	6.7	Roan Antelope Cattle Egret Red Monkey	++ +++ +	A – D
Sawa – Razaful	15.75	N 110 44'47.8 - N 110 44' 43.3 E 140 21'39.8 - E 140 21' 41.1	6.3	Roan Antelope Elephant	++ +	A – D
Sharaba – Garasulun Dam	18	N 110 44'41.9 - N 110 44' 41.2 E 140 21'32.1 - E 140 21' 42.9	7.2	Roan Antelope Idiot	++ +++	A – D
Aka Dabanga – Ngatada Pond	8.5	N 110 37'24.3 - N 110 37' 25.1 E 140 23'47.4 - E 140 23' 42.5	3.4	Guinea Fowl Red Monkey Monitor Lizard	+ ++ +++	A - C
Chingurmi – Ngatada Pond	17.	N 110 34'32.3 - N 110 34'36.1 E 140 21'36.4 - E 140 21' 38.2	7	Giraffe Guinea Fowl Monitor Lizard	++ + +++	A – D
Amchaka – Bushkur Dam	20	N 110 44'18.5 - N 110 44' 18.6 E 140 21'39.2 - E 140 21' 39.1	8	Elephant Red Monkey Mongoose	+++ ++ ++	A – E
Duguma – Bushkur Dam	15	N 110 35'47.6 - N110 35' 45.1 E 140 22'26.7 - E 140 22' 28.2	6	Red Monkey Monitor Lizard Giraffe	+ ++ +	A – D
Duguma – Garasulum	17.5	N 110 35'47.6 - N110 35' 45.1	7	Guinea Fowl Ostriches	++ +	A – D

Locations (from – to)	Distance (in km)	Co-ordinate (Left - Right)	Scale on Map (1:250,000 cm)	Species Types (Plants)	No. found (Populations)	Points (Populations)
Dam		E 140 22'26.7 - E140 22' 29.2		Red Monkey Rabbits Red Monkey Roan Antelope Squirrel Rats	+++ ++ +++ +++ +++ ++++	
Kash kash – Duguma	26.25	N 110 34'39.1 - N 110 34' 37.5 E 140 22'31.2 - E 140 22' 28.4	10.5	Rabbits Giraffe Squirrel Snake	+++ ++ +++ ++++	A – E
Kash kash – Garasulum	26	N 110 34'39.1 - N 110 34' 37.5 E 140 22'31.2 - E 140 22' 28.4	10	Red Monkey Rats Ostriches Tortoise	+++ ++ ++ ++	A – E
Kash kash – Bushkur Dam	21.75	N 110 34'39.1 - N 110 34' 37.5 E 140 22'31.2 - E 140 22' 28.4	8.7	Red Monkey Rats Ostriches Tortoise	+++ ++ ++ ++	A - E
Duguma – Mboro Dam	26	N 110 32'26.8 - N 11032'21.7 E 140 21'48.8 - E 140 21' 39.6	10	Red Monkey Roan Antelope	+++ +++	A - E

Keys: Km = kilometre, cm = Centimetre, No = number, + = few, ++ = many, +++ = highly abundant, ++++ = densely

Table 4. Distribution of Respondents According to Gender Group.

Gender - Group	Frequency	Percentage
Male	83	69.2
Female	37	30.8
Total (Mean \pm StDev.)	120 (60 \pm 32.5)	100 (50 \pm 27.2)

Table 5. Distribution of the Respondents According to their Age – Group.

Age – Group (Years)	Number of Respondents	%
25 - 30	34	28.3
31 - 35	21	17.5
36 - 40	21	17.5
41 and above	44	36.7
Total (Mean \pm Standard Deviation)	120 (30 \pm 11.2)	100 (25 \pm 9.3)

Keys: % = Percentage, \pm = Sign of Equals or Minus.

Table 6. Period Lived and Reasons Given by the Respondents for Relocation Surrounding the Park Area.

Factor	Frequencies	%
How long (Years) have you lived in this villages?		
a. Since birth	31	25.8
b. 5 - 10	8	6.7
c. 11 - 20	16	13.3
d. 21 - 30	20	16.7
e. 31 - 40	45	37.5
Total (Mean \pm StDev)	120 (24 \pm 14.4)	100 (19.6 \pm 11.2)
Have you ever changed location?		
a. Yes	99	82.5
b. No	21	17.5
Total (Mean \pm StDev)	120 (60 \pm 55.2)	100 (50 \pm 46)
If yes, for what purpose?		
a. In search of food and water	29	29.3
b. In search of resources	30	30.3
c. Because of dispute over resources	20	20.2
d. Because of other crises e.g. arm banditry, etc.	20	20.2
Total (Mean \pm StDev)	99 (24.8 \pm 5.5)	100 (25 \pm 5.6)

Key: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

Table 7. Benefits of Living around the Sector of the Park.

Factor	Frequency	%
Do you derive certain benefits by living around the park?		
a. Yes	92	76.7
b. No	28	23.3
Total (Mean \pm StDev)	120 (60 \pm 45.2)	100 (50 \pm 37.8)
If yes, what benefits or importance do you gain by living		
a. The animal species as a source of food	20	21.7
b. The plant species as a source of fire wood	22	23.9
c. The fauna and the flora for money income	30	32.6
d. The plant for medicinal use	10	10.9
e. The water for consumption (human and Animals)	8	8.7
f. The land for farming activities	2	2.2
Total (Mean \pm StDev)	92 (15.3 \pm 10.4)	100 (16.7 \pm 11.3)

Keys: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

Table 8. Relevance of Chingurmi Duguma Sector of the National Park to the Surrounding Communities.

Factor	Frequency	%
Have you ever received any enlightenment from your park managers and traditional leaders on the relevance of the park to you?		
a. Yes	92	76.7
b. No	28	23.3
Total (Mean \pm StDev)	120 (60 \pm 45.3)	100 (50 \pm 37.8)
If yes, what are the relevant?		
a. The importance of the plant species in the park	v 56	60.8
b. The importance of the animal species in the park	10	10.8
c. The risk of the wild animals in the park	12	13.0
d. The law protecting encroachment into the park	14	15.2
Total (Mean \pm StDev)	92 (23 \pm 22.1)	100 (25 \pm 24)
Suggest how human activities can be stopped or be minimized in the park?		
a. Enlightenment on the importance of the park	96	80.0
b. Employ more ranges	24	20.0
Total (Mean \pm StDev)	120 (60 \pm 50.9)	100 (50 \pm 42.4)

Keys: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

Table 9. Public Enlightenment on the Relevance of the Park to the Surrounding Village's Communities.

Factor	Frequency	%
Have there been any public enlightenment on the importance of the park by the management?		
a. Yes	96	80.0
b. No	24	20.0
Total (Mean \pm StDev)	120 (60 \pm 50.9)	100 (50 \pm 42.4)
If yes, what do you intend to gain from the campaign on Enlightenment?		
a. Educate on the importance of fauna Spp.	20	20.8
b. Educate on the importance of flora Spp.	20	20.8
c. Educate on the risk of farming activities in the park	30	31.2
d. Educate on any law encroachment in to the park	16	16.7
e. On general objectives of the park	10	10.4
Total (Mean \pm StDev)	96 (19.2 \pm 7.3)	100 (20 \pm 7.6)

Keys: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

Table 10. Time of the Animals Appear in the Park Observed by the Surrounding Villagers.

Factor	Frequency	%
At what time of the day do you usually see wild animals in the field?		
a. Day time (Diurnal)	30	25.0
b. Night time (Nocturnal)	90	75.0
Total (Mean \pm StDev)	120 (60 \pm 42.4)	100 (50 \pm 35.4)
Which of the wild animal usually appears at day time (Diurnal)?		
a. Elephant	10	33.3
b. Hyena	3	10.0
c. Lion	1	3.3
d. Tiger	5	16.7
e. Giraffe	2	6.7
f. Jackal	7	23.3
g. Ostrich	2	6.7
Total (Mean \pm StDev)	30 (4.3 \pm 3.3)	100 (14.3 \pm 10.8)
Which of the wild animal usually appears at night (Nocturnal)?		
a. Elephant	30	33.3
b. Hyena	15	16.7
c. Lion	7	7.7
d. Tiger	3	3.3
e. Giraffe	15	16.7
f. Jackal	5	5.6
g. Ostrich	15	16.7
Total (Mean \pm StDev)	90 (12.9 \pm 9.1)	100 (14.2 \pm 10.2)

Keys: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

Table 11. Types of human activities on Fauna and Flora in the Park.

Factor	Frequency	%
Which of the following have you ever practiced in the park?		
a. Bush burning	10	8.3
b. Deforestation	30	25.0
c. Collection of gum Arabic	20	16.7
d. Overgrazing / poaching and hunting	60	50.0
Total (Mean \pm StDev)	120 (30 \pm 21.6)	100 (25 \pm 18)
If poaching / hunting, which animal have you ever hunted?		
a. Elephant	5	8.3
b. Giraffe	5	8.3
c. Roan antelope	10	16.7
d. Red monkey	10	16.7
e. Rabbit	10	16.7
f. Ostrich	5	8.3
g. Birds	15	25.0
Total (Mean \pm StDev)	60 (8.6 \pm 3.8)	100 (14.3 \pm 6.3)
If deforestation which species of trees have you ever felled?		
a. Balanite aegyptiaca	4	13.3
b. Acacia senegal	4	13.3
c. Acacia nilotica	1	3.3
d. Acacia seyal	4	13.3
e. Azadiracta indica	2	6.7
f. Tamarindus indica	1	3.3
g. Zizyphus mauritaniana	1	3.3
h. Zizipus spinachristii	4	13.3
i. Diospyros mespiliformis	2	6.7
j. Acacia albida	7	23.3
Total (Mean \pm StDev)	30 (3 \pm 1.9)	100 (10 \pm 6.5)

Keys: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

Table 12. *Level of Tempering With the Resources (Fauna and Flora) of the Park by the Communities.*

Factor	Frequency	%
Have you ever witnessed or seen people tempering with the resources (Fauna and Flora) of the park?		
a. Yes	120	100.0
b. No	0	0.0
Total (Mean \pm StDev)	120 (60 \pm 85)	100 (50 \pm 71)
If yes, what sought of tempering or human activities have you witness?		
a. Bush burning in the park	20	16.7
b. Deforestation in the park	17	14.2
c. Collection of gum Arabic	13	10.8
d. Grazing in the park	10	8.3
e. Poaching and hunting of animals	50	41.7
f. Farming activities	10	8.3
Total (Mean \pm StDev)	120 (20 \pm 15)	100 (17 \pm 13)

Keys: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

Table 13. *Time of Service and Militating Factors by the Management or Park Officials (Applicable to Park Officials Only).*

Factor	Frequency	%
How long (Years) have you been serving in the park?		
a. 1 - 5	3	20.0
b. 6 - 10	7	46.7
c. 11 - 15	3	20.0
d. 16 - 20	0	0.0
e. 21 - 25	1	6.7
f. 26 and above	1	6.7
Total (Mean \pm StDev)	15 (2.5 \pm 2.5)	100 (16.7 \pm 16.7)
What is the management skills adapted in the park?		
a. Anti poaching and patrol	4	26.6
b. Community enlightenment	3	20.0
c. Conservation education	2	13.3
d. Construction of dam	3	20.0
e. Habitant manipulation	3	20.0
Total (Mean \pm StDev)	15 (3 \pm 0.7)	100 (20 \pm 4.7)
What type of methods do you adopt in managing the Aforementioned Resources?		
a. Maintaining of law and order on illegal act	5	33.3
b. Habitat manipulation	3	20.0
c. Arrest and prosecution	3	20.0
e. Anti poaches patrol	4	26.6
Total (Mean \pm StDev)	15 (3.8 \pm 1)	100 (25 \pm 6.4)

Keys: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

Table 14. *The Relationships between the Park Officials and the Surrounding Communities (Applicable to Park Officials).*

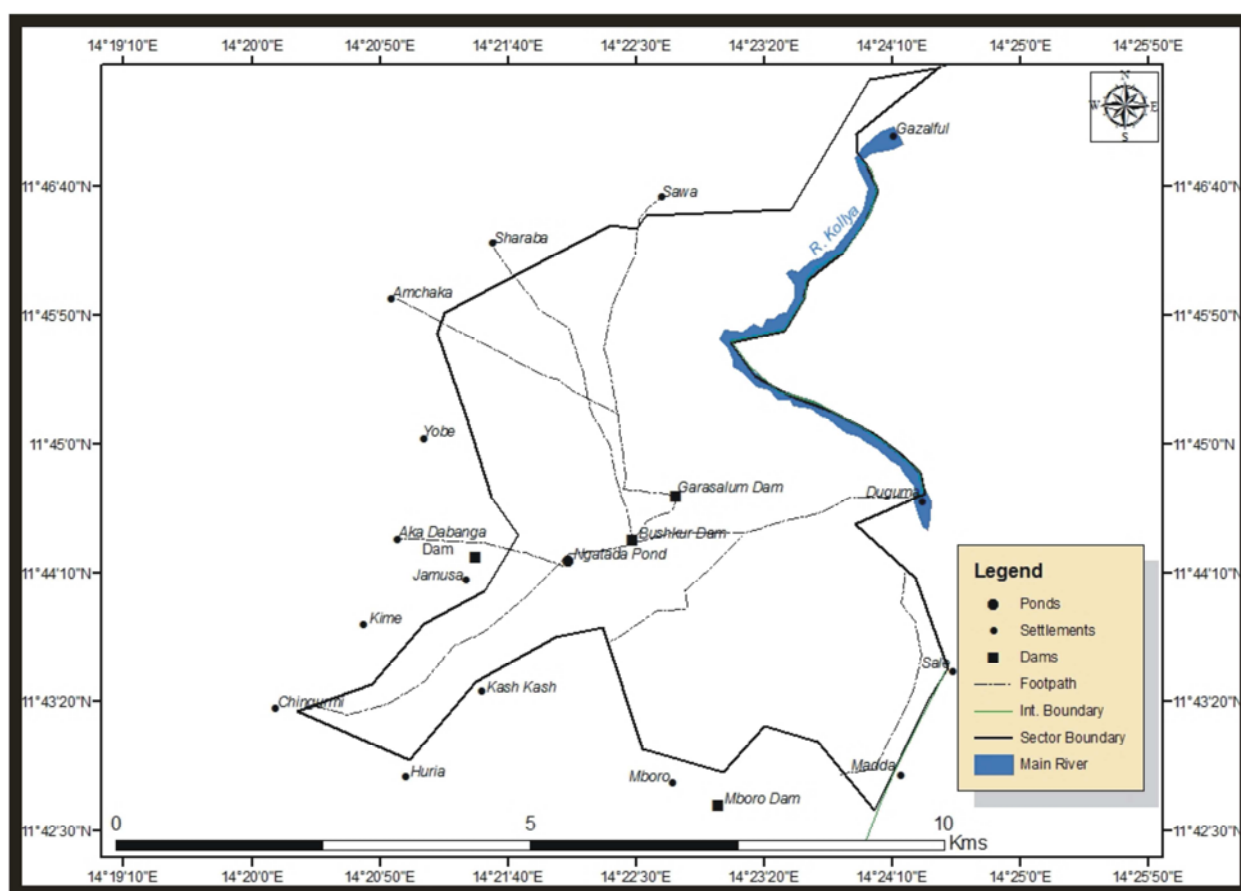
Factors	Frequency	%
Are there any mutual relationship between the officials of park and the surrounding communities?		
a. Yes	10	66.7
b. No	5	33.3
Total (Mean \pm StDev)	15 (7.5 \pm 3.5)	100 (50 \pm 23.6)
If yes, what benefit do you derive from each other communities?		
a. Benefits from the resources in the park	5	33.3
b. Communities gain knowledge on the reservation of natural resources	1	6.7
c. The management gain the confidence of protection of natural resources	4	26.7
Total (Mean \pm StDev)	10 (3.3 \pm 2.1)	67 (22 \pm 14)
If no, what went wrong?		
a. Communication gab	3	20.0
b. Nonchalant attitude from both side	2	13.3
Total (Mean \pm StDev)	5 (2.5 \pm 0.7)	33.3 (16.7 \pm 4.7)

Keys: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

Table 15. Resources in the Chingurmi Duguma Sector National Park (Applicable to Park Officials only).

Factor	Frequency	%
Do you notice any resources available in the Chingurmi -Duguma park which of the fauna species do you notice most?		
a. Giraffe	1	6.6
b. Roan antelope	2	13.3
c. Elephant	3	20.0
d. Lion	1	6.6
e. Hyena	1	6.6
f. Tiger	1	6.6
g. Jackal	1	6.6
h. Toffee	1	6.6
i. Rabbit	3	20.0
j. Guinea Fowl	1	6.6
Total (Mean \pm StDev)	15 (1.5 \pm 0.8)	100 (10 \pm 5.7)
Which one of the flora species do you notice most?		
a. Acacia albida	2	13.3
b. Acacia Senegal	1	6.6
c. Acacia nilotica	1	6.6
d. Balanite aegyp	4	26.6
e. Adansonia digitata	1	6.6
f. Tamarindus indica	2	13.3
g. Zizipus mauritiana	1	6.6
h. Diospyros mesipiliformus	1	6.6
i. Acacia seyal	1	6.6
j. Azadiracta indica	1	6.6
Total (Mean \pm StDev)	15 (1.5 \pm 1) 6.5)	100 (9.9 \pm 5.7)

Keys: % = Percentage, \pm = Sign of Equals or Minus, StDev. = Standard Deviation.

**Figure 1.** Shown the map of the study Location area (Chingurmi – Duguma Sector of the Chad Basin National Park).

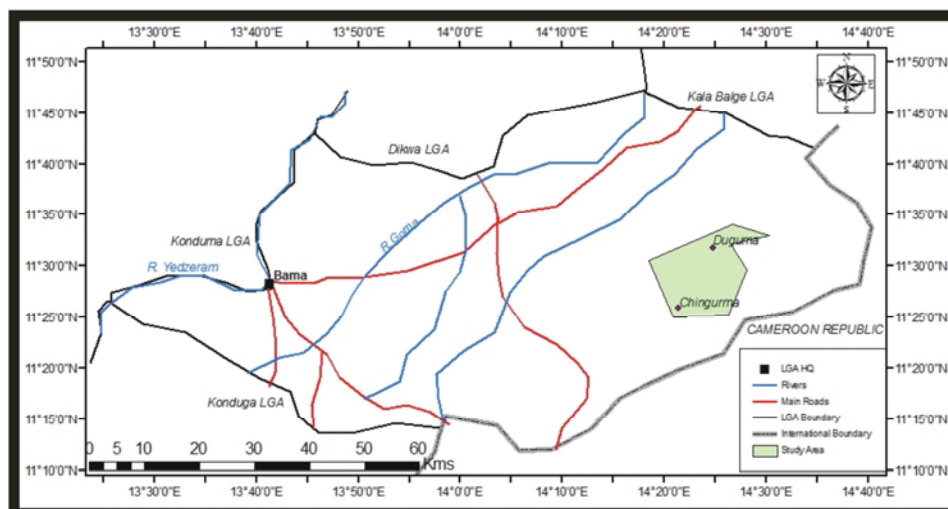


Figure 2. Showed the map of Bama Local Government showing the study Location and area.

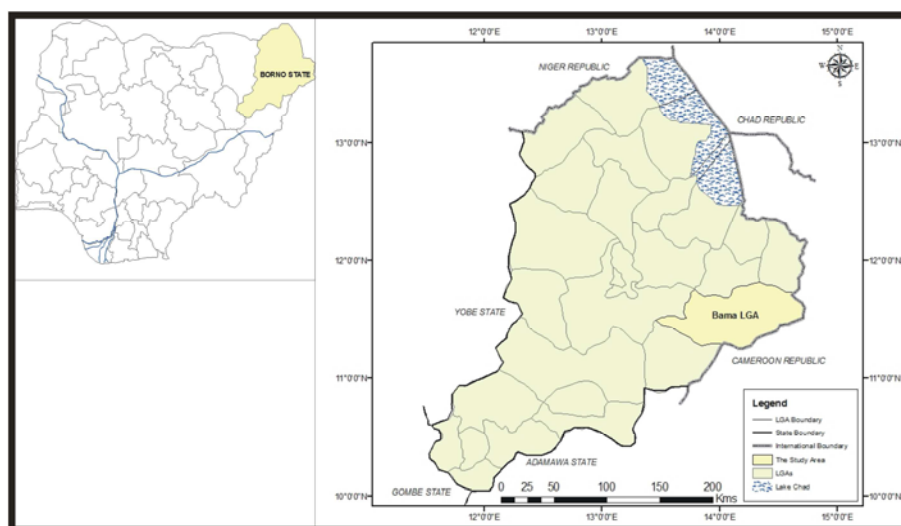


Figure 3. Showed the map of Nigeria showing Borno state and showing Bama Local Government Area as well.



Figure 4. Bush burning in the park (as a result of human activity).



Figure 5. Showing the footpath of Elephant in the deforested open land as an indication of human activity do occurred this area.



Figure 9. Cattle rearing in the Park (as a result human activities).



Figure 6. Ne of the species of fauna (Red Monkey) displaced in Gulumba village market for sale (as aresult of human activities).



Figure 10. Farming activities (sorghum) in the park.



Figure 7. Extracted fire wood in the park brought for sale in Gulumba village market as a result of the human activity.



Figure 11. Farming activities (millet) in the park.



Figure 8. Extraction of fire wood (deforestation activities) within the park.



Figure 12. Farming activities in the park (Okro farming) in the park.

4. Discussions

Mankind and his activities on the earth and the world in which he live, naturally or artificially, through the application of knowledge and craft skills has a better benefit and negative impact or effect on him and other species' of the environment in which he is dwelling. An environment is the natural world in which people, animals and plants live, e.g. terrestrial, aquatic, arboreal, climate environment, e.t.c. The sum of all the different species of animal, plant, fungi, and microbial organisms (Faunal and Floral) living on earth and the variety of habitats in which they live is called Biodiversity.

According to Gwana *et al*, [1] who stated that, some Scientists estimate that upwards of 10 million or more than 100 million of different species inhabit the earth. Each species is adapted to its unique niche in the environment. It underlies everything from food production to medical research. The array of living organisms found in a particular environment together with the physical and environmental factors that affect them is known as Ecosystem. Healthy ecosystems are vital to life. Ecosystems, in turn, depend on the continued health and vitality of the individual organisms that compose them. Removing just one species from an ecosystem can prevent the ecosystem from operating optimally.

Deforestation is one of the human activities that do occurred either by farming activities through shifting cultivation practice, extractions of fire wood through trees felling practice, poaching, hunting and gathering through bush burning, etc, which lead to serious dessert encroachment. The rate at which the dessert encroachment is taken placed now is more than 1.5 kilometres per year, and this may be due to human activities, e.g. the global warming. These negative activities has some negatives impacts or effects on human and other faunal and floral species' of the environment in which he is dwelling. The United Nations Organization with its recent programmes on special issues on the environmental protection, planning and policy, such as global warming, ecosystem management and conservations, or implementation of the seventeen objectives of the sustainable development goals and if these are well manage and implement it would have solved most of the environmental problems such as equal opportunity, global serenity, aspirations, transformations, poverty eradication, Agricultural business, health and portable water provision, etc, and the journey so far.

With the recent shift from millennium development goals (MDGs which had eight objectives) to sustainable development goals (SDGs have seventeen objectives which is more complex or comprehensive) journey so far. These objectives when properly and orderly planned, regulated and implemented; there would be a lot of achievements to be harness all over the world. But the most problems that are facing now where these programmes were implemented and lack of data keeping. There are no proper or lack of genuine, reliable and valid data of the activities of the MDGs – SDGs

actions taken in some countries, especially, in the developing countries, e.g. Nigeria. These countries are devastated by more than any other disease than we have known. These diseases are corruption and selfishness, few to be mentioned, all caused by the leaders or those the mantle of leadership behold on them. These diseases mentioned, causing by human negative activities are curable and eradicable or reducible to certain meager level if the problems are handle legally and within the jurisdiction as the case may be.

But the current present Government of Nigeria, provide ease of doing business within some index; Nigeria moves up with the present Government fighting corruption and insurgency with reviving agriculture which now a business not development, providing jobs and entrepreneurship development to the needy ones through many possible schemes such as MPower youth employment, the comprehensive local agricultural plan (C-LAP), etc. Many jobs were created and youth were engaged with positive activities within the local environment; both the micro - environment, meso - environment and the macro - environment are been engaged, this is in order to protect and make positive and useful of human activities in our environments.

To achieve the objectives of the SDGs journey so far, there is the need for appropriate implementation and monitoring the activities of those responsible and the achievements, to be carried out by a special team on the monitoring and evaluations so that data could be obtained or stored data, i.e. data capturing and record keeping.

Some scientific researchers such as Munn [3], Botkin and Keller [4], Augustine [5], Ayuba [6], etc, defined environment and impact as; an environment is the sum total of conditions which summon human beings on the surface of the earth; therefore it implies that environment is that part of the earth where human activities take place. However, the environment has three basic components physical, biological and socio-economic components, while an impact is the effect of one thing upon one another. Park is an environment (land, forest, aquatic spaces, etc) that is guarded or protected by the government for special reasons or for visitors or tour because of it natural beauty, scientific interest (Research purpose) and or for historical purpose or interest or both. In Nigeria, national parks are designed purposely to protect and preserve the indigenous fauna and flora species, to maintain the ecosystem, to enhance conservation, to improve the management of man - made systems, to provide clues, to achieve self sufficiency for Nigeria in food fiber and medicine, to maintain genetic diversity in order to ensure supply to satisfy basic human needs.

Nevertheless, the park is been designed to protect the ecological integrity of one or more ecosystem for present and future generation in which provides a foundation for spiritual scientific, education, recreational and visit opportunities all of which must be environmentally and culturally. Ogunnika and Irefin [17] and Udo [34] who stated that, parks and natural area have become refuges for the plants and animals that once occupied vast expanse of land. If these refuges fall

to the developers' bulldozer or converted to agricultural use, many organisms will become extinct.

In Nigeria, more than 80 percent of the total population in the rural areas, been noted depend on agriculture and exploitation of other environmental resources for survival and about these populations, 70 % of Nigerian lives in rural areas. As a result of resources exploitation, the earth had been tampered, larger area of the forest had been cleared, water resources, animals and plants species are under threat due to animal grazing, agricultural activities, poaching, bush burning and deforestation and other developmental activities. It is important to note that many organisms provide service that we enjoy without thinking about them. Forest trees release water through transpiration and moderate temperature change, bees and other insects pollinate crops, insects, predators eat pest and decomposer and recycle dead organisms. For these mentioned reasons, the present research surveyed study was conducted, and the findings of the study revealed that, in Chingurmi – Duguma sector of the Chad Basin National Park, north – eastern Nigeria, some vital information on the sector of the park were ascertained which include the demographic data and socio economic characteristics of the people surrounding the Park, the fauna and flora available in the study area, the techniques being employed by the National Park in the management of the resources available in the Chingurmi -Duguma sector, the relationships between the Park and the communities surroundings the Park, and the major problems affecting the management of the sector of the park respectively.

There are about eight (8) well known national parks located within the eight state in Nigeria, their locations, area land marks per kilometer square with percentage of area land marks of each park occupied; Chad Basin located in Borno and Yobe states with area land marks of 2,250 km² had 9.17%, Gashaka – Gumti (Adamawa state) 6,402 km² had 26.08%, Cross River (Cross River state) 4,000 km² had 16.30%, Old Oyo (Oyo state) 2,512 km² had 10.23%, Okomu (Edo state) 181 km² had 0.74%, Kamuku (Kaduna state) 1,121 km² had 4.57%, Kainji (Niger state) 5,830 km² had 23.75% and Yankari (Bauchi state) 2,250.10 had 9.17% and with the total area land marks of 24,546.01 per Km². These national parks are designed purposely for recreational centre, to protect and preserve the indigenous fauna and flora species, to maintain the ecosystem, to enhance conservation, to improve the management of man - made systems, to provide clues, to achieve self sufficiency for Nigeria in food fibers and medicines, to maintain genetic diversity in order to ensure supply to satisfy basic human needs.

In this study, survey trip was conducted, studied and identified the plants (Flora) species in the Chingurmi – Duguma sector of said park at interval of every five (5) kilometres (km). Traveled from one village to other within the distances in km, with geographical location (co-ordinance) from left to right, using the scale on the map (1:250,000 cm). Plants such as genus of; *Acacia*, *Azadiracta*, *Balanite*, *Adansonia*, *Anona*, *Calatropis*, *Anogeissus*, *Leicapus*, *Celtis*, *Diosprros*, *Mespiliformis*, *Guerra*,

Jotropha, *Lowsonia*, *Pillostigma*, *Reticulate*, *Tamarindus*, *Zizipus*, *Spinachristi*, etc, of which twenty six (26) different plants species were studied and identified in scarcely, moderately and abundantly from point 'A' to 'E'. Likewise, same techniques was applied to the animals (Fauna) species in the sector of the park, and such as; Alligator, Cattle egret, Red monkey, Guinea fowl, Idiot, Elephant, Roan antelope, Monitor lizard, Mongoose, Giraffe, Ostriches, Rabbits, Squirrel, Rats, Snakes, Tortoise, etc, of which about fifteen (15) different fauna species were studied and identified in scarcely, moderately and abundantly from point 'A' to 'E' respectively.

The findings of the research revealed that the respondents from the communities involved in the study area according to their gender and age - group that out of the 120 respondents; 83 of them were males with 69% and 37 were females with a 31%, that is, out of the total population of the respondents, males were more than twice than the females involved. The age of the respondents reveals that 41 above years old were 44 the highest in number with 37%, followed by those within 25 – 30 years were 34 in number with 28% and the least in number were those within the age – group of 31 – 35 and 36 – 40 years old, 21 (18%) each respectively. From these results obtained on the demographic data of the respondents in the community concerned, it revealed that the information obtained is reliable and genuine, this is because, most of it came from the adult males which is between the ages 41 years old and above been the ones dwell and involve actively in human activities in Chingurmi – Duguma sector of the Chad Basin National Park.

In another development, the results obtained revealed that it depicts the period someone (respondents) lived in a particular village. It was observed that most of the respondents, about 38% of them lived in their own village over a period of 31 to 40 years. About 83% of respondents ever change their location in the Chingurmi – Duguma sector of the Chad Basin national park, and only 17% have never changed location. It also revealed that, the purpose for the change of location, where good reasons were offered. About 30% of respondent said that they change location in search of resources, while only 29% said; the change in location comes as a result of search of food and water. while the remaining 20% of the aforementioned factors above goes to searching of resources, dispute over resources and certain crises e.g. arm - banditry in addition to search of food and water. The study also looked at the cases such as period someone had lived around the park and possible reason for relocation if any. This is another good finding, which was never documented in any previous project that image out of the park and its habitats environs.

With consideration that takes into account whether the communities that lives around the sector of the park, do gain or derive some benefits by staying around the sector of the park. The majority of the respondents that said they gain or derive some benefits by staying around the sector of the park were 77%, while some says they don't seem to gain anything were 23%. On certain type of benefits; the majority of the

respondents living around the park for exploiting the fauna and the flora for money income were 33%. While on the other hand about 24% of them derive additional benefits from the sector of the park. These ranges from plant species as source of fire wood, animal's species as source of food, Plant species for money income, and plant for a medicinal. The results obtained in this study is in agreement with the earlier finding of Enger and Smith [18], who reported that, human beings have a mutual relationship with plants and animals. This evidence clearly shows that the sum total of our domesticated plants and animals rely on us for support while nutrient are extracted from them in form of companionship (symbiotic relationship). It is in view of this that the present study on the type of benefits that people derived by staying around the sector of the park. It is also evidently true that people gain some benefits as follows; Animals as source of food, plants as a source of firewood, Fauna and flora for money income, plant for medicinal uses, water for consumption for both animal and plant and land for farming activities.

It was observed that, when the respondents were questioned on whether there is any enlightenment from the park manager or the traditional leaders of each communities and to give any possible suggestions on how to stop or minimize human activities in the park. About 61% of the people agreed to have received enlightenment from their traditional leaders on importance of the plant species in the park, while 15% goes for law protecting encroachment into park. However on the suggestion how human activities can be stopped or minimized in the park, about 80% have agreed on the enlightenment on the importance of the park by the communities.

On the account of relevant of Chingurmi national park to the surrounding communities, the present study had made critical observations, particularly on the importance of animal and plant species and law protecting it. A similar study was undertaken by Enger and Smith [18] where it was observed that human has mutuality relationships with Plant and animal species, by supporting their live existence, while nutrition are extracted from them.

This study has observed that, the majority of the communities (80%) were not ignorant of laws prohibiting indiscriminate poaching / hunting of fauna and flora species in the park, because there has been a constant public enlightenment on the importance of the park. However, public enlightenments were observed to be one of the cardinal measures in protecting the park in the present study. This was in agreement with earlier work of Adeyanju [25] who reported that poaching and hunting had adverse effect on animals in the forest, game reserve and parks by human beings. Therefore public enlightenment has assisted reducing such menaces. Furthermore, such menaces have continued in Gashaka Gumti National Park [14], hence public enlightenment was paramount. Currently, in Gashaka – Gumti sector of the national park, felling of trees (e.g. *Balanite spp*) is one of major problems affecting the park.

The study also reveals the time of the game animals

appears in the field that observed by the surrounding villagers, whether nocturnal or diurnal or at both; it was observed that almost all the wild animals (90%) appears in the night time, while only very few species (30%) appears in the day time. Amongst the animals that usually appears in the day time (diurnal) were; elephant had the highest (10%), seconded by jackal (7%), then followed tiger (5%), hyena (3%), giraffe and ostriches (2%) and least was lion with 1% only. While those wild animals that appears during night time (nocturnal) searching for their food and water were; elephant had highest (30%), ostriches and giraffe (15%) each, then followed lion (7%), jackal (5%), tiger (3%), and hyena was least with 3% respectively. These results revealed that there are lot of ostriches in the sector of park and other wild animals, hence, given a source of the ostriches and other game animals reserve.

Furthermore, when looked at human activities at individual level and to specific fauna and flora that they usually tempered with; at individual level the majority of the respondents (50%) usually go into the park for grazing / poaching and hunting, 25% for those go for deforestation and 17% go into the park for gum Arabic, while very few (8%) for bush burning only. When inquired on specific animal being hunted for; about 25% of respondents usually hunt for birds, Roan antelope, buffalo and rabbit, at 17% each and elephant, giraffe and ostriches were 8% each approximately. Similarly, when inquired on species of plant of victims or deforestation majority; 23% agree on felling trees, especially *Acacia albida*. However, some of the respondents 13% of them agree on tempered with *Azadiracta indica*, *Balanite aegyptiaca*, *Acacia senegal*, *Acacia seyal*, *Zizipus spinachristii*, and least was 3% goes for *Acacia nilotica*, *Tamarindus indica*, and *Zizipus mauritaniana* respectively. To this, we could deduce that trees felling was one of the major problems of the Chingurmi – Duguma sector of the Chad Basin national park. This was specific about human activities and on which fauna and flora in particular. The findings present that bush burning, deforestation, collection of gum Arabic and overgrazing \ poaching and hunting has been in practice in the park. Hence the following species has been a victim elephant, roan antelope, buffalos, rabbits, ostrich and other birds. Similarly several trees has been deforested, these are *Balanite aegyptiaca*, *Acacia senegal*, *Acacia nilotica*, *Acacia seyal*, *Azadiracta indica*, *Zizipus spp*, etc. This indicated almost all economic resources are tempered with, and the finding agrees with the work of Ayuba [6] and Udo [34].

In another consideration, the level of tempering with resources (fauna and flora) of the sector of the park depicts whether the surrounding communities ever witness people tempering with the resources in the park as part of human activities, where 100% of the surrounding villages agreed to have seen people tempering with the resources in the park. However these types of human activities are identified by almost all the surrounding communities. These are; poaching / hunting in the park at high percent of 42%, indiscriminate bush burning (17%) in the park, deforestation of trees (14%),

and collection of gum Arabic (11%), hence only very few, 8% that are engaged in grazing and farming activities each in the park. However, there are methods adopted in the park in managing the aforementioned resources as reported by the entire park officials, these methods are; maintaining of law and order on illegal acts, arrest and prosecution on habitant manipulations, and anti poaching patrols. This research takes into account the time of services rendered in the park by the officials (6 – 10 years had 47%, 1 – 5 and 11 – 15 had 20% each, 21 – 25 and 26 and above had 7% each and non from 16 – 20 years time of duration of service) and the managerial skills adopted managing the park. This enable to know how conversant or experience the officials might have in managing the park. It was therefore observed that, the managerial skills are as follows; anti poaching and patrol (27%), community enlightenment, construction of dam for source of water, and so the fauna might be not disappears in search for water and habitant manipulation had (20%) each and conservation education had 13% respectively.

In order to maintain the above skills, certain methods are put in place viz; maintaining of law and order on illegal act (33%), anti poaches patrol (27%), habitant manipulation, arrest and prosecution (20%)etc. this findings is in conformity with the earlier work of Ahmed [15], Miligant *et al*, [35] and Pickering and Owen [36] who reported that conservational action and aimed at maintaining and protecting wild resources for economic, ecological, scientific, educational and cultural purposes. The techniques involved prohibition, control, restoration, subsidy sanctuaries, etc. These were achieved through the conservational measures, such as enforcement of regulation of trade of endangered species for fauna and flora. Also heavy grazing of cattle and other domestic lead to trampling and cap action of the soil, reducing its capacity to hold water and altering its structuring are prohibited.

Again the results obtained revealed that, depicts whether there is mutual relationship between the park officials and the surrounding communities; where most of the park officials admitted that, 67% said yes it exist and few (33%) said no. It was inquired of what benefit do they derive from each other; where those of them agreed to the communities benefit from the resources in the park were 33%, those that said the management gain the confidence of protection of natural resources were 27% and the least goes for those said that the communities gain knowledge on the reservation of natural resources within the Chigurmi – Duguma sector of the Chad Basin National Park 7% as well for the reservation of natural resources, while the officials gain confidence of protection of natural resources. Hence for those who said no (33%); it was inquired what went wrong, and then some problems were identified as communication gab had 20% and nonchalant attitude (13%) by both side (the park officials and the surrounding communities). The relationship enjoyed by the park officials and surroundings communities has been noted in the present study, which was never documented in any other study yet. This study has taken a huge consideration in observing the relationship so far, which is one of the major steps in protecting the reserve and the officials

managing the reserve.

Finally, whether there are any resources available in Chingurmi Duguma, and whether there are fauna and flora and possible methods adapted in managing the resources in the park. It was discovered that through the park officials that there are resources, both of fauna and flora species. The types of fauna species noted and identified by all of (100%) the park officials are; the most noted and identified were Elephant and Rabbit had 20%, followed by Roan antelope had 13%, Giraffe, Lion, Hyena, Tiger, jackal, Toffee, Guinea fowl had 7% each were the least. Similarly, the types of flora species identified by all of (100%) the park officials are; *Balanite aegyptiaca* was the most highly noted had 27%, followed by *Tamarindus indica* and *Acacia albida* had 13%, the least were *Acacia senegal*, *Acacia nilotica*, *Acacia seyal*, *Adansonia digitata*, *Zizipus mauritiana*, *Diospyros mesiphilifarmis* and *Azadiracta indica* had 7% respectively.

The resources in Chingurmi Duguma are identified as flora and fauna. The presence of such resources gave Chingurmi Duguma the home of wild animals and different species of plant, hence it likened to National Parks. This finding is in line with the earlier findings of Ahmed [15], who reported similar resources found in seven (7) National Parks in Nigeria, that of NAP [37] who stated similar solutions towards the implementation of the united nations convention to combat desertification and mitigate, effect of drought in the country Nigeria.

In conclusion this, wildlife management is a conservational and environmental aspects, actions aimed at the total ecological biodiversity at increasing the capacity of healthy fauna and flora and there availability through the; maintaining and protecting wild resources for economic, ecological, scientific, educational and cultural purposes. The techniques involved in the administration and management aspect of conservations include prohibition, control, restoration, subsidy, sanctuaries and public ownership. These are often actualized with the aid of some conventional measures such as enforcement of the regulation of trade on the convention on international trade of endangered species of fauna and flora and legal measure against hunting, establishment of botanical garden, parks and games reserves, capital breeding and research and enlightenment campaigns. The domestication of animals also has a major impact on the land surface. Heavy grazing of cattle and other domestic animals leads to trampling and compaction of the soil, reducing its capacity to hold water and altering its structure and thus major problems created due to human activities in a healthy environment which lead to climate change. In our National parks, however, some climate change do occurred.

Today, Chad Basin National Park which is the only source of ostriches, elephants, giraffes and antelopes as fauna species that are found across the country with their values is in danger condition with the occurrences of the activities of the insurgency and arm banditry in area, and Chigurmi – Duguma will not be exclusive. Nigeria National Parks are special natural ecosystem with unique activities if well

protected and manage properly. Nigeria National Parks plays special tangible and intangible roles vital to national and regional well-being. Apart from acting as vehicle for the development of ecotourism, Nigeria National Park enhances ecological processes and life support system. The Nigerian National Parks have already achieved their goals.

According to Mohammed *et al.*, [38] who stated that, Nigeria, in order to meet the growing demands for shelter, fuel wood, fodder for livestock, food security, pharmaceuticals and manufacturing industries demand, to arrest desertification and to provide most simple, easiest, and cheap measures of control has been a top priority of this present administration of Federal Government of Nigeria, clarion call for a change. Call for positive change for all sustainable development goals and the clarion call for Zero Hunger Initiative; ending hunger by the year 2030 by UN / FAO. In the arid zone of some states in the Northern Nigeria, plantation depend largely on the acquisitions of skill techniques and the knowledge of forestry technology, draught resistant plants and their varieties, adequate number of viable and sterilized seeds and seedlings indigenous one that could adopt to the environment, climate condition of the area concern and grow well within a short period.

Now it's not time to complain but it's time to join the campaign for a positive change in order to control and preserve and conserve our environmental ecosystem, this is obtainable through the answering the clarion call, and this case, Nigerian have seen the light and are harvesting the benefit of doubt and it is necessary to delivered and reach the next positive level through the both extrinsic and intrinsic motivations. "We'll attend to solve the problems frontally in reviving of our agriculture and the economy" as said by the present president of the Federal Republic of Nigeria in his inauguration speech in 2015.

The study examined Chad Basin National Parks, with specific reference to Chingurmi - Duguma sector where the human activities and assesses people's perceptions on the resources available in the Chingurmi Duguma sector of Chad Basin National Park and the efforts of the park management in regulating the environmental balance were identified. Further observed the resources available on the (fauna and flora) in the park and the techniques and methods used by the management of the park on the found resources, the relationships between the park and the communities surroundings the park, also the major problems affecting the management of the park are equally spelt out in this study.

5. Conclusion

National parks are designed purposely to protect and preserve the indigenous fauna and flora species, to maintain the ecosystem, to enhance conservation, to improve the management of man - made systems, to provide clues, to achieve self sufficiency for Nigeria in food fiber and medicine, to maintain genetic diversity in order to ensure supply to satisfy basic human needs. Nevertheless, the park is

designed to protect the ecological integrity of one or more ecosystem for present and future generation in which provides a foundation for spiritual scientific, education, recreational and visit opportunities all of which must be environmentally and culturally. In this study some number of human activities has been presented especially, poaching and hunting, indiscriminate bush burning, indiscriminate felling of trees, rampant collection of gum Arabic, overgrazing and farming activities. Therefore, there is a tendency if these problems have not been controlled or overcome under the powerful and permanent law enforcement by the federal government, since this study were useful to the general public, the immediate communities and to the entire nation would therefore serves as a basis for sound policies that enhance proper planning, conservation, management and development strategies for improving the effort of Chad Basin National Park in insuring sustainable development and economic growth.

Recommendations

To achieve proper conservation and management in Chad Basin National Park, especially in Chingurmi Duguma sector, the following recommendations are suggested and necessary.

1. The park management must use a strong device on the relevance of the park especially in conducting regular mobilization campaign to avoid illegal practices, especially in the areas of poaching and hunting, deforestation, overgrazing, bush burning, fishing and farming activities in the park.
2. There was no access road to the park, especially during the raining season. Therefore the management should strongly consider steps through the federal government to improve access road to the park.
3. Embarking of regular public education on mobilization and enlightenment verbal and media channel like radio, on the relevance of the National Parks with the collaboration of the traditional rulers in the area. Separate empowerment must be provided to the traditional rulers to tackle some programmes to the communities in their environment. This will mitigate some of the human activities like poaching and hunting, bush burning, etc.
4. There is the need to employ more rangers with sophisticated weapons. This is because some of the poachers and hunters were using guns, bows and arrows in the park. Therefore such weapons are necessary to the rangers to protect themselves and the entire environment of the park to ensure effective monitoring of several illegal encroachers so as to effect regular monitoring in the park interior of illegal encroachers.
5. The management should therefore conduct regular research work, aimed at finding in any latest development so as to boost in conservation, management and programmes.
6. There is also the need for the management of the park

to conduct regular training, workshops and seminars to the existing field officers and rangers towards proper planning and sound policies and programmes in handling the resources available in the park.

7. Provision of facilities like telephones, functional transportation system for example car, lorry etc, first aid, portable drinking water, electricity should be available so as to provide conducive and comfortable tourist and for easy detective problems in the park.

Acknowledgement

We acknowledge with most honoured, duly respected and most grateful to the Management of Chingurmi – Dugma sector of the Chad Basin National Park, Borno State of Nigeria, Department of Geography, Faculty of Social Management, University of Maiduguri, Maiduguri, Nigeria, the Department of Forestry Technology, Mohamet Lawan College of Agriculture, Maiduguri, Nigeria and all persons who have helped and aided us in the course of carrying out this research study successfully.

References

- [1] Gwana A. M, Bassey E. E, Bagudu B. Y, Malah A. M, Wakil U. B, Shettima M. L, Shettima U. K, Halima M. B. Role of SLT: Environmental Impact Assessments and Statements Concept. *International Journal of Environmental Protection and Policy*. Special Issue: The Role of SLT: Environmental Impact Assessment and Statement Concept. Vol. 5, No. 6-1, 2017a, pp. 1–7. doi: 10.11648/j.ijep.s.2017050601.11.
- [2] Mohammed L. S, Gwana A. M, Badawi H. L, Mu'azu A. K, Bassey E. E, Marte M. L, Shettima U. K, Abubakar A. Comparative Techniques of Raising Seedlings of *Acacia seyal* in the Arid Zone of Borno State, North - Eastern Nigeria. *International Journal of Environmental Protection and Policy*. Special Issue: The Role of SLT: Environmental Impact Assessment And Statement Concept. In Press, 2017, pp. 1 - 10, doi: 10.11648/j.2017a.
- [3] Munn, R. E. "Environmental Impact Assessment", Scope 5, second edition, Toronto, pp. 3 – 5, October, 1977.
- [4] Botkin, D. B. and Keller, E. A. "Environmental Science, Earth as living Planet", Second Edition, pp. 270 - 273. 1997.
- [5] Augustine, U. E. "Critical Sites for Biodiversity Conservation in Nigeria" published by Conservation Foundation (NF), pp. 3-16. 2002.
- [6] Ayuba, H. K. "Environmental Science" *An Introductory Text*, Published in Nigeria, Apani Publications, a Division of Apani Business and Research Consult, No. 27, Bagaruwa Road, Costain, Kaduna, Nigeria, pp. 2-75. 2005.
- [7] International Union for conservation of nature (IUCN). "Criteria for National Parks", International Commission on National Parks, BANFF, Canada, pp. 1, 1972.
- [8] World Bird Watches (WBW). "Beyond the Summit", Bird Life, UK, Vol. 24 No. September 2002.
- [9] World Resources Institute (WRI). United Nation Environmental Programmes (UNEP) and United Nation Development Programmes (UNDP), 1992.
- [10] Abong, A. "Adopting Support Zone Development Programmes as Strategy for Management Development of National Park", A Case Study of Cross River National Park, Nigeria National Park, Bulletin No. 3, pp. 5-10. 1996.
- [11] Olatoke, R. A. "Thrills and Dangers of Patrols at Night", A Park Warden Experiences, in Kainji Lake National Park, PP. 4. 1996.
- [12] Ayuba, H. K., Maryah, U. M. and Gwary, D. M. "Climate Change Impact on Plant Species, Composition in Six Semi-Arid Rangelands of North –Eastern Nigeria", Workshop Paper, AIACC Stakeholders Workshop on Climate Change, Crop Yield and Food Security in 21st Century, Nigeria, OAU, Ile-Ife, Nigeria, September 20th–21st, 2004.
- [13] Daura, M. M. "The physical Environment and development". A study of Borno Region In: Ogunnika O., Irefen D., Daura M. M., and Balami D. (Eds.). "Environment and Development Issues in Sub - Saharan Africa", Faculty of Social and Management Science, University of Maiduguri, Maiduguri, Nigeria, Seminar Series Vol. 1, pp. 35–47. 2001.
- [14] Nigeria National Park Service (NNPS). "The Magazine of Nigeria National Park" National Management to Wear a Human Face-Minister, Volume, No. 2, July 24th, 1996, pp. 5., 1996.
- [15] Ahmed, M. I. C. "Introduction to Environmental Problems and Management", Puplished in Nigeria by Wadallah Environmental Consults (WADEC) ISBN 97836 411-07. 2002.
- [16] United Nation Environment and Programmes (UNEP). "The Nigeria Situation United Nation World Conference on Desertification Region Preparatory Meeting for Sub-Saharan Africa", Nairobi, Kenya. 1997.
- [17] Federal Government of Nigeria (FGN). The Establishment of National Parks in Nigeria, on Enactment Decree No. 22 August, 1991.
- [18] Enger, E. D. and Smith B. F. "Environmental Science", a Study of Interrelationships, Published by McGraw-Hill, a Business Unit of the McGraw-Hills Companies Inc., 1221 Avenue of the Americas, New York, NY10020, pp. 16-269. 2006.
- [19] Ogunnika O., Irefen D., Daura M. M., and Balami D. (Eds.). "Environment and Development Issues in Sub-Saharan Africa", Faculty of Social and Management Science, University of Maiduguri, Maiduguri, Nigeria, Seminar Series, Vol. 1, pp. 35–47. 2001.
- [20] Bowonder, B. "Deforestation in developing countries", *J. Environmental System*, 171192., pp. 15, 1986.
- [21] Frost, P. Menaut J. Medina E. Solbring O. T. Swift, M. and Walker B. "Response of Savanna to Stress and Disturbance", a Proposal for Collaborative Programmes of Research, pp. 16–269. 1985.
- [22] Mamza, J. U. "The Ostrich (*Struthio camelus*) and its Attributes", A Case Study of Chad Basin National Park, Nigeria. Published by Nigerian National Park Service, 1996.
- [23] Maria, J. R. T. "Examining the Potentials of the Zaha Mafa Drainage Basin for Sustainable Agriculture in Gwoza, Borno State, Nigeria", in (M. Sc. Dissertation Based Seminar Paper), 2005.

- [24] Spore Magazine. "Park and Natural Reserves", Driving Force of Ecotourism, Monthly Bulletin of Scientific and Technical Information Concerning Rural and Agricultural Development, published by Technical Centre for Agricultural and Rural Co-operation (CTA), Bulletin of CTA No. 62 of April, 1996.
- [25] Adeyanju, D. "Poaching", A Threat to Conservation Area in Nigeria Parks, the Magazine of the Nigerian National Parks (NNPS), Bulletin No. 3. pp. 6-8. 1999.
- [26] Adeola, M. O. "Illegal Grazing in Nigeria National Park" A Case Study of Old Oyo, Nigerian National Park Service, Bulletin No. 2, pp. 3–10. 1996.
- [27] Marguba, L. G. "Nigeria National Parks, their Significance and Potentials to Nation" In: the Magazine of the Nigeria National Parks Service, Vol. 1, No. 2, pp. 5. 1996.
- [28] International Union for the Conservation of Nature (IUCNN). "National Parks and Conservation", Magazine, Vol. 46. pp. 1. 1969.
- [29] Faniran, A. "River Basin and Development Planning in West Africa", West Africa Regional Conference, Common-Wealth Geographical Bur, Accra, Sept. 1970.
- [30] Faniran, A. "Drainage Basin Development and Political Boundaries in Africa", *Nigeria Journal of Economic and Social Studies*, Vol. 163, pp. 10. 1975.
- [31] Ayoade, J. O. and Oyebande, B. L. "Water Resources", In: Oguntoyinbo, T. S., Areola, O. And Fulani, M. (eds.) "A Geography of Nigerian Development", Heinemann Educational Book Nigeria Ltd; Ibadan, pp. 11-87. 1975.
- [32] Chad Basin National Park (CBNP). "Conservation Unit", Administrative Head Office, P. M. B. 1026, Biu Road, Maiduguri, Borno State of Nigeria. 2004.
- [33] Stroud, K. A and Booth, D. J. "Statistical Package", In: *Engineering Mathematics* WWW.Palgrave.Com / Stroud, Palgrave. GB, London, 5th Edition; pp: 1130–1139. 2001.
- [34] Udo, E. O. "The Role of Nigeria Forest in the Nutrition of the People Implication on Biodiversity Conservation", Proceeding Annual Conference of Forestry Association of Nigeria, pp. 3–7. 1999.
- [35] Milligan, K. Von, Kaufman R. and Ajayi S. S. "The Abundance Distribution and Production of Large Herbivores", pp. 83. 1982.
- [36] Pickering, K. T and Lewis A. O. "Introduction to Global Environment Issues", pp. 252-276. 1990.
- [37] National Action Programmes (NAP). "Towards the Implementation of the United Nation Convention to Combat Desertification and Mitigate, effect of Drought in the country Nigeria", Nigerian National Park News (NNPN, 2004) Vol. 1 issue No. 1 P. 3 pp. 10. 2000.
- [38] Mohammed, L. S, Gwana, A. M, Hauwa, L. B, Mu'azu, A. K, Bassey, E. E, Mohammed, L. M, Shettima, U. K, Abubakar, A. Comparative Techniques of Raising Seedlings of Acacia seyal in the Arid Zone of Borno State, North – Eastern Nigeria. *International Journal of Environmental Protection and Policy*, Special Issue: The Role of SLT: Environmental Impact Assessment And Statement Concept. Vol. 5, No. 6- 1, 2017b, pp. 40-49. doi: 10.11648/j.ijepp.s.2017050601.16