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*Full Length Research Paper*

# Assessment of the Checklist and Regeneration Status Potential of Species Seedlings and Saplings of Baturiya Hadejia Wetland Game Reserve, Jigawa State, Nigeria

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**This study evaluates the checklist of tree species and regeneration status potential of species seedlings and saplings of Baturiya hadejia wetland game reserve. To determine the checklist and regeneration status potential of species seedlings and saplings, three Plots of 100mx100m$^2$ were systematically laid in three habitats (Fadama, Upland and Swampy) sub plots of 5mx5m$^2$ in a quadrate were laid to assess species seedlings and saplings regeneration potential. A total of 83 species belonging to 63 genera and 36 families were recorded. Of this 12 species appeared in (3) habitats, 22 species in (2) habitats and 49 species in (1). *Fabaceae* family were recorded with highest represented trees of (15 species) *Moraceae* (8 species), *Rubiaceae* (5 species), and the least represented families were recorded with (1 specie) respectively. Saplings were found to be with density of 77.1% stems/ha, and Seedlings with density of 34.7% stems/ha, the finding also recorded regeneration status potential in term of Good, Fair, Poor and Not regenerate. However study suggests conservation strategies to protect woody species against anthropogenic pressures, rather than following a strict protectionist approach in the management of the game.**

**Keywords:** Checklist, Tree species, Regeneration, Seedlings and Saplings.

## INTRODUCTION

In Nigeria and the other tropical world, several forest regeneration methods have been attempted. Tree species composition as an ecosystem, is a habitat for biodiversity represent the very foundation of human existence as it produces goods and services for the most fundamental human needs. For instance, forest trees provide resources like food, traditional medicine, energy, timber, shade, clear air, fresh water, food, fuel wood and habitats for other organisms. It also provides recreational, psychological, emotional and spiritual fulfillment (FAO, 2016). Globally, 52% of the total forests are in tropical regions and they are known to be the most important areas in terms of biodiversity. Local communities living nearby depend on these trees for their livelihoods. The rapid increase in

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human population near forest ecosystems has increased threats of degradation and fragmentation to this ecosystem, (David, 2014).

Checklist is an attempt to list all of the vascular plant and bryophytes of the Guinnas in an effort to encourage further research. Checklist also helped to determine the accurate information on the particular forest reserves area. Tree species inventory and diversity studies help to understand the species composition diversity status of forests which also determine the information for forest conservation. Prior to forest management operations, biodiversity inventories also gives the researcher hint on the nature and distribution of diversity resources of the region being managed. Such biodiversity inventories are best integrated with the timber resource inventories in order that forest management operations can be planned, (Sivakumar, *et al,* 2014).

Regeneration is the ability for a cell tissue or organism to recover from damage. It can also be used to describe the ability of an ecosystem specifically, the environment and its living population to recover from damage. Regeneration is a key to sustainable forestry and can be accomplished through two basic approaches: Allowing a forest to regenerate is crucial (FAO, 2016). Regeneration is basic to the continuation of forest, as well as to the afforestation of treeless land. Regeneration can take place through self-sown seed ("natural regeneration"), by artificially sown seed, or by planted seedlings. In either case, the performance of regeneration depends on its growth potential and the degree to which its environment allows the potential to be expressed (Grossnickle, 2000). Seed, of course, is needed for all regeneration modes, both for natural or artificial sowing and for raising planting stock in the nursery."Human-assisted natural regeneration" means establishment of a forest age class from natural seeding or sprouting in an area after harvesting in that area through selection cutting, shelter (or seed-tree) harvest, soil preparation, or restricting the size of a clear-cut stand to secure natural regeneration from the surrounding trees Shiva (2007).

The process of natural regeneration involves the renewal of forests by means of self-sown seeds, root suckers, or coppicing. In natural forests, conifers rely almost entirely on regeneration through seed. Most of the broadleaves, however, are able to regenerate by the means of emergence of shoots from stumps (coppice) and broken stems (Dutta, 2013).

Seedlings are young plant (Sporophyte) developing out of a plant embryo, seedlings also refers to a very young tree which is less then 2.5cm in context to DBH. Sapings are plant which is generally marked by 2.5 to 15cm in context to DBH. Seedling and Saplings are two different juvenile life stage of a tree, (Raghubanshi and Tripathi 2009). Nigeria is among the ten countries with the highest annual net negative change rates from 2000- 2005 degrading at the rate of 3.3% (FAO, 2006).

## MATERIALS AND METHODS

The research was carried out in Baturiya Hadejia Wetland Game Reserve, the wetland covers approximately about 101,095ha and it is located 20km south east of Hadejia. It lies between latitude $11^0$20'- $12^0$ 35' N and longitudes $10^0$10'- $10^0$ 40'E. Mean annual temperature varies from 28°C - 34°C, the pattern of rainfall varied markedly across the state. In the south east (where the reserve is located) mean annual rainfall range between 600mm to 850mm, (Ramsar, 2008). The vegetation of the study area is of Sudano- sahelian type, comprising of varieties of *Acacia spp, Adansonia spp, Tamarindus spp, Mitrogynus spp, Diospirus spp Faidhebia spp Ficus spp* and *Hyphaene spp* e.t.c and the vegetational cover varies being dense with taller trees, (JSMARP, 2016)

A reconnaissance survey was made in the study area, general features of reserve were assess and different sites in the area was identified for selection of sample plots. Three plots of 100 x 100m$^2$ from the habitat (Upland, Fadama and Swampy) was made. All the tree species were enumerated by direct counting and consolidated check list of all the trees species in the sample plots was made. Plant entries include species, family and Hausa or vernacular names of every living plant species encountered on the plots. Specie with dbh ≥ 15cm were enumerated as matured trees, (Akinyemi *et al.,* 2001). Fifteen sub plots of 5mx5m$^2$ in a quadrate were laid to assess species seedlings and saplings regeneration status. A survey was conducted to ascertain the possibility of self regeneration by the parent trees. Regeneration status was determined by enumerating the trees stands in each sub plots within the three main plots

Regeneration Status was calculated by the below formula as cited by Curlis and Inrosh (1950), and adopted by Ashish *et-al,*(2013) as;

$$RP = \frac{Numberofseedlings/saplings\ per\ /hectare}{Numberofparenttreesperhectare}$$

## RESULTS

Results of the checklist of tree species diversity and regeneration statyus of specie seedlings and saplings in the study area are presented below. The checklist was recorded with a total of 83 species belonging to 63 genera and 36 families. Of this 12 species appeared in three (3) habitats, followed by 22 species in two (2) habitats and 49 species in one (1) habitat as shown in table 1 with the symbols (√) for species present and (X) for species Absent in each habitat. Family recorded with highest represented trees is *Fabaceae* (15 species) followed by *Moraceae* (8 species), *Rubiaceae* (5 species), *Combretaceae* and *Leguminosae* (4 species) each and *Amaranthaceae, Anacardiaceae, Arecaceae* and *Rhamnaceae* (3 species) each and *Burseraceae, Capparaceae, Dioscoreaceae, Euphorbiaceae, Loganiaceae, Meliaceae, Poaceae* and

**Table 1:** Check list of Tree species diversity, family and Hausa names of Baturiya hadejia wetland game reserve

| S/no | Species | Family | Hausa names | Habitat I | Habitat II | Habitat III |
|---|---|---|---|---|---|---|
| 2 | *Acacia nilotica* | Fabaceae | Bagaruwa | ✓ | X | ✓ |
| 3 | *Acacia polyacantha* | Fabaceae | Ƙar-Kara | X | ✓ | X |
| 4 | *Acacia Senegal* | Fabaceae | Ɗakwara | ✓ | ✓ | ✓ |
| 5 | *Acacia seyel* | Fabaceae | Dushe | X | ✓ | X |
| 6 | *Acacia sieberana* | Fabaceae | Farar Kaya | ✓ | ✓ | ✓ |
| 7 | *Adansonia digitata* | Malvaceae | Kuka | ✓ | ✓ | ✓ |
| 8 | *Adenium obsesum* | Apolynaceae | Ƙarya | ✓ | X | X |
| 9 | *Albizia chevalieri* | Mimosoideae | Katsari | X | ✓ | X |
| 10 | *Anogeissus lieocarpus* | Combretaceae | Marke | ✓ | ✓ | ✓ |
| 11 | *Anona senegalensis* | Annonaceae | Ɠwadar Daji | X | ✓ | X |
| 12 | *Aristolochis albida* | Aristolochiaceae | Maɗacin Ƙasa | ✓ | X | X |
| 13 | *Azadirachta indica* | Meliaceae | Darbejiya | ✓ | X | ✓ |
| 14 | *Balanite aegyptiaca* | Zygophyllaceae | Aduwa | ✓ | ✓ | X |
| 15 | *Balsamodendrum africanum* | Burseraceae | Dashi | ✓ | X | X |
| 16 | *Bauhinia rufescens* | Caesalpiniodeae | Matsa-Tsagi | X | ✓ | ✓ |
| 17 | *Borassus aethiopum* | Arecaceae | Giginya | ✓ | ✓ | ✓ |
| 18 | *Boseia senegalensis* | Capparaceae | Tabila | ✓ | X | X |
| 19 | *Boswellia odorata* | Burseraceae | Hano | X | ✓ | ✓ |
| 20 | *Calotrospis procera* | Apocynaceae | Tunfafiya | X | X | ✓ |
| 21 | *Canavalia ensiformis* | Fabaceae | Barankachi | ✓ | X | ✓ |
| 22 | *Capparis tomentosa* | Capparaceae | Ƙabdodo | X | ✓ | X |
| 23 | *Cassia singueana* | Fabaceae | Rumfu | ✓ | X | X |
| 24 | *Celosia argentea* | Amaranthaceae | Rimi | ✓ | X | X |
| 25 | *Celtis integrifolia* | Ulmaceae | Zuwo | ✓ | X | X |
| 26 | *Clerodendrum capticatum* | Verbenaceae | Bambarwa | ✓ | ✓ | X |
| 27 | *Cochlospermum tinctorium* | Cochlospermaceae | Rawuya | X | X | ✓ |
| 28 | *Combretum glutinosum* | Combretaceae | Kantakara | X | ✓ | ✓ |
| 29 | *Combretum micranthum* | Dioscoreaceae | Geza | X | ✓ | ✓ |
| 30 | *Crosspteryx febrifusa* | Rubiaceae | Giginyar Mata | ✓ | X | X |
| 31 | *Cycatophyta cycad* | Cycadaceae | Shuwaki | X | ✓ | X |
| 32 | *Daniellia oliverii* | Caesalpioidaceae | Maje | ✓ | ✓ | ✓ |
| 33 | *Detarium microcarpus* | Fabaceae | Taura | ✓ | X | X |
| 34 | *Diospyros mespiliformis* | Ebenaceae | Kanya | ✓ | X | ✓ |
| 35 | *Eragrostis gangetica* | Poaceae | Durburwa | X | X | ✓ |
| 36 | *Euphorbia kamerunica* | Euphorbiaceae | Kyarana | X | X | ✓ |
| 37 | *Euphorbia poissoni* | Euphorbiaceae | Tinya | X | X | ✓ |
| 38 | *Faidhebia albida* | Fabaceae | Gawo | ✓ | ✓ | ✓ |
| 39 | *Ficus abutilifolia* | Moraceae | Yande | X | ✓ | X |
| 40 | *Ficus iteophylla* | Moraceae | Shirinya | X | X | ✓ |
| 41 | *Ficus lutea* | Moraceae | Ɓauren Kurmi | X | ✓ | X |
| 42 | *Ficus polita* | Moraceae | Durumi | ✓ | ✓ | ✓ |
| 43 | *Ficus ptatyphylla* | Moraceae | Gamji | X | ✓ | X |
| 44 | *Ficus sycomorus* | Moraceae | Ɓaure | ✓ | X | X |
| 45 | *Ficus thonningii* | Moraceae | Cheeɗiya | ✓ | ✓ | X |
| 46 | *Ficus vallis- choude* | Moraceae | Lubiya | X | ✓ | X |
| 47 | *Gardenia aqualla* | Rubiaceae | Gauɗe | X | ✓ | X |
| 48 | *Guiera senegalensis* | Combretaceae | Sabara | X | ✓ | X |

**Table 1:** Continue

| | | | | | | |
|---|---|---|---|---|---|---|
| 49 | ***Hippocratea guineensis*** | **Celastraceae** | **Gwaɗayi** | ✓ | **X** | **X** |
| 50 | *Hyphaene thebaica* | Arecaceae | Goruba | ✓ | X | ✓ |
| 51 | *Isoberlinia doka* | Fabaceae | Doka | ✓ | X | ✓ |
| 52 | *Khaya senegalensis* | Meliacea | Maɗacci | ✓ | X | ✓ |
| 53 | *Lannea microcarpa* | Anacardiaceae | Faru | ✓ | ✓ | ✓ |
| 54 | *Mangifera indica* | Anacardiaceae | Mangwaro | X | ✓ | X |
| 55 | *Mimosa pigra* | Fabaceae | Ƙaidaji | X | ✓ | ✓ |
| 56 | *Mitragyna inermis* | Rubiaceae | Giyyaya | X | ✓ | X |
| 57 | *Nauclea diderrichii* | Rubiaceae | Tafashiya | X | ✓ | X |
| 58 | *Nauclea latifolia* | Rubiaceae | Gidido | ✓ | X | ✓ |
| 59 | *Olea europea* | Oleaceae | Zaitun | ✓ | X | X |
| 60 | *Oxytenanthera abyssinica* | Poaceae | Gora | ✓ | X | ✓ |
| 61 | *Parinari macrophylla* | Chrysobalanaceae | Gawasa | X | ✓ | X |
| 62 | *Parkia biglobosa* | Fabaceae | Ɗorowa | ✓ | X | X |
| 63 | *Parkiasonia acculeata* | Fabaceae | Sharannabi | ✓ | X | X |
| 64 | *Piliotigma recticulatum* | Leguminosaceae | Kalgo | ✓ | X | ✓ |
| 65 | *Prosopis Africana* | Leguminasae | Ƙirya | X | ✓ | X |
| 66 | *Raphia sudanica* | Arecaceae | Kwagwala | X | X | ✓ |
| 67 | *Raphionacme brownie* | Apocynaceae | Ɓauji | ✓ | X | X |
| 68 | *Sclerocarya birrea* | Anacardiaceae | Danya | ✓ | X | X |
| 69 | *Securidaca longepedunculata* | Polygalceae | Sanya | X | ✓ | ✓ |
| 70 | *Sesbania dalzielli* | Leguminosae | Alambo | ✓ | X | ✓ |
| 71 | *Sterculia setigera* | Sterculiaceae | Kukkuki | X | ✓ | X |
| 72 | *Strychnos spinosa* | Loganiaceae | Ƙoƙiya | X | ✓ | X |
| 73 | *Syzygium guineense* | Myrtaceae | Malmo | X | X | ✓ |
| 74 | *Tacca leontopetaloide* | Arecaceae | Yaryara | X | ✓ | ✓ |
| 75 | *Tamarindus indica* | Fabaceae | Tsamiya | ✓ | X | X |
| 76 | *Terminalia macroptera* | Combretaceae | Kandare | X | X | ✓ |
| 77 | *Trema orientalis* | Cannabaceae | Ajenana | X | ✓ | X |
| 78 | *Vitellaria paradox* | Sapotaceae | Kaɗanya | ✓ | X | X |
| 79 | *Vitex doniana* | Verbenaceae | Dinya | ✓ | ✓ | ✓ |
| 80 | *Voacanga thouarsii* | Loganiaceae | Ƙoƙiyar Biri | X | ✓ | X |
| 81 | *Ziziphus mauritiania* | Rhmnaceae | Magarya | ✓ | ✓ | ✓ |
| 82 | *Ziziphus micronata* | Rhamnaceae | Magaryar Kura | X | ✓ | X |
| 83 | *Ziziphus spinsa- Christi* | Rhamnaceae | Kurna | ✓ | X | ✓ |

Source: Field survey (2019)

*Verbenaceae* (2 species) each. The least represented are families were recorded with (1 specie) in Table 1 respectively.

The results of Regeneration status potential of species Seedlings and Saplings indicated that Saplings had the higher density of 77.1% stems/ha, and Seedlings were recorded with least density of 34.7% stems/ha. The results also recorded the regeneration status potential of 83 identified species base on Good, Fair, Poor and Not regenerateable status as shown in table 2 below respectively.

## DISCUSSION

The checklist of tree species diversity of Baturiya Hadejia Wetland Game Reserve recorded a total of 83 species belonging to 63 genera which were distributed in 36 families. Of which 12 species of *Acacia Senegal, A. sieberana, Adansonia digitata, Anogeissus lieocarpus, Borassus aethiopum, Daniellia oliverii, Faidhebia albida, Ficus polita, Lannea microcarpa, Vitex doniana, Ziziphus mauritiana* and *Zizphus micronata* appeared in three (3) habitats, followed by 22 species appeared in two (2)

**Table 2:** Regeneration Status Potential of species seedlings and saplings of Baturiya Hadejia Wetland Game Reserves

| S/no | Species | Seedlings | | Saplings | |
|---|---|---|---|---|---|
| | | **RP** | **Status** | **RP** | **Status** |
| 1 | *Acacia farnesiana* | 0.000 | Not regenerate | 1.000 | Good |
| 2 | *Acacia nilotica* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 3 | *Acacia polyacantha* | 0.000 | Not regenerate | 3.000 | Good |
| 4 | *Acacia Senegal* | 0.333 | Poor | 0.778 | Fair |
| 5 | *Acacia seyel* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 6 | *Acacia sieberana* | 0.126 | Poor | 0.253 | Poor |
| 7 | *Adansonia digitata* | 1.750 | Good | 0.250 | poor |
| 8 | *Adenium obsesum* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 9 | *Albizia chevalieri* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 10 | *Anogeissus lieocarpus* | 0.750 | Fair | 0.000 | Not regenerate |
| 11 | *Anona senegalensis* | 0.214 | Poor | 0.143 | Poor |
| 12 | *Aristolochis albida* | 0.000 | Not regenerate | 2.000 | Good |
| 13 | *Azadirachta indica* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 14 | *Balanite aegyptiaca* | 0.070 | Poor | 0.351 | Poor |
| 15 | *Balsamodendrum africanum* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 16 | *Bauhinia rufescens* | 1.000 | Good | 4.000 | Good |
| 17 | *Borassus aethiopum* | 0.000 | Not regenerate | 0.294 | Poor |
| 18 | *Boseia senegalensis* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 19 | *Boswellia odorata* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 20 | *Calotrospis procera* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 21 | *Canavalia ensiformis* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 22 | *Capparis tomentosa* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 23 | *Cassia singueana* | 0.000 | Not regenerate | 0.722 | Fair |
| 24 | *Celosia argentea* | 3.000 | Good | 12.000 | Good |
| 25 | *Celtis integrifolia* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 26 | *Clerodendrum capticatum* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 27 | *Cochlospermum tinctorium* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 28 | *Combretum glutinosum* | 0.000 | Not regenerate | 0.353 | Poor |
| 29 | *Combretum micranthum* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 30 | *Crosspteryx febrifusa* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 31 | *Cycatophyta cycad* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 32 | *Daniellia oliverii* | 0.431 | Fair | 0.353 | Poor |
| 33 | *Detarium microcarpus* | 0.000 | Not regenerate | 1.600 | Good |
| 34 | *Diospyros mespiliformis* | 0.000 | Not regenerate | 0.219 | Poor |
| 35 | *Eragrostis gangetica* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 36 | *Euphorbia kamerunica* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 37 | *Euphorbia poissoni* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 38 | *Faidhebia albida* | 0.103 | Poor | 0.276 | Poor |
| 39 | *Ficus abutilifolia* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 40 | *Ficus iteophylla* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 41 | *Ficus lutea* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 42 | *Ficus polita* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 43 | *Ficus ptatyphylla* | 2.000 | Good | 0.000 | Not regenerate |
| 44 | *Ficus sycomorus* | 0.000 | Not regenerate | 2.000 | Good |
| 45 | *Ficus thonningii* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 46 | *Ficus vallis- choude* | 7.000 | Good | 0.000 | Good |
| 47 | *Gardenia aqualla* | 0.000 | Not regenerate | 0.000 | Not regenerate |

**Table 2:** Continue

| | | | | | |
|---|---|---|---|---|---|
| 48 | ***Guiera senegalensis*** | **5.000** | **Good** | **0.000** | **Not regenerate** |
| 49 | *Hippocratea guineensis* | 0.146 | Poor | 0.317 | Poor |
| 50 | *Hyphaene thebaica* | 0.265 | Fair | 0.554 | Fair |
| 51 | *Isoberlinia doka* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 52 | *Khaya senegalensis* | 0.000 | Not regenerate | 1.500 | Good |
| 53 | *Lannea microcarpa* | 1.200 | Good | 3.600 | Good |
| 54 | *Mangifera indica* | 4.000 | Good | 0.000 | Not regenerate |
| 55 | *Mimosa pigra* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 56 | *Mitragyna inermis* | 0.407 | Fair | 0.852 | Fair |
| 57 | *Nauclea diderrichii* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 58 | *Nauclea latifolia* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 59 | *Olea europea* | 1.500 | Good | 3.000 | Good |
| 60 | *Oxytenanthera abyssinica* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 61 | *Parinari macrophylla* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 62 | *Parkia biglobosa* | 1.000 | Good | 3.000 | Good |
| 63 | *Parkiasonia acculeata* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 64 | *Piliotigma recticulatum* | 0.157 | Poor | 0.431 | Fair |
| 65 | *Prosopis Africana* | 0.833 | Fair | 3.000 | Good |
| 66 | *Raphia sudanica* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 67 | *Raphionacme brownie* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 68 | *Sclerocarya birrea* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 69 | *Securidaca longepedunculata* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 70 | *Sesbania dalzielli* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 71 | *Sterculia setigera* | 0.000 | Not regenerate | 11.000 | Good |
| 72 | *Strychnos spinosa* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 73 | *Syzygium guineense* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 74 | *Tacca leontopetaloide* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 75 | *Tamarindus indica* | 2.667 | Good | 8.000 | Good |
| 76 | *Terminalia macroptera* | 0.000 | Not regenerate | 2.000 | Good |
| 77 | *Trema orientalis* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 78 | *Vitellaria paradox* | 0.000 | Not regenerate | 7.000 | Good |
| 79 | *Vitex doniana* | 0.000 | Not regenerate | 2.000 | Good |
| 80 | *Voacanga thouarsii* | 0.000 | Not regenerate | 0.000 | Not regenerate |
| 81 | *Ziziphus mauritiania* | 0.129 | poor | 0.314 | Poor |
| 82 | *Ziziphus micronata* | 0.000 | Not regenarate | 0.000 | Not regenerate |
| 83 | *Ziziphus spinsa- Christi* | 0.667 | Fair | 0.905 | Fair |
| | **Total** | **34.750** | | **77.065** | |

Source: Field survey (2019)
RP = Regeneration Percentages

habitats and 49 species in one (1) habitat as shown in table 1 with the symbols (√) for species present and (X) for species Absent in each habitat respectively. Family recorded with highest represented trees is *Fabaceae* with 18.1% (15 species) followed by *Moraceae* 9.6%, (8 species), *Rubiaceae* 6.0% (5 species), *Combretaceae* and *Leguminosae* with 4.8% (4 species) each and *Amaranthaceae, Anacardiaceae, Arecaceae* and *Rhamnaceae* with 3.6% (3 species) each and *Burseraceae, Capparaceae, Dioscoreaceae, Euphorbiaceae, Loganiaceae, Meliaceae, Poaceae* and *Verbenaceae* with 2.4% (2 species) each. The least represented family is *Annonaceae, Apocynaceae, Aristolochiaceae, Caesalpinioideae, Cannabaceae, Celastraceae, Chrysobalanaceae, Cochlospermaceae, Cycadaceae, Ebenaceae Malvaceae, Mimosoideae, Myrtaceae, Oleaceae, Polygalceae, Sapotaceae, Sterculiaceae, Ulmaceae* and *Zygophyllaceae* with 1.2% (1 specie) each in plot frequency. This finding could be attributed as a result of anthropogenic activities or due to

the fact that the family of *Fabaceae* is the most common family found in the tropics and can be found in all the habitats as cited by Hadiza (2015). This finding is similar to the finding of Sivakumar *et al*, 2014 in his research on the Checklist of tree species in selected forest fragments of the Western Ghats, Tamilnadu also far from what Muazu, (2010) found in Kuyambana Forest Reserve, Zamfara State, Nigeria. He reported the dominance family of *Caesalpinaceae*, *Mimosaceae* and *Combretaceae* comparatively. This could be due to the fact that some species are sparsely distributed.

Regeneration status potential of species seedlings and saplings were recorded, the finding indicated that Saplings had the highest regeneration status of 77.1% stems/ha in terms of the species density in the study area, out of this*Celosis argentea*has higher percentage of 12.0%, followed by *Sterculia setigera*11.0% and *Termarandus indica* 8.0%. *Adonsonia digitata* were recorded with least frequency of 0.07%. The finding also recorded the regeneration status of 83 identified species out of which 18 species had Good regeneration of (1- 12%), followd by 6 species with Fair renеneration of (0.4- 0.9%), and 11 species with Poor regeneration of (0.01- 0.39%) and 48 species Not regenerateablewith (0.00%). Species of*Celosis argentea, Sterculia setigera* and *Termarandus indica* were found as dominant tree species of study area in sapling. Seedlings were recorded with least density of 34.7% stems/ha. *Ficus vallia-choude* had higher percentage of 7.0%, *Guiera senegalensis* 5.0% followed by *Celosia argentea* 3.0% and *Balanite aegytiaca* were recorded with least regenerateable of seedlings.The finding also recorded the regeneration status of 83 identified species out of which 11 species had Good regeneration of (1- 12%), followd by 6 species with Fair renеneration of (0.4- 0.9%), and 8 species with Poor regeneration of (0.01- 0.39%) and 58 species Not regenerateablewith (0.00%). Species of *Ficus vallia-choude, Guiera senegalensis* and *Celosia argentea* were identified as dominant tree species. This finding is similar to the finding of Ashish, *et al.* (2013).This may be due to the effect of varying coppice of the harvested tree species in term of sapling and or Anthropogenic activities and livestock farming which lead to the attribute of seedlings disturbances as the seedlings were destroyed from trampling by people and livestock as well as other unfavorable effects such as inadequate soil nutrients in the reserve area. This finding is close to the finding of Abdulrashid *et al,* (2017) in the parklands of Gwarzo in Kano state who recorded Sapling with higher density of (78.72stems/ha) and seedlings recorded with the least density with 44.16 stems/ha, also similar to the research conducted at the parklands of Katsina state by Nuraddeen (2014) he reported a similar pattern of regeneration in which there was a higher density of mature stems and lower density of smaller stems (seedlings and saplings).

## CONCLUSION

Checklist helped to determine the accurate information on the particular forest reserves area. Regeneration also is the ability for a cell tissue or organism to recover from damage. Quantitative assessment of the tree species diversity indices and regeneration status was carried out using systematic sampling techniques. Tree species and families were identified. The checklist of tree species diversity of the study area recorded a total of 83 species belonging to 63 genera which were distributed in 36 families. The finding of Regeneration status potential of species Seedlings and Saplings also were recorded Saplings with the higher density of 77.1% stems/ha, and Seedlings with least density of 34.7% stems/ha. However study suggests conservation strategies to protect woody species against anthropogenic pressures (for example, protection from or reducing the frequency and/or intensity of disturbance, especially wood cutting and bushfires), Rather than following a strict protectionist approach in the management of the game.

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