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Geography

VEGETATION ANALYSIS IN THE DEGRADED QUARRY MINE SITES OF ISHIAGU, EBONYI STATE

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ABSTRACT This study examined the composition of trees and shrubs in the degraded mined sites of Ishiagu in Ebonyi State. Eight quadrats of size 100m x 100m were laid in two locations of both the Crushed Rock and Setraco companies. Four quadrats were in each of the sites. Each of the quadrats was divided into 10 grid cells of dimension 10m x 10m. This yielded a total of 40 grid cells in both the mined and unmined sites. Tree/shrub species composition was then analyzed based on their volume and frequency of occurrence across the 40 cells in both the mined and unmined sites. The result of the analysis revealed that in the Crushed Rock quarry mined site, 18 tree/shrub species from 14 families with a density of 53 bions were recorded. In the Crushed Rock unmined site, 37 tree/shrub species in 21 families with a density of 101 were realized. On the other hand, in Setraco quarry mined site, there were 14 tree/shrub species from seven families and with a density of 35 were recorded. In the unmined site, there were 50 tree/shrub species in 29 families and with a density of 105 were found.

KEYWORDS : Vegetation, Composition, Degraded, Mines, Quarry, Biosphere, Mineral

Introduction

Vegetation, which refers to the plant cover of the earth, according to Kumi-Boateng, Boye and Issaka (2012) displays patterns that reflect a wide variety of environmental characteristics as well as temporal aspects operating on it. According to the authors, this is due to the fact that it supports critical functions in the biosphere by regulating the flow of numerous bio-geochemical cycles like that of water, carbon, and nitrogen. It is also of great importance in local and global energy balance. Vegetation also strongly affects soil characteristics, including soil fertility, chemistry and texture (Adekeye, 2001; David and Mark, 2005).

Though vegetation is of high environmental and biological importance, it is often under intense human pressure in mining areas especially where surface mining and illegal small scale mining activities are prevalent resulting into changes in land use/land cover of mine areas. Directly or indirectly, mining has been seen to be a major factor responsible for vegetation loss in mining areas the world over (Maponga, 1995; Adekeye, 2001; David & Mark, 2005). Directly, it is caused by vegetation clearance for various mining activities and indirectly, with dust pollution as plenty of dust is discharged into the air during the process of quarrying. Adekeye (2001) and Maponga (1995) asserted that when calcium, sulphur-dioxide among other chemical constituents enter the plants through the stomata pores it leads to the destruction of chlorophyll and disruption of photosynthesis in plants subsequently leading to stunted growth or death.

According to Aigbedion (2005), the scale of operations involved in each stage of mineral development however determines the intensity and extent of vegetation loss and subsequently environmental degradation. Thus a greater damage is witnessed most specifically in the localities where the minerals are being mined.

In Nigeria, the situation of vegetation especially in mining regions over the years has been deplorable, in his work Aigbedion (2005) Stated that large scale mining of tin and associated minerals in the Jos Plateau has given room to high degree of degradation of arable land, vegetation and landscape resulting into several other environmental problems. According to the author, vegetation in form of natural forest or crop plantation is usually the first casualty to suffer total or partial destruction during the exploitation and exploitation of minerals in a locality. For example, in the Niger Delta where oil is mined, oil spillage on vegetation has caused loss of palm tree plantations within the area (Tolulope, 2004). Recent environmental impact studies of limestones mining in Sagamu has also revealed a decline in kolanut output from the plantations within a few kilometres radius of the mine (Adekoya, 2003; Tolulope, 2004; Aigbedion, 2005). Within the Jos Plateau, Adekoya (2003) stated that large amount of vegetation was stripped due to the open cast mining method employed by the miners. This has given rise to the destruction of the scenic landscape which is replaced by unsightly large irregular holes and heaped of debris produced by the opencast method of mining.

Following the discovery of limestone traces in Mbayion, Gboko Local Government Area, Benue State of Nigeria in 1960, a cement plant was established within the region and it commenced operation in 1980. Subsequently, in 2004 with Dangote Industries Plc. As a new management of the company, an aggressive upgrading and rehabilitation of the plant was carried out and this has subsequently transformed the company into a new state-of-the-art cement factory with two million tonnes lines (Vetiva, 2010). Due to increase in quarrying activities caused by the upgrade of the processing plant within the study area, the natural vegetation belt of the area which is characterised with the presence of tall grasses and tall trees is being threatened as it has to be cleared to give room for mining activities. The consequences of vegetal deterioration within the study area are however enormous with various environmental and economic implications as agriculture is the main source of income for people living within the study area. Against this backdrop, the assessment of the effect of mining within the area especially as it affects vegetation becomes necessary.

The areal extent of vegetation communities exposed to human activities has been known to correlate with the amount of biodiversity loss. In a study on the impact of farm size and topography on plant and insect diversity in Italy, Marini, Fontana, Klimek, Battisti and Gaston (2009) posited that the larger a farm size was the more the impact it had on both plants and other biota and that the more intensive the farming operation the less plant species were found on the site. Aside direct effect of depleting flora species in the tree/shrup class were also identified in the study area both on the mined and unmined sites. Their results are presented below.

Scope

This research is within the confines of the assessment of the composition of trees and shrubs in the degraded quarry sites of Ishiagu, Ebonyi State. Two quarry sites owned by Setraco and Crushed Rock companies were selected for the study. Information regarding trees and shrubs were collected from these two sites.

Objectives

(i) To examine the composition of trees and shrubs in the study area

(ii) To classify the floral species into their respective families.

Study area

The study area (Ishiagu) is located within the southern part of the lower Benue rift. Nigeria Ishiagu lies within latitude 5051 to 60001N and longitude 70251 to 70381E. Ishiagu is bounded to the North by Awgu and Aninri (Enugu state) to the South by Ugwueke, Ishiukwato (Abia) to the West by Lokpa and Lekwesi (Abia state) and to the the East by Akaeze (Ebonyi state). It is one of the largest autonomous communities in Ivo Local Government Area of Ebonyi state.

The area is a sub-humid tropical region. Generally, it has an annual mean temperature range 0of 230C to 340C (Iwena, 2008). Two distinct seasons - dry and wet season characterize the area. The dry season, starts from late November to March and is dominated by the tropical continental air mass. The wet/rainy season on the other hand starts from April to November and it is characterized by the tropical maritime air mass which brings rainfall and wet conditions to the area (Iwena, 2008). The "mean annual precipitation is about 1,370mm and it is described by Ojanuga and Ekwoanya (1994) as having a bimodal pattern. The average wind speed over the study area is about 1.50m/s, while the average ambient air temperature is about 300C"(Nigeria Meteological Agency, 2012).

The area is generally low-lying with swampy terrain and gentle undulating shaley lands about 70-95m above sea level. The low-lying hills are made up of both resistant highly indurated shales and Igneous intrusive rock outcrops where the quarries (Crushed Rocks Industries Limited and Setraco) are located (Chiadikobi & Chinghanam, 2011).

The hydrology is characterized by rivers, streams and lakes which flows from the South West Region towards the North East. The Ivo River, the largest rises from the region of Uturu and Umuchieze and meanders it ways through to join the Ike River Eastwards. The river passes through Uburu to join the Esu River and empties into the Cross River that finally joins the Atlantic Ocean near Calabar. A numerous small lakes and springs can be found in some parts in the community. Prominent among the lakes include Ogwu and Iyiodu, they are noted for providing the inhabitant source of drinking water (Anyata, 2001).

Ishiagu is located within the transitional forest savanna mosaic (derived savanna) zone. The area is characterized by varying vegetation profiles such that the disturbed lowland forest formation and the floristic composition of the study area is diverse. Within the area, the predominant soil is tropical ferruginuous soils; coarse loamy soils, laterite soils as well as sandy soils (Iwena, 2008). A considerable variation in physiognomy, structure and girth sizes occurs. Riparian forests of some fresh water trees and mancrophytes are commonly found along the fringes of water courses and flood rice swamps. In some of the areas of the study area, the existing plant cover is a mosaic of farmland and fallow vegetation at various stages of re-growth and maturity.Based on the 2006 National Population Census figures however, Ishiagu community of Ivo Local Government in general has a population of 61,669 persons out of which 29475 represent the population for the male and 32194 represent the population for the female.

Within the study area also the inhabitants are largely pre-occupied in traditional subsistence agriculture/land cultivation and wildlife hunting. Important cash crops that are cultivated in the study area include, rice groundnut and citrus. Other cash crops include melon, African pear, hot pepper, cashew and oil palm. Food crops include yam, cassava, sweet potatoes, beans, maize, millet and guinea corn. Other economic activities in the area include blacksmithing, fishing, carving and pot making.

Methods

Data for this work emanated from primary and secondary sources. Primary sources entailed filed observation as well as the identification, inventory and assessment of the flora species composition in terms of types and number of species and their bions in the mined and unmined sites of the study area. Secondary data were sourced from the annual reports, other published and unpublished works on the quary mine annual reports, laws and regulations of the Federal Ministry of Mines and Steel Development as well as from other textbooks, journals articles, maps, internet articles and periodicals The purposive sampling method was used to select the villages that are closest to the Quarry mines boundary (Crush Rock and Setraco) or within the mine core area, and which are directly engaged in quarry mining in the study area.

Eight quadrats of size 100m x 100m were established in the two locations of Crushed Rock and Setraco, two each on a mined site and two each on an unmined site. Each quadrat was divided into 10 grids cells of dimension 10m x 10m out of which eight was selected for sampling. This yielded a total of 40 grid cells in the mined sites, and 40 grid cells in the unmined sites.

The census quadrat method was used to delineate the sample plots to facilitate the listing of flora species found in the study area and the counting of their bions according to Nwadinigwe (2013). The supplied checklists were used to identify the flora species composition of (trees/shrubs) from each of the selected eight grid cells in the mined and unmined sites in the study area.Tree/shrub species composition were analyzed based on their volume and frequency of occurrence across the 40 cells on both the mined and unmined sites. The scores were then used to calculate the percentage of occurrence of each species. S

Discussion of Findings

In Crush Rock Quary mined site a total of 18 tree/shrub species from 14 families with a density of 53 bions were encountered and identified. From Table 1, it was observed that three tree/shrub species, Borasus aethropium, Alstomia Booneil and Hibiscus suratten, were common and therefore more dominant(9.43% each) followed by spomdia mombia and Inauclea atifola (7.5% each). Other species, for example Pittosporium viriciflorophira alata Pterocarpus erinacia are rare species. The site was dominated by Ancerachiaceae, Malvaceae and Fabaceae families while the rest of the families were less abundant present were rare.

Table 1 revealed that 37 tree/shrub species in families were recorded in Crush rock unmined site with a density of 101. It was noted that the site was rich in tree/shrub species abundance with, Burkea Auaploaca togoensis, Albinia adeamfricana being more abundant (6.9%) followed by Sterculia setigera (4.9%). Other notable occurrences were Manifera indica, Bredelia feruginea, Afzilia Africana, Vitteleria paradoxa, and Parinari exelsa (3.9%) each. The least tree/shrub species occurrences on this site were Terminalia glaucescens, Muhecuna pruriens, Solanum nigrum, Sesbania leptocarpa. This diversity richness is accounted for by the relative minimal disturbance of the unmined site.

Table 1: Tree/shrub Composition in the Crushed Rock Quarry Mined Site

S/N	Common name	Tree/shrub species	Family	No. Bions	Freq.	%bions
1	Silk cotton	Ciba pentengra tephrosia	Bombeae	2	2	3.77
2	Hoarypea	Bracteolate anacardium	Fabaceae	2	2	3.77
3	Cashew	Occidentale	Anacandiaceae	1	1	1.89

4	Kola nut	Cola nitida	Malvaceae	1	1	1.89
5	African peach	Nauclea latifola boassus	Rubiaceae	4	1	7.55
6	Date palm	Aethropium	Palmae	5	1	9.43
7	Stool wood	Alstomia booneil	Apocynaceae	5	1	9.43
8	Buffalo bean	Mucuna pruriens helichrysum	Fabaceae	3	2	5.66
9	Silver bush	Pertiolare pittosporum	Asteraceae	2	1	3.77
10	Cheesewoods	Viricliflorum pterocarpus	Pittosporaceae	3	1	5.56
11	Barwood	Erinacius ricinodendron	Proteaceae	1	1	1.89
12	Soft wood	Heudelatin	Melastomataceae	3	1	5.66
13	Bush sorrel	Hibiscus surattensis	Malvaceae	5	1	9.43
14	Hog plum	Spondiamombia	Anacerahiaceae	4	1	7.55
15	Locus bean tree	Porkia bigblibosa	Mimosaceae	3	1	5.66
16	Mango	Magnifera indica	Anacandiaceae	3	1	5.66
17	Red iron wood	Iophira alota daibergia	Ochnaceae	1	1	1.89
18	African blackwood	Meamoxylon alchornea	Fabbaceae	2	2	3.77
19	Christmas bush	Floribunda	Euphoribiaceae	3	2	5.66
	Total			53	24	100.00

Source: Authors Field Survey, 2017.

Table 2: Tree/shrub Species Composition in Crushed Rock Unmined Sites

S/N	Common name	Tree/shrub species	Family	No. Of bions	Freq.	% bions
1	Erinado	Ricndendrum hentonic	Euphorbiaceae	2	1	1.98
2	Mango	Magnifera indica harungana	Anacardiaceae	4	2	3.96
3	Orange milk tree	Madagascariensis	Guttiferaeceae	3	2	2.97
4	Plantain	Musa paradisuaca	Musaceae	2	1	1.98
5	Banana	Musa sapietum	Musaceae	2	1	1.98
6	Cape jasmine	Gardenia aqualla	Rubiaceae	3	2	2.97
7	Charcoal tree	Trema orientalis termialia	Cannabaceae	3	2	2.97
8	Birom	Glucescens	Tamaricaceae	1	1	0.99
9	Locust bean tree	Bridelia ferrugine a	Phyllanthaceae	4	4	3.96
10	Balsam tree	Daniela oliveri	Leguminoseae	2	2	1.98
11	Crystal bark	Crossopteryx febrifuga	Rubiaceae	3	2	2.97
12	Somon	Uapaca togoensis	Phyllanthaceae	4	2	3.96
13	Wild seringa	Burkea Africana	Fabaceae	7	5	6.93
14	Velvet bushwillow	Combretum molle	Combretaceae	3	2	2.97
15	Christmas bush	Alchornea floribunda	euphorbiaceae	3	2	2.97
16	Albino	Albinia adeamlefoha pittosporum	Fabeceae	4	2	3.96
17	Cheesewoods	Viricliflorum	Pittosporaceae	2	1	1.98
18	Iron tree	Prosopis Africana	Fabaceae	3	2	2.97
19	African mahogany	Afzelia Africana	Fabaceae	4	3	3.96
20	Hoarypea	Tephrosia bracteolate	Fabeceae	2	1	1.98
21	Guinea plum	Parinari exelsa	Chrysobalanaceae	4	3	3.96
22	Buffalo bean	Mucuna pruriens	Fabaceae	3	2	2.97
23	Bush sorrel	Hibiscus surattensis	Malvaceae	1	1	0.99
24	African teak	Afromozia laxiflora	Leguminoseae	2	1	1.98
25	Shea butter tree	Vitteleria paradoxa	Sapotaceae	4	3	3.96
26	Black nightshade	Solanum nigrum	Solanaceae	1	1	0.99
27	Tropical chestnut	Sterculia setigera	Malvaceae	5	3	4.95
28	Fig mulberry	Ficus sycomorus	Fabaceae	2	2	1.98
29	False yam	Icacina trichantha	Icacinaceae	2	2	1.98
30	Vegetable fern	Diplazium esculentium	Dryopteridaceae	2	1	1.98

31	Wild custard apple	Annona senegalensis	Anarcadiaceae	2	1	1.98
32	Monkey bread	Piliostigma thonningi	Fabaceae	2	1	1.98
33	African birch	Annogessus leiocarpus helichrysum	Combretaceae	2	1	1.98
34	Silver bush	Pertiolare	Asteraceae	2	1	1.98
35	Riverhemp	Sesbania leptocarpa	Leguminoseae	1	1	0.99
36	Red ironwood	Lophira alata	Ochnaceae	3	2	2.97
37	Gmelila	Gmilia arborea	Verbenaceae	2	1	1.98
	Total			101	67	100.00

Source: Authors Field Survey, 2016

The dominant family was Fabaceae followed by Malvaceae, Rubiaceae, Phyllanthaceae, Legumiosae and Euphorbiaceae each with at least three representatives. Others such as Verbenaceae, Asteraceae, Icacinaceae, Chrysobalanaceae, Ochnaceae, Pittosporaceae, Guttiferaceae, Combretaceae, Tamaricaceae, Musaceae etc were rare with a value between 2 and 1.

Fourteen tree/shrub species from seven families with a density of 35 were enumerated in Setraco Quarry mined site as can be seen in Table 3 According to the table Senna torao and Carapa procer were the most dominant species on the site with a value of 11.43% each. This was followed by Albinia adeamlefoh, Pseudocedrala kotshiyi, Alchornea cordifolia, Solanum indicum and Pterocardrum osim and Solanum nigrum with a value of 2.86% each. The low number of tree/shrub species on this site as compared to other quarry mined site was accounted for the rapid expansion of the quarry mine site and the consequence of the over burdens including uprooting and felling of trees and removal of surface during quarry mining operations.

Four families, Meliaceae, Fabaceae, Euphorbiaceae, and Solanaceae were prominent but not dominant while other families had a value of 1 each. As with the other mined sites, it was obvious that there were less families on the mined site than on the unmined site. The outright clearing of vegetation and uprooting of tree/shrub species and the low and non regenerative effect of uprooted and cut down tree/shrub species due to quarry mine expansion was responsible for the low species diversity.

In the Setraco Quarry unmined site 50 tree/shrub species in 29 families with density of 105 were enumerated. Table 4 shows that the site was dominated by Alchornea cordifolia, with a value of 4.76%. This was followed by Lophira alata, Phiostigma tommigii, Carpa procera with a value of 3.81% each. Other occurrences in this site are Bridelia ferruginea Solanium indicum, Furunia elastic, Albinia adeamlefoh, Tremorientalis, Pentacielbera macrophylla, Musa paradisaceae, pittosporum vircliflorum, Anthocleista vogeellia, Dembeya ledermanii and Anacardium occidetale. Among rare species in terms of occurrence include Ficus capensis, Rice noderdrum, Ireultuahsi, Diplazium esculentium, Phoenix reclinata, Tephrosia bracteolate, Rauvolfiavomit oria, Sesbania leptocarpa, Annona senegalenesis and Cola gigantean etc. The high difference in the number of the tree/shrub species found between the mined and unmined sites signifies the amount of species lost in the mined site during the mining process, agreeing with the findings of Lawal (2011); Gilbert (2010) and Adekoya (1995) that mining destroys vegetation.

The unmined site equally harboured a staggering 29 families of tree/shrub species against the 7 families recorded in Setraco Quarry mined site. It thus demonstrated the fact that the low numbers of species and families recorded in the mined sites were a function of the adverse impact of quarry stone mining and mining expansion on those sites and clearly shows the danger of mining to the flora species diversity of the affected area.

Table 3: Tree/shrub composition in the Setraco mined sites of the study area

S/N	Common name	Tree/shrub species	Family	No bions	Freq	% bions
1	Albinia	Albinia adeamlefoh	Fabaceae	3	1	8.57
2	Blume	Ficus thonningii alchornea	Moraceae	2	1	5.71
3	Dovewood	Cordifolia	Euphorbiaceae	2	1	5.71
4	Christmas bush	Floribunda	Euphoribiaceae	3	1	8.57
5	Black nightshade	Solanum nigrum	Solanaceae	1	1	2.86
6	Bush tomato	Solanum indicum pittosporum	Solanaceae	3	1	8.57
7	Cheese woods	Viriclilorum	Pittosporaceae	2	1	5.71
8	Bush fig	Ficus capensis	Moraceae	2	1	5.71
9	Stinking cassia	Senna tora	Fabaceae	4	1	11.43
10	Wild date palm	Phoenix reclinata	Arecaceae	2	1	5.71
11	Osimna	Pterocardrum osim	Fabaceae	1	1	2.86
12	African crab wood	Carapa procera piliostigma	Meliaceae	4	1	11.43
13	Monkey bread	Thonnigii pseudocedrala	Fabaceae	3	2	8.57
14	Cedar	Kotshiyi	Meliaceae	3	1	8.57
	Total			35	16	100.00

Source: Authors Field Work, 2016.

Table 4: Tree/Shrub species composition in the Setraco Quarry Unmined Site

S/N	Common name	Tree/shrub species	Family	No bions	Freq	% bions
1	Horse wood	Clausena anisata	Rutaceae	2	1	1.90
2	Bush fig	Ficus capensis	Moraceae	1	1	0.95
3	Locust bean tree	Bridelia feruginea	Phyllanthaceae	3	2	2.86

4	Cheese woods	Pittosporum vircliflorum	Pittosporaceae	2	1	1.90
5	Bush tomato	Solanum indicum	Solanaceae	3	1	2.86
6	African rubber	Furiuna elastic	Apcynaceae	3	2	2.86
7	Albinia	Albinia adeamlefoh	Fabaceae	3	1	2.86
8	Cabbage tree	Anthoclesta vogelli	Gentianaceae	1	1	0.95
9	Soft wood	Ricenoderdrum heulelotii	Euphorbiaceae	1	1	0.95
10	Stinking cassia	Senna tora	Fabaceae	2	1	1.90
11	Pindball tree	Dembeya ledermanni	Sterculiaceae	2	1	1.90
12	Vegetable fern	Diplazium esculntium	Dryopterdaceae	1	1	0.95
13	Wild date palm	Phoenix reclinata	Arecaceae	1	1	0.95
14	Charcoal tree	Trema orientalis	Cannabaceae	3	2	2.86
15	Violet tree	Securidaca longepedunculata	Polygalaceae	3	1	2.86
16	Christmas bush	Alchornea floribunda	Euphorbiaceae	2	2	1.90
17	Velvet bush willow	Combretum molle	Combretaceae	2	1	1.90
18	Monkey bread	Pihostigma thonnigii	Fabaceae	4	3	3.81
19	Cheese wood	Pittosporum viricliflorum	Pittosporaceae	2	2	1.90
20	Christmas berry	Psorospermum guineense	Guttiferaceae	1	1	0.95
21	Foot of death	Mallotus oppositiffolius	Euphorbiaceae	1	1	0.95
22	Silver bush	Helichrysum pertiolare	Asteraceae	1	1	0.05
23	Buffalo bean	Mucuna pruriens	Fabaceae	2	2	1.90
24	Dovewood	Alchornea cordifolia	Euphorbiaceae	5	2	4.76
25	Bamboo	Bambusa costatum	Bambaceae	1	1	0.95
26	Giant kola	Cola gigantean	Malvaceae	1	1	0.95
27	Wild oil palm	Elaeis guineensis	Palmae	1	1	0.95
28	Somoh	Uapaca togoensis	Phyllanthaceae	3	2	2.86
29	Common wild elder	Nuxia congesta	Buddlejaceae	1	1	0.95
30	Hoarype a	Tephrosia bracteolate	Fabaceae	1	1	0.95
31	Pear	Dacryodes edutis	Burseaceae	4	2	3.81
32	Poison devil's pepper	Rauvolfia vomitoria	Apocynaceae	1	1	0.95
33	African oil bean	Pentacielbera macrophylla	Fabaceae	3	1	2.86
34	Black nightshade	Solanum nigrum	Solanaceae	2	2	1.90
35	Riverhemp	Sesbania nigrum	Leguminoseae	1	1	0.95
36	African crabwood	Carapa leptocarpa	Meliaceae	4	2	3.81
37	Plantain	Musa paradisiaea	Musaceae	3	1	2.86
38	Origo (Yoruba)	Grewia mollis	Malvaceae	2	1	1.90
39	Gabbage tree	Anthocleista vogellii	Logineceae	2	1	1.90
40	Wild custard apple	Annona senegalensis	Anarcadiaceae	1	1	0.95
41	African teak	Afromozia laxiflora	Leguminoseae	2	1	1.90
42	Crystal bark	Crossopterix febrifuga	Rubiaceae	3	1	2.86
43	Red ironwood	Lophira alata	Ochnaceae	4	1	3.81
44	Cape jasmine	Gardenia aqualla	Rubiaceae	2	1	1.90
45	Locust bean tree	Parkia bigblobosa	Mimocaceae	3	1	2.86
46	Cedar	Pseudocedrala kotshyi	Meliaceae	2	1	1.90
47	Silk cotton	Ciba pentengra	Bombeae	2	2	1.90
48	Bush mango	Irvingia gabonesis	Irvingiaceae	2	2	1.90
49	Cashew	Anacardium occidentale	Anacandiaceae	1	1	0.95
50	Cane	Secundiflorun	Polmae	2	2	1.90
	Total			105	66	100.00

Source: Authors Field work, 2016

Conclusions

The present trend of degradation of the landscape all over the world cannot be overemphasized. The quest for sustainability or means of livelihood has forced man to continue to interact with the bio-physical environment to the level that he ultimately finds himself at

the brink of collapse if no measure is taken to ameliorate the situation. What has happened in Ishiagu area is that there is steady quarrying of the granite that abounds in the area. This scenario has led to not only the destruction of the landscape but that the vegetation is completely cleared. Hence, the rich biodiversity of the area is highly threatened. There is no doubt that landscapes so degraded may never recover particularly where there is no reclamation plan for the resuscitation of fragile sites like what is being witnessed in the study area. What seems to be feasible in this case is the use of legislative power to curb further exploitation of the granite in the area.

References

1. Adekeye, J. I. D. (2001) The Impact of Artisanal and Illegal Mining on the Environment in Nigeria. Retrieved July 6 2014 from http://www.artisanal.illegalmining.com
2. Adekoya, J. A. (1995) Negative Environmental Impact of Solid Mineral Exploitation in Nigeria. N Aflayan, J. Aichei, E., A., Ag., Wangari, E. O., A., O., Ishichei, E. A. Agbelusi, O. A. Fagbenro, S. O. Akindele, Z. D. Adeyefa & A. O. Olufayo (eds) Impact of Human Activities on the West African Savanna (pp.33-36). Akure: Freelance Books.
3. Aigbedion, I. N. (2005) Environmental Pollution in the Niger Delta, Nigeria. Inter-Disciplinary Journal, 3(4), 205-210.
4. Anyata, E. U. (2001) Ishiagu in cultural perspective. Abakiliki: Alphabet Nigeria Publishers.
5. Adekoya, J. A. (2003) Environmental Effect of Solid Minerals Mining. Kenya. Journal of Physical Science, 2,625-640.
6. Chiadikobi, K. C. & Chiaghanam, O. J. (2011) Petrographic Analysis and Total Organic Carbon (TOC) of Igneous Intrusive in Ishiagu Area of Ebonyi State, Nigeria. Achieve of Applied Science Research, 3(4), 377-387. Retrieved June 14, 2014 from http://scholrresearchlibrary.com/archieve.html.
7. David, L. & Mark, B. (2005) Practical Conservation Biology. Melbourne: CSIRO Publishing.
8. Gilbert, N. (2010) Mountain Mining Damages Streams. Nature, 466(23), 19-24.
9. Iwena, O. A. (2008) Essential Geography. Lagos: Tonad Publishers Limited
10. Kumi-Boateng, B., Mireku-Gyimah, D. & Duker, A. A. (2012) A Spatio-temporal base estimation of vegetation changes in the Tarkwa Mining Area of Ghana. Research Journal of Environmental and Earth Sciences, 4(3), 215-229.
11. Lawal, P. O. (2011) Effects of Sand/gravel Mining in Minna Emirate Area on Stakeholders. Journal of Sustainable Development, 4(11), 740-750.
12. Maponga, O. (1995) Small-scale Mining and the Environment in Zimbabwe: The Case of Alluvial Gold Panning. Harrare: Institute of Mining Research.
13. Marini, L., Fontana, P., Klimek, S. Battistia, A. & Gaston, K. J. (2009) Impact of Farm Size and Topography on Plant and Insect Diversity of Managed Grasslands in the Alps. Biological Conservation, 142, 394-403.
14. Nigeria Meteorological Agency (2012) Weather Data for Ebonyi State. Abakiliki: NIMET.
15. Nwandinigwe, A. I. (2013) Methods of Vegetation analysis. Enugu: Welfare and Industrial International Promoters Limited.
16. Ojanuga, A. G. & Ekwoanya, M. A. (1994) Temporal Changes in Land-use Pattern in the Benue River Flood Plain and Adjoining Uplands at Makurdi, Nigeria. Retrieved December 3, 2013 from http://www.horizon.documentation.ird.fr/exl-doc/.
17. Tolulope, A. O. (2004) Oil Exploration and Environmental Degradation: The Nigerian Experience. Environmental Informatics Archives, 2,387-393.
18. Vetiva Research (2010) The Emergence of a Titan: Scheme of Merger Document. Lagos: Vetiva Capital Management Limited.