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IMPACT OF INDISCRIMINATE LANDUSES ON SPECIES ABUNDANCE OF SILK COTTON TREE *CEIBA PETENDRA* COLONY AT SOUTHERN PART OF ZARIA SUBURB

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ABSTRACT : *The case of silk cotton tree (Ceiba petendra) that has colonized an area .of more than 1,000 hectres at the southern suburb of Zaria city for almost 5 centuries' is the subject of the study. It aims at documenting how indiscriminate human activities led to the gradual depletion of the vegetal cover. Landuse characterization, botanical and ecological parameters were focused and an alarming negative results were evident in such indices as species density, species 'regeneration, surface cover, soil erosion and fertility status. This negative development as assiduously been affecting not only the tree colony but also land quality, crop yield and the water table of the entire city. Consequently, a re-reservation and the re-plantation of the colony was proposed as a panacea to the ever increasing deterioration of the fragile ecosystem.*

KEYWORDS: Cotton Tree , Landuses , Zaria Suburb

INTRODUCTION

The urban setting all over the world, provides a good example of how 'man by carrying out his normal day-to-day activities in an attempt to make comfortable in his environment can comprehensively alter the ecological system through the destruction of vegetation cover, errection of buildings, encroachment of buffer zones, squatter urban fringes and master plan deviation (Cottoamm 1959). Urbanization affects vegetation in terms of reduction in species density, species abundarice and species evenness of especially native and endemic species (Le Houerou 1980), reported severe instances of vegetal destruction due to Suburb landuses and abuses in England and Wales. The effect of un-control urban growth of Mexico city on the indigenous vegetation of the city was a topic of researchers like (Pollard 1971) and Amano (1994). The researchers indicated severe loss of biodensity, ecological imbalance, land degradation and problems of flooding. These and may findings necessitated a comprehensive vegetation/landuse provision for urban environment. The Ebenezer Howard (1963) Garden city concept and its similar "Green concepts" for urban development were meant for ecosystem preservation through planting of various trees and shrubs in and urban formation.

Unfortunately in Africa, especially south of the Sahara the "Green concept" in urban development is not given the deserved attention. Instead of planting vegetation around cities, the existing ones as reported by Coauton (1988) and Lykke (1998)" are under severe attack. A case in history, is the silk cotton tree colony in the Zaria southern suburb that is persistently being depleted by several activities. As the destruction is going unnoticed the effect is glaringly manifesting atleast in the last two decades. Unfortunately no attempt is, being made to even study the phenomena moreless to stop it. This .dearth of negligence on the tree colony as

prompted the present research.

The Study Area

Zaria city is located at 11 ° Nand 7° 38' E (insert of fig 1) in Kaduna State on the central high plains of Hausaland in northern part of Nigeria (Udo 1978). The major soil type in the area is the tropical ferginous; while along the wide gentle sloping valley bottom lands are the dark vertisoil (Fadama soils). Zaria falls within the northern guinea savanna vegetation. The climax climate vegetation, of the area was thought to be tropical deciduous. However, because nearly all the vegetation of the area had been degraded due to intense urban agriculture, fuel wood harvesting and urbanization processes, tree climatic climax vegetation is absent except in the remnant silk-cotton tree colony around the southern suburb.

Notwithstanding, there are few scattered tree stands, interspersed with tal I grasses about I-15m and 2-5m respectively (Jackson, 1970). Common trees found include locust bean *Parkia bigcobose,* tamarind *Jamarindus indica,* Isobelina *lsobelina doka,* Shea butter *Butteres permium parkia* and the silk cotton Ceiba pentendra which is the single dominant species that has colorized the southern suburb. The grass types include *Andropogonaea Spp* such as' *Hypherrhenia Spp, Androging Spp.* Others are *sizachnium semiberbe* and *monocynbium seresiiforme* (Jackson, 1970).Zaria experiences tropical continental climate (Aw), according to Trewatho's modification of Koppen's climate classification. Aw climate is characterized by a wet and dry season in a year. The wet season lasts for six months, May to October. and is dominated by convectional heavy falls with high intensities of up to over 120minlhr. The mean annual rainfall peaks up in July/August.

Antecedent of Zaria and Colonization of Silk Cotton Tree (Ceiba petendra)

The settlement of Zaria was established in 1520 by Bakwa Turunku. It was named after one of his daughters Zaria. The other daughter Amina was compensated by giving her political powers of the Zazzau Kingdom; she was responsible for waging wars to expand the kingdom and sourcing slaves for the Arab slave merchants. (Smith, 1972) The impact of Amina in the two spheres were very remarkable as she expanded the Zazzau kingdom far and wide; up to Maradi and Lokoja to the north and south respectably. She also generates great fortunes for the kingdom in terms of spoils of war and slaves conquered. The later made Birnin Zaria a haven for Arab slave trade. The slaves were exchanged in bata for Iron wares (war and agricultural implements), mattresses and horse sadles, as well as other royal wares; The southern part of the Zaria settlement was ear-marked as slave deports before being moved to the market in the walled city. According to Gems (1968) there were .over 50 slave depot around the southern boarder of Zaria settlement in 1780; being maintained by individual slave Merchant/Agents.

Silk cotton tree was first brought to the area from Indo-Arabian sub-continent by the slave merchants who exchanged its products (mattresses and horse saddles) for slave. The tree's seed was through the trade dispersed into the area and eventually germinated and grown as a through such trade species. Its uses in the area helped in its poiner propagation, planting and protection when sooner, the of Zaria realized several uses of the tree products for forage, for animals, medicinal uses and several other utility uses. This made the Tree species a "Hotcake" for the natives (Dan Shariff, 1973).In 1912, the then Emir of Zazzau Mallam Aliyu Dan Sidi proclaimed the region (present southern suburb of Zaria) which the Ceiba tree had colorized as a green

reserve. (Norlin, 1968). Restrictions were imposed for especially settlement (except the 4 existing ones; fig 1.0); tree felling, bush burning were all prohibited in the reserve, etc. while hunting and crop farming were allowed. Even at the time the reservation was proclaimed, the species abundant/acre had fallen from 117 stands in 19th century to 62 stands/acre.The conversion in 1973 of parts (72 hectre) of the Green reserve for low Housing Estate, as well as the subsequent encroachments (42 hectres) for establishing a UPE college in 1976, construction of a police barrack in 1980 within the given reserve (40 hectre; E4 in fig. 2.0); also a large chunk' of the reserve (27 hectres) was used for sitting a hospital in 1985 and another encroachment (27 hectres, E 3 in fig. 2.0) for an additional college in 1989 had unofficially de-reserved the area and opened up the colony for exploitation and abuse by various human activities; which this paper seek to study and proffer solutions.

In order to assess the damage done to the silk Cotton Tree colony of the southern Zaria suburb, the following parameters were selected in the study:
Species abundance per hectre: which according to Belsky (1994) is the best way of assessing tree colony integrity.
ii) Rate of regeneration per hectre; which as an indicator for biomass sustainability per given area (Tivy: 1968)
iii) Landuse characteristic; which serves is a pointer to sustainable or exploitative human activity in an ecosystem according to Maydell (1995).
iv) Species characteristics; through botanical investigation.
A total of 1217 hectres was covered by the study. This is about 70% 'of the Colony reserved and is about the area with remnants of the tree species. For study purposes, the area was subdivided into four equal parts of 304.25 hectres and a landuse 'analysis of each part was undertaken. using ERAM methodology (1994)" The physical inventory of the species biological and ecological characteristics was carryout using Dansereu method (1972), in which a diagonal transect was also laid across the length of the study area using ranging poles and survey chains. Then, alternatively spaced quadrants of 100 metre square were delineated for study at either side of the transect (alternatively) at 30 and 120 metres interval, then the botanical and ecological characteristic of the Tree colony were inventoried.

RESULTS

Land use characterization and encroachment result in the four subdivided portion of the study area is presented on table 1.0 averagely about 50 percent of the uses the land resources is put into is outside the stipulated use by the authority. While the northern part of the study area is affected, more by institutional and residential encroachment the southern part of the area is most affected by firewood harvest, over grazing and utility encroachment.

Table 1.0 Land use Characterization of the Study Area.

		in Section A	in Section B	in Section C	in Section 0	Encroachment
I	Institutional	12km^2	24km^2	19km^2	8km^2	63 krn^2
2	Residential	4km^2	7km^2	6cm^2	3km^2	20 krn^2
4	Commercial	4 ha	5 ha	9 ha	2 ha	20 ha
	harvest					
6	Forae/grazing	5 ha	7 ha	4 ha	10 ha	26 ha

Source: Author's Field work February

Table 2.0 contains the biological status of the species IS in terms of species density, regeneration and appearance. All the result shown on the table is far below the normal figures. Similarly, the ecological parameters of surface cover, erosion and soil fertility indices were in the negative.

Table 20: Botanical and Ecological characterization of silk cotton tree in the study Area

S/N	Parameters	Section A	Section B	Section C	Section 0	Standard
1	Species density	17/ha	10/ha	12/ha	24/ha	75/ha
	regeneration					
	Appearance	. pruned	pruned	pruned	pruned	
	index					
5	Soil erosion index	Severe	Severe	Severe	Merchant	Decimal
6	Soil fertility status	Poor	Poor	Good	Good	Excellent

Source: Author's Field work ,February, 2006

DISCUSSION

Landuse, botanical and ecological characterization focused on different ,aspect of vegetation dynamics, but also have different limitations. By combining the three methods it seems possible to derive a detailed and reliable picture of the changes' that occurred in the silk-cotton tree colony of Zaria southern suburb during the last 5 decades; because there is a large accordance between information derived from different methods.

The study documented changes in the direction of a reduced and impoverished silk-cotton tree vegetal cover which more specifically can be summarized under the following headings:
A general decline of colony trees of silk cotton species from 78 stands/ha in 1910 to 16 stands ha in 2006 Lack of smaller trees to replace existing stands, on average/ha against 16/ha. A rarefaction or disappearance of the tree species in areas under extensive human utilization of especially institutional and residential by an encroachment rate of up to 62%. The general decline of the species abundance in this study corresponds to results from earlier investigations of tree colonias being affected by indiscriminate landuse elsewhere. For instance Pearce (1988) established this point in the study of Baobab (Adansonia digitata) tree colony in old Tsafe settlement. Except that Sarkin (1994) found a recovery of valley stands during the *last* decades, which contrast from the present study. An increasing decline of species abundance in Commiphore Africana colony in Cameroon and also reported by Stiles (1995) on the basis of earlier vegetation investigation from the southern region. This coincides with the general tendency in the. present study. "

Several .implications on the rapid decline of the vegetal resources of the Zaria Ceiba tree colony by the indiscriminate landuse can be enumerated to include; dependence on the plant for firewood, medicine, roofing materials, forage and selling its products like the cotton and seeds. The continuous degradation of the colony has therefore direct impact on the livehood of the Zaria city and the ecological sustainability of the environment. The over dependence on the trees species for livestock fodder year round as the main source of food especially in the dry season when grass and herb production ceases, had great implication for species density and regeneration, this point is buttressed by even the appearance of over 90% of the existing stands which are severely pruned and sometimes killed (see plate 6 & 1).

Ecological, the soil fertility and stability are greatly at risk as pointed on table 2.0 in which erosion index of three-quarter of the study area is severe, in the same vein the soil fertility status in terms of available Nitrogen, potassium and phosphorus are fool' in half of the study are especially in section A and B of the area. These adversities are not unconnected with the role of the tree species in sustaining and ameliorating the soil and grass component of the savannah system. Generally a higher fertility and stability of soil is achieved around areas under canopies than in the surrounding due to increased shade for surface cover against splash erosion, rainstorm wash away, and agents of loading. Similarly, the regeneration of trees is stimulated under canopies Le Hourou (1989) the observed decline in the canopy layer therefore makes it difficult for new stands of the species to establish itself and grow.

CONCLUSION

This study documented that silk cotton tree colony of Zaria has become impoverished during the last five decades and that most stands are currently being threatened by urban growth and indiscriminate landuses. This has generated unbearable impairment on the soil system and may affect crop' yields and water table in Zaria city. The observed tree colony modification that had lead to a decline in some of free and most desirable resources must be checked through re-reservation and re-plantation of the south and eastern part 'of the colony relics.

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