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**Ecological Cost of City Growth in Africa:
The Experience of Kano in Nigeria**

Introduction

No doubt Kano is one of the most important settlements in Nigeria in view of its economic, political as well as it being a cultural rainbow. It is not only the largest city in northern Nigeria but also the capital of the most populous state in Nigeria as the latest figures of the national population headcount held in 2006 show. This paper attempts to examine how the processes of urbanisation have impinged on components of the natural environment of this ancient city. Obviously, there are copious ecological problems that need to be diagnosed in the city in order to design for sustainability of the habitat. What is the nature and trend of city growth in Kano now? How does it differ from the past? What is the extent of the Ecological costs? What is the extent of the Ecological costs? How can a city with an estimated number of three million inhabitants cope with the problem or reverse it?

Urbanisation in Kano Space and Time

There are discernible though not disagreeing points raised by historians, archaeologists, and geographers on how Kano originated. Geographers and archaeologists look at the environment while historians go beyond that to consider the oral traditions. It all started as isolated groups of hunters and gatherers on and around few hills - Dala, Goron Dutse, Magwan, Bompai and Panisau all in the present day Kano metropolitan (Kurawa, 2006). Apart

from these hills, Last (1979) identifies others which include Lambu settlement complex and Fangwai - Santalo complex which lie within what Mortimore (1972) calls *Kano Close-Settled Zone* which covers an area of over 30 miles (50 kilometres) radius of Kano city which is a high density. Perhaps this means that since its origin Kano was destined to grow and expand. The early settlers used to move in and out of Kano to some far distant areas as mentioned above. On the other hand, Olofin (1987) reveals that a thermoluminescent dating of some man-made relics suggests that man was actively engaged in iron smelting culture in Kano at about 320 - 380 AD. So conclusively people must have been there for more than one thousand years to develop such skills of iron smelting. Liman and Adamu (2003) opine that Kano survived to answer the name of city by 11th and 12th centuries when the first phase of the city wall construction project was finished. By then, Kano had become a city where immigrants move into and consequently the need for security had increased rapidly. Ibid (2003) indicate that British colonialists maintained Kano as the capital city of the emirate and added to its spatial units by creating CBD, the Government Residential Areas (GRAs) and other service areas like the military and police barracks etc.

Demographically speaking, Barau (2006) summarises the accounts given by three outstanding agents of colonialism namely Clapperton, Barth and Lord Lugard. The trio's journals indicate a lot about the demographic numbers of Kano, which appeared for them to be awesome. Clapperton came to Kano as an explorer cum spy in the 1820s and estimated the population of Kano to be 30,000 - 40,000. Barth on the other hand came to Kano in March 1851 estimated the population of Kano city to be 60, 000 half of which he believed were slaves. As at that time, the area of the walled

city of Kano was roughly 5,400 acres out of which, only about 2000 acres were actually inhabited. The ponds and open spaces indicate the eco-friendliness of the city then. In the case of Lord Lugard, the evidence of Kano's demographic might is indicated in his military mobilisation to conquer Kano city and its towns in 1903. The population density of Kano city then was estimated at 21 persons per square kilometre. Lugard mobilised one thousand foot soldiers, fifty European commanders, plenty long range guns and four maxim guns. In the 19th century Barth was convinced of Kano's cosmopolitan nature. The various ethnic groups observed conducting their business under free and fair atmosphere included the Nupes, Cyprians, Arabs, Mandigos (Wangara of Mali) among others. The toponymy (name of places) of many areas in Kano testifies that Kano's ethnic composition looked cosmopolitan since that time. Dan Asabe (2004) lists some of the wards that bear name of some tribes. They include Zangon Barebari for (Kanuri merchants and scholars that came from Kanem-Borno); Tudun Nupawa for Nupe (Guinea Savannah); Ayagi for Yorubas (of the Forest belt); Madabo for Wangarawas of Mali; Kul-Kul, Koki and Kan Tudun Madabo for the people of Katsina; Agadasawa for the people Agades (in the Sahara); Daurawa for people of Daura, Soron Dinki for Fulani migrants; and Dandalin Turawa for the people of Arab lineage. All these wards have been in existence before the 19th century. Mabogunje (1990) reports that in 1952 Kano had a population of 127, 204 inhabitants and Udo (1990) relates the Kano population figures in 1963 to be 130,173. The estimated annual growth of the population then was put at 7.7%. Mortimore (1991) puts the population density of the city at around 500 persons per square kilometre. Sustainable Kano Project (1997) highlights that the growth witnessed by Kano is mainly contributed by in-migration rather than the

natural growth of the population. Liman and Yusuf (2003) maintain that the rate of in-migration to Kano after national independence was largely due to due to commercial and industrial opportunities in the city and the fact that colonial segregation policies for settlements virtually came to standstill. And that coupled with political and economic changes that swept Nigeria. The political changes in the 1960s made Kano the capital city of the new Kano State in the Nigerian federation, while the oil boom of that era opened more doors of economic prosperity and opportunities for people to move into the city. Sani (2004) maintains that the major cause of rapid urban growth in Kano is primarily due to serious rural neglect in Kano state. The rural dwellers migrate to the city exert more pressure to the already inadequate to already overstretched infrastructure and services.

As urban area, Kano is a conglomeration of the ancient walled Kano city and Fagge (pre-colonial) and other colonial and postcolonial settlements that continue to overflow to date. Ajayi (1997) shows that spatially between 1962 to 1981 the northern part of the city has increased by 62.2%; from the south the city increased by 66.7% and in the northwest it increased by 57.1%. However, between 1981 to 1991, the eastern part of the city increased by 100% and from north-western direction the city grew by 90.9%. By the figures of the 1991 national census, the population of urban Kano was estimated at about 1.6 million. Kano metropolis is one of the largest cities in Nigeria that witness's rapid expansion spatially and demographically. Maiwada (2000) confirms the above information by stating that in 1932 the estimated population of Kano was 83,000, by 1952 it jumped to 131,361 and in 1991 it leaped to 1.6 million. This demographic expansion corresponds with increased pressure on land for various development needs which continue to eat up city ponds and open spaces

within and around the city. Similarly, the figures of the 2006 national census put the Kano urban population at about 3 million inhabitants. The contemporary rapid population growth in urban Kano is fuelled mainly by in-migration induced among others by the overall emphasis put by government, organisations and individuals on urban development, a bias that is at neglect of the far and near rural areas. Therefore, the spatial incursion of the built up areas into the peri-urban areas continued unabated.

Sani (2004) notes that at the moment Kano grows without any master plan, it grows aimlessly with no focus, no direction and little control spreading over 11 local government areas. He maintains that Travellian Plan made for the period 1963-1983 was realised. Ibrahim (2005) reveals that even in non- industrial of the metropolitan Kano wells are contaminated by some industrial effluents and that the city ponds within and around the Kano city walls are used for fishing and irrigation in spite of their high level of contamination by pollutants. The ponds also serve as breeding ground for mosquitoes and other vectors. Bichi (2000) remarks that the deterioration of surface water quality in Kano is caused by industrial effluents and domestic waste generated from and dumped within the urban and peri urban rivers and streams. The author finds that the concentration of ammonia-nitrogen, chlorides, total solids, hardness, temperature, pH, chemical oxygen demand (COD) in Rivers Jakara, Getsi, Salanta, Tatswarki Maiwada are beyond the international acceptable limits for consumption and fishing. Maiwada (2000) finds that open spaces in low and high-density areas of the city are progressively disappearing in Kano city. He adds that the disappearance of the pens spaces in goes with their advantageous functions, which include water purification, disposal of atmospheric pollution, flood control recreation and wild life support. Still on the degradation of urban land,

Liman and Yusuf (2003) maintain that the phenomenal rate of in migration into Kano lead to the emergence of informal land market, land speculation and illegal and unplanned settlements across the city.

Methodology

In order to investigate the current levels of ecological problems attributable to urbanisation in Kano, interviews were conducted with fifty (50) respondents (who are inhabitants of the ancient city). The said respondents answered questions that relate to desiccation of the city wetlands (city ponds) and disappearance of open spaces and some local biodiversity in the ancient city of Kano, Central Business District and the Government Residential Areas (GRA) as well as other questions on the comparison of the climatic conditions of the city in the past and present. Other questions border on the past and current condition of the indigenous biodiversity (plants and animals) in the city and its outskirts. For the same interest, another fifty respondents (who are Residents of) selected peri-urban areas affected by rapid urbanisation were also queried with same set of questions.

Satellite imageries were also used to visually investigate the changes meted out by urbanisation on the ancient city, the central business district (CBD) and other peri urban areas. The imageries used include a photo mosaic by Kenting Africa (1981); Coloured airphotos by Geonex (1991); Quick-bird (2002) and Kano imageries captured by the GOOGLE-EARTH. Field investigations were also undertaken with a view to ground truthing the satellite imageries.

Results and Discussions

a) Intensification of the Built Areas in Kano (1990 – 2006)

From observations drawn from the Google earth and the quick bird imageries it shows that presently the built-up areas in urban Kano have increased by about 45% in the north, about 40% in the west, 50-60% in the south and east, while north registers about 60% growth. Comparatively, this rate of areal expansion is lower than what transpired between 1970s to 1980s and 1990s. Actually what happens is that Kano is presently registering intensification of the built up areas. Places like Rijiyar Zaki, Rijiyar Lemu, Naibawa used to have linear settlements but they have now become nucleated settlements. Many primary and post primary schools in urban and peri urban Kano lost their open spaces or got them reduced sequel to increase in classes or other land uses. The said intensification which generally causes pressure on land and increase in the density of the built up areas is attributed to some growth poles which cause land developers to stick to such growth poles. For instance, Bayero University's new campus located in the west of the city is a growth pole for all the settlements around it. Similarly, land intensification towards the east of the city is attributable to the emergence of Legislative quarters and a Danladi Nasidi housing estate, which came up in the last ten years. More houses are now springing up in the area. The northern part of the city is equally intensifying due to continuous impacts of Dawanau international food commodities market. Another spatial accumulation in urban Kano is found in the southeast along Hadejia road; this expansion is supported by the presence of functioning industrial sites at Jogana. Still in the south, Tukuntawa and Tudun Maliki are the other axes of urban intensification.

Through the interview conducted many about sixty percent of the respondents confirmed that intensification in the urban built up areas is connected to democratisation process in Nigeria. The reinstatement of

democratic rule in 1999 has given ample opportunities to public servants and other political appointees at the federal, state and local government levels. Many politicians invest their legal or illegal earnings into estate and properties sector of urban Kano.

b) Environmental Pollution

The state of the environment in urban Kano is partly captured under the literature reviewed. But it is pertinent to add that new patterns of environmental abuse are emerging in the city. It is observed through fieldwork that some communities now resort to dumping waste on streets. They believe by so doing they will force authorities to evacuate waste as quickly as possible. In recent years number of vehicles has increased very much, so traffic congestion not only exacerbates the situation with its pollutants which people inhale freely, but it also generates unwanted noise. Drainages are left unattended to and that causes perennial flooding in the city which cost lives and property seasonally.

c) Biodiversity Decline

Compared to the past, the biodiversity composition of urban Kano has progressively declined. About 90 % of the respondents from peri urban area suggested that most of the trees on the farmed parklands that have been urbanised have gone for good. Thus, wherever, there is land conversion from farmland into residential area, the vegetation of the area is felled for good. In the same fashion, respondents from the ancient city and the metropolis also blame land intensification in the city as part of the reasons for the decline of the vegetal cover in the city. Observations from the imageries also confirm this development as some green areas in the old imageries are no longer discernible in the latest imageries – Quick bird and Google earth. Results of the ground truthing indicate that there is significant quantity of exotic plant

species that were planted for ornamental purposes on roads and public and private buildings. This development is ecologically correct, however, the decline of local species is quite unacceptable going by the unknown ecological significance of the local plant species. The only 'sinks' or 'sanctuaries' that protect the 'urban plants' in the city of Kano include the Emir's Palaces in the city and others at Dorayi and Panisau both in the peri urban Kano. Public schools, graveyards, public offices etc are the other protective sites for the local plant species.

On the other hand, the respondents from the city and the peri urban areas confirmed that desiccation of several wetlands within and around the old city and could be the main reason for the disappearance of several faunal species. For instance, in the last twenty-five years several bird species have become extinct in the city and the peri urban areas. Vultures are among such extinct birds, while *lekki-lekki*, hawks, crows, canaries, bats etc that used to be quite abundant are now rare and confined to the sanctuaries mentioned above. As the quantity and quality of wetlands and scrublands have sharply reduced, many reptiles and insects have definitely lost their breeding grounds and habitats. Toads and frogs, alligators, and uncountable insects have disappeared with the desiccated wetlands and scrublands.

d) Climate Change in Urban Kano

Barau (1999) records that as at 1993 the maximum temperature of urban Kano was 1.3°C higher than Minjibir a settlement located some 40 kilometres away. Relative humidity also varied between the two areas. Idris (2005) also maintains that the phenomenon of heat island is reality in Kano owing to temperature variability between the city and its outskirts. However, the as a result of intensification of urbanisation since the 1990s to date, meteorological readings indicate that the temperature differences between

the old city and Mariri a suburb of Kano is as high as 2-4⁰C. Such differences in the temperature levels is attributed to increased land desiccation, removal of tree cover and increase in the number of vehicles that roam the city. Besides, observation of the satellite imageries reveals that intensification of the built up areas in urban Kano may be another factor if one considers the apparent changes in the albedo (heat reflectivity of the surface) of the built up areas which tend to absorb more heat through changed meted out on the cityscape.

Conclusion/Recommendations

By and large, the current pattern of urban growth in Kano is different from previous decades when rapid spatial or areal growth and expansion was witnessed. In the recent years, the prominent feature of the city growth in Kano is through intensification of the built up areas. Intensification is brought about by emergence of some growth poles in the city and its suburb. Intensification brings about congestion and concentration with attending vicious implications on urban Kano. More open spaces and wetlands are disappearing and the cost of that is decline in the amount of fauna and floral diversity within and around city. Urban built up area intensification also causes increase in temperature levels in the city. The intensity of the impact of urban growth though ubiquitous across the city, but is more pathetic in the high density areas like the ancient walled city, Kurna and Dorayi. Another lesson drawn from this study is that, if the observed trend of urban intensification is left unchecked, settlements like the city of Kano will soon loss their glory as major commercial centres and tourist destinations in Africa. The quality of water and air are not safe for the consumption of the inhabitants. It is observed that intensification in urban Kano is not commensurate with the actual development needs of the inhabitants of the

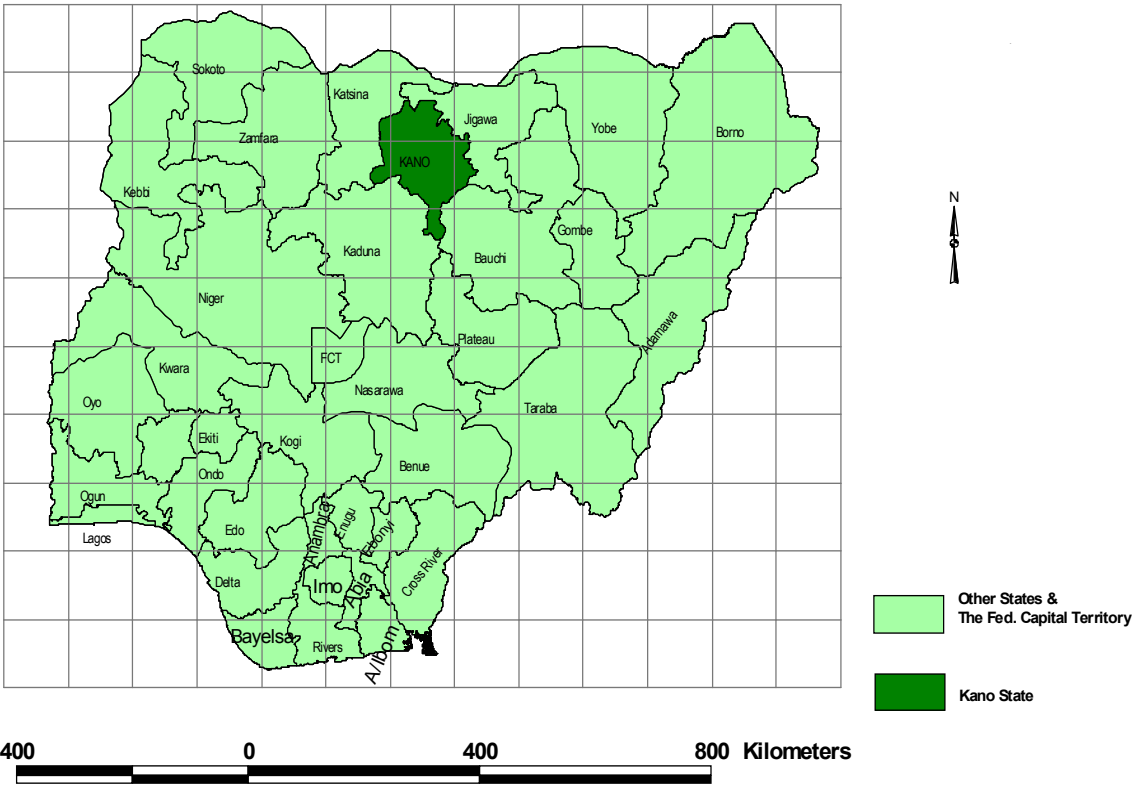
city. Thus intensification is seen within premises of schools, hospitals and other public housing units. Most of the recent wings grown by the city do not have new and standard hospitals and schools. Cities like Kano must mimic their beginnings which were through decongested settlements that spread radially and in disjointed patterns. For now, city growth has to be within limits that do not damage the ecology. Any attempt to reverse the current trend should be pursued through negotiation with general public deserve to first understand the problem and the needed solutions.

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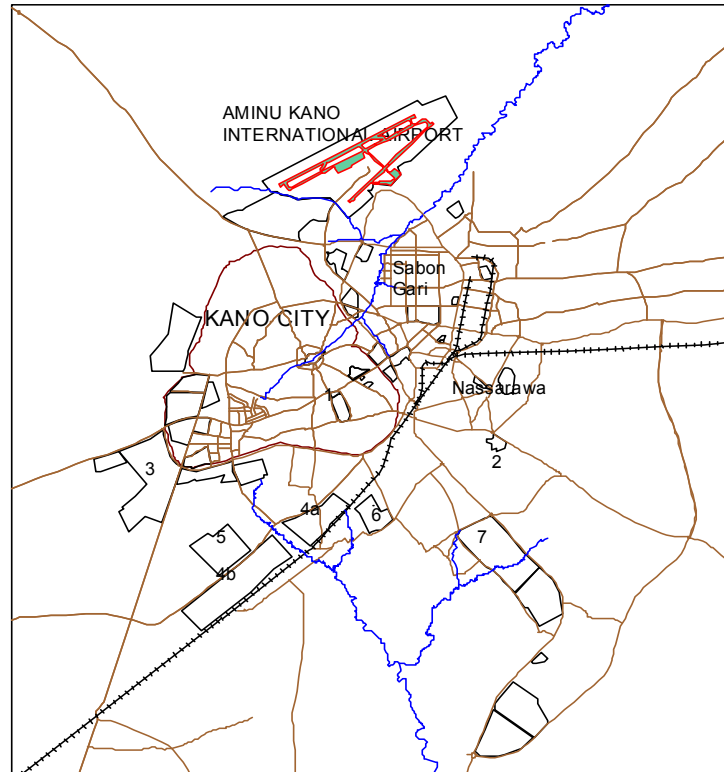
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Map 1: States of the Federation



Kano Metropolis 2005



LEGEND

 Streams

 Rail lines

 Roads

 Kano City wall

- 1 = Emir's Palace
- 2 = Government House
- 3 = BUK Old Campus
- 4a = Sharada Industrial Estate
- 4b = Sharada Industrial Estate
- 5 = Federal Housing Estate
- 6 = Zoological Garden
- 7 = Aminu Kano Teaching Hospital