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Paying For the Priceless: The Consequences of Air and Noise Pollution in Some Commercial Areas of Kano Metropolis

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ABSTRACT: *The paper evaluates the extent, and consequences of noise and air pollution in three major commercial areas of Kano metropolis, Nigeria. The methods used involved direct field measurements of noise levels at 300 different locations with the aid of Noise-Level Metre; ambient air quality with the aid of Air-Quality Analyser; Volumetric Count; In-depth Interviews and FGD. The result shows that vehicular movement and electric generators are the major causes of noise and air contamination in the three major commercial areas of Kano metropolis. Mean noise level in all the three commercial areas exceed the threshold limit and ambient air quality is greatly affected by high amount of CO_2, CO, and particulate matters thereby resulting to unfavourable condition to trading activities and health hazards. It has been recommended that adequate and stable electric power supply should be put in place, more parking spaces should be provided, and the market space should be decongested, among others.*

KEYWORDS: *Noise, Air, Pollution, Consequences, Markets.*

I. INTRODUCTION

In urban planning and management, commercial areas are not only given high priority but are also considered as central places that attract growth and development of urban set up. This assertion has been made since the1800s by Heinrich von Thünen in his Model of Land use and later supported by Walter Christallers' location theory in the 1930s. Therefore, this makes commercial areas and market places in particular among the top most indexes of measuring the performance of urban management, especially, in developing countries, let alone the economic and social roles they played. In Nigeria, majority of the urban populace engage in small-scale retail trades and other forms of commercial activities, thus the existence of traditional market places become inevitable. Kano metropolis being a centre of commerce is engulf with numerous markets and shopping complexes; some adequately planned and many are in shabby form. Among the planned and partially planned are Muhammad Abubakar Rimi (Sabongari) Market, Kofar Wambai Market, and Kwari Market. These three markets in addition with five more others; Kurmi; Rimi; Kofar Ruwa; Akija; and Dawanau markets form the base of all trading activities in Kano metropolis due to their local, regional, national, and international importance. They are stock with all kinds of mercantile goods worth numerous billions of dollars (US) and about one-third of the inhabitants of Kano metropolis are directly drawing their livelihoods from them. However, as a result of inadequate planning and poor development control measures, the growth of these markets has been disorderly, disjointed and incoherent thereby leading to massive congestion; poor accessibility; and encroachment on roads. Moreover, the supply of basic utilities such as water supply, electricity, fire services, and refuse disposal are grossly inadequate. Therefore, these abnormalities, in particular, massive congestion, non-electric power supply and weather produced unpleasant condition to trading activities that vehemently necessitates the traders to source a way out. This is in form of self electric power generation with the aid of potable electric generators, for those that can afford, while others resort to patronizing the services of informal private electric power suppliers commonly known as *Maja* (See Maigari, 2014a). Thus, the great number of such electric generators in most of these markets produce high amount of noise and smoke that need to be addressed and managed accordingly. It is in line with this that this paper attempts to evaluate the extent and consequences of noise and air pollution in Muhammad Abubakar Rimi (Sabongari) market, Kwari and Kofar-Wambai markets.

Profile

Kwari and Sabongari markets are second generation in the evolutionary trend of markets development in Kano metropolis while Kofar Wambai market is a third generation market (See Maigari 2014b). Kurmi market is a first generation market founded in the 15^{th} century by Muhammadu Rumfa and is still among the leading market places in Kano metropolis (over 500 years old). Kwari and Sabongari markets are about 100 years old each; Kwari market was established around 1912 as a transitional market between Lebanese settlement camp and Kurmi market, while Sabongari market was established in 1914 following rail way construction in 1912.

Kofar Wambai market was established in 1977 in an attempt to decongest Kwari and Sabongari markets by the then military administrator Col. Sani Bello. However, these markets have undergone series of transformation that gave them their present features. Sabongari market now covers an area of about 325,164m^2 and accommodates over 6,000 shops. While Kwari and Kofar Wambai markets each covers an area of 319,349m^2 and 183,796m^2 and accommodates about 4,500 shops and 3780 shops respectively. In deed, due to their close neighborhood link these three markets are often described as the 'triple sisters' of Kano *('Yan-Ukun Kano'*). Nevertheless, they are distinct from one another in terms of mercantile stock. Kwari market is entirely stocked with textile materials and majority of the transaction is on bulk or whole sale while Sabongari market is a mixed stock market with all kinds of goods and majority of the transaction is on retail basis. Kofar Wambai market is an off-shot of Kwari market, it is stock mainly with cloth wares, wrist watches, and shoes and majority of the transaction is on bulk or whole sale basis.In general, the 'triple sisters' of Kano covers a total land area of 828,309m^2 (8.231Km^2) that is about 6.05% of the total land area of urban Kano (about 137Km^2). They accommodate about 15,000 shops and on average about 0.7 million people attend to these markets daily.

II. POLLUTION DIAGNOSIS

The major kinds of pollution prevailing in these three studied markets are noise and air pollution. The noise pollution aspect falls within those described by WHO (1995) as environmental noise or community noise (also called, residential noise or domestic noise and commercial noise); which is the noise emitted from road, rail and air traffic, construction and public work, and the neighbourhood. While the impurities injected into the ambient air are within the stage of contamination. An instrumental survey using noise level metre and ambient air quality analyser at 300 sites (150 in Sabongari; 80 in Kwari; and 70 in Kofar Wambai markets) shows a slight variation in noise level and ambient air among the three studied market places. In all the three studied markets, mean noise levels are greatly above the threshold level of 65dB (during the day time) and ambient air quality is affected with significant amount of carbon-dioxide (CO_2), carbon monoxide (CO), and particulate matters (SPM). This entails that the artificial avenue created in these markets is not only unfavourable for trading activities but also represent human health hazards, since frequent exposure to high noise level (mean of 80.96dB), CO_2, and CO can results into many health problems. In deed, all the traders or shop keepers in the three studied markets, that are habitually exposed to about 8hours (from 10am to 6pm) daily, are vulnerable to the associated health hazards. Table 1 shows the analytical findings.

Table 1: Mean Noise Level and Air Quality in Three Major Markets in Kano

Location	Mean Noise	Mean CO_2	CO	SPM
K. Wambai	76.35dB	415ppm	3.65ug/m^3	55.35ug/m^3
Kwari	78.08dB	430ppm	3.47ug/m^3	58.50ug/m^3
M. A. R.	88.44dB	500ppm	4.05ug/m^3	109.5ug/m^3
Average	80.96dB	448.33ppm	3.72ug/m^3	74.45ug/m^3

Source: Fieldwork, 2014

Table 1 above shows the extent of noise pollution and ambient air contamination in the three study markets. In particular Sabongari market (M.A.R) is more affected with noise pollution (88.44dB) followed by Kwari market with a mean of 78.09dB and Kofar Wambai market with 76,35dB. On the other hand the average mean of CO_2 (448.33ppm) in all the three markets is within the threshold limit (1000ppm), equally CO and suspended particulate matter are all below the threshold of 11.4ug/m^3 and 250ug/m^3 respectively, but are very critical in terms of exposure index. Frequent exposure to CO_2, in particular according to USEPA (1988) can result to serious health hazards such as headache, increased heart rate, dizziness, fatigue, rapid breathing, visual and hearing dysfunctions, and may lead to sudden death in terms of high exposure.

Causes

Habitually, market places are noisy in nature arising from overcrowding of people and haulage of goods, but in most cases the resultant noise is within the bearable level. This was true to most markets in Kano metropolis some years back. Currently, this observed scenario has changed to unbearable level in the three studied markets as a result of two main inducing factors. These are: proliferation of portable electric power generators and high vehicular commuting in and around the 'triple sisters' which apart from inducing noise pollution, they as well contaminates the surrounding ambient air. An inventory of electric power generators shows there are total of 1,352 electric power generators in the three studied market; 23 commercial electric power supply (*Maja*) and 1,329 for individual personal use; the detail is presented in Table 2 below.

Table 2: Number of Electric Power Generators in the Study Markets

Location	Private	Commercial	Total
Kofar Wambai	216	3	219
Kwari	390	4	394
Sabongari	723	16	739
Total	1329	23	1352
Average	443	7.67	-

Source: Fieldwork, 2014

However, it should be noted that the inventoried generators vary in terms of sizes and voltage capacity; those that are used in commercial electric power supply ranges from 25KVA to 100KVA while the private once are mainly 2.0KW and below. Nevertheless, the critical issue here is the amount of noise produced, for example, a single new brand 2.0KW capacity generator produces 93dB and its noise level increases as the generator gets older. Thus, the cumulative noise and smoke produced by these inventoried electric power generators adds greater weight to the background noise levels and ambient air of each of the studied markets.Apart from electric power generators, noise level and ambient air quality in the three studied markets are greatly influenced by vehicular movements. The 'triple sisters' of Kano are the central business district (CBD) of Kano metropolis, as such they attract commuters from all segment of the metropolis and beyond. The common vehicles that move in and around the studied markets are buses, cars, trucks, tricycles, and motor cycles. A volumetric survey aimed at ascertaining vehicular traffic volume around the studied markets shows that a mean of 12 buses; 8 cars; 23 tricycles; 2 trucks; and 10 motor cycles moves in all the axis of the study markets after every 5 minutes. Table 3 below shows the detail findings.

Table 3: Mean Traffic Volume around the Study Markets – 10am to 6pm

Location	Volumetric Count in 5 minutes					Total
	Buses	Cars	Trucks	Tricycles	M. cycles	
K. Wambai	8	8	2	15	8	41
Kwari	10	6	0	26	10	52
Sabongari	18	10	4	28	12	72
Total	36	24	6	69	30	165
Average	12	8	2	23	10	-

Source: Fieldwork, 2014

Table 3 above shows Sabongari market has the highest traffic volume; with about 14.4 vehicles moving around per minute, followed by Kwari with 10.4 per minute and Kofar Wambai with 8.2 vehicles per minute. Thus, with this background there is no doubt that the cumulative effect of the noise generated by such traffic volume can induce noise pollution and the amount of smoke emitted can contaminate the ambient air. Conventional literature reveals that a new passenger car emits an average of 130 grams of CO_2 per kilometer (ICCT, 2014). Similarly, according to WHO (1995) the severity of noise pollution problem in cities of developing countries are caused mainly by traffic. Data collected alongside densely travelled roads were found to have equivalent sound pressure levels for 24 hours of 75 to 80 dB(A).

III. CONSEQUENCES

A focus group discussion with shop owners and attendants and in depth interview with operators of commercial generators revealed that the noisy market situation in most instances cause distortion of telephone communication and radio signals; which according to respondents made them to lose a lot of their business contacts. A respondent in Kwari market revealed that he often reached his customers through text messages rather than voice communication due to noisy market situation that do not allow him to clearly hear his respondent. He also added that any time he wants to make important business deals over telephone he has to go up to his house or away from the market; which he described as very unpleasant. This goes in agreement with WHO (1999) assertion that 'environmental noise may also mask other acoustical signals that are important for daily life, such as door bells, telephone signals, alarm clocks, fire alarms and other warning signals, and music'. Other issues that featured in the focus group discussions are stressful talking and hearing; lost of voice; and dizziness, all attributed to the noisy market situation. Respondents maintained that the proliferation of electric generators in markets has made them to talk to their customers or neighbours like 'Lagos people' who talk very loud, and since they are not use to it, they find it very stressful and in some cases they lost their voices. Also, respondents indicated that at many times they experienced

dizziness mostly in the mid-day especially when lunch is delayed. Moreover, an in depth interview with Chairman Traders Association in Kwari market revealed that within five months from January to May, 2014 he has reconciled about 12 cases of fights that broke between traders due to faulty electric power generators that produced too much smoke and noise. In deed, this supports the conventional literature that 'noise can produce a number of social and behavioural effects as well as annoyance' (WHO 1999). Based on WHO community noise guideline (1999) continuous noise exceeding 55dB can induce serious annoyance during the daytime. Thus, in order to protect the majority of people from being moderately annoyed during the daytime, it has been recommended that the outdoor sound level should not exceed 50 dB LAeq. As indicated earlier, the mean noise level in all the three studied markets have exceeded 75dB (See Table 1).Although the levels of CO_2, CO and suspended particulate matter (SPM) in all the study markets are within the threshold limits, but in particular, frequent exposure to CO_2 according to USEPA (1988) 'can cause headache, increased heart rate, dizziness, fatigue, rapid breathing, and visual and hearing dysfunctions. Exposure to higher levels may also cause unconsciousness or death within minutes of exposure'**.** The glaring effect as it relates to the three study markets is staining of paints of the surrounding structures and stationary objects. Also respondents complain of headache and dizziness which could be due to frequent exposure to smoke emission (CO_2) and high noise level as indicated earlier.

Respondents described these identified consequences of noise and air contamination in the study markets as 'paying for the priceless'. In Sabongari market a respondent stated that (in Hausa language) "*in dai kana hulda da 'Yan-ukun Kano, to lalle sai ka biya su harajin da ba adadi*" (also with a body language that signifies high emphasis and cohesion). Laterally, this means that, 'if you are dealing with the 'triple sisters' of Kano, you must pay them an endless tax'. In fact, this statement apart from describing the existing situation of the three studied markets it has as well show case the severity of the consequences in terms of human health and social implication.

IV. HUMAN RESPONSE

Since 1980, the World Health Organization (WHO) has addressed the problem of community noise by producing health-based guidelines on community noise that served as the basis for deriving noise standards within a framework of noise management. This among others include abatement options; models for forecasting and for assessing source control action; setting noise emission standards for existing and planned sources; noise exposure assessment; and testing the compliance of noise exposure with noise emission standards. However, in relation to the three study markets none of the above measures is being pursue or is in practice in order to deal with noise and air contamination. Instead, the traders at individual levels pursue some relief measures as the only adjustment measures to high noisy situation that characterized their trading environment. These are: i) Making use of ear phone to listen to Quran recitation or religious songs and preaching, especially if customers are not available; ii) frequent taking of menthol sweets in order to gain voice lost; iii) frequent taking of pain relievers such as paracetamol in order to get relief from headache; iv) closing early, some times around 4pm instead of 6pm; and v) occasional trips away from market area in order to attend to some important business telephone calls.

V. CONCLUSION

From the forgoing analysis of the extent and consequences of noise pollution and air contamination in the three studied markets of Kano metropolis, it is evidently clear that the situation is very critical since they are posing a great threat not only to trading activities but also to human health and life. This is because, unlike many other environmental problems, noise and air pollution continue to grow and they are accompanied by increasing number of complaints from people exposed to them. Therefore, this makes the growth in noise and air pollution unsustainable due to the fact that they involve direct, as well as cumulative, adverse health effects. Moreover, noise and air pollution adversely affects future generations, and have socio-cultural, esthetic and economic effects. As a medication against such gloomier future, the following measures are recommended: i) that adequate and stable electric power supply should be put in place in all the markets in Kano metropolis at least from opening to closing time (from 10am to 6pm); ii) more parking spaces should be provided away from market premises in order to reduce traffic volume and ease accessibility into the market premises; iii) the market space should be decongested in order to alter with cumulative and multiplier effect of environmental noise and air clogging; and vi) government should set up facilities for full implementation of environmental noise management in the state as a whole which among other should include: strategies and priorities in the management of noise levels; noise policies and legislation; environmental noise impact; and enforcement of regulatory standards.

REFERENCES:

[1] Heinrich von Thünen (1800) Microsoft ® Encarta ® 2009. © 1993-2008 Microsoft Corporation. All rights reserved.

[2] International Council on Clean Transportation (ICCT, 2014). "EU CO2 standards for passenger cars and light-commercial vehicles". Retrieved 5 February 2014EU Regulation No 443/2009

[3] Maigari Ahmed Ibrahim (2014a) Informal Private Sector Participation in Electric Power Supply in some Areas of Kano Metropolis. International Journal of Engineering Science Invention ISSN (Online): 2319 – 6734, ISSN (Print): 2319 – 6726 www.ijesi.org Volume 3 Issue 6‖ June 2014 ‖ PP.44-51

[4] Maigari Ahmed Ibrahim (2014b) Historical Development and Spatial Distribution of Markets in Kano Metropolis (In Press)

[5] USEPA (1988) United State of America, Environmental Protection Agency, Operational Guide, CO2 Emission Limits.

[6] Walter Christaller (1930) Microsoft ® Encarta ® 2009. © 1993-2008 Microsoft Corporation. All rights reserved.

[7] World Health Organisation (WHO, 1995) Guidelines for Community Noise (WHO, 1995, 95 p.) Edited by Birgitta Berglund; Thomas Lindvall and Dietrich H Schwela. Protection of the Human Environment Document prepared for WHO. Archives of the Centre for Sensory Research, Vol. 2, Issue 1, 1995. Stockholm University and Karolinska Institute.

[8] World Health Organisation (WHO, 1999) "Community Noise" WHO-expert task force meeting held in London, United Kingdom, in April 1999.