

PROFILE OF BUILDINGS ON THE SETBACK OF HIGH TENSION POWER LINES IN AGBADO, OGUN STATE.

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ABSTRACT

This study aims at profiling buildings on the setback of high tension power lines in Agbado, Ifo Local Government Area of Ogun State, with the view to suggesting strategies for controlling development in the study area. The objectives of the study are to: identify buildings encroaching on a stipulated 50-meter setback from the high tension power lines and their characteristics; investigate the demographic characteristics of households occupying the buildings; examine the factors responsible for locating the buildings on the setbacks of high tension power lines, and; investigate their susceptibility to the hazard of electromagnetic radiation. Remote Sensing technique was used to establish a buffer of 50-meter on both sides of the high tension power line traversing the affected area. The study employed random systematic sampling, on the basis of an interval of 4 buildings. Households were the units of data collection. Household heads in 150 buildings representing 25% of the total, and 7% of the total households in the study area were surveyed. Findings, among others, reveal majority of the respondents (52.7%) express ignorance about the negative health effects of electromagnetic fields emitted by High-tension Power lines. It recommends among others that all the 602 structures encroaching on the 50 meters setback from the high tension line routed through the study area should be demolished, and the vacant spaces should be landscaped with special trees and shrubs. This should represent another way of greening metropolitan areas and improving urban ecology.

Keywords: Buildings, Electro-magnetic Radiation, Encroachment, High-Tension, Power lines, Setback

INTRODUCTION

Land-rights, housing and sustainable habitats are economic issues which are not only important for individuals' survival but also future development of cities (Omole, 2007). Urbanization significantly influences land use in urban centers. As well captured by Bashorun (2003), Brockerhoff (2000) describes level of urbanization as the share of country's population that lives in urban area.

The process of urbanization is a global phenomenon caused by migratory movement, natural increase and the globalization of the world economy (Omole, 2007). According to UNHABITAT (2008), though Africa still had only 39.15% of its total population cities, its urbanization rate from 2005-2010 was 3.31%. The projected urbanization for Nigeria between 2010 and 2020 is 3.39%. The recently reviewed population statistics of Nigeria by National Population Census puts Nigeria's population at 167,000,000 (Oketola, 2012).

Notwithstanding its constantly increasing population, its total land area is still fixed at 923,700 square kilometers. Hence population density, in the face of competing uses of land will continually soar. The total population of Lagos, increased from 3.5 million in 1975 to over 10 million. Its population is expected to reach 24 million by 2020, with an estimation of 606 people entering into it every minute. With a meagre land mass of 3577 square miles, and an estimated population of over 10 million, Lagos state has population density of about 5,171 persons per square kilometer, as at 2008 (Opeyemi, 2008).

In the last 20 years, explosive unprecedented urban growth had occurred in the southern parts of the city, and increasingly now into Ogun state (LAMATA 2008). This explosion has caused unusual land and demographic pressure directing migration and development towards the fringes. This invasion usually leads to uncontrolled and unorganized development. The encroaching communities lack basic infrastructure and are developed chaotically. The second factor accounting for land use encroachment is the absence of

sound institutional arrangement to manage urban fringe growth (Fahria, 2009). Though the marginal land in the fringes where encroachment occurs is continuous with the political boundaries of main cities, they are considered institutional deserts.

Lands encroached upon are not under rigorous development controls, because they are mostly excised from planning areas of main cities. Development activities take place without conforming to planning regulations. Due to high demand of land from city workers, available marginal lands are filled up from various development purposes without considering environmental impacts. Therefore, the haphazardly developed fringe areas are not provided with adequate facilities (Fahria, 2009).

AIM AND OBJECTIVES OF THE STUDY

The aim of the study is to profile buildings on the setback of high tension power lines in Agbado, Ifo Local Government Area of Ogun State, with the view to suggesting strategies for controlling development in the study area. The objectives of the study are to:

- i. identify buildings encroaching on a stipulated 50-meter setback from the high tension power lines and their characteristics;
- ii. investigate the demographic characteristics of households occupying the buildings ;
- iii. examine the factors responsible for locating the buildings on the setbacks of high tension power lines, and;
- iv. investigate their susceptibility to the hazard of electromagnetic radiation with a view to protecting health of residents

STUDY AREA

The geographical area under consideration falls within Olatoye (Power line bus stop) area of Agbado through Iju, which is directly situated under the 330kVA power line that traverses Agbado to the step down station at the Ikeja West step down station in Ikeja Lagos State. The total area of the strip of high tension power lines' setback from Olatoye to Ogun state's boundary before Iju-Ishaga road that is encroached upon and defined as the study area is 134.01 hectares. Agbado is an informal satellite settlement, whose rapid expansion was borne out of its closeness to Lagos State which has been experiencing the

problems of urbanization in the form of housing shortages, traffic congestion and environmental deterioration. Agbado is situated within Ward four (4) of Ifo Local Government Area of Ogun state- a Local Government area consisting of eleven (11) wards.

LITERATURE REVIEW

The unprecedented growth in cities in Nigeria, which is most times unguided had culminated in a variety of problems such as chaotic land development, haphazard land uses, (Olamiju and Oyinloye, 2015). Virtually no regulatory or policy reference to the socio-economic impact of electricity projects is integrated into the environmental regulatory framework of Nigeria. All issues related to compensation or involuntary resettlements due to the exercise of eminent domain are addressed in the Land Use Act of 1978 (amended 1990). This act provides the legal basis for land acquisition and resettlement in Nigeria. According to the act, all land in Nigeria is vested in the Governor of each state, to be held in trust for the use and common benefit of all people (Oyesiku, 2001). The administration of urban land is directly under the control and management of the Governor, whereas non-urban land is under the control and management of the Local Government Authority. The Governor has the right to grant statutory rights of occupancy to land. Local government has the right to grant customary rights of occupancy. The Land Use Act gives government the right to revoke statutory and customary rights to land for the overriding public interest (Awogbemi, 1982). Power Holding Company of Nigeria (PHCN), as a federal agency, was also empowered by a land use decree and by NEPA Operational Decree No. 24 of 1972 to acquire land for projects that relate to public interests. Since the Land Use Act gives to the state the ownership of all land, compensation by NEPA was restricted to structures, installations, and improvements on the land, not the land itself (Olapeju, 2014).

However, the act does require the state or local government to provide alternative land for affected people who will lose farmland and alternative residential plots for people who will lose their houses. NEPA generally did this for hydropower resettlement programs, but not for transmission line and sub-station projects, or for distribution

projects. In some areas closer to towns and cities, additional cash compensation was paid on a case by case basis, to people who lost building plots, other land, or houses to make way for sub-stations. Alternative land was not provided (NEDP,2005).

Susceptibility and Electromagnetic Radiation

Many countries have their own national standards or guidelines for exposure to EMFs or have adopted those of the International Commission for Non- Ionising Radiological Protection (ICNIRP). WHO(2007) has stated that exposure levels directly beneath the centre span of a 400kV overhead power line would under certain conditions exceed the ICNIRP 5kV/m public exposure guidelines. Although the electric field would be screened, to some degree by the building, the magnetic field would still be the same. Many countries are now recommending that new double circuit lines should be arranged in a special configuration to allow some cancelling of the magnetic fields, in order to reduce the overall field strengths in the vicinity of overhead power lines. In the USA, National Electric Safety Code(NESC) specifies 50-100ft for 34 kv,70-100ft for 138 kv,and 150 ft for 345 kv in urban areas.(AEP,2010).

Electric transmission lines are projects with a wide range of Environmental risk, depending on the location and project size. Impacts are principally associated with the creation and maintenance of corridors, the construction of towers, and the health risks from electromagnetic fields. Specific risks include:the fragmentation of habitat and vegetation along the right of way; new access to protected areas and wild habitats along the right of way; loss of land and other assets and physical relocation along the right of way; and electrocution if low-slung lines are near human activity(PSC,2010).

PHCN guidelines stipulate a minimum horizontal distance of 4.5 meters between a building and 11kv cable, and minimum horizontal distances of 7.5 meters, 30 meters, and 60 meters are recommended for a building between 33kv cable, 132kv cable, and 330kv cable respectively (Federal Government of Nigeria, 1996). Ogun state's Urban and regional planning regulation is slightly different from that of PHCN. Section 35(1d) of

the Ogun State Urban and Regional Planning Law 2005 also states that : “an application for a development permit may be rejected if the proposed development falls within the setback of road, National Electric Power Authority High Tension power line, drainage channel, land of water body. Part 1, section 4 of the Ogun State Building Plan Regulation further stipulates that the minimum distance from a building to the center of overhead power line shall be 50 meters for 333kv less than 132 kv wires; and 10 meters, 8 meters, and 12 meters for 132kv less or equal to 33kv wires, 11kv less or equal to 0.415kv wires, and a substation ,respectively (Ogun State Government,2005).

CONCEPTUAL FRAMEWORK

The Bid Rent Theory

Human encroachment of natural areas stems from the demand for both residential space and agricultural production. These demands have been placed in spatial context by bid-rent models. David Ricardo is also credited with the pioneer of the well-known bid rent theory that connects the land value and locations of different land uses in a theoretically sound analytical approach. In 1826 the German economist Johann Heinrich Von Thünen published his work, *The Isolated State*, giving probably the first serious treatment of the spatial analysis on rents, which highlighted the importance of centrality and transport (Crosier, 2009).

Rural-Urban Fringe Concept.

The Rural-urban fringe concept which was first used by T.L Smith in connection with the Louisiana, USA, is applicable to this study. Rural-Urban fringe is a dynamic zone at the outer borders of the city. It is a zone that simultaneously reflects the existence of both the rural and urban sectors (Fahria, 2009). Aruna (2010) posits that rural urban fringe is related to the growth of cities which lies immediately outside designated urban limits. The zone usually has strong interaction with the present city, and reflects its physical occupational and demographic characteristics. The rural urban fringe is the consequence of invasion process.

METHODOLOGY

Data Type and Sources

This study employed both primary and secondary sources of information in collecting data. Primary data was collected with the aid of structured questionnaires coupled with oral interviews, photographs, and physical observation. The secondary data relied upon for the study's literature review and the construct of complementary inferences to the body of findings are journal publications, newspapers, study notes, textbooks and internet articles.

Sampling Technique and Sampling size, and Research Instrument

This study only focused on buildings observed to have encroached on the 50-meter recommended by part 1, section 4 of the Ogun State Building Plan Regulation as setback for high tension power lines in Ogun state. Remote Sensing technique was used to establish a buffer of 50-meter on both sides of the high tension power line traversing the affected area. However, all the buildings that fall within this buffer were identified, and the residents in totality, represent the research population. Owing to the homogeneous nature of research case in the study area, the study employed random systematic sampling, on the basis of an interval of 4 buildings. Households were the units of data collection. From the data of the pilot survey, the bungalows in the study area were mostly rooming apartments occupied by an average of 4 households, while the storey buildings were mostly occupied by an average of 2 households. With this, the total number of households estimated to be living in the 501 residential/mixed uses (residential and commercial) bungalows in the study area were 2004 households. A total of 126 households are estimated to be staying in the residential/mixed uses storey buildings. Hence, the total household size estimate for the study area is 2130. However, using the generally embraced household size of 7 as espoused by Fasakin (2000), the total population living in bungalows was estimated to be 14,028, while those of storey buildings was given as 882. The total population in the study area is therefore estimated to be 14,910. The study employed random systematic sampling, on the basis of an interval of 4 buildings. Households were the units of data collection. Household heads in 150 buildings representing 25% of the total, and 7% of the total households in the study

area were surveyed. The position of Agboola et al(2001) that 10% sample size is considered adequate, and the homogenous nature of research case justifies the sample size arrived at by this proposal. However, all the 48 leukemia patients that were receiving treatment at Lagos State Teaching Hospital during the course of the research were interviewed on their appointment dates (Tuesdays and Thursdays of the week).

DISCUSSION OF FINDINGS

Identification of Buildings Encroaching On A Stipulated 50-Meter Setback From The High Tension Power Lines And Their Characteristics

The total number of land uses identified in the study area are 602, out of which 427(71%) are residential. While 501, representing 88.9 % of the residential and mixed use buildings identified in the study area are bungalows, 63 representing 11.1% are storey buildings. 85.3% of respondents' buildings have one floor. 45% of the buildings are of flat system. 94% of buildings in the study area were built with cement block. 66.4% of the buildings in the study area are made of corrugated iron sheets, and are in sound condition. 78.7% depend on commercial boreholes as water sources. All the respondents have their water sources in location that are within 1000meters reach from homes. This is actually in line with the World Health Organization (WHO) standard that water source has to be within 1000meters of the home and collection time should not exceed 30 minutes. All the buildings in the study area are accessed by an untarred road, with some of the buildings locating in deep valleys within the encroachment area .None of the 150 buildings surveyed had title documents such as Certificate of Occupancy and copy of duly stamped approved plan of building or letter bearing the approval stamp of Ogun State Urban and Regional Planning Board.

Demographic Characteristics of Households Occupying The Buildings

The total no of households estimated for the study area is 2130, and the totalestimated population in the study area is 14,910. Majority of the respondents are males (70.7%), while (29.3%) are females. The (29.3%) females are actually respondents who in the

absence of their husbands stood as household representatives, as well as those who are widowers and divorcees. While about 94.7% of households surveyed are married, there is an insignificant presence of widows (3.33%), as well as widow/widowers (2%) among the respondents. Majority of the respondents are within the age bracket of 36-65 years (80%), followed by respondents within the age bracket of 18-35 years (12%), while 8% of respondents are above 65 years. 11.3% of people that built in the study area have tertiary education. 64.7% of the people who built in the study area, work in the neighboring Lagos state. 64.7% of the respondents, who are in the majority work in Lagos state. 28.7% of the respondents work within the environ of Agbado, while 6.6% of them make their living in other settlements within Ogun state. This is evident of Lagos's over-bearing influence in being a regional hub of commerce and employment opportunities. It also brings to fore the pressure of accommodation shortages and transportation, which Lagos workers have been grappling with. Interviews complementarily conducted to the respondents working in Lagos reveal that the huge cost of accommodation in Lagos leaves them with no option than locating in fringe settlements like Agbado where cheap lands and means of transportation can be afforded.

47.3% of people living in the study area (earn above #600,000 annually. However, none of the respondents' annual income falls below the dollar per day standard often used by the National Bureau of Statistics in measuring poverty. 97% of the people living in the study area acquired their lands from land speculators known as 'OmoOniles' in Indigenous parlance. The land owners who now sell the illegal lands had been paid compensation on land acquisition by the Power Holding Company of Nigeria before 1973 when the transmission lines were routed through the settlement. All the buildings in the study area were constructed after the transmission lines have been routed through the settlement in 1973 (39 years ago).

Factors Responsible for Locating the Buildings on the Setbacks of High Tension Power Lines

Majority of respondents (68.0%) claim cheapness of land in the study area as the main reason they located in there. While 17.3% of the respondents claim unaffordability of rents in their former places of abode forced them to have bought lands encroaching on power line setbacks, 14.7% claim they located their buildings in the study area because

they knew they would face little or no resistance from planning authorities. Only 17.54% of the settlers recognized the possibility of future demolition of their buildings by planning authorities as a disadvantage of living in the study area.

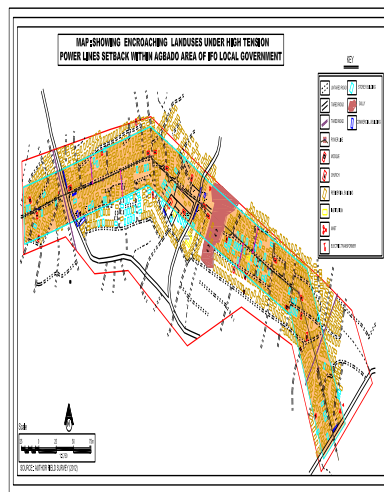


Figure 1: Map of the Study Area Showing Land uses encroaching under High tension Powerlines

Susceptibility of Households to the Hazard Of Electromagnetic Radiation

Majority of the respondents (52.7%) express ignorance about the negative health effects of electromagnetic fields emitted by High-tension Power lines. This is followed by 24% who are aware of the possible negative health effects of electromagnetic fields emitted by High-tension Power lines, and 23.3% who were indifferent. 96% of the respondents claimed not to have been diagnosed of leukemia, 4% were indifferent. However, interview conducted to the medical director of Alonge Hospital that is located just 10 meters outside the range of the study area reveal that 2 individuals living around the study area have been diagnosed of Acute myeloblastic leukemia, and recommended to Lagos State University Teaching Hospital that has capability in leukemia therapy in the Ogun-Lagos Region. The medical director's interview also gave an insight to the knowledge that people only recourse to medical treatments after ailments get to critical condition. Moreover, most of the Leukemia patients interviewed at Lagos State University Teaching Hospital-the regional specialist hospital that has capability in leukemia therapy in Ogun-Lagos region were within the range of 35-65 years (66.7%). This is followed by 16.7% of patients above 65 years, and 8.3% each for 1-10 years and 10-15 years. 58.3% of the leukemia patients interviewed, which is the majority, claimed that they were diagnosed of chronic myeloid leukemia. This is followed by 23.4% who claimed to have been diagnosed of chronic lymphocytic leukemia, 10% who had been diagnosed of acute myeloid leukemia, and 8.3% of those who had been diagnosed of Acute myeloblastic leukemia. Age group of leukemia, however, most likely determines the type of leukemia patients will be diagnosed of. While Acute myeloblastic leukemia is peculiar to 1-10 years age category, Acute myeloid leukemia is peculiar to 10-15 years age category, Chronic myeloid leukemia is common with 45-65 years age category, and chronic lymphocytic leukemia is mostly associated with those patients above 65 years. (Healthwise, 2012)

While majority of leukemia patients (91.7%) have never lived near a high tension power line, 8.3% claimed to have done so. This result is obviously as a result of the multiple causal factors of leukemia ailment. While some of the patients could have been genetically infected with leukemia, others could be as a result of exposure to chemicals like benzene and smoke, and genetic factors. While majority of the respondents (75%) claimed to have lived close to high tension power line for above 15 years, 25% of the respondents claimed to have lived close to high tension power lines for 10-15 years.

Conclusion and Recommendations

It is evident, from the foregoing that monitoring of physical development in the study area is non-existent, and it is a typical case of an 'institutional desert'. It is equally apparent that the corridor is mostly occupied by the poor who would take advantage of marginal and cheap lands, as they are constrained, economically, to secure lands legally and in planned locations. The residents of the study are also mostly ignorant of the actual setback their buildings are supposed to observe from the power line and the risk associated with living very close to it. Based on these conclusions, the following recommendations were made:

1. All the 602 structures encroaching on the 50 meters setback from the high tension line routed through the study area should be demolished. And the spaces should be landscaped with special trees and shrubs. This should represent another way of greening metropolitan areas and improving urban ecology.
2. According to Annex 3.3 World Bank Policy on Involuntary Resettlement Policy Directive OD 4.30, encroachers are not eligible for compensation after displacement from their illegal locations. They are also not eligible to rehabilitation measures. However, there is a need for the encroachers to be displaced with a human face. The fact that the Ogun state government had not lived to its constitutional and 'welfarist' expectations in investing in site and services schemes, mass housing development, and proactive development control in the face of rapid urbanization in its neighbouring Lagos state, should impress on it a moral burden that must be translated into a reasonable compensatory cost for encroachers who shall be displaced from the study area.
3. There is need for Ogun state to take advantage of the urbanization pressure on its southern border with Lagos state in commencing investment in site and services schemes and affordable housing estates. This will prevent potential house developers from developing lands unsustainably. It will also ensure that the state raises more revenue from issuance of certificate of occupancy certificates and building approval charges.

4. Ogun State Government should consistently sensitize the public through media publications and Television paid advertisement on the consequences of building near power lines. It should ensure that the 50meters setback recommended by the Ogun State Urban and Regional Planning Law is enforced in both the study area and other areas traversed by high tension power lines in Ogun state.

5. The Development Control Department of Agbado zonal planning office should be empowered in carrying out its development control responsibilities. Site inspection vehicles and adequate security provisions should be provided for officers that are involved in the development monitoring and compliance.

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