

PLANNING AND HEALTH IMPLICATIONS OF LAND USE
ENCROACHMENT ON SETBACK OF HIGH TENSION POWER
LINES IN NIGERIA: A STUDY OF AGBADO POWER LINE IN
OGUN STATE, NIGERIA

OLAPEJU, OLASUNKANMI O.
ELESIN, GANIYU O.

*Department of Urban and Regional Planning
Federal Polytechnic
Iloro, Nigeria.*

Abstract

This study aims at investigating the incidences of Land use' encroachment 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 uses; assess the approval status of land uses encroaching on high tension power lines' setback in the study area; and investigate the proportion of people in the study area that are affected by Electro-magnetic radiation induced ailments. 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 that the total number of land uses identified in the study area is 602, out of which 427(71%) are residential. None of the buildings surveyed had approved plan. It recommends among others the 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 in order to prevent potential house developers from developing lands unsustainably.

INTRODUCTION

Nigeria, like most countries is undergoing a period of rapid urbanization. The level of urbanization in the country rose from 4.8% in 1921 to an estimated 31.7% in 1985(Ogu, 2002). UNICEF (2010) puts Nigeria's level of urbanization at 50%. The annual growth rate of urban population in Nigeria was 4.1% between 1990 and 2020. Between, 2010- 2030, however, it is expected to be 3.7% (Ogu,2002). The problem of rapid and uncontrolled expansion and its encroachment on city fringe is highly linked with urbanization.

According to UN HABITAT (2008), Lagos and Cairo are the first African mega cities. Lagos with an estimated population of over 10million is expected to reach 25million by 2015. This will make it the third largest mega city in the world (Francisco, 2006). This explosion has caused unusual land and demographic pressure directing migration and development towards the immediate peripheral areas. In the last 30years, the explosive urban growth in Lagos has been increasingly spreading northwardly into peripheries that administratively fall within the political boundary of Ogun state (Oloto *et al*, 2007). One of such settlements in Ogun state that is at the receiving end of this expansion is Agbado in Ifo Local Government Area. Like in most settlements in different parts of Lagos periphery, invasion leads to uncontrolled and unorganized development.

The main focus of the study is the dimension that lateral sprawl development is taking within Agbado settlement. As the settlement expands in geographic boundaries, various kind of development activities encroach on the setback of the 330KVA high tension power line routed from Kanji to a step down station at Ikeja, Lagos state. This raises serious health concerns, as dwellers encroaching on high tension power lines seriously stand the risk of direct exposure to dangerous electric magnetic fields resulting from high tension power lines. It is therefore the intention of this study to investigate the incidences of land use's encroachment on the set back of high tension power lines in Agbado, Ifo Local government area of Ogun state with the view of suggesting ways

for better control of land under high tension power lines.

The aim of the study is to investigate the incidences of Land use' encroachment 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 uses;
- ii. assess the approval status of land uses encroaching on high tension power lines' setback in the study area; and
- iii. investigate the proportion of people in the study area that are affected by Electro-magnetic radiation induced ailments.

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

Reasons for Land Use Encroachment

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). Agbola *et al* posits that urbanization significantly influences land use in urban centers, As well captured by Bashorun (2003), urbanization is 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). 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. As accounted by Oloto *et al*, (2010), 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 3577square miles, and an estimated population of over 10million, 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 had 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.(Oloto *et al*, 2010) 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.

Electromagnetic Field Exposure Guidelines

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). 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 (FGN, 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 33kv 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 Uses

Of the 602 buildings identified in the study area, 427(71%) were residential, 137(22.8%) were of mixed use (residential and commercial),23(3.82%) buildings were of public use (mostly churches and mosques) and 9 (1.2%) were of commercial use(petrol filling stations). However, just 1 (0.2%) was of institutional use (a private nursery and primary school), and 5 (0.83%) are of service

industries. 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. 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. Findings reveal that 97% of respondents acquired their lands from land speculators known as 'Omo Oniles' in Indigenous parlance. However, 3% of the respondents claim that their acquisition of land is temporary, as they make monthly rent payments to land speculators. 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.

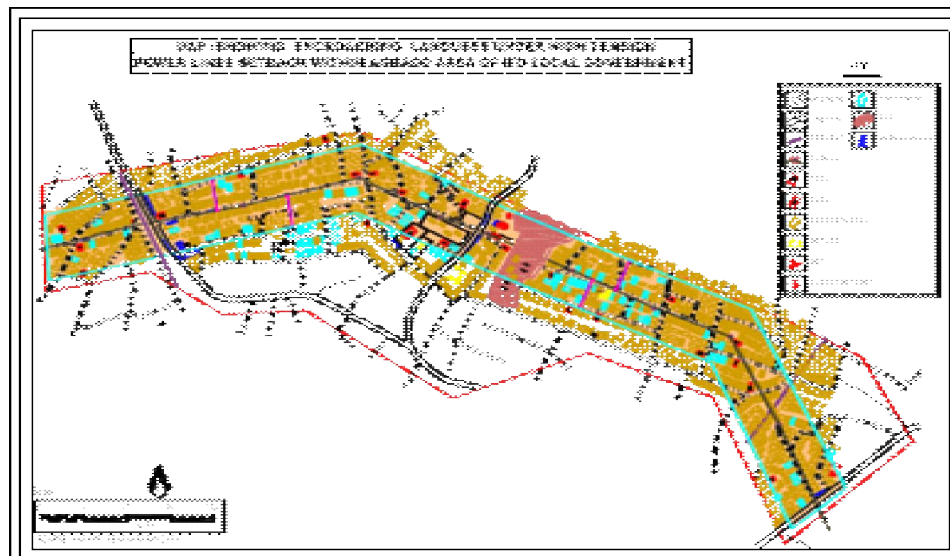


Figure 1: Map of the Study Area Showing Land Uses Encroaching Under High Tension Powerlines

Investigation of The Proportion of People in the Study Area that are Affected by Electro-Magnetic Radiation Induced Ailments.

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 lymphoblastic 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 lymphoblastic leukemia. Age group of leukemia, however, most likely determines the type of leukemia patients will be diagnosed of. While Acute lymphoblastic 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.

Table 1: Test Statistics Results of Weak Regulation from Planning Authorities is not a Significant Reason why Respondents Constructed their Buildings Close to High Tension Power Lines

	Reason why Respondents who constructed buildings after HTPL installation located close to HTPL
Chi-Square(a)	81.28
Df	2
Asymp. Sig.	.000

The calculated Asymptotic significance= 0.00, while the level of significance is taken as 0.01. Since the Asymptotic significance (0.00) is less than stated level of significance (0.01), the null hypothesis which states that weak regulation from planning authorities is not a significant reason why respondents constructed their buildings close to high tension power lines is rejected. The alternative hypothesis which states that weak regulation from planning authorities is a significant reason why respondents constructed their buildings close to high tension power lines is therefore accepted. This therefore implies that apart from relative cheapness of land, the weakness of regulation on the part of the planning agency also represents an incentive to locating closely to high tension lines.

CONCLUSION AND RECOMMENDATIONS

The study found out that a problem of development control on power line setbacks is a spin-off from the controversial nature of the ownership and control complexion of lands situated around high tension power lines. Though PHCN was responsible for acquisition of land for transmission lines and to a large extent involved in the payment of compensation for both economic trees and crops together with the parcel of land under the lines, it has no powers to preventing encroachers on high tension lines' setbacks. This has basis in the recent Supreme Court judgment in respect of the case between the Attorney- General of Lagos State Government and the Attorney General of Federal Government over jurisdictional powers on land management and control. By a majority decision of four justices of the Supreme Court to three, the court substantially granted the reliefs sought by the state on the grounds that the power to managing and controlling land development constitutionally resides in the state (Fagbohun, 2005). This is very instructive on the limitation of PHCN- a federal parastatal in controlling developments on lands situated within its properties. This therefore logically lays the greatest part of the blame of failure in the control of development in the study area on Ogun State Government. Hence, Ogun state government will be saddled with taking up the greatest part of the study's recommendation.

Based on the conclusions of this study, the following recommendations were made on how to restore back the high tension power lines setbacks to their normal state, minimize public exposure to health risks and essentially ensure effective physical development control in the study area:

1. This study recommends 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 restored back to their normal and vacant state.
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 neighboring 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.

REFERENCES

- Adeboyejo, A.; Olajoke, A.; Abodunrin, F. & Jelili, M.** (2007). *Prediction Modeling of Urban Spatial Expansion And Implications aor Livelihood and Sustenance In Peri-Urban Areas of Ogbomosho, Nigeria.* Paper Presented at the 5th African Conference (UAPS) Arugh, Tanzania on December 10-14 2007
- Agbola, T. & Olatubara, C. O.** (2001). *Readings in Urban and Regional Planning.* Macmillan Publisher: London.
- American Electric Power(AEP)** (2010). *Encroachment on Electric Transmission Rights of Way.*
- Aruna, S.** (2010). *Monitoring Of Urban Fringe Areas Using Remote Sensing And GIS Techniques.*
- Bashorun, J.**(2003). *Basic Elements of Planning.* Shalom Publishers, Akure, Ondo state, Nigeria.
- Bond, S.** (2001). The Use of Conjoint Analysis to Assess the Impact of Environmental Stigma. *Pacific Rim Property Research Journal Sydney Australia 7(3):182-194*
- Crosier, S.** (2009). *Johann-Heinrich Von Thünen: Balancing Land-use Allocation with Transport Cost' CSISS Classics (Center for Spatially Integrated Social Science, Santa Barbara),*
- Fagbogun, O.** (2005). *Physical Planning and the Petroleum Industry: Nigeria's Legislation in Perspective.* Paper presented at the 36th Annual Conference of the Nigerian Institute of Town Planners: Physical Planning and the Petroleum Industry in Nigeria. Enugu, Enugu state, 16th -19th November 2005.
- Fahria, M.** (2009). *Urban Fringe Management and Role of Good Governance: Integrating Stakeholders in Land Management Process.* 7th FIG Regional Conference Spatial Data Serving People: Land Governance and the Environment – Building the Capacity Hanoi, Vietnam, 19-22

- Fasakin, J. O.** (2000). *Land Use Analysis Of Operational Characteristics Of Commercial Motorcycles In Akure Ondo State*. PhD Thesis. Akure: Federal University of Technology.
- Francisco, A.** (2006). *Housing In Lagos Megacity-Improving Livability, Inclusion And Governance*. Paper Delivered At The International Conference On Building Nigeria's Capacity To Implement Economics, Social And Cultural Rights: Lessons Learned, Challenges And The Way Forward Held At Abuja Between 27th And 28th Of September
- Healthwise** (2012). *Leukemia-Symptoms, Types, Causes, Diagnosis and Treatment Options for Leukemia*.
- Lagos Metropolitan Area Transport Authority** (2008). *Lagos Blue line urban line Concession*.
- Oketola** (2012). Internet access experts worry over 95% deprived Nigerians. The punch news paper, February 11. Pg7.
- Oloto, E. & Adebayo, A.** (2007). *The New Lagos –Challenges Facing The Peri-Urban Areas And Its Relationship With Its City Center*. Department of Architecture, University of Lagos, Nigeria.
- Ogu, V.** (2002). *Urban Infrastructure development and sustainability in Nigeria*.
- Ogun State Government of Nigeria** (2005). Ogun State Urban and Regional Planning Law.
- Omole, F. K.** (2009). Land Use Violations: Implication For Sustainable Development, The Case Study of the Federal Capital City Abuja. *Journal of social Sciences* 1(1): 31- 37.
- Onokerhoraye, A. & Omuta, G.** (1994). *City structure and Planning for Africa*. Ilupeju Press limited, Benin City, Nigeria.
- Opeyemi, B.**(2008). *Need for more Federal Government Presence In State Capitals.(A Case Study of Lagos Mega City)*. Paper Delivered at the Annual Dinner And Award Night of The Association of National Accountants of Nigeria Ikeja Branch At Lagos Airport Hotel on 12th December

Public Service Commission Wisconsin (PSC) (2010) *Environmental Impacts of Transmission Lines.*

UNICEF (2010). *At a glance: Nigeria.*