

KNOWLEDGE BASED DECISIONS OF ENVIRONMENTAL IMPACT ASSESSMENT OF BUILDING PROJECTS IN NIGERIA

KEFTIN, Namala Amuga

Department of Building,
School of Environmental Sciences
Modibbo Adama University, Yola – Nigeria
keftinnamala@yahoo.com,
+234(0)8035879482

and

KUROSHI, Peter Ayinde

Department of Building,
School of Environmental Sciences
Modibbo Adama University, Yola – Nigeria
drptkuroshi@yahoo.com
+234(0)8034514872

Corresponding author: **Kuroshi, Peter Ayinde**

Department of Building,
School of Environmental Sciences
Modibbo Adama University, Yola – Nigeria
drptkuroshi@yahoo.com
+234(0)8034514872

Abstract

Environmental Impact Assessment (EIA) is a management mechanism used to predict actions of adverse impact on the environment, with a view to providing mitigation measures against such. In recognition and response to these problems, the Federal Government of Nigeria enacted the Environmental Impact Assessment (EIA) Act, the Urban and Regional Planning (URP) Act, and the Federal Environmental Protection Agency (FEPA) Act, almost simultaneously in 1992. These regulations are intended to ensure sustainable development and are designed to integrate the EIA process into early planning of projects. However, despite the enactment of the EIA Act, its implementation has not been appreciable in the building subsector. This paper presents outcome of a study that examined the likely decisions of assessors on the environmental impact of building construction activities based on their knowledge of EIA. The findings are intended for identifying critical impact areas to be considered while conducting EIA of building construction projects. In addition, the checklist method of survey was used to ascertain critical impact areas to be considered while conducting EIA on building projects. The study considered 17 impact areas. Out of the 170 questionnaires distributed, 150 responses were obtained. Findings revealed that building construction activities can have significant negative impacts in the following areas: housing, noise, land use, human health, earth, utilities, public services, plant life, transportation and aesthetics. This indicates that it is necessary to consider such impact areas each time an EIA is to be conducted for building projects.

Keywords: Building, EIA, Wetlands, Climate, Physiology

1.0 INTRODUCTION

1.1 Characteristics of the Nigerian Building Industry

The building industry in Nigeria is composed of several economic units called firms or companies. These units execute vast building projects ranging from petty works to multi-billion naira (capital) projects. It may not be out of place to regard the industry as an all comers one. This is in view of the numerous firms of varying characteristics in terms of size, composition and objectives. On the premise of the country's population which is over 160 million, Nigeria occupies the position of the biggest building market on the African continent.

The building industry is an important and inevitable service industry that contributes immensely to the process of the development of the environment. Construction of houses, hospitals, schools, factories, etc are the physical basis on which the developmental efforts and the improvement of the environment are consolidated. This makes the industry in most developing countries to have multiplier effect on the development of the environment. It provides a significant source of economic resources and social environments resulting in employment opportunities and other social amenities on the one hand and displacement of commodities, accidents and pollution of the environment on the other. It has been estimated that the building industry employs a significant proportion of any country's total registered labour force. As the existing building stock in Nigeria is concerned, there are substantial reasons to single out the following groups of buildings; residential buildings, building structures in service for National development, and building objects that constitutes infrastructure. At the same time, it is obvious that the building stock in Nigeria differs from one region to another.

1.2 Building Stock and Justification for Environment Impact Assessment

The spatial spread and quantity of building stock defines the extent of the effect of man's interaction with the environment. In other words, the construction and use of buildings have impacted on the environment, some of which are significant. These impacts have caused adverse effects and could contribute to irreversible changes in the global climate, atmosphere and consequential damage to the ecosystems. Moreover, pronouncements on global climate change are largely as a result of human activities that poses a serious threat to the existence of the universe itself. Further to this, the production processes of the built environment are said to have contributed to environmental changes, which need to be examined so as to identify the impacts for the purposes of mitigation; hence the study on environmental assessment cannot be overemphasized especially in developing countries. In Nigeria, there is an obvious paucity of documented information on the nature and scope of the impact of building construction activities on the environment. In addition, there is no efficient EIA framework for building projects. EIA requirements for building projects in the country are presumably lax, the legislation tends to only regulate and control the activities on bigger projects like in Power and the Oil and gas sectors. Whereas environmental problems could also be traced to the smallest development action. Moreover, such problem tends to have cumulative impacts arising across all types and sizes of projects. The negative impact recorded on construction activities makes it imperative to fully integrate EIA in building projects. This is to provide for effective management of construction works with minimum adverse effects.

2.0 ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

2.1 Concepts and Perspectives of Environmental Impact Assessment

The United Nations Environmental Programme (UNEP) defined EIA as a process that identifies, predicts and describes in appropriate terms the pros and cons (penalties and

benefits) of a proposed development. Historically, EIA started as a by-product of the first wave of environmental consciousness, which culminated in the 1972 Report of the Club of Rome and the Stockholm Conference, and was the beginning of United Nations Environmental Protection (UNEP). Environmental Impact Assessment as a national instrument are deemed to be undertaken for proposed activities that are likely to have significant adverse impact on the environment and are subject to a decision of a competent authority, hence the need for integrating it in every aspect that will enhance sustainability. Thus, EIA enables the identification, prediction and evaluation of the environmental effects of proposed actions and projects. The process is applied prior to major decisions and commitments on a project are made. Moreover, appropriate social, cultural and health effects are considered as an integral part of EIA. Particular attention is given in EIA practice to preventing, mitigating and offsetting the significant adverse effects of proposed undertakings.

2.2 Imperatives for Environmental Impact Assessment of Building Projects

Building projects globally enabled rapid population increase, technological advancement, urbanization, and meaningful economic growth, but these positives over the years resulted in environmental degradation. Environmental degradation due to construction of buildings occurs when natural resources are taken and used in the construction process, natural water courses are altered, with waste being generated during and after construction (Abrantes, V. et al, 2007).

Environmental considerations are increasingly becoming crucial in the development planning and policy decision-making process of many countries, both developed and developing. This is because of the concerns over the adverse effects created on the environment by the various economic and social activities. Most governments are becoming sensitized on the fact that effects of air and water pollution, deforestation, soil erosion and unsustainable exploitation of natural resources threaten the quality of life of their citizenry. This trend is being discouraged so as to conserve the natural base of the environment for the present and future generations, and EIA has become a veritable tool for addressing the environmental problems but not without some challenges.

UNIDO (in Sadler, 2005) reports that the use of EIA in developing countries to review industrial projects is constrained by several issues such as limited methodology, lack of data, narrow scope of method of analysis (e.g. omitting examination of site and of technological alternatives), absence of follow up, and insufficient linkages to other process and instruments for environmental management, which include life cycle analysis, health and safety systems and ISO standards. However, incorporating environmental considerations into the development process is now a generally accepted principle in all developing countries and most of them have either a formal EIA system or are still in an experimental stage with the irregular preparation of EIA document. The challenge is no longer whether the principle is valid and applicable, but rather how it can be operationally incorporated in the planning and management process (Biswas and Agarwala, 1992). Tanzania though struggling with ineffectiveness in guiding environmental management, now has a comprehensive legal and institutional framework that promises to guarantee desired results (Sosovele, 2011). There are published reports on Nigeria that indicates significant consciousness and procedural knowledge of EIA for a range of development projects in areas like solid waste management projects (Irtwange and Sha'Ato, 2009), road project (SEEMS, 2012), urban management (Udeh, 2010), industrial waste from textile manufacturing and the Oil & gas (Anago, 2002), water, agriculture, sanitation, and

energy projects (OECD, 2006). There is virtually no report suggesting concerns on the impact of building construction activities on the environment in Nigeria, thus it is difficult to be specific on the critical environmental impact issues to consider when a building project is embarked upon.

2.3 Global Footprint of Environmental Impact Assessment

EIA was first formally established in the USA in 1969, with the signing into law the National Environmental Policy Act (NEPA) on January 1, 1970. This act resulted in the creation of a new “action-forcing” mechanism, the EIA. The Environmental Impact System or Statement (EIS), the document, which is the result of the EIA process, was required to force the agencies to take the substantive provisions of the NEPA seriously and to consider the environmental policy directives of the Congress in the formulation of agency plans and procedures. In this act, all agencies of the Federal government were required to include EIA, in every recommendation or report on proposals for legislation and other actions significantly affecting the quality of the human environment.

The analytical process (the American EIA procedure) established by NEPA was a model for comparative systems worldwide (Glasson, Therival and Chadwick, 1999). Gradually the legal institutionalization of EIA spread to Canada in 1973, Australia in 1974, West Germany in 1975, France in 1976, some Asian countries, some countries in Latin America and few countries in Africa in the early 1990s. On a global scale, the necessity of EIA as an instrument of environmental management tool has in recent times continued to be understood and fully accepted. Over the years, there has been global spread of EIA legislation (Table 1). However, progress in adopting EIA tool in the developing countries has been extremely slow. Although these countries have general environmental related laws and regulations, which can be exploited for EIA purposes, they seem to impact less on environmental protection measures because of serious technical, administrative and political constraints (Giliomee, 1980; Abel and Stocking, 1981; Leonard and Morell, 1981; Geoghehan, 1985; Leonard, 1985; Toletino, 1986; Gamman and McCreary, 1988).

In the past, environmental concern was viewed as a cleaning-up process by the industrialized countries, while these concerns in the developing countries should be marked by a determination to achieve sustainable development in an environmentally sound manner. The EIA legislations vary globally; some are in the form of mandatory regulations, acts or statutes and are generally enforced by requiring the preparation of an adequate environmental impact statement (EIS) before permission is given for a project to proceed.

2.4 Profiling EIA for Building Projects in Nigeria

2.4.1 The Status and Need for EIA

The Federal government, having recognized the essence and relevance of EIA to sustainable development, on December 10, 1993 promulgated the EIA Decree No. 86 of 1992. It is worthy to note that the Decree made the application of the process of EIA mandatory in all major development projects in the country. Consequently, the Federal Environmental Protection Agency (FEPA), complimented by the states agencies is charged with the implementation of the EIA process in all major development projects. Further to dealing with the issue of Environmental Impact Assessment, section 33 of the Urban & Regional Planning (URP) Decree No. 88 of 1992 made it clear that the developer shall submit a detailed EIA for application for the following types of developmental projects:

- A residential land in excess of 2 hectares;
- Permission to build or expand a factory or for the construction of an office building in excess of four floors or 500sq. m of let able space; and

- Permission for a major recreational development (FEPA, 1992, 1995)

2.4.1 Building Development Projects and EIA Actions

Section 13(7) of the EIA law (Decree No.86 of 1992) stipulates that EIA should be conducted on Housing development covering an area of 50ha and above. Most building construction project do not cover such area. Units of residential houses, shops and offices are not likely to benefit from the law. However, the development control office in the Federal Capital Territory (FCT) is concerned about this especially that most building construction projects in the FCT do not span to the space required. This may be responsible for the low level EIA activity in the industry. Section 33 of the Urban and Regional Planning (URP) law (Decree No.88 of 1992) reduced the requirement to excess of 2ha for residential projects, excess of four (4) floors for office accommodation or 500sq.m for letting space. Yet, many building construction projects do not enjoy the scope of these laws; hence a proposition for no restriction to any development action is imperative.

2.4.2 EIA as Building Project Management tool

The impacts of construction projects on the environment are not static and that EIA is synonymous with feasibility studies, used by officials as planning and management tool for policy formulation on development projects (Wathern, 1990). This presupposes that the impacts of construction activities are relative on individual project sites. Hence a careful assessment of impacts on project activities becomes a necessary process that should even be an element of a project's feasibility and viability study. Bamisile (1999) posits that feasibility and viability studies cannot be fully completed until and unless EIA is conducted. It is therefore incumbent on consulting professional Builders to advise clients on the need to include EIA report in the terms of engagement, if not originally considered. Hence, the Builder who is the custodian of construction management and its processes must admit and integrate EIA on building construction projects, so as to preserve resources and materials, the duo having evolved from the environment. This clearly sensitizes the operators that some elements of EIA are specific inputs in feasibility studies. However, the EIA legislation in Nigeria tends to only regulate and control the activities on bigger projects whereas environmental problems could also be traced to the smallest development action. It is obvious that environmental problems are cumulative impacts arising both in the small, medium as well in advance projects.

The need for construction managers to avail themselves with environmental problems on site will promote conducting EIA for each worksite whether it is for building construction or civil engineering works. This in turn can be part of the management programme for activities to reduce the environmental burden in construction. Thus, it is necessary and inevitable for dynamic construction managers to study and understand the environmental problems on a particular site. EIA as a building project management tool will aid the managerial skills of the managers to achieve better judgment and effective output. As a decision making tool, the value of EIA is more likely to be realized in the timely communication of information between individuals conducting the assessment and those planning the proposed action than in the writing of massive technical document that few (if any) decision makers will ever read to apply its content.

3.0 METHODOLOGY

The study adapted an approach from Rau and Wooten (1980) which revealed the behavior of impacts on construction activities in different potential impact areas, such as climate and air, water, biota, physiology, special land features and land use. Generally, in all these areas, there exists

certain degree of impact in some components, which makes it absolutely necessary to examine and re-examine each time an EIA is conducted.

Data were obtained using the checklist method. This method gives an overview of the range of impacts that can be associated with the projects being considered. Forty nine (49) environmental issues were listed to stimulate the respondents to think broadly on the likely possible effects to be considered in environmental impact assessment on any particular building project. This method helps to identify and ensure that no impact is overlooked.

The forty nine (49) environmental issues were categorized into seventeen (17) impact areas for which information was collected from seventeen (17) states across the six geo-political zones of Nigeria. Liaison officers were recruited in each of the zones to assist in the distribution and collection of the questionnaires to enhance response. Out of 170 questionnaires distributed, 150 responses were obtained. The respondents are personnel with knowledge of EIA and can assess projects for EIA compliance in the Urban Development Board, the Ministry of Environment, and the State Environmental Protection Agency. Each respondent was required to score the list of the impacts by considering whether Yes or No will the proposed project result in a specific outcome as presented in the checklist of impact areas considered (see Table 2). Simple percentages and bar graph were used to illustrate the character of the impacts.

4.0 RESULTS

The characters of decisions by EIA personnel impact with respect to the impact areas studied are highlighted in table 2 and figures 1. The value shown for each impact area is the percentage of the total number of Yes responses with respect to the likely impact outcome presented to the assessing personnel. The responses with significant outcomes are housing (86.67%), noise (82%), land use (76.67%), human health (72.67%), earth (71.33%), utilities (66.67%), public services (64%), plant life (58%), transportation (53.33%) and aesthetics (52.67%); these are indications of the critical impact areas to be considered while conducting EIA on building projects.

5.0 CONCLUSIONS

The destruction of the vegetation, energy/material wastages and noise pollution, amongst others constitutes the most visible impacts associated with building construction projects in Nigeria. However, this study reveals that building construction activities can have significant negative impacts in the following areas: housing, noise, land use, human health, earth, utilities, public services, plant life, transportation and aesthetics. This indicates that it is necessary to consider such impact areas each time an EIA is to be conducted for building projects in Nigeria.

6.0 TABLES AND FIGURES

Table 1: Global Footprint of EIA Legislation

S.No	Country	Legislation	Date
1	United States of America	National Environmental Policy Act (NEPA)	1969
2	Canada	EA and Review process	1973
3	Australia	Individual state legislation	1974
4	Columbia	National code of Renewable natural resources and protection of the environment	1974
5	Philippines	Presidential Decree No.1151	1977
6	Korea	Environmental preservation Act	1977
7	European Community Countries (ECC)	Directive 85/337	1985
8	Kazakhstan	Non-legal administrative procedures outlined in provisional instruction	1991
9	Nigeria	Environmental Impact Assessment Decree No.86	1992

Table 2: Environmental Issues for EIA of Building Projects

S. No	Impact Area	Like result of environmental impact
1	EARTH	<ul style="list-style-type: none"> • Destruction of any unique geologic or physical feature • Creation of steep slopes or other unstable earth conditions • Potential increase of soil erosion , either on or off the site • Changes in the channel of a stream, or the bed of the ocean, lagoon • Exposure of people or property geological hazards such as landslides ground failure, or similar hazards
2	AIR	<ul style="list-style-type: none"> • Substantial air emissions or deterioration of existing air quality • Creation of objectionable odors
3	WATER	<ul style="list-style-type: none"> • Changes in currents, or the course or direction of water movements, in either marine or fresh water • Changes in absorption rates, drainage patterns, or the amount of surface runoff • Alterations to the course or flow of flood waters • Discharge into surface waters or any alteration of surface water quality including but not limited to temperature, dissolved oxygen, bacteria, or turbidity? • Contamination of ground waters or wells, either from salt water intrusion or surface activities? • Change in the quantity of ground waters, either through direct additions or withdrawal, or through interception of an aquifer by cuts or excavations • Substantial reduction in the amount or quality of water otherwise available for public water supplies • Exposure of people or property to water related hazards such as flooding or tidal waves
4	PLANT LIFE	<ul style="list-style-type: none"> • Destruction of any upland or mangrove forest communities • Destruction of other important communities, such as sea grasses or plants having potential commercial value

		<ul style="list-style-type: none"> • Reduction of the numbers of any unique, rare or endangered plant species • Introduction of new species of plants into an area or result in a barrier to the normal replenishment of existing species • Reduction in acreage of any agriculture crop
5	ANIMAL LIFE	<ul style="list-style-type: none"> • Destruction of any coral reef areas • Reduction of the numbers of any unique, rare, or endangered animal species • Introduction of new animal species into an area, or result in a barrier to the migration or movement of animals • Substantial deterioration of fish or wildlife habitats
6	NOISE	<ul style="list-style-type: none"> • Increase in existing noise levels or exposure of people to severe noise levels
7	LAND USE	<ul style="list-style-type: none"> • Substantial alternation of the present or planned land use of an area
8	NATURAL RESOURCES	<ul style="list-style-type: none"> • A noticeable increase in the rate of use of any natural resources • Substantial depletion of any nonrenewable natural resources
9	RISK OF UPSET	<ul style="list-style-type: none"> • A risk of an explosion or the release of hazardous substances including but not limited to oil, pesticides, chemicals or radiation, in the event of an accident or upset conditions • Possible interference with an emergency response plan
10	POPULATION	<ul style="list-style-type: none"> • Relocation or altered, distribution, density, or growth rate of the human population of an area
11	HOUSING	<ul style="list-style-type: none"> • Changes in existing housing or create a demand for additional housing
12	TRANSPORTATION	<ul style="list-style-type: none"> • Generation of substantial additional vehicular movement: Substantial impact on roads and existing transportation system • Alteration to present patterns of movement of people and/or goods
13	PUBLIC SERVICES	<ul style="list-style-type: none"> • result in the need for new or altered services in Police or fire protection • result in the need for new or altered services in Schools • result in the need for new or altered services in Parks or other recreational facilities • result in the need for new or altered services in Hospital • result in the need for new or altered services in Other Government services
14	UTILITIES	<ul style="list-style-type: none"> • result in the need for new systems, or substantial changes in Power • result in the need for new systems, or substantial changes in Communications • result in the need for new systems, or substantial changes in Water • result in the need for new systems, or substantial changes in Sewage Disposal • result in the need for new systems, or substantial changes in Solid waste disposal
15	AESTHETICS	<ul style="list-style-type: none"> • Obstruction of any scenic vista
16	RECREATION	<ul style="list-style-type: none"> • Change in the quality or amount of existing recreational

		opportunities
17	CULTURAL RESOURCES	<ul style="list-style-type: none"> • Alteration or destruction of archaeological sites • Adverse physical or aesthetic effects to a historic site • Potential to cause a physical change which would affect unique cultural values • Restriction of existing religious or sacred uses within the affected area

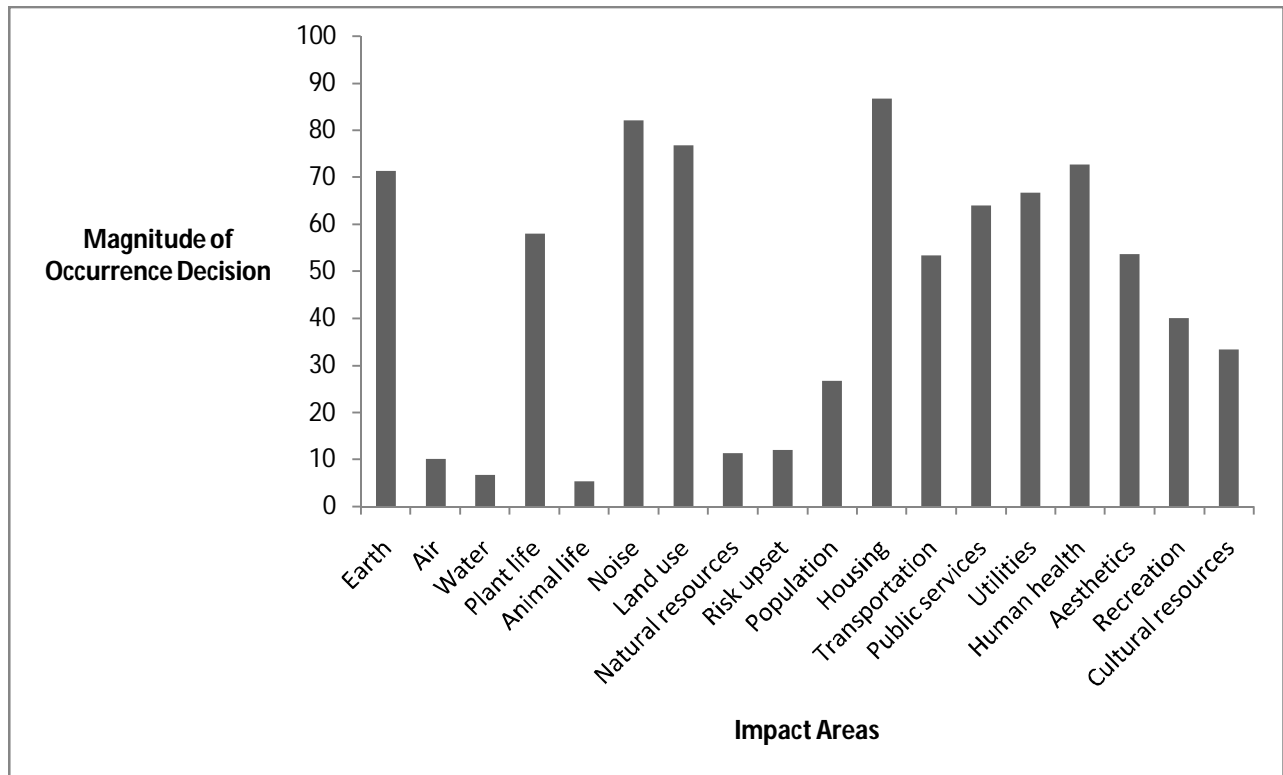


Figure 1 - Magnitude Decisions Environmental Impact of Building Construction based on Knowledge of EIA

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