

Environmental implications of residential to commercial land use succession on formal housing stock: A conceptual analysis

Olubukunmi Temitope Makinde^{1*}, Olusola Oladapo Makinde², Timothy Tunde Oladokun³

¹Department of Estate Management, Osun State University, Osogbo, Nigeria

²Department of Architecture, Ladoke Akintola University of Technology, Ogbomoso, Nigeria

³Department of Estate Management, Obafemi Awolowo University, Ile-Ife, Nigeria

E-mail: *bukunmakinde2019@gmail.com*

Abstract. This study investigates the environmental implications of land use succession on formal housing stock. It pursues to provide information that will assist in reducing or total elimination of the negative environmental impacts of land use succession on formal housing stock with the aim of enhancing housing and property investment decisions. The study methodology relied primarily on past issues relating to the environmental implications of residential to commercial land use succession on formal housing stock. The study looked at the concepts and theories related to the study. The study also examined Nigerian organizations and legal frameworks in charge of environmental activities. The study observed that the environmental implications resulting from residential succession by commercial land use among others includes; population displacement, traffic congestion, air pollution, noise pollution, water erosion, waste management issues, and climatic changes. The study suggests that the city's relevant government entities should regulate, monitor, and control land use succession. Commercial and residential zones should be clearly defined in land use policies. There should be a sound legal framework for urban cities and more effective and efficient land use monitoring and management methods. In addition, individual land owners and investors/developers should be informed about the negative environmental impacts of land use succession on formal housing stock, thus preserving formal housing by reducing or eliminating population displacement and other negative environmental impacts.

Keywords. Environmental implications, residential to commercial land use, land use succession, formal housing.

1. Introduction

Land use successions in general have received wide coverage across the world over the past few years [1]. This became so serious, especially after noticing that the land is continuously being exploited at will for economic gain without considering the environmental impacts of such succession. Increased population, industrial activities, and economic expansion have resulted in urban sprawl [1], with environmental consequences accompanying land use successions, particularly from residential to commercial. One cardinal notable issue is the tens of thousands of square miles of open land and existing dwellings being taken over annually for business, which has further resulted in less formal housing stock alongside increased congestion and widespread environmental impacts in residential areas, similar to the Central Business Districts ([1-3]). The negative environmental impacts of land use succession resulting from residential to commercial land use on formal housing undermine the aim of housing, reducing its capability to satisfy the requirements of its population equitably (Moser, 1996). Reference [4] stressed that "citizen deserves a decent housing that is affordable, reduces stress, toxins and infectious diseases, thereby reducing public health hazards". From this perspective, housing and property investment decisions become imperative.

Observations in most centres of urban cities in Nigeria, such as Lagos, Kaduna, Port-harcourt, and Osogbo, among others, especially in their current form, have shown that there are continuous variations in land use from formal housing to various uses, especially to commercial uses. Reference [5] asserted that one land use tends to succeed another, where there is no control of such use. Land use succession in these urban centres has been a result of an increase in the demand for commercial property. Land use succession has become a common occurrence in these cities, which has been enhanced by the activities of property developers that concentrated on converting existing houses to commercial properties, thereby neglecting and reducing the stock of residential properties [2].

However, because of this succession of residential uses by commercial, there have been some environmental impacts on formal housing. These environmental impacts limit the functionality and quality of formal housing. Findings from past studies have shown that the majority of the people have been displaced due to environmental impacts [6]. Environmental impacts of residential to commercial land use succession have led to displacement of the population. Reference [7] established that the negative environmental impact of land use succession reduced its ability to equitably support the needs of the population. Investigation of the environmental implications of residential to commercial land use on formal housing stock will assist in preserving formal housing, thereby reducing or eliminating population displacement and other negative environmental impacts. Furthermore, this study will provide information to all land stakeholders with the aim of enhancing housing and property investment decisions. Furthermore, this study will provide information to all land stakeholders with the aim of enhancing housing and property investment decisions. Furthermore, Reference [8] noted that knowledge about the environmental implications of land use succession will help mitigate negative environmental impacts on residents. If proper attention is not paid to the issue of indiscriminate succession of residential by commercial use, the goal of the housing, which is to offer a balanced, pleasant, and attractive environment, may be undermined. Furthermore, Reference [9] established that examining environmental impact will help in devising appropriate management strategies to minimise wastage.

The increasing level of population displacement, traffic congestion, air pollution, noise pollution, water erosion, waste management, and climatic changes associated with land use succession are undesirable developments that have led to discomfort and environmental problems. However, the succession of residential stock by commercial uses often leads to a scarcity of housing facilities for residential purposes, and residents of residential dwellings are forced to relocate in search of alternative accommodation. Reference [10] in Dadin Kowa, Jos, Nigeria, investigated the re-evaluation of succession and invasion of land use/land cover changes. This study discovered that succession and invasion are critical to the global increase in land use and land cover (LULC) changes. Notwithstanding its worldwide significance, land use management decisions have paid less consideration to the environmental implications of succession and invasion in LULC shifts. The study shows that data on LULC change should be made readily available to planners and policymakers for towns and cities to accomplish successful spatial planning and management.

Reference [2] investigated the trend of residential land use commercialisation and rental value in Osogbo, Nigeria. The study assessed the impact of property use conversions from residential to commercial uses in order of rental trends of converted or commercialised two and three-bedroom apartments as well as tenement buildings.

Dings along the Gbongan road, an area previously characterised by residential development in the Osogbo metropolis. The study's findings found that residential land use commercialisation was more prevalent along key arterial highways, resulting in an immediate reduction of the area's available residential housing stock. Although converted or commercialised properties attracted greater rental values, their failure to comply with state planning requirements resulted in city distortion. Reference [11] theorised the links between official and informal housing markets in low- and middle-income nations. This study presented a paradigm for analysing the linkages between official and informal housing markets, both at the municipal and individual levels, in terms of the mechanisms that link the two housing markets. The framework outlines the factors that connect formal and informal housing markets at the city level, such as competition, dis-amenity or negative spillover, and redevelopment or positive spillover. The study indicated that because of the structural complexity of the housing stock and the uncertainty of the future pace of change, thorough comprehension is difficult to attain.

Reference [12] investigated the analysis of land use succession and property value in Ile-Ife, Nigeria. This study examined the relationship between rental value and forms of land use succession in the study area as well as trends in property rental values between 2002 and 2016. This was done to provide information that could help with real estate investing decisions. The findings from the study established that residential to commercial was the prevalent type of land use succession. The study also established that land use succession has affected the master plan of the area. The major effects identified in the study were increased rental value, pollution, and traffic congestion among others. The study recommended that property owners should seek town planning and land services approval before embarking on land use succession of any type. In addition, the enabling law should assist in monitoring, guiding, and regulating development on land. The study sparingly discusses the environmental implications of this land use succession. Reference [13] investigated the impact of land use succession on real estate transactions in Ilorin. This study investigated the pattern of land use succession as well as the factors influencing land use succession. According to the study findings, residential to commercial land use succession was the most prevalent form of land use succession. It was also established that the land use succession nature included additional floors on existing floors and internal modifications. In addition, the linear pattern was growth and development. It concluded that there was a need to meet the increasing demand for commercial space. The study is limited in the area of environmental implications of land use succession.

Reference [14] examined the impact of environmental elements on the choice of residential location by property buyers in Poland. This study identified the reasons responsible for Polish residential location preferences of property buyers, including single-family houses and apartments. The study assessed the quality of their living environment and identified environmental elements that could impact their well-being. This study provided new information on consumers' environmental awareness and the need for environmental education changes. Furthermore, the study revealed that the most highly listed environmental factors by respondents were bad smell, illegal waste dumps, proximity to green areas and leisure grounds, traffic noise, air pollution, and nature conservation areas in the neighbourhood. The findings indicated favourable changes in property owners' attitudes, with more likely recognition of the relevance of environmental elements and their influence on inhabitants' health and quality of life. Furthermore, the study found that the quality of the residents' living environment influenced their health. The report recommended that the following environmental protection actions be implemented in the following order: support for alternative modes of transportation, enhancements in the quality of air and drinking water, sewer connexions, waste sorting, eradicating local sources of air pollution, landscape protection, reduced use of hazardous procedures as well as toxic chemicals in agriculture, and construction of noise barriers are all examples of ways to improve the quality of life in one's current location. Other proposed remedies included financial assistance for organic farms, increased security surveillance, traffic speed regulation, event planning for the local community, and a greater influence over outdoor advertising and visual pollution. Other proposed remedies included financial assistance for organic farms, increased security surveillance, traffic speed regulation, event planning for the local community, and greater influence over outdoor advertising and visual pollution. This study did not examine the environmental impact of residential to commercial land use succession on formal housing stock. The environmental impacts were examined on the property buyer based on the choice of residential location.

Reference [15] investigated the arbitrary shifts of urban residential to commercial uses, such as shops and light industrial operations, with the goal of identifying and addressing key variables that drive change in use. More specifically, this study investigated the causes and consequences of problems related to this change in use in relation to the impacts and repercussions of usage on the neighbourhood. The study discovered that property owners responded mostly to demand,

but the consequences of this tendency are far-reaching. The report concluded by advising the government to be more aggressive in ensuring strict adherence to planning laws. Research on the environmental impacts of land use succession on formal dwelling stock is scarce.

Reference [16] investigated the impact of environmental conditions on property values. The study discovered that the environmental qualities of a certain place, such as neighbourhood amenities, parks, and a sense of security, influenced residential property prices. According to the study, the top environmental elements influencing property prices include greenery, surface water, noise impacts, and landscape aspects. According to the study, projected property prices in places with high environmental values were higher than those in areas with low environmental values. This study did not investigate the influence of environmental factors on formal housing stock as a result of residential-to-commercial land use succession.

Reference [17] studied the implications of residential to commercial land use shifts on Lusaka's official housing stock. This research focuses on the areas in the city, which are closer to the central business district, otherwise known as town centre, where there are continuous changes in residential land use to other uses, especially to business uses. According to the survey findings, profit maximisation resulting from increased demand for commercial space uses, and physical ageing of residential building structures leads to obsolescence. These factors contribute to sudden land use changes from residential to commercial in Lusaka city. The analysis also found that there is no sufficient regulatory framework or monitoring in the area to prevent the conversion of existing land use structures. The study concluded that the impacts of residential use on commercial land use succession range from a reduction in formal residential stock, high rental prices, abuse of land, challenges in physical development, and challenges emanating from developmental control. This study was limited in the aspect of examining the environmental impacts on formal housing stock.

However, most of the existing studies both in Nigeria and outside had succeeded in establishing the impacts of land use succession on property value, which is the economic aspect of the impacts, without investigating the need to examine the environmental impacts of succession of residential by commercial land use on formal housing stock. Therefore, existing studies have not been able to establish the need to examine the environmental impacts of residential to commercial land use succession on formal housing stock. Hence, there exists a gap that this study intends to fill. It is therefore vital to examine the environmental implications of residential to commercial land use succession on formal housing stock in urban cities.

2. Literature Review

2.1 Concept of Land

Land is a valuable commodity that can be used for various purposes. Land is one of the most important natural resources on which all human activities rely [18]. Land also denotes space; it is a physical entity alongside spatial nature and topography that is frequently associated via monetary worth, represented by prices per plot, right transfer, and hectare of possession. However, the qualities and attributes of land include: structural, topographic, agricultural and the climate; The site's mineral resources; water; an abundance of clean air; and surrounding environmental attributes such as aesthetic beauty, quietness, privacy, and safety among others [19].

2.2 Concept of Land Use Succession

Land use succession refers to any development or use that differs from the most recent use allowed by the planning authority. Variations in the primary usage of a certain area or neighbourhood over time are referred to as land use succession. More specifically, land use succession refers to a shift in the use of land or buildings. Land use succession refers to the use of land or buildings for purposes other than those for which they were originally zoned and intended [20]. Decisions to use land for a certain purpose, and the demand for land at different times, are susceptible to change. Households and business organisations may need to expand at some point in time, which may necessitate relocating or redeveloping existing structures. In addition, there exist unavoidable processes of obsolescence and reconstruction. Because of the diversity of human activities, numerous land uses exist, with specific land use defined by geography, climate (past and present), social and religious customs, legislation and legal choices, needs for products and services (including varying levels of demand), and the policy of local and federal government in terms of building and land supply.

Invasion precedes this succession process. Invasion is the penetration of one land use by another due to economic, social, and cultural differences between the old and new, which may eventually lead to the invading land use succeeding the old. This invasion and succession strategy results in the greatest and best utilisation of land. This phenomenon is typically caused by the characteristics of land resources shifting to uses that provide the maximum return for the usage of net income that is fundamentally limited to a parcel of land [15].

2.2.1 Succession Theory

Theories by Burgess, Sector, and Hoyt presumed that over time, as the highest and best use evolves, urban expansion will result in a succession of diverse land uses. Commercial areas, for example, that are currently confined by other immediate uses will eventually expand only through the purchase and development of neighbouring uses, transforming their character to that of commercial property [21]. This land use succession applies to residential real estate properties and may occur when needs arise from other land users for acquisition purposes. For instance, people who live in older

but initially expensive residential buildings close to a growing and rising commercial sector may examine the possibility of upgrading, restoring, and reconstructing their homes, but they frequently decide to sell instead. In addition, the concept of synergistic land use relationships as incorporated by Hoyt's theory observed that having similar land uses next to one another has an advantage. For example, industrial property will typically be located next to other industrial property, whereas residential property will be located next to residential property. This reinforces the "interchange" qualities of being near comparable land uses while minimising the negative impacts of unharmonious uses being adjacent to each other Hoyt, as cited in [21].

2.3 Factors Influencing Land Use Succession

A change of use is the use of land or buildings for an intention other than that for which they were originally zoned and intended. Thus, changes in usage are caused by various variables, the majority of which are economic in character. However, at the advanced level, change of use is identical to an increase in the intensity of use, which is prompted by an increase in demand. An increase in commercial property demand is followed by an increase in business activity. These two elements are inextricably linked, as an increase in the demand for commercial property would result in an increase in business activity in any particular place [15]. This expansion has created conflict between finite resources (land) and the ever-increasing uses for which it is used [2]. Unplanned shifts in usage also impact the housing situation. This is due to the fact that very few places are presently available for residential use due to succession by other uses, intensifying the housing scarcity situation [2,15].

In addition, maximising the return on investments or conforming to present economic realities and meeting up with neighbourhood trends (competition) by the property owner is another factor. To remain competitive and avoid being left behind, the majority of property owners in the area altered the use of their land from residential to commercial. They typically imitate the behaviour of people in their neighbourhood thereby leading to a housing shortage [15].

2.4 Concept of Formal Housing

Housing, all over the world, constitutes a significant characteristic of societal well-being, having a substantial impact on the basis of their economic and social lives [22]. Citizen deserves affordably priced housing that minimises stress, pollutants, and infectious diseases, thus lowering public health risks [4]. It is also frequently used as a reflection and a sign of social standing [23]. Residential real estate, in addition to delivering homes for families, is frequently the main source of wealth and savings for many households [24]. Housing is not just a representation of a household's economic standing, but it is also a major economic activity that can account for a large amount of GDP ([24,25]).

Formal and Informal housing are important in developing-country housing markets. Formal housing is defined as a dwelling with a valid legal title that is structurally sound and complies with local planning standards and construction laws and can be pledged as collateral for a long-term mortgage loan [26]. In Nigeria, formal housing is defined as standardised and controlled housing that is frequently well supplied by infrastructure and is usually found in cities [24]. Formal dwelling (housing) is a residential property for which the acquisition, development, and allocation of property right comply with regulatory requirements. Therefore, ownership of formal housing is a residential property with approved building plans for which the owner or occupant has rights to the land and performs the legal requirements to maintain the property. In the case where property is rented, legal rental status is achieved when the registered owner of the property issues a lease to the occupant [27]. Formal housing residents have defended and documented rights (property registration documents), which are known as *de jure* rights [26].

The informal dwelling, as defined by [28], refers to those that are erected on unregulated places and are not fully provided with good infrastructure, and is mostly found in rural and suburban areas of the country. Although certain informal housing developments may have economic value and generate money, the risks associated with their informality make them less mortgage-worthy ([24,25]). Informal housing residents may be in violation of municipal development plans or land restrictions because they lack part or all documentation. As a result, people may be evicted or have their homes razed. Informal housing encompasses a wide range of housing types, ranging from unlawful housing where residents have undisputed ownership of the land and tolerance by the government, implying *de facto* rights to use and transfer their residence to other users [26].

2.5 Concept of the Housing Stock

"Taking stock" is English idiom derived from the practise of shopkeepers counting and appraising the number of things in their possession. Housing stock, also known as housing stock, refers to the total number of residences (houses, bungalows, flats, maisonettes, and apartments) in a certain area, region, or country that are classified as domestic or mixed for rating purposes [29]. The phrase "housing stock" refers to the number of existing dwelling units based on Bureau of the Census statistics and refers to a particular period of time [30]. Reference [31] observed that Houses, specialty houses, flats, service rooms, and other residential rooms in other structures used for living are all included in the housing stock, independent of ownership type. Houses with basic facilities express the comfort level of the housing stock and by extension, the quality of the dwelling. Housing stock statistics are frequently linked to housing supply (Designing Buildings, 2023). Estimates of the total housing stock are typically obtained from previous year census data by combining address information for households with information provided by householders in response to census questions [32].

2.6 Concept of the Environmental Impact

An environmental effect is defined as any change to the environment, whether negative or positive, caused by the operations, goods, or services of a facility [33]. In other words, it is the impact of human activity on the environment. When volatile organic compounds, for example, are released into the environment, the result is pollution in the form of smog, which can be considered a negative impact. It can also go the other way, with a person picking up litter having a positive impact on the local environment [33].

2.7 Land Use Succession and Environmental Impacts

Land use succession has been extensively documented to cause a variety of environmental impacts at lower spatial levels in urban, suburban, rural, and open space areas. Of special significance are land use successions that occur on the outskirts of large urban concentrations that are subject to urbanisation and industrialisation pressures, which often result in the loss of residential uses [19]. Environmental effects (impacts) include changes in the area's hydrological balance, an increase in the risk of floods and landslides, air pollution, water pollution, and so on. Other local effects of land use succession include soil erosion, sedimentation, soil and groundwater degradation, salinisation, and the erasure of the original inhabitants. The significance of these consequences is not limited to the immediate region of interest, as they are typically cumulative because of numerous individual land and property owners' decisions to act in their narrow self-interest. Furthermore, land use succession in one location may have environmental consequences in other distant areas. For example, urbanisation or tourism development in one area raises the demand for water supplied by another [19].

National energy policies often articulate their aims through specific target values for certain groupings of buildings. Heating energy, electricity consumption, primary energy, and CO₂ output should be examined in more recent research if a residential structure is converted into a commercial building [34]. Recognising the need to minimise energy consumption in the housing sector has resulted in studies investigating how much energy buildings consume, predicting how consumption patterns will evolve, and determining how energy reduction strategies could be implemented [34]. The transformation of existing buildings is a critical issue in terms of energy and air pollution (greenhouse effect) [35]. There is a need to understand how future consumption objectives may be met, which are often predicated on the premise that land use succession would result in increasing energy requirements. The critical challenge is predicting how energy efficient the modifications will be. As a result, employing energy forecast models will provide a logical explanation for the transfer of residential stock to commercial buildings. Energy-related problems and building descriptions will create data on the larger building stock and its development [35].

The volume of construction waste in urban centres has become a major concern for politicians and regional planners. Landfill sites have become scarce, and water and soil requirements have tightened. Building waste is generated through new construction, renovation, and destruction, all of which result from a change in usage [36]. Building waste forecasting is mainly based on trend analysis. This is really troublesome because the basic data on current waste are untrustworthy. Furthermore, the volume and composition of future waste are determined by current and projected rehabilitation rates, as well as the composition of the dwelling stock [36,37].

It is necessary to estimate how new lifestyles affect Nigeria's overall environmental impact. Conversion concerns are typically disregarded in studies. Most analyses also assume a high rate of succession, implying considerable compensation requirements for new buildings. The assumed life periods of buildings are used to calculate the succession rates [34]. The causes of succession are multifaceted [38] and have little to do with the age of the structures. Instead, the primary drivers of succession are functional and formal obsolescence, and shifting land values [39]. Environmental health repercussions, and those from other sources, can be integrated using novel measures such as health burden [40].

Unplanned changes in use have environmental consequences for the housing situation. This is because relatively few places are currently available for residential use, as succession by other uses has set in, worsening the housing scarcity situation. This succession of various applications has resulted in a scarcity of residential dwelling facilities [15]. Residents of residential houses have little choice but to search for alternative housing. The increased volume of traffic caused by the change in use has created issues that the government must address with limited resources. However, the traffic problem is an undesirable development that has created nuisances, and this condition must be addressed [15]. Proximate controlling sources are the aggregate final actions that result from the interaction between the human driving and minimising forces that lead to environmental transformations, either through the use of space, the output of waste (solid waste, emissions, pollution, etc.), or the output of products that affect the environment (e.g., cars, plastic bags). Other examples of nearby sources include species transfer, drainage, site abandonment, proliferation of cultures that promote erosion, urbanisation, suburbanisation, urban periphery development, and fire [41].

2.8 Positive and Negative Environmental Impacts of Land Use Succession on Housing Stock

It should be emphasised that most land use succession consequences are anticipated to be negative. This is not always the case; whether an impact is positive or negative is determined by human mitigating forces such as environmental, social regulation and policies, land rehabilitation projects, and similar actions that may impede the adverse impacts of human driving forces and thus mitigate, if not eliminate, the unwanted consequences of land use succession [42]. The quality and condition of the surroundings essentially influences residential property assessment. This, however, impacts and influences the formal housing stock [16]. For instance, high electricity usage was observed in the study with less corresponding supply, which might affect both the business activities and living conditions of the residents in the

neighbourhood.

Population displacement has been identified as an environmental element that must be examined to determine the potential influence of environmental deterioration in population movements away from areas undergoing environmental stress [6]. Human safety and any aspects that may pose hazards to human health, welfare, and well-being in each geographic area must be considered. Another significant environmental problem is air pollution, which is caused by excessive traffic, proximity to manufacturing or other air polluting plants, and so on. Noise pollution, particularly from aircraft and strong traffic are sources of air pollution [16]. There is a need to examine these environmental factors with emphasis on the distribution and compatibility of uses, and the protection and enhancement of housing stock. Other environmental impacts as a result of land use succession on formal housing stock include: open space networks; town and neighbourhood safety, and technical characteristics such as lighting and accessibility ([43,44]).

Furthermore, succession of residential by commercial land use might also lead to higher energy needs, waste generation, water usage, and traffic congestion among others ([36,45]). Most importantly is the forecast of the manner in which these changes will actually be as a result of succession of residential by commercial land use and the impacts it might have on formal housing stock. There is a need to understand how future consumption requirements could be met, often based on assumptions that land use succession puts demand on current urban infrastructure based on intensity of use, resulting in housing scarcity for residential reasons. Findings on the environmental consequences of land use succession from residential to commercial activities revealed that while commercial activities are economically beneficial to households' annual aggregate income, they have a disproportionately negative impact on the environment due to air and noise pollution generated by traffic and other production activities, as well as sophisticated respiratory health problems. As a result, responsible institutions and planners should concentrate on the multifaceted impact of commercial operations and production on environmental concerns and complicated health problems, particularly in the nearest populations.

2.9 Influence of Environmental Factors on Residents

Reference [46] concentrated on geospatial applications for environmental health research, such as environmental justice challenges, health inequities, air and water contamination, and infectious illnesses. According to the findings of the study, urban sustainability and regeneration plans focussed mostly on man-made components of the urban environment. In comparison, the natural components and green spaces of urban structures continue to receive little attention [47]. Air pollution was the greatest health hazard identified by the residents, followed by increasing traffic and a lack of access to sewage treatment plants. The study also showed that residents in the region were more aware of the risks associated with soil pollution or erroneous agricultural practises.

In the group of non-economic elements, neighbourhood and scenic value were recognised as the most important predictors. Middle-aged respondents valued environmental and social variables (scenic value and prestige) more than older respondents, which might be linked to cultural influences, and younger inhabitants, who prioritise economic aspects [14]. Reference [48] took a more holistic approach to environmental challenges, recognising that poor waste management techniques could contribute to water and soil degradation. Air quality, including disagreeable scents, was the most highly scored environmental aspect. A survey conducted in the region yielded similar results, with rubbish dumping ranked as the most significant environmental issue.

3. Concept of Environmental Impact Assessment (EIA)

The "environment" is defined as the surrounds; the complex of physical, chemical, and biological elements that impact the form, function, and survival of a living system; the biophysical realities that regulate everything on Earth. The "impact" is defined as a strong touch; a significant effect of one object on another [49]. Environmental impact assessment in Nigeria was studied by [50]. The study defined Environmental Impact Assessment (EIA) as an important decision-making tool in development projects, as well as a systematic process for identifying, forecasting, and evaluating the environmental effects of proposed actions and projects; the process is used prior to major decisions and commitments being made. Environmental impact assessment (EIA) is a study of the potential positive and negative effects of a proposed project on the environment. Reference [51] also defined environmental impact assessment (EIA) as the formal appraisal process for identifying, predicting, evaluating, and justifying the ecological, social, and related biophysical effects of a proposed policy, programme, or project on the environment.

Globally since the 1972 Stockholm UN Conference on the Human Environment, this established the link between under development and environmental integrity. Nigeria is one of the few developing countries with particular relevant legislation, which was passed in 1992; as a result, the environment is severely endangered by a variety of issues, some of which are caused by construction project activities [52]. The United Nations Environmental Programme issued an impartial assessment study in 2011 proving that decades of oil and gas exploration and production by international oil companies have resulted in serious contamination of the Niger Delta ecosystem [53].

The dumping of hazardous waste into Koko Port in 1989 precipitated the formulation of two major environmental decrees by the federal government of Nigeria; prior to this period, the government had been adamant about the need for a solid legal framework to ensure a sustainable environment [54]. The Federal Environmental Protection Agency (FEPA) decree No. 58 of 1988, revised in 1992 as decree No. 59, was enacted because of toxic waste disposal. In addition, Harmful Waste Decree No. 42 of 1988 was enacted to regulate hazardous waste disposal. The core of these decrees subsequently led to the development of several bodies and legislative frameworks in the country dealing with environmental issues [54].

3.1 Environmental Impact Assessment and Sustainability

Environmental Impact Assessment (EIA) has grown and become a necessity for large projects in many countries, including Nigeria, to achieve sustainable development and reduce poverty levels of people affected by projects [55]. To be sustainable, development must address the increasing demands of current and future generations. To achieve sustainable development in any activity in Nigeria, EIA is a critical instrument for integrating environmental considerations into the development process [56].

3.2 Methods for Assessing Environmental Impacts

The environmental impact is a particular action that may be studied using a life cycle assessment, which is the process of studying a product from its “cradle to grave” and assessing the impacts connected with it at each phase [33]. These procedures are somewhat subjective and resource costly [33]. Emission inventories, for example, can measure pollutant emissions; however, risk assessments can examine the consequences of these pollutants on the health of those in the environment. Process hazard analysis involves identifying and assessing the potential consequences of unforeseen hazardous materials. A team may rank the potential dangers and focus on preventing those that can cause the most harm [33].

3.3 Environmental Impact and How It Is Measured

The influence of human activities on the environment in the form of environmental imbalance is referred to as environmental impact. Air pollution, water pollution (seas, rivers, and groundwater), soil pollution, waste generation, noise pollution, ecosystem destruction, and biodiversity loss are some of the most common environmental consequences. The environment has a direct impact on human well-being [49]. Therefore, it is critical to measure, plan, and minimise action that may disrupt the environmental balance. All human activities impact the environment. Some have irreversible environmental consequences, such as pollution and habitat damage. Furthermore, as the human population expands, natural resources are depleting. Improving the sustainability of human growth is becoming increasingly vital, and it is critical to quantify, reduce, and compensate for these adverse effects [49].

The COVID-19 pandemic is just one example of how human well-being is inextricably tied to environmental balance [49]. As the pandemic continues to claim lives and devastate economies worldwide, the United Nations warns in a new study that “we must unite human, animal, and environmental health to prevent the next pandemic.” During the report’s presentation, Inger Andersen, Executive Director of the United Nations Environment Programme (UNEP), stated that “science has made it clear that, if we continue to destroy our environments, in the coming years we will see a continuous flow of diseases in our society” [49]. Any project that may have a significant environmental impact must be assessed. The Environmental Impact Assessment was intended to examine such environmental effects and was based on sustainable development indicators [49].

3.4 Environmental Laws in Nigeria

Nigeria (Africa’s most populous country) has been independent since 1960 and has a land area of 923,768 km² with various climates and seasons. Her current estimated population is around 182,202,000 million people, up from 140,431,790 million people in 2006, while agriculture was the economic basis before 1970, before the advent of oil [55]. As a result of the illegal dumping of toxic wastes in Koko, in the former Bendel State, in 1987, the Nigerian government enacted the Harmful Wastes Decree, which establishes a legal framework for the effective control of the disposal of toxic and hazardous waste into any environment within Nigeria’s borders. In 1988, the Federal Environmental Protection Agency (FEPA) was established as a regulating authority [57].

FEPA is a regulatory agency in charge of safeguarding and enhancing the Nigerian environment. It also implements a National Policy produced as the primary document for the preservation and conservation of Nigeria’s environment. Furthermore, in 1989, a National Policy Plan (NPP) was released to attain sustainable development [58]. This advancement is consistent with sectorial rules such as the National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes, Regulation of 1991). As a result of the regulation, EIA became mandatory only when requested by FEPA; thereafter, EIA became an essential prerequisite for the effective implementation of national environmental policy, and it was further directed that EIA be made mandatory for all development projects beginning in March 1991. The body also mandated environmental auditing for all existing industries throughout the country [58].

3.5 Challenges and Constraints of Environmental Impact Assessment in Nigeria

Experience, particularly about infrastructure projects, has revealed that EIAs are rarely carried out before the approval of most projects in Nigeria. As a result, building development projects in Nigeria have both direct and indirect environmental implications (Ijigah et al., 2013). In Nigeria, EIA is being delayed because of the shortcomings and misinterpretations of several regulatory regulations. Because there are too many regulatory organisations, there is duplication of roles and overlapping responsibilities in the processes and procedures governing the execution of the numerous impact assessment activities [52].

Among the issues of EIA, Reference [56] identified a lack of credibility and openness, the absence of effective sanctions, and abuse of the exclusion clause in the EIA statute. During the 21-day public presentation of EIA drafts, a considerable proportion of the Nigerian population was unaware of EIA provisions and their rights to object to potentially harmful environmental projects. Nigeria suffers from severe environmental degradation because of pollution from the oil and gas industry [59]. Burning coal to generate steam for electricity is another source of environmental impact. Greenhouse gases (GHG) are produced in large quantities, causing local environmental damage [52]. These are the difficulties that are threatening the standard of the environment and the ecosystem as a whole; thus, the use of EIA is unavoidable.

Many small and medium-sized companies (SMSE) generate hazardous wastes, such as lead, from small-scale lead mining in Zamfara State, Northern Nigeria, which resulted in 163 deaths, including 111 children, and 355 cases were detected. An investigation revealed that the people were digging for gold at the time of their deaths in an area where lead was abundant [55].

3.6 Basic Principles of Environmental Impact Assessment

These 14 parts form the essential concepts of environmental impact assessment, as noted by [59,60]. These are some examples: targeted-the process should focus on substantial environmental consequences and key issues, i.e., the ones that must be considered when making decisions. The process should be purposeful in that it should influence decision making and result in adequate levels of environmental protection and community well-being. Practical: The process should produce information and outcomes that aid in problem solving and are acceptable to and implementable by proponents. Rigorous: The procedure should use “best practicable” science, utilising methodologies and techniques relevant to the problems under investigation. Cost-effectiveness entails achieving EIA objectives within the constraints of available information, time, resources, and methodology. Relevant: The process should provide adequate, trustworthy, and usable information for development planning and decision making. Interdisciplinary: The process should ensure that appropriate techniques and expertise in the relevant biophysical and socioeconomic fields are used, including the application of traditional knowledge where applicable. Efficient: The procedure should impose the least amount of financial and time stress on proponents and participants while achieving established EIA rules and objectives. Credible: The process should be conducted with professionalism, diligence, fairness, objectivity, impartiality, and balance, and it should be subject to independent checks and verification. Adaptive: The process should be iterative, including lessons acquired throughout the proposal’s life cycle, and modified to the facts, issues, and circumstances of the proposals under review without jeopardising the process’s integrity. Integrated: The process should consider the interdependence of social, economic, and biophysical factors. Participatory-the process should provide suitable chances for informing and including the interested and impacted publics, and their inputs and concerns should be explicitly acknowledged in the documentation and decision making. Transparent: The process should have clear, simply understood EIA content standards; provide public access to information; disclose the reasons to be considered in decision making; and admit limitations and problems. Systematic: The approach should include comprehensive consideration of all relevant information on the impacted environment, possible alternatives and their implications, and the procedures required to monitor and study residual effects ([6,59]).

3.7 Advantages and Benefits of Environmental Impact Assessment

The screening and monitoring stages of EIA require specific care [61]. “The following are the primary advantages and benefits of EIA: improved project design/siting; minimised environmental damage; better informed decision-making (with enhanced potential for public participation in decision-making); greater awareness of environmentally sensitive decisions; improved integration of projects into their social and environmental settings; and increased accountability; transparency during the development process and more efficient initiatives in terms of achieving financial and/or socioeconomic goals” [62].

3.8 Environmental Injustice

The harm caused to one group by environmentally harmful actions that benefit another. Environmental injustices such as institutional racism occur in both industrialised and developing countries. When land-use planners locate hazardous waste plants in minority areas or when environmental agencies charge larger fines for hazardous waste infractions in minority communities than in white communities, injustice can occur [49]. Individual and collective reproductive and consumptive behaviour, which has resulted in amazing success as a species, is the source of human environmental effects. However, the exact factors that have allowed humanity to thrive in almost every ecosystem have also intensified our influence on those settings [49].

3.9 Bodies and Legal Frameworks Responsible for Environmental Activities in Nigeria

The Federal Government of Nigeria and several Nigerian States have established various agencies and organisations as part of the government's measures to preserve the environment and its resources, protect Nigerians from hazardous and waste ecological nuisances, and fight and prevent pollution in Nigeria. These agencies are guided by and operate in line with all Nigeria's environmental laws and legislation. The following are the list of Osun State government environmental agencies and connected agencies (federal and non-governmental organisations) in the state: Federal Environmental Protection Agency (FEPA), Federal Ministry of Environment (FMOE), and Environmental Health Officers Registration Council of Nigeria (EHORCN). Friends of the Environment Nigeria (NGO), Federal Ministry of Environment, Housing and Urban Development (FMEHUD), Forestry Research Institute of Nigeria (FRIN).

4. Recommendations

Environmental impact assessments should always have sufficient fiscal funding. Experts should study the legislation on a regular basis. Environmental sectors must be checked and balanced in the state, particularly where land use succession has taken place, to provide proper environmental monitoring and change control. The government and individuals should examine the efficient and effective application of environmental settled rules before and after projects are converted. The research also shows that the city's different relevant government bodies regulate, monitor, and control land use succession. Commercial and residential zones should be clearly defined in land use policies. In addition, individual land owners and investors/developers should be informed about the negative environmental impacts of land use succession on formal housing stock. Individual land owners and investors/developers should be subject to the law governing land use to avoid irregular and uncontrolled land use succession. It is also important to ensure that any decision on the succession of residential to commercial land use should aim towards enhancing housing by reducing or eliminating population displacement and other negative environmental impacts of such succession on formal housing stock. Residential regulations of this type include building limits, environmental zoning, restrictions on house paint colour and even lawn mowing requirements that are implemented in some towns. There is a need to encourage sustainable land management practises and support sustainable land management. In this domain, researchers must focus on developing long-term solutions to environmental contamination using technical mechanisms and scientific methodologies.

5. Conclusions

The study concludes that it is imperative to consider the need to examine the environmental impacts of residential to commercial land use succession on formal housing stock. To deal with the current impact of human activity, it is important to correctly identify the nature of human interaction with the environment and how human actions affect that relationship. Many people still believe that the environment is something that must be overcome. The keys to finding effective ways to control our impacts are identifying and comprehending the genetic importance of our activities and their repercussions on the environment, including our own social and economic systems. Ken Saro-Wiwa, an Ogoni campaigner, gave a statement soon before his execution by the Nigerian government in 1995, saying "The environment is man's first right. Without a safe environment, man cannot exist to claim other rights, be they political, social, or economic." If this kind of advice is ignored, urban towns might be seeing a new kind of development, whereby people will be migrating away from where this phenomenon is prevalent in an attempt to avoid environmental degradation and poor living situations. Many important human rights, including the rights to good health, livelihood, culture, privacy, and property, are put at risk by such degradation.

Author Contributions

Olubukunmi Temitope Makinde carried out literature review, conceptualization and methodology. Makinde Olusola Oladapo carried out supervision and interpretation and contributed in area of visualization, formal analysis, investigation and original draft preparation, writing manuscript review and editing.

Conflicts of Interest

The authors declare no conflict of interest.

References

- [1] A. O. Bhagawat, Urban growth and land use/land cover change of Pokhara Sub-Metropolitan City. *The Journal of Theoretical and Applied Information Technology*, 2, Nepal. 2011.
- [2] I. A. Ankeli, M. B. Nuhu, A. I. Sule, U. C. Ankeli, & A. T. Bello, Residential land use commercialisation and rental value trend in Osogbo, Nigeria. *International Journal of Creative Research Thoughts (IJCRT)*, vol. 8, no. 6 ISSN: 2320-2882. 2020.
- [3] UN-HABITAT, This State of Osun structure plans project, Nigeria. HS Number: HS/045/15E, ISBN Number (Series): 978-92-1-133396-1, ISBN 978-92-1-132664-2, 2014.

- [4] A. Paccoud, M. Hesse, T. Becker, & M. Gorczynska, Land and the housing affordability crisis: landowner and developer strategies in Luxembourg's facilitative planning context, *Housing Studies*, DOI: 10.1080/02673037.2021.1950647. 2021.
- [5] O. F. Nwankezie, A. N. Iroegbu, M. Alozie & K. A. Okorochoa Issues in land use allocation in Nigeria: *Nigerian Journal of Research and Production*: vol. 17, no. 2. 2010.
- [6] S. Lonergan, The role of environmental degradation in population displacement: Research report 1, Global environmental change and human security project; International human dimensions program on global environmental change. 1998.
- [7] S. C. Moser, A partial instructional module on global and regional land use/cover change: assessing the data and searching for general relationships: *Geo journal*, vol.39, no 3, pp. 241-283, 1996.
- [8] J. Wu, P. Gong, C. He, T. Zhu, L. Wang, & G. Liang, Urban sustainability assessment: the case of Beijing. *Journal of Cleaner Production*, 208, 932-944. 2019.
- [9] M. A. Montgomery, D. Balk, & S. Dhakal, The challenges of urban transition Implications of climate change adaptation in cities. *Environmental and Urbanization*, vol. 30 no. 1, pp. 5-24. 2018.
- [10] A. S. Achuen, A. I. Harir & K. F. Aleem, Re-evaluation of succession and invasion of land use/land cover changes in Dadin Kowa, Jos, Nigeria. *International Journal of Scientific and Research Publications*, vol.10, no. 9, ISSN 2250-3153. <http://dx.doi.org/10.29322/IJSRP.10.09.2020.p10592>. 2020.
- [11] I. Sukriti, Conceptualizing the connections of formal and informal housing markets in low and middle income countries, *Housing Studies*, DOI: 10.1080/02673037.2020.1831444, 2020.
- [12] O.O. Makinde, & O. T. Makinde, An analysis of land use succession and property value in Ile-Ife, Nigeria. *Randwick International of Social Science (RISS) Journal*. ISSN Online: 2722-5674, ISSN Print: 2722-5666. vol. 1, no. 1, pp. 133-151. DOI: <https://doi.org/10.47175/rissj.v1i1.17>, 2020.
- [13] O. A. Hassan, Land use succession and real estate transactions in Ilorin metropolis. Unpublished M.sc Thesis submitted to the Department of Estate Management Faculty of Environmental Design and Management Obafemi Awolowo University Ile-Ife Osun State, Nigeria. 2015.
- [14] O. O Makinde, Urbanization, housing and environment: Megacities of Africa. *International Journal of Development and Sustainability*, Online ISSN: 2168, vol. 1, no. 3, ISDS Article ID: IJDS12091805 Pages 976-993 Available on line at <http://isdsnet.com/ijds-v1n3-26.pdf>. 2012.
- [15] O. A. Ogungbemi, Factors influencing change of use and its attendant problems: Case study of Yaya Abatan Ogba, Lagos State: *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*. vol. 3 no. 6, pp. 901-906. 2012.
- [16] R. Cellmer, A. Senetra, A. Szczepańska, The effect of environmental Factors on Property Value, (paper presented at the FIG Working Week 2012 TS06H-Valuation-Environmental Factors 5748, Rome, Italy), www.fig.net. 2012.
- [17] A. Sydney, An analysis of residential-commercial land use changes in Lusaka City: What are its effects on formal Housing Stock? Published thesis submitted in partial fulfillment of the Copperbelt University requirement of the award of the Bachelor of Science in real estate studies. 2012
- [18] S. Famoriyo, Land tenure, land use and land acquisition in Nigeria. Institute for Agricultural research Ahmadu Bello University Zaria, Nigeria. 2007.
- [19] H. Briassoulis, Analysis of land use change: theoretical and modelling approaches <http://www.rri.wvu.edu/WebBook/Briassoulis/contents.htm>. 2015
- [20] A. O. Olayinka, Factors influencing change of use and its attendant problems: case study of Yaya Abatan Ogba, Lagos State. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)* vol. 3, no 6, pp. 901-906, (ISSN: 2141-7024. 2012.
- [21] J. McDonagh, Theories of urban land use and their application to the Christ church property. *Market Property and Land Economy Institute of New Zealand Newsletter*. 2015.
- [22] P. Wakely, Sustainable urban housing policies in the era of post-covid climate change mitigation, *International Journal of Urban Sustainable Development*, DOI: 10.1080/19463138.2022.2055298. 2022.
- [23] N. Ngwenya, & L. R. Cirolia, (2021). Conflicts between and within: the 'conflicting rationalities' of informal occupation in South Africa. *planning theory & practice*, vol. 22 no. 5, pp. 691-706, DOI: 10.1080/14649357.2020.1808237.
- [24] R. S. Aliyu, Addressing housing deficit in Nigeria: issues, challenges and prospects. *CBN Economic and Financial Review*. vol. 57, no 4, pp. 189-200, 2019.
- [25] R. Lahoti, A method to measure perceived tenure security in low income settlements in India, *International Journal of Urban Sustainable Development*, DOI: 10.1080/19463138.2021.1964972. 2021.

- [26] J. Vikram, C. Subhash & K. Ashish, Informal housing, inadequate property rights. Understanding the needs of India's informal housing dwellers. Omidyar Network. FSG Mumbai. 2016
- [27] O.O. Makinde, Evaluating Indigenous Environmental Consciousness for Residents of Ogbomoso in Nigerians; *Journal of Geography and Regional Planning*. vol. 9 no. 5, pp. 87-103, DOI: <https://doi:10.5897/jgrp2015.0524>. Nigeria. 2016.
- [28] B. Oyelaran-Oyeyinka, Financing affordable housing in Nigeria Issues: Issues Challenges & Prospects. In conference on affordable housing finance. Abuja. 2017.
- [29] S. H. Bayramukov, Z. N. Dolayeva, & D. H. Hatuyev, Modern technologies in the renovation of dilapidated buildings of housing stock. pp. 7-10. (<https://moluch.ru/archive/130/36200>). 2016.
- [30] O. O. Makinde, Ecological and Sustainability Issues in Earth Construction: *Journal of Environmental Science, Toxicology and Food Technology*, ISBN: 2319-2399. vol.1, no. 4, 2012.
- [31] V. Cujba, & R. Sirbu, Estimation and analysis of integrated infrastructure development indicator from the center development region localities of the republic of Moldova: *Economica*, xxv, vol. 3 no. 105, pp. 112-121. <https://ase.md/files/publicatii/>. 2018.
- [32] R., Sirbu, & V. Cujbă, Housing quality in the Republic of Moldova. *Acta Sci. Pol. Administratio Locorum*, vol. 21, no. 1, pp. 139-151. 2022.
- [33] US Environmental Protection Agency. Life Cycle Assessment [Online]. Available: <http://www.epa.gov/nrmrl/std/lca/lca.html#define> 2015.
- [34] Ikarus-Projekt Instrumente für Klimagasreduktionen. Forschungszentrum Jülich. Available online at: <http://www.fiz-karlsruhe.de/peu/ikarger.html>. 1995
- [35] O. O. Makinde, and O. T. Makinde, Public Land Acquisition and Administration in Nigeria: Issues, Strategies and Policies; *Journal of Multidisciplinary Engineering Science and Technology*. ISSN: 2458-9403 (Online) vol. 6 no 7, pp. 10381-10394, <https://www.jmest.org/wp-content/uploads/JMESTN42353003.pdf> 2019
- [36] O.O. Makinde, Environmental Factors in Housing: *Journal of Environment and Earth Science*. vol. 3, no.1, pp. 86-97, 2013.
- [37] O. O. Makinde A Review of Essential Sustainable Development Principles in Housing: The Case of Nigeria. *International Journal of Research and Scientific Innovation (IJRSI)*, vol 7, no 1, ISSN: 2321-2705, pp. 201-211. 2020.
- [38] B. L. Golton, Building obsolescence and the sustainability agenda. in CIB (Conseil international du bâtiment), Second international conference, Buildings and the Environment, Paris. 1997.
- [39] N. Kohler, U. Hassler, and H. Paschen, (ed.) *Stoff-ströme und Kosten im Bereich Bauen und Wohnen. Studie im Auftrag der Enquete Kommission des deutschen Bundestages, 'Schutz des Menschen und der Umwelt'*, Springer Verlag, Berlin. 1999.
- [40] C. L. J. Murray, and A. D. Lopes, *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries and Risk Factors in 1990 and Projected to 2020*, Harvard School of Public Health, Cambridge, Mass. 1996.
- [41] B. L. Turner II, and B. L Meyer, "Global Land Use and Land Cover Change: An Overview." In *Changes in Land Use and Land Cover: A Global Perspective*, eds. W.B. Meyer and B.L. Turner II, 3-10. Cambridge: Cambridge University Press. 1994.
- [42] B. L. Turner II, D. Skole, S. Sanderson, G. Fischer, L.Fresco, & R. Leemans, *Land-use and land-cover change; Science/Research Plan: IGBP Report vol 35, no. 7. IGBP, HDP, Stockholm and Geneva. 1995.*
- [43] L. M. Olayiwola, O. A. Adeleye, & A. O. Oduwaye, Spatial Variation in Residential Land Value Determinants in Lagos Nigeria: Paper presented at the International Conference on Promoting Land Administration and Good Governance. 5th FIG Regional Conference, 2006.
- [44] A. O. Oni, An empirical study of the Lagos State Rent Edict of 1997. *Journal of the Nigerian Institution of Estate Surveyors and Valuers*. vol. 3, no. 1, pp. 20-32. 2008.
- [45] Makinde, O.O. (2013). Environmental Factors in Housing: *Journal of Environment and Earth Science*. ISSN 2224-3216 (Print); ISSN 2225-0948 (Online) vol. 3, no.1, pp. 86-97.
- [46] J. A. Maantay, S. McLafferty, *Geospatial analysis of environmental health, series: geotechnologies and the environment*, vol. 4, no. 14, (Springer). 2011.
- [47] A. Chiesura, The role of urban parks for the sustainable city, *Landscape and Urban Planning*, vol. 68, pp. 129-138. 2004.
- [48] E. Saks, Świadomość proekologiczna mieszkańców-wpływ na środowisko i uatrakcyjnienie regionu. (Environment-friendly awareness of inhabitants-the influence on the environment and enhancing the region), *Problemy Ekologii Krajobrazu*, vol. 25, pp. 47-52. 2009.

- [49] E.W, Chu, and J. R. Karr, *Environmental Impact: Concept, Consequences, Measurement*. Elsevier, Reference Module in Life Sciences; doi:10.1016/B978-0-12-809633-8.02380-3. 2017.
- [50] A. I., Abdullateef, S. Abbas, M. G. Ali, A. I. Muhammad, S. S. Mustapha, & U. Z. Idris, Environmental impact assessment in Nigeria-A review. *World Journal of Advanced Research and Reviews*, vol. 08, no. 03, pp. 330-336. E-ISSN: 2581-9615, CrossRef DOI: 10.30574/wjarr. DOI: <https://doi.org/10.30574/wjarr.2020.8.3.0487>. 2020,
- [51] N. P. Anulika, O. Osaze, A. H. Abiola, & E.O. Ignatius, The role of environmental impact assessment in environmental sustainability of Onitsha Metropolis in Anambra State, *International Journal of Technology Enhancements and Emerging Engineering Research*. vol. 3 no. 11, pp. 109-114. 2015.
- [52] E. A. Ijigah, R. A. Jimoh, B. O. Aruleba, & A. B. Ade, An Assessment of Environmental Impacts of Building Construction Projects. *Civil and Environmental Research*. vol. 3, no. 1, pp. 93-105. 2013.
- [53] C. U. Duru, *Environmental degradation: Key challenge to sustainable economic development in the Niger Delta*. 2014.
- [54] Akamabe, U. B., & Kpae, G. A critique on Nigeria national policy on environment: Reasons for policy review. *International Journal of Geography and Environmental Management*. vol. 3, no. 3, pp. 22-36. 2017.
- [55] U. D. Onuora, A. V. Eze, & N. B. Ugboji Environmental impact assessment: A veritable tool for sustainable development in Nigeria. *Journal of Applied Chemistry (IOSR-JAC)*; vol. 10, no. 9: pp. 38-43. 2017.
- [56] O. Owoyemi, and O. Bamigboye Contemporary environmental impact assessment issues in Nigeria. *RMZ-M&G*. vol. 60, pp. 219-224. 2013.
- [57] N. Echefu, & E. Akpofure, *Environmental impact assessment in Nigeria: regulatory background and procedural framework*. EIA Training Resource Manual. pp. 63-74. 2002.
- [58] M. N. Isah, *The Role of Environmental Impact Assessment in Nigeria's Oil and Gas Industry*, (Doctoral dissertation, Cardiff University). pp. 1-193. 2012.
- [59] P. Senécal, B. Goldsmith, S. Conover, B. Sadler, K. Brown, *Principles of environmental impact assessment best practice*, International association for impact assessment in cooperation with Institute of environmental assessment, UK. 1999.
- [60] V. A. Akintoye, & O. A. Opeyemi, Prospects for achieving sustainable development through the millennium development goals in Nigeria. *European Journal of Sustainable Development*. vol. 3, no. 1, pp 33-33. 2014.
- [61] C. Nugent, *Review of environmental impact assessment and monitoring in aquaculture in Africa*. FAO. Environmental impact assessment and monitoring in aquaculture. FAO Fisheries and aquaculture technical paper. no. 527: pp. 59-151. 2009.
- [62] H. Abaza, R. Bisset, & B. Sadler *Environmental impact assessment and strategic environmental assessment: towards an integrated approach*. UNEP/Earthprint. 2004.