

Contemporary issues in
the GEOGRAPHY
of Urban & Regional
Planning in Nigeria
(A FESTSCHRIFT IN HONOUR OF PROF. A. S. AGUDA)

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PROFESSOR AKINOLA
SAMUEL AGUDA

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FORWARD

This book is a collection of research-based articles written in honour of Professor Akinola Samuel Aguda, to mark his retirement from the Obafemi Awolowo University, Ile-Ife, Nigeria. The focus of Professor Aguda's research in the fields of Urban, Industrial and Development Geography has been on housing problems and spatial growth of cities in Nigeria, Crime, Communal Conflict and Violence on Urban Residential Segregation, Community Development (Home Town Associations and Government Efforts), Urban Growth and Problems in Nigerian Cities, Spatial Pattern of Manufacturing Industries in Nigeria. He also researched extensively on Spatial Distribution and Locational Efficiency of infrastructure and social services as well as Consumer Behaviour regarding social services accessibility in Nigerian Urban Centre. His work also reflected the role of informal Sector in employment generation in the Urban Setting and proffer strategies of achieving, reliable and sustainable infrastructural services in Nigeria's Urban Areas. Most of the studies presented in this book are in the same sub discipline of Geography as Professor Aguda's research.

The fact that the book is dedicated to a guru of urban and Industrial Geography in Nigeria underscore the importance of Geography in planning and development. The articles contained in this book have been contributed by scholars and academics many of whom have passed through the tutelage of Professor Aguda. The topics are carefully selected and the book is structured in such a way that contemporary issues in Geography of Urban and Regional Planning are well laid out and discussed.

The book would be of immense value to research students, academics and planners in Nigeria and elsewhere in sub-Saharan Africa in formulating research questions and policies. To the general readers with interest in the urban geography and planning, this book provides a rich source of data and information.

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August, 2023.

PREFACE

In recent years, Geographers have been writing papers and books in honour of retiring erudite professors. The theme of such papers and books often reflects the retiring scholar field of specialization and in which they have contributed meaningfully to extend the frontier of knowledge while in active service. Consequently, the retirement of Professor Akinola Sam Aguda from the Department of Geography, Obafemi Awolowo University, Ile-Ife, Nigeria affords scholars and his academic sons and daughters (Masters and PhDs graduates) the opportunity to celebrate the erudite urban geographer by contributing papers on different themes in the Geography of Urban and Regional Planning that led to the publication of the book.

The book is in 8 sections and 25 chapters. **Section 1** focuses on the biography and career of Professor Akinola Samuel Aguda. **Section 2** is on Urbanisation. In this section Olabamiji and Ajala examined subjective poverty in selected cities of Osun State, Nigeria using geospatial techniques, while Okpuvwie et al, also using geospatial techniques investigated crimes committed against persons in Ughelli Metropolis, Delta State, Nigeria. Areola looked at urban beautification projects in Ibadan Metropolis, Nigeria. While Eludoyin examined domestic water quality and the discriminatory influence of socio-economic stratification on accessibility to safe water in Olorunda local government area in Osun State, Nigeria.

Section 3 focused on transportation and transport planning. Olawole et al, using Lagos -Accra transport corridor to examined service quality of cross-border road transport in West Africa. Aboyeji considered the impact of transport on farmers' accessibility to Agricultural Extension in Kwara South Senatorial District, Nigeria. Ale in his contribution assessed mobility and quality of life of rural elderly in Ondo North Senatorial District, Ondo State, Nigeria. While Yoade and Atoyebi looked at the effects of road expansion and highway development in South-West, Nigeria. Oladepo et al. classified driving behaviour of taxi drivers in Ibadan to include reckless driving, risky driving, distracted driving, self-willed/emotional driving and cautious driving behaviour and found that taxi drivers in the city drive aggressively most of the times. Significant similarity in reckless driving behaviour was observed among taxi drivers in the eleven local government areas in the city.

Section 4 is on urban industrial location dynamics. Abba examined locational pattern and physical forms of gated communities in Kano Metropolis Nigeria. In terms of distribution, Abba found that the gated developments in the city have a cluster spatial pattern. While Olugbamila et al, raised issues the location of Base Transceiver Stations

in Ile-Ife, Nigeria and revealed that availability of power and increased in property value, attraction of other industries, financial gain and population increase are minor economic impact derived from the erection of BTS in a location.

Section 5 is on urban management. Adeniyi and Olayiwola evaluated traders' participation in weekly environmental sanitation in Osogbo and concluded that ignorance on the part of space users and ineffective environmental laws are the reasons for the poor participation of space users in weekly environmental sanitation. Dankani, Dankani, Dankani and Mustapha explored the nature and challenges of urban agricultural practices in Kano Metropolis, Nigeria. The study found out that urban agriculture is bedevilled with challenges ranging from lack of support, non-recognition by the state, small land holding and insecurity of tenure, pressure from land owners and developers which requires serious policy change and concludes that government need to recognize and give legitimacy to urban agricultural practices in metropolitan Kano as it is now commonly adopted in many countries of the world in line with the goals, targets and indicators of Sustainable Development Goals. Odunjo, contribution is on urbanisation and sustainable housing provision in Nigeria. Oladimeji. Abubakar-Kamar, Odunjo and Adeoye examined mass housing schemes delivery strategies and the challenges of maintenance in Nigeria. Olaniyan, Medayese and Kasim look at green city interventions for sustainable urban ecology in Nigeria. Olawuni, Popoola and Adeyemi examined hazard reduction strategies in flood prone area of Ibadan Oyo State, Nigeria. The study recommends flood control and management policies, that incorporate public participation among other mitigation measure.

Section 6 focusses on urban and regional planning strategies. Omolade and Agun examined grassroots participation as a veritable pathway to sustainable national development using Ondo Development Committee (ODC) as a case study. While Ajila. and Farinde examined the contributions of textile extension services in rural development in Nigeria. While Akinloye examined the effect of land acquisition on peasantry in Ifelodun Local Government Area, Osun State Nigeria

Section 7 is on urban ecology. Sylvanus, Ajibuah, and Akinwumi looked at the role of armed banditry on land use and Land cover changes in Chikun LGA, Kaduna State, Nigeria and study concludes that the incidence of armed banditry in the LGA poses a threat to human habitation and agricultural productivity and therefore, call for a concerted effort by the government and relevant stakeholders in taking back the spaces occupied by armed bandits and also stop the bandits from further destruction of Land use and Land cover in Chikun LGA. Ismaila, Sirajo and Yusuf looked at land values and spatial structure in Sokoto Metropolis

Section 8 concludes on geospatial applications in urban and regional planning. Nwaezeigwe evaluated the application of Radar and Optical Sensors in road feature extraction in Ikorodu Urban, Lagos State, Nigeria and linear features especially road network can be extracted with ease without the rigour of digitization from Radar and Optical imageries. The study also showed that Radar image provided more efficiency than the optical image. While, Makinde and Abdul explore the use of machine learning for feature detection and land cover dynamics assessment using Ohafia Abia, Abia State, Nigeria and a case study.

Given the coverage of the papers, the simple ways the issues of urban space were treated, this book would be an invaluable resource to both undergraduate and graduate students in Universities and consultants interested in all the major sections addressed in the book.

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Mass Housing Schemes Delivery Strategies and the Challenges of Maintenance in Nigeria

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INTRODUCTION

One of the housing initiatives implemented to overcome the current imbalance between housing demand and supply is mass housing. Unfortunately, some of these mass housing schemes in developing nations such as Nigeria are threatened by maintenance problems. It has been determined that maintenance is the only way to guarantee that a home serves the intended purpose throughout its lifespan. Maintenance processes also directly affect legal, social, economic, cultural, and environmental issues (Nour, 2003). Maintenance is a type of repair and is distinct from renovation, remodeling, refurbishment, or replacement.

Mass housing programs have been undertaken in Nigeria as a result of various housing construction paradigms and shelter delivery systems used by succeeding governments and the private sector. To address the severe housing crisis in cities, these repeating housing options have been developed as an addition to urban renewal. This is so that low-cost housing can be provided for the low-income segment of society, as was mandated by National Housing policy of 1991 (NHP), which placed responsibility for this on various levels of government.

According to Oladimeji, Odunjo and Adeoye (2022), majority of these mass housing schemes are in a state of disrepair, lack of maintenance of these housing units may be attributed to the fact that, maintenance aspect was not considered during the planning, construction and delivery. It is against this background therefore that the study tried to examine some of the causes of maintenance problems, the challenges, with a view to making recommendations for a sustainable policy framework to make most of the existing mass housing schemes sustainable in conformity with Sustainable Development Goal (SDG)

Mass Housing Schemes

The supply of a large number of dwelling units for a particular group of individuals or, in some situations, the broader public is known as mass housing. Adedayo (2012). Projects involving the construction of residential units utilizing mass manufacturing techniques are referred to as mass housing projects (Abbaszadeh, 2016). A construction model for mass housing that maximizes three factors—quality, time, and cost—has high economic, technical, and managerial viability. In order to address the severe housing crisis, particularly in large cities, mass housing is a dense and repeated housing alternative that has evolved as a supplement to urban redevelopment efforts. A house is said to be mass-produced when it is constructed in the same neighborhood, community, or city. Another name for mass housing is housing estate or housing development. The housing estate is a residential area in which the houses have all been planned and built at the same time.

A housing estate is defined as a location with numerous homes or apartments that were constructed adjacent to one another at the same time, according to the Cambridge Advanced Learners Dictionary (2020). a collection of dwellings constructed in a planned manner to offer affordable housing for rent or purchase. Because there are typically only a few different house or building design styles used in housing estate construction, they tend to have a homogeneous appearance. A gated community or neighborhood are another name for it. The term "mass housing" has come to mean "low-cost housing," and the whole national effort in this area has been shifted toward building less expensive homes. Traditionally, the individual who has built his own house has been intricately involved in the whole process.

Mass Housing Delivery System in Nigeria

The Nigerian mass housing delivery system is made up of a number of interconnected procedures. There are three main systems of housing delivery in Nigeria: public, private, public-private delivery techniques. These processes are influenced by a number of endogenous and exogenous variables. The peculiar flaws in the private housing market are the reason for the need for public intervention in the housing delivery system, and the policies and programs of the public housing delivery system, as shown by lessons learned, are haphazard and half-hearted and have not significantly improved the appalling housing conditions of the people that the public intervention programs are intended to help (Agbola, 2001).

The procedure for allocating housing to Nigerian households is known as the housing distribution system. A procedure like this involves building new homes,

remodeling or rehabilitating old ones, and distributing both to the new and existing units that require them. As a result, the housing delivery system is a conglomerate of institutions that influence the housing supply, public and private actors, and production methods. The housing delivery system consists of five parts: financing, infrastructure and service provision, shelter building, and policy creation and sponsorship. Each component interacts with the others, but they are not all necessary for the system to function as a whole. Public and private processes are the three main methods used to deliver houses. These three processes have been given the task of ameliorating the housing problems of the country.

Before the arrival of colonial masters, communal housing provision efforts—where families, peer groups, friends, and relatives come together and use conventional building materials like mud, stone, etc. to produce housing for their use—were the most common traditional method of housing delivery through self-help in Nigeria. These were founded on a shared agreement between the project owner and these groups, who most frequently agreed on a day to help with construction while the project owner took care of their housing, food, and other necessities for the duration.

Public Mass Housing Schemes delivery system

Many different types of public housing services could be provided for low-income or economically disadvantaged people. These include the direct building of homes, the allocation of serviced land, the accessibility of mortgage financing at interest rates below the market, and tax breaks for extensive rehabilitation programs. The most prominent and well-liked of these strategies in Nigeria is direct housing development (Agbola, 2001).

The outbreak of the Bubonic Plague in Lagos, Nigeria, from 1928 to 1929 coincided with the first documented government intervention in urban housing in Nigeria (Ibimilua and Ibitoye, 2015). Public housing initiatives have their origins in colonial times when they were restricted to building European-style homes for the colonial population and establishing Government Reservation Areas (GRAs) and erection of European-type structures for the colonial staff and a few lucky high-placed Nigerians. In 1946, Urban Councils were created as the first public institutions to maintain law and order, control the erection of private buildings and ensure that they do not interfere with public buildings and institutions (Sada, 1981). The Lagos Executive Development Board (LEDB) was established in 1928. The LEDB was the premier government agency responsible for the construction of public housing in the early 1950s. There was the African Staff Housing Scheme which was to grant housing loans to African colonial civil servants. As if to complement these efforts, the Nigerian Building Society was established in 1956. The

establishment of Regional Housing Corporations in 1959 marked the first active involvement of the public in housing in Nigeria.

The first development plan's (1962–1968) efforts to provide government housing were similar to those made during the colonial era and exclusively offered staff housing for officials. Although the initial plan called for the development and production of staff homes for low-income individuals and groups, with costs spread over twenty years through monthly payments, none of these goals was achieved. The government's involvement was given more consideration under the second development plan. The Federal Housing Authority was founded by the government to carry out the 59,000 housing unit targets set for the plan period, of which 15,000 were to be erected in Lagos. The National Council on Housing did not stop with the foundation of the National Housing Council. The third plan came out boldly in favour of housing because of the acute shortage of desperately needed housing units. Government involvement became very pronounced.

(b) Private Mass Housing schemes delivery system

Private sector housing is that which is designed, planned, and built utilizing conventional and contemporary institutional procedures, after which it is made available for purchase, rental, or lease. According to research conducted in 1981 by the Nigerian Institute of Social and Economic Research (NISER), the private sector is putting out four times as much effort as the governmental sector to provide more housing units. The private housing delivery system uses four different types of private housing developers to provide dwellings. These are:

(i) Merchant Builders

Wealthy businessmen who seek to produce homes at a lower cost per unit are typically merchant builders. They hire a single contractor, purchase supplies in bulk, and have comparable plans for all the different units of homes they wish to construct. As a result, they are able to realize some economies of scale. Since the developer does not wish to keep ownership, the homes are sold as soon as they are finished. In Nigeria, this kind of builder is typical. Real estate is a key asset that provides dignity and prestige to its owners in Nigeria's socioeconomic environment. The Lagos State Property Development Corporation (LSDPC) is currently engaged in this activity.

(ii) Builder Investors

Builder investors are similar to merchant builders in that they both hope to take advantage of economies of scale by constructing a number of homes at once. However, this group of investors is distinct from the first in a number of respects. In addition to always building fewer units than merchant builders, they also continue to own and manage these estates, which is quite significant. Even if there aren't many builder investors, they have significantly increased the amount of housing stock overall. Examples in the Ibadan Metropolitan Area include the 48-unit Adetunji housing estate and the 20-unit Salami estate. (Ibimilua, 2011)

(iii) On-Site Builders

The largest group in Nigeria may be this one. It is made up of a diverse group of people from all socioeconomic tiers of Nigerian society. Each person buys a piece of land, goes through all the stages of development, and then constructs the house according to his preferences. Owner involvement is fairly prevalent in this kind of construction process. Typically, he leases or rents the entire home, however he may reside in one area while renting out other units.

(iv) Land Developers

Land developers are very important to the private housing delivery system. Land developers acquire large tracts of land, subdivide it into varying building sizes and service it with amenities, mainly roads, sometimes water, and electricity. They then sell the land either in plots or by hectares. Available shreds of evidence show that land developers more than any single body of developers have contributed significantly to the provision of housing units in the Ibadan metropolis. Between 1960 and 1976 for example, there were 2,587 registered layouts in the metropolitan area of Ibadan occupying a total acreage of 48, 620 hectares. If there are 14 plots in a hectare, a total of 680, 680 plots would have been available for housing development in the city. This is no mean achievement when it is realized that the public sector contributed about 6000 buildable plot, while a single land developer developed 10, 000 plots within the same period (Agbola, 2001)

(c) Public- Private- Partnership (PPP) Mass Housing Schemes Delivery system

Wallace, (1998) defined public-private partnership as arrangements where development is undertaken with a combination of not-for-profit, private, and public participation in programs. Zhang and Chen (2013) opined that Public-Private Partnerships (PPPs) play an important role in bringing the private sector competition to public monopolies in infrastructure development and service provision. The PPP model also assists in merging resources of both public and private sectors to better serve the public.

A public-private- partnership is a legally binding contract between the government and private sectors for the provision of assets and the delivery of services that allocates responsibilities and business risks among the various partners (British Colombia, 2003). The main objective of PPP is to encourage private sector participation in the provision of housing and to encourage the private sector to plow back some of their profit into very critical areas of national need. Okebukola *et.al* (2004)

This initiative generally involves more direct government intervention than incented private development. The housing authority becomes an active partner in development, rather than functioning as a passive, regulatory actor. In a PPP, the private developers often build housing units on public land, with finished units sold directly by the private partner or allocated by the government to buyers or tenants. The primary role of government is to eliminate risk from the development and create the right contractual and legal framework for private players to bid on projects and join the partnership. The tools of incented private development may also be used in a PPP (Moskalyk, 2008; Ibem, 2012; Woetzel, *et al.*, 2014).

Housing Maintenance

Housing maintenance is the art and process of successfully and efficiently retaining the performance of houses and equipment at their highest levels, in the most possible economical way (Chew *et al.*, 2018). Housing maintenance can contribute to reducing building cost through a continuous effort of cost reduction in maintenance operations. Maintenance cost should be classified in alternative ways to indicate the nature of the work done, the reason for carrying out the work and the appropriate locational reference.

Housing maintenance is a concept geared toward striking a balance between the existing housing units and the acceptable housing and environmental quality. Thus, housing maintenance is very necessary to improve the quality and condition of houses. Sharma and Gahlot, (2006) recognises two types of housing maintenance. They are:

- (a) **The Routine Day-to-Day Maintenance:** This helps to prevent housing units from deteriorating and can well be referred to as preventive maintenance. Example of this type of maintenance is the plashing of joinery or other wooding furniture, changing bulbs, socket, swich, and so on.
- (b) **The Seasonal or Planned Maintenance:** It has to do with the in-storing of a house to a considerable quality level. Planned maintenance requires a good knowledge of the building components and materials that need replacement at appropriate times. Examples include the replacement of broken louvers and windows, plastering and painting of the house, repair and replacement of plumbing equipment, repair and replacement of broken doors, and so on. According to Olagunju (2015), level of maintenance and repair vary considerably between countless types of buildings and forms of tenure and individual households. Maintenance and repair costs are noted to have a strong relationship with the initial quality of parts of the house and the house environment. It is, therefore, possible to determine the value of the repair through the main tenancy cost which in investment terms is referred to as depreciation. Yates and Ge (2010) define planned maintenance as work to prevent failure, which recurs predictably within the life of a building, it means to plan for the level of maintenance to be carried out to prevent the building from collapsing.

Life Cycle Assessment of Houses

There is a need to assess the life cycle of every house, this is because all houses have a life cycle. The life cycle assessment of a house normally involves evaluating its whole life cycle, the construction process stage, use stage, demolition, and disposal or recycling of materials. The building's life cycle is therefore divided into five stages which need to be dealt with: The product stage, construction process stage, use, and maintenance stage, the end-of-life stage, and benefits and loads beyond the system boundary.

- i. **The product stage:** The life cycle of most housing products starts with the extraction of building materials such as iron ore, timber, blocks, etc to be use on construction site.
- ii. **Construction process stage:** in construction process stage, all construction materials from the product stage, components and sub-assemblies were put together in the construction of the entire housing. This stage starts with the transportation of housing construction materials and sub-assemblies from building materials manufacturing to building sites within each city.

- iii. **Use and maintenance stage:** The use and maintenance stage included all of the life-cycle elements needed during the 75 years of maintenance. These include the use of building materials, construction activities, and waste management of discarded building materials. During the occupancy stage there is need to maintained the house as well as the introduction of new products such as paints, stains, floor coverings and other interior finishes. We also have to take account of the fact a house may be remodeled or reconfigured several times over its life (a form of reuse), with changes to interior partitions and possibly the addition of new products or systems. In the course of maintenance, some parts of a house will be altered (e.g. by painting), but other parts may not be seen or touched until the house is demolished.
- iv. **End of life stage:** Demolition marks the end of a house life cycle although it is not the end for individual component materials or products, which face a subsequent recycling/reuse/disposal stage.
- v. **Recycling/Disposal stage:** This is the final stage in the life cycle of the individual components or products comprising a house.

Factors Responsible for Mass Housing Schemes Deterioration

Mass housing schemes maintenance is concerned with all the factors that influence and cause the need for maintenance work. Maintenance generators degrade the quality standard of a house at design and commissioning stage. The occurrence in the fabric of a house can result from many unrelated design decisions, unsuitable materials, incorrect assessment of loads, inadequate appreciation of condition of use and inadequate assessment of exposure. However, Olagunju (2015) opined that deterioration can be avoided through maintenance of the building. Some of the factors that is responsible for mass housing schemes maintenance are described below:

(i) Design Factors

Decision by designers especially Architects in the process of designing has vital effect on the volume of maintenance work that will be required by the completed building. As such, the role of the Architects in building maintenance cannot be overemphasized. Inherent design problem such as complex specification, wrong design decision, incorrect assessment of loads condition upon which the building will be exposed and subjected to, will affect maintenance of the building in future. Faremi and Adenuga, (2012) Opined that

much can be done at the design stage to reduce the amount of subsequent maintenance work. Unsuitable materials due to a lack of knowledge of their characteristics and the use of the inadequate size of structural members will result in the failure of the housing component. The faulty design will lead to faster deterioration of the house structure. Adequate attention to the maintenance needs of the future at the time of design is essential to reduce maintenance problems. Some of the private developers in a way to cut corners and maximize profit engaged the service of quack in the design of mass housing schemes.

(ii) - Human Factor/The User

The human factor may be either sociocultural or economic factors. Socio-cultural factors may include the educational level of the developer, the competency of the professionals involved in the design, construction, and management of the house, and the attitude and culture of the end-users of the housing. Also, the desire of house owners in the area of taste for modernity without regard to environmental implications may lead to a high cost of maintenance. The human factor can be viewed from two aspects; the Maintenance staff's lack of maintenance culture and the occupant's misuse of the house. Deterioration occurs due to a lack of appropriate maintenance culture on the part of the maintenance staff. Failure to provide the necessary capital, either due to inappropriate budgeting or inadequate allocation of financial resources hampers maintenance and thus leads to deterioration. Delay in attending to the maintenance job can also lead to more severe problem of maintenance. Deterioration may also be enhanced due to failure to carry out routine maintenance well in time, lack of knowledge about factors causing deterioration, poor planning, budgeting and allocation of inadequate monetary resources to enable maintenance activities to be undertaken. It could also be due to lack of awareness of maintenance needs among the users, using casual approach to repairs, failure to establish acceptable standards of maintenance and having a negative attitude of waiting until emergency measures become necessary. The users of the house also contribute to its deterioration and this usually takes various forms. One of such ways is vandalism, which is the intentional damage and disfiguration of the house and its components such as doors, windows, furniture, electrical and sanitary fittings. Lack of security and awareness among users on the need to keep their surrounding tidy and failure to repair the areas damaged by vandalism are some of the causes which become sources of further deterioration in houses. In some cases, the houses are converted to different uses from the initial design purpose resulting in rapid deterioration of the building. Overuse and overcrowding of houses can accelerate deterioration and contribute largely to the deplorable living condition in the structures. A building occupied by careful occupants will result in less maintenance than a similar one occupied by careless occupants.

(iii) Environmental Factors

These refer to the effect of soil types, climatic conditions (sun, rain, dust), and vegetation on housing maintenance. The severity of these environmental factors is based on the site and orientation of the house. For example, a structure built on firm, evenly sloped, well-drained, and stable soil will require less work to maintain. On the other hand, a house built on swampy soil may require more attention to maintain both the foundation and the house as an entity. Similarly, some building materials are sensitive to climatic factors like temperature, rainfall, and humidity. For example, extremes in heat and cold can lead to cracks in concrete, if adequate expansion joints are not provided. While extreme sunshine and frequent rain can also make the paint on exposed external wall fade faster in areas such as Maiduguri and Jos in Nigeria respectively. In addition, a house in an area of heavy rainfall such as Lagos and Port Harcourt in Nigeria is more likely to have maintenance problems of roof leakages or roofs blown away during heavy rainstorms. The chemical content of the atmosphere due to environmental pollution also affects the rate of deterioration of the external finishes of a house. A house close to the sea for example in areas such as Lagos is exposed to salty moist breezes from the sea which leads to chemical reactions on exposed wall surfaces and roofs. High humidity may also affect some metabolic fittings and rust can easily occur. (Adenuga and Iyagba, 2005).

(iv) Age of House

The older the house is, the more the need for its maintenance (Sharma and Gahlot, 2006). As a house reaches its full life span, it depreciates at a fast rate and the cost of maintenance tends to be higher than in the early stages of occupation. The lives and property of the users at the apex of the house life tend to be in danger, if they are not evacuated on time or if the house is not demolished for the new site.

(v) Sub-standard Materials

Similar to the effect of human factors on maintenance are the materials used in the construction of the house. The following causes result in poor quality of construction which in turn, give rise to future maintenance problems; wrong selection of materials and specifications, use of substandard materials, an inadequate inspection of materials, provision of inadequate facilities for storage at the site, inconsistent mixing of materials at the site, use of inappropriate materials in relation to use and use of stale/expired materials

(Soladoye, 2017). A house owner should not think of using cheaper materials based on the absolute scale. He should rather be concerned with the cost-in-use of each alternative material and this will assist him in evaluating the life cycle cost of each material. This will in turn help him to select the best quality materials that will require less maintenance. Cheaper materials might require more frequent maintenance than high-quality materials at the long run.

(v) Poor Construction/Poor Workmanship

The following factors will give rise to maintenance problems during the service life of the house; lack of supervision during the construction period, failure to monitor the work adequately, failure to understand and follow exactly the specifications/drawings, failure to replace the defective work, lack of skilled labour and overemphasize on the need for quantity rather than quality output.

(vi) Poor System

Inadequate knowledge on the part of the designer, unsatisfactory design details, the inability of the builder to follow specifications/drawings, inadequate testing of the system before commissioning, failure to follow maintenance instructions, and the inability of the owner to operate the system as instructed can generate maintenance problems in a house. According to Akinsola *et al.* (2012), other factors that contribute to poor maintenance include inadequate routine maintenance, ineffective maintenance program, lack of proper inspections on a planned basis, changing standards and or/and tastes, and inadequate data to enable the preceding items to be properly carried out.

Challenges of Mass Housing Schemes Maintenance in Nigeria

There are various challenges confronting mass housing scheme maintenance in Nigeria. It may be a result of the inability of mass housing schemes provider to factor into the production, the maintenance issues. These challenges differ from one delivery strategy to another and it encompasses housing space, housing element, and infrastructures.

(a) Housing Space

Housing spaces such as; bedrooms, living rooms, kitchen, dining, toilets, laundry, and store among others. The maintenance challenges in housing space depend on so many variables, the socioeconomic status of the occupants, for instance, income, ownership status, educational background, etc. some of the occupants of the mass housing schemes that are tenants will not bother much about the maintenance of the spaces. Also, the income of the occupants also will determine the maintenance level of the housing space.

(b) Housing Element

Housing elements are the different components that makeup houses. Components such as foundation, floor, walls, roof, windows, doors, ceiling, and finishes. Challenges of maintenance of housing components also depends on several factors such as, the materials used in construction, methods of construction, poor workmanship, not involvement of the end users in the construction among others. Plate 16.1 shows a typical example of default in materials and method of construction.



Plate 16.1: View of Harmony Mass Housing Schemes Ilorin

Source: Author's field survey (2022)

(c) Infrastructures Maintenance

The majority of mass housing schemes in Nigeria lack infrastructure maintenance. Maintenance of infrastructures such as roads, drainage, water supply, electricity supply, and waste and refuse disposal among others does not factor into the production of mass housing during planning and construction. This maintenance problem is rampant in private delivery mass housing. The opinion of some of the residents of mass housing schemes was that the government at all levels should be responsible for the maintenance of infrastructures in mass housing schemes. Plate 16.2 shows defect in maintenance of infrastructures in mass housing schemes.



Plate 16.2: Blocked drainage and bad road in Harmony Mass Housing Schemes Ilorin

Source: Author's field survey (2022)

Roles of Architects in Housing Maintenance

Architecture and design influence not merely the aesthetics of houses and other physical surroundings; it also influences the way individuals perceive and go about performing everyday activities. Contemporary architecture considers and shapes the behavior of people at home. In this regard, contemporary architecture incorporates diverse materials with different and unique qualities in order to create surroundings that facilitate the

intended and naturally occurring behavior of visitors and everyday users. Architects thus create spaces that enable us to perform daily tasks and a range of everyday social activities. The role of an Architect in building industry is enormous; this includes all of the stages in housing delivery ranging from, preliminaries/design sketches, presentation drawings, working drawings, construction/supervision, and maintenance. Architects play a vital role in securing the maintenance of houses in order to secure the continued existence of physical spaces.

Furthermore, Architects engage in uncompromised aesthetics through thoughtful design in houses and open possibilities with flexible solutions for housing maintenance (Oladimeji, Odunjo and Adeoye 2022). Architects use their knowledge of how the house was designed to direct how to fix them before or after a breakdown. In housing maintenance, Architect wears the cap of a facility manager using his knowledge of how things were put together to direct how to fix them before or after they breakdown. Architects prepare schedules for repairs to be done and how the work will be carried out.

The Way Forward

In other to improve the maintenance of mass housing schemes and make it sustainable, the end users should be actively involved in design and construction. This will enable the provider to factor in the provision of the socioeconomic status of the owners and sustainable building materials will be specified for the construction. Also, it was discovered that most of the housing units in the mass housing schemes that are supposed to be for low-income earners end up in the hand of the high-income earner who in turn leased it out again. The rationale behind the policy of mass housing should be reviewed and maintenance policy to be introduced as well.

Renewal policies by private and public organisations should be carried out, this will improve the aesthetics of most of the mass housing schemes. Proper attention should be given to most of the existing mass housing schemes to prevent them from being squatter settlements and ghettos within the cities.

Also, there is the need to enlighten the residents on the danger involved in poor maintenance of spaces such as toilets, bathrooms and laundry to avoid the total collapse of the facilities. Also, there is a need for the residents to engage in the preventive maintenance of facilities such as the wall, roof, floor, painting/tile among others to prevent the houses from tending to a state of disrepair. Mass housing schemes was part of the housing programmes that was put in place to reduce housing deficits, but maintenance of these housing schemes need to be giving adequate attention.

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