Possibilities of Sustainable Social Housing in Lagos Nigeria; A Case study of the design, Specification and Adaptability of the new Lagos Homs Housing Scheme

Oluwasegun Akande* and Kazunobu Minami

1 Graduate Student, Architecture and Civil Engineering Department, Shibaura Institute of Technology, Japan
2 Professor, Architecture and Civil Engineering Department, Shibaura Institute of Technology, Japan

Abstract
Housing is recognized by the United Nation as a human right, yet Nigeria’s low-income households in particular struggle when it comes to adequate shelter. The urban population in the country has increased from 10% in 1952 to 47.8% in 2015 with a housing deficiency of about 14 million units. Most of the housing schemes delivered in Nigeria to date target the high-end luxury market segment and, to some extent, the middle class that has emerged over recent years and may increase due to the economic growth and continuous industrialization. Housing scheme provided by government has not been termed sustainable over the years and therefore it has created maintenance problems to both the occupants and the managers. This research investigated the design, specification and the adaptability for continuous change of the new Lagos Homs Scheme which has been put in Place by the government to solve the housing lag in the State. The paper concludes that sustainability and adaptability is possible if the designs can be adjusted to the conclusions made in this paper. This will allow for new emerging building material and component market and will enable the Government to improve on its policy on housing sustainability in Lagos.

Keywords: Design, Specification, Adaptability, Sustainability, Housing

1. Introduction

Housing is recognized by the United Nation as a human right, yet Nigeria’s low-income households in particular struggle when it comes to adequate shelter. The urban population in the country has increased from 10% in 1952 to 47.8% in 2015 with a housing lag of about 14 million units at the moment. Low-income i.e. the urban poor households face a number of barriers, besides weak individual purchasing power, access to housing is lacking, land and infrastructure are unavailable and housing supply is inadequate to meet the actual needs. Almost 50% of the Nigerian population lives in cities and about 80% of this urban population lives in conditions characterized by general disorder, overcrowding, low sanitation standards, the use of unconventional building materials, substandard construction techniques, and lacking road and services infrastructure.

Over the years, the construction of residential houses in Nigeria has been the traditional style of concrete structure, with block or brick wall partitions and different kinds of floor, wall, electrical and plumbing fittings according to the availability of funds of the user or owner. Lack of design innovation to a better and faster way of construction has characterized the industry. From previous researches, higher percentage of the users of Government built homes have done some repair or adjustments works in their homes in the first few months of moving in.

*Contact Author: Akande Oluwasegun, Graduate Student, Architectural and Civil Engineering Department, Shibaura Institute of Technology.

3-7-5 Toyosu Koto-ku 135-8548 Tokyo, Japan.
Tel: +817042342049
email: me16029@shibaura-it.ac.jp
This paper through intensive literature review of documents, journals, books, periodical, seminar papers, designs amongst others critically explore the technical issues relating to the sustainability and adaptability for continuous change and for ease of maintenance of the design of the new Lagos Homs Scheme which has been put in Place by the government to solve the housing Lag. The study project used is the new Ilubirin housing scheme still under construction. The project was selected because adjustments from some previous design failures have been made and also because it is the single largest government housing scheme at the moment.

2. Design

The term ‘design’ according to Gropius W. as quoted by Ramly A. embraces the whole orbit of man-made, visible surroundings, from simple everyday goods to the complex pattern of a whole town. In the process of designing a building a good designer must be able to consider various factors and categories to enable the building to become a quality product that consumers can utilize to maximum satisfaction. A building should not be looked at only from the aspect of aesthetics or its function because the product of quality building design is the creation of a comfortable working environment and living activities. Designing a building must satisfy the input and output requirements that consist of real things and psychological needs (Ramly A. 2006).

Before a product of building design can be achieved there are two basic requirements that must be analyzed as design input, i.e. external and internal input. Factors such as client, user, general public, local community, consumer and authority can be categorized as external input, whilst for the internal input, the requirements are environmental considerations, materials/equipment, maintenance/services, methods/technologies, cost/economics and psychological needs (Ahmad R. 2006). It is only then that good building design is achievable to produce quality output that consists of excellent building performance, aesthetic values, longer life spans or cycle, rehabilitation, comfort, safety and health conditions.

3. Lagos Homs Scheme

Steady and increasing urbanization over the years has resulted in the phenomenal rise in population. In Lagos, Nigeria, the government has been involved over the years in the provision of residential units through the Lagos Executive Development Board (LEDB), now Lagos State Development and Property Corporation (LSDPC) (Adebayo A. and Iweka A. 2013). Like what is obtained in many other countries, the housing units available in LSDPC’s housing estates were designed and built without empirically determining who the tenants or owners will be. There is urgent need to provide mass housing, but also there’s need to put the end users in mind in the production of such houses. Every user has their own set of needs and customs and their own way of life, which may vary over the years.

LSDPC has produced 24,689 housing unit from 1981-2015 with improvement in design over the years. From the Author’s previous research on the effect of maintenance on public residential buildings, it was concluded that the users’ feedback has not been considered in succeeding design thereby making maintenance and sustainability difficult to achieve. Subsequent Administrations have tried to bridge this housing gap without success. The major reason was found to be the lack of access to affordable mortgage finance. For the first time therefore, through Lagos HOMS, government has intervened in housing with a focus on affordable mortgage finance which is believed to be more sustainable than previous housing intervention policies. The most recent scheme is shown below in figure 1 below.
Fig. 1. Lagos Homs Ilubirin housing scheme Layout.

4. Sustainable Building

Many scholars over the years have tried to define sustainability in different terms referring to different spheres and from different point of view. For the purpose of this paper, sustainability means developing, and protecting a building and the complete system at a rate and in a manner that enables users to meet their current needs and changing needs over the period of stay and any other user who intends to use such systems in future.

Stephen Kendall (2010) highlighted the following for sustainable building;

a. The base building or sometimes called the frame structure is meant to last longer.
b. The fit-out or infill as labeled by the Japanese is also meant to last longer than the equipment that occupants bring in to support their activities.
c. The base building has to be designed to accommodate change of use.
d. The buildings must have capacity for variable functions over their lifetime.
e. There must be level distribution of power in the making of the complete system.

5. Technical Issues

The new type design will accommodate different families into different kinds of spaces where one, two and three-bedroom apartment will be constructed together in one building. This identifies that the users are heterogeneous and that there is room for all levels of users.

5.1 Frame Structure or the Base Building

From the above, the following can be observed;

a. The building is a framed structure with a minimum floor-to-floor height of 3 meters which is good enough to accommodate electrical and plumbing pipes.
b. The structure is a reinforced concrete structure with a minimum life span of 50-60 years. The life span can be increased for subsequent ones like those buildings in Japan that have been designed
to last for 200 years. By investing in long life buildings, there will be more room for new buildings instead of focusing on demolishing and recycling after 50 years.

c. The Span from each column is enough to accommodate easy change in partitions used.

d. The framed structure has been produced on site (i.e. in-situ) but there is room for industrialization for mass production. This will reduce waste, control risk from mechanical movements and increase productivity but will also require huge investments in heavy industries for production of building elements and haulage systems.

e. The ground floor is free for general use and can be changed in the future.

5.2 The infill or fit-out

External walls and internal partitions used in Nigeria residential buildings are made of blocks which accommodates the plumbing and the electrical piping works. The internal walls are usually non-load bearing walls but have been in use for years. In commercial buildings and offices, light partitioned infill has been used and electrical pipes are accommodated in the column through the floor or attached to external walls. Toilets are usually designed close to the external walls made of blocks where pipes can be accommodated.

Fig. 3. Electrical pipes in block walls.

For adaptability and sustainability, the infill needs to be flexible. Piping works have to be separated from walling systems for ease of maintenance. Wet Areas like toilet and kitchen have to be redesigned for easy piping without interfering with the internal infill. The infill systems have to be industrialized and modernized in residential units to allow for easy change if the units are meant to change over time like the life of the user. New infill system should also be able to take care of the climate situation in the country.

5.3 Mechanical and Electrical works

The mechanical and electrical works have to be designed in such a way that the regular maintenance must be easy to accomplish.

Fig. 4. Electrical pipes embedded in the slab and on the floor.
In multi dwelling housing units in Japan, UR agency designed the units to have a common corridor for easy access to the pipe ducts. This can be seen in figure 5 where the wet areas are moved as close to the duct. The wet area is entirely separated from the dry area which will further aid maintenance.

From figure 6, the pipe ducts in the Lagos Ilubirin housing units have been designed to be inside each unit which will likely bring discomfort to people living there. From the author’s previous research, it has been identified that this was a major defect generator in maintenance problems in multifamily dwellings. Sometimes piping works are laid on the floor and then floor finishes like tiles are laid over it with cement and sand. In maintaining such, tiles will be broken and sometimes, such tiles will no longer be in existence after a while.

Flooring systems can be adopted in the Japan case where floor finishes are raised about 250mm above the concrete floor. New systems need to be designed since the construction industry still rely so much on floor and wall tiles as finishes in Nigeria. The subsequent new Lagos Homes can be redesigned for a new model since the floor to floor height is about 3m.
An introduction of a common corridor will also allow for proper flow of air and the duct can be placed on that corridor for easy maintenance.

6. Conclusion

Higher levels exercise dominance over lower levels, while lower levels are dependent on higher-level structures. The levels here are clearly defined. The Base building directly serves and affects all occupants. In addition to the building envelope (roof and facade) in whole or part; public circulation and fire egress (lobbies, corridors, elevators and public stairs); the primary mechanical and supply systems (electricity, air conditioning, telephone, water supply, drainage, gas, etc.) up to the point of contact with individual occupant spaces should be added to the base building. The infill will then be clearly spelt out for the users. The fit-out or infill needs to be more flexible. The usage of blocks as infill should be modified as this is very rigid and also has a lot of weight on the building base. More research should be done about the infill component that will work in the climate and for the kind of users per time. The Plumbing and the mechanical supplies should be more durable so as to make the users enjoy the apartment. There should be maintenance manual for all the supplies and the building components to make it more sustainable.

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