

IMPROVING HOUSING DURABILITY IN INFORMAL SETTLEMENTS USING AFFORDABLE BUILDING MATERIALS - THE CASE OF KIBERA, NAIROBI

JA Walubwa¹ and P Shah²

¹Department of Regional and Urban Planning, Technical University of Kenya, Nairobi , Kenya

²Department of Geography and Environmental Studies, University of Nairobi, Nairobi, Kenya

Abstract:

Durable and affordable housing is seen as a major challenge in most cities in developing countries. This is because poverty, natural population increase and in migration provide a challenge for city planners in keeping up with provision of decent, durable and environmental friendly housing and other infrastructure to its citizens. The end product is usually a colony of informal settlements dotted with non-durable structures. However with the empowerment of youth and communities, education and quality of life could be boosted, there would be the use of indigenous knowledge, development and the sharing of technology to overcome non-durable structures. All informal settlements would have sustainable housing if the problems and challenges of non-durable housing are overcome. The paper has used quantitative methods of research to evaluate a specific community on their access to durable housing. Various parameters were used to cross check if the people live in non-durable housing out of choice. It became evident that affordability and lack of technological innovation on locally available materials were the main culprits for the persistence of living in non-durable structures. As a way of conclusion the study advocates for use of interlocking bricks as a way of mitigating the challenge of non-durable building materials. They are also environmentally friendly for this particular settlement.

Keywords: Durability, Low income housing, Materials, Sustainability, Kenya

INTRODUCTION

Africa is urbanizing at a very high rate with an annual urbanization growth rate of 3.31% (2005-2010) with a projected increase in population from 373.4 million people in 2007 to 759.4 million in 2030. In fact, 38.7% of Africa's population is living in urban areas as documented by the United Nations Human Settlements Programme (UN-HABITAT 2008). Kenya is no exception; in 1962, only one out of every 12 Kenyans lived in an urban centre but by 1999, the proportion of the urban population had

¹ walubwajacque@gmail.com

² suryasuru@yahoo.co.uk

increased to 34.5%, i.e. one out of every three Kenyans was living in an urban centre. Furthermore, during the period of 1989-1999, the country's urban population had increased by 155% (Government of Kenya 2002). Today, the urban growth factors in Kenya are natural increase and *in-situ* urbanization (the absorption of rural and peri-urban settlements in the spatial growth of a larger adjacent city.)

As the developing countries keep on having a population surge, the worst hit areas of these countries are the urban areas, bringing with them a couple of problems like crime, poverty, lack of sustainable housing and formation of slums. Already this is evident in the continents of Africa, Asia and South America. The cities of Mumbai, Nairobi, Rio de Janeiro and Manila are some of the examples of cities with slums. These slums lack planning, they have poor infrastructural amenities, there is lack of permanency in the structures and a sense of seasonality- though sometimes it spans for 20 years- reflected in the building materials and design. This means that there is a persistent need for housing, and housing which is durable.

Most materials used in the construction of these settlements are innovative but not durable. This is because the slum dwellers build their houses in tandem with their financial ability. Over 60% of these slum dwellers in most of the slums are very poor and cannot afford durable materials for sustainable housing. According to (UN-HABITAT 2003), a house is durable provided that the materials used are structurally permanent, can protect its inhabitants in extreme climate conditions and is built in a hazard free location. Furthermore, every citizen has a right to good housing and should not stay in deplorable conditions like the slums.

Most governments and authorities have resorted to slum upgrading in line with the Millennium Development Goals (MDGs). Kenya is one of them. These responses are aimed at keeping up with the provision of decent and durable housing with an aim of improving quality of life. This paper tries to address the gap found in the provision of durable housing by the local authorities in Kibera-Kenya, which can be bridged by having new appropriate technology, material science and fundamental mechanisms.

DURABLE HOUSING IN KIBERA-NAIROBI, KENYA

Durable housing is a panacea for any development to take root. Through the use of indigenous knowledge, education and development of technology, durable housing is always a possibility. Technology becomes available with access to affordable finance. But most poor people are entangled in the trap where good housing is unaffordable as they do not have access to financial capital or institutions. In Kenya, the informal settlements bear the largest brunt of economic development in urban areas yet there is a lot of potential man power resource inside the settlements. The guidelines in the Poverty Reduction Strategy Paper point out to slum upgrading as one of the key elements of reducing poverty. It states that the slum dwellers should be involved in the designing and implementation of the housing as they themselves can solve these problems. Under the Global Land Tool Network (GLTN), the slum dwellers are empowered through capacity building, research and training

Kenya, working closely with the GLTN and UN-HABITAT has developed the Kenya Slum Upgrading Programme (KENSUP). This program seeks to eradicate slums in the whole country and has a pilot phase in Kibera which is the main focus of this paper. Most homes are generally one-story, one-room, 10 ft. x 10 ft. huts made of mud and precariously placed corrugated tin roofing. Structures are so poor that in case of

heavy rainfall or fire, they would be destroyed. In case of such a tragedy, there would be a high number of casualties as there is very little space in between the alleys for people to escape. These intervening bodies have come together to provide durable housing as a wholistic process. In Kibera every effort has been made to ensure that the slum dwellers own and feel that they own their homes, and as such the interventions focus on community participation in the innovation of building materials for their houses.

Objectives of the Study

To achieve the aims of the study the following objectives were used as guiding principles:

- To find out the challenges present in accessing durable housing in informal settlements.
- To identify the presence of locally available materials for constructing durable houses.

RESEARCH METHODOLOGY

Research Design

As this was a specific project being targeted, the sample was drawn from one of the twelve villages in which the intervention was being carried out- Soweto East village. Simple random sampling was used to select the respondents for the study and in total 40 adults constituted the sample. The sample size was selected based on the minimum number of samples being 30 in any sample. People living in durable houses as well as non-durable houses were interviewed.

The variables used included type of housing one was staying in, materials used in housing, body in charge of building houses, improvements in housing, affordability and choice of housing structure, whether one would like to live in a durable house, problems of non-durable homes, challenges of having a durable house and recommendations for a durable housing structure.

Methods of Data Collection

The research depended mainly on primary data though also some desk studies had been done earlier. The data was collected through the use of questionnaires, interviews, focus group discussions, expert interviews and observation.

Data Analysis and Synthesis

From the field data processing was done by scrutinizing the return questionnaires to check for inaccuracies and inconsistencies. Once the data was cleaned, a code book was designed and generated to translate the entries in the questionnaires to a spread sheet. The spread sheet data were then converted to electronic form using Statistical Package for the Social Sciences (SPSS) interface data editor since SPSS was the main analysis platform. The resulting dataset was further subjected to cleaning based on the preliminary frequency distributions.

At the preliminary stages statistical data was subjected to exploratory data analysis using statistical tools of descriptive measures including measures of central tendencies and dispersion to assist in accurate description of statistical data. The results of these analyses were presented in tabular form or in graph form and remarks made about them.

FINDINGS

Problems of Non-durable Housing

Out of 40 respondents, 10 (25%) were living in durable homes while 30 (75%) were living in substandard structures. The materials used in the durable homes were ‘stones’ made from cement and bricks made from cement and sand. In the non-durable homes the materials ranged from rusted iron, paper, mud, cloth and skin. The respondents cited problems associated with living in non-durable houses as shown in Figure 1:

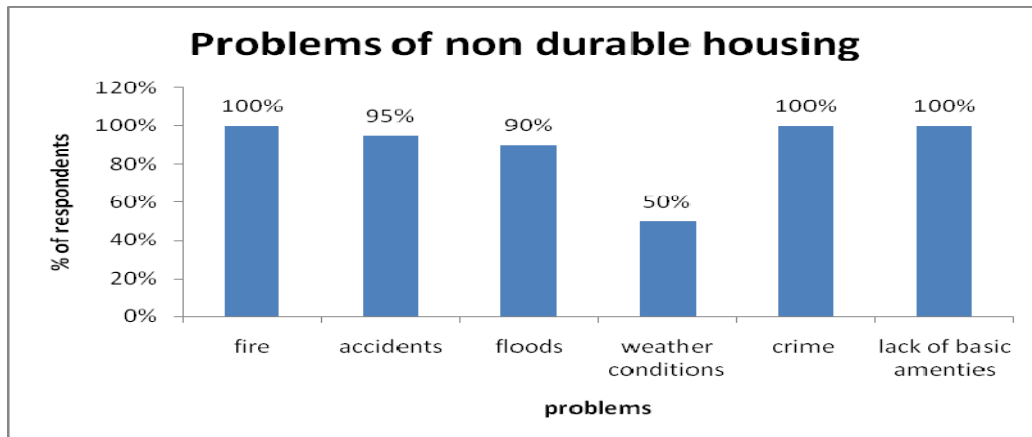


Figure 1: Problems associated with non-durable housing

Ownership of Homes

The respondents were also asked who was responsible for their tenure-ship of the housing structures. 25% of the respondents stated that it was the government together with KENSUP while 75% stated that it was the rich landlords to whom they were paying rent and as such they were not motivated to make any improvements to their housing condition, since it would not amount to any investment on their part.

Challenges to Accessing Durable Houses

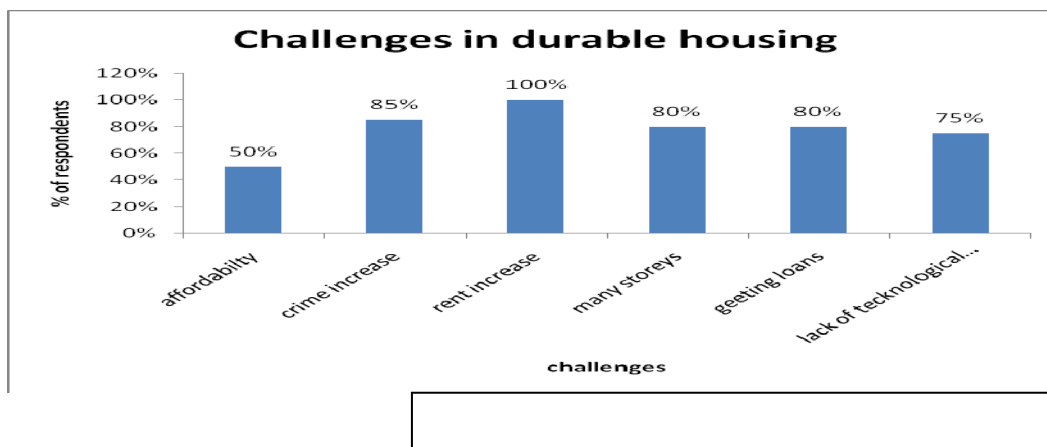


Figure 2: Challenges in durable housing

Various responses emanated from the question relating to the challenges experienced in accessing durable homes. Among them was the aspect of affordability which 25% claimed that it was affordable. This was Figure 2: Challenges of having durable housing the percentage that was staying in areas with durable structures. Of the 75% staying in non-durable housing, only 10 respondents (33.3%) stated that they could afford durable housing. This was due to the fact that they would not afford a bigger chunk of their salary for rural remittance purposes. Other responses about the challenges encountered in accessing durable housing included; increase in crime rates, difficulty in accessing the higher floors in multiple storey buildings, arbitrary rent increments, difficulty in accessing loans without surety and lack of cheap technological innovations.

Recommendations on Material Choice for Housing

Though living in non-durable houses, the respondents were aware of the steps that could be taken to ensure that their houses are durable. Among them, they cited durable and cheaper materials like stones, waste water bottles, corrugated iron sheets and cement. See Table 1. All respondents commented that the cement stones and bricks made by the youths in Kibera were affordable. Further questioning found out that the cement bought by the Youth Empowerment Programme was bought directly from a cement manufacturing company and as the project was for empowering the youth, the cement was sold to them at a subsidized price. This encouraged the youth to make cheap stones and bricks. Plate 1 shows youth making cement stones.

Table 1: Affordable and durable material

Type of Material	Percentage Respondents
Stones	90
Waste Water Bottles	25
Corrugated Iron Sheets	80
Cement	75



Plate 1: Youth making affordable bricks

DISCUSSION

Majority of the respondents were against the idea of having non-durable housing (plate 2) and opted for durable housing. Challenges like fire, limited access to basic amenities, crime, accidents, floods and weather topped the list. Studies carried out by different researchers have shown accidents, floods, fires and crime to be the main problems associated with non-durable housing in the slums of Kibera. With floods the risks of diseases also increases. In 1997 the El Nino rains created severe floods which led to deaths of humans, destruction of property as well as structures. The flood waters contaminated the fresh water and diseases occurred (Hayombe, 1997). Lack of basic amenities includes access to clean water and sanitation. In fact in most of the non-durable houses, people look for illegal connections or open man holes (Septic tank) so as to divert sewage water to farms causing disease. For instance, in parts of Kibera farmers remove manhole covers and block the city’s main sewer, diverting raw sewage

on to their land to irrigate their crops (Scott *et al.* 2004). Plate 3 shows the small walking alleys in the informal settlement of Kibera which lead to serious accidents in case of falls.



The results indicated that very few people lived in durable housing in Kibera in spite of the fact that they desired to live in them. This is because they foresaw problems of living in durable houses. Increase in rent, crimes, lack of negotiating power for loans and buildings with multiple storeys were rated at or over 80% of the problems. The issue of rent meant that if one lived in a durable house, the landlord would think that the tenant is rich and would keep on increasing the rent at every opportunity he got. This indicates that in the long run affordability would be a hindrance (COHRE 2006). Crimes would also increase in durable houses as it is a perception that the rich live in such houses. Many respondents felt that living in affordable houses was not favourable to them as access to cheap loans was a problem. Only with a good increment of salary, would they be able to afford the loans.

It was also of note that many households had elderly and disabled people; this led to another challenge which was the design of the houses. The durable houses tended to occupy less space horizontally and more vertically and as such they posed a challenge to the elderly who would not be in a position to climb the stairs of multiple storey buildings. Lack of affordable and innovative technology was cited as a major challenge. The residents felt that the solutions being provided in mitigating their deplorable conditions were very generic and revolved around expensive solutions thus not helping them in any way. They thought that if technology was viable and available then, durable, affordable and sustainable materials would be produced for their houses. Some even proposed the use of plastic waste water bottles as affordable material for housing. This was seen as a cheaper option, since the bottles would be recycled as opposed to them being thrown as non-biodegradable waste and polluting the environment. This idea is a viable and sustainable solution as depicted in Dar es Salaam's Chumazi area, where local communities have been building housing using waste plastic bottles (Plate 4).

The respondents in Kibera felt that the use of interlocking bricks should gain more momentum and popularity as it was cheap and sustainable. The interlocking blocks used material that was locally available, thus incurring less cost in terms of production and labour. Plate 5 shows the making of interlocking blocks in Kibera.



Plate 4: Waste water bottles as innovative building material



Plate 5: Interlocking bricks

Through an initiative by KENSUP and UN HABITAT, the youth in the area have been producing 2,500 ‘cement and sand’ bricks per day. They had a finance facility to procure the machines needed. This process is labour intensive and requires one to mix a particular percentage of sand and cement, with cement being more and add water to it. This is then put in the machine which compresses the mixture and produces interlocking bricks. These bricks are affordable and require no additional cement for them to stick together; they only require interlocking for a decent and durable house. It costs approximately KES 100,000 (US\$ 1,176) to have a 2 roomed house in Kibera made from these interlocking bricks.

CONCLUSIONS AND FURTHER RESEARCH

From the study it is important to note that the respondents had one desire, which was to live in durable, decent and disaster proof houses. They knew what the solution was but a lack of financial resources hampered their progress in attaining their goal. As researchers and people charged with the task of innovating, it will be of paramount importance to look for ways in which affordable building materials can be accessed by all sectors of society. In this particular area; the technological invention that was cited is the use of interlocking bricks to make durable houses. This is a step forward, but could it be made cheaper than what it costs now? Could the idea of recycling plastic bottles be incorporated? If this idea is possible, what would be the cost?

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