



Original Article

Adoption of Green Neighbourhood Development: A Case of Affordable Housing Projects

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The Kenyan government identified low-cost housing as one of four top priorities and aimed to add 500 000 affordable homes. The ability of affordable housing projects to continue, remain sustainable, and be effective is one of the most crucial hurdles. Expanding the boundaries of assessment to the neighbourhood scale in Kenya means that not only the single buildings but also spaces between them, services that are provided, humans and other organisms that are living there, and the synergies between this broad range of elements and activities have to be considered in the assessment process. This study examined in detail the provision of low-cost housing within the LEED-ND rating system as a platform for having a rating system that focuses on sustainable low-cost housing. The study adopted a survey research design and made use of both qualitative and quantitative modes of investigation to examine the green building practice in Kenya. The proposed park road Ngara project entailed the construction of six blocks four of them housing one two and three-bedroom units, one block housing a parking silo, and another housing a kindergarten and other auxiliary facilities. The study's target population comprises park road low-cost housing units of the big four agenda by the government. Analysis was undertaken to generate a descriptive picture of the data gathered. The study concludes that the process used to produce an implementation tool can be just as crucial to the success of the tool itself as the tool itself is to the success of the process. The high cost of certification and the labour-intensive complexity of certifying development projects which frequently encompassed a large number of buildings and were finished over several years had two primary issues established, the first being that green neighbourhood assessment systems that are utilised frequently were called LEED-ND. Secondly, the green neighbourhood assessment was another popular technique that was utilised to assist in the decision-making process. The results of the study indicate that LEED-ND is currently the standard that the industry has adopted as a benchmark for environmentally responsible neighbourhood development everywhere in the world. The study recommends that LEED-ND incorporate a post-occupancy evaluation to determine the level of satisfaction felt by residents and transition from a prescriptive-based system to a performance-based one.

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INTRODUCTION

Phrases such as green Construction, high-performance Construction, ecologically Construction and sustainable Construction are similar and refer to the green building concept. Green building is the process of building structures and infrastructure using as few resources as possible to minimise harmful effects on the surroundings and enhance the quality of life for the local population (Howe, 2010).

The housing industry has embraced impact assessment tools as part of its vocabulary. These tools are used to determine whether a low-cost housing project will be sustainable over the long term. The overwhelming majority of people think that ecologically responsible and cost-effective housing cannot coexist (Howe, 2010). Sustainable affordability of houses for people with lower incomes makes green construction the best way to reach this goal because it protects the ecology and meets the demand for housing at the same time this is because green building satisfies both of these criteria project (Oino, 2015).

Simultaneously, their mixed-use communities that include appropriate access and exit amenities such as stores, workspaces, and parks characterise green neighbourhoods. The sustainable neighbourhood assessment tools are the most up-

to-date generation of impact assessment tools since the turn of the century. There has been a significant increase in the number of people interested in ecologically responsible methods of community improvement. Alongside this movement, there has been a proliferation of tools for assessing neighbourhood sustainability. This came about because of the realisation that evaluating individual buildings is insufficient to accomplish sustainability goals. Sustainable neighbourhoods can take many different shapes but they all have certain qualities in common (Parliamentary Service Commission, 2018). These neighbourhoods are mixed-use relatively compact communities that have easy access to public transportation and offer a wide range of housing options, workplaces, park amenities, and retail and service establishments. They also have ample resources and operate effectively which helps to ensure that all citizens enjoy a high standard of living.

The idea of ecologically responsible and social living is gaining popularity. This reality has emerged because of efforts made in the housing sector (Adhiambo, 2012) toward the achievement of sustainability goals. Kenya's housing program aims to build 500,000 housing units for households of lower-income populations in all forty-seven counties. The construction will be in phases where 30,000 shall be developed in the first phase to account for at least 30 percent of

the project commission (Alborzfard, 2012). The foregoing necessitated the line ministry in charge of housing the developer to propose 1370 residential units on plot LR no 20920159. They are located along Kinshasa Road in the park road area of Nairobi City County. They are the first low-cost housing project to meet the increasing demand for standard habitable and low-cost houses while adhering to best practices on ecology in Nairobi City County zoning regulations as well as other relevant rules. This will safeguard the development program against failing to bring sustained low-cost benefits to the target groups (Muse, 2006).

STATEMENT OF THE PROBLEM

With the expansion of the economy, Kenyans are migrating from rural areas to more urban regions in search of higher-paying careers. With close to 50 million inhabitants' Kenyan counties have created a need for additional affordable housing. The Government of Kenya recognised the need for low-cost housing as one of the urgent priorities and aimed to add 500,000 affordable homes. One of the most critical obstacles is the extent to which the projects can persist and remain sustainable, affordable, and effective (Barista, 2007). Unfortunately, current approaches to delivering low-cost housing have not been working. The problem is that they rarely deal sufficiently with the affordability issue. The ability of affordable housing projects to continue, remain sustainable, and be effective is one of the most crucial hurdles. There is a need to shift from building environmental assessments to neighbourhood sustainability in Kenya (Kirk, 2006). Expanding the boundaries of assessment to the neighbourhood scale in Kenya means that not only the single buildings but also spaces between them, services that are provided, humans and other organisms that are living there, and the synergies between this broad range of elements and activities have to be considered in the assessment process. This study examines the provision of affordable housing within the LEED-ND rating system as a platform for having a rating

system that focuses on sustainable affordable housing projects in Kenya.

PURPOSE OF THE STUDY

The empirical findings of the study, gained through a case study survey, are useful in understanding the relationship between Green Neighbourhood Development and Affordable Housing Projects, thereby contributing to sustainable affordable development.

RESEARCH OBJECTIVES

- To examine the level of awareness of the Green Neighbourhood Development Concept on Affordable Housing Projects
- To determine the challenges of the Green Neighbourhood Development Concept on Affordable Housing Projects
- To determine the degree to which the LEED-ND rating system promotes sustainable development in low-cost housing projects.

THE LEED-ND RATING SYSTEM FOR LOW-COST HOUSING PROJECTS

It has become essential to look at the background of the LEED-ND system of rating to understand how it evolved and how it fulfils the design of sustainable neighbourhoods. LEED-ND grading structure is now the most prevalent green valuation tool used in the United States. Significant changes in the real estate markets have increased the value of the green concept in construction that is being driven by the LEED-ND certification (Soloman, 2005). A coalition of establishments in construction was established to serve as a forum for discussing the numerous social costs and benefits brought about by various designs and construction options (Soloman, 2005).

The forum initiated a pilot program in 1999 that was referred to as LEED-ND for renovations and construction LEED-NC. This program was a green housing concept of rating used to certify structures based on a specified format for green

housing. The initial official version of LEED-NC 20 was made available to the public in March of the year 2000. American green firms first began advocating using this cutting-edge technology. One of its key goals was to contribute to the revolution of the construction industry (Soloman, 2005). Renewable green materials are now more readily available and less expensive than they were before LEED certification (Kirk, 2006). America's green construction concept has developed the LEED-ND system of rating, which is the first system to certify projects that comprise multiple houses including neighbourhoods. Because of how well LEED-NC was welcomed, other grading systems were implemented (Javid, 2007). LEED-ND is coming: are you ready? How to implement green planning and design principles now.

People working in the sector of green construction came to conclude that houses could not be regarded as truly green unless it was appraised in the context of their surrounding area. This context should encompass not only other buildings but also housing, transportation, and services (Elissa, 2015). The LEED-ND team devised a rating system that was capable of distinguishing between a variety of construction configurations. The four main topics were green construction and technology (GCT), the innovation and design process (IDP), smart places, and connection. In contrast to earlier rating systems, LEED scope takes into account not only ecological but also social considerations as a reward for including a variety of dwelling styles and making their projects accessible to a wider range of income brackets (Elissa, 2015).

Developers are awarded 10 points of the overall number of neighbourhood patterns and design points that are available by allowing people who work in the community to also live in low-cost housing in the same neighbourhood. Providing housing for people with varying income levels may help improve the environment as this would cut down on the number of people commuting to and from work thereby reducing greenhouse gas emissions that contribute to climate change.

MATERIALS AND METHODS

The study employed a survey research design and made use of both qualitative and quantitative modes to examine the green building practice in Kenya. The project entailed the construction of six blocks, four of them housing up to three-bedroom units, a parking silo, and a kindergarten. The site is located along Kinsasha Road, off Park Road on latitude $1^{\circ}16'28.96''S$ and longitude $36^{\circ}49'57.48''E$ in Park Road Area of Starehe Sub County, Nairobi City County. Notable landmarks include Muslim Primary School that borders the site to the west and Park Road Mosque to the East. The parcel of land to be developed measures approximately 7.843 Ha. The target population comprised park road affordable housing units of the big four agenda of Kenya by the government. Neighbourhood design and development of the 1370 park road affordable housing units for analysis. Descriptive statistics were used to analyse the quantitative data obtained from the household questionnaire administration.

RESULTS

The first objective findings were to determine the degree to which the LEED-ND rating system promotes sustainable development in low-cost housing projects. This section provides an analysis of the LEED certification in light of the finding of the study, which indicated that the way by which a tool is implemented might be just as important to the success of the tool as the tool itself. The two key concerns brought up in the reviewed literature are both relevant and consistent with one another. The high cost of certification was one of the primary issues along with the labour-intensive complexity of certifying development projects, which frequently involved a large number of individuals. The fee structure is such that any project over 100 acres pays \$20,000; projects that are between 20 to 100 acres pay \$14,000 and 20 acres or fewer pay \$8,000.

Figure 1: Percent of LEED-ND Pilot Projects within each fee category

Neighborhood Development fees

Neighborhood and Development fees	First 20 acres	21-100 acres	More than 100 acres
Registration	\$1,500 (for all)		
Smart Location and Linkage (SLL) Prerequisite Review (Optional for LEED v2009)	\$2,250 (for all)		
<i>Expedited review</i> (reduce from 20-25 business days to 10-12, available based on GBCI review capacity)	\$5,000 (for all)		
Smart Location and Linkage (SLL) and Neighborhood Pattern and Design (NPD) Prerequisite Review (Optional for LEED v4)	\$5,000 (for all)		
<i>Expedited review</i> (reduce from 20-25 days to 10-12, available based on GBCI review capacity)	\$5,000 (for all)		
Initial Stage Review	\$18,000	\$350 per acre	Contact for pricing
<i>Expedited review</i> (reduce from 20-25 business days to 10-12, available based on GBCI review capacity)	\$25,000 (for all)		
Subsequent Stage Review	\$10,000	\$350 per acre	Contact for pricing
<i>Expedited review</i> (reduce from 20-25 business days to 10-12, available based on GBCI review capacity)	\$15,000 (for all)		

Source: USGBC (2022)

Because the process is so challenging, it is essential to have a solid understanding of how the USGBC plans to certify community development projects, which typically have considerably more extensive build-out timetables than individual buildings. Construction of multi-building projects often takes place in phases, which complicates certification issues such as determining whether or not each phase can be certified independently or whether or not the project can be certified once it has been finished in its whole. The construction period for multi-building projects is often longer than the construction period for single-building projects. To overcome these drawbacks, the United States Green Building Council developed the ND rating system. This system makes it possible for projects to be certified at various phases of their production, and if the client so chooses, even while they are being built in separate sections.

DISCUSSION

The study adopted a checklist data collection tool through the case study of the Park Road affordable housing development. The choice of this case study was made using a few control factors (namely the fact that they are all geographically located in Nairobi County, they were all built less than 5 years ago and it is an affordable housing scheme to adopt green practices). Its central location, close to the city centre, made it the perfect choice. The LEED-ND Certification Process is covered in the first section, followed by a discussion of the LEED-ND Standards in the second, and a summary of the findings from the LEED-ND pilot project case study on Park Road Ngara in the third.

Documentation for the LEED-ND rating system is submitted following a three-step process. At this level, neither the plan nor the project would be accepted because stage 1 is an optional pre-review

approval from the USGBC. Stage 1 acts as the pre-review approval. The LEED-ND pre-review approval stamp is required to be included in applications for new construction. This stamp demonstrates to the permitting authority that the developer is dedicated to producing a high-quality building. When all of the prerequisite permissions and approvals for the proposed project have been secured, the next stage can begin. It is required that the USGBC be informed of any alterations that have been made to the plan since stage 1 for it to be reevaluated. The United States Green Building Council (USGBC) will issue a certificate stating that the design is a LEED-ND certified plan if certification is obtained at stage 2 verifying that community development is complete is the objective of stage 3 once building on the project is completed additional paperwork will be required.

The third goal concentrated on the difficulties that the green neighbourhood development concept presents for projects that provide affordable housing. The study found that green neighbourhood assessment places more emphasis on the neighbourhood than it does on the efficiency of individual buildings, which is another important component of a city. Since its inception, green neighbourhood assessment has received a lot of attention because it is widely accepted that green practices in individual buildings are insufficient to meet the overall green practice objectives for the entire society. As a result of this recognition, green neighbourhood assessment has gained popularity as a tool to aid in decision-making, and LEED-ND is one of the most widely used green neighbourhood assessment systems.

The fourth objective was to evaluate the Green Neighbourhood Development Concept's suitable strategies for Affordable Housing Projects. The study found that only 40% of LEED-ND projects currently include affordable housing in their developments, as shown by statistical scorecard evidence from the "Housing Types and Affordability" credit under the neighbourhood pattern and design category. Furthermore, only 29% of LEED-ND projects include affordable

housing in addition to a variety of housing types. Although it is simpler to capture a wider range of variation in building type rather than price, 68% of residents are incorporating a greater diversity of housing types into their neighbourhoods.

CONCLUSION

The LEED-ND certification system is currently the standard for environmentally responsible communities worldwide. The rating system has been significant in fostering green innovation in the market. The rating system can be enhanced by applying many strategies that address low-cost green housing projects; these strategies have the potential to improve the rating system.

RECOMMENDATION

According to the findings of the study, post-occupancy evaluation can be included as part of LEED-ND to gauge satisfaction from residents and make the transition from a prescribing-based system to an implementing one after the completion of the construction. It would be reasonable to do so annually and then every five years after that give credit for the new development's overall quantity of parking spots as well as the parking ratios that were implemented.

AREAS OF FUTURE STUDY

Based on the findings of this study, it is recommended that additional research be carried out on the knowledge and perception of the green neighbourhood in Kenya.

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