

Architecture for The Urban Poor: *A Case of a Participatory Slum Upgrading in Nairobi, Kenya*

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Received on 1st August, 2019; Received in revised form 29th May, 2020; Accepted on 12th June, 2020.

Abstract

Architecture in its broad perspective denotes both a process and a product. In the formal built environment, there are distinct mechanisms for engaging with the two dimensions unlike with the informal where the mode of 'architecture without architects' prevails. Extreme informality is typified by slums that constitute a sizeable portion of the urban formation in the global South. Past upgrading initiatives have experienced gentrification and displacement of beneficiaries ostensibly due to mismatches between the residents' real needs and the state of the upgrading; an apparent implication for architecture. Contextually, the current Kenya government's big four agenda for development cites slum upgrading as a focus area in the affordable housing pillar. It is thus imperative to examine better ways of structuring architecture to appropriately respond to the specific needs of the urban poor and avoid the pitfalls experienced with previous initiatives. The paper adopts a practice research approach that espouses 'writing from practice'. While a myriad of other disciplinary accounts could be derived from the referenced case, this study focuses only on the state of architecture in the upgrading based on the author's practical experiences as a community architect for the project. The study of Kambi Moto upgrading depicts a participatory approach that promotes close interactions between the community and the technical design team. A feedback loop remains open; constantly linking the community's reactions on the emerging upgrading to the design solutions for subsequent upgrading phases. The community's involvement obviates the gaps that conventionally exist between the user, the developer and the designer and enhances resonance between user needs and design solutions. The incremental construction approach enables the owners to scale up the architecture in tandem with improvements in their financial capacity. While the specific experiences herein may not wholesomely be generalized for other contexts, it is the principles behind the architecture that would be of adaptive replication in the upgrading of other slums.

Keywords: Architecture, Participation, Slum upgrading, Urban poor.

INTRODUCTION

The demographics of the urban poor in the developing world continue to soar due to the high rural-urban migration coupled with natural population growth from within the urban areas. Compounded with inadequate resources, inordinate land and property speculation, this has led to the proliferation of slum settlements whose deplorable living conditions are further exacerbated by the high rate of un-employment and the rampant environmental degradation. Admittedly, the existing technical approaches, regulatory framework for planning standards and administrative procedures by which the process of urban development and growth is managed have been cited as being inadequate towards addressing the built environment needs of the

urban poor (Payne, 2004). Hence, the urban poor continue to manage their built environment without professional involvement akin to what has been referred to as 'architecture without architects'. Given that they constitute majority of urban dwellers, it renders further credence to the assertion that the true builders and planners of Third World cities are the urban poor (McAuslan, 1985).

In the Kenyan context, there have been several structured initiatives aimed at housing the urban poor. These include the slum clearance and provision of public housing of the 1960s and early 1970s, sites and services schemes of the 1970s, tenure and physical upgrading of the 1980s and the enabling approaches of the 1990s and early

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2000s. The current government’s development plans encapsulated in the big four agenda has slum upgrading in the fourth pillar on housing where it is referenced as social housing and has the biggest financial allocation in the pillar’s medium term budget allocations (Parliamentary-Budget-office, 2018). Out of the expected 83,000 housing units to be constructed in the 2018/2019 financial year, slum upgrading would deliver 12,000 units (Table 1).

The challenge of housing the urban poor has been part of periodical global development discussions such as the United Nations Agenda 21 of 1992, the Millennium Development Goals of 2000, and the Sustainable Development Goals (SDGs) of 2015. In the current phase of the SDGs, goal 11 on sustainable cities and communities envisions making cities and human settlements inclusive, safe, resilient and sustainable (Clive-Barnett, 2016). The UN-Habitat, as a custodian agency for the housing targets, engages with governments and other actors with emphasis on inter alia; participation, sustainable energy sources, housing sector policy reforms, sustainable neighborhood designs and technologies. Lately, such collaboration between the Kenya government and the UN-Habitat resulted in the Soweto East upgrading program in Kibera slums.

Similar past interventions for housing the urban poor styled as slum upgrading encountered mismatches between the state of the improved environment and the socio-economic situation

of the residents; leading to gentrification and the eventual displacement of the urban poor by more affluent people. There is an apparent need to explore more sustainable approaches of doing architecture for the urban poor in order to ensure that both the processes and the products thereof respond to their unique needs.

THEORY

Argument for Architecture for the urban poor

Architecture can be described as the art or practice of designing and building structures and especially habitable ones. This description posits two perspectives; that of a process as well as a product. The process of Architecture conventionally involves different actors, each executing their clearly defined roles. On the other hand, the process of putting up self-built environments as characterized by slums has the urban poor as the dominant actors who solely execute multiple roles in a non-mediated process that results in what is often perceived as substandard built environments. The search for a most appropriate approach to architecture for the urban poor would benefit from a review of the situations presented by both the conventional and the self-built modes of architecture.

Conventional approach: Multiple actors, distinct roles

For the conventional approach, the actors involved entail the client, the designer (architect), the user and the legislator (Lawson, 2006), each playing

TABLE 1: Big four projects in housing and the allocations over the medium term

Project	Allocation 2017-18 Kshs. millions	Allocation 2018-19 Kshs. millions	2019-20 millions Kshs.	2020-21 millions Kshs.
Construction of 7,394 housing units for National Police and Kenya Prison Services	1,350	1,500	1,500	1,500
Construction of 440,000 affordable housing units	0	1,000	1,000	1,000
Construction of 200,000 social housing units	0	2,000	2,200	2,535
Civil Servants Housing Scheme (mortgage to 1,220 beneficiaries)	587	1,537	1,537	1,537

Source: Parliamentary-Budget-office 2018

distinct roles. Ordinarily, the client provides the material resources and background instructions. The user and legislator provide a range of requirements. The architect reflects on the design implications posed by the constraints from the client's instructions, the user needs, the building legislation requirements and site conditions. The user and legislator tend to present more rigid and mandatory constraints while the designer and client constraints can be negotiated and range from being flexible to optional.

Self-built approach: Multiple roles, single actor

Self-built environments like slums are essentially styled by the residents themselves, often acting autonomously. In the absence of strong oversight controls, the residents also play the regulator role with their own quasi building guidelines. This collapses the roles of actors as described in the conventional approach into a single actor role (Figure 1) whose process of iterative self-negotiation is definitely full of intricacies. For instance, it changes the design requirements from being viewed as constraints to being seen as a range of needs and opportunities that the actor has to match off.

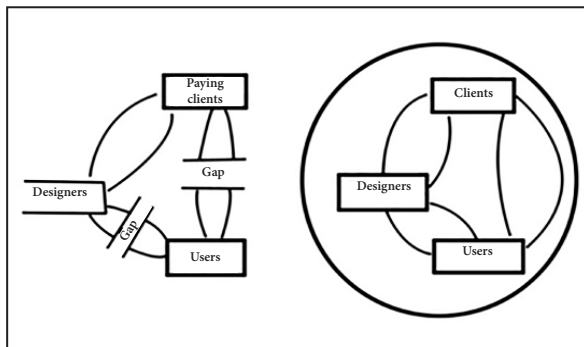


FIGURE 1
Illustration of relating multiple actors and single actor
Source: Adapted from Zeisel 1984

The single actor phenomenon also points to the likelihood of a process and products that lack the user gaps that characterize the involvement of multiple actors (Zeisel, 1984). The designer in the conventional approach relies on instructions from the client while in the self-built approach the instructions emanate from and are dealt with by the same actor, assuming the multiple roles of client, user and designer (Figure 2). Although this lacks strong centralized control and would

appear to be precursory to chaos, it presents an approach that is more participatory, mediated by social and communal interrelations between the actors rather than by institutionalized authorities. Turner (1976), while advancing the case for self-help approach to housing solutions for the urban poor, avers that they (urban poor) are better placed to assess their needs, to own-design their solutions and manage the building process.

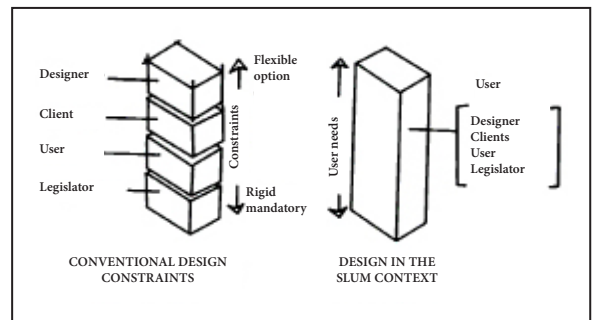


FIGURE 2
Illustration of conventional design versus the single actor situation in slums
Source: Adapted from Zeisel 1984

Norberg-Sculz (1971) refers to an urban actor's distinct life-world whose framework is shaped by a range of factors entailing personal knowledge, communal knowledge and scientific knowledge. Despite slum residents possessing personal and some communal knowledge that would be of immense significance during upgrading, they may lack the requisite scientific knowledge that would make their built environment more sustainable, responsive and integrative with the rest of the formalized urban establishment. Slum upgrading interventions are undertaken in order to redress such shortcomings arising from the initial efforts by slums residents to house themselves. Hence, the need to reflect on what would inform the choice of architecture that is deemed appropriate for slum upgrading.

Slum upgrading, what approach to architecture for the urban poor?

From a basic description, upgrading denotes improvements to an existing situation (COHRE, 2005). As such, it would have to take cognizance of the existing built environment and by extension the socio-economic situation of the residents therein. However, most slum upgrading initiatives

that have remarkably failed tended to assume a tabular rasa scenario without factoring in the existing physical structure of the settlement and ignoring the involvement of the residents. On the converse, the few cases of sustainable upgrading have been characterized by participation of the residents alongside other actors. Participation straddles between the self-built scenario and the conventional approach; it taps on the technical benefits of conventional architecture while also harnessing the richness of self-built approaches through user involvement.

The import of user participation in upgrading cannot be underrated. Lynch (1981) alludes to the significant role played by even the less powerful actors akin to slum residents in shaping the city by observing that the ultimate form of the city emerges from below, from the activities of the urban actors from the grassroots with bottom-up open networks of decision making. Local networks of citizens co-operate in a semi-autonomous system of interactive relationships (Shane, 2005). Women have especially been singled out for their outstanding participative role in the provision of urban housing (Schlyter, 1984).

Despite the preceding highlights on the significance of participation, there are some likely challenges regarding its application in architecture for slum upgrading. First, slums exist in diverse contexts and hence there may not be a universal mode of participation. Second, given the range and varied interests of actors involved, such participation can be susceptible to manipulation (Arnstein, 1969). Third, there could be an organizational and logistical challenge of managing the community's direct involvement in such a technical undertaking as Architectural design. Fourth, slum communities may not be sufficiently equipped to directly undertake complex construction works that require specialized skills and organizational capacities. Fifth, the collective involvement of the residents and their instant contribution of ideas may not necessarily deliver the same richness and socio-economic sustainability as produced by their individual and gradual involvement in building their existing settlements.

In order to understand how the above challenges present in a participatory setting of architecture, it is imperative to carry out a study based on a successful case of slum upgrading and establish the responses adopted therein.

RESEARCH METHODS

Given the author's involvement in the identified case study, that is Kambi Moto settlement, a practice research approach is adopted. It is a descriptive qualitative approach that draws on experiences during both the design and the implementation stages of the project. Some archival data in the form of drawings and baseline surveys are incorporated in order to augment the descriptions therein.

The practice research approach is suggested for study of cases without vast documentation related to the subject matter. It could also entail an isolated phenomenon that requires a simulated real life experience in order to draw conclusions (Archer, 1995). This approach is distinctively relevant to applied disciplines such as Architecture where physically simulated solutions can be analyzed objectively. Perhaps, the challenge would relate to tacit knowledge; ensuring that the study of the resultant processes and products makes the right interpretation of the designer's initial thoughts and intentions. However, this does not obtain in the current case as the author making the analytical deductions was also involved in developing the study case.

There are multiple perspectives that emanate from the practice research approach. One perspective entails 'research for practice' whereby the knowledge generated from research informs the nature of practice that is carried out. A second perspective involves 'research through practice' whereby one engages in practice to generate research content. A third view, and which is most relevant for the case being studied herein is the 'research from practice' perspective. It provides an opportunity for reflections on what transpires during practice. All in all, it's noteworthy to observe that research and practice do not necessarily have to be construed as a dichotomy but as interactive realities that built into each other. This approach is adopted to study the Kambi Moto slum upgrading

case. The study is organized into five sections corresponding to the previously identified challenges that confront participatory approaches in architecture. This comprises of;

- An introduction that provides background information in order to bring out the significance of the immediate context and the wider urban settings on participation.

- The structure of the program, the gamut of actors involved and their interactions in order to examine how the challenge of complex relations among actors and the likelihood of manipulation are addressed in participation.

- The management of the design process in order to assess how the unique technical aspects of architecture are handled in a participatory approach.

- The construction process in order to assess how any specialized skills deficiencies and inadequate organizational capacity of the participating community were dealt with.

- A detailed exposition of the significant architectural design and planning qualities as a way of assessing how community participation leads to sustainable built environment.

RESULTS AND DISCUSSION

The Kambi Moto Slum Upgrading Program

Kambi Moto settlement is located in Huruma, on the North Eastern part of the Nairobi City. It is surrounded by a formally planned social housing estate developed in the 1970s (**Figure 3**).

The settlement site was initially designated as a car park space but remained unutilized since occupants of the adjacent formal houses lacked cars. It underwent a series of use transformations before eventually becoming a slum settlement. Owing to its lack of formal recognition, the settlement missed on the services network of water, sewer, electricity and storm water drainage that served the formally planned neighborhood around it. The settlement had a total resident population of 1241 people constituted of 275 households and comprising of 65% females and 35% males. There were 203 tenant households and 72 structure owner households.

Upon request from the community members, the then Nairobi City Council set aside the land for upgrading as a Special Planning Area; thus

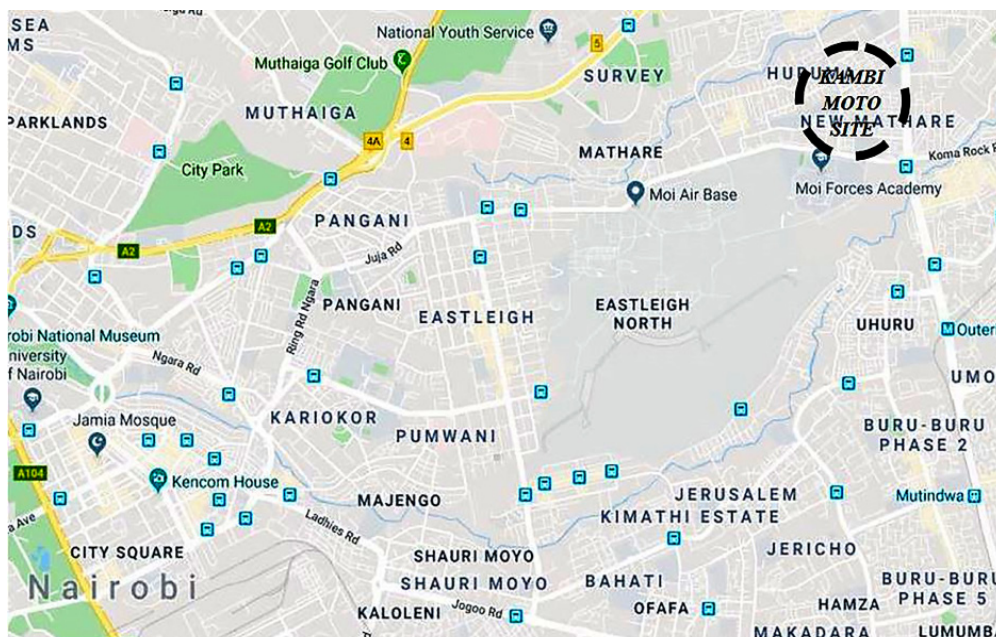


FIGURE 3

Map showing location of Kambi Moto

Source: Adapted from Google maps 2019

exempting the envisioned development from stringent formal planning standards. According to the formal planning standards, the neighborhood had initially been zoned for low density residential use with a plot ratio of 1.5 and ground coverage of 50% (City-Council-of-Nairobi, 2004).

Program structure

The mobilization of different actors involved in the program was undertaken by Pamoja Trust, a local non-governmental organization. The then City Council provided the policy and technical framework while availing a favorable political environment by rallying for support of the program from civic leaders. The then Provincial Administration hosted the Nairobi Informal Settlements Consultative Committee (NISCC) forum that offered broad guidelines for upgrading while stressing the importance of community involvement at all stages. Practical Action, then named Intermediate Technology Development Group (ITDG), provided technical support during the construction training. Other organizations involved in supporting the program included COOPI, Shack Dwellers International (SDI), Shelter Forum, University of Nairobi (UoN) and Jomo Kenyatta University of Agriculture and Technology (JKUAT).

Pamoja Trust carried out social mobilization of the slum residents, championing for the formation of a savings group in order to pool together finances through daily collection of savings in tandem with the regime of daily wages for low income earners. Participation was encouraged by having the collectors comprising of community members picked on a rotational basis. All collections were entered into ledgers that were audited on a weekly basis by a group of community auditors who had initially been tutored by qualified auditing officers. The accumulated savings were initially loaned out to community members to meet their short-term financial needs while nurturing the culture of loan repayments and trust with each other.

From the pooled savings and with the assistance of the supporting NGO, the slum residents established a grassroots revolving fund named 'Akiba Mashinani', a Swahili word for grassroots savings. This formed a common account into

which any additional funds sourced from donors were channeled and from which members eventually obtained loans for house construction.

Community design process

An initial baseline survey for enumeration of demographics statistics and mapping of land and infrastructure situation was undertaken by the community with logistical assistance from the supporting organizations. Additional information was collected during a design studio exercise by students from the Department of Architecture at JKUAT that resulted in preliminary design proposals for house typologies and settlement layout. The resultant data was further verified by the residents in a public display within the settlement and was ultimately utilized in establishing the site constraints and gauging the user needs.

Several architects were collaboratively involved in supporting the community design and construction process in different capacities as outlined below. Architect Erastus Abonyo of Tecta Consultants, a Nairobi based architectural practice formally hosted the process and provided the initial design orientation and subsequent critiques. Architect Aaron Wegmann of Aaron J Wegmann Architects from Zurich provided the framework and organizational insights for community design and construction approaches based on his vast experience gained from involvement in similar initiatives in India and South Africa. Architect Professor Crispino Ochieng, a specialist in Human settlements from JKUAT provided design reviews and part onsite project supervision. The author was tasked with directly coordinating the community design sessions, collating the input from senior colleagues and the community, preparing the technical drawings and supervision of construction works.

Participatory community design sessions were held within the community precincts for ease of attendance by the residents. Given that most community members lacked basic technical knowledge, they used simple methods of design communication. Some produced rudimentary sketches indicating their preferred spatial setups and overall building form while others practically paced or staked out their envisioned real size house

layouts on the open ground. Initial design ideas from the community featured more of upscale housing provisions such as car ports, swimming pools and multiple bedrooms.

After a series of design permutations informed by the identified community needs and the size of available land, some key principles for guiding the house design and settlement layout were established. The main house typology was to be based on ground space ownership as opposed to vertically layered ownership and would comprise of three rooms plus a cooking area and a toilet cum shower developed incrementally; the first room on the ground to be available for use in advance as subsequent additions of the other rooms went on. For equitable accommodation of all residents in the settlement, a single house design typology was adopted. From these initial design considerations, the architects guided the community in a series of design iterations with presentations on large format papers on which the residents could scribble their feedback.

The changes in the evolving designs were constantly rationalized in lieu of their cost implications and overall affordability. The goal was to match the cost of the houses with the member's ability to repay the loan by ensuring that monthly repayment installments did not exceed the amount they had been paying as rent in the unimproved structures.

As part of advancing the design communication and feedback, a real size model of the proposed house was put up using timber framing and clad in cloth material for enclosure. Further simulation of a functional house was achieved by furnishing the different rooms with their respective furniture. A ceremony to inaugurate the house model and which was graced by all the stakeholders, including civic leaders and officials from the then Nairobi City Council, elicited additional feedback on the house design and provided further advocacy for the program. After consolidating all feedback and making the necessary design amendments, submission drawings were presented to the urban authorities for approval considerations. Partial approval was granted for the construction of a sample demonstration cluster of houses which would allow for further onsite review before

granting comprehensive approvals.

Construction process

A series of preliminary activities preceded the actual construction works and entailed the identification of beneficiaries, budgeting and procurement of materials, construction training and site organization. Given their lack of experience in matters upgrading, the community members went for peer learning visits to other similar precedence setting programs in India and South Africa. The then Intermediate Technology Development Group (ITDG) in conjunction with Housing and Building Research Institute (HABRI) at the University of Nairobi conducted an advance construction skills training workshop and did follow-up onsite training to the community members.

The overall management of the project was undertaken by a team comprising of community representatives, a storekeeper, site manager, social process support personnel from the facilitating NGO and the technical professionals. The team held weekly meetings to review the site expenditure, the labor schedules, storekeeping records, progress of building works and other arising community organization matters. A construction committee made up of community representatives and the site manager undertook the daily coordination of site activities including procurement of construction materials and supervision of labor.

The financing for the construction works came from the earlier mentioned consolidated fund with a loan constituting 80% of the total cost and the other 20% coming from the beneficiary members' savings. In order to lower the direct construction costs and further shore up affordability, the community members made sweat equity contribution by directly providing unskilled labor services. Those in regular employment hired their available counterparts to stand in for them in the works roster. The community members who had participated in the advance skills training workshop were prioritized for skilled labor engagement. Throughout the entire construction process, women accounted for 75% of the total labor force.

In order to ensure minimum displacement and disruptions to the residents, the clearance of shacks for upgrading space was done in phases and only when all other preparatory activities had been completed. The construction of the first phase of 28 starter houses commenced in 2002 and was finalized in 2005. The beneficiaries of the upgraded houses were identified based on a set of criteria that, among others, required one to have; provided the most hours of unskilled labor during construction, made savings to match what was established as direct contribution to the overall cost and consistently attended community activities and meetings. After occupying the houses, the beneficiaries enjoyed a grace period of three months before commencing loan repayments with interest pegged at the rate of ten percent per annum and which was merely meant to compensate for the operational costs and inflationary effects. The loan repayments replenished the revolving fund and made it possible for others to acquire loans for construction purposes. The occupants of the starter houses could apply for another loan to construct the subsequent incremental phases, but only after clearing their first loan obligations. The residents of the upgraded houses constituted a management committee to oversee such common matters as sanitation, repairs and maintenance.

With the benefit of lessons learnt during the first phase, additional phases of construction have since been undertaken. Some of the initial starter houses have been built up to completion as per the design. At the time of writing this paper, the settlement had been substantially upgraded with houses at different stages of completion.

Architectural design and settlement planning qualities

The design of the houses and the settlement layout deviated from the applicable housing standards and planning parameters for the context neighborhood. The ground coverage and the plot ratio for the upgrading are 80% and 2.5 respectively as compared to that of 50% and 1.5 per the area planning guidelines (City-Council-of-Nairobi, 2004). The total floor area for the full house adds up to 55.76 square meters, which is relatively generous compared to that of 41.25 square meters, suggested in an almost similar semi-detached

3-roomed self-contained units which had been proposed for the low-income housing standards review.

Based on design permutations that considered accommodating all the enumerated households within the surveyed acreage and with provision for some open spaces, the footprint of each house was determined to measure 4.5 by 4.5 meters. The basic housing unit comprises of a single room on the ground floor with some other two rooms layered vertically. The space on the ground floor functions as a lounge and measures 3.95 by 4.2 meters internally (**Figure 4**). It has a kitchenette ventilated via a chimney positioned above the cooking space and also incorporates a storage space tucked under the steps. On the first floor, there is a bedroom, a toilet cum a shower and a balcony for those units fronting the streets (**Figure 5**). On the second floor, there is an additional bedroom with a balcony (**Figure 6**). The top most floor level has a terrace for outdoor resting, drying of laundry and which has also been adaptively used for urban agriculture in containers and sacks as planters.

The house has a simple structural design comprising of a concrete strip foundation whose depth goes to just over a meter owing to a shallow stable rocky ground. The structural walls are made of 200mm thick masonry stone (**Figure 7**). The upper floor slabs are primarily made of 760mm square sized pre-cast concrete elements with convex configuration that enhances the compressive strength of concrete and hence the use of minimal ring reinforcement on the edges only. The elements rest on inverted T-beams and have a 50mm thick insitu concrete topping to even out the floor surface.

The settlement layout is made up of the above type houses laid out in a series of interconnected clusters (**Figure 8**) with each cluster having between three to five houses that front a shared common outdoor space. A system of interlinked internal streets connects these clusters to form a neighborhood with open spaces at differentiated scales and which also accommodate the reticulation of services; water, electricity and drainage.

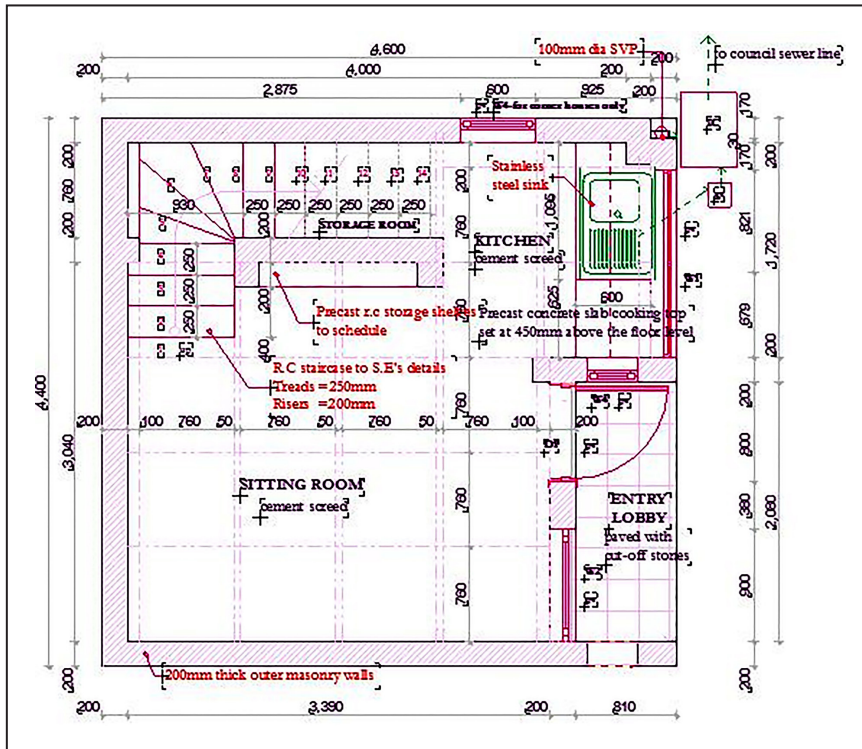


FIGURE 4
 Ground floor plan
 Source: Tecta Consultants – Architects 2005

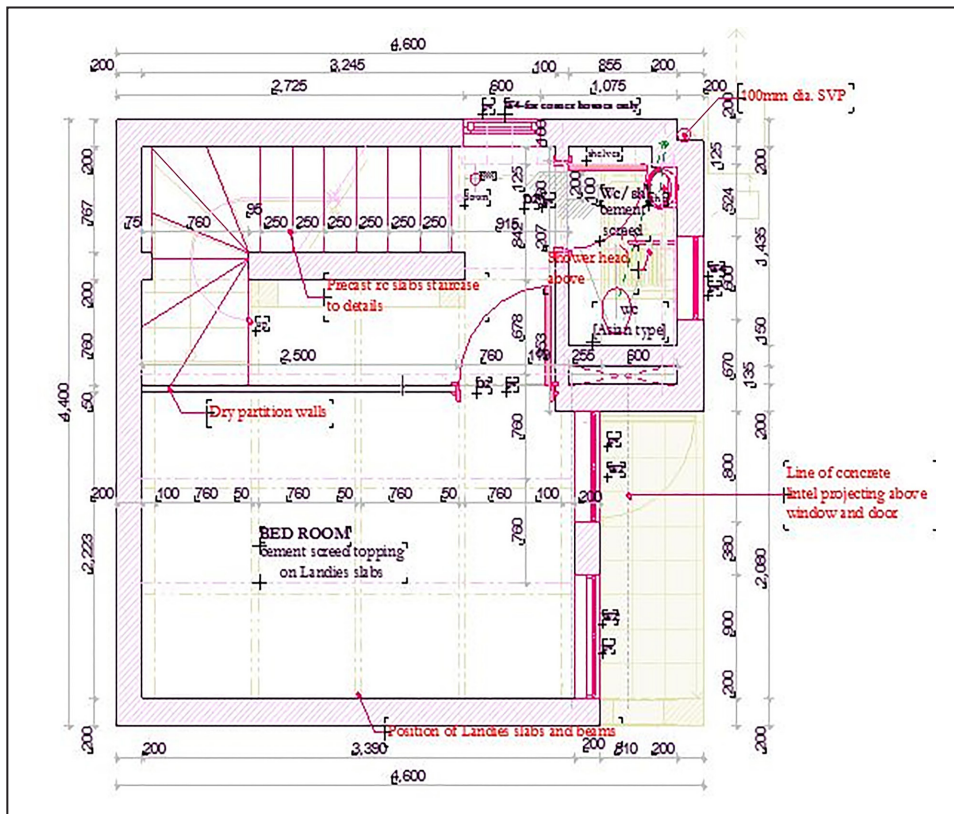


FIGURE 5
 First floor plan
 Source: Tecta Consultants – Architects 2005

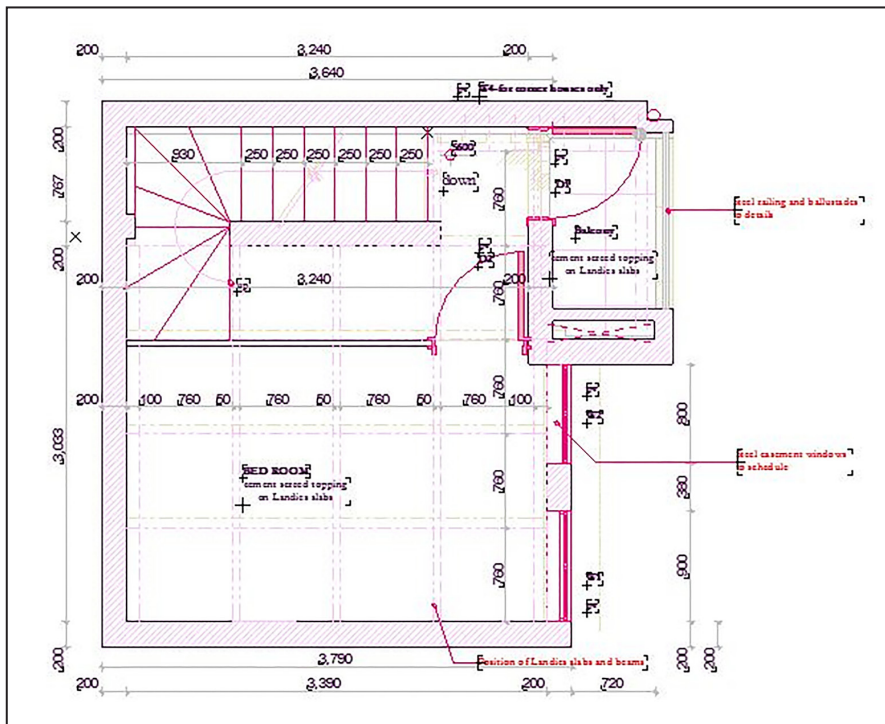


FIGURE 6

Second floor plan

Source: Tecta Consultants – Architects 2005

Reflections on the participatory architecture in Kambi Moto upgrading

Some concepts drawn from the structure of the pre-existing settlement were incorporated into the design of the new settlement layout (Figure 9). For instance, the dense labyrinth of interconnected circulation paths that characterized the original settlement structure informed the intricate network of circulation corridors in the upgraded settlement. Additionally, there was minimal disruption of existing social structure as the program avoided unnecessary displacement of the community members. Even with these traits adopted from the pre-existing slum structure, the emerging housing offers a distinct new outlook (Figure 10, Figure 11, Figure 12).

Overall, the program was modeled to reach out to all the urban poor. However, a closer scrutiny reveals that it sidelined the extremely poor in the community. The requirement that a community member ought to have saved the equivalent of twenty percent of the total construction cost in order to benefit only works for those who are relatively well off among the poor. In addition,

the lowest phase of construction comprising of the starter unit remained way beyond reach of the very poor in the community.

The project was generally touted as affordable on the basis of the direct construction cost being below what was prevailing in the formal market. However, there were latent costs in the project that ostensibly made it look that affordable. For instance, while each member from the saving scheme put in about 80 days of work, this component of sweat equity was not factored in when computing the cost of the house. Similarly, the cost of technical support for design and social facilitation was also not factored in as it was borne by the facilitating NGO. The cost of land was not considered as it was provided at no cost by the then Nairobi City Council.

CONCLUSION

This study sought to establish some of the key highlights of a sustainable approach for managing the architecture for the urban poor based on a set of identified gaps in participatory approaches.

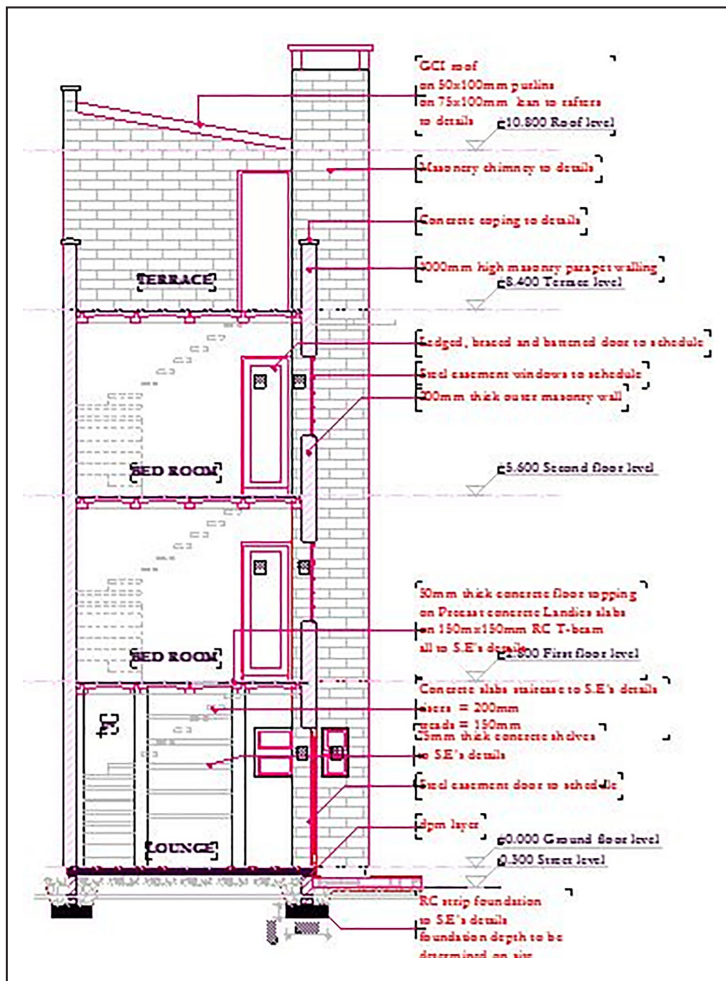


FIGURE 7
 Building section
 Source: Tecta Consultants – Architects 2005

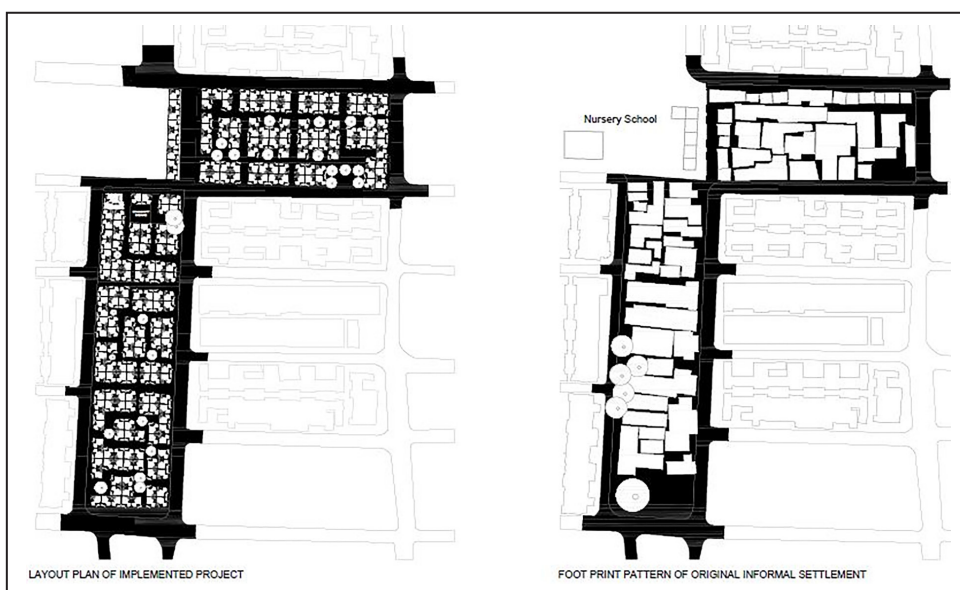


FIGURE 8
 Kambi Moto settlement plan and the figure ground map before upgrading
 Source: Tecta Consultants / Aaron Wegmann – Architects 2005

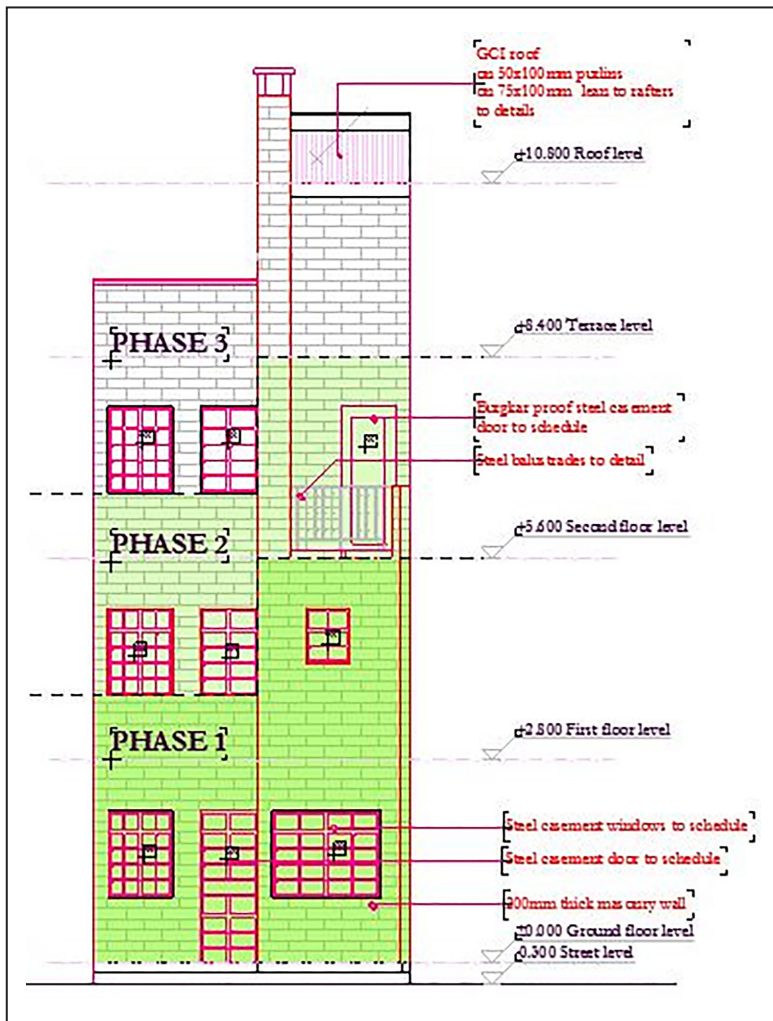


FIGURE 9
 The different stages of construction
 Source: Adapted drawings by Tecta Consultants – Architects 2005



FIGURE 10
 Implemented and occupied houses in the background, ongoing construction and a shack in the foreground
 Source: Author 2005



FIGURE 11
 An emerging street front of new houses depicting different stages of construction
 Source: Author 2005



FIGURE 12
 View of a house constructed up to phase 2
 Source: Claudio 2008

One of the issues being investigated was the implications of diverse contexts on participatory upgrading approaches. The studied settlement largely typifies the state of other slum settlements albeit with some distinguishing unique qualities. The existence of a planned neighborhood made it easy to plug the upgrading into the existing infrastructural network. The recognition and participation of structure owners alongside the tenants is a first given that previous upgrading initiatives have always focused on the residents. This avoided discord among the residents and provided both social and financial capital for the project's success.

The study also sought to unravel how interrelations among actors can be managed in order to deliver sustainable architecture for the urban poor. From the studied case, the process has evidently been participatory with different actors playing diverse roles in the process. The direct participation of community members in decision making, providing labor and management input enhances their sense of ownership and attachment to the project which mitigate against the gentrification and displacement that afflicted previous upgrading initiatives and also helps in lowering the upgrading costs. Noteworthy is the overwhelming participation of females as compared to males, giving further credence to the earlier assertion that

women play a central role in provision of urban housing.

Another focus of this study was to seek an understanding of how the technical aspects of architecture can be managed in a participatory setting. The organization of the design process at the settlement level, akin to taking the architects' design studio to the grassroots facilitated the attendance of as many residents and enabled immediate referencing to contextual matters and application of rudimentary communication techniques. The application of elaborate design props such as the life-size house model with simulation of lived in experience replete with furniture arrangement simplified design communication and psyched up the residents towards eventual actualization of the construction. Overall, this approach demystifies the practice of architecture in a participatory setting without taking away the need for professional rigor in resolving critical technical aspects.

The existence of active and endless feedback loops throughout the entire process allows for continued incorporation of adjustments as required of by the users. While this ensures that the resultant built product closely aligns with user expectations, there is also a challenge of separating decision making and implementation process. Hence a difficulty in precise planning as there is always a looming likelihood of altering the process in response to some feedback along the way. The retention of a design team to continuously incorporate the emerging feedback in conventional practice would definitely have cost implications unlike in the study case where it was possible because the design team was engaged on modest terms and even then such expenses were not directly loaded onto the house costs.

The study also examined the challenge of engaging communities with limited organization and inadequate technical knowhow in complex and long drawn process like construction. The approach of the studied case not only addresses the challenge of building houses, but also entails the 'building of communities' by empowering slum dwellers financially, socially and technically. This multifaceted approach definitely preempts

any occurrence of gentrification and displacement by ensuring that the slum communities also get 'upgraded' economically and socially to match the improved physical environment. Indeed, the approach has essentially objectified the expression that 'housing is a process' and not just a product. The incremental and phased development approach lowers the threshold for entry into the upgrading process. With the initial phase of minimal construction, the residents begin to enjoy the early benefits of the upgrading. There is of course a challenge in ensuring that there is consistency and quality control in the subsequent phases of the construction.

RECOMMENDATIONS

The occurrence of open feedback loops in the process is laudable but an equally expensive practice to retain professionals on an extended design process and thus a need to establish other sustainable ways of managing this. One recommended approach would be to engage 'barefoot architects' comprised of community members who get onsite basic training to be able to incorporate simple design iterations arising from the feedback. Another approach would be to utilize corporate social responsibility services from professional bodies or like in the case of the university students who undertook the initial studies and concept designs for the project.

The architecture for the urban poor ought to be addressed concurrently with other encompassing aspects of urban life and not an exclusive focus on house construction. In any case, the built environment tends to evolve incrementally as the income levels of the residents improve, a process that has elsewhere been referred to as consolidation of spontaneous settlements. This ensures that the residents have financial capacity to sustain the upgrading through repayment of any loan financing, and meet the maintenance and servicing costs associated with an improved built environment.

It is incumbent upon institutions involved in slum upgrading to provide mechanisms for engaging with grassroots approaches to urban development. For instance, urban authorities ought to create a clear strategy for dealing with technical evaluation

of communally generated designs and which may deviate from established approaches. Design professionals ought to adopt community design processes into their practices when dealing with the urban poor.

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