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Community-led vs. subsidised housing. Lessons from informal settlements in Durban

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ABSTRACT

Rapid urbanization, poverty and socio-economic inequalities are causes of the backlog of informal settlements in South Africa, as dwellers cannot access formal housing schemes. Such unplanned settlements often need more basic services, social facilities and adequate housing. Nevertheless, informal settlements are core parts of the urban form rather than places for eradication. This article examines self-building and community-led upgrading practices in three case studies of partially and non-serviced informal settlements in Durban. It adopts action research participatory methods to coproduce knowledge and map various perspectives around community-led housing upgrading, building materials and construction skills in an effort to enhance community resilience and self-reliance. The findings reveal the key drivers and challenges associated with self-building, informal procurement and overall project management of the housing process. Successful grassroots practices demonstrate community ownership and dweller control beyond the physical upgrading per se. The lessons learned call for inclusive, participatory, and incremental approaches for effective community organization, self-reliance, social capital and livelihood development.

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1. Introduction

While there is progress in reducing the global urban population living in slums, more than 1 billion still live in such sub-standard settlements, with 23% in Sub-Saharan Africa (UN-Habitat, 2020). Access to adequate housing is a major debate in post-apartheid South Africa, and commitments to deliver housing to the poor have been made since the White Paper on Reconstruction and Development (RSA, 1994). Urbanization and poverty are significant causes of the housing crisis, as many low-income dwellers do not have access to formal housing (Mutisya and Yarime, 2011; Wekesa *et al.*, 2011).

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The Reconstruction and Development Program (RDP) has traditionally responded to the physical upgrading of informal structures and providing basic services, such as communal taps and rudimentary sanitation (Dupont *et al.*, 2015; SACN, 2016). Nevertheless, according to the 2022 Census data, South Africa still had over 2 million households living in informal settlements with housing, environmental hazards, and a lack of tenure (RSA, 2022). Visagie *et al.* (2020) suggest that 287,000 informal households live in the eThekweni municipality, where approximately 530 informal settlements exist (RSA, 2022). To exacerbate this, Durban city centre is fragmented, segregating economic opportunities from formal housing (eThekweni Municipality, 2016).

This article focuses on ‘self-building’ in community-led housing upgrading in three partially and non-serviced informal settlements in Durban, namely Namibia Stop 8, Piesang River and Havelock. The study adopts action research participatory methods to coproduce knowledge with informal dwellers and map households’ barriers, success factors, values and needs in self-building activities that enhance community resilience and self-reliance. Overall, the article has three objectives. First, the study provides an overview of household and neighbourhood self-building practices in informal settlements about the top structures’ design, construction, procurement and overall project management. Second, it examines how self-building practices are adopted in the housing upgrading of three informal settlements in Durban. By applying mixed methods, the authors present an evidence base of how local communities acquire the necessary resources and construction skills from local industry to manage the self-building process. Third, it makes a novel contribution to conceptualization by integrating the value of participatory upgrading processes, the skills and capacity building for both communities and local authorities, providing novel directions for city-wide incremental and inclusive upgrading frameworks.

2. Background and literature review

2.1. Overview of informal settlements upgrading in South Africa

Over the years, the definition of upgrading has expanded beyond substandard housing and physical challenges to include micro-scale sustainability interventions for community development, creation of livelihoods and social cohesion (Cirolia *et al.*, 2017; Khalifa, 2015; Kovacic *et al.*, 2019; Marx and Charlton, 2003; Roy, 2011; Shortt and Hammett, 2013). Informal settlements are dynamic places of self-organization (Roy, 2011) and core parts of the urban fabric with valuable assets and potential for grassroots innovation (Celhay and Gil, 2020; Georgiadou and Loggia, 2021; Kovacic *et al.*, 2019). Progressive definitions go beyond the interpretation of slums as failures or deficiencies in urban planning and government, suggesting that informal settlements offer, in fact, an immediate response to affordable housing due to their strategic proximity to jobs, schools, healthcare and other public facilities (Celhay and Gil, 2020; Huchzermeyer, 2011; Visagie *et al.*, 2020).

As informal settlements rapidly increase in South Africa, a ‘full upgrade’ has proven financially and temporally unsustainable (NUSP, 2015; Parikh *et al.*, 2020). *In-situ*, incremental upgrading is promoted under the National Housing Code and the South African Upgrading of Informal Settlement Programme (UISP)¹, which

acknowledge informal settlements as urban structures, avoiding relocation and slum clearance locations (Pieterse and van Donk, 2014; Visagie *et al.*, 2020). Under the UISP, municipalities provide infrastructure services, social inclusion with minimum disruption, and basic, functional tenure. The Informal Settlement programme under the Human Settlements Unit of eThekweni Municipality promotes *in-situ*, incremental upgrading of informal settlements (Cirolia *et al.*, 2017; NUSP, 2015; Parikh *et al.*, 2020). The municipality seeks to integrate informal settlements into the urban fabric to overcome spatial, social and economic segregation (eThekweni municipality, 2015).

2.2. Community participation and self-building in housing upgrading

Self-building comes from Turner's (1972) notion of 'housing as a verb' or 'freedom to build' and is defined as a bottom-up approach where households drive the construction process. In incremental upgrading, self-building refers to housing construction completed by the informal dwellers involved in either the design, construction or project management of top structures (Cohen, 2015; Dupont *et al.*, 2015; Marais *et al.*, 2008; Landman and Napier, 2010; Marais and Ntema, 2013; Parnell and Hart, 1999; Van Noorloos *et al.*, 2020). In self-building, dweller control is the ability to make critical decisions about the construction process, not necessarily to be involved in actual construction (Benson and Hamiduddin, 2017). The first post-apartheid policy to adopt a community-led approach was the People Housing Process (PHP). It sought to promote self-build housing through beneficiaries' local knowledge, skills and capabilities and implement it through housing cooperatives and self-help groups (Mitlin, 2011). With the Breaking New Ground (BNG) in 2004, the focus moved from delivering fully subsidised and serviced housing units to integrated human settlements with access to social services and job opportunities (Parikh *et al.*, 2020). With BNG, participatory housing upgrading became a significant driving force in citizen empowerment (Goebel, 2007; Rukwaro and Olima, 2003). In 2008, the enhanced people's housing process (ePHP) actively integrated beneficiaries who could make minimum contributions in terms of time, savings, labour and materials into housing upgrading (NUSP, 2015). Community-based organizations have led the ePHPbn process in terms of leading self-organization practices, mobilizing project management, empowering women and youth groups, and ensuring housing upgrading, which is more responsive to the needs of the community (Croese *et al.*, 2016; Venter *et al.*, 2019; Lizarralde, 2010; Tissington, 2011).

The implementation of the ePHP approach has been criticized by the South African Shack/Slum Dwellers International Alliance (SASDI) and various scholars (Bolnick and Bradlow, 2010; Bradlow, 2015; Landman and Napier, 2010; Marais *et al.*, 2008; Marais and Ntema, 2013; Mitlin and Mogaladi, 2013), as rather technocratic and conventional state intervention to control the number of housing units provided, thus shifting away from the original people-centred approach and Turner's model. Self-building in subsidised housing delivery is still quite limited as practitioners and policymakers often assume that they understand the values and needs of communities (Chitekwe-Biti *et al.*, 2012; Del Mistro and Hensher, 2009; Huchzermeyer, 2006, 2009; Iglesias, 2010; Mitlin, 2008; Smith and Brown, 2019; Van Noorloos *et al.*, 2020; Visagie *et al.*, 2020). Recent studies suggest regenerative

development practices to facilitate self-building (Brown-Luthango *et al.*, 2017; Venter *et al.*, 2019) and support a continuous learning platform with skills enhancement through learning by doing, social (community) learning and self-organization (Roseland and Spiliotopoulou, 2016; Venter *et al.*, 2019). For housing construction, these may include climate-resilient strategies to address overheating through a combination of natural building materials or recycled, re-used and repurposed waste material to contribute to circular economy practices (Robinson & Cole, 2015; Roseland and Spiliotopoulou, 2016).

2.3. Project management and procurement in informal settlements upgrading

The heterogeneous nature of grassroots, informal procurement processes and the self-build networks in housing upgrading of informal settlements constitute a complex system which can provide materials and labour without relying on public sector subsidies (Omenya, 2002). The ability to build adequate structures exists within informal settlements with skilled informal dwellers and self-taught builders (Bolnick and Bradlow, 2010; Lizarralde and Root, 2008). However, participatory project management in informal settlements is complicated and time-consuming (Dupont *et al.*, 2015; Rigon, 2014). Meredith and MacDonald (2017) and Amin and Cirolia (2018) examined adaptive project management strategies that promote community involvement in slum upgrading. They concluded that a hybrid, adaptive management approach that engages the community during upgrading while mobilizing resources from municipalities and large agencies can overcome some of the limitations of the typical 'top-down' or 'bottom-up' approaches, particularly critical delays or local capacity challenges (Meredith and MacDonald, 2017).

Subsidised housing is one of the key strategies used in developing countries to alleviate low-cost housing shortages, using procurement as a policy tool with broader social, economic, environmental and political implications (Ferguson and Navarrete, 2003; Gilbert, 2004). However, ineffective project management by municipalities and a shortage of construction skills and building materials can undermine effective and timely housing delivery and add to end-users' dissatisfaction (Mbachu and Nkado, 2007; Mzini *et al.*, 2013). The Expanded Public Works Programme (EPWP) is a government initiative in South Africa to enhance job opportunities and skills in construction and infrastructure delivery. According to the International Labour Office (Robbins *et al.*, 2005), city-level EPWPs could align housing delivery with the incremental upgrading of public facilities and the skills required to construct, operate and maintain housing and infrastructure delivery. However, Taing (2017) and Naidoo (2013) point out the conflicting prioritization of municipal objectives, including EPWPs, in complex development initiatives, such as informal settlements upgrading. Johnson *et al.* (2005) identified two levels of procurement: 'macro-procurement' at the national government level and 'micro-procurement' at the local (community) and individual level. 'Micro-procurement' strategies of community groups in self-building practices in low-income settlements could be part of a collaborative procurement framework (Georgiadou and Loggia, 2021; Georgiadou *et al.*, 2021). There is a gap in incentive-based compensations for community involvement and careful selection of municipality suppliers in South Africa. Such measures would

increase the effectiveness and value-for-money of building materials in housing construction (Georgiadou and Loggia, 2021). However, those who benefit from collaborative procurement practices are not often the stakeholders bearing the cost. For instance, the durability of building materials and maintenance costs affect the informal dwellers, but they are not entirely considered by municipalities (Meehan and Bryde, 2015). There is limited empirical research on how the public sector addresses green procurement, whole lifecycle thinking and a circular economy in a slum upgrading project (Ogunsanya *et al.*, 2022; Olanrewaju *et al.*, 2014).

2.4. Conceptual framework

Theoretical frameworks for community-led housing in informal settlements originate from Abbott (2002) and Turner (1972). Sustainability and environmental concerns in the project management and procurement of low-income housing construction have been addressed by Ndlangamandla and Combrinck (2020), Ogunsanya *et al.* (2022), and Nassar and El-Sayed (2016). Hasgül (2016) has summarized the incremental housing process, indicating the involved parties' participation and the vernacular nature of the settlements. More recently, Parvin *et al.* (2023) developed a framework for disaster adaptive housing upgrading from a social vulnerability perspective, including tenure security, dwelling units, infrastructure and services, socio-political networks and livelihood and finance.

To analyse the three selected case studies, the authors adopted the sustainability–affordable habitat framework presented in Figure 1, initially developed by Nair *et al.* (2005) and more recently adapted by Parikh *et al.* (2020). This framework comprises four sustainable-habitat factors: socio-cultural, economic, technological and environmental. Moreover, it focuses on decision (process) thinking rather than intervention-driven; hence, it could respond to various informal settlements in the Global South depending on their type, dynamics and between the four domains.

As this study's focal point is self-building, procurement and project management in housing upgrading, the authors did not consider all four sustainability factors equally. The authors mapped all the technological factors (the core of the analysis) against two socio-cultural factors (self-help housing and community participation), two economic factors (affordability and procurement) and two environmental factors (proper planning and healthy environment). Self-help upgrading was explored as reactive or autonomous adaptation at household and neighbourhood levels. The authors conducted a thematic analysis for the three case studies, mapping the interlinkages between self-building and project management and their connection with community participation, procurement of building materials (affordability, feasibility, functionality, durability and quality) and skills training.

3. Methodology

3.1. Research design

The study adopted a Participatory Action Research (PAR) methodology to explore 'best available participatory practices' in self-building, procurement and project

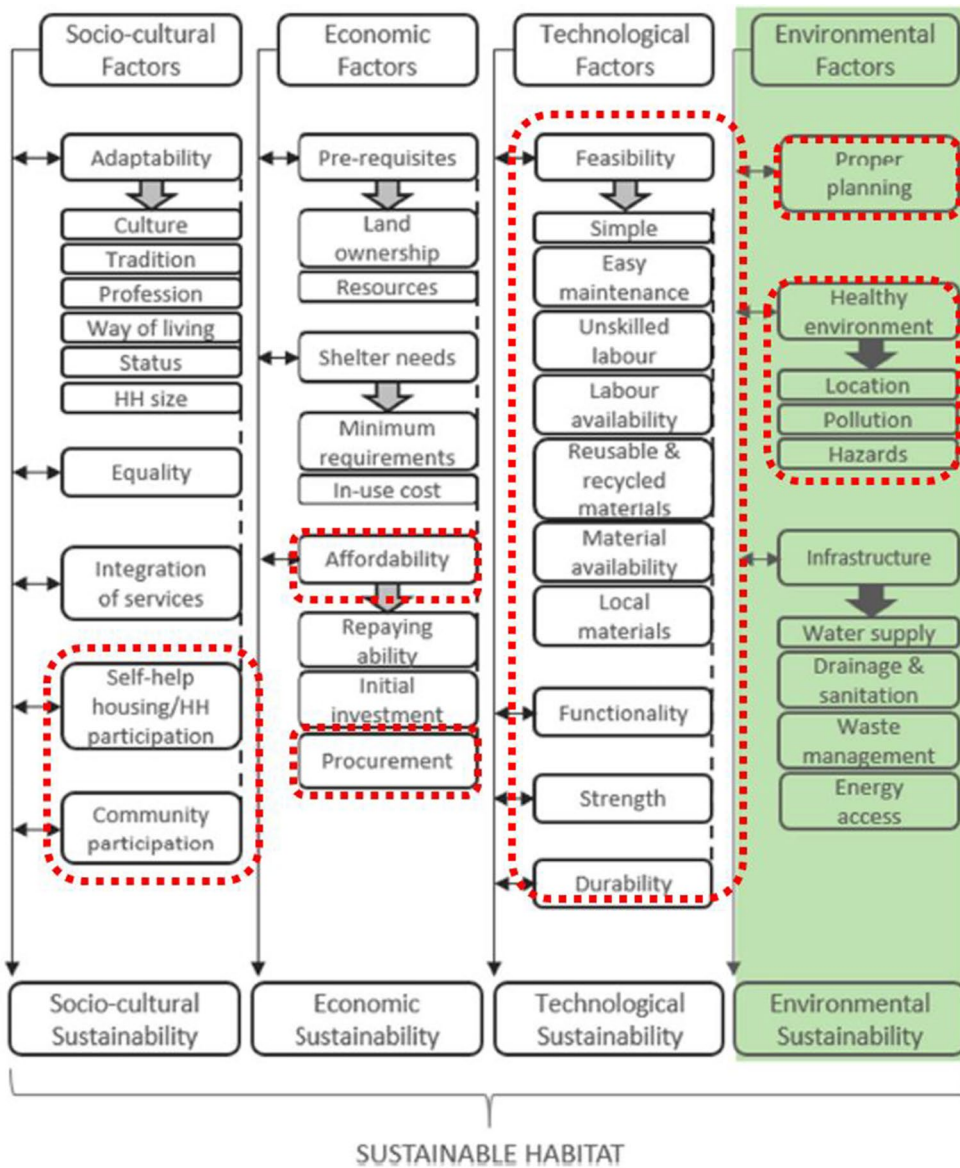


Figure 1. The sustainable – affordable habitat framework adapted by Parikh *et al.* (2020).

management practices, applying coproduction strategies, whereby selected informal dwellers were co-investigators in the research (Cornish *et al.*, 2023; Loggia and Govender, 2020; Mitlin, 2008). Action research intends to prompt learning among the project participants, thus building relationships with key social groups and promoting change (Burchell *et al.*, 2017; Cornish *et al.*, 2023; Ozanne and Anderson, 2010; Reason and Bradbury, 2008). A group of 15 Community Researchers (CRs) was selected from the three case studies. The academic team trained these 15 CRs to help deliver the research methods. The inclusion of CRs enabled the academic

team to work closely with the local communities and communicate the purpose of the research design and methods used².

Following the training of the CRs, the team undertook a collaborative mapping approach to understand the lived experiences of informal dwellers within each case study area; namely, interpretations of their housing space, needs and values in self-building. The collaborative mapping process involved transect walks with dwellers' narratives, sketches and photo voices. These tools helped to visually observe existing housing structures, building materials, key features or hazards, thus enabling the co-design of responsive housing strategies for community resilience (Loggia and Govender, 2020).

3.2. Case studies

Previous studies on *in-situ* upgrading of informal settlements in Durban explored community-led approaches from the perspective of poor tenure arrangements (Charlton, 2006; Van Horen, 2000) or the lack of municipal skills and capacity for 'informal continuity' post-upgrading (Charlton, 2006; Patel, 2013, 2016), but not from the perspective of participatory approaches in housing construction. A set of criteria was developed for selecting case studies, including community leadership, active community-support organizations and evidence of community self-organization practices. A systematic analysis of these criteria led to the final selection of the three most suitable case studies for primary data collection, as presented below.

3.1.1. Case study 1: Namibia Stop 8

Located in Inanda, the northern region of eThekweni on the outskirts of Durban, Namibia Stop 8 was built between 2010 and 2014 by community contractors who constructed 2500 dwellings providing homes for 10,000 people (SDI South African Alliance, 2012). Namibia Stop 8 was originally a greenfield project, and residents were moved back to the settlement from two neighbouring areas, i.e. Namibia and Stop 8. The housing provided was a mixture of government-provided RDP houses, which were 40sqm and 96 houses built through the Federation of the Urban and Rural Poor (FEDUP) in Phase 1, which were larger at 56 sqm and plastered, as shown in [Figure 2](#). FEDUP used the ePHP model for a community-driven participatory approach.

uTshani Fund, a community-support organization and partner of the SASDI Alliance, accommodated funding arrangements for FEDUP, who, as community contractors, led the provision of self-build housing. The settlement has water pipes, a formal electricity network, roads (although not all properties have access) and a sewage system.

3.1.2. Case study 2: Piesang River

Piesang River is a historic informal settlement, and since the 1980s, it has demonstrated strong elements of community leadership and negotiation around housing upgrading. Piesang River is located 25km northwest of Durban.

Since the early 1990s, the settlement has undergone a gradual formal upgrading process. Female leadership was vital in upgrading as women initiated and led group



Figure 2. Namibia Stop 8 (Inanda, Durban Metropolitan Area).



Figure 3. Piesang River.

savings. In recent years, government subsidies were received through uTshani Fund, which enabled FEDUP to support the incremental upgrade of formal structures, as shown in [Figure 3](#). This large settlement has 70 saving groups, enabling the construction of over 2500 FEDUP houses (SDI Tag: Durban, 2017). Various housing types were constructed, including two-storey flats, houses and cottages. Houses have access to water supply, sewage systems and electricity.

3.1.3. Case study 3: Havelock

Havelock informal settlement is located 8km outside Durban city centre, with 200 self-built houses and more than 400 residents (Parikh *et al.*, 2020). The informal dwellings are built on steep terrain with a polluted stream at the bottom, overflowing during heavy rains. The settlement has several hazards, including naked electricity wires spread across the site, illegal electricity connections, and building materials prone to fire and flooding (see [Figure 4](#)). Havelock shacks have no toilets, and the municipality has installed ablution blocks. Like most informal settlements in Durban, the land is partly owned by the municipality and partly privately, which impacts the ability of long-term planning as private owners want to demolish the shacks. Community Resource Organization Centre (CORC) conducted the first enumeration with the community in 2012, setting the ground for self-organization practices.

In December 2019, a fire incident burned down the whole settlement. Havelock is still on the priority list of eThekweni municipality for *in-situ* upgrading.



Figure 4. Havelock.

Table 1. The primary data collection methods conducted during fieldwork.

Method case study	Household interviews	Community focus groups	External stakeholder focus groups	External stakeholder interviews
Namibia Stop 8	54	One (15 community participants)	One focus group with five participants from eThekweni Planning and Settlements Units	100 Resilient Cities Programme Leader
Piesang River	51	One (15 community participants)		Chief Executive Officer, Project Preparation Trust
Havelock	52	One (15 community participants)		Head, Human Settlements Unit, eThekweni municipality

3.3. Research methods

The study used mixed methods to understand community housing needs and upgrading challenges. Empirical data on participatory housing approaches, including self-building, project management and procurement, were gathered through two rounds of fieldwork between February 2017 and May 2018. The primary data collection methods included household interviews, focus group discussions and external stakeholder interviews with municipality officers and construction practitioners in Durban, as shown in [Table 1](#).

One to four supervisors from community-support organizations (CORC, uTshani Fund and FEDUP), two multilingual fieldworkers from the local academic institution, and the 15 CRs assisted with the household interviews and community focus-group discussions. This approach was essential to mitigate possible language and cultural barriers. The fieldwork data were analysed using thematic and content analysis methods.

3.3.1. Household interviews

Participating households were selected randomly through convenience sampling. Household interviews were conducted in February 2017 and May 2018 in two rounds, reaching 157 households (54 in Namibia Stop 8, 51 in Piesang River and 52 in Havelock). CRs and participants in all three settlements used the same semi-structured questionnaire. It was designed to collect quantitative and qualitative data and included multiple-choice, ranked scale, and open-ended questions. In Namibia Stop 8 and Piesang River, the sample involved government-led RDP and FEDUP community-led

houses, with the latter engaged in self-building practices. The interview questions covered the areas of self-building, project management, and procurement strategies, also seeking to identify any informal routes to procurement, the level of training received, and the construction skill set gained within each settlement.

3.2.2. Focus groups

In May 2018, the team conducted three household focus group discussions (one per case study) with 15 participants. These were held within each settlement and led by CRs and under the supervision of three local NGOs: CORC, uTshani Fund and FEDUP. The discussion templates were translated into Isizulu to ensure broader participation. To eliminate further bias, only FEDUP households (those involved in community-led upgrading) were invited to participate in the case of Namibia Stop 8 and Piesang River to focus specifically on participatory housing upgrading practices. In Havelock, the objective of the focus group was to brainstorm about housing upgrading, as there were no actual houses other than self-built shacks.

In May 2018, the data from focus group discussions within the three communities were triangulated with an additional focus group with five external professionals from eThekweni municipality (Planning Unit and Human Settlements Unit) to gain their perspectives on regulatory, project management and procurement issues around housing upgrading in informal settlements.

3.2.3. Stakeholder interviews

Qualitative data was also gathered through external practitioner interviews. Three complementary interviews were conducted in February 2018 with the 100 Resilient Cities Programme³ Leader, the Chief Executive Officer of the Project Preparation Trust, and the Head of the eThekweni Human Settlements Unit. Interviews typically lasted about 90 min, took place in Durban and were recorded after receiving informed consent. All interviews were transcribed in full and cited as [Interview Number – Interview Date] throughout, for example (Int.2-14/02/2018).

4. Results

4.1. Self-building practices

Figure 5 gives insights into the stakeholders that carried out the construction work, highlighting the level of self-building and input from external parties, such as trade companies, NGOs and eThekweni municipality. In Namibia Stop 8, 78% of households and in Piesang River 82% of households outsourced the construction work to trade companies. Focus group participants from eThekweni municipality agreed that these refer mainly to the construction of RDP houses, dominant in both case studies, whose owners were not involved in self-building practices.

In Namibia Stop 8, around 25% of household interviews were part of the 96 FEDUP self-built houses. Community self-organization practices in FEDUP households revolved around self-build housing, house maintenance and extension. Residents had upgraded their homes themselves, with the help of family members, or using

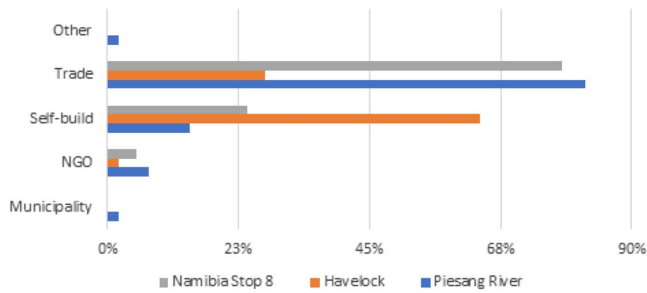


Figure 5. Percentage of stakeholders who conducted the construction work in the three case studies. Data: all households.



Figure 6. FEDUP households; the interior improvements and extensions in Namibia Stop 8.

an informal network of FEDUP construction workers (Figure 6). Examples of upgrading discussed during household interviews included:

- adding one-story extensions to create additional bedrooms or separate spaces that could be rented;
- building separate outbuildings and fencing adjacent space around properties for security;
- Interior refurbishment by adding internal wiring, plastering internal walls, adding floor tiles and putting up ceiling boards; and
- gradually accumulating building materials based on available income or owning partially built extensions.

For those 96 houses, Community Construction Management Teams (CCMTs) coordinated the construction process. The original goal was to identify builders who were FEDUP members; however, financial delays and political issues meant that recruitment and training had to be done quickly. uTshani Fund approved professional contractors, and three FEDUP members set up and managed the CCMTs and provided technical support with heavy construction tasks. Most community FEDUP members assisted with carrying water and building materials (e.g. blocks and tiles) on-site rather than building their own homes.

The eThekweni municipality was not involved in this process [Int.3-14/02/2018; Int.4-14/02/2018]. In Havelock, there are no formal houses. Self-building practices were adopted in 64% of households completing the construction of the shacks by themselves or with assistance from family or community members.

A male FEDUP focus group participant from Namibia Stop 8 commented, 'We were paying according to how much we could afford. We were told that the government houses were too small. We needed to save to get bigger houses. We said that we would build houses ourselves; we would collect all the material from the [local municipal waste disposal] trucks, be it cement or roof planks'. A community leader said that "the majority of people continued to live in the [FEDUP] houses after the upgrading. In contrast, the comparative figures for the municipality [RDP] houses are about 50%'. RDP homeowners needed more motivation to invest in self-building, and any improvements would have had to be entirely self-funded, as they had not engaged in community self-organization activities.

In Namibia Stop 8, FEDUP households identified the lack of clear boundaries between public paths and their houses as a key challenge of self-building at the neighbourhood level (Figure 7). In this settlement, neighbourhood planning regarding public space design (public paths, open space) was not part of the community mobilization activities and was excluded from community planning. Self-building activities focused only on the construction of the FEDUP dwelling units. This uncertainty interferes with extension plans and leads to conflict over land ownership and privacy issues due to:

- Poor passages with difficulty in accessing the main roads (e.g. walking through neighbours' yards to access the main road); and,
- Fencing the immediate open space outside the property which hinders household activities, such as gardening or children playing.

A general lack of community mobilization to address neighbourhood issues was observed in Namibia Stop 8 and Piesang River, together with a high reliance on eThekweni municipality, ward councillors or community-support organizations to lead upgrading initiatives at a neighbourhood level. Once the construction of FEDUP houses was completed in Namibia Stop 8, the community lost interest in continuing with mobilization and group savings. To counteract this in Piesang River, FEDUP introduced a membership-based loan system for financing emergency housing maintenance. Piesang River residents continued contributing to collective savings and applying the skills built long after the last houses were built. Other self-building challenges reported in Piesang River were the increased costs in double-storey



Figure 7. Views of the passages showing their poor condition, lack of boundaries and the encroachment into people's yards.

buildings due to losing floor area under staircases, party walls and complex fire controls.

4.2. Building materials: formal vs. informal procurement

Each community has its unique procurement processes, and various building materials were observed across the three case studies, as presented in Table 2. Havelock is an informal settlement composed of shacks, whilst the housing typology (government-led RDP and community-driven FEDUP) in Namibia Stop 8 and Piesang River are similar in that they consist of brick and block units. Table 2 also shows that in Namibia Stop 8 and Piesang River, formal building materials were used in housing construction, such as cement, sand, concrete blocks, paint, corrugated metal/zinc, wood and tiles, applied in both RDP and FEDUP community-built houses. Focus group respondents and an external interviewee commented that in Havelock, the spectrum of materials used was broader and more informal, including components not conventionally used for house building, e.g. untreated timber, plastic, cardboard, mud, poles, iron rods and clothing materials, often sourced from an informal waste disposal area at the cul-de-sac entrance road to the settlement [Int.2-14/02/2018]. Many of these are flammable, a fire hazard in densely built settlements.

Figure 8 presents the leading provider of building materials for the three case studies. Only FEDUP households were interviewed in Namibia Stop 8 and Piesang River to understand community-led practices. A factor impacting the number of quotations in these two case studies was the ability to use Trade Information Directories to identify a range of local building suppliers. In Namibia Stop 8, CCMTs and uTshani Fund compared three local hardware stores, choosing a supplier named 'Build It' based on a cost-benefit assessment of quality and cost. The supplier was the sole provider of all building materials for the community-led construction of the ePHP houses. In Piesang River, there was a varied response, but the most common route of obtaining materials was through social networks. A quote from three building suppliers was considered by 63% of the households, whilst 16% considered four or more. FEDUP households' decision to use one provider was based on an offer of free material delivery, personal recommendations or word of mouth among the community members.

Table 2. Selection of building materials per case study. Data: all households.

Material choices	Cement	Sand	Blocks	Paint	Corrugated Metal Zinc	Wood	Tiles	Plastic	Mud	Poles	Iron Rods	Clothing	Facia Boards	Asbestos	Plaster
Namibia Stop 8	✓	✓	✓	✓	✓	✓	✓							✓	✓
Havelock	✓	✓			✓	✓		✓	✓	✓	✓	✓			
Piesang River	✓	✓	✓	✓	✓	✓	✓						✓	✓	✓

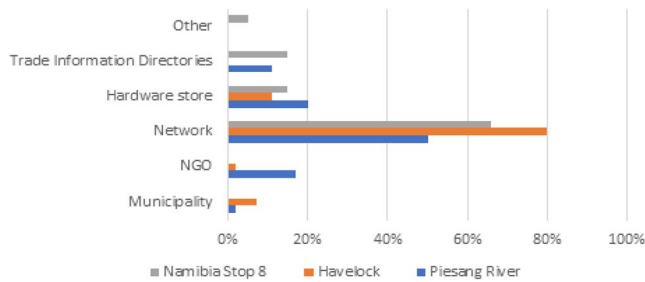


Figure 8. Source of building materials in the three case studies. Data: exclusively from FEDUP households in Namibia Stop 8 and Piesang River.

Households commented on the specific criteria affecting their decision-making on building materials. FEDUP and uTshani Fund led material procurement. The informal procurement strategy in both Namibia Stop 8 and Piesang River included price, quality, durability (in terms of water tightness), cost (affordability) and fire safety when visiting different hardware stores for a quote, particularly for the most used building materials, such as bricks, blocks and cement. Self-building took approximately one or two weeks for one house in Piesang River.

Unlike Namibia Stop 8 and Piesang River, where self-building is presented with dwellings from formal construction materials, Havelock is still a non-serviced settlement with self-built temporary shacks. Nevertheless, community participatory initiatives, strong community leadership and active engagement of the SASDI Alliance demonstrate a different approach to traditional self-building and an expressed need to improve living conditions. Havelock respondents often referred to their dwelling as ‘a shelter, not a home’, highlighting the temporary or uncertain nature of the settlement impacting procurement decisions. Havelock dwellers utilized their local networks significantly more than the other two settlements, whilst the municipality provided few building materials as post-disaster relief to several minor episodes of fires post-1994⁴. A community leader in Havelock stated, ‘[W]e hired a community member who works at a factory that manufactures boards [...] this person was able to advise when companies are throwing away materials for us to collect. Informal dwellers purchased 15% of primary source materials externally in Havelock. The remaining 85% followed a free material flow to the community through informal procurement processes, either as by-products at the end of their lifecycle or waste materials obtained before disposal to the local construction, manufacturing and domestic waste industry.

As affordability remains challenging, self-built practices have relied only on informal procurement, without any government funding or public procurement of certified building materials. Havelock participants agreed that the cost of formal building materials at various local providers (hardware stores) was prohibitively high. To ensure the long-term durability of the upgraded shacks, community leaders commented that Havelock residents should shift from the business-as-usual mindset of getting free or cheap salvaged materials, which require frequent maintenance or replacements. However, a local dweller argued during a household interview, ‘[We] know that we will not be [in] here for the rest of our lives, so why pay for more expensive building materials?’. The insecurity of tenure acts as a barrier to long-term

thinking about building materials and ways of improving the physical conditions of the shacks due to the status quo of a temporary settlement.

4.3. Project management

Cost, time and quality are key factors determining the success and satisfaction levels of housing upgrading. The expected construction costs were higher than anticipated for 81% of all participants (RDP and FEDUP households) in Namibia Stop 8. However, 85% of only community-led households interviewed stated that the construction work was completed on time without significant delays, and 76% of participants were satisfied with the final product. In Piesang River, the final cost of the construction work was lower than anticipated. A female community leader argued that there is a strong relationship between the number of quotations for building materials and construction services and the level of satisfaction regarding the house upgrade. As such, a higher satisfaction of the final cost and quality of work corresponds with a higher number of quotations for the procurement of materials and construction services. From the participating households, 84% were satisfied with the result, commenting positively on the improvements to their houses and establishing a relationship with builders they would hire again in future construction, refurbishment or maintenance projects.

In Havelock, about half (58%) of households could comment on the cost comparison. The remaining participants said they could not afford to pay for the materials as they sourced them from their local networks. Hence, there was no estimated cost to which they could compare the final price or effort. However, out of those households that estimated, 47% argued that the cost was higher than anticipated, 20% stated it was on budget, and 33% felt it was lower than expected. A community leader argued that '[W]hen you are building yourself you are looking for the cheapest materials and labour, so I have tried to collect materials locally to avoid delivery costs.'

Nevertheless, 79% of interviewees were satisfied with their self-building practices. For the 30 households that purchased building materials from the supply chain, a positive relationship exists between the number of quotations received and the final costs incurred. When communities obtained more than three quotations, the likelihood of the final price being on a budget or lower and the households being satisfied with the overall work conducted was approximately 80% higher than in the case of fewer quotations.

4.4. Construction skills and training

The FEDUP household interviews and community focus group discussions highlighted three broad types of construction skills. These were skills that participants felt that they had gained after engaging in some level of community organization or self-building.

- technical skills: bricklaying, laying foundations, tiling, woodwork, fencing, plumbing, general maintenance;

- management skills: resource management, accounting, book-keeping (for group savings), quantity surveying; and,
- social facilitation skills: community mobilization, negotiation, external communication (with community-support organizations, other settlements, eThekweni municipality).

Figure 9 shows that most participants still needed formal self-building training from local authorities or community-based organizations within each community. uTshani Fund enabled FEDUP members in Namibia Stop 8 and Piesang River to support housing construction through pre-financing mechanisms, allowing communities to access loans after demonstrating self-organization practices. In Namibia Stop 8, only five of the 54 households interviewed stated that they had received formal training sessions from FEDUP, which involved understanding design principles and reading house plans. There was a strong desire from the community for additional training to enhance their future employability as construction workers in Durban, mainly around building, welding, installation and fixing of pipes, construction management and computer skills.

Piesang River is the settlement with the highest rate (46%) of households reporting to have received training or guidance. A community leader commented, '[W]e want more people within the community to have the skills to build their own houses to reduce reliance on external stakeholders'. A steering committee divided Piesang River inhabitants into seven groups of four to ten members, each according to their type of construction skills. FEDUP brought professional (external) builders to provide on-site training and assistance to these seven groups. The skills taught during the training sessions covered cement protection from rainwater, concrete mixing/pouring, building techniques, and group savings. The community felt those training sessions were beneficial, as they could immediately apply this knowledge and skills to their property. All households interviewed mentioned they would like further training and skills development to educate young generations in tiling, woodwork and fencing.

In Havelock, 25% of households interviewed received formal guidance and training from eThekweni municipality in 2016 on building materials' fire safety and resistance. CORC helped the Havelock community by providing further enumeration skills, group savings and fire prevention training. In 2017, two community members took

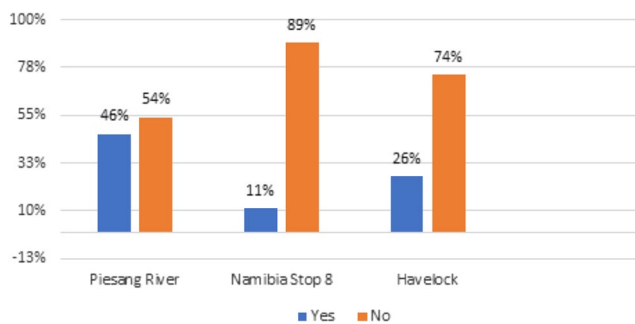


Figure 9. Percentage of inhabitants receiving guidance and training across case studies. Data: all households.

the initiative to share their knowledge and construction skills in an informal training session to empower the community to build and maintain their shacks. Desired skills highlighted in the Havelock focus group discussion were cleaning and removing debris or hazards; moving and preparing materials to be used on-site; building temporary structures; bricklaying; and administration skills, which could lead to future employment as construction workers in Durban.

5. Discussion

The external focus group and practitioners' interviews revealed that municipalities and communities measure 'success' differently in an upgrading project (Int.1-14/02/2018; Int.2-14/02/2018; Int.3-14/02/2018; Int.4-14/02/2018). A participant from the eThekweni Planning Unit argues that the municipality's technical knowledge has yet to embrace community participation fully. '[P]eople have been moved from informal settlements to formal RDP houses, and we then see a massive return to their previous locations, their networks are there, their livelihoods are there, people's schools are there. RDP is a benchmark, single story 40sqm concrete block, sheeting and tiled roof house, which we still replicate on all housing projects instead of producing bespoke typologies to suit individual community needs'. The Head of eThekweni Housing Unit complemented this view by saying that '[w]e have no standard framework for inclusive, participatory processes due to the silo mentality of working between individual departments and complex political agendas. Hence, we are not connected, which is a problem for implementing any housing policy, particularly regarding participation and community-led upgrading. It is important to have an evidence base of the community priorities through enumerations to inform our decision-making and redesign of the layout'. Hence, municipalities should build their capacity in participatory planning and invest further in municipal training for inclusive stakeholder engagement by understanding the minimum preconditions that unlock community participation in an upgrading project. Empirical data from the three settlements revealed that community ownership of interventions leads to successful upgrading, social capital and livelihood development – not just the delivery of physical structures and basic services, as also argued by Georgiadou *et al.* (2021), Georgiadou and Loggia (2021) and Parikh *et al.* (2020).

The impact of skills enhancement in collaborative housing upgrading is critical for future employment opportunities (within the upgrading context or externally at a local level), especially if the training involves formal certification or is provided through government initiatives such as the EPWP (Chitekwe-Biti *et al.*, 2012; Robbins *et al.*, 2005). Community participation enables decision-making responsibility over the housing process and helps to mobilize and retain social capital through the ability to offer services based on the community's developed or enhanced skills (Huchzermeyer, 2009; Tissington, 2011). The skillset informal dwellers obtained through sweat equity (time, group savings and labour) while self-building the FEDUP houses in Namibia Stop 8 and Piesang River enhanced their sense of permanent ownership, community resilience and livelihood development, unlike in Havelock, which is a settlement with high unemployment rates (Georgiadou and Loggia, 2021).

The introduction of CCMTs in Namibia Stop 8 and the informal skills training efforts in Piesang River resulted in better chances for formal employment in the local labour market (SDI Alliance 2012). Connecting self-building with job opportunities can also respond to informal dwellers living intentionally in temporal settlements, such as Havelock, whilst renting their formal RDP houses to meet their immediate economic needs. Hlatshwayo (2017) discusses the importance of including community and informal workers' perceptions in EPWP project evaluations. For instance, the participatory housing upgrading approach in FEDUP houses could complement the EPWP implementation with grassroots approaches, including job opportunities and skills obtained during self-building.

Comparing the empirical findings to Nair's *et al.* (2005) and Parikh's *et al.* (2020) conceptual framework, there is a case to be made for self-building and community participation (socio-cultural factors) to improve housing structures and create healthy environments (environmental factors) (Nair *et al.*, 2005; Parikh *et al.*, 2020). The two-way relationship between all the technological factors with self-help activities (socio-cultural factor), community participation (socio-cultural factor), affordability (economic factor) and procurement (economic factor) shows the various interdependencies which can facilitate (or hinder) sustainable livelihood creation and healthy environments, as discussed in Parikh *et al.* (2020). There is a strong focus on housing upgrading in terms of dwelling units. However, the findings from Namibia Stop 8 suggest that communities are far less interested in inclusive neighbourhood planning, spatial integration, open space and community layout, which are major causes of conflict irrespective of the nature of the settlement, the presence of traditional self-building approaches or formal services. Hence, there is a clear need for community engagement and community mobilization beyond the individual top structures in all settlements.

Regarding project management in Namibia Stop 8 and Piesang River, community-led upgrading practices (socio-cultural factors) help deliver houses larger than the traditional RDP houses. Both communities followed an investigation into the criteria for selecting building materials, namely affordability, quality, durability and safety, getting quotes from local hardware stores. The collaborative approach can positively impact the socio-cultural factors of the conceptual framework, boosting equality and community participation, as well as economic and environmental sustainability (Bolnick and Bradlow, 2010). Informal dwellers in Namibia Stop 8 and Piesang River invested their time and financial resources in the project management and construction of the FEDUP houses. The culture of group savings and CCMTs in FEDUP households had a positive impact on community empowerment and a sense of ownership and control, thereby having local inhabitants leading the development process, leading to successful and sustainable projects in the long term (Davidson *et al.*, 2007; Georgiadou and Loggia, 2021; Gunter, 2013; Muchiri and Opiyo, 2022). In Havelock, affordability and spatial segregation have hindered the procurement of formal building materials and construction services, impeding residents from fully accessing the supply network and pushing them to source materials as locally as possible while also looking to minimize expenditure (Int.3-14/02/2018; Int.4-14/02/2018; Omenya, 2002). The community instead opt for second-hand or discarded materials in the short term. In Havelock, only reclaimed materials from dumps and local networks have been used for building or maintaining the shacks. What stops the dwellers from purchasing standard (and

more expensive) building materials is affordability and potential damage or theft. The findings demonstrate that the community has the local knowledge of how to build with non-traditional materials and how to utilize social networks for cost reduction and maximum efficiency. However, in future upgrading scenarios in Havelock, potential building materials will have to be of better quality and ideally fire- and flood-proof to enhance community resilience to climate change and protect from fire hazards due to naked wires of illegal electrical connections and the use of paraffin stoves (Int.1-14/02/2018; Int.2-14/02/2018; Int.3-14/02/2018; Int.4-14/02/2018).

Community mobilization has manifested differently in Havelock due to the unique nature of the settlement. If a long-term mindset was achieved, this could shift the informal dwellers' perceptions towards seeing Havelock as a more permanent settlement (Parikh *et al.*, 2020). Compared to Namibia Stop 8 and Piesang River, the feeling of impermanence in Havelock impedes investment into formal (and more permanent) building materials and structures, hindering the overall tenure security and future government subsidies. However, Havelock is included in the list of the UISP-funded *in-situ* upgrading projects with an inclusive developmental plan currently underway (Int.1-14/02/2018; Int.2-14/02/2018; Int.3-14/02/2018; Int.4-14/02/2018). There is also a positive interlinkage between the four factors of the adopted sustainable-affordable habitat framework in Havelock due to the potential for regenerative development and circular environmental management strategies, enabling whole lifecycle thinking. Currently, the Havelock community are implicitly utilizing the local environment and investing in waste recycling by being waste pickers themselves and integrating waste material (e.g. tyres, plastic, glass, clay soil or timber) into the construction of the shacks. Integrating dwellers' informal efforts into formal waste recycling initiatives and re-use (or repurposing) of construction and demolition waste would promote circular practices, generate income opportunities through microfinance and formal cooperatives, maximize material efficiency and reduce waste accumulation in the settlement (Elgizawy *et al.*, 2016; Venter *et al.*, 2019). Community-led upgrading processes can empower local informal communities, particularly in terms of developing construction management skills, as confirmed in various Sub-Saharan African contexts (Huchzermeyer, 2011, 2009; Smith and Brown, 2019; Walker, 2016). Bolnick and Bradlow (2010) discuss the need to transfer the technical and management knowledge gained for long-term participatory practices over generations. The notable challenge is to ensure that the empowerment activity is not a one-off action but a lifecycle consideration (Goebel, 2007; Mitlin, 2008; Rukwaro and Olima, 2003). There has been a clear desire to receive training or expand on the already enhanced skills in the three settlements. Focus group participants at Namibia Stop 8 emphasized the need for additional training or hiring skilled workers in future upgrading projects. One resident explained: 'We are trying to encourage anybody that builds [contractors] to have someone from the community on the side so there is a transfer of skills. We tried it informally with Phase 1, but it needs to be done more formally'. The youth did not engage in group savings post-project completion of the 96 houses, which coincided with a general decline in self-organization practices. The knowledge of CCMTs around design, construction, procurement, quantity surveying and overall project management would be helpful in any future housing extensions and community projects. There was, therefore,

limited continuity as most of the community skills were lost. FEDUP households in Piesang River invest in training youth groups and manage to pass on the culture of savings to the next generations. The community realized that investing in training would help them save money and build larger houses (Georgiadou and Loggia, 2021).

The findings also suggest a further interrelation between the provision of formal training and the community satisfaction with the upgrading process. In Piesang River, which is the settlement that received the most formal training, many informal dwellers were able to develop individual saving practices towards their household needs and pursued bricklaying as a formal profession, thus facilitating the transfer of formal skills back to the community (Georgiadou and Loggia, 2021; Sekoboto and Landman, 2019; Smith and Brown, 2019). Focus group participants also claimed that FEDUP training taught them how to ‘collaborate and tolerate one another’, thus enhancing social cohesion within the community.

6. Conclusions and recommendations

This study explored self-building project management and procurement routes for obtaining materials and services for community-led housing upgrading in three informal settlements in the Durban metropolitan area whilst gaining insights into the impacts of the collaborative approach on skills enhancement. The findings suggest that self-building is inherent to community participation and empowerment. Community-led housing upgrading practices give community members ownership over decision-making and allow them to develop technical, management and soft facilitation skills around construction. Investing in self-building, procurement and project management practices depends on a long-term community capacity to manage the project (dwelling) lifecycle from design and construction to operation and maintenance. The empirical investigation has shown good practices in the informal procurement of FEDUP houses in Namibia Stop 8 and Piesang River by comparing prices for building materials. When communities receive more quotations, the construction work, time efficiency, cost and quality are improved. In future upgrading, the ability to leverage competition by comparing quotes could lower costs and enhance further satisfaction outcomes. Communities should also pass on the knowledge of good practices around material procurement, cost savings and quality in any future housing upgrading projects.

Some final recommendations related to participatory housing approaches that should be considered in current and future upgrading frameworks include:

- There is a need for effective stakeholder management between individuals, households, local authorities, suppliers and practitioners to bring social value to the upgrading process. Evaluating the roles of key stakeholders involved in self-building is essential to explore the informal and formal procurement methods the informal dwellers adopt. The government-led mechanism of providing housing subsidies and grants has been the cause of a deep-rooted dependency syndrome on municipalities to provide adequate housing for all, which inevitably has led to mistrust and miscommunication when this is not possible. Despite good intentions, there are shortcomings in municipal

tendering and procurement processes, internal (municipal departments) and external communication and data management. Community-support organizations could fill some gaps, but more effective stakeholder management is needed at an early stage. Future research should explore the potential of digital technologies between informal dwellers, community-support organizations, planners and construction professionals to address the gap in inclusive stakeholder engagement in housing upgrading.

- Municipalities and community-support organizations should promote vocational education and training in construction and leadership programmes, which would provide certification for formal employment. In all three settlements, many respondents were concerned about the need to teach construction skills to the younger generations. The continued work of community-support organizations, such as FEDUP and CORC, has provided a strong foundation of knowledge and construction skills for the youth. This aspect is critical for the success of such grassroots efforts, training the youth and the community's ability to maintain similar participatory efforts in the future. Such training could be integrated into EPWPs, create additional job opportunities in terms of further construction improvements and maintenance and improve time, cost and quality aspects in future incremental upgrading. Further support offered by eThekweni municipality in terms of supply chain integration and capacity building could help boost informal dwellers' qualifications.
- Municipalities and practitioners should engage formally with communities to incorporate new forms of indigenous knowledge rooted within everyday experiences, needs, values and community perceptions. The study also revealed the importance of collaborative mapping, for instance, in post-disaster management in Havelock. This approach could help co-design responsive interventions around material procurement, construction (e.g. laying foundations), and project management. In turn, this can lead to the creation of more inclusive and sustainable human settlements where the communities make the most critical decisions according to their needs in South Africa and the Global South. eThekweni municipality, amongst many South African municipalities, is shifting from a mere housing provider to an enabler of community-led approaches. Hence, besides skills enhancement for communities, there is also the need for capacity building at the municipal level to coproduce socio-economic data and coordinate interventions between various departments effectively. Empirical data from the three settlements revealed that community ownership of interventions leads to successful upgrading, social capital and livelihood development - not just the delivery of physical structures and basic services). Communities should invest in regenerative development strategies and circular zero-waste practices that would increase user-perceived values by repurposing waste into construction materials, thus promoting social empowerment, microfinancing incentives, climate resilience, environmental sustainability and public health benefits for informal dwellers.
- Future research should explore the potential of digital innovation and mapping regulatory aspects in a reframed sustainability habitat conceptual

framework. The policy implications of the findings suggest informing institutional planning frameworks to account for collaborative mapping in upgrading in Durban and through scaling up in wider South Africa and the Global South. The interrelations between socio-cultural, economic, technological and environmental factors could be mapped against various regulatory and policy targets, accounting also for some flexibility in informal procurement practices. This approach will enable a cross-case comparison between different contexts in the Global South and investigate the transferability of the findings beyond Durban.

Notes

1. The Upgrading Informal Settlements Programme (UISP) and Urban Settlements Development Grant (USDG), administered by the National Department of Human Settlements (NDHS), are the primary policy and grant instruments used to meet national targets.
2. The role of CRs is pivotal to designing and executing the PAR protocol. CRs form a PAR-friendly network of people who act as a bridge between the researchers and the local communities during PAR activities by (Cornish *et al.*, 2023): building relationships; establishing a common understanding of the issues explored; observing, gathering and generating information; managing power inequalities and the decentralisation of control; and, holding the research team accountable by using critical reflexivity and redistribution of power.
3. The 100RC Programme in Durban led to the development of the Durban Resilience Strategy, which focuses on collaborative informal settlement action (100 Resilient Cities, 2017).
4. Such relief has not yet occurred after the last devastating fire in December 2019.

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Ethical consent statement

The study is covered under the University of Westminster Research Ethics Committee reference number: VRE1516-0595, February 2016). This includes data generated by household and external stakeholder interviews and focus group discussions.

Authors' contributions

Maria Christina Georgiadou: Conceptualization, Methodology, Investigation, Visualization, Resources, Funding acquisition, Project Administration, Writing – original draft.

Claudia Loggia: Conceptualization, Methodology, Investigation, Visualisation, Resources, Funding acquisition, Project Administration, Writing – Review and Editing.

Disclosure statement

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Data availability statement

Interview data and focus group discussions are not shared publicly in the interests of data protection and confidentiality; however, they can be available upon request.

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