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Exploring the Transformation of Sustainable Collective Spaces: A Study from Mlalakuwa Informal Settlement

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ABSTRACT

A major challenge in collective space transformation is addressing the complexity of informal urbanisation in developing countries. Using a case study approach, this paper examines the concerns related to a particular informal settlement's sustainable collective space transformation. One of the key findings is that the absence of formal rules and regulations in the development of informal settlements in combination with land-grabbing leads to the absence of open spaces that could be used collectively. It is observed that sustainability in urban development is another body of critical thought that integrates several streams of current urban elements and embodies various conceptions of social-cultural, social-economic, environmental, and technological aspects as success factors for sustainable collective space transformation. As part of informal urbanisation, collective spaces should be addressed to lessen the intensity of restricted community spaces and create sustainable urban settings. Sustainable collective space development seems important in cities since it enhances several activities in the urban context with stable and appropriate collective spaces for community life. The paper concludes with a call for development actors, political commitment, and recognition of contextual responses when transforming collective spaces, rules set within informal settlements, and strategies branded for sustainable transformation.

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INTRODUCTION

Background

Studies show the importance of urban spaces for fostering social cohesion and integration to encourage a peaceful and pluralistic society in which all inhabitants' needs are met (Becker, 2016; Gehl & Svarre, 2013). Kim (2015) sees urban spaces as vital spaces for social, cultural, and political inclusion, notably the

provision of the means to ensure humans can participate in fully flagged social subjects in urban life without guarantee of rightful citizenship. He also highlights urban public space as contributing to public social life (Gurney, 2015). Madanipour (2003) accentuates public space as a meeting point where different paths and trajectories (political, socio-cultural, and individual) are met, or as instrumental places for freedom of expression. Studying urban spaces to comprehend their levels,

functions, and transformations is necessary to understand urban environmental changes better and maximize their potential (Bertram & Rehdanz, 2014).

A notable example of gradual urbanization is the development of public spaces within cities that are split due to the different privileges enjoyed by some of their residents, who have different social and economic statuses. The transformation of public spaces is characterized by population growth. Scholars accentuate the population increase in Africa and the migration rate of people to urban centers as significant factors in collective space transformation (Czoch & Cooper, 2012; Muzenda, 2019). When transformation occurs in a city, it enhances the rise of dynamic urban space structures that differ depending on their hierarchy of use (Schoonjans & Zhang, 2020).

In 1992, Manuel de Solà-Morales coined the concept of "collective space" versus the concept of public space to better understand the hierarchy of spaces. He defines collective spaces as spaces that foster collectivity and interaction, including distinct types of urban spaces. According to de Solà-Morales (1992), these spaces include the full range of spaces between those that are used for private purposes and those that permit public usage. Collective spaces are not strictly public or private but can be read simultaneously. Collective spaces are often linked with land use and shared spaces that are defined by multiple physical, cultural, or territorial boundaries (de Sola Morales, 1992; Scheerlink, 2015). Globally, the study of collective space and its transitions has advanced in recent decades. There is, however, limited study in the field of collective spaces in informal settlements, particularly in studying how people get access to and sustainably use collective spaces. Collective spaces are also important, especially in informal settlements, due to their emerging and being enveloped through an incremental process of self-organisation. They also support the capacity of communities to

build up sociality with culture, politics, and economics (Hernández-García, 2011; Kamalipour, 2023). In informal settlements, the dwellers form the start of the informal settlements or are involved in improving the existing informal settlements in their physical environments. The local and national governments (which have quite lax rules and regulations) on space usage in the existing open spaces often escalate tensions among community inhabitants, who are hardly searching for spaces for their daily activities. This leads to unguided spatial growth, which is steered by other informal rational forms of spaces. In this condition of informality, one can detect a heterogeneous set of non-built spaces (Hernández-García, 2011; Wang et al., 2019). By viewing informality as a kind of practice, McFarlane (2012) presents an alternative spatial practice that influences urban development through planning and politics over time (Chukwuemeka, 2021; McFarlane, 2012). Therefore, the terms "informal settlements" and "informal urbanisation," "unplanned settlements," "self-generated settlements," "squatters," "illegal settlements," and "unauthorised settlements" are all used interchangeably in this work.

In Tanzania, informal settlements are also known to be self-organised systems with diverse functions that foster most individuals' social, economic, political, and cultural needs (Hansen & Vaa, 2004; Kombe & Kreibich, 2000; Sheuya, 2010). In that case, spaces in informal settlements have often been appropriated as collective spaces. At the same time, the government never defined the open spaces in informal settlements as public spaces. It is an open space that can be collectively used. The distinction between collectiveness and publicness is found in the appropriation by habitually specific groups. Open space does not have the same publicness (being open and accessible to the general public for all) as public spaces (Bahendwa, 2013; Kalugila, 2013; Nguluma, 2003). It is important to understand that in global south

cities, the norms, rationale, and context of the spaces are collectively utilized. It is imperative because it contains a variety of social, economic, political, and cultural activities that have substantial features for the sustainable collective space transformation process (Nguluma, 2003; UN-Habitat, 2020).

LITERATURE REVIEW

Sustainability

Sustainability is about meeting the needs of the present without compromising the ability of future generations to meet their own needs. It involves balancing economic, environmental, and social considerations to ensure that our actions today do not harm the planet or deplete its resources for tomorrow (Folorunso & Ajulo, 2015; UN-Habitat, 2020). Sustainable practices aim to minimize negative impacts on the environment, promote social equity, and ensure economic viability over the long term. It can also mean the process through which individuals manage changes within a homeostasis-balanced environment, where resource extraction, investment direction, technological development direction, and institutional change all work together harmoniously to maximize the capacity of the present and future to satisfy human needs and ambitions (Adedeji, 2005; Taiwo & Adebayo, 2013).

The environment, economy, and equity are the "three pillars" of sustainability that steer the larger movement toward environmental sustainability. Of all pillars, equity (is seen as part of social-cultural relations and equality) (Feng & Hou, 2023; Wiesli et al., 2021). Mwendu (2016) addresses sustainable spaces, as effective space planning, energy conservation, using locally produced, recycled, and sustainable building materials, and stormwater management strategies (Fernandes, et al., 2014; Martinovic et al., 2023). As per Nguluma (2003), comprehending sustainable development would require an insight into the exploration of collective

space transformation and the link between the requirements for safer and more inclusive communities. Sustainable collective space transformation enhances the management and use of urban land, facilitates cheap access to urban services, and boosts the quality and number of affordable spaces for dwelling purposes, as well as fostering the development of the local economy and employment opportunities (Abolade et al., 2019; Feng & Hou, 2023).

Sharma (2021) demonstrates sustainable space as upgrading and improving the living conditions of urban residents to lessen the negative effects of an unlivable urban environment. Therefore, in this research, the transformation of sustainable collective spaces would mean improving and minimizing negative impacts on physical spaces that are more spontaneously appropriated by the community and less preconditioned in design or by governmental regulations. In Tanzania, the transformation of sustainable collective space' seen as an important urban feature that supports the capacity of communities to build up sociality. Therefore, this research intends to study how the Mlalakuwa neighbourhood is transformed due to its informality, specific urban setting, and the impact of sustainable collective space transformation.

METHODS AND MATERIALS

Document Review and Observation

The document review, observation, and semi-structured interviews were the research methods used for this study. The interviews were conducted with space owners and key stakeholders, including architects, planners, and fundi in the local building construction industry. Three main questions were raised about understanding the sustainable collective space transformation process. The questions were: how do social-cultural practices affect the sustainable transformation of collective spaces? How do social-economic

activities influence collective space transformation? What are the environmental challenges associated with collective space transformation? How has technological advancement contributed to collective space changes in the neighbourhood?

To acquire additional data regarding sustainable collective space transformation, 73 interviews were conducted in the Mlalakuwa informal neighbourhood. Five main groups were involved in the interview process: gender, education level, profession, authority, and age. However, thirty-six questionnaires were randomly distributed to various residents' categories using space transformations in Mlalakuwa. The observations were carried out concerning the types of activities that dominated the use of collective spaces. A sample strategy adhered to Glaser and Strauss' theoretical

sampling approach (Glaser & Strauss, 2017; Wiesli et al., 2021). This made it possible for us to incorporate individuals with a variety of backgrounds and modify the sample to reflect the sociodemographic conditions of the Mlalakuwa informal neighbourhood. Snowball sampling was purposefully avoided to reduce sociodemographic biases. In light of the sample aims, participants were gathered near open spaces in the MEO office. The sample shown in Table 1 is the outcome of this methodology. The 73 interviews yielded adequate data, qualitative insights, and acceptable variation across sociodemographic categories. Even though our goal was not to conduct a representative quantitative study, the participants in our sample were sufficient to capture the opinions of many different rural demographic groups.

Table 1: Sample of Interview Participants

| Social demographic Factors | Frequency (n) | Percentage (%) |
|--|---------------|----------------|
| Gender | | |
| Male | 47 | 64.8 |
| Female | 26 | 35.1 |
| Total | 73 | |
| Education Level | | |
| University Professors | 5 | 6.8 |
| University Students | 38 | 51.7 |
| Others (Primary to Tertiary schools) | 30 | 41.5 |
| Total | 73 | |
| Profession | | |
| Other Development Actors (Fundi, NGOs, Planners, Designers, Engineers) | 23 | 31.8 |
| Army Soldiers | | |
| Entrepreneurs | 4 | 5.6 |
| Retired civil servants (Army soldiers) | 34 | 45.7 |
| Total | 12 | 16.9 |
| | 73 | |
| Authority | | |
| Municipal, Region and Central Government. | 9 | 12.4 |
| | 14 | 19.3 |
| | 50 | 68.3 |
| | 73 | |

| | | |
|---|----|------|
| MEO, WEO, ¹ Ten cell leaders, ² | | |
| Total | | |
| Age | | |
| 18-39 | 40 | 54.1 |
| 40-54 | 30 | 41.9 |
| ≥55 years | 3 | 4.1 |
| Total | 73 | |
| N=73 | | |

Source: Author's Field study (2023).

Qualitative Interviews

Based on our understanding of sustainable collective space transformation, we employed a semi-structured interview guide following the conversational flow. The questionnaire was evaluated and improved multiple times before the interviews were conducted. After that, a research assistant³ and the authors conducted the interviews. Asking open-ended questions like "Why do you think so?" or "How do you feel about this?" allowed the interviewers to obtain ideas, feelings, or justifications without resorting to overtly suggestive queries. The typical interview lasted 30 minutes. Open-ended questions about the participant's understanding of sustainable collective space transformation and the specific elements of collective space changes were asked during the first section of the interview. Subsequently, the interviewers inquired about the participants' thoughts on the issues that were derived from their everyday activities. The second section of the interview was to understand who uses existing spaces and how often spaces are

used to accommodate the preferred activities. Then respondents' opinions were gathered in our first set of environmentally friendly group area makeovers.

Case study Area

Mlalakuwa's informal settlement is a sub-neighbourhood of Makongo ward in the Kinondoni district of Dar es Salaam. It is located northwest of the city, close to the famous Mlimani economic hub. Two public academic institutions surround the neighbourhood. On the south and southwest, it is bordered by the University of Dar es Salaam (UDSM); on the west, it is bordered by Ardhi University (ARU). The Sky City shopping mall was also built in the Mlalakuwa neighbourhood, which makes a typical informal settlement in the core of the city of Dar es Salaam (Figure 1(a) and (b)). Mlalakuwa occupies an area of 83.33 hectares and is surrounded by two famous busy roads, i.e. Samu Nujoma Road, Bagamoyo Road, and Makongo Juu Road.⁴ In 2012, the population in Mlalakuwa was about 19,000, and there were 3,185 houses. The density in 1992 was 18 houses per hectare, in 2002 it was 23 houses per hectare, rising to 31 houses

¹Ward Executive Officer (WEO) and Mtaa Executive Officer (MEO): Are the Executive Officers for Street and is part of a division of sub-ward and Ward Executive is part of ward includes a part of a division of a township situated within an area under the jurisdiction of an urban authority WEO and MEO appointed by the Municipal Director. Local Government administrative appointee under Prime Minister's Office, Regional Administration, and Local Government. They work together with local administrative leaders who are politicians.

²Ten Cell leaders is a *ten-cell/ (Ten housing units) administrative leadership* system. In Swahili it is commonly referred to as 'Nyumba Kumi'. Apparently, it is referred to as the lowest sub-ward representatives within the Mlalakuwa neighbourhood.

³Two groups of undergraduate research assistants (4 people in each group) from Ardhi University helped with the data collection during the fieldwork and supported the observation and survey approaches for effective triangulation. During summer school, from the end of July to mid-August 2022, KU Leuven master's students were also involved in analysis and mapping.

⁴The famous University Road has currently changed to Makongo Juu Road.

per hectare in 2012 (URT, 2013). Like many informal settlements, it experienced continuous transformation processes involving several activities done by residents and other investors outside of the neighbourhood. The current growth of the

Mlalakuwa neighbourhood has a particular setting that you can detect in not so many other informal settlements. This setting resulted in a dynamic and rapidly changing environment due to external economic and social pressure.

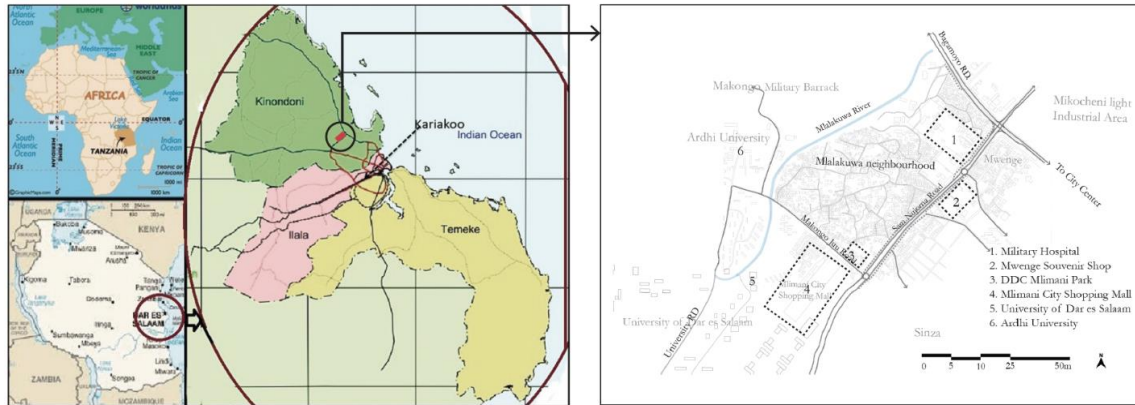


Figure 1: Dar es Salaam map shows the Mlalakuwa location. Source: Layson, 2014 and edited by the author (2023).

RESULTS AND DISCUSSIONS

To understand the transformation of sustainable collective space, the discussions were conducted using different parameters, as shown in the following sections: Section 3.1 presents the interview participants' views of social-cultural aspects. Section 3.2 describes the economic discrepancies between the interview participants' views and the preliminary understanding of sustainable collective space transformation. In Section 3.3, we present the environmental concept that resulted from merging the collective spaces, and finally, we present the technological aspects as agents for collective space transformation. When conducting interviews, as shown in Table 1, the percentage of the group interviewed responses was identified and divided into five main categories: gender, age, profession,⁵ education level, and authority. Gender-wise, 35% of the interviewed inhabitants were females, and 65% were males. The second group viewed the

interviewees' ages as a factor in assessing how the social and cultural structure of Mlalakuwa fit into the dynamic of collective space development. About 54.1% of respondents were between the ages of 18 and 39, the majority of them university students. About 41.9% of the respondents were between the ages of 40 and 54, while 4.1% were over the age of 55. The third group of respondents were professionals, including fundi, NGOs, planners, designers, entrepreneurs, and civil servants/army soldiers, all of whom had 37.4% and 19.3% who were represented by authorities (WEO, MEO, municipal, and central government). 58.5% of those polled were professors and university students.

Social-Cultural Aspects

For a very long time, the city of Dar es Salaam witnessed collective space change in many informal settlements, which was the result of the growth of the microeconomic sector and quick social and

⁵ Other times, professional groups referred to activities conducted by an individual person.

cultural development. The study showed that, due to weak and non-relevant formal governance institutions, policies cannot contribute to land use (Nguluma 2003). Social-cultural elements in informal settlement are seen as a driving force in the transformation process, reflecting many different social dimensions including; employment, social services, and spaces for collective use. The dynamic effects of ethnic groups on the creation, management, and use of spaces greatly influence the collective space changes of building form. Without suitable rules, the dynamic change of a collective space form has been seen to destroy the urban morphology's structure and result in an informal settlement. Ultimately, the occupant forfeits sustainable collective spaces for their regular social gatherings. Slowik (2011) emphasizes the effective and comprehensive utilization and development of spaces as part of sustainable collective space change.

To understand how collective spaces are being transformed in the neighbourhood, the interview was conducted to the level of authority. The study showed that 11 out of the 14 local leaders who were interviewed responded to the fact that most of the spaces are affected by irregular building orientation. This is mostly caused by the impact of traditional architectural styles, which vary depending on the ethnic group. For instance, the difference in orientation creates vulnerability to various spaces, which affects the environment in the neighbourhood. Among the environmental repercussions that are visible in the Mlalakuwa neighbourhood are flash floods and air pollution. During the interview, one of the local leaders narrated that:

(...) "People from varied social-cultural backgrounds came to Dar es Salaam mostly through rural-urban migration, as they did to Mlalakuwa.

*When seen on a wide scale, they produce patterns of relationships between social and cultural elements, which influence the collective space changes. This is often caused when individuals move from rural areas to the city in search of a better life, and new informal settlements emerge as an enclave in the city. Since there are limited procedures regarding planning in informal settlements. Over 80% of the land and spaces in the Mlalakuwa neighbourhood are privately held, and any development ought to be carried out by the owners themselves. This facilitated the haphazard construction and caused challenges in the collective space organisation by limiting open spaces that could be used for service provision for the sake of creating sustainable collective spaces."*⁶

However, critical observation was done in the Mlalakuwa neighbourhood on seven houses to understand the nature of building layouts. As seen in buildings 1–7, in their layouts Figure 2(a), most of the buildings seem to interlock and overlap, resulting in densely layered structures that cannot be broken down into distinct parts that could allow open space for collectivity. The open space in between buildings 3, 5, 6, and 7 in Figure 2(a) is used by the neighbourhood as their collective space. The rear veranda is oriented east, while the front veranda is to the west. Figure 2(b) shows the transformation of a new building with a front veranda facing the north and a rear veranda oriented to the south. The plan shows that the new construction used almost more than 60% of the open spaces that were in the past used as collective spaces. A tiny open space can be detected on the left side of building 7 and the front sides of buildings 3 and 6, which was a bit of a challenge to use collectively.

⁶ An interview with one of the Mlalakuwa local leaders (from Ngalapa Street, located in the northern part of Mlalakuwa neighbourhood) was conducted

in June 2022. He was a retired army officer who had lived in Mlalakuwa since the 1980s.

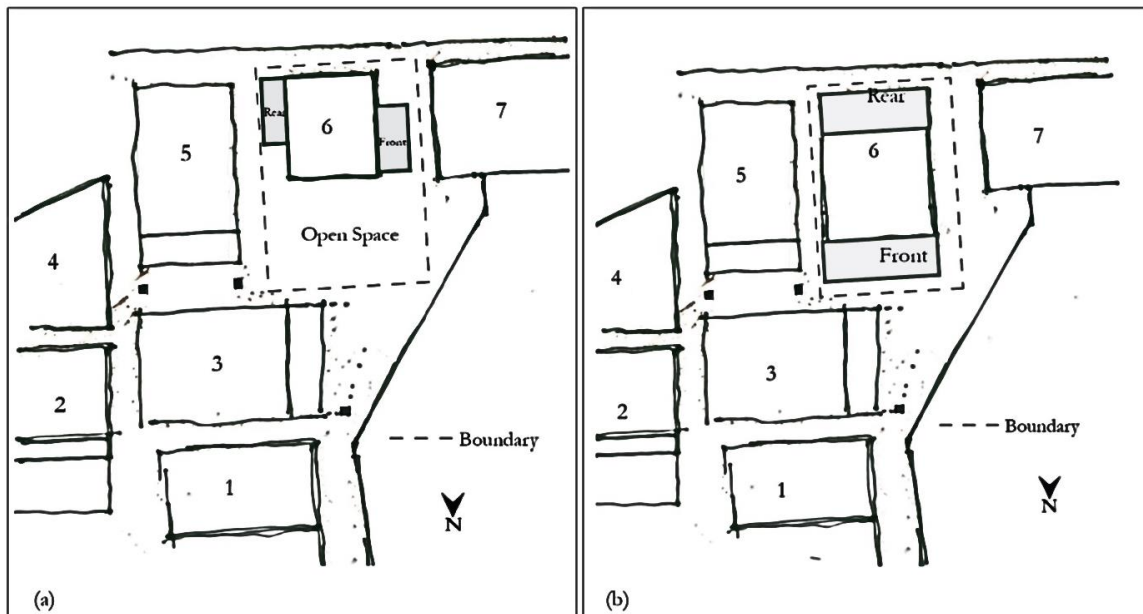


Figure 2: Building layouts showing building 6 before and after the newly constructed building (Fieldwork, 2022).

25 of the 38 students who were interviewed responded that the misuse of already-existing open spaces had ruined sustainable collective spaces transformation. More buildings have been allowed to be built without considering alternative uses of the spaces, which has a major impact on the spaces in the neighbourhood and renders the current collective spaces unsustainable. Residents tend to construct and use spaces as per their social and cultural reflections from their origins, like Swahili building layout⁷ which is often dominated by Swahili social and cultural elements. The study showed that the whole process of transformation relates to the local knowledge and ability of the inhabitants to perform daily activities, which in turn influences space usage. One of the respondents narrated that:

(...) *“The internal dynamics of collective spaces are the result of the space transformation, which includes the users’ day-to-day*

*activities between public and private interactions, and among other things. The neighbourhood’s open spaces seem to be developing unsustainably due to construction habits and space encroachments.”*⁸

The continuous enrichment of activities and practices has led to satisfaction and better living experiences among residents in many informal settlements. This also limits the role of spaces that most individuals might use collectively, ultimately reducing sustainable spaces’ quality. Pincetl (2004) argues that the core elements of sustainable cities in the twenty-first century may be rendered considerably more livable through the deliberate restructuring of urban open-space systems to enhance the desire of individuals to interact. During the study, it was discovered that the diversity of ethnic groups results from the intricate interplay of social and cultural dynamics, which

⁷ Swahili House/Building: This is a phrase that refers to a wide range of traditional building constructions that have courtyards or front and rear verandas that are currently or were once practiced

along the coast, including Dar es Salaam, Mtwara, Kilwa, Zanzibar, and Tanga.

⁸ An interview was held in December 2022 with Mlalakuwa resident.

impacts space usage, formation, and organisation (Lutta et al., 2021). Also, collective spaces along the roadsides have been transformed into multiple uses where motorcyclists, taxi drivers, and tricycle riders use the generated collective spaces for socialisation. The growth of roadsides occurred in three stages. Stage one entails identifying a location in the road

reserve area where someone needs to set up activities. Stage two implies planting trees to provide shade for collective space users. These operations are carried out by individuals who are motorcycle operators. Stage three entails making temporary benches for them to sit on. The places are commonly called *Vijiwe*⁹ in Swahili (Figure 3).

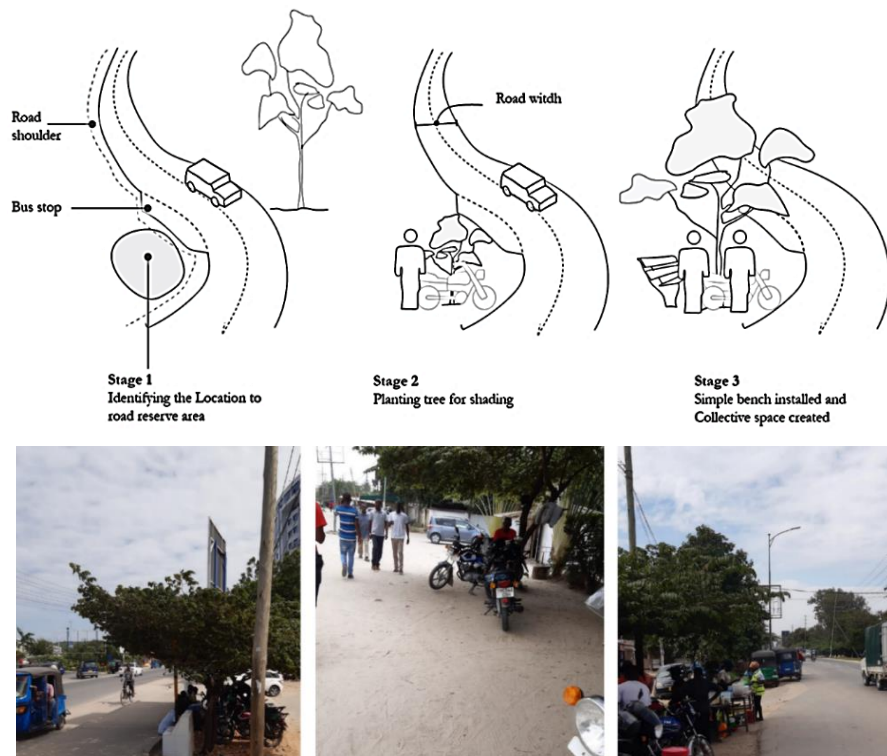


Figure 3: Diagram showing stages of space transformation on the roadsides of Makongo Juu road to collective spaces by motorcyclists and taxi drivers (Fieldwork, 2021).

There are no expenses involved in the development of these spaces. People are banding together and petitioning the local authority for permission to create their businesses. During the interview, one of the participants stated:

(...) *“We are occupying areas that do not belong to anyone. We built this area on our dime, and it wasn’t*

*too costly. We contributed by purchasing wood and constructing these benches. This is an excellent place for us to wait for passengers from public transportation before bringing them to other destinations.”*¹⁰

Considering they assist people in accessing transportation to other different locations,

⁹ *Vijiwe*” is a Swahili word that means a place where people meet and have a conversation. It’s actually a semi-public space or open space.

¹⁰ Interview conducted in July 2020, with a Motorcycle rider (34 years) who is conducting his business in the Mlalakuwa area. He started his business two years ago. He is now living in the Makongo area. It takes five to seven minutes to ride from his home to Mlalakuwa.

local authorities permitted these folks to do their business along roadsides. The map in Figure 4 illustrates how the Mlalakuwa neighbourhood's spaces have transformed. The map demonstrates that between 1960 and 1980, not many buildings were built in Mlalakuwa. Most of them were residential buildings, shown by grey lines and dispersed around the neighbourhood. A significant rise in construction occurred between 1980 and 2000 (shown in orange on the map). The owners built both residential and commercial structures across the Mlalakuwa neighbourhood, contributing more and more to the collective space transformation. Between 2000 and 2020, there was an increase in building activity both inside the neighbourhood and along the main internal streets, as seen by the structures highlighted in red on the map.

The study by Kironde (1995), on the land use structure in Dar es Salaam, refers to 'social-cultural' factors that encourage spatial transformation in an informal settlement. The same author highlights, the social and cultural importance of informal behaviours, which are gaining prominence in the current conversation about upgrading informal settlements. Madanipour, (2003), brings to the agenda the social and cultural dynamics in the current society and how their differences in beliefs can be included in the process of creating better spaces within urban life (Brown, 2001; Madanipour, 2003). The spatial knowledge that may depend upon the activity that organizes a person's space exploration will

be supported by a coherent understanding of how sociocultural factors combine with practical activity and spatial knowledge (Gauvain, 2024). This will further fulfil the global sustainable development goal by making cities more inclusive, safe, resilient, and sustainable (UN-SDG₁₁,2018).

Economic Aspects

The economic factor is another aspect that mobilises significant public and private investment outside the formal economy and investment cycles. One of the major challenges facing low-income groups in many informal settlements has been managing the cost of livelihood (Mbisso & Kalugila, 2018; Tesha, 2020). In almost all informal settlements, the economic practices reflect skills necessary for organising and supervising the production of informal enterprises. The space/land transaction process is one of the elements that hinders the ability of the government to oversee and plan sustainable land use (Lupala, 2002; Lupala et al., 2014). The achievements and capacity of the informal sectors in many informal settlements are meant to provide assets and lift livability for low-income groups (Sheuya, 2010). 18 out of 23 professionals interviewed highlighted the importance of rethinking the idea of sustainable collective space intervention and acknowledging them because they play an essential role in supporting the livelihood of a large part of the population in informal settlements.



Figure 4: Map showing urban transformation trends of the Mlalakuwa neighbourhood. (Dar es Salaam Master Plan, 1968; and Mosaic, 2019).

The findings show that investments (including medical hospitals, shopping, marketplaces, and education facilities) that are located in big cities seem to increase higher levels of collective space transformation. The same can be seen in the city of Dar es Salaam, where the concentration of social-economic facilities in the city is correlated with population growth. As a typical city in sub-Saharan Africa, Dar es Salaam is characterised by formal and informal economic development that impacts the collective space transformation of both formal and informal settlements (Nuhu et al., 2023; Swai & Deguchi, 2009). The transformation in informal settlements in the city of Dar es Salaam provides an example of how the building's spatial extension and floor plan have been changed. The observations show that different types of buildings and collective spaces transformed, which is based on some shared economic features (Swai &

Deguchi, 2008). This enables an extensive reading of the unsustainable collective space transformation in informal settlements. During the interview, Mlalakuwa residents narrated that:

(...) "The neighbourhood changes mainly caused by economic pressure, domestic and household collective spaces that the residents utilised for social activities have often been transformed into commercial spaces. Additional rooms were created to provide space for accommodation and other income-generating activities, such as a shop, a workshop a hostel, a lodge, etc. Next to the transformation, new towers can be seen constructed in the open areas with similar functions as mentioned above this leads to reduce the quality

of spaces that could be used collectively.”¹¹

This is not per se a negative aspect of the ongoing commercialisation process in the existing open spaces, and along roadsides the streets, but the main challenges are the open spaces that were used collectively have been changed to economic operations and let other space users not sure of their stay to perform their social activities sustainably (Figure 5). One benefit of economic activities in informal settlements is the opportunity to carry out a variety of economic practices outside the oversight of the local authorities. These activities were seen to play a major role in the space transformation and lowering the quality of collective spaces for most of the individuals in the neighbourhood. Scholars highlight the economic expansion and its effects on environmental deterioration (Brad et al., 2016). This is the response to human behaviour to the adaptability to ensure the compatibility of economic growth with the fulfillment of changing environments (Cialani, 2007).” This is conceivable, according to studies done by Mbisso & Kalugila, (2018), as proper progressive economic activities in informal settlements enhance people’s access to employment opportunities and housing facilities which are crucial survival tactics for sustainable economic development. 19 of 34 entrepreneurs were interviewed regarding sustainable economic activities for a better living environment and asserted that economic growth has a direct relation with community lives; it was agreed on the balancing mechanism between economic prosperity and environmental sustainability for better community development. To provide technical assistance, public authorities require the support of NGOs and other stakeholders who engage closely with the communities in the planning and allocating of spaces for

economic activities and collective spaces for socialisation. This will guarantee that revenue production is made to the low-income groups on the one hand while maintaining a socially cohesive, healthy, and sustainable environment for community living on the other hand.



Figure 5: Typical example of economic activities along the Streets sides at the Savei area along Makongo Juu Road. (KU Leuven Summer School – Global Minds – VLIR-OUS project, 2022).

Environmental Aspects

The environmental challenges in informal settlements are associated with a lack of planning and misuse of land, which contributes to urban sprawl and deficient infrastructure networks. The infrastructure deficit in informal settlements is significant and these caused by densification leading to the difficult provision of infrastructure systems (Cialani, 2007; Sharma, 2021). The increasing collective space transformation in informal settlements corresponds to the deterioration of the environment, with social-economic and environmental consequences (Adeel et al., 2021).

On the other hand, densification leads to insufficient spaces for important services like drainage systems. For example, the presence of erratic rainy water remains largely challenging in the neighbourhood, sometimes wastewater from bathrooms discharges on the streets and puts the environment in danger (Figure 6). The same observation has been noticed by Cialani, (2007). For example, the observation shows that only 79 out of 314 buildings observed as informal settlements have access to sewerage, compared with 235 houses seen to use pit latrines in Mlalakuwa. This shows that more than 75% of the communities are exposed to environmental

¹¹ An interview was held in December 2022 with Mlalakuwa resident.

hazards. Due to limited drainage systems, these open spaces tend to create potholes that collect rainwater which results in flooding, or mosquito breeding grounds¹² (Figure 7). The ongoing collective space transformation process also raises the prospect that the areas will be riskier when it rains. All these happen and create health risks for the residents, often children and women, who use the available open spaces for collective gatherings. Mlalakuwa sub-ward chairperson¹³ narrated:

(...) "The majority of inhabitants are self-governed, and they establish adaptable and innovative ways of modifying their spaces in various circumstances for living, social, and economic reasons at the end they tend to ruin the environment. For instance, we are facing the challenges of drainage systems because of poor planning. More than 75% of spaces in Mlalakuwa are privately owned, and we can't control the owners to provide spaces for drainage systems. To solve these constraints, we are attempting to engage in a general framework of negotiation with the

*owners to see if they can provide spaces for drainage. This will be one of the best solutions to improve the environment in our neighbourhood."*¹⁴

The quality of life in a compact urban environment was found to be correlated with considering function, labour related to land use, and accessibility of collective spaces (Madanipour et al., 2014). They reflect the social, cultural, and environmental issues that must be favourably seen throughout their entirety during the urban development process. Undoubtedly, this brought up concerns about resource management in the Mlalakuwa informal settlement and collective space sustainability. The open spaces available can be secured and managed by improving the drainage systems that allow the flow of rainwater and leave environments clean. To attain favourable sustainable environments, development stakeholders should be involved in the development program to intervene in the planning process and implementation and call for policies which favour diversity in the planning process.



Figure 6: Photos showing an example of the water from bathrooms discharged to alleyways and affecting the front verandas as space that were used collectively by the residents. Source: Fieldwork (2023).

¹² Because many potholes don't allow the flow of water, they mostly contribute to local malaria outbreaks by encouraging mosquito breeding, which at one point pollutes the environment.

¹³ A sub-ward chairperson is the Chairperson of all six administrative zones in Mlalakuwa.

¹⁴ An interview was held in April 2020 with the CCM chairperson who is currently the sub-ward leader in the Mlalakuwa neighbourhood.



Figure 7: Photos illustrating an example of the environmental hazard on the streets: the formation of rainwater cesspools on the buildings' front veranda. Source: Fieldwork (2022).

Technological Aspects as an Agent for Collective Space Transformation

Technology greatly influences the direction of the city transformation where information and communication using electronic devices as tools continue to take place to disseminate information. New technologies promote participatory spatial analytic tools for collaborative planning of upgrading informal settlements (Sechi et al., 2023). In understanding the technological aspects, three main issues were taken into consideration. First, the information and communication aspect of collective space changes; second, the ability to create and develop spaces as part of their daily activities, and third, the ability to create socio-economic activities to run the community's daily lives.

The study indicates that inhabitants in the Mlalakuwa informal settlement were involved in the communication process through diverse social media platforms.¹⁵ This is a kind of community involvement through communication, where people discuss and give solutions to the existing space challenges, which is a real reflection of technological advancement. The

information and communication help access information between the informer and space developer/tenants. Information flowing through brokers¹⁶ to developers and tenants. The whole process relies upon how individuals are exposed to receive the right information that would help developers to make the right decision regarding the availability of spaces. Later the developer can make improvements to the area to suit his needs after acquiring accurate information about the condition of the space. As a result, information and communication in informal settlements are applied as an agent of the transformation process in the neighbourhood. Observing how technology significantly contributes to the transformation of spaces was fascinating. One of the respondents narrated that:

(...) "I provide space seekers with information about the rooms and other spaces using my cell phone. I have to share a variety of images on social media that showcase rooms and other important spaces for renting. In the end, prospective space seekers mostly won't need to meet the owners in person to have a clue about the space's

¹⁵ Twitter, WhatsApp, Facebook, and Instagram are the most popular platforms used in exchanging information about the availability of rooms/spaces and giving full information regarding space specifications for customers.

¹⁶ They are sometimes referred to as "informers" and are those who are familiar with which resources are available in the area, such as plots of land, furniture, or anything else that has to be sold by the owners.

location, size, and price. I believe that technology is important because it facilitates quick communication with land seekers anywhere."¹⁷

It was seen collective space transformation is accelerated by information exchange through social media because space seekers have a complete awareness of the spaces and know what adjustments should be made rather than just to improve the quality of the spaces. On the other hand, the observation revealed that with the limited collective spaces for socialisation, Mlalakuwa's inhabitants use other possibilities to establish spaces for collective usage where they can meet and socialise. For example, some residents tend to construct temporary video booths (*famously known as vibanda-umiza in the Swahili language*) as their collective space for watching football games (Figure 8). The video booths have been important areas for creating temporary habitable collective spaces for communities that promote alternative land use. During the interview, one of the respondents narrated that:

(...) "Video booths in Mlalakuwa influenced the living environment and made it more responsive to people's needs and desires. Social needs in

Mlalakuwa represent environmental settings, including the video booths, which tend to wipe out the existing open spaces that could be used collectively by the community. Of course, people can meet in these booths, but the notion of sustainability of collective spaces has faded away because it has been commercialised instead of enhancing the community's sociality."¹⁸

The importance of technology on the influence of collective space changes is also backed up by Kalugila, (2014), in enhancing the role of better collective space transformation for boosting sustainable built environment in global south cities. New-technologies promote participatory spatial analytic tools for collaborative planning for upgrading informal settlements (Kalugila, 2013; Sechi et al., 2023). Therefore, collective spaces are important for creating sustainable community development. This should be a wake-call for all designers and all development actors to have clues on the use of technology in shaping spaces that suit collective usage for sustainable development.



Figure 8: An example of a video booth (Kibanda umiza) located at Ngalapa Street in Mlalakuwa at (a) and Mikoroshini Street (b) at Mlalakuwa. Source: Ardhi University students, (2022). And Author, 2022

¹⁷ An interview was held in December 2022.

¹⁸ An interview was held in January 2023 with one of the Mlalakuwa residents.

CONCLUSION

Collective space transformation reflects the land use changes in the structure and collective space pattern of the most informal settlements in suburbs. The intensity of the changes in land use is due to population growth, which has limited important spaces for community activities. Significant geographical changes brought emerging social-economic, social-political, and social-cultural growth, associated with a decline in sustainable environmental quality because of the spatial morphological variation. The dynamic spatial morphology impacted open spaces that people might use collectively. The observed changes tend to reduce some open spaces that inhabitants may use collectively. In this study, sustainable development can be advocated by encouraging individuals to use knowledge and available resources to shape the quality of life in their environment. While the transformation process takes place in most African cities, which vary in scale and intensity, it can still show to some extent how they change. The absence of formal rules and regulations in collective space development, in combination with land-grabbing, leads to a limited number of open spaces that could be used sustainably. Sustainable collective space transformation in informal settlements is believed to be another body of critical thought that deviates from several streams of current urban elements and embodies various conventional conceptions of social, cultural, political and economic frameworks as success factors of sustainability.

In this way, the development actors in informal practices, as exemplified, directly impact the urbanisation process that needs to reflect sustainable collective space development conditions. It is important to consider technological advancement and social-cultural, social-economic, and environmental aspects in current planning and development processes to avert

sustainable collective space transformation in the current informal settlements, which seem to be neglected in most developing cities. Additionally, there should be a way to synthesize appropriate collective space planning policies and adequate land management systems to eliminate the existing collective space challenges. Authorities, however, should understand and recognise the importance of informal settlements in the city, and the role of sustainable collective spaces at the grassroots level because it is the best way to assist people in enjoying urban life through the use of sustainable collective spaces for social and economic activities.

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Declaration of Interest Statement

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