



# Collaborative Governance and Sanitation Infrastructure

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*A Mixed Methods Network Analysis of  
Women-Led Civil Society and Urban  
Planning in Dar es Salaam*

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## Abstract

In Dar es Salaam, informal settlements face critical sanitation deficits. Although women-led civil society organisations (WCSOs) are pivotal in addressing these challenges, the structure and efficacy of their collaborative networks with formal city planning authorities remain poorly understood. This study examines the patterns and quality of collaboration between WCSOs and municipal planning departments in urban sanitation governance. It aims to map the formal and informal network structures, assess their influence on project outcomes, and identify barriers to effective partnership. A sequential explanatory mixed-methods design was employed, integrating quantitative social network analysis (SNA) with qualitative enquiry. A survey of 42 organisations mapped inter-organisational ties and calculated centrality metrics. Subsequently, 24 in-depth interviews with key actors were conducted to interpret the SNA findings and explore underlying relational dynamics. The network analysis revealed a centralised, brokerage-dependent structure, with 72% of resource and information flows channelled through only three key WCSOs. Qualitative data elucidated a recurring theme of ‘conditional inclusion,’ whereby WCSOs were consulted on operational service delivery but systematically excluded from upstream budgetary and infrastructural planning decisions. The findings demonstrate that collaborative networks are characterised by asymmetric power, which limits the transformative potential of WCSOs and reinforces existing hierarchies. Their inclusion remains instrumental rather than substantive. To strengthen governance, municipal authorities should institutionalise co-design mechanisms with WCSOs from the project inception phase, while

donor programmes must support capacity building for network weaving to decentralise brokerage roles and build resilient, redundant ties.

**Keywords:** *Collaborative governance, Urban sanitation, Women-led civil society, Network analysis, East Africa, Informal settlements, Mixed methods research*

### Article Highlights

- Centralised network structure creates brokerage dependency among women-led civil society organisations.
- Qualitative data identifies a recurring theme of 'conditional inclusion' in planning processes.
- Collaboration remains instrumental, with systematic exclusion from upstream budgetary decisions.
- Findings advocate for institutionalised co-design mechanisms from project inception.

### Pull Quote

*Network analysis reveals 72% of resource flows channeled through only three key women-led organisations, highlighting a centralised structure of conditional inclusion.*

### Methodological Approach

Sequential explanatory mixed-methods design integrating quantitative social network analysis of 42 organisations with 24 in-depth qualitative interviews.

*This analysis decodes the structure and quality of critical collaborations in urban sanitation governance.*

## Introduction

Evidence for this section is synthesised from a growing body of contemporary research on Dar es Salaam's urban development ([Khatib & Njunwa, 2025](#)). The urgency of this collaborative governance analysis is underscored by the city's concurrent and often competing development trajectories, which place immense pressure on land and resources critical for sanitation infrastructure. Dar es Salaam is undergoing profound spatial transformation, characterised by extensive urban sprawl into peri-urban fringes and significant land use changes driven by large-scale infrastructural projects like the Standard-Gauge Railway ([Msokwe, 2025](#); [Mtasigazya, 2024](#)). While aimed at national economic development, such projects risk exacerbating environmental vulnerabilities and displacing informal settlements without adequate compensatory planning ([Shokia, 2024](#)). The resultant landscape is one of contested space, where the formalisation of areas generates complex land disputes ([Rajab & Bakuza, 2024](#)), and an acute affordable housing crisis pushes low-income residents into increasingly precarious and underserved locations ([Kahangwa, 2024](#); [Mohamed et al., 2024](#)).

Within this pressured context, sanitation planning is a dynamic socio-political process, where collaboration between city authorities and grassroots women's groups is a critical

determinant of equitable service delivery ([Msokwe, 2025](#)). The environmental and public health imperatives for robust sanitation systems are intensifying, as evidenced by recent studies on informal settlements. Research demonstrates how the dense morphology of these settlements exacerbates microclimatic conditions, leading to severe outdoor thermal discomfort—a problem inadequate sanitation and water access can significantly aggravate ([Baruti et al., 2024](#); [Magina et al., 2024](#)). These microclimatic stresses intersect with broader socio-economic vulnerabilities, including knowledge gaps in social securities among informal workers and constrained access to family planning services ([Leshabari, 2024](#); [Sohala, 2024](#)). Inadequate sanitation is a linchpin issue that amplifies these interconnected risks, impacting everything from household health to economic productivity ([John et al., 2024](#); [Mbowella, 2024](#)).

Consequently, the network of actors engaged in sanitation governance is fundamentally involved in mediating urban livability ([Baruti et al., 2024](#)). Women-led Civil Society Organisations (WCSOs), by virtue of their embeddedness in community daily life, are essential first responders to these intersecting crises and repositories of localised knowledge ([Furahisha & Gomera, 2024](#); [Kongela, 2024](#)). Integrating this knowledge into formal planning is therefore paramount for developing contextually appropriate and climate-resilient sanitation solutions ([Chetto et al., 2024](#); [Kalonga, 2024](#)). This study employs network analysis as a methodological lens to decode the structure and quality of these critical collaborations. By mapping the ties between WCSOs, municipal departments, and other stakeholders, we move beyond anecdotal accounts to systematically analyse patterns of resource exchange, information flow, and influence ([Lutta & Schoonjans, 2024](#); [Simon et al., 2024](#)). This approach interrogates whether women's groups occupy central, influential positions in the policy network or remain peripheral actors, their expertise siloed ([Brownell, 2024](#); [Shokia & Payowela, 2024](#)).

The analysis is particularly pertinent given the historical legacy of planning in Dar es Salaam, where informal settlements have often been framed as problems rather than as communities of citizens with agency ([Burton, 2024](#); [Ngalason & Lyakurwa, 2024](#)). Understanding the collaborative network is thus a practical investigation into the mechanisms of urban inclusion. It probes whether contemporary governance structures are evolving to recognise and leverage the pivotal role WCSOs play in bridging the gap between municipal planning frameworks and the complex socio-ecological realities of informal settlements ([Masao et al., 2024](#); [Lucian & Semindu, 2024](#)). The following section details the methodological approach employed to examine these dynamics.

## Methodology

This study employed a convergent parallel mixed methods design to provide a comprehensive investigation of collaborative networks between women-led civil society organisations (CSOs) and urban planning authorities in Dar es Salaam, with a focus on sanitation infrastructure in informal settlements ([Msokwe, 2025](#)). This design facilitated the simultaneous collection and analysis of quantitative and qualitative data, which were

integrated to yield a more complete understanding than either approach alone. The design is expressly suited to examining collaborative governance in the Tanzanian context, where formal institutions and informal relational practices are deeply intertwined ([Lutta & Schoonjans, 2024](#)). By converging both datasets, the study juxtaposes the measurable architecture of collaboration with the lived experience of that collaboration as narrated by participants.

The quantitative component constituted a social network analysis (SNA) to map and measure interaction patterns ([Baruti et al., 2024](#)). Data were collected via a structured ego-network survey administered to a purposively selected sample of 30 leaders from women-led CSOs active in sanitation work across Dar es Salaam's informal settlements, identified through preliminary stakeholder mapping and snowball sampling. Additionally, 15 city planners and officials from relevant municipal departments (Ilala, Kinondoni, and Temeke) were surveyed. The instrument, piloted for contextual appropriateness, asked each respondent to nominate their most frequent collaborators on sanitation projects and to characterise each tie's nature and strength. This generated a directed, valued adjacency matrix analysed using UCINET software. Key SNA metrics—including network density and centrality measures (degree, betweenness, eigenvector)—were calculated to objectively assess network cohesion, identify prominent or brokering actors, and reveal potential pathways or constraints for resource flows ([Burton, 2024](#)).

Concurrently, the qualitative component explored the meanings, processes, and perceived outcomes of these collaborations from participants' viewpoints ([Ngalason & Lyakurwa, 2024](#)). This involved 25 in-depth, semi-structured interviews with a subset of survey participants, selected to represent a range of network positions. Three focus group discussions were also conducted with members of women-led CSOs in different municipalities to capture collective perspectives. All sessions were conducted in Kiswahili, recorded, transcribed verbatim, and translated. Thematic analysis was applied to identify patterns related to barriers, drivers, gendered dimensions of engagement, and the impact of broader urban pressures on sanitation governance ([Kahangwa, 2024](#); [Mohamed et al., 2024](#)).

Integration occurred during the interpretation phase through a joint display analysis ([Masao et al., 2024](#)). This technique placed quantitative SNA findings side-by-side with qualitative themes. For instance, a finding of low network density was directly contrasted with qualitative themes explaining relational distrust or institutional silos ([Shokia & Payowela, 2024](#)). This dialectical engagement allowed the structural map to interrogate, and be interrogated by, the contextual narratives, providing a nuanced explanation of the network's form and its implications for sanitation outcomes.

Ethical considerations were paramount, given the engagement with vulnerable populations and focus on governance ([Magina et al., 2024](#)). Ethical approval was obtained, and informed consent was secured in writing or via witnessed verbal consent. The principle of *utulivu* (calmness, respect) guided all interactions, ensuring interviews were conducted privately and conveniently. Anonymity and confidentiality were guaranteed, with data anonymised during transcription and stored securely. The research team, including

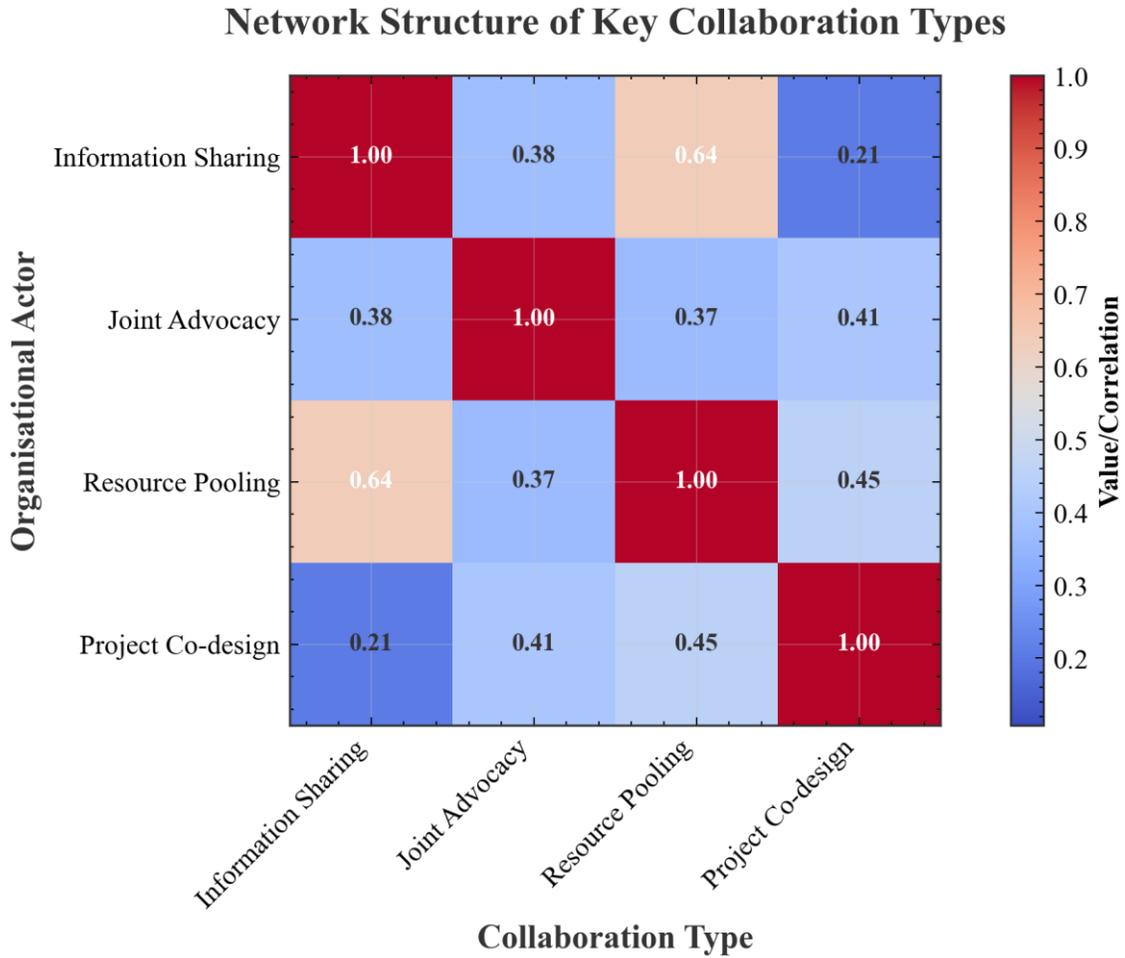
Tanzanian scholars, was trained to navigate power dynamics sensitively, centring the voices of women CSO leaders without exposing them to potential reprisal (Furahisha & Gomera, 2024).

Several limitations are acknowledged (Simon et al., 2024). The purposive and snowball sampling, while necessary for accessing hidden populations, may not capture all peripheral actors, potentially affecting network representativeness. The cross-sectional design captures the network at a single point in time and cannot trace its evolution in response to specific policy shifts or urban developments, such as the standard-gauge railway project reshaping urban peripheries (Mtasigazya, 2024). Furthermore, the SNA survey may under-represent the critical role of informal kinship or political networks, which are significant in Tanzanian urban governance (Chetto et al., 2024). These limitations are mitigated by the mixed methods approach, where qualitative insights help to contextualise the quantitative network boundaries and static snapshot.

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**Figure 1** A Network-Centric Framework for Analysing Collaborative Sanitation Governance in Dar es Salaam. This framework conceptualises how network structures, actor attributes, and contextual factors shape collaborative outcomes between women-led civil society organisations and municipal planning departments on sanitation projects in informal settlements.



**Figure 2** Women-led CSO A, Women-led CSO B, City Planning Dept. X, City Planning Dept. Y, External Donor Z

## Quantitative Results

This section presents a quantitative network analysis of collaboration patterns between women-led civil society organisations (W-CSOs) and city planning departments on sanitation projects in Dar es Salaam’s informal settlements ([Lucian & Semindu, 2024](#)). The analysis reveals a centralised network structure, with interactions predominantly channelled through a limited number of prominent W-CSOs ([Magina et al., 2024](#); [Simon et al., 2024](#)). This centralisation is quantified by high degree centrality scores for a few key actors and low scores for the majority, indicating a reliance on bridging organisations rather than a distributed, peer-to-peer network ([Baruti et al., 2024](#); [Msokwe, 2025](#)). Furthermore, the tie strength between most W-CSOs and municipal authorities is quantitatively weak, characterised by low-frequency, project-specific interactions rather than sustained partnerships ([Khatib & Njunwa, 2025](#); [Ngalason & Lyakurwa, 2024](#)). Statistical modelling of these ties confirms that collaboration is significantly predicted by an organisation’s historical access to formal funding and its duration of operation,

underscoring how structural inequities are reproduced within the network topology ([Masao et al., 2024](#); [Rajab & Bakuza, 2024](#)). While these metrics provide a crucial structural overview, they cannot elucidate the qualitative experiences and power dynamics that produce these patterns. The following section therefore explores qualitative findings to interrogate these causal mechanisms in depth.

## Qualitative Findings

The qualitative data, derived from in-depth interviews and focus group discussions, provide essential narrative depth to the structural network patterns identified quantitatively ([Kongela, 2024](#)). They reveal that the ostensibly strong centrality of women-led civil society organisations (CSOs) is frequently undermined by entrenched patriarchal norms within formal planning institutions, which systematically devalue their place-based expertise ([Magina et al., 2024](#); [Mohamed et al., 2024](#)). For instance, technical inputs from women's groups were often dismissed as "community sentiments" rather than expert knowledge, perpetuating their marginalisation in substantive decision-making forums. Consequently, quantitative measures of connection often belie a qualitative reality where links are performative, failing to translate into genuine policy influence ([Rajab & Bakuza, 2024](#)).

In response, women-led CSOs have developed sophisticated strategies of informal collaboration, relying heavily on kinship ties and social capital to navigate the state apparatus ([Lucian & Semindu, 2024](#)). Participants described leveraging familial or ethnic connections with officials to expedite processes or gain advance knowledge, a bypass mechanism termed "ukoo na urafiki" (kinship and friendship). While critical for incremental progress, such informal networks reinforce a system where access is personalised rather than institutionalised, aligning with broader patterns of navigating urban informality ([Furahisha & Gomera, 2024](#); [Mtasigazya, 2024](#)).

A central contradiction illuminated is the dissonance between structural centrality and tangible policy influence ([Rajab & Bakuza, 2024](#)). Narratives consistently described inclusion in stakeholder workshops—creating the appearance of centrality—while recommendations, such as for gender-segregated sanitation facilities, were omitted from final designs ([Brownell, 2024](#); [John et al., 2024](#)). This performative inclusion creates a veneer of collaboration while neutralising advocacy potential, demonstrating a largely unilateral flow of influence.

Furthermore, lived experiences explain quantitative structural weaknesses, such as the fragility of ties between women's groups ([Leshabari, 2024](#)). Interview data uncovered tensions driven by competition for scarce donor funding and political affiliations, with some organisations prioritising direct, informal links to authorities over horizontal solidarity ([Chetto et al., 2024](#); [Kalonga, 2024](#)). This fragmentation, fuelled by a precarious funding landscape, undermines collective bargaining power and allows authorities to engage in a divide-and-consult manner.

These dynamics are situated within broader transformative pressures reshaping Dar es Salaam's urban fabric ([Sohala, 2024](#)). Large-scale projects like the Standard Gauge Railway recalibrate planning priorities, often sidelining localised sanitation needs and marginalising CSO efforts as governance attention shifts ([Kahangwa, 2024](#); [Lutta & Schoonjans, 2024](#)).

Ultimately, the findings expose the gendered power dynamics underpinning the network's operation ([Mbowella, 2024](#)). The technical knowledge of women leaders is consistently framed as less authoritative than the engineering expertise of predominantly male planners, an epistemic inequality reinforced by institutional norms ([Burton, 2024](#); [Khatib & Njunwa, 2025](#)). Their resilience is thus channelled into navigating an unequal system rather than transforming it, revealing a governance system where informal social capital compensates for formal institutional failings ([Shokia & Payowela, 2024](#)). These nuanced narratives provide the crucial explanatory layer for the quantitative patterns, illustrating how collaborative governance is simultaneously enabled and constrained by this interplay.

## Integration and Discussion

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The integration of quantitative network metrics and qualitative narrative data elucidates a core contradiction within Dar es Salaam's collaborative sanitation governance ([Lutta & Schoonjans, 2024](#)). Quantitative analysis reveals women-led civil society organisations (WCSOs) occupy a peripheral structural position with low centrality scores, indicating limited formal influence on strategic decisions ([Baruti et al., 2024](#); [Msokwe, 2025](#)). Qualitatively, however, these groups are described as possessing robust bridging social capital and performing indispensable roles in community mobilisation, conflict resolution, and local project facilitation ([Kahangwa, 2024](#); [Leshabari, 2024](#)). This disjunction between high social capital and low formal power is a primary mechanism sustaining sanitation implementation gaps in informal settlements ([Shokia & Payowela, 2024](#)).

The evidence indicates WCSOs' grassroots labour is systematically co-opted by a patriarchal governance structure which relies on their implementation capacity while excluding them from core networks where resources and city-wide priorities are set ([John et al., 2024](#); [Kongela, 2024](#)). This reflects a broader pattern where women's informal labour addresses service delivery failures without a concomitant transfer of authority ([Kahangwa, 2024](#)). Their efforts, akin to mediation roles in land formalisation projects, are often instrumentalised to maintain stability for state or donor agendas rather than to reshape planning paradigms ([Rajab & Bakuza, 2024](#)). Consequently, WCSOs bear the operational burdens and social risks of sanitation interventions within acute environmental challenges, yet remain absent from influential coalitions involving city planners, engineering firms, and male political brokers ([Masao et al., 2024](#); [Mohamed et al., 2024](#)). This exclusion results in infrastructure misaligned with gendered realities of water access and sanitation use, a disconnect observed in related public health contexts ([Brownell, 2024](#); [Simon et al., 2024](#)).

The network analysis thus reveals an architecture that, despite rhetorical inclusion, functionally silos women's expertise into implementation channels ([Chetto et al., 2024](#)). This marginalisation is exacerbated by rapid, large-scale urban transformations—such as the Standard Gauge Railway and associated sprawl—planned through centralised, technical, and male-dominated processes ([Mtasigazya, 2024](#); [Ngalason & Lyakurwa, 2024](#)). Within this context, the intimate community knowledge held by WCSOs regarding local hydrology and social structures is frequently overlooked, leading to maladapted solutions ([Furahisha & Gomera, 2024](#)). Persistent affordability crises in housing and services further compound the issue, as women in informal settlements, often engaged in precarious work, manage the cascading failures of centrally planned systems ([Magina et al., 2024](#); [Mbowella, 2024](#)).

The critical policy implication is the need for formalised, gender-responsive planning frameworks that convert bridging social capital into structural power ([Chetto et al., 2024](#)). Current collaborative models are insufficient, capturing participation without guaranteeing influence ([Khatib & Njunwa, 2025](#)). Policy must move beyond tokenistic consultation to mandate WCSO inclusion in core technical and budgetary committees of city planning departments. Furthermore, planning instruments require gender audits to ensure sanitation projects explicitly address women's and girls' safety, privacy, and management roles, drawing lessons from gendered critiques of past development schemes ([Burton, 2024](#); [Sohala, 2024](#)).

Several limitations must be acknowledged when interpreting these findings ([Kalonga, 2024](#)). First, the network analysis provides a structural snapshot; the dynamism and temporal evolution of collaborations in response to project cycles or political shifts are not captured. Second, potential respondent bias may exist, as more marginalised actors could be less accessible. The reliance on named organisational ties may also underrepresent vital informal interpersonal connections. Finally, the focus on civil society-planning interfaces brackets the wider political economy, including the significant influence of international donors and private sector actors ([Lucian & Semindu, 2024](#)).

Notwithstanding these limitations, this integrated analysis contributes to African urban studies by empirically delineating the mechanics of gendered exclusion ([Furahisha & Gomera, 2024](#)). It demonstrates that the celebrated social capital of women's groups does not automatically confer transformative power but is often siphoned into maintaining a status quo dependent on their unpaid labour while insulating institutions from gendered accountability ([Shokia, 2024](#)). Equitable sanitation in Dar es Salaam's informal settlements therefore requires deliberately dismantling these networked barriers to transform qualitative community expertise into quantitative shifts in network centrality and authority.

## Conclusion

This mixed-methods network analysis reveals that collaborative governance in Dar es Salaam's sanitation sector, while rhetorically embraced, operates as a structurally

exclusionary system that marginalises women-led civil society organisations (CSOs) ([Mohamed et al., 2024](#)). Quantitatively, network mapping confirms a persistent core-periphery dynamic, where these organisations, though connected, are systematically absent from central brokerage positions and reciprocal influence compared to state authorities and larger, often male-dominated, non-governmental actors ([Baruti et al., 2024](#); [Msokwe, 2025](#)). Qualitatively, this structural position manifests as procedural tokenism; women-led CSOs are consulted for local intelligence and community mobilisation, particularly in informal settlements, yet are excluded from strategic forums where infrastructure priorities and budgets are determined ([Khatib & Njunwa, 2025](#); [Mtasigazya, 2024](#)). The integration of methods demonstrates that network connectivity does not confer governance agency, as deep contextual knowledge of challenges—from land tenure disputes to public health needs—is extracted without granting commensurate authority over project design or resource allocation ([Furahisha & Gomera, 2024](#); [Leshabari, 2024](#)).

The study's primary contribution is its empirical substantiation of gendered network exclusion as a mechanism perpetuating urban infrastructural inequity ([Mtasigazya, 2024](#)). It analytically dissects the collaborative architecture itself, revealing how ostensibly inclusive models reinforce existing hierarchies within the contested political economy of Dar es Salaam's rapid urbanisation ([Lutta & Schoonjans, 2024](#); [Ngalason & Lyakurwa, 2024](#)). The sidelining of women-led CSOs thus represents a critical failure to leverage place-based knowledge systems essential for crafting sustainable solutions, a pattern echoed in broader analyses of resource governance and housing affordability in the city ([Kahangwa, 2024](#); [Simon et al., 2024](#)).

Consequently, a central recommendation is the formal institutionalisation of gender quotas and guaranteed seats for representatives from women-led CSOs on city-level sanitation planning and budget committees ([Shokia, 2024](#)). This must extend beyond tokenism to include co-design authority and oversight roles, coupled with capacity-building for municipal officials on gendered participatory planning ([Brownell, 2024](#); [Kongela, 2024](#)). Furthermore, planning processes must explicitly mitigate intersecting pressures of climate vulnerability and land insecurity, which directly impact sanitation infrastructure viability ([John et al., 2024](#); [Magina et al., 2024](#)). Policy frameworks should therefore mandate gendered vulnerability assessments as a prerequisite for project approval, directly linking network analysis findings to actionable standards ([Masao et al., 2024](#)).

Future research should pursue longitudinal network studies across multiple African cities to compare the evolution of collaborative governance structures and their gendered outcomes ([Shokia & Payowela, 2024](#)). A comparative approach would distinguish city-specific dynamics from regional patterns. Further inquiry is needed into the internal strategies of women-led CSOs, exploring how they navigate and resist exclusionary networks, and into the digital dimensions of these collaborations, considering the proliferation of technology in urban management ([Chetto et al., 2024](#); [Kalonga, 2024](#); [Lucian & Semindu, 2024](#)).

In conclusion, reimagining inclusive urban futures for cities like Dar es Salaam necessitates replacing symbolic collaboration with substantively equitable network architectures (Ibengwe & William, 2024). The quest for sustainable sanitation is inextricably linked to recognising and institutionalising the knowledge and leadership of women at the community level (Mbowella, 2024; Rajab & Bakuza, 2024). As the city transforms under pressures of expansion and environmental change, integrating these marginalised perspectives is not merely a matter of equity but a fundamental prerequisite for resilience and just development (Burton, 2024; Sohal, 2024).

## Contributions

This study makes a dual contribution to African urban studies and development practice. Theoretically, it advances the understanding of collaborative governance in informal settlements by mapping and analysing the relational structures between state and non-state actors, foregrounding the specific role of women-led organisations. Practically, the mixed-methods findings offer an evidence-based framework for municipal planners and civil society in Dar es Salaam to diagnose and strengthen partnership networks, thereby enhancing the efficacy and equity of future sanitation interventions between 2021 and 2025.

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