

Decolonising Circular Economy: Feminist Food Practices and Everyday Circularity in Nairobi - The Example of Women-led Eateries in Mathare as Infrastructures of Care

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Abstract

The circular economy (CE) has become a dominant sustainability framework, commonly defined through material and energy loops and R-strategies such as reuse, repair, and recycling. Yet prevailing approaches remain largely technocratic, gender-blind, and rooted in Global North epistemologies. This paper offers a decolonial-feminist re-reading of circularity through an empirical study of women-led informal eateries in Mathare, one of Nairobi's largest informal settlements. Drawing on qualitative data from semi-structured interviews, a focus group discussion, and PhotoVoice conducted between August and November 2024, the study examines how circularity is enacted through everyday food provisioning, labour, and care. Findings reveal three interwoven forms of feminist and decolonial circularity: material, labour and social circularity, that sustain household stability and community cohesion where formal systems have failed. Critically, these practices are structurally double-edged: they function as counterpublic care infrastructures contesting colonial legacies, patriarchal norms, and market volatility, while absorbing systemic failures, displacing economic and social costs onto women's bodies, labour, and time. This study proposes a novel framework that reconceptualises circularity by integrating feminist and decolonial perspectives, highlighting the roles of care and structural constraint in shaping circular practices in the Global South. By centring Afro-decolonial and feminist perspectives, the paper reframes the circular economy not as a universal technical fix but as a contested social and ethical process embedded in survival economies.

Keywords Circular Economy · Informal Food Systems · Care Economies · Urban Informal Settlements · Nairobi Kenya · Women-led Businesses · Decolonial Perspectives

1. Introduction

Across sub-Saharan Africa, food systems are deeply entangled with the intersecting crises of climate change, socio-economic inequality, and structural injustice (FAO et al., 2023; Carney, 2012; Leach et al., 2010). While agricultural production remains central to livelihoods, ...the effects of climate volatility and global shocks, such as the COVID-19 pandemic and the price spikes of staple foods triggered in the early months of Russia's war in Ukraine have intensified food insecurity, particularly among urban poor communities (Barrett, 2021, Karume et al., 2024). In Nairobi, Kenya's capital, over sixty per cent of the population lives in informal settlements, where precarious housing, limited access to basic services, and fluctuating food prices shape everyday life (UN-Habitat, 2020; Celentano & Habert, 2021; Paganini et al., 2025). These dynamics expose the inequalities embedded in food systems, inequalities that are profoundly gendered (Bezner Kerr, 2019;

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Kimani-Murage, 2014). Women not only constitute the majority of small-scale food producers in Sub-Saharan Africa but also carry the disproportionate burden of unpaid care and food provisioning work (Ogunlela & Mukhtar 2009). Amid these layered injustices, women in Nairobi's informal settlements have developed multiple strategies of resilience (Resnick, 2020). One key site of such everyday resilience is the informal eatery: small, women-led businesses that prepare and sell cooked food. These eateries sustain households, support neighbours, and reproduce the social fabric of communities through practices of sharing, reciprocity, and care. Despite their centrality, women's contributions to the circular economy of food systems remain undervalued, and their knowledge systems largely invisible in policy and scholarly debates.

The concept of the circular economy (CE) has gained global traction as a pathway towards sustainability. It seeks to reduce waste, close resource loops, and promote efficiency through design, innovation, and technology (Kirchherr et al., 2017; Potting et al., 2017). See Section 2.1 for definitions of the circular economy and the R-strategies (Kirchherr et al., 2017). However, dominant interpretations of the CE are grounded in Global North epistemologies that privilege industrial processes and economic growth, while largely sidelining questions of justice and transformation, issues that recent critically oriented CE scholarship has begun to foreground (Gregson et al., 2015; Corvellec et al., 2022; Schröder et al., 2020). Despite the rise of circular economy initiatives in Nairobi, including the Fair Recycling Project (which strengthens recycling infrastructure and formalises waste pickers), Material Recovery Facilities in informal settlements such as Korogocho (for sorting and recycling), and county-level strategies for source separation and waste-to-energy systems, these efforts overwhelmingly focus on formal businesses and technological innovation, leaving everyday circular practices in low-income settlements largely unexamined (Nairobi City County, 2025a, 2025b; Climate-KIC & Wasafiri, 2024; AICS/UN-Habitat/Nairobi City County, 2026). Dominant CE frameworks remain strikingly gender-blind and tend to overlook the social relations, care work, and informal labour that sustain everyday forms of circularity in the majority world, even though a growing strand of CE research calls for integrating social equity, labour rights, and recognition into debates on circular transitions (Schröder et al., 2020). Against this backdrop, a significant research gap remains concerning how women in informal food economies, such as eateries, enact circularity through their daily labour and care work, and how these practices relate to broader circular economy debates.

This study responds to this gap by empirically grounding critiques of the circular economy in the lived experiences of women operating informal eateries in Mathare. The paper argues that, to make the circular economy truly transformative and centred on justice, its conceptual framework must apply a decolonial and feminist lens. This includes recognising how colonial and capitalist histories have shaped unequal resource flows, waste geographies, and epistemic hierarchies between the Global North and the Global South (Tamale, 2020; Lugones, 2010). Emerging feminist scholarship highlights how circular practices are embedded in uneven distributions of care work and access to resources, while policy analyses call for CE initiatives that explicitly address unpaid care and create spaces for women to thrive (Palm et al., 2024; Federal Government of Germany, 2026; ISWA, 2026; Waste & Recycling Magazine, 2026). Care economies encompass both paid and unpaid care work (International Labour Organization, n.d.). A feminist perspective, in turn, highlights the embodied, emotional, relational, and economic dimensions of care that sustain life and social reproduction, particularly in informal economies (Federici, 2012; Tronto, 2013; Paganini, 2025).

Building on feminist political economy and African decolonial thinking, this paper conceptualises women-led eateries in Nairobi as sites of everyday circularity sustained through informal networks and solidarity. By foregrounding care, redistribution, and relational repair, this approach redefines circularity as a social process of maintaining life under conditions of structural neglect.

Empirically, the paper draws on qualitative research conducted by the first author, and supervised by the second author, in Mathare—one of Nairobi's oldest and most densely populated informal settlements—as part of an interdisciplinary research programme, Urban Food Futures. Fieldwork was undertaken between August and November 2024 and included semi-structured interviews with eleven key informants, a focus group discussion, photovoice exercises, and participant observation. The research builds on a decolonial Afro-feminist methodology that centres lived experience and reflexivity in knowledge production (Tamale, 2020; Smith, 2012). Through the narratives and practices of women operating eateries, the study examines how gendered care, resource scarcity, and community solidarity intersect to shape urban food systems.

This paper seeks to make two main contributions. First, it challenges the current analytical scope of the circular economy by integrating feminist and decolonial theories, shifting the focus from technological innovation to the social and ethical dimensions of circularity. Second, in doing so, we draw on the case study

to foreground the contributions of women-led informal food economies as essential yet under-recognised components of urban circular systems. Accordingly, we address two research questions:

- RQ1. How do women operating informal eateries in Nairobi enact everyday circular practices in relation to food, materials, and labour?
- RQ2. How do everyday forms of circularity shape and interact with dominant economic, gendered, and colonial dynamics within the urban food system?

The paper outlines its framework (Section 2), methods (Section 3), and empirical findings on circularity and their economic, gendered, and colonial entanglements (Section 4), before discussing these in relation to decolonising the circular economy (Section 5) and concluding (Section 6). It argues that circular economy transitions require not only technological solutions but also recognition of those who practise circularity daily, often invisibly, precariously, and through care.

2. Theoretical Framework

The circular economy (CE) is commonly presented as a framework for addressing sustainability challenges through technological solutions, replacing linear ‘take–make–dispose’ models of production and consumption with closed material and energy loops (Kirchherr et al., 2017).

Nevertheless, the gendered dimensions of circularity, care work, and community reciprocity that underpin survival in contexts of scarcity remain largely unacknowledged (Schröder et al., 2020). A feminist and decolonial lens foregrounds lived experience and knowledge from the South, framing circularity as a social and relational, not just technical, process.

2.1. Mainstream Circular Economy

The circular economy is a key sustainability framework, aiming to keep materials and products in use as long as possible, with the potential to decouple economic activity from resource depletion and environmental harm. At its core, CE aims to reduce waste, extend product lifespans, and retain value within socio-economic systems through **material circularity** such as reuse, repair, remanufacturing, and recycling, as codified in widely cited definitions and R-frameworks (Kirchherr, Reike, & Hekkert, 2017; Potting et al., 2017; Kirchherr et al., 2025). Building on these material-centric understandings, an alternative strand of CE scholarship conceptualises circularity at the level of inter-firm collaboration and systemic performance, framing it as ecosystem flows of material and energy, information and knowledge, and economic value (Aarikka-Stenroos et al., 2021). While often presented as a novel paradigm, the CE functions as an “umbrella concept” that brings together ideas from industrial ecology, ecological economics, regenerative design, information and knowledge flows, and cradle-to-cradle approaches. This conceptual breadth helps explain its plasticity and diffuse boundaries (Aarikka-Stenroos et al., 2021; Leach, Scoones, & Stirling, 2010; Murray, Skene, & Haynes, 2023; Corvellec et al., 2022; Elkington, 2007).

Despite its coherence, CE is contested, with some approaches emphasising technological innovation and market-based redesigns. This framing aligns closely with corporate- and policy-led circularity initiatives in the Global North (Kirchherr et al., 2025). A second, less visible strand emphasises resource sufficiency, social well-being, and localised practices of repair and reuse (Gregson et al., 2015). Their coexistence highlights CE’s conceptual elasticity: it can support both incremental reform and transformative socio-economic change.

Mainstream CE prioritises industrial flows while overlooking the social and gendered labour that sustain everyday circularity, particularly in the Global South (Corvellec, Stowell, & Johansson, 2022). Yet evidence from African cities shows that informal entrepreneurs hold extensive practical knowledge about repairing, reusing and repurposing materials, while facing stigma and lack of recognition in formal CE agendas (UNDP, 2024).

2.2. Limits and Blind Spots of Mainstream Circular Economy – The Need to Decolonise

Decolonisation refers to the multi-layered process of delinking from economic, political, cultural, mental, ecological, and physical colonisation; while decoloniality entails the disruption of racial, gender and geopolitical systems of inequality and domination (Tamala, 2020). A central critique of mainstream CE frameworks concerns their tendency to depoliticise socio-ecological conflict by framing circularity as a consensual win-win solution, thereby obscuring struggles over land, labour, extraction, and waste, particularly across North-South relations (Korhonen, Honkasalo, & Seppälä, 2018a; Gregson et al., 2015; Corvellec et al., 2022). The language of circularity often signals consensus and shared purpose, obscuring struggles over land and labour, particularly across North-South relations (Korhonen, Honkasalo, & Seppälä, 2018a). This is evident in recycling and repair economies, where hazardous and low-paid labour is disproportionately located in the South, while economic value is captured elsewhere (Gregson et al., 2015). Recent work warns that unless social justice, poverty, health and gender equity are explicitly integrated, CE initiatives risk deepening existing inequalities and precarious working conditions in the South (Park, 2024, Hadfield et al., 2025). Circularity is therefore not neutral; without attention to justice and redistribution, it risks reproducing existing hierarchies and economic exploitation, the effects of colonialism and coloniality. At the same time, recent scholarship cautions against dismissing the CE on these grounds alone. Kirchherr et al.'s (2025) *A defense of the circular economy* argues that CE should be understood as a contested and flexible umbrella concept whose outcomes depend on how it is enacted. Rather than assuming a single transition pathway, they emphasise examining which actors shape CE strategies, which knowledges are legitimised, and whose priorities are foregrounded. This perspective opens analytical space for expanding CE in directions that centre social reproduction, collective well-being, and alternative epistemologies.

Viewing CE as political raises critical questions: Who performs it, who benefits, and whose knowledge counts?

2.3. Feminist and Afro-Decolonial Perspectives on Circularity

Calls to broaden the circular economy emphasise addressing the historical and structural conditions shaping resource flows, labour, and knowledge, and their implications for social justice and recognition of marginalised groups. (Schröder et al., 2020). An Afro-decolonial perspective highlights how contemporary economic systems remain structured through extractive and dependent relations rooted in colonial rule, persisting across trade and production systems in African countries (Tamale, 2020). These dynamics influence not only material circulation, but also which practices and knowledges are recognised as innovative or valuable. Within dominant CE discourse, knowledge is often legitimised when aligned with technological paradigms from the Global North. Everyday practices of reuse, repair, and improvisation in the Global South are often framed as informal or residual, rather than recognised as central forms of circularity that keep materials in use. (Gregson et al., 2015; Corvellec et al., 2022).

Decolonial feminist theorists emphasise that gendered labour cannot be analysed independently of colonial histories shaping both economic relations and gendered identities (Lugones, 2010; Tamale, 2020). In many African urban contexts, care practices are organised relationally through collective norms of responsibility and reciprocity. Such relational ethics resonate with calls for a gender-inclusive circular economy that recognises women as key knowledge holders of traditional sustainable practices and local value chains (Circular Innovation Lab, 2022). When decolonising epistemic hierarchies and centering knowledge from Africa, Ubuntu emerges as suitable in this paper's context. The example of informal food economies in Nairobi, such as eateries, enact *Ubuntu* principles. The Southern African philosophy of Ubuntu foregrounds relational ethics of interdependence and shared well-being as principles of social organization (Tamale, 2020). Ubuntu's emphasis on reciprocity "*I am because we are*" provides a useful counterpoint to the individualised, market-driven logic that underpins many CE frameworks.

Gender hierarchies structure unequal access to resources and power, privileging masculinity while subordinating femininity (Connell, 1987), while gender injustice manifests as systemic discrimination constraining women's agency (Kabeer, 1994). Feminist political economy further clarifies how circularity depends on labour that is systematically undervalued. Taken together **labour circularity** emerges as combining, productive and reproductive work flows, where time skills flow and where gender, social and

traditional realtions shape who does what and how, and where colonial histories form power realtions within the sphere of work.

Feminist scholarship has long demonstrated that social reproduction, including sourcing, preparing, distributing, and sharing food, constitutes a foundational economic domain that enables production itself (Federici, 2012; Tronto, 2013). This labour is disproportionately performed by women and remains largely excluded from formal economic accounting. CE policies rarely account for the gendered organisation of circular labour, even though women are central in low-paid and informal circular activities such as waste collection and food provision (UNDP, 2022).

Recent CE scholarship increasingly recognises social sustainability as extending beyond material loops to encompass value retention in labour, care, and social relations (Geissdoerfer et al., 2017). This includes attention to **social circularity** in form of social reproduction and care work as foundational to circular systems (Friant et al., 2021), and calls for "just circular economy" frameworks that integrate equity, inclusion, and Global South perspectives (Schröder et al., 2020; Hadfield et al., 2025).

3. Research Design and Methodology

This study draws on qualitative data collected by the first author in Mathare, Nairobi, between August and November 2024. While the broader research examined food justice and the gendered dynamics of informal food systems (Kouablan Klein, 2025), the present paper re-analyses these materials, focusing specifically on everyday circular practices, care-based economies, and the gendered labour embedded within them.

3.1. Research Approach

The research adopts a constructivist epistemology, acknowledging that realities are co-produced through interaction, and is grounded in decolonial Afro-feminist scholarship (Creswell, 2009; Merriam, 2014; Tamale, 2020). This approach is particularly relevant as it centres marginalised knowledge, interrogates power asymmetries in research, and foregrounds the relational, embodied, and collective dimensions of survival within informal settlements (Bhattacharjee, 2012; Yin, 2003).

3.2. Data Collection

Three complementary qualitative methods were employed. Semi-structured interviews formed the primary data source (Adams, 2015; Kvale, 2010). For the purpose of this paper, eleven key-informant interviews were carried out with representatives from NGOs (n = 7), universities (n = 2), and county government (n = 1), together with one respondent from the National Land Commission. All interviews were audio-recorded (45–91 minutes, mostly in English). A focus-group discussion (FGD, 150 minutes) and follow-up interviews (12–17 minutes) engaged eleven women operating informal eateries in Mathare, conducted in Swahili and English with translation. Table 1 summarises the interviews, indicating identification (ID), sample group, sector and area of expertise, interview mode, duration, language, and date.

Table 1. List of interviewees. (*Authors' own work*).

Interview ID	Sample Group	Sector and Expertise	Interview Modus	Length of Interview	Language	Date
01 A	NGO	Grassroots CBO, Mathare; Food justice, informal settlements, gender & circular food systems and community-driven practices	In-person audio recording	65 min	English	09.25
02 V	NGO	Grassroots CBO; Women's land rights, smallholder agriculture, rural-urban food linkages; circular provisioning through eateries in crises	Online, via Zoom, audio recording	55 min	English	10.25

Table 1 (cont). List of interviewees. (*Authors' own work*).

Interview ID	Sample Group	Sector and Expertise	Interview Modus	Length of Interview	Language	Date
03 P	NGO	Local NGO/Grassroots, Mathare; informal settlement and eateries	In-person audio recording	91 min	English	10.25
04 Ak	Scientist	University, Nairobi; Feminist urban studies; everyday circularity and informal food economies	Online, via Zoom, audio recording	66 min	English	10.25
05 An	NGO	Local NGO/CSO, Mukuru; Community development, livelihoods, urban farming; circular food security and resource-sharing in informal settlements	In-person audio recording	69 min	English	10.25
06 S	NGO	Local NGO, Mukuru; Community work, urban food security, youth & women; circular provisioning and local food networks	In-person audio recording	58 min	English	10.25
07 M	NGO	Local CBO, Mathare; informal settlement and eateries	In-person audio recording	60 min	Swahili and English, translator present	10.25
08 E	Policy maker	Nairobi county health departments, gender coordinator, Gender coordination in health, GBV response, policy implementation; circular care and public health in informal settlements	In-person audio recording	65 min	English	10.25
09 O	NGO	NGO on national level, Kibera, Mathare, Mukuru; informal settlements, infrastructure; enabling circular and just urban food systems through policy	In-person audio recording	64 min	English	11.25
10 Sa	Scientist	University, Nairobi; Medical anthropology, nutrition, health in informal settlements; cultural practices and circular food behaviors	Online, via Zoom, audio recording	57 min	English	11.25
11 R	NGO	National Land Commission, Kenya; Land tenure, urban planning, land rights as foundation for circular and just food systems	Online and Written Answers	x	English	11.25
12 FGD	Eatery Operators	Informal economy, Mathare; Experience as owners in small eateries in the settlement Mathare	In-person audio recording	150 min	Swahili and English, translator present	10.25

The focus group discussion (FGD) was conducted following a six-week trust-building phase. This preparatory period involved repeated visits to Mathare, an introductory meeting with eatery operators to clarify expectations, discuss ethics (anonymity, consent, photograph use), and address concerns through informal conversations and joint activities.

Table 2. List of FGD participants (*Authors' own work*).

ID	Age	Education	Experience	Type of Business	Eatery Remy Payment	Children and other Dependents
13 Cat	39	KCPE/ CPE + Secretarial certificate	6 months -1 year in the Informal economy, Mathare; Food practices as eatery operators	Self constructed temporary Open-air space	6000 KES	3
12 Emm	36	KCSE/KACE/A-level / EACE/ KJSE/ O-level	1-5 years in the Informal economy, Mathare; Food practices as eatery operators	Self-constructed Rented temporary Permanent	8000 KES	7

Table 2 (cont). List of FGD participants (*Authors' own work*).

ID	Age	Education	Experience	Type of Business	Eatery Reny Payment	Children and other Dependents
13 Ivo	35	KCPE/ CPE KCPE/ CPE Did not complete primary school KCPE/CPE	> 5 years in the Informal economy, Mathare; Food practices as eatery operators	Self-constructed temporary Permanent	No rent payment	7
13 Joy	52	KCPE/ CPE + community health worker, caregiver	> 5 years in the Informal economy, Mathare; Food practices as eatery operators	Self-constructed temporary Open- air space	No rent payment	6
13 Mar	45	KCPE/ CPE	> 5 years in the Informal economy, Mathare; Food practices as eatery operators	Self-constructed Rented temporary Permanent	No rent payment	3
13 Mau	35	KCPE/ CPE + Dressmaking certificate	1-5 years in the Informal economy, Mathare; Food practices as eatery operators	Self-constructed temporary Permanent	5000 KES	14
13 Phe	46	KCPE/ CPE +Business training certificate	> 5 years in the Informal economy, Mathare; Food practices as eatery operators	Self-constructed temporary Open- air space	2000 KES	5
13 Ann	41	KCPE/ CPE + Secretarial certificate	> 5 years in the Informal economy, Mathare; Food practices as eatery operators	Self-constructed Rented temporary Permanent	7000 KES	4
13 Sus	39	KCSE/KACE/ A-level / EACE/ KJSE/ O- level	> 5 years in the Informal economy, Mathare; Food practices as eatery operators	Self-constructed temporary Permanent	3000 KES	6
13 Ros	55	KCPE/ CPE KCPE/ CPE Did not complete primary school KCPE/CPE	> 5 years in the Informal economy, Mathare; Food practices as eatery operators	Self-constructed temporary Open- air space	No rent payment	15

These steps aimed to reduce power imbalances between researcher and participants and to create a safe space for collective discussion. The FGD facilitated the articulation of shared narratives around community organisation, mutual support, and strategies for coping with food scarcity.

Table 2 shows that all listed participants belong to the sample group of eatery operators, all of whom are women and sole owners of their businesses.

PhotoVoice (PV) is a participatory visual method in which participants photograph their lived realities to document community concerns and advocate for change (Wang & Burris, 1997). PV was integrated into the FGD following a brief training session during the preparatory phase. Participants were instructed in the method, including ethical considerations (such as avoiding identifiable faces without consent) and guiding questions related to food work, challenges, and empowerment. Over subsequent weeks, the eatery operators documented their everyday experiences through photographs of their working environments and practices. During the FGD, participants selected and presented images to initiate discussion, enabling them to shape the conversational agenda and foreground those aspects of circularity and care they regarded as most relevant.

3.3. Data Processing

All interviews and the FGD were audio-recorded with participants' consent and transcribed verbatim by the first author. Ten interviews were conducted in English, while the FGD and one key-informant interview (ID 07 M) were held in Swahili and English, with a local research assistant providing real-time translation during data collection. All coding and analysis were performed on the English transcripts using MAXQDA software. The quotations presented in this paper are drawn directly from these English versions.

3.4. Data Analysis

This paper presents a theory-driven secondary analysis of existing qualitative data, eleven interview transcripts, FGD dialogue, and PhotoVoice narratives, originally collected for a food-justice study (Klein, 2025). The material was systematically reinterpreted through a circular-economy lens, reorganised along two analytical axes introduced in the theoretical framework (Section 2):

1. Circularity dimensions (material, labour, social circularity)
2. Structural constraints (colonial legacies, gender regimes, capitalist dynamics, state neglect) – defined as macro-conditions constraining micro-practices

3.4.1. Analysis Process (5 steps):

1. Data Preparation: English transcripts were imported into MAXQDA 2025.
2. Initial Screening: All existing Food Justice codes (n=397), Decolonial and Afro-Feminism codes (n=723), and Role of Eateries codes (n=596) were reviewed for CE relevance (material loops, labour circulation, social reproduction).
 - Re-categorisation: Relevant segments were mapped to three CE dimensions:
 - Material circularity (12 codes): reuse, redistribution, waste minimisation
 - Labour circularity (14 codes): time/skills exchange, productive/reproductive work
 - Social circularity (5 codes): Ubuntu reciprocity, emotional repair, care work
3. Second Axis: CE practices were cross-referenced with structural constraints (18 codes), yielding in 47 total codes visualised in Figure 1 (coding tree).
4. Validation: Triangulation across interviews/FGD/photovoice; researcher inter-coder reliability check (90% agreement).

This approach privileged empirical understandings of circularity emerging from participants' lived experiences over prescriptive, technocratic definitions.

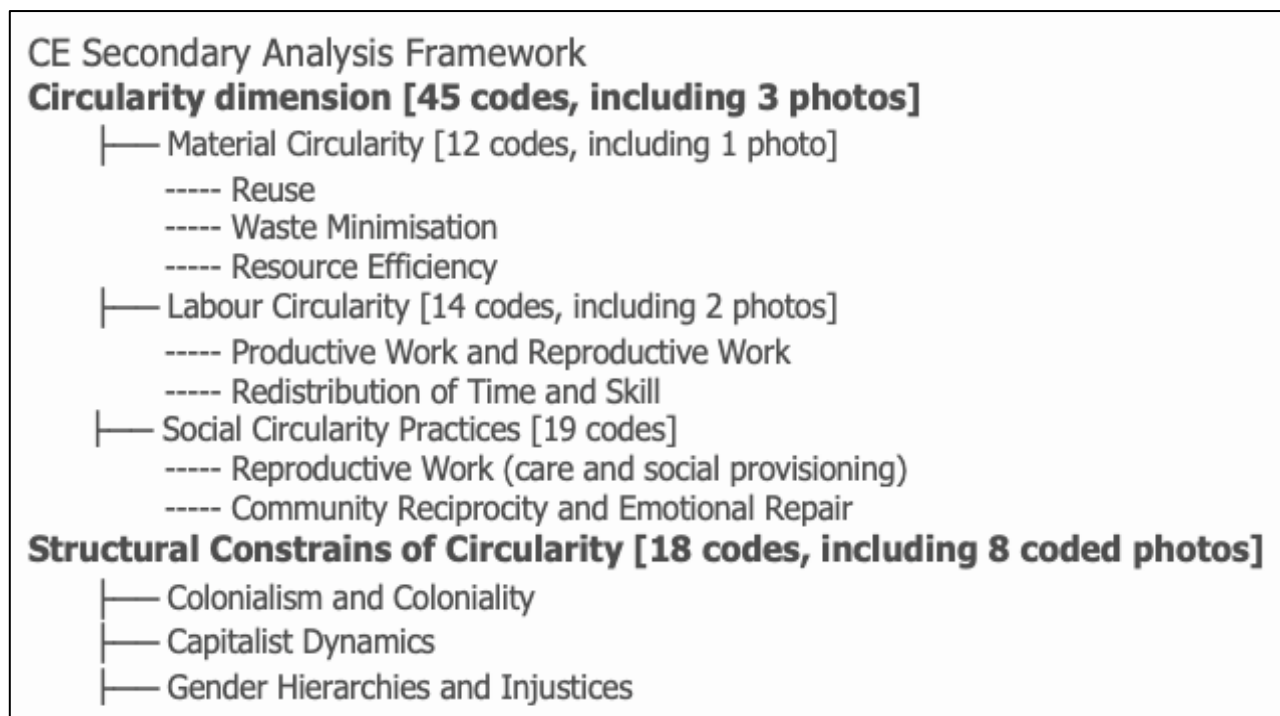


Figure 1. Coding tree. (Authors' own work).

MAXQDA 2024 was used for manual coding; AI features (Code Suggestion, Sentiment Analysis) were not applied. All interpretive decisions remained researcher-driven, and no AI was used for theory development or

writing. Language-focused AI tools were only employed to check grammar, spelling, and readability, followed by careful manual revision and editing.

3.5. Ethics

Ethical considerations followed established guidelines for qualitative research conducted in precarious settings (Ellard et al., 2021). Participation was voluntary, with informed consent obtained, privacy strictly protected through pseudonymisation, and fair compensation provided for time and transport costs. Decolonial ethics informed a non-extractive research practice grounded in prolonged trust-building, sensitivity to power asymmetries between researcher and participants, and accountability to local collaborators through knowledge co-production and the sharing of results.

4. Findings

4.1. Circular Practices of Women operating Informal Eateries in Nairobi

RQ1. How do women operating informal eateries in Nairobi enact everyday circular practices in relation to food, materials, and labour?

The analysis combined deductive codes, derived from circular economy debates on material loops, labour and social reproduction, with inductive codes that emerged from the data, such as Ubuntu, emotional labour and informal safety nets. Table 3 summarises selected coded segments illustrating the practices women employ to negotiate structural constraints, such as price volatility and state neglect, in relation to circular-economy principles.

Table 3. Examples of Codes regarding Research Question 1. (*Authors' own work*).

Quote	Code Reference
“Because cooking will require a lot of fuel. So, they go and buy portions, from the kibanda or from the ... the ... the roadside hoka, who is selling some food, who has cooked food in bulk, maybe it's beans.”	10 Sa, Pos. 17 Scientist
“... by four-thirty to five, many of them will be walking from their companies and they will most ... most of them to those small food kiosks, maybe to have their dinners and some to have their four o'clock tea. In those places, you'll find that there is a television, a TV that is there some of them they also buy a newspaper. And they'll be analyzing the newspaper, they will be realizing the ... the news that come on the TV. So, it also offers an arena for ... to share the political issues of the country, to share things that are happening in the community, in the country they shared their updates and their stories.”	05 An, Pos. 31 Community-based NGO
“They (Eateries) help the community. So, for those who cannot afford a balanced diet, they help.”	12 FGD, Pos. 162 Eatery Operators
“... how we form the group. We are helping each other, the eatery women, they are helping each other.”	13 Cat, Pos. 36 Eatery Operator
“She says that they kiba, eateries, we call them kibandaski, they are very important to her and the community, because they eateries have bridged the gap whereby when their family members dont have enough food, they can run to the eateries. They can borrow, the example she has given of beans, they can go take the beans and then they give their baby and then the baby drinks it with the soup.”	07M, Pos. 67 Community-based NGO
“For the larger community, it also makes the community survive. Yeah the food kiosk make the community survive. Like maybe men, who live here, maybe those who are single or who have left their wives back home, they can be able to afford a basic good meal from the kiosk here. So it also supports the economic status of this community, because the food is sold to the lowest unit that you have. You will be served some something for the money that you have. If you need the beans for 10 shillings you will get. There is something called the chapati choma, that is chapati with just soup. And many people survive on that year who work in the industries and those who don't earn enough. At least that those food kiosk they do really support.”	05 An, Pos. 27 Community-based NGO

Women's eateries act as community stabilisers by providing affordable, culturally appropriate meals that mitigate hunger, reduce stress in households with unstable incomes, and support children's schooling. By addressing immediate food needs while generating income for their operators, these eateries occupy the intersection of food provisioning, social reproduction, and material circularity (02 V Pos. 17; Pos. 35, Pos. 36; 08 E, Pos. 31, Pos. 35; 06 S, Pos. 22; 07 M, Pos. 64). The findings show that women-led eateries minimise waste through resource-efficient cooking, material reuse and adaptive food practices. Operators incorporate whole animals and less marketable parts, such as bones, heads, legs and intestines, into meals, thereby reducing waste while expanding nutritional access. Water and fuel are reused whenever possible, and leftovers are channelled into operators' households, creating loops between income generation and household sustenance. Here, material circularity is driven less by environmental ideology than by necessity, local knowledge, and everyday life under conditions of scarcity (04 Ak, Pos. 29; 05 An, Pos. 24; 11 R, Pos. 180). At community level, eateries externalise energy- and labour-intensive meal preparation from households, creating shared loops of fuel, water, and labour. Purchasing prepared food reduces household resource use and allows caregivers, predominantly women, to reallocate time towards income generation, rest, or care work. Local sourcing and seasonal ingredients reinforce this place-based circularity, though they may introduce food safety risks where produce originates from environmentally degraded areas (01 A, Pos. 18; 02 V, Pos. 17; 03 P, Pos. 46; 05 An, Pos. 26; Pos. 44; 06 S, Pos. 20; 07 M, Pos. 67; 10 Sa, Pos. 17).

4.1.1. Productive Practices and Reproductive Practices Eateries redistribute emotional and caregiving labour through everyday practices of support, including watching children, mediating conflicts, monitoring neighbours' well-being, and offering meals on credit. This redistribution of care reduces the burden of social reproduction within households, mitigates stress, and enhances resilience in contexts of chronic insecurity. Care emerges as a collective, circulating resource rather than a private, individual responsibility (05 An, Pos. 26, Pos. 31; 06 S, Pos. 26; 11 R, Pos. 180, 12 FGD, Pos. 224). Eatery operators combine productive and reproductive labour in closely intertwined daily routines. Beyond selling food, women-led eateries sustain households and communities through cleaning, childcare, mentoring, and other forms of work. They function as hubs of gendered, multi-layered work, providing food, income, and caregiving, while creating local economic opportunities in the informal economy. In a context shaped by colonial urban planning and unequal access to education, such employment offers one of few accessible pathways into legally operating, albeit informal, economic activity (participant observations and 02 V, Pos. 33).

A third dimension of everyday circularity concerns Ubuntu-based social practices. Eateries also function as social spaces, offering opportunities for rest, conversation, and informal political discussion. Through participation in savings groups and cooperative self-help arrangements, operators strengthen community-based systems of mutual aid and emotional repair that compensate for limited state support. Flexible payment arrangements and food credit constitute informal safety nets grounded in trust. These practices reflect Ubuntu-inspired logics of interdependence, where value circulates through relationships rather than solely through monetary exchange (01 A, Pos. 6; Pos. 62; 05 An, Pos. 31, Pos. 34; 13 Mau, Pos. 21). Figure 2 provides illustrative examples to the enrich the answers to RQ1 with pictures of food culture and practices, how food provisioning informality and Ubuntu intersect in this context.



Figure 2. From left to right: Informality as survival and resistance; everyday circular practices in women-led eateries illustrated through interaction with a water provider; food provisioning, redistribution, and waste practices; and social provisioning and Ubuntu practices. All photos were taken by the first author and the photovoice activity, 2025. (Authors' own work).

To address the first research question, we frame informal eateries as relational infrastructures in which food, labour, care, and resources circulate amid structural scarcity. In this sense, circularity emerges as a lived and dynamic practice, rooted in everyday survival strategies rather than formal circular-economy initiatives. Material circularity is enacted through resource-efficient cooking, the reuse of materials, the reintegration of leftovers into household consumption and the redistribution of energy use. The incorporation of whole animals and less marketable parts into meals minimises waste while maintaining nutritional access under constrained conditions. Labour circularity arises through the redistribution of time, skills, and energy. By externalising energy- and labour-intensive meal preparation to eateries, households participate in shared loops of fuel, water, and labour.

In sum, the findings for RQ1 show that women operating informal eateries enact everyday circularity through intertwined forms of material circularity (resource-efficient cooking, reuse, and redistribution), labour circularity (reorganisation of time, effort, and income), and social circularity (care, reciprocity, and Ubuntu-based mutual support).

4.2. Embeddedness of Circular Economy Practices

RQ2: How do everyday forms of circularity shape and interact with dominant economic, gendered, and colonial dynamics within the urban food system?

To address the second question, these practices were interpreted in relation to structural conditions, including gendered labour regimes, colonial legacies of urban planning and knowledge production, state neglect, and market volatility. Table 4 summarises coded segments showing how colonial, capitalist and patriarchal narratives are enforced and challenged.

Table 4. Examples of Codes regarding Research Question 2. (*Authors' own work*).

Quote	Code Reference
"She's empowered because she is the source of employment for to some."	13 Mau, Pos. 18 Eatery Operator
"She is saying she is the definition of empowerment."	13 Cat, Pos. 17 Eatery operator
"...violence when there is no money to buy food. Yes, domestic violence comes in and all that and as a result of lack of provision."	04 Ak, Pos. 27 Scientist
"When she went, she got frustrated, that the cereal prices had hiked.(...) So that shows you some of the market and ... and unexpectations, that also happens at all times. You are alone, at times you have maybe planned ... you had planned for less money,"	12 FGD, Pos. 68 Eatery operator
"When there is food injustice (...) because there is the argument in the house there is ... and now you can connect to that ...? Translator asks in Swahili. All participants answering together: There is gender-based violence that comes in."	12 FGD, Pos. 148-150 Eater operators
"She's empowered because she is the source of employment for to some."	13 Mau, Pos. 18 Eatery Operator

In Nairobi's informal settlements, women-led eateries (kibandas/kibas/cookeries) emerged as adaptive responses to intersecting crises including food insecurity, unemployment, pandemic disruptions, and limited mobility. With minimal start-up capital (sometimes KES 1,000 \approx €6.60), single mothers, widows, and rural-urban migrants established businesses operating through short supply chains that circulate resources locally while supporting extended households (02V Pos. 17, 35; 06S Pos. 22; 08E Pos. 31, 35).

Women's eateries operate within structural conditions of scarcity shaped by colonial urban planning, environmental degradation, capitalist volatility, and state neglect. Here, circularity is driven by survival rather than by voluntary sustainability. Colonial knowledge devalues local foods and women's culinary practices, while formal CE initiatives favour capital-intensive, technocratic models. Operators experience exclusion from policy and finance through high taxation, costly business registration, and criminalisation. Public authorities neglect food infrastructure while simultaneously policing and exploiting women. Gendered power relations impose triple burdens of reproductive labour, income generation, and social provisioning, compounded by gender-based violence and economic insecurity, both of which undermine trust and social reproduction.

At the same time, eateries enact Ubuntu-based counter-practices that rework dominant dynamics. Through affordable meals, food credit, emotional support, and collective care, they disrupt the link between food scarcity and domestic violence while stabilising households. Women's economic centrality challenges patriarchal breadwinner norms through everyday survival economies rather than formal empowerment programmes.

In sum, RQ2 findings demonstrate that everyday circularity both depends upon and contests structural constraints, operating as negotiated survival strategies within unequal urban food systems.

4.3. Photovoice as an Analytic Bridge Between Findings and Discussion

To transition from empirical findings to the broader theoretical discussion, this paper draws on selected photovoice narratives as an interpretive lens. PhotoVoice is mobilised here to illuminate how women operating informal eateries make sense of their labour, environments, and social relations, and how they visually articulate meanings of circularity.

Through visual storytelling, eatery operators foreground their work as skilled, relational, and socially indispensable. In doing so, PV reveals how dignity is actively produced within contexts of material scarcity and structural neglect.

Several images emphasise spaces of interaction: shared cooking areas, informal seating arrangements, and moments of conversation, rest, or collective problem-solving. These visual accounts highlight circularity as a social and emotional process, sustained through trust, reciprocity, and mutual dependence Ubuntu practices. The photographs make visible cycles of care, emotional labour, and community stabilisation that underpin

food provisioning in informal settlements. Figures 3 and 4 illustrate PhotoVoice findings that enrich RQ2 visually.



Figure 3. From left to right: A shared meal during a community break, where participants exchange relevant information; a joyful moment as eatery operators dance in celebration of good sales and shared happiness; an exchange between an eatery operator and a community. (All photos were taken by FGD participants).

Importantly, photovoice also exposes the ambivalence of everyday circularity. While women reclaim value and recognition through their narratives, the images simultaneously point to exhaustion and exposure to risk. Circular practices emerge not as emancipatory solutions per se, but as negotiated responses within unequal urban food systems shaped by colonial legacies and gendered labour hierarchies.

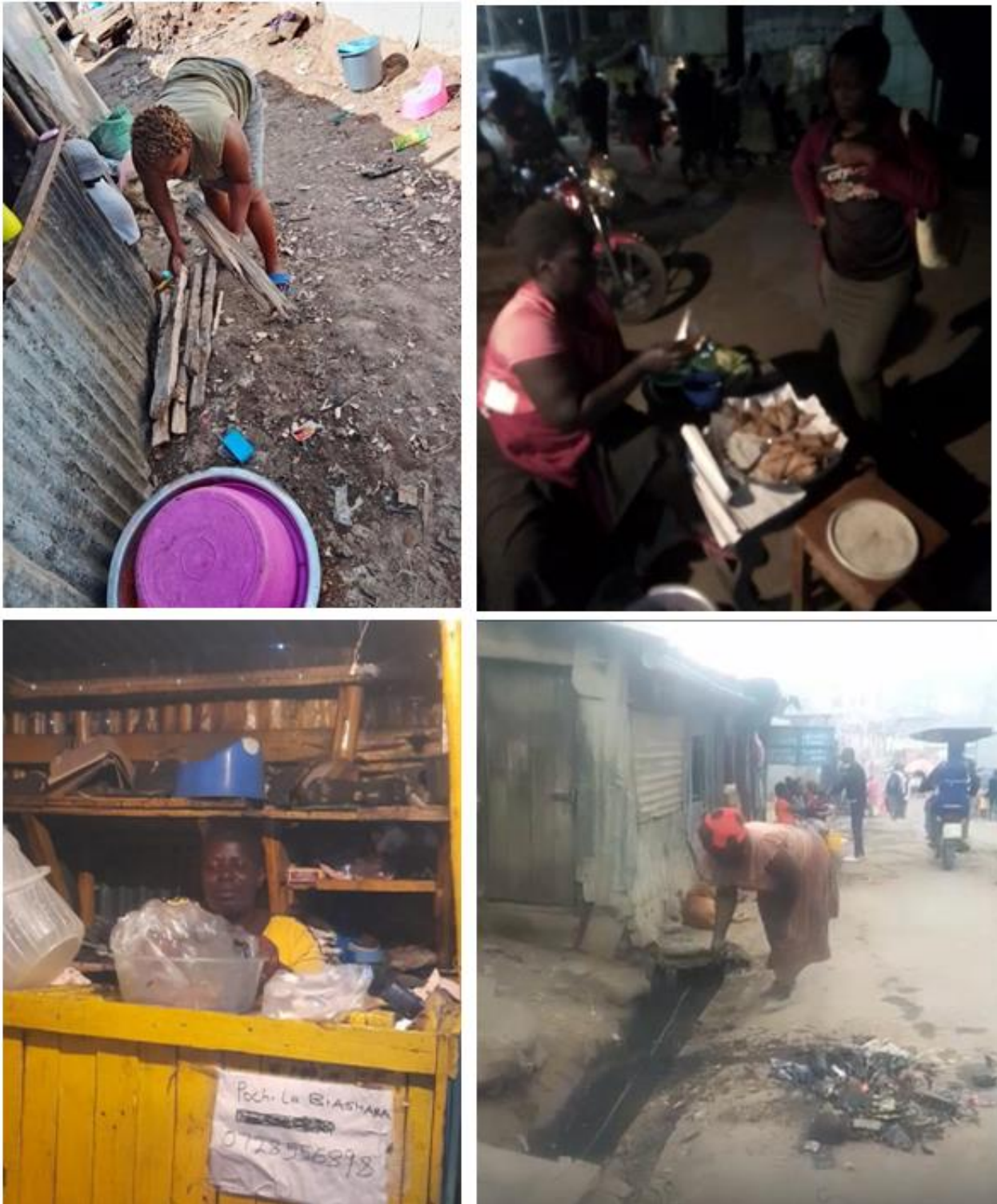


Figure 4. From left to right: As charcoal prices soared, communities turned to cheaper firewood alternatives, extending working hours into the night; an eatery operator continues her long day despite increased security risks for women after dark; frustration and exhaustion set in when customers are few or helpers fail to turn up; and finally, eatery operators take on unpaid tasks such as cleaning clogged drainage to prevent food insecurity, disease outbreaks, and flooding after rain. (All photos were taken by FGD participants).

By centering participants' visual and narrative interpretations, photovoice unsettles Eurocentric and technocratic imaginaries of circular economy that prioritise efficiency, optimisation, and growth. Narratives shared during the FGD indicated that hegemonial and colonial statements were reproduced while at the same time a strong locally adapted and own understanding of concepts of justice or circularity surfaced. This

perspective provides a critical entry point for the subsequent discussion, which interrogates how every day, feminised forms of circularity both contest and remain constrained.

5. Discussion

Circularity in Mathare's women-led eateries arises not as innovation but as necessity—a condition that simultaneously distinguishes these practices from technocratic circular-economy frameworks and reveals their analytical significance for circular-economy scholarship more broadly. The following discussion develops this argument across three interconnected dimensions: the material and social content of everyday circular practices (RQ1), and their entanglement with economic, gendered, and colonial power relations (RQ2). The analysis foregrounds a central tension running through all findings: women's circular practices constitute genuine counter-public infrastructures while simultaneously absorbing the structural failures they contest.

5.1. Community Circularity as Parallel Infrastructure

Mathare's eateries enact what we term *community circularity* resource-efficient cooking, whole-animal utilisation, water and fuel reuse, leftover redistribution, material repurposing. These are practices that constitute self-contained economic loops sustaining basic life functions where formal systems have withdrawn. Unlike industrial CE contexts in the North, where circularity typically optimises established supply chains, these practices function as parallel infrastructures: food procured through informal traders, fuel sourced via local vendors, meals cooked centrally to support workers across settlement functions, income recirculated locally. The analytical significance lies not in their efficiency per se, but in their systemic character: "The biggest impact ... is that the food is cost effective ... families don't cook. Most families just come to buy food from the eateries" (02 V, Pos. 34).

This systemic character is obscured by dominant CE frameworks centred on R-strategies (reduce, reuse, recycle) derived from industrial production contexts (Kirchherr et al., 2017; Potting et al., 2017). Applied to majority-world informal settlements, such frameworks misread community circularity as residual inefficiency rather than as constitutive survival architecture. The distinction matters: residual practices are absorbed into formal systems as they develop; constitutive survival architectures *are* the system. They maintain social cohesion and economic circulation precisely because formal alternatives remain absent or inaccessible.

This absence is not accidental. Colonial urban planning legacies have produced the infrastructural conditions within which women's circular practices operate. Mathare remains structurally excluded from Water, Sanitation and Hygiene (WASH) systems and formal waste infrastructure, a condition participants narrate as ongoing rather than historical: "The gaps are still there ... they have not cleaned the river ... and they know how polluted the water they used for planting is" (04 Ak, Pos. 25). Simultaneously, colonial disruption of food cultures has devalued the indigenous culinary knowledge underpinning resource-efficient cooking: "We started shifting from what we had, including the foods we used to cook ... to eat the western food makes you look ... be somebody of class ... which has eroded some of our very rich cultural heritage" (10 Sa, Pos. 43). Here, circularity is not a choice but a structurally produced condition—what Fraser (2016) terms "counter-public maintenance work": social reproduction enacted where the state has withdrawn and grounded in Ubuntu-based care ethics (Paganini, 2025; Skinner & Haysom, 2016).

5.2. The Double-Edged Character of Circularity

The most significant and theoretically generative finding is not that circular practices exist in Mathare, but that they are structurally double-edged: they simultaneously constitute counterpublic resistance to dominant economic and gendered dynamics and absorb the systemic failures they contest stabilising the very structures that produce marginalisation.

This double-edged character is most visible in women's responses to capitalist market volatility. Global supply chain disruptions, staple food cartelisation, and regressive taxation generate economic instability that formal markets do not absorb. Women absorb it instead through flexible pricing, variable portioning, and informal credit reworking market rigidities into micro-redistribution. The analytical problem, as critical CE scholarship has underscored (Gregson et al., 2022; Corvellec et al., 2022), is that this depoliticises circularity

by isolating efficiency from production relations: economic adjustment costs are displaced onto women's bodies, labour, and time, exemplifying what Federici (2012) calls the feminisation of survival and what Mezzadri (2019) identifies as the feminisation of economic risk in reproductive economies.

The same double-edged structure organises social circularity. Eateries function as what Mezzadri (2019) calls "reproductive factories" sites where production, reproduction, and care intersect. Flexible credit, food provisioning, and sustained emotional labour create what Fraser (2016) identifies as "hidden circuits of care" mitigating hunger and reducing domestic conflict: "It has reduced the burden of access to health ... people are emotionally okay ... it has reduced the number of incidences of GBV" (08 E, Pos. 35). Women's economic centrality through eateries demonstrably challenges patriarchal breadwinner norms and generates informal safety nets. Yet these same care ethics deepen women's financial exposure, accelerate burnout, and increase vulnerability to violence (Paganini, 2025; Resnick, 2020). Ubuntu solidarity reworks dominant dynamics: it does not dismantle them.

The key question for circular-economy scholarship remains when community circular practices shift from compensatory survival to genuine redistribution. While a single site cannot resolve this, evidence suggests two necessary conditions: formal recognition of informal food infrastructures, providing protection and resources rather than formalisation pressure; and redistributive fiscal policies that retain surplus locally instead of offloading costs onto women's labour. Without such shifts, circularity in Mathare remains an impressive but systematically exploited survival strategy.

5.3. Implications for CE Theory and Practice

These findings carry three implications for CE scholarship. First, epistemic implication: the Mathare case demonstrates that CE concepts like R-strategies gain analytical traction only when grounded in the power relations and material conditions of specific contexts. The concept of community circularity invites a reconceptualisation of what "circularity" means and whose knowledge counts in defining it. Informal settlement knowledge constitutes a distinct and generative theoretical resource for CE scholarship (Schröder et al., 2020; Hadfield et al., 2025).

Second, substantive implication: the findings demonstrate that care work and social reproduction are foundational to circular systems. Eateries redistribute not only materials but also emotional labour, childcare, conflict mediation, and mutual aid in hidden circuits sustaining both production and reproduction (Fraser, 2016). Integrating these dimensions challenges CE's material-centric focus (Geissdoerfer et al., 2017) and requires frameworks that value feminised maintenance work as essential circular infrastructure rather than as externality or residual inefficiency.

Third, methodological implication: capturing the relational dimensions of circularity such as trust networks, care ethics, affective labour requires participatory visual approaches that conventional CE metrics cannot reach. The photovoice methodology deployed in this study generated data on the spatial and relational organisation of circular flows that interviews alone would not have surfaced, suggesting that methodological pluralism is not supplementary but constitutive of adequate CE research in informal settlement contexts.

Forth, integrative implication: Figure 5 presents the developed framework, illustrating the interconnections between key CE concepts and the empirical findings on women-led eateries, particularly across the dimensions of material, social, and labour circularity and structural constraints or enablers. It demonstrates how resource-efficient practices connect to care redistribution and Ubuntu ethics (reciprocity, dependencies and solidarity), while embedded within structural constraints like colonial planning and gender regimes.

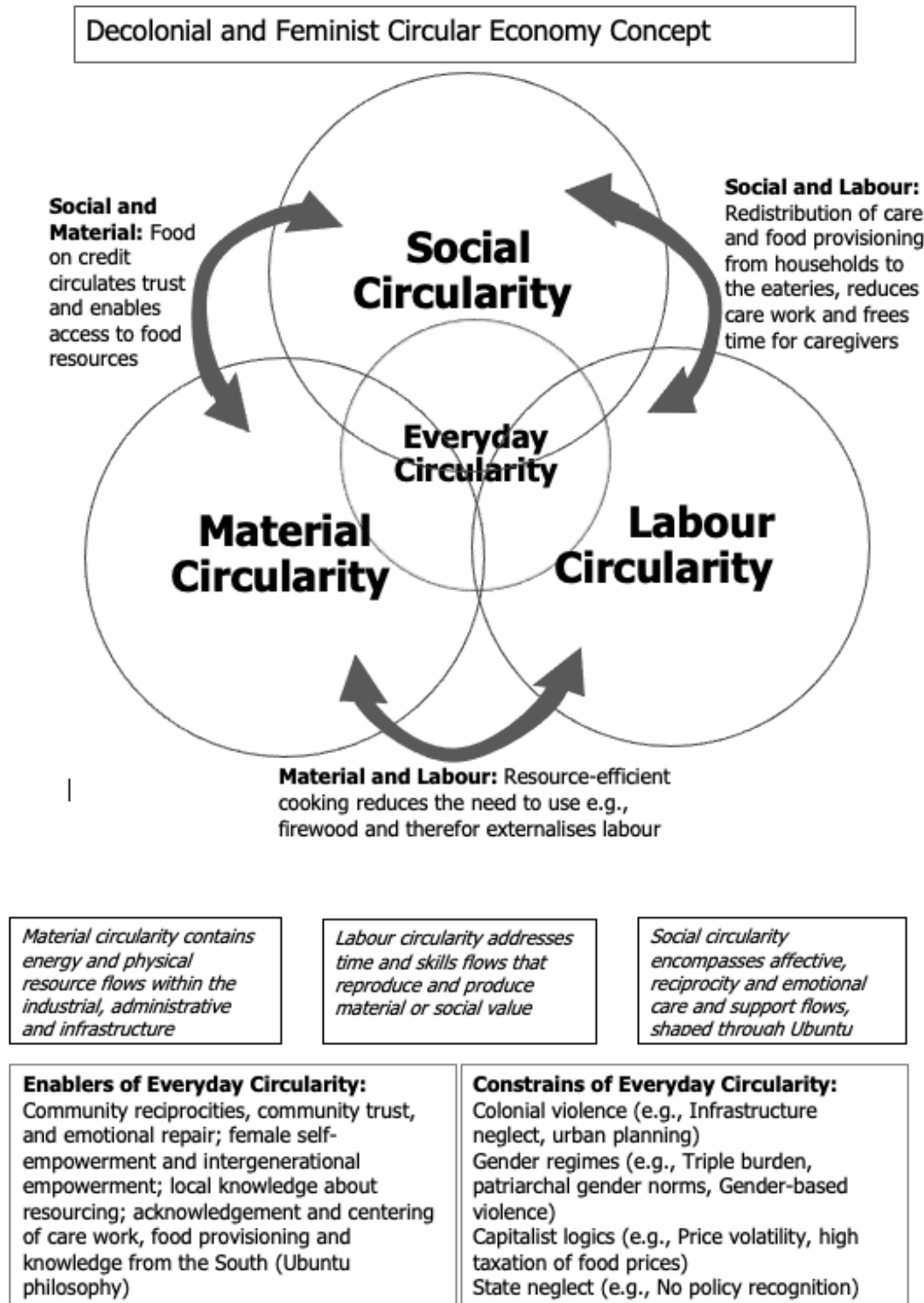


Figure 5. Framework synthesising circular economy literature streams with empirical and analytical dimensions. (Authors' own work).

Other frameworks conceptualise circularity through ecosystem flows of material and energy, information and knowledge, and economic value (Aarikka-Stenroos et al., 2021) or the triple bottom line of social, economic, and environmental sustainability (Elkington, 2007). These typologies map inter-firm collaboration and macro-performance effectively but remain abstract on micro-level labour and care dynamics sustaining circularity in informal, Global South contexts. Our framework extends these by preserving material

circularity (resource loops) while disaggregating the "social" dimension into labour circularity (time/skills exchange across households/eateries) and social circularity (affective/Ubuntu-based reciprocity). This reveals how feminised reproductive work, overlooked in economic/information flow models, enables material loops, and how emotional repair generates value beyond financial metrics and how we can center perspectives from the South and decolonize systems from the North. Recent work on island and Indigenous circular systems further emphasises socio-cultural dimensions like reciprocal care (aloha 'āina) alongside material loops, highlighting gaps in social equity within global CE policy (Beamer et al., 2023).

Eco-feminist approaches frame circular transitions as socio-ecological struggles over labour and recognition (Planext, 2025), while policy analyses call for circular-economy strategies that address unpaid care and create discrimination-sensitive spaces for women (Federal Government of Germany, 2026). Consequently, the findings suggest three main policy and practice implications.

First, circular-economy strategies in Nairobi and similar cities should explicitly recognise informal eateries and other survival economies as circular infrastructures and include them in circular-economy planning, rather than treating them as marginal or temporary.

Second, programmes that aim to scale urban circularity should redistribute risk and responsibility away from women's unpaid and underpaid care work—for instance, through social protection, accessible credit, and safe working conditions for small food businesses.

Third, donors and municipal authorities should co-design circular-economy interventions with women operators and local organisations, ensuring that Ubuntu-based principles of reciprocity and collective well-being inform policy design rather than being overridden by purely market-driven logics.

5.4. Limitations

This study has several limitations. First, it is based on a small qualitative sample drawn from one informal settlement in Nairobi and therefore does not claim statistical representativeness. Second, it relies on secondary coding of data originally collected for a broader food-justice study, which may have constrained circularity-related insights despite the theory-driven re-analysis. Third, while focusing on women-led eateries highlights gendered care work, it leaves open how other actors, such as vendors, suppliers, and municipal authorities, shape circular practices. Future research could address these limitations through comparative case studies, mixed-methods approaches, and an examination of interactions between policy-led circular initiatives and existing informal care infrastructures.

6. Conclusion

This study reveals women-led informal eateries in Nairobi's Mathare as vital yet structurally double-edged infrastructures of everyday circularity. These practices constitute self-contained parallel economies that sustain nutritional access, social cohesion, and economic circulation where formal systems have failed. The analytical framework (see Figure 5) contributes to circular-economy debates by making visible the often-overlooked role of feminised labour, care relations, and structural inequalities in enabling and sustaining circular systems.

Material circularity maintains basic nutrition under infrastructural exclusion. Labour circularity redistributes time, skills, and emotional support as households externalise meal preparation, enabling women to balance income generation with caregiving under constrained conditions. Social circularity, grounded in Ubuntu ethics, manifests through flexible credit, mutual aid, childcare exchange, and community stabilisation, compensating for state withdrawal and creating informal safety nets that reduce domestic violence and strengthen household stability.

The central analytical finding is one of structural ambivalence. Colonial urban planning and capitalist market volatility generate the scarcity within which circularity arises as necessity. Women absorb the economic and social costs of structural failure through flexible pricing, emotional labour, and care provisioning, ultimately stabilising the very structures that marginalise them. Ubuntu solidarity reworks dominant dynamics without dismantling them; circularity sustains life without transforming the conditions of precarity.

This double-edged character carries important implications for circular-economy scholarship and urban policy alike. For scholarship, it cautions against celebrating "resilience" without addressing structural conditions. Circularity does not automatically generate emancipatory outcomes: whether practices represent

survival absorption or redistributive potential depends on the structural context, something Northern circular-economy frameworks are ill-equipped to discern.

For urban policy, integrating women-led food infrastructures into circular-economy strategies requires more than technical recognition. Legal protection for eateries as provisioning infrastructure, redistributive fiscal policies, and investment in WASH and waste systems are essential. Without these interventions, circular-economy policies risk instrumentalising already-circular practices while leaving precarity intact.

Centring knowledge from Mathare's eateries strengthens circular-economy theory by foregrounding power, epistemic justice, and the feminised care work that underpins circular systems.

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Author Contributions Jamina Akoua Kouablan Klein: Conceptualisation; research design and methodology; data collection; data curation; qualitative analysis; interpretation of findings; original draft preparation; visual and narrative analysis; integration of theoretical frameworks and refinement of arguments, critical review and editing of the manuscript. Dr Nicole Paganini: Qualitative analysis; interpretation of findings; original draft preparation; contextualisation of findings; integration of theoretical frameworks; contribution to theoretical framing and refinement of arguments; critical review and editing of the manuscript. All authors discussed the results and contributed to the final version of the manuscript.

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Data Availability The data supporting the findings of this study consist of qualitative interview material, participatory visual data, and field notes collected in informal settlement contexts. Due to ethical considerations, including the protection of participants' anonymity, the full raw datasets are not publicly available. Coded and anonymised interview excerpts will be made accessible in a suitable repository (e.g., ResearchGate) upon publication. Researchers interested in accessing the anonymised data for secondary analysis may also contact the corresponding author, subject to ethical approval and consent conditions.

Declarations

Competing Interests The authors declare no competing interests.

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Ethics Approval and Consent to Participate Ethical approval for this study was obtained in accordance with the guidelines of Humboldt University of Berlin. All participants provided informed consent prior to participation. Pseudonyms were used and identifying information was removed to ensure confidentiality.

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