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Governing Food Distribution Resilience: Infrastructure Coordination between Busokelo District and Mbeya City, Tanzania

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Abstract
Rural and urban food systems depend on infrastructure, markets, and actor networks that cross administrative boundaries. In Tanzania, however, rural production, feeder roads, storage, urban markets, and drainage are governed through separate sectoral and jurisdictional mandates. Failure at one infrastructure node can therefore delay commodity movement, increase post-harvest losses and transport costs, reduce rural incomes, and constrain urban food availability and affordability. This study examined how coupled infrastructure and territorial governance shape food distribution resilience between Lwangwa Ward in Busokelo District and Ruanda Ward in Mbeya City. A convergent mixed-methods case study combined a household survey (n = 100), five key-informant interviews, field observation, document review, and geospatial mapping. Quantitative and qualitative evidence was analysed separately and integrated. Results showed that 56% of respondents rated roads as poor or very poor (n = 100), 95.2% of valid respondents reported rainy-season access difficulties (n = 42), and 61% lacked nearby storage (n = 100). The household-perceived distribution-resilience index was low (mean = 2.31/5; 46.2%), while mean recovery speed was 1.33/5. Road, storage, aggregation, market, and drainage weaknesses interacted as a coupled system. Disruptions exposed rural households to production, income, and market-access risks, while urban households experienced supply contraction and higher prices. Informal traders sustained flows, but channels for incorporating their knowledge into district-city planning, maintenance, information sharing, and seasonal preparedness were absent. The study conceptualises resilience as a problem of institutional fit and territorial inclusion and recommends corridor-wide planning that coordinates infrastructure, market governance, actor participation, route redundancy, and seasonal preparedness.

Introduction
Food-security depends on agricultural production and on reliable food movement, storage, exchange, and household access. Rural-urban distribution systems connect production and consumption through commodity, information, financial, and institutional flows. In the Busokelo-Mbeya corridor,

seasonal rainfall, flooding, deteriorated roads, and related transport and price disruptions are the principal shocks examined. When roads, aggregation facilities, storage, or markets fail, adequate production may coexist with shortages, post-harvest losses, and price increases (FAO et al., 2021; Tendall et al., 2015). Reliable distribution also supports the 2030 Agenda goals of ending hunger, building resilient settlements, and reducing spatial inequality (United Nations, 2015). These risks are pronounced in sub-Saharan Africa, where smallholders and informal traders supply much urban food through uneven logistics and market infrastructure (FAO, 2017; Reardon et al., 2019; Skinner & Haysom, 2016). Although informal arrangements can be flexible, poor feeder roads, limited storage, congestion, and weakly connected markets constrain shock absorption and recovery. Rural and urban components are often planned separately, obscuring the territorial system connecting farms, collection points, transport corridors, markets, retailers, and consumers (HLPE-FSN, 2024; UN-Habitat, 2018, 2020). Institutional breakdowns across governance levels reinforce physical fragmentation (Agussabti et al., 2026; Nathan, 2025). Effective governance therefore requires vertical and horizontal coordination between central mandates, subnational administration, and marginalised communities (Agussabti et al., 2026; Leyva-Hernández et al., 2026; Ardiansyah, 2026).

Tanzania's policy framework recognises market-access, climate resilience, post-harvest management, and infrastructure development (URT, 2018, 2019, 2021; World Bank, 2023). Implementation remains difficult because production zones, feeder roads, storage, markets, informal retail, and urban drainage fall under separate mandates. Mbeya is a Southern Highlands consumption and redistribution hub, while Busokelo supplies crops through feeder roads, informal collection, and trader networks. Seasonal rainfall and flooding interrupt these relations, limiting alternative routes, storage, shared information, and coordinated responses. The issue is therefore whether coupled assets and actors are governed at the scale of the functional food territory. Despite policy recognition of market-access, post-harvest management, and climate resilience, food distribution planning in Tanzania remains divided across rural production, transport, storage, and urban market mandates. Research has likewise tended to examine these components separately. Consequently, evidence remains limited on how coupled infrastructure failures propagate through a district-city corridor, how formal and informal actors sustain or constrain recovery, and why the same disruption produces different rural and urban consequences. This institutional and territorial mismatch is the problem addressed by this study.

Against this problem, the study aimed to explain how infrastructure, market institutions, and governance arrangements shape resilience in the Busokelo-Mbeya food distribution corridor. Four research questions guided the investigation before the literature was reviewed and synthesised: (1) Which actors, commodity routes, and institutional relations connect food distribution between Busokelo District and Mbeya City? (2) How are roads, transport links, aggregation and storage facilities, and market nodes distributed, and how adequate and mutually connected are they? (3) How do infrastructure and market disruptions affect absorptive, adaptive, and recovery capacities and produce differentiated rural and urban outcomes? (4) How well do planning and coordination arrangements align public responsibilities, resources, information, and actor participation with the functional territory through which food moves?

Literature Review: Rural-urban linkages as territorial food-system relations

Rural-urban linkages are material and institutional interdependencies through which production and consumption locations form a territorial food-system (Tacoli, 2003; UN-Habitat, 2019). They include flows of food, labour, finance, information, knowledge, and authority. Urban demand influences rural production and land use, while rural infrastructure shapes urban availability and affordability. This relational perspective replaces a simple rural-to-urban chain with an analysis of the institutions and

dependencies that connect production, distribution, and consumption (López-García & González de Molina, 2021; Tacoli, 2003).

The concept of 'new localities' captures functional food territories that cross administrative boundaries and exceed a rural-urban binary (Berkhout et al., 2023). Secondary cities are pivotal because they combine consumption, processing, transport, finance, and public services while remaining tied to agricultural hinterlands. Their resilience depends on connectivity, buffering, diversity, and actor agency. Mbeya City and Busokelo District therefore constitute analytically distinct jurisdictions within one food distribution territory. Territorial integration can expand markets and livelihoods, but benefits are unequal. Producers with weak roads, traders without storage, low-income consumers facing price increases, and informal actors excluded from planning bear disproportionate costs. Evidence that weak rural-urban dialogue constrains integrated food policy identifies a comparable coordination problem (Galli et al., 2024).

Distribution infrastructure as a coupled system

Roads, transport, aggregation, storage, drainage, and markets form a coupled distribution system (Berkhout et al., 2023; Dorosh et al., 2012; Tendall et al., 2015). Roads provide connectivity, storage provides temporal buffering, and markets aggregate supply, form prices, and support livelihoods. Traditional markets and informal retail are therefore physical and institutional infrastructure (Davies et al., 2022; Hannah et al., 2022). These components are mutually dependent: roads yield limited benefits without aggregation and storage; storage underperforms when feeder routes fail; and dependence on one market or route magnifies disruption. Coordinated access, storage, drainage, market space, and information expand options for producers and traders (Brander et al., 2021; Abwe & Daniel, 2021). Interdependence is clearest during disruption. Flooding can damage roads, delay collection, increase costs and losses, and reduce urban supply. Inadequate storage removes the buffer that could stabilise flows, while market concentration transmits scarcity into higher prices. Infrastructure weakness is thus a cascading mechanism rather than a collection of isolated deficits. This mechanism informed the study's examination of roads, storage, markets, drainage, and transport as one connected system and its tracing of how disruption moved from Lwangwa's production areas to Ruanda's urban consumers.

Food distribution resilience and the capacity to respond

Food-system resilience is the capacity to maintain food-security outcomes during disturbance through persistence, adaptation, and transformation (Barrett & Constas, 2014; Tendall et al., 2015). For distribution, it concerns the continuity and recovery of commodity movement, market functioning, accessibility, and affordability. A system can be efficient in normal conditions yet fragile when it depends on one road, market, storage location, or actor group. Inherent resilience arises from pre-existing network structure, buffer capacity, redundancy, and social connections. Adaptive resilience arises from reorganising routes, storage, information, and practices (Umar & Wilson, 2024). These correspond to absorptive, adaptive, and transformative capacities. Stocks can absorb immediate pressure, alternatives enable adaptation, and coordinated redesign of assets and mandates can transform recurrent exposure.

Social protection can preserve consumption during shocks (FAO, 2015), but household coping is not proof of system resilience. Reducing meals, drawing down stocks, or shifting markets may transfer costs to vulnerable actors and weaken future capacity. Because resilience emerges from interaction among infrastructure, institutions, organisations, and households, assessment must connect reliability, diversity, adaptability, coordination, efficiency, exposure, coping, recovery, and the distribution of costs (Béné et al., 2023).

Territorial governance, spatial-planning and coordination

Food distribution is governed through land, budgets, mandates, maintenance, information, and participation (HLPE-FSN, 2024; Oliveira & Hersperger, 2019). Spatial-planning affects production areas, roads, aggregation, storage, markets, drainage, and alternative routes. It should convene public and non-state actors, coordinate sectors, and ensure accountability (Schmitt & Wiechmann, 2018). Because functional food territories cross boundaries while agriculture, roads, trade, markets, and disaster management remain institutionally divided, institutional fit requires coordination across government levels, sectors, and producers, traders, transporters, market committees, communities, and private providers (Knickel et al., 2021; UN-Habitat, 2019).

Plans and forums do not by themselves create governance capacity. Implementation depends on authority, finance, knowledge, relationships, assigned responsibilities, maintenance schedules, shared information, and monitoring. Spatial-planning capacity varies by problem and administrative level (Kiessling & Pütz, 2020), and its influence is limited when sectoral policy, budgets, and implementation remain disconnected (Galli et al., 2024; Knickel et al., 2021). Coordination must also confront power. Collaborative governance requires inclusive participation, negotiated responsibilities, joint decisions, and implementation (Ansell & Gash, 2008), yet formal consultation may leave remote producers, informal traders, women food purchasers, and low-income consumers without influence. Corridor governance must therefore specify whose knowledge counts, who finances and maintains assets, how conflicts are resolved, and how performance is reported across jurisdictions.

African evidence and the role of secondary cities

African food-system research has focused disproportionately on capital cities. Secondary cities differ through proximity to agricultural hinterlands, limited municipal capacity, developing infrastructure, and strong rural ties. Evidence from Zambia shows rural-urban and urban-urban sourcing shaped by commodities and retail structures (Zimmer et al., 2022), while Ugandan evidence shows unequal household access to rural land and social networks (Mackay, 2019). Traditional markets and informal retail provide affordable food, market entry, wholesale functions, and employment. Their effectiveness depends on committees, government engagement, conflict resolution, and physical services (Davies et al., 2022; Hannah et al., 2022). Treating informal trade only as a regulatory problem can therefore weaken access and adaptive capacity.

Food flows also exceed city boundaries. West African cities perform overlapping consumption, aggregation, and redistribution roles within multi-scale networks (Karg et al., 2022). Road quality, storage, market connectivity, and border conditions consequently affect wider systems, supporting analysis of roads, aggregation, wholesale markets, and informal retail as connected assets. African secondary cities require governance tailored to functional territories and actor networks, consistent with the Malabo commitment to inclusive agricultural transformation and resilient livelihoods (African Union, 2014). Because producers, traders, transporters, committees, governments, and agencies hold unequal resources and authority, consultation alone does not ensure inclusion. Decentralised food security frameworks depend on intergovernmental coordination, local administrative capacity, and multi-stakeholder community participation (De Araújo Palmeira & Salles-Costa, 2020; Nurhayati et al., 2026; Ardiansyah, 2026; Killagane et al., 2025), while participation, reporting, maintenance, and follow-through must affect resource allocation (Makhaye & Subban, 2024; Mubangizi, 2025; Shopola, 2022).

Tanzanian evidence and policy context

Tanzanian policy recognises commercialisation, market-access, climate resilience, post-harvest management, and infrastructure (URT, 1992, 2013, 2018, 2019, 2021). Implementation remains territorially fragmented because production, roads, drainage, markets, planning, disaster response, and storage span institutions and government levels. Policy does not adequately coordinate facilities within functional corridors or recognise downstream urban benefits from rural investment. Storage and post-harvest deficits persist (Rutta, 2024). In the Mbeya-Njombe avocado chain, feeder roads, cold storage, logistics, market information, and service-provider coordination remain constraints (Salum et al., 2026). The present study extends this commodity-specific evidence to a multi-actor district-city corridor and examines how failures affect urban access and affordability. Tanzanian studies illuminate separate components: farm storage can reduce seasonal food insecurity (Brander et al., 2021), public markets support access and livelihoods (Abwe & Daniel, 2021), and small towns mediate food, labour, service, and income flows (Tacoli & Agergaard, 2017). Less understood is how rural roads, aggregation, storage, urban drainage, markets, and governance interact across one district-city corridor and shape differentiated household outcomes.

Research gap and contribution

Five related gaps emerge from the literature. Studies increasingly recognise African secondary cities as consumption centres, aggregation hubs and redistribution nodes within interconnected rural-urban and urban-urban food networks (Karg et al., 2022; Zimmer et al., 2022; Karg et al., 2025). However, limited research traces commodity flows together with information, finance and decision-making across complete functional territories or examines how disruptions affect producers, traders and consumers differently. Roads, transport services, aggregation facilities, storage, wholesale markets and informal retail are also commonly examined separately, obscuring their operational interdependence and the cascading effects that failure at one node may generate across the distribution network (Diem et al., 2024; Kibriya and Fatema, 2026; Peñaranda-Márquez et al., 2026). Similarly, household coping strategies and short-term adjustments by traders are frequently interpreted as evidence of system resilience without establishing whether food availability and affordability are maintained, how quickly distribution functions recover, or who bears the costs of adaptation (Ihle et al., 2020; Mackay et al., 2022; Murphy et al., 2023; Hannah et al., 2025). Governance and spatial-planning studies have also paid limited attention to whether urban and rural authorities coordinate their mandates and investments at the territorial scale of actual food flows, or whether smallholders, transporters and informal traders influence planning decisions (Karg et al., 2025; Dinku and Van den Broeck, 2026). In Tanzania, valuable studies of production, commodity chains, post-harvest technologies, household storage and urban markets remain largely disconnected. Consequently, how infrastructure, market institutions, actor inclusion and cross-boundary governance jointly shape secondary-city food distribution resilience remains insufficiently understood. This study addresses this gap through an integrated territorial framework linking food flows, infrastructure interdependencies, distributional outcomes and multilevel governance.

This study addresses these empirical and conceptual gaps through a paired rural-urban case comprising Lwangwa Ward in Busokelo District and Ruanda Ward in Mbeya City. It integrates household evidence, key-informant accounts, field observation, document review, and geospatial mapping to examine: (i) how road, transport, storage, and market conditions operate as a coupled distribution system; (ii) how disruptions propagate from production areas through aggregation and market nodes to urban consumers; (iii) how reliability, efficiency, supply diversity, adaptability,

coordination, coping, and recovery differ between rural and urban locations; and (iv) whether planning and coordination arrangements align public responsibilities, resources, information, and the participation of formal and informal actors with the functional food territory. The study's central contribution is to conceptualise food distribution resilience as an institutional fit and territorial inclusion problem. Resilience depends not only on the presence of infrastructure, but also on whether the spatial scale of planning and implementation matches the geography of food flows and whether the actors who sustain traditional markets and informal distribution can influence decisions. This formulation connects African secondary-city evidence with systems theory, territorial and collaborative governance, and food-system resilience, while directing attention to corridor-wide planning, accountable coordination, and equitable outcomes.

Theoretical and conceptual framework

The framework combines general systems theory, territorial and collaborative governance, and food-system resilience. Systems theory treats producers, roads, transport, storage, markets, institutions, traders, and households as interacting components connected by flows of food, finance, information, and decisions (von Bertalanffy, 1968). Failure can therefore cascade from a flooded feeder road to delayed collection, higher losses and costs, reduced urban supply, and increased prices. Territorial governance asks whether planning, investment, maintenance, and accountability match this functional geography (HLPE-FSN, 2024; OECD, 2020; UN-Habitat, 2019), while collaborative governance emphasises rules, inclusive participation, shared information, joint decisions, and follow-through (Ansell & Gash, 2008; Stoeva, 2025). Food-system resilience provides the performance lens: absorptive capacity maintains supply and access during shocks; adaptive capacity uses alternative routes, markets, storage, information, or practices; and recovery capacity restores commodity movement and affordability (Barrett & Constas, 2014; Tendall et al., 2015; Béné et al., 2023). Coordination, supply diversity, adaptability, reliability, and efficiency operationalise these capacities. The framework predicts that resilience depends not only on infrastructure quantity but also on location, condition, redundancy, maintenance, mandate clarity, coordination, and feedback.

Conceptual framework and analytical propositions

Figure 1 links the functional food territory and its actor network to two interacting conditions: territorial governance and inclusion, and the coupled infrastructure of roads, transport, aggregation, storage, markets, and informal retail. These conditions shape connectivity, flows, coverage, redundancy, and participation, which in turn influence absorption, adaptation, recovery, food availability, affordability, livelihoods, and the distribution of costs. Shocks and observed outcomes feed back into maintenance, facility siting, contingency planning, and institutional reform.

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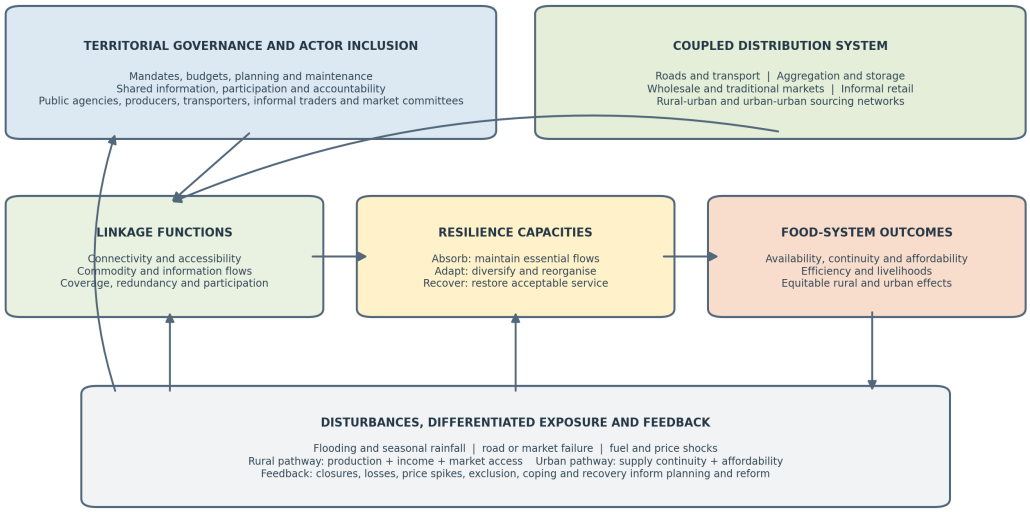


Figure 1: Conceptual framework for governing urban-rural food-system linkages and distribution-resilience

Note. Source: Author's synthesis informed by Berkhout et al. (2023), Béné et al. (2023), HLPE-FSN (2024), Schneider et al. (2025), and Stoeva (2025).

Five propositions guide interpretation: (1) jointly functioning infrastructure should improve connectivity, reliability, and efficiency; (2) diversified routes, suppliers, storage, and market nodes should limit cascading failure; (3) mandate clarity, coordinated budgets, maintenance, information, and emergency action should reduce disruption and recovery time; (4) meaningful actor inclusion should improve the relevance and equity of decisions; and (5) rural households should face production, income, and access risks, whereas urban households should face supply and affordability risks. These are analytical expectations, not causal hypotheses.

Method: Study area and design

A convergent mixed-methods case study examined Lwangwa Ward in Busokelo District and Ruanda Ward in Mbeya City (Figure 2). Household surveys, interviews, observation, document review, and geospatial mapping were analysed separately and then integrated to assess convergence, complementarity, and divergence (Creswell & Plano Clark, 2018; Yin, 2018). Lwangwa represented rural production and Ruanda urban consumption and trade; the paired case traced one-corridor rather than Mbeya's complete food network.

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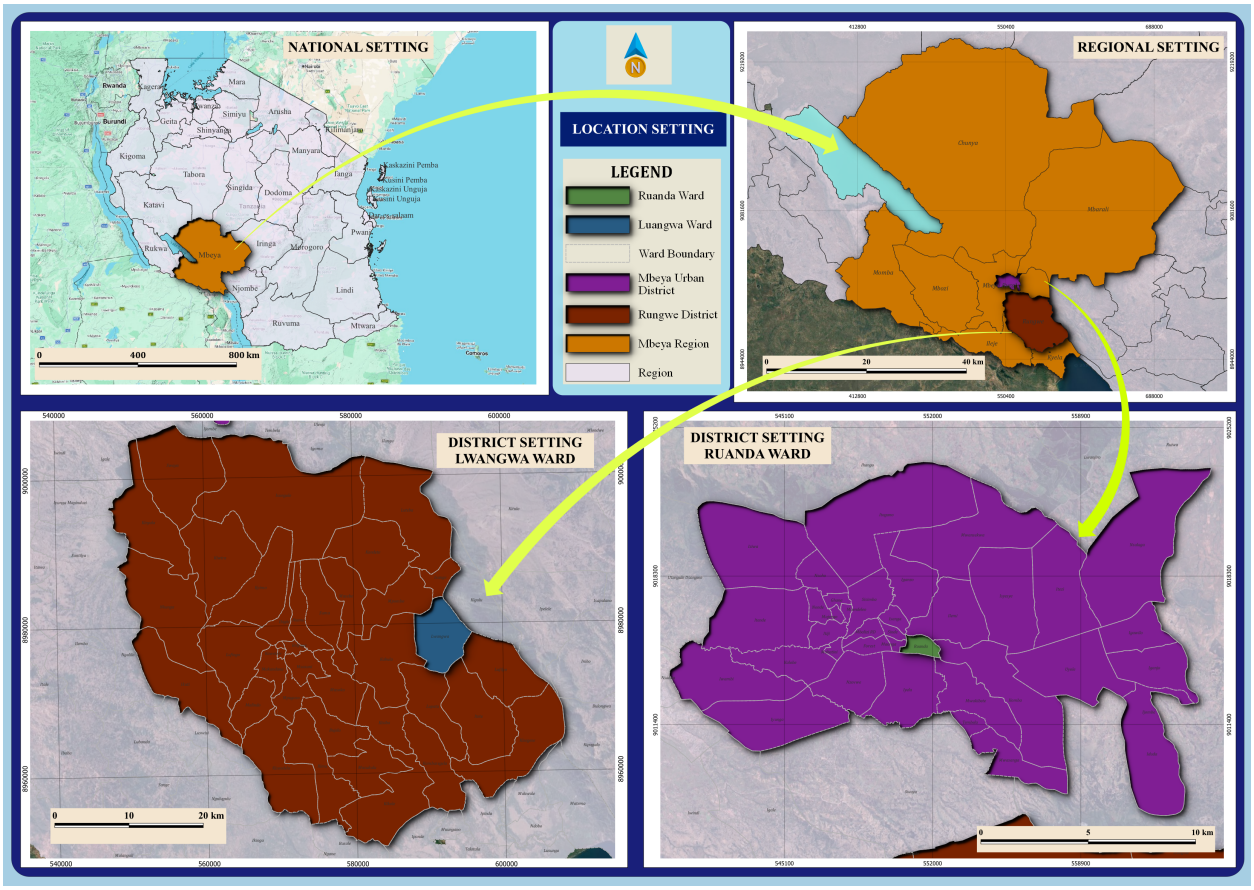


Figure 2: Location of Lwangwa Ward in Busokelo District and Ruanda Ward in Mbeya City

Note. Source: Household survey and field mapping, 2026.

Sample size determination and sampling procedure

The sampling frame comprised 9,354 households: 6,126 in Ruanda and 3,228 in Lwangwa (NBS, 2022). The minimum household sample was calculated using Yamane's (1967) finite-population formula: $n = N/[1 + N(e^2)]$, where n is the required sample size, N is the total number of households, and e is the acceptable margin of error. With N = 9,354 and e = 0.10, the calculation was: $n = 9{,}354/[1 + 9{,}354(0.10^2)] = 9{,}354/94.54 = 98.94 \approx 99$

The result (98.94, approximately 99) was increased to 100 households to support equal allocation and ward comparison. Each ward formed a stratum with 50 households. This disproportionate allocation ensured adequate representation of smaller Lwangwa and prevented Ruanda from dominating the comparison (Cochran, 1977; Lohr, 2021). Systematic random sampling used updated lists, random starts, and intervals of approximately 123 households in Ruanda and 65 in Lwangwa.

Equal allocation produced different selection probabilities. Design weights (N_h/n_h) were 122.52 for Ruanda and 64.56 for Lwangwa and would be required for combined population estimates (Heeringa et al., 2017; Lohr, 2021). The analysis instead reports primarily unweighted comparisons of the two equal ward samples; unless labelled otherwise, pooled percentages describe the achieved sample rather than prevalence among all 9,354 households. The achieved sample comprised 60 women and 40 men and included farming, household-consumption, entrepreneurial, and trading perspectives.

Five key informants were selected purposively because their planning, road, market, or food distribution roles provided information-rich institutional evidence (Campbell et al., 2020). Household data support structured ward comparison, while informants explain mechanisms; neither source represents all informal actors or wider urban-urban supply links.

Data collection

Data were collected through a household questionnaire, five semi-structured interviews, field observation, document review, and geospatial mapping. Instruments covered actors, food sources, transport, roads, storage, markets, disruption, prices, coping, recovery, governance, and five resilience dimensions: reliability, efficiency, supply diversity, adaptability, and coordination (Béné et al., 2023; Tendall et al., 2015). Fieldworkers checked questionnaires for missing responses. Observations and photographs documented infrastructure conditions; documents supplied mandates, strategies, investments, and statistics; and coordinates located roads, markets, storage, aggregation sites, and constrained-access points (Kraak & Ormeling, 2020).

Data analysis and evidence integration

Survey data were summarised using frequencies, valid-response percentages, means, and resilience indices. Whole percentages were reported for questions answered by all 100 households; decimals arose from item-specific valid denominators, subgroups, means, indices, or multiple responses. Weighted and unweighted estimates were not combined (Heeringa et al., 2017; Lohr, 2021). Percentages were calculated as $p = (f/n_v) \times 100$. Item non-response was excluded only from the relevant denominator, with no imputation (Little & Rubin, 2019). Thus, 40 of 42 valid responses reporting rainy-season access difficulty yielded 95.2%. Valid denominators are reported in tables or the narrative. Five-point resilience means were converted to indices as (mean/5) × 100; the composite was the arithmetic mean of the five-dimension means. A mean of 2.31/5 therefore equals 46.2%. Recovery speed remained a separate five-point item. These are descriptive household-perception measures, not a validated population scale, and actor inclusion and institutional fit were assessed qualitatively (Béné et al., 2023). Spatial analysis mapped infrastructure and constrained-access areas. Interviews, observations, and documents were coded thematically around actors, infrastructure, connectivity, disruption, prices, governance, participation, adaptation, and recovery (Braun & Clarke, 2021). Findings converged when a survey pattern was supported by an independent source; complementary evidence explained mechanisms or spatial context; and divergent evidence was retained and interpreted by location, actor, and source (Noble & Heale, 2019; Schlunegger et al., 2024). Outcomes were compared across rural production-income-access and urban supply-affordability pathways.

Ethical considerations

Participation was voluntary. Respondents were informed about the study purpose, confidentiality, and their right to decline or withdraw. No identifying household information is reported. Institutional statements quoted or paraphrased have been presented here by role rather than by personal identity.

Results: Demographic characteristics of respondents

The survey included 50 respondents from each ward (Table 1). Women represented 60% and men 40% of the achieved sample; farmers were the largest occupational group (35%). These figures describe respondents, not ward populations. Unless stated otherwise, pooled results are unweighted sample descriptions, while ward percentages compare the two equal strata.

Table 1: Demographic characteristics of survey respondents (n = 100)

Characteristic	Category	Frequency	Percentage (%)
Study ward	Lwangwa	50	50.0
	Ruanda	50	50.0
Sex	Female	60	60.0
	Male	40	40.0
Primary occupation	Farmer/agriculturalist	35	35.0
	Domestic role	28	28.0
	Entrepreneur	20	20.0
	Trader/seller	12	12.0
	Other	5	5.0

Note. Data source: Household survey (2026).

Structure and governance of the rural-urban distribution system

The corridor linked Busokelo smallholders with assemblers, transporters, informal traders, retailers, and Mbeya consumers. Formal market authorities administered regulation and revenue, while market committees represented traders and facility management. Produce moved through Ntangasale Market in Busokelo towards Soweto Market in Mbeya City (Figure 3). Informal relations sustained flows, but no institutionalised district-city platform connected actor knowledge with infrastructure priorities, market management, preparedness, or monitoring.

> *"Busokelo's institutional response to disruptions is limited to reducing tariffs and revenue collection during disaster periods to maintain affordable food prices" (Respondent 1, Key-informant interview, 2026)*

The response reflected reactive price moderation rather than restoration of access, diversion of traffic, or coordinated recovery. Food access differed sharply: 78% of Lwangwa households mainly produced food, whereas 88% of Ruanda households mainly purchased it. Informal traders and mixed transport connected rural production and urban consumption.

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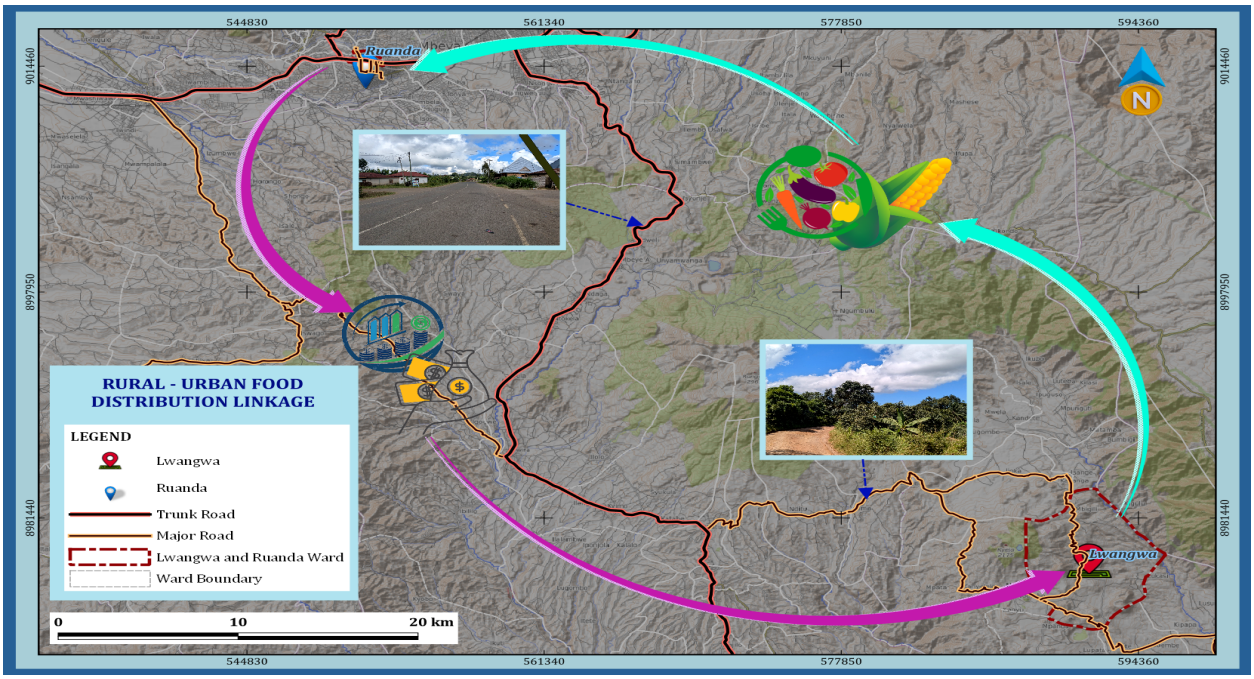


Figure 3: Rural-urban food distribution linkage between Lwangwa and Mbeya City

Note. Source: Household survey and field mapping, 2026.

Spatial adequacy of roads, storage and markets

Roads were the dominant constraint: 56% rated them poor or very poor, 91% rated them fair or worse, and 95.2% of valid respondents reported difficult or impassable rainy-season access. Interviews and observation identified vulnerable Lufiliyo-Itete and Lwangwa-Tukuyu segments; Ruanda had denser roads, but drainage and standing water impaired access.

> "…Especially to the segment known as Mwalisi Road within Lwangwa-Tukuyu corridor, which is unpaved with a distance of about 14.8 km, causing trucks to get stuck due to its bad condition during the rainy period" (Respondent 1, key-informant interview, 2026)

> *"…Unplanned areas systematically produce poor local road conditions" (Respondent 4, Key-informant interview, 2026)*

These accounts linked distribution failure to inadequate rural corridor maintenance and the road consequences of unplanned urban development.

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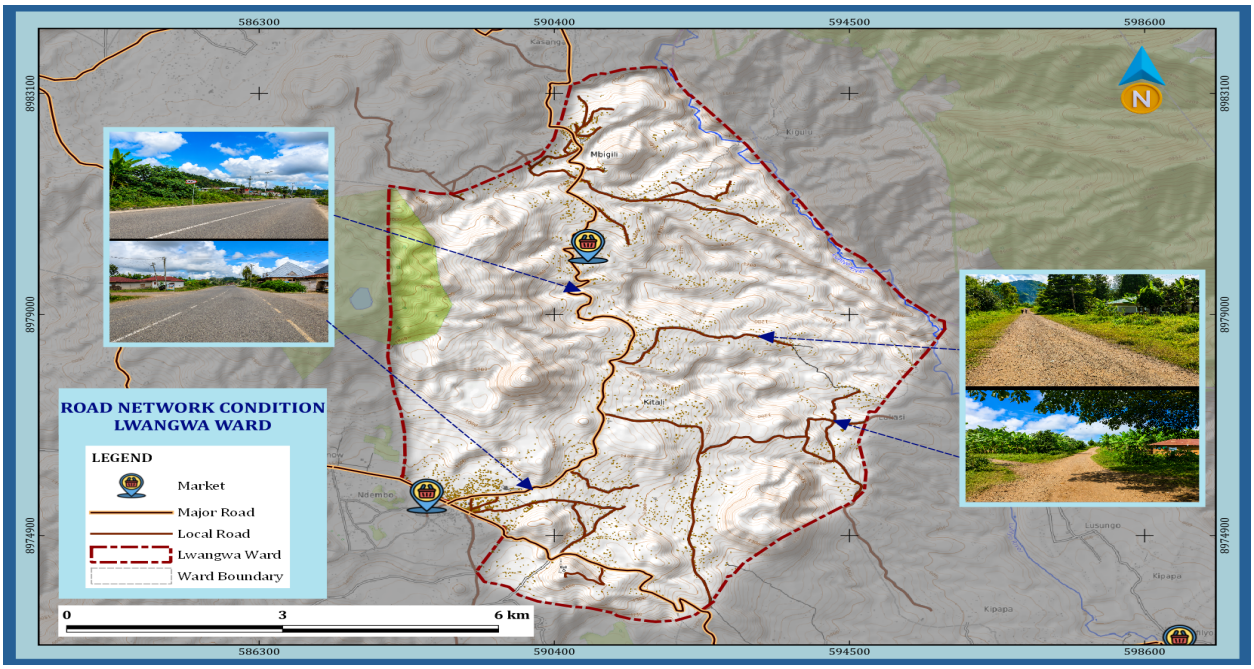


Figure 4: Road-network condition in Lwangwa Ward

Note. Source: Household survey and field mapping, 2026.

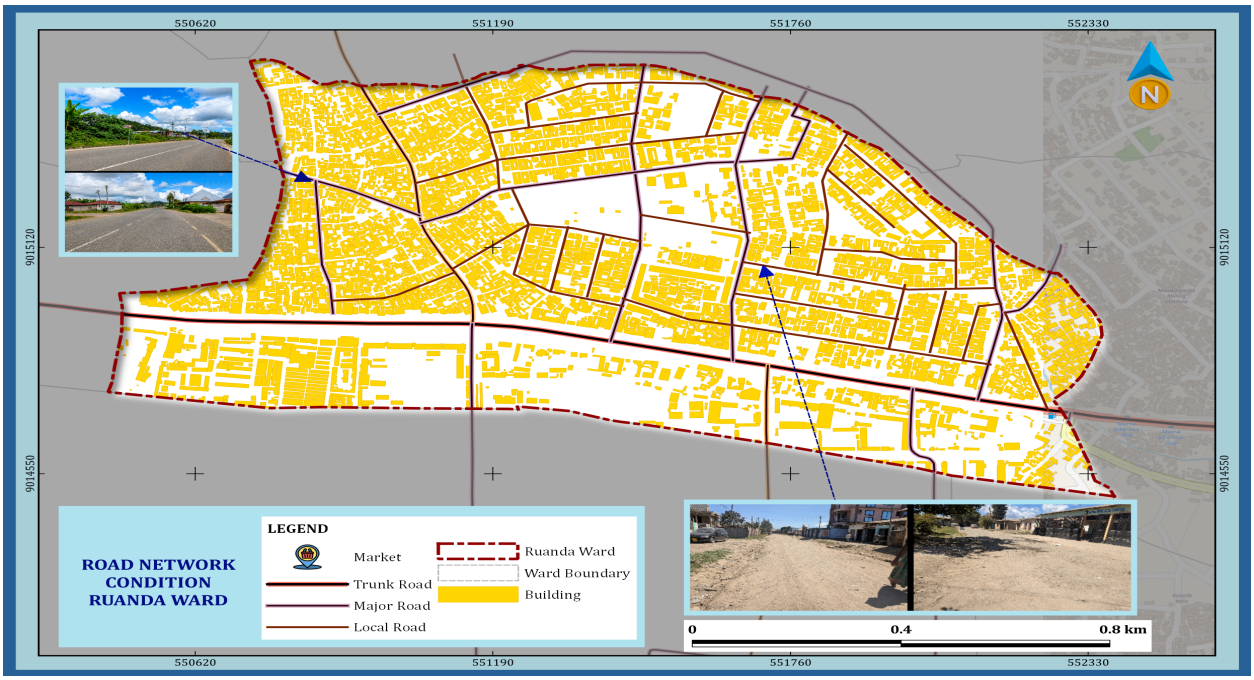


Figure 5: Road-network condition in Ruanda Ward

Note. Source: Household survey and field mapping, 2026.

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Storage was scarce: 61% reported no nearby facility, including 70% in Lwangwa. Producers therefore sold rapidly, while traders and households had little capacity to hold stocks. Avocado facilities under development at Mbigili and Ipelo addressed a real deficit but remained commodity-specific and depended on operation, wet-season access, management, network connections, and practical access for small producers and informal traders.

> *"There are two ongoing projects of building two avocado collection and storage centres in Lwangwa ward (Mbigili village) and Kandite ward (Ipelo village)" (Respondent 1, Key-informant interview, 2026)*

Storage siting was therefore both an infrastructure and inclusion decision.

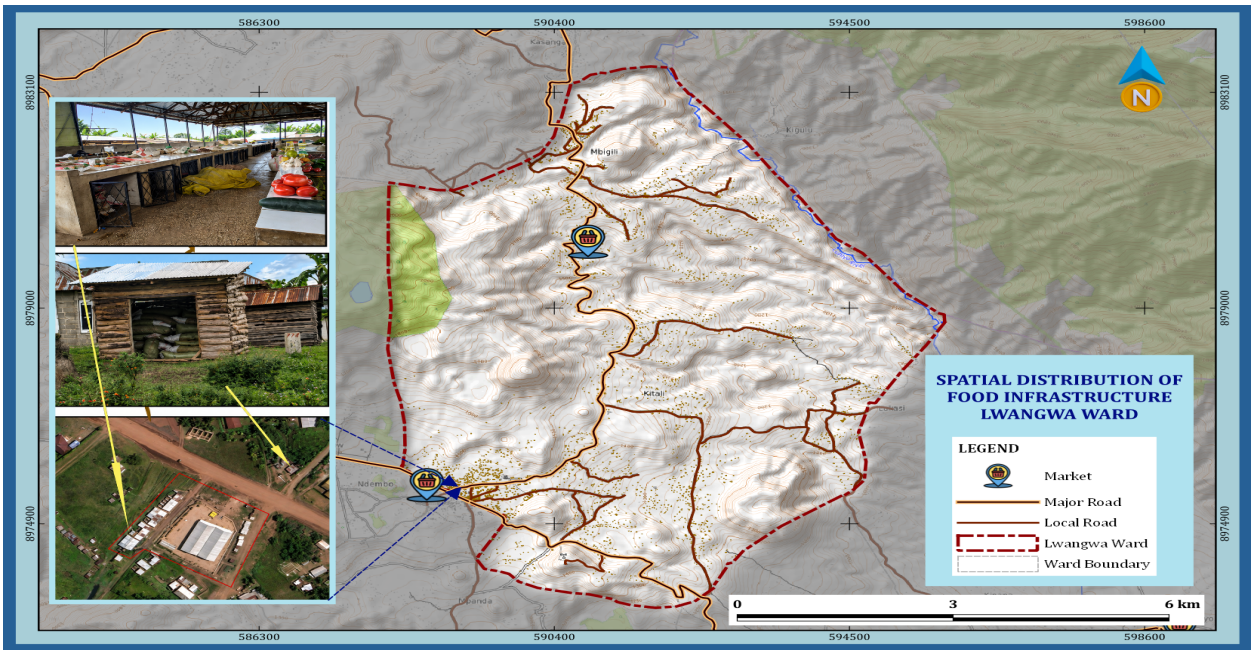


Figure 6: Spatial distribution of food infrastructure in Lwangwa Ward

Note. Source: Household survey and field mapping, 2026.

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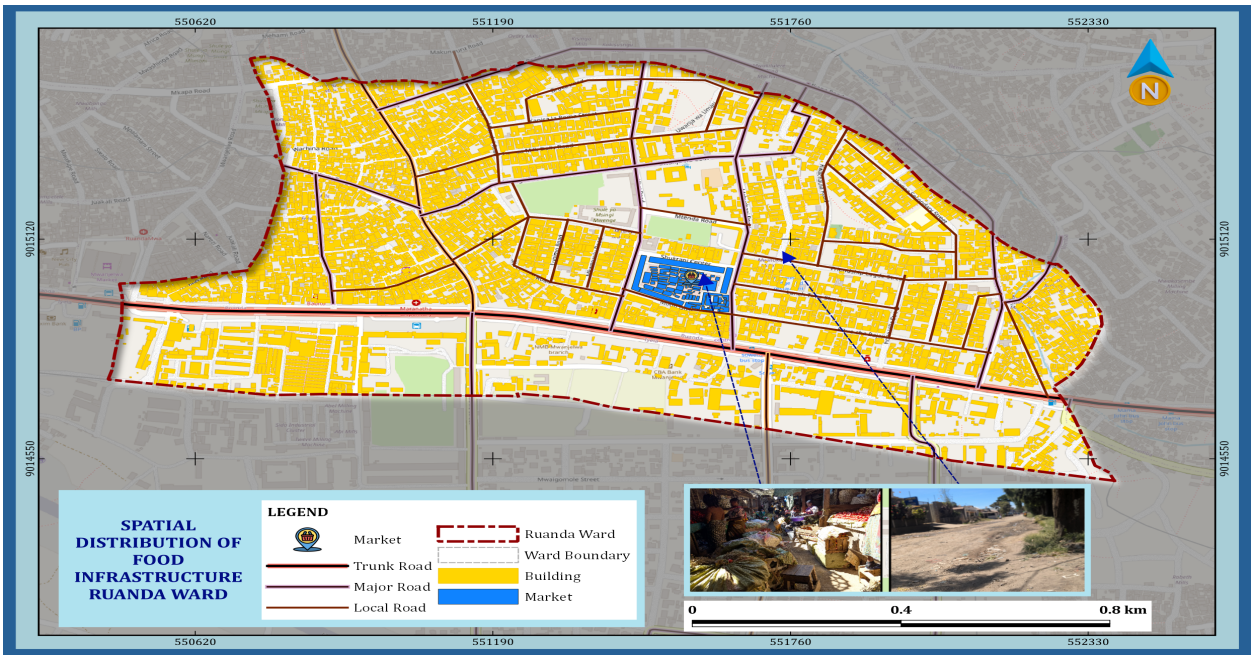


Figure 7: Spatial distribution of food infrastructure in Ruanda Ward
Note. Source: Household survey and field mapping, 2026.

Ntangasale and Soweto markets concentrated aggregation, price formation, employment, and retail access. This improved routine efficiency but increased bottleneck risk because alternative collection points, routes, storage, and documented supply channels were limited. Rural households faced weather-sensitive links; urban households remained exposed to upstream failure, drainage problems, and price transmission (Table 2).

Table 2: Selected infrastructure and disruption indicators

Indicator	Valid n and result	Interpretation
Roads rated poor or very poor	n = 100; 56.0%	Road condition constrains routine distribution
Roads rated fair or worse	n = 100; 91.0%	Good-quality access is uncommon
Rainy-season access difficulty	n = 42; 95.2%	Strong seasonal exposure
No nearby storage access	Overall: n = 100; 61.0% Lwangwa: n = 50; 70.0%	Weak buffer against delay and post-harvest loss
Flood-related food availability impact	n = 42; 95.2%	Distribution shocks reach households
Transport disruption affects food prices	Mean impact = approximately 4.0/5	High price transmission from infrastructure failure

Note. Data source: Household survey, interviews, observation, and spatial assessment (2026). Note: Percentages are based on valid responses to each item. Valid sample sizes vary because of item non-response and are shown where they differ from the full sample.

Price transmission and shock exposure

Transport delays, closures, and costs were associated with higher retail prices; combined high- and moderate-impact responses produced a mean near 4.0/5. Flooding affected food availability for 95.2% of valid respondents. Road failure constrained Lwangwa sales and purchases, while reduced inflow generated Ruanda scarcity and higher prices. Commodity volumes and other urban-urban flows were not quantified.

Distribution system resilience

All resilience dimensions were weak. Coordination was highest (2.62/5; 52.4%) but did not indicate effective corridor governance when triangulated with interviews. Efficiency was lowest (2.03/5; 40.6%), followed by reliability (2.19/5; 43.8%), adaptability (2.30/5; 46.0%), and supply diversity (2.40/5; 48.0%). The composite was 2.31/5 (46.2%; Table 3).

Table 3: Composite assessment of distribution system resilience

Dimension	Mean (maximum = 5)	Index (%)	Interpretation
Coordination	2.62	52.4	Near midpoint; institutionally weak
Supply diversity	2.40	48.0	Low
Adaptability	2.30	46.0	Low
Reliability	2.19	43.8	Low
Efficiency	2.03	40.6	Low
Composite resilience	2.31	46.2	Low

Note. Data source: Household survey (2026). The common denominator for each index is the five-point scale maximum: index (%) = mean/5 × 100. Composite mean = sum of the five-dimension means/5.

Dimension-level interpretation

Low reliability and efficiency matched delays, spoilage, irregular access, and rising costs; low diversity and adaptability reflected few route, storage, market, and supply alternatives. Interviews showed no shared district-city planning, information, preparedness, or accountability. The coordination score therefore did not demonstrate meaningful actor influence.

Shock exposure and recovery capacity

Shock exposure was high: 83.7% of valid respondents reported a food-system shock and 95.2% reported flood effects. Mean recovery speed was 1.33/5 among those who rated it. Informal action maintained reduced flows, but road closures, limited route redundancy, scarce storage, and tariff-focused formal support slowed recovery.

Household coping and spatial differences

Coping was reactive: 31.4% of valid respondents took no action, while others waited, reduced meals, used farm stocks, or bought less. In the small urban subgroup (n = 14), 35.7% stored food, 14.3% purchased early, and 7.1% each used another market or maintained a kitchen garden. Lwangwa retained limited production buffers; Ruanda had more retail options but depended on income and external supply. Coping did not equal system resilience.

Overall resilience finding

The corridor had limited absorptive, weak adaptive, and very low recovery capacity. Its composite resilience score was 2.31/5 (46.2%), recovery speed was 1.33/5, 56% rated roads poor or very poor, 95.2% of valid respondents reported rainy-season access difficulty (40/42), and 61% lacked nearby

storage. Continuity relied on informal and household action amid limited early warning, buffers, diversion protocols, information, and coordinated recovery. The evidence supported the proposed mechanisms but remains associative case evidence rather than causal estimation.

Triangulated synthesis

Survey, interview, observation, spatial, and documentary evidence converged on the main conclusions. Table 4 identifies the quantitative indicators, qualitative mechanisms, and independent sources supporting each finding.

Table 4: Triangulation of major findings

Finding	Survey evidence	Independent evidence	Synthesis
Seasonal road constraint	Poor/fair road ratings and 95.2% reporting wet-season difficulty (valid n = 42)	Interviews identified vulnerable links; observation documented damaged or waterlogged sections	Road condition is a binding and seasonal distribution constraint
Storage deficit	61.0% lacked nearby storage (n = 100)	Observed limited facilities; informants described new but incomplete investments	Storage provides insufficient buffering and aggregation capacity
Price transmission	Respondents reported higher prices during transport disruption	Traders and officials described higher transport costs and delayed supply	Infrastructure disruption is transmitted to household affordability
Low resilience	Composite score 2.31/5 and recovery speed 1.33/5	Interviews reported weak coordination and limited preparedness	The system copes reactively but has weak adaptive and recovery capacity
Governance and actor inclusion gap	Occupational and food-source profiles show dependence on producers, traders, and market-access	Actor mapping and interviews identified informal coordination but no robust district-city platform	Informal actors sustain flows, but institutional fit and influence over corridor decisions remain weak

Discussion

The findings support a relational account of resilience: degraded roads and drainage, scarce storage, concentrated markets, low diversity, informal coordination, and divided mandates jointly transmitted disruption. Systems theory explains cascading interdependence; territorial governance explains why food crossed boundaries while planning and budgets did not; collaborative governance reveals whose knowledge influenced decisions; and resilience theory distinguishes coping from adaptation. Weak institutional fit and actor inclusion allowed shocks to produce unequal outcomes.

Infrastructure failure as a governance outcome

Road and drainage failures reflected planning, finance, maintenance, and territorial priorities, not engineering alone. Wet-season deterioration delayed collection, raised costs and losses, and increased prices, extending evidence on connectivity and crop marketing (Dorosh et al., 2012). Fragmented authority also dispersed accountability (Makhaye & Subban, 2024; Mutandwa & Vyas-Doorgapersad, 2023). Busokelo requires all-weather feeder roads, drainage, slope protection, and aggregation links; Ruanda requires drainage, maintenance, and protected road reserves.

Storage, redundancy and market concentration

Scarce storage removed a temporal buffer: producers sold quickly, traders could not pre-position stocks, and markets could not stabilise wet-season supply, consistent with regional and Tanzanian evidence (Affognon et al., 2015; Brander et al., 2021). Ntangasale and Soweto combined efficiency with vulnerability because dependence on few nodes reduced redundancy (Davies et al., 2022; Hannah et

al., 2022). New facilities, routes, suppliers, and collection points should extend rather than displace informal networks.

Unequal vulnerability across the rural-urban continuum

Lwangwa households faced output, income, and market-access risks, whereas Ruanda households faced supply contraction and price escalation, consistent with unequal rural-urban dependence in African secondary cities (Mackay, 2019; Zimmer et al., 2022). The case traces one-corridor, not Mbeya's complete food shed, but shows how rural failure reaches urban affordability. Investment must connect rural access and storage with urban drainage and market governance and give affected informal actors influence over decisions.

From reactive coping to adaptive governance

Low recovery indicated coping rather than adaptation. Adaptive capacity requires weather and market information, accessible stocks, diversion procedures, diversified sourcing, coordinated maintenance, and learning. Transformation requires changes in infrastructure, planning, market governance, and participation (Barrett & Constas, 2014; Folke et al., 2010). A corridor arrangement should establish a convening authority, rules, shared responsibility, transparent information, and follow-through among councils, agencies, market authorities, producers, transporters, traders, and consumers (Ansell & Gash, 2008; Stoeva, 2025).

Conclusion

The Lwangwa-Ruanda corridor is functionally integrated but institutionally fragmented. Coupled weaknesses in feeder roads, drainage, aggregation, storage, markets, route diversity, and coordination convert seasonal rainfall and flooding into interrupted movement, post-harvest loss, rural income disruption, and higher urban food prices. The central constraint is a governance-scale mismatch: food moves through a rural-urban corridor, while infrastructure, budgets, markets, and participation are organised through separate administrative and sectoral arrangements. Informal actors bridge these divisions but lack reliable infrastructure and formal influence over corridor-wide decisions. The study therefore connects secondary-city food networks with a territorial model in which infrastructure interdependence, institutional fit, redundancy, and actor inclusion jointly shape resilience. Policy should combine all-weather feeder roads, urban drainage, accessible aggregation and storage, stronger market and informal retail connections, diversified routes and suppliers, and joint district-city preparedness. The study is limited by its modest sample, purposive informants, perception-based indicators, one-corridor design, and absence of quantified commodity flows, price series, and wider sourcing data. Future research should map Mbeya's full foodshed, follow seasonal formal and informal flows, measure prices and travel times, assess participation quality, and test institutional performance longitudinally.

References

Abwe, F. G., & Daniel, K. (2021). Local public markets infrastructure and urban food systems in African small cities: Insights from Arusha, Tanzania. *Cities & Health*, *5*(Suppl. 1), S127-S130. https://doi.org/10.1080/23748834.2020.1816758

Affognon, H., Mutungi, C., Sanginga, P. C., & Borgemeister, C. (2015). Unpacking postharvest losses in sub-Saharan Africa: A meta-analysis. *World Development*, *66*, 49-68.

African Union. (2014). *Malabo declaration on accelerated agricultural growth and transformation for shared prosperity and improved livelihoods* (Assembly/AU/Decl.1(XXIII)). African Union Digital Repository. au.int

Agussabti, A., Nugroho, A. R., Summase, A. P., Mudatsir, R., & Summase, I. (2026). Institutional framework for improving food security in crisis-prone areas in Indonesia. *Journal of Agriculture and Food Research*. https://doi.org/10.1016/j.jafr.2026.102774

Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, *18*(4), 543-571. https://doi.org/10.1093/jopart/mum032

Ardiansyah, F. (2026). Street-level policy entrepreneurs: Activating policy capacity in local food security implementation. *Journal of Social Science and Economics (JOSSE)*. https://doi.org/10.70188/tx5fa880

Barrett, C. B., & Constas, M. A. (2014). Toward a theory of resilience for international development applications. *Proceedings of the National Academy of Sciences*, *111*(40), 14625-14630. https://doi.org/10.1073/pnas.1320880111

Berkhout, E., Sovová, L., & Sonneveld, A. (2023). The role of urban-rural connections in building food system resilience. *Sustainability*, *15*(3), Article 1818. https://doi.org/10.3390/su15031818

Brander, M., Bernauer, T., & Huss, M. (2021). Improved on-farm storage reduces seasonal food insecurity of smallholder farmer households: Evidence from a randomized control trial in Tanzania. *Food Policy*, *98*, Article 101891. https://doi.org/10.1016/j.foodpol.2020.101891

Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. SAGE.

Béné, C., Frankenberger, T. R., Nelson, S., Constas, M. A., Collins, G., Langworthy, M., & Fox, K. (2023). Food system resilience measurement: Principles, framework and caveats. *Food Security*, *15*, 1437-1458. https://doi.org/10.1007/s12571-023-01407-y

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: Complex or simple? Research case examples. *Journal of Research in Nursing*, *25*(8), 652-661. https://doi.org/10.1177/1744987120927206

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research (3rd ed.)*. SAGE.

Cochran, W. G. (1977). *Sampling techniques (3rd ed.)*. John Wiley & Sons.

Davies, J., Blekking, J., Hannah, C., Zimmer, A., Joshi, N., Anderson, P., Chilenga, A., & Evans, T. (2022). Governance of traditional markets and rural-urban food systems in sub-Saharan Africa. *Habitat International*, *127*, Article 102620. https://doi.org/10.1016/j.habitatint.2022.102620

De Araújo Palmeira, P., & Salles-Costa, R. (2020). Food security governance promoted by national government at the local level: A case study in Brazil. *Food Security*, *12*, 591–606. https://doi.org/10.1007/s12571-019-01000-2

Diem, C., Schueller, W., Gerschberger, M., Stangl, J., Conrady, B., Gerschberger, M., & Thurner, S. (2024). Supply network stress-testing of food security on the establishment-level. *International Journal of Production Research, 63*, 3259 - 3283. https://doi.org/10.1080/00207543.2024.2416555

Dinku, A., & Van Den Broeck, G. (2026). The various face(t)s of urban agriculture: evidence from secondary towns in Ethiopia. *International Journal of Agricultural Sustainability*. https://doi.org/10.1080/14735903.2026.2628453

Dorosh, P., Wang, H. G., You, L., & Schmidt, E. (2012). Road connectivity, population, and crop production in sub-Saharan Africa. *Agricultural Economics*, *43*(1), 89-103. https://doi.org/10.1111/j.1574-0862.2011.00567.x

Folke, C., Carpenter, S. R., Walker, B., Scheffer, M., Chapin, T., & Rockstrom, J. (2010). Resilience thinking: Integrating resilience, adaptability and transformability. *Ecology and Society*, *15*(4), Article 20. https://doi.org/10.5751/ES-03610-150420

Food and Agriculture Organization, International Fund for Agricultural Development, UNICEF, World Food Programme, & World Health Organization. (2021). The state of food security and nutrition in the world 2021. *Food and Agriculture Organization*. https://doi.org/10.4060/cb4474en

Food and Agriculture Organization. (2015). *The state of food and agriculture 2015: Social protection and agriculture: Breaking the cycle of rural poverty*. FAO. fao.org

Food and Agriculture Organization. (2017). *The state of food and agriculture 2017: Leveraging food systems for inclusive rural transformation*. FAO. https://www.fao.org/interactive/state-of-food-agriculture/2017/en/

Galli, F., Arcuri, S., Belletti, G., Marescotti, A., Moretti, M., & Rovai, M. (2024). Integrating local food policies and spatial planning to enhance food systems and rural-urban links: A living lab experiment. *Land*, *13*(12), Article 2014. https://doi.org/10.3390/land13122014

Hannah, C., Davies, J., Green, R., Zimmer, A., Anderson, P., Battersby, J., Baylis, K., Joshi, N., & Evans, T. P. (2022). Persistence of open-air markets in the food systems of Africa's secondary cities. *Cities*, *124*, Article 103608. https://doi.org/10.1016/j.cities.2022.103608

Hannah, C., Blekking, J., Davies, J., Battersby, J., Chilenga, A., Kabuya, D., & Toriro, P. (2025). Urban African food systems as sites of challenges and opportunities for household food equity and resilience. *Ecology and Society*. https://doi.org/10.5751/es-16259-300328

Heeringa, S. G., West, B. T., & Berglund, P. A. (2017). *Applied survey data analysis (2nd ed.)*. Chapman and Hall/CRC. https://doi.org/10.1201/9781315153278

High Level Panel of Experts on Food Security and Nutrition. (2024). Strengthening urban and peri-urban food systems to achieve food security and nutrition, in the context of urbanization and rural transformation (HLPE-FSN Report No. 19). Committee on World Food Security. https://openknowledge.fao.org/handle/20.500.14283/cd1459en

Ihle, R., Rubin, O. D., Bar-Nahum, Z., & Jongeneel, R. (2020). Imperfect food markets in times of crisis: economic consequences of supply chain disruptions and fragmentation for local market power and urban vulnerability. *Food Security, 12*, 727-734.

Karg, H., Bouscarat, J., Akoto-Danso, E. K., Heinrigs, P., Drechsel, P., Amprako, L., & Buerkert, A. (2022). Food flows and the roles of cities in West African food distribution networks. *Frontiers in Sustainable Food Systems*, *6*, Article 857567. https://doi.org/10.3389/fsufs.2022.857567

Karg, H., Bellwood-Howard, I., & Ramankutty, N. (2025). How cities source their food: spatial interactions in West African urban food supply. *Food Security, 17*, 439-460.

Kibriya, S., Fatema, N., & Kafle, K. (2026). Food insecurity and supply chain issues in fragile areas. *International Food and Agribusiness Management Review.* https://doi.org/10.22434/ifamr.20260002

Kiessling, N., & Pütz, M. (2020). Assessing the regional governance capacities of spatial planning: The case of the canton of Zurich. *Regional Studies, Regional Science*, *7*(1), 183-205. https://doi.org/10.1080/21681376.2020.1776631

Killagane, S., Mhando, D., Nyamhanga, P. J., & Mahonge, C. (2025). The influence of formal central-local government interface on implementing good agricultural practices. *International Journal of Research in Business and Social Science (2147-4478)*. https://doi.org/10.20525/ijrbs.v14i4.4008

Knickel, K., Almeida, A., Bauchinger, L., Casini, M. P., Gassler, B., Hausegger-Nestelberger, K., Heley, J., Henke, R., Knickel, M., Oostindie, H., Ovaska, U., Pina, C., Rovai, M., Vulto, H., & Wiskerke, J. S. C. (2021). Towards more balanced territorial relations: The role (and limitations) of spatial planning as a governance approach. *Sustainability*, *13*(9), Article 5308. https://doi.org/10.3390/su13095308

Kraak, M.-J., & Ormeling, F. (2020). *Cartography: Visualization of geospatial data (4th ed.)*. CRC Press. https://doi.org/10.1201/9780429464195

Leyva-Hernández, S., Del Carmen Avendaño-Rito, M., Cruz-Cruz, E., & Arango-Ramírez, P. M. (2026). Multilevel governance and food resilience in local communities: Addressing institutional barriers. *Frontiers in Sustainable Food Systems*. https://doi.org/10.3389/fsufs.2026.1791737

Little, R. J. A., & Rubin, D. B. (2019). *Statistical analysis with missing data (3rd ed.)*. Wiley. https://doi.org/10.1002/9781119482260

Lohr, S. L. (2021). *Sampling: Design and analysis (3rd ed.)*. Chapman and Hall/CRC.

López-García, D., & González de Molina, M. (2021). An operational approach to agroecology-based local agri-food systems. *Sustainability*, *13*(15), Article 8443. https://doi.org/10.3390/su13158443

Mackay, H. (2019). Food sources and access strategies in Ugandan secondary cities: An intersectional analysis. *Environment and Urbanisation*, *31*(2), 375-396.

Mackay, H., Tusabe, R., & Mugagga, F. (2022). Similar, yet different! Comparing Ugandan secondary cities' food system and nutritional transformations to findings from African primary cities. *Urban Transformations, 4*. https://doi.org/10.1186/s42854-022-00047-3

Makhaye, A., & Subban, M. (2024). Leading local economic development in the 'new' normal: Urban and rural challenges in the case of a district municipality in KwaZulu-Natal, South Africa. *African Journal of Governance and Development*, *13*(1), 110-134. https://doi.org/10.36369/2616-9045/2024/v13i1a7

Mubangizi, B. C. (2025). Community engagement, governance, and policy implementation for resilient rural livelihoods in South Africa. *African Journal of Governance and Development*, *14*(1), 140-157. https://doi.org/10.36369/2616-9045/2024/v14i1a9

Murphy, M., Carey, R., & Alexandra, L. (2023). Building the resilience of agri-food systems to compounding shocks and stresses: A case study from Melbourne, Australia. https://doi.org/10.3389/fsufs.2023.1130978

Mutandwa, H., & Vyas-Doorgapersad, S. (2023). The state of water infrastructure development in Zimbabwe. *African Journal of Governance and Development*, *12*(2), 40-57. https://doi.org/10.36369/2616-9045/2023/v12i2a4

Nathan, I. A. (2025). Strategi pemerintah daerah dalam mewujudkan ketahanan pangan: Sinergi kebijakan dan administrasi publik di Merauke. *Jejak Digital: Jurnal Ilmiah Multidisiplin*. https://doi.org/10.63822/9y5pyw47

National Bureau of Statistics. (2022). 2022 Population and Housing Census: Administrative units population distribution report, Tanzania Mainland, Volume 1B. Ministry of Finance and Planning.

Noble, H., & Heale, R. (2019). Triangulation in research, with examples. *Evidence-Based Nursing*, *22*(3), 67-68. https://doi.org/10.1136/ebnurs-2019-103145

Nurhayati, N., Effendi, W. R., Zamora, R., & Yerikania, U. (2026). The role of government in national food security: A systematic literature review and bibliometric analysis. *Jurnal Bina Praja*. https://doi.org/10.21787/jbp.18.2026.2931

Oliveira, E., & Hersperger, A. M. (2019). Disentangling the governance configurations of strategic spatial plan-making in European urban regions. *Planning Practice & Research*, *34*(1), 47-61. https://doi.org/10.1080/02697459.2018.1548218

Organisation for Economic Co-operation and Development. (2020). Rural well-being: Geography of opportunities. OECD Publishing. https://doi.org/10.1787/d25cef80-en

Peñaranda-Márquez, M. A., Alarcon-Bohada, D., Londoño-Moreno, S., Muñoz-Hoyos, C., & González-Calderón, C. (2026). Wholesale and retail food hubs as nodes of formal and informal urban logistics: evidence from Medellín, Colombia. *Case Studies on Transport Policy*. https://doi.org/10.1016/j.cstp.2026.101875

Reardon, T., Echeverria, R., Berdegue, J., Minten, B., Liverpool-Tasie, S., Tschirley, D., & Zilberman, D. (2019). Rapid transformation of food systems in developing regions: Highlighting the role of agricultural research and innovations. *Agricultural Systems*, *172*, 47-59. https://doi.org/10.1016/j.agsy.2018.01.022

Rutta, E. W. (2024). Postharvest food loss reduction and agriculture policy framework in Tanzania: Status and way forward. *Agriculture & Food Security*, *13*, Article 36.

https://doi.org/10.1186/s40066-024-00489-x

Salum, T., Mwagike, L. R., & Mrope, N. P. (2026). Mapping the avocado value chain in Mbeya and Njombe regions with a focus on market access implications. *Discover Agriculture*, *4*, Article 141. https://doi.org/10.1007/s44279-026-00586-4

Schlunegger, M. C., Zumstein-Shaha, M., & Palm, R. (2024). Methodologic and data-analysis triangulation in case studies: A scoping review. *Western Journal of Nursing Research*, *46*(8), 611-622. https://doi.org/10.1177/01939459241263011

Schmitt, P., & Wiechmann, T. (2018). Unpacking spatial planning as the governance of place: Extracting potentials for future advancements in planning research. *disP - The Planning Review*, *54*(4), 21-33. https://doi.org/10.1080/02513625.2018.1562795

Schneider, K. R., Remans, R., Bekele, T. H., Aytekin, D., Conforti, P., Dasgupta, S., DeClerck, F., Dewi, D., Fabi, C., Gephart, J. A., Masuda, Y. J., McLaren, R., Saisana, M., Aburto, N., Ambikapathi, R., Arellano Rodriguez, M., Barquera, S., Battersby, J., Beal, T., ... Fanzo, J. (2025). Governance and resilience as entry points for transforming food systems in the countdown to 2030. *Nature Food*, *6*(1), 105-116. https://doi.org/10.1038/s43016-024-01109-4

Shopola, A. M. (2022). Management of district-local relations through the district intergovernmental forum in Mopani District Municipality, South Africa. *African Journal of Governance and Development*, *11*(1.1), 25-46. https://doi.org/10.10520/ejc-ajgd_v11_n1.1_a3

Skinner, C., & Haysom, G. (2016). The informal sector's role in food security: A missing link in policy debates? (Working Paper 44). PLAAS and Centre of Excellence on Food Security.

Stoeva, S. (2025). Collaborative governance in urban agriculture: Stakeholder roles, collaborative mechanisms, and power dynamics. *Journal of Agriculture, Food Systems, and Community Development*, *15*(1), 133-154. https://doi.org/10.5304/jafscd.2025.151.014

Tacoli, C. (2003). The links between urban and rural development. *Environment and Urbanization*, *15*(1), 3-12. https://doi.org/10.1177/095624780301500111

Tacoli, C., & Agergaard, J. (2017). *Urbanisation, rural transformations and food systems: The role of small towns*. International Institute for Environment and Development. https://www.iied.org/10806iied

Tendall, D. M., Joerin, J., Kopainsky, B., Edwards, P., Shreck, A., Le, Q. B., Kruetli, P., Grant, M., & Six, J. (2015). Food system resilience: Defining the concept. *Global Food Security*, *6*, 17-23. https://doi.org/10.1016/j.gfs.2015.08.001

Umar, M., & Wilson, M. M. J. (2024). Inherent and adaptive resilience of logistics operations in food supply chains. *Journal of Business Logistics*, *45*(1), Article e12362. https://doi.org/10.1111/jbl.12362

United Nations Human Settlements Programme. (2019). *Urban-rural linkages: Guiding principles and framework for action to advance integrated territorial development*. UN-Habitata. https://unhabitat.org/urban-rural-linkages-guiding-principles

United Nations Human Settlements Programme. (2020). *World cities report 2020: The value of sustainable urbanisation*. UN-Habitat. unhabitat.org

United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. https://sdgs.un.org/2030agenda

United Republic of Tanzania. (1992). *Food and nutrition policy*. Government Printer.

United Republic of Tanzania. (2013). National agriculture policy. Ministry of Agriculture, Food Security and Cooperatives.

United Republic of Tanzania. (2018). *Agriculture sector development programme phase II (ASDP II)*. Ministry of Agriculture. kilimo.go.tz

United Republic of Tanzania. (2019). *National postharvest management strategy 2019-2029*. Ministry of Agriculture.

United Republic of Tanzania. (2019). *National post-harvest management strategy (NPHMS) 2019-2029*. Ministry of Agriculture. https://faolex.fao.org/docs/pdf/tan191075.pdf

United Republic of Tanzania. (2021). *National climate change response strategy 2021-2026*. Vice President's Office, Division of Environment. https://climate-laws.org/document/national-climate-change-strategy-2021-2026_50bb

von Bertalanffy, L. (1968). *General system theory: Foundations, development, applications*. George Braziller.

World Bank. (2023). Tanzania Food Systems Resilience Program (P179818). https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099051123162533400

Yin, R. K. (2018). *Case study research and applications: Design and methods (6th ed.)*. SAGE.

Yamane, T. (1967). *Statistics: An introductory analysis (2nd ed.)*. Harper & Row.

Zimmer, A., Guido, Z., Davies, J., Joshi, N., Chilenga, A., & Evans, T. (2022). Food systems and rural-urban linkages in African secondary cities. *Urban Transformations*, *4*, Article 13. https://doi.org/10.1186/s42854-022-00042-8