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Feeding the Capital, Governing the Soil: Turning Urban Agriculture Policies and By-laws into Action in Dodoma City Council, Tanzania

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Abstract
This paper assesses the implementation of national policies and city by-laws guiding urban agriculture (UA) activities in Dodoma City Council, Tanzania. It uses a convergent mixed-methods case-study design based on a survey of 300 urban farmers, key informant interviews, focus group discussions, direct observation, and documentary review. Quantitative data were analysed using descriptive statistics, cross-tabulations, and chi-square tests, while qualitative data were analysed thematically and used to explain policy and implementation processes. The findings show that only 15.9 per cent of sampled urban farmers were aware of city planning initiatives, 25.4 per cent accessed extension services, 24.0 per cent accessed credit to start UA, 45.5 per cent had reliable water sources, and 24.4 per cent were aware of city regulations governing UA. These findings indicate that supportive national policy recognition has not been translated into effective local implementation, farmer awareness, reliable service delivery, or practical enforcement. The study recommends harmonising UA-related by-laws with land-use plans, designating suitable production zones, strengthening ward-level awareness, integrating UA into city plans and budgets, improving extension and financial services, and establishing a multi-stakeholder UA coordination platform. The paper contributes to urban policy by showing that UA governance requires more than regulation; it requires a participatory, service-supported, and enforceable framework that links urban livelihoods, food-system resilience, public health, and orderly land-use planning.

Key terms: City by-laws, Tanzania, urban agriculture, urban food systems, urban governance.

1.0 INTRODUCTION

Urban agriculture (UA) is increasingly recognised as part of urban food systems, local economic development, and climate-resilient urban governance. It includes crop cultivation, livestock keeping, horticulture, aquaculture, agroforestry, and other food-related activities undertaken within or around urban areas. In African cities, UA contributes to household food access, income generation, micro-enterprise development, and the productive use of urban spaces. It also raises planning, public health, water, land tenure, and environmental questions that cannot be addressed through informal tolerance alone. The policy challenge is therefore not simply whether UA should be allowed, but how it can be governed in ways that protect livelihoods while managing land-use conflicts, health risks, and environmental pressures (FAO et al., 2022; UN-Habitat, 2024).

Dodoma City Council provides an important setting for examining this issue because it is located in a semi-arid environment where urban food production is influenced by land scarcity, water scarcity, urban expansion, and the city's status as a capital. Dodoma has changed considerably since the original fieldwork. It is now the national capital city, with growing demand for land, infrastructure, housing, public institutions, and urban services. In such a context, poorly managed farming may compete with residential, institutional, commercial, recreational, and environmental land uses. At the same time, prohibiting or ignoring UA may undermine the livelihoods of low- and middle-income urban households.

The current literature confirms that the role of UA in cities is contested but important. FAO et al. (2022) argue that UA should be treated as part of wider urban food systems rather than as a marginal informal activity. UN-Habitat (2024) shows that cities are increasingly exposed to heat, drought, flooding, and other climate-related risks, making food-system planning and urban resilience central to city governance. Studies from African and global contexts also show that UA governance is constrained by fragmented institutions, unclear mandates, weak farmer participation, and inadequate technical support (Puppim de Oliveira & Ahmed, 2021; Lee et al., 2023). Recent reviews further show that urban agriculture is increasingly linked to resilience-building, city food security, socio-ecological functions, and sustainable development, but its contribution depends on supportive legislation, access to resources, and careful management of risks (Ghahremani et al., 2024; Gunapala et al., 2025; Senthamizh & Anbarasan, 2025).

Despite this growing recognition, a gap remains between policy recognition and practical implementation. National policies and legislation provide a basis for recognising and regulating UA, while city by-laws provide local rules for crop cultivation and livestock keeping. However, the effectiveness of these instruments depends on awareness, consistency, enforcement, land-use planning, stakeholder participation, and supportive services. This paper, therefore, assesses how national policies and city by-laws guiding UA activities are implemented in Dodoma City Council, and identifies policy and planning measures needed to make implementation more coherent, participatory, and practical.

2.0 LITERATURE REVIEW

Theoretical Framework

This paper is informed by four complementary theoretical perspectives: sustainable livelihoods theory, urban governance theory, collaborative planning theory, and institutional theory. These perspectives are appropriate because UA is not only a farming activity; it is also a livelihood strategy, a land-use issue, a food-system component, and a governance concern. Sustainable livelihoods theory explains why

households practise UA as part of wider livelihood portfolios; urban governance theory explains how different institutions coordinate or fail to coordinate implementation; collaborative planning theory explains why affected actors need to participate in planning decisions; and institutional theory explains why policies and by-laws may exist but remain weakly implemented when they are not understood, resourced or consistently enforced (North, 1990; Scoones, 1998; Puppim de Oliveira & Ahmed, 2021; FAO et al., 2022).

Sustainable livelihoods theory is useful because UA is not only a land-use issue; it is also a household strategy for managing food, income, and vulnerability. Urban households engage in UA to diversify livelihoods, reduce food expenditure, and generate income, especially where formal employment is limited. In the original study, UA was conceptualised as an activity influenced by policy and institutional frameworks, infrastructure and supportive services, and community attributes that shape people's choices and opportunities. Recent literature strengthens this interpretation by showing that UA contributes to food security, employment, income generation, and resilience when farmers have access to land, water, knowledge, inputs, markets, and supportive institutions (FAO et al., 2022; Lee et al., 2023). In this regard, the sustainable livelihoods perspective helps interpret UA in Dodoma City Council as a practical household response to urban poverty, food insecurity, water stress, and limited livelihood alternatives rather than as an activity understood only through physical planning regulations.

Urban governance theory helps explain why the implementation of UA policies and bylaws depends on how institutions coordinate decisions across land, water, health, planning, and agriculture. City-level implementation is rarely determined by a single institution. It involves planning departments, agricultural and livestock officers, environmental health officers, water utilities, ward and mtaa leaders, land authorities, and farmers themselves. Where these actors operate with weak coordination, urban farmers may receive contradictory signals: national policies may recognise UA, while local planning practice may fail to protect land or provide services. Evidence from African cities shows that fragmented mandates, limited technical support, and unclear institutional responsibilities reduce the sustainability benefits of UA (Puppim de Oliveira & Ahmed, 2021). For the Dodoma City Council, urban governance theory therefore explains why implementation requires coordination among planning, land, agriculture, livestock, health, water, environment, and community development actors.

Collaborative planning theory is also relevant because UA involves competing interests over urban land. Urban planners, farmers, residents, developers, and service providers may all claim legitimate interests. Planning decisions that exclude urban farmers can produce resistance, informal land use, and conflict. Recent work on African urban food systems argues that planning must recognise the diverse ways households obtain food, including production, markets, vendors, and informal food systems (Hannah et al., 2025). This means that UA should not be treated as a residual activity, but as part of a broader urban food and livelihood system. Collaborative planning, therefore, provides a basis for involving urban farmers, mtaa leaders, ward officials, planners, health officers, livestock officers, water authorities, and other stakeholders in identifying suitable UA zones, regulating risky practices, and designing bylaws that are socially legitimate and practically enforceable.

Institutional theory clarifies why bylaws may exist without being implemented. Rules become effective when they are known, accepted, resourced, and enforced consistently. Where by-laws are poorly communicated, contradict land-use plans, exclude emerging farming practices, or are enforced selectively,

they remain administrative texts rather than practical governance instruments. This is particularly important in the Dodoma City Council, where the findings of this study reveal low awareness of city regulations among urban farmers and weak implementation of restrictions on crop height, animal keeping, and land-use control. Recent systematic evidence shows that UA is enabled or constrained by farmers' knowledge, land availability, institutional support, urban-development pressures, policy design, and local opportunity structures (Lee et al., 2023). Institutional theory, therefore, helps explain why the implementation problem in Dodoma City Council, a farmer-compliance problem, is not only a problem of communication, but also a problem of institutional capacity, planning alignment, and enforcement credibility.

The four theoretical perspectives are further strengthened by recent literature on ecosystem services, climate resilience, and urban food systems. Urban agriculture can provide ecosystem services such as food provision, greening, biodiversity support, waste reuse, cooling, and social benefits, but these benefits depend on design, regulation, and management (Evans et al., 2022; Sanye-Mengual et al., 2020). Climate-focused literature also shows that urban food and income security in sub-Saharan Africa require climate-smart and locally adapted approaches, especially in cities facing water stress, heat, and livelihood vulnerability (Khumalo et al., 2024; UN-Habitat, 2024). In semi-arid Dodoma, UA theory should therefore consider water governance, safe irrigation, public health, climate adaptation, and the role of urban farming in strengthening household resilience.

Table 1: Theoretical Perspectives and Their Relevance to UA Policy and By-Law Implementation

Theoretical perspective	Main contribution	Application to Dodoma City Council
Sustainable livelihoods theory	Explains UA as part of household strategies for food, income, and vulnerability management.	Guides the interpretation of UA as a livelihood and food-security activity, not only a land-use problem.
Urban governance theory	Explains how multiple institutions coordinate or fail to coordinate implementation.	Highlights the need for coordination among planning, agriculture, livestock, health, land, water, and environmental actors.
Collaborative planning theory	Emphasises participation, negotiation, and inclusion of affected actors.	Supports farmer involvement in UA zoning, by-law review, awareness creation, and enforcement design.

Empirical Review

Empirical literature confirms that UA can contribute to food security, livelihoods, ecosystem services, and urban resilience, but it also shows that these benefits are not automatic. Evans et al. (2022) show, through a systematic review, that urban agriculture and green infrastructure can provide ecosystem services, though benefits depend on design, management, and context. Similarly, Sanye-Mengual et al. (2020) show that different groups perceive ecosystem services from UA differently, suggesting that city planning should integrate public expectations, farmer needs, and environmental safeguards. Pradhan et al. (2024) add that UA is linked to all Sustainable Development Goals but does not automatically advance sustainability unless negative trade-offs are managed. This evidence suggests that UA should be governed as a multifunctional urban system rather than simply promoted as a food production system.

Governance remains a central issue across studies. Puppim de Oliveira and Ahmed (2021) show that urban agriculture in African cities is shaped by multiple actors and institutional arrangements, but sustainability benefits decline when governance is fragmented. Lee et al. (2023) identify farmer knowledge, institutional support, land opportunities, and urban-development pressures as conditions that either enable or constrain sustainable UA. Fei et al. (2025) further show that urban and peri-urban agriculture requires supportive innovation environments, technology dissemination, and market integration. These studies converge on one point: urban agriculture works better where institutions combine regulation with practical support. They differ, however, in their emphasis; governance studies emphasise institutional coordination, while technology-oriented studies emphasise innovation systems and implementation capacity.

Additional synthesis shows that UA should be positioned within wider resilience planning. Langemeyer et al. (2021) link UA to urban resilience, while Akinsemolu et al. (2024) show that climate-smart agriculture can strengthen food security under climate stress. Kiribou et al. (2024) identify land, water, input, and governance constraints in sub-Saharan African urban farming systems, and the High-Level Panel of Experts on Food Security and Nutrition (2024) calls for coordinated urban and peri-urban food-system planning. Climate-related literature adds another layer to the debate. Khumalo et al. (2024) show that climate-smart approaches can improve urban food and income security in sub-Saharan Africa when practices are adapted to local contexts. Gao et al. (2025) emphasise that land scarcity, soil contamination, water management, and regulatory frameworks affect the sustainability of UA under changing climatic conditions. Shin et al. (2024) show that home gardening, crop diversity, tree management, and irrigation can support food security in sub-Saharan Africa, but also call for policies that recognise local adaptation practices. These findings are directly relevant to semi-arid Dodoma, where water availability is a major constraint and where some urban farmers rely on streams, shallow wells, rainfall, and wastewater.

African urban food system studies show that urban food security is not only a production problem but also a planning and governance issue. Ameye et al. (2025) show that African food environments are changing rapidly, and that policy must address affordability, accessibility, convenience, and desirability of healthy diets. Hannah et al. (2025) show that urban agriculture is one of several household food-sourcing strategies in Southern African cities, while Gu et al. (2026) argue that urban food resilience requires planning integration across production, supply-chain, consumption, and governance dimensions. Khan et al. (2024) similarly argue that UA can support food security, greening, biodiversity, and circular economy functions, but only where awareness, land access, value addition, and supportive policy are strengthened.

In Tanzania, policy recognition of UA has existed for many years, but implementation remains uneven. The National Human Settlements Development Policy recognises the potential of UA for income, employment, and supplementary food supply, while also warning of conflicts with other urban land uses, land degradation, water pollution, and public health risks (URT, 2000). Mlozi (2004) and Magigi (2008) similarly show that Tanzanian urban agriculture has long been shaped by legal recognition, planning ambiguity, and land-governance challenges. The Urban Farming Regulations, the Land Use Planning Act, and the Urban Planning Act provide formal entry points for managing UA (URT, 1992, 2007a, 2007b). The critical literature gap is that policy recognition has not been matched by evidence on how city-level by-laws, services, and planning instruments actually shape farmers' compliance and livelihoods.

3.0 METHODOLOGY

The study used a convergent mixed-methods case-study design to assess the implementation of national policies and city by-laws guiding UA in the Dodoma City Council. Quantitative data were collected from 300 urban farmers selected from 15 mitaa in eight wards within Dodoma Urban Division. Dodoma Urban Division, wards, and mitaa were purposively selected because they had significant UA activities, while convenience and snowball procedures were used to identify active urban farmers where complete sampling frames were unavailable. These procedures were appropriate for reaching farmers operating in formal, informal, and dispersed urban spaces, although the findings are more analytically than statistically generalisable. Qualitative data were collected through key informant interviews with ward, mtaa, planning, agriculture, land, water, and other relevant officers; eight FGDs involving 96 adult community members; direct observation; and documentary review.

Quantitative data were analysed using descriptive statistics, cross-tabulations, and chi-square tests, while qualitative data were analysed thematically to explain awareness, enforcement, planning participation, and service-delivery patterns. Ethical principles of informed participation, confidentiality, and responsible reporting were observed. The methodological design also strengthened triangulation. Survey findings established the scale of implementation gaps, while KIIs and FGDs explained why those gaps persisted in practice. Direct observation verified whether by-law provisions on crop cultivation, animal keeping, water use, and land-use control were reflected in actual field conditions. This integration of statistical and qualitative evidence improved the credibility of the findings and made the findings more useful for policy and planning decisions.

4.0 RESULTS AND DISCUSSION

This section presents findings and discussion on the implementation of national policies and city by-laws that guide UA activities within the Dodoma City Council. The discussion integrates quantitative findings with qualitative evidence from KIIs and FGDs and situates the evidence within current literature. Each subsection refers explicitly to the relevant table and explains what the findings imply for policy implementation, urban planning, and city governance.

Awareness of City Planning Initiatives and Prospects for Integrating UA

Findings in Table 2 show that only 15.9 per cent of sampled urban farmers were aware of city planning initiatives, while 68.7 per cent were not aware. The same table shows that 91.8 per cent of respondents considered integration of UA in city planning to be not promising. These findings reveal a major participation gap: urban farmers were expected to comply with planning decisions, but most were not sufficiently reached by planning communication or involved in shaping how UA should be accommodated.

Table 2: Awareness of City Planning Initiatives and Opinions on Integrating UA in Planning (N = 300)

Indicator	Response category	Squatter N (%)	Non-squatter N (%)	All N (%)	p-value	Strategic implication
Awareness of city planning initiatives	Aware of city planning initiatives	16 (16.7)	23 (15.4)	39 (15.9)	0.363	Strengthen planning and communication.
	Not aware of city planning initiatives	80 (68.0)	126 (69.6)	206 (68.7)	0.363	Prioritise ward-level sensitisation.
Opinion on integrating UA in city planning	Integration of UA in city planning is promising	5 (5.7)	14 (9.7)	19 (8.2)	0.287	Build on positive perceptions.
	Integration of UA in city planning is not promising	82 (94.3)	130 (90.3)	212 (91.8)	0.287	Address low confidence in planning.
Validity of responses on planning awareness	Valid responses provided	96 (80.7)	149 (82.3)	245 (81.7)	—	Use valid awareness responses.
	No valid response provided	23 (19.3)	32 (17.7)	55 (18.3)	—	Improve response capture.

Note. Percentages are based on valid responses reported in the study. Differences were not statistically significant at $p < .05$. The two validity rows clarify missing or invalid responses for the awareness item.

The findings in Table 2 are consistent with the literature, which shows that UA governance requires effective engagement of multiple actors rather than fragmented institutional control (Puppim de Oliveira & Ahmed, 2021). They also support Lee et al. (2023), who show that UA development depends on institutional support, land opportunities, and recognition in planning. In Dodoma City Council, farmers' pessimism about integration appears to reflect practical experience with weak services, limited legally secured UA areas, and limited political attention to UA as an urban livelihood.

Qualitative complement from FGDs: Participants explained that integration of UA into city planning was weak because farmers were rarely involved in planning meetings and because UA priorities were not reflected in council plans and budgets. They emphasised that the lack of extension, credit, water, and legally recognised farming spaces made UA appear tolerated rather than actively supported.

Qualitative complement from KIIs: Key informants observed that planning decisions were often dominated by formal land-use interests, while urban farmers were treated as temporary users of space. They noted that land-use plans recognised agriculture in principle, but implementation increasingly converted potential agricultural spaces into residential and institutional uses.

Access to Agricultural Extension Services

Findings in Table 3 show that 74.6 per cent of urban farmers did not access agricultural extension services, while only 25.4 per cent reported access. The difference between squatter and non-squatter settlements was statistically significant. Among those who accessed extension services, 64.5 per cent received services from government extension officers, 19.7 per cent from fellow farmers, and 11.8 per cent from friends, neighbours, or relatives. However, 52.0 per cent of those who received extension services reported not accessing them often.

Table 3: Access to Extension Services Among Urban Farmers (N = 300

Indicator	Response category	Squatter N (%)	Non-squatter N (%)	All N (%)	p-value	Strategic implication
Access to extension services	Accessed extension services	19 (16.1)	57 (31.5)	76 (25.4)	0.003	Expand services.
	Did not access extension services	99 (83.9)	124 (68.5)	223 (74.6)	0.003	Prioritise underserved farmers.
Sources of extension services	Government officers	14 (73.7)	35 (61.4)	49 (64.5)	0.299	Strengthen public extension.
	Fellow farmers	5 (26.3)	10 (17.5)	15 (19.7)	0.299	Formalise peer learning.
	Radio programmes	0 (0.0)	2 (3.5)	2 (2.6)	0.299	Use targeted radio messages.
	Friends, neighbours, or relatives	0 (0.0)	9 (15.8)	9 (11.8)	0.299	Improve informal advice.
	Leaflets or publications	0 (0.0)	1 (1.8)	1 (1.3)	0.299	Prepare simple guides.
Frequency of extension contact	Very frequent contact	0 (0.0)	6 (10.5)	6 (8.0)	0.033	Maintain follow-up.
	Frequent contact	4 (22.2)	26 (45.6)	30 (40.0)	0.033	Schedule routine visits.
	Infrequent contact	14 (77.8)	25 (43.9)	39 (52.0)	0.033	Increase field contact.
Type of support received	Advice only	5 (27.8)	27 (47.4)	32 (42.7)	0.464	Add demonstrations.
	Training only	1 (5.6)	1 (1.8)	2 (2.7)	0.464	Broaden training.
	Advice and training	11 (61.1)	25 (43.9)	36 (48.0)	0.464	Scale-integrated support.
	Market information	0 (0.0)	2 (3.5)	2 (2.7)	0.464	Add market guidance.
	Input-supply information	1 (5.6)	2 (3.5)	3 (4.0)	0.464	Link farmers to inputs.

Note. Percentages are based on valid responses reported in the study. Differences with $p < .05$ are statistically significant.

The findings in Table 3 reveal that the implementation of policy support for UA was constrained by weak service delivery. Extension services are critical because safe and productive UA requires information on crop choice, livestock management, water use, pest control, waste handling, market information, and environmental safeguards. When most urban farmers operate without extension, bylaws risk becoming punitive instruments rather than developmental tools. This is inconsistent with current literature, which shows that UA requires knowledge, capacity, and technical support to become sustainable (FAO et al., 2022; Lee et al., 2023).

Qualitative complement from FGDs: Participants indicated that extension systems were largely designed for rural farmers, while urban farmers were rarely visited unless they requested specific veterinary or crop advice. Participants noted that most UA practices were learned through experience, from neighbours and fellow farmers rather than through structured city support.

Qualitative complement from KIIs: city key informants confirmed that there was no strong, budgeted programme to provide extension services to urban farmers. They explained that agricultural extension priorities were often directed to rural settings, leaving UA with limited technical support despite its contribution to food and income security.

Access to Credit and Start-up Capital for UA

Findings in Table 4 show that 76.0 per cent of urban farmers did not have access to credit to start UA activities, while only 24.0 per cent reported access. The findings also show that 75.0 per cent relied on their own sources of capital, compared with 10.7 per cent who used banks, 5.3 per cent who used SACCOS, and only 3.7 per cent who received capital from the city council. These findings show that UA was largely financed informally by farmers themselves.

Table 4: Access to Credit and Sources of Start-Up Capital for UA (N = 300)

Indicator	Response category	Squatter N (%)	Non-squatter N (%)	All N (%)	p-value	Strategic implication
Access to credit for starting UA	Accessed credit	25 (21.0)	47 (26.0)	72 (24.0)	0.325	Link farmers to finance.
	Did not access credit	94 (79.0)	134 (74.0)	228 (76.0)	0.325	Design UA credit products.
Amount of start-up capital	Below TZS 100,000	9 (7.6)	11 (6.1)	20 (6.7)	0.130	Support micro-investment.
	TZS 100,000-500,000	6 (5.0)	25 (13.8)	31 (10.3)	0.130	Support small enterprise growth.
	TZS 500,001-1,000,000	7 (5.9)	6 (3.3)	13 (4.3)	0.130	Support improved facilities.
	Above TZS 1,000,000	3 (2.5)	6 (3.3)	9 (3.0)	0.130	Target commercial UA actors.
	Amount not remembered	94 (79.0)	133 (73.5)	227 (75.7)	0.130	Promote farm records.
Sources of start-up capital	SACCOS	4 (3.4)	12 (6.6)	16 (5.3)	0.367	Strengthen SACCOS linkages.
	Relatives	6 (5.0)	8 (4.4)	14 (4.7)	0.367	Guide informal financing.
	Banks	14 (11.8)	18 (9.9)	32 (10.7)	0.367	Develop bankable UA loans.
	Revolving funds	0 (0.0)	2 (1.1)	2 (0.7)	0.367	Revitalise revolving funds.
	City council support	2 (1.7)	9 (5.0)	11 (3.7)	0.367	Create city support windows.
	Own sources	93 (78.2)	132 (72.9)	225 (75.0)	0.367	Promote savings groups.

Note. TZS = Tanzanian shillings; SACCOS = Savings and Credit Co-operative Societies.

The findings in Table 4 reveal that the implementation of supportive policy for UA was weak in the finance area. If farmers are expected to comply with standards on safe production, zero-grazing, waste management, water use, and improved technologies, they need access to credit and investment support. Without finance, farmers are less able to invest in water harvesting, enclosures, manure management, improved seeds, improved breeds, protective equipment, or hygienic production systems. This aligns with recent literature that calls for enabling policy frameworks and incentives to support UA in contributing to food-system resilience under changing climatic conditions (Gao et al., 2025; FAO et al., 2022).

Qualitative complement from KIIs: city key informants stated that the city needed clear financial commitment to UA, including budget lines, mobilisation of local resources, and integration of UA into council structures. They argued that without finance, policy recognition would remain rhetorical.

Qualitative complement from FGDs: Participants noted that most farmers depended on household savings and small informal contributions. They explained that the lack of formal credit limited their ability to invest in improved production practices, water systems, and proper animal housing required by city regulations.

Water Reliability and Sources for UA Activities

Findings in Table 5 indicate that 54.5 per cent of respondents lacked a reliable water source for UA activities. The difference between squatter and non-squatter settlements was statistically significant. Among those reporting water sources, 68.1 per cent used tap water, 15.0 per cent used streams or furrows, 13.0 per cent used wastewater or stabilisation ponds, and 3.9 per cent used deep or shallow wells.

Table 5: Reliability and Sources of Water for UA Activities (N = 300)

Indicator	Response category	Squatter N (%)	Non-squatter N (%)	All N (%)	p-value	Strategic implication
Reliability of the water source	Reliable source available	33 (32.4)	84 (54.2)	117 (45.5)	0.001	Plan water-secure UA zones.
	No reliable source available	69 (67.6)	71 (45.8)	140 (54.5)	0.001	Promote safe alternatives.
Main source of water	Tap water	63 (66.3)	110 (69.2)	173 (68.1)	0.353	Regulate non-domestic use.
	Streams or furrows	16 (16.8)	22 (13.8)	38 (15.0)	0.353	Monitor water quality.
	Wastewater or stabilisation ponds	15 (15.8)	18 (11.3)	33 (13.0)	0.353	Require treatment first.
	Deep or shallow wells	1 (1.1)	9 (5.7)	10 (3.9)	0.353	Monitor well safety.
Validity of water-reliability responses	Valid responses provided	102 (85.7)	155 (85.6)	257 (85.7)	—	Use valid responses.
	No valid response provided	17 (14.3)	26 (14.4)	43 (14.3)	—	Improve response capture.

Note: The table maintains the original findings while adding policy-oriented implications for water governance.

The findings in Table 5 reveal a major implementation dilemma. While UA contributes to livelihoods, it requires water in a semi-arid city where domestic water demand is increasing. If tap water is intended primarily for human consumption, yet many farmers depend on it for UA, policy implementation must address water allocation, safe reuse, wastewater management, and rainwater harvesting rather than relying only on restrictions. This is consistent with UN-Habitat (2024), which stresses that climate risks and urban service pressures require integrated city-level responses.

Qualitative complement from KIIs: A water-sector key informant explained that water was not enough for all household and non-household activities, and that the water-supply system could hardly keep up with

the needs of a growing urban population. The informant added that reliable access to tap water was especially problematic in some squatter areas, thereby limiting UA's development and growth.

Qualitative complement from FGDs and observation: Evidence showed that some farmers used streams, furrows, shallow wells, rainfall, and raw wastewater. Participants recognised that these sources were sometimes the only available options, while also acknowledging the health risks of using wastewater without proper treatment.

Awareness and Implementation of City By-laws

Findings in Table 6 show that only 24.4 per cent of urban farmers were aware of city regulations governing UA activities, while 68.3 per cent were not aware. This is one of the strongest indicators of weak implementation. Bylaws cannot guide behaviour effectively when most intended users do not know them. Low awareness also means that enforcement may be perceived as unfair, selective, or punitive.

Table 6: Awareness of City By-Laws and Regulations Guiding UA (N = 300)

Indicator	Response category	Squatter N (%)	Non-squatter N (%)	All N (%)	p-value	Strategic implication
Awareness of city regulations governing UA	Aware of city regulations	20 (18.5)	46 (28.2)	66 (24.4)	0.056	Use peer educators.
	Not aware of city regulations	88 (73.9)	117 (64.6)	205 (68.3)	0.056	Prioritise awareness.
Validity of survey responses	Valid responses provided	108 (90.8)	163 (90.1)	271 (90.3)	—	Use valid responses.
	No valid response provided	11 (9.2)	18 (9.9)	29 (9.7)	—	Improve response capture.

Note. Some respondents did not provide valid responses; hence, percentages do not sum to 100.

The findings in Table 6 are complemented by qualitative evidence on crop cultivation and animal keeping. City bylaws allowed certain forms of crop cultivation under restrictions, including height limits in specified wards. However, direct observation and farmer accounts showed that crops exceeding the permitted height, especially maize and sunflower, were cultivated in restricted areas. This confirms that low awareness was accompanied by weak enforcement and limited credibility of the regulatory system.

Findings from the FGDs and farmer interviews revealed limited awareness and enforcement of by-laws restricting crop cultivation in certain areas. One farmer stated that he was not aware of the existence of such by-laws, noting that he had cultivated in the area for many years without restriction. He further argued that crop cultivation was also taking place around government offices, which made the bylaws appear either absent, weakly enforced, or irrelevant to ordinary residents.

A key informant from the former land-use planning structure observed that city by-laws contradicted aspects of the land-use plan because they allowed cultivation in some places where UA was not clearly

supported by the master plan. Another city official explained that bylaws existed largely because local government authorities were required to regulate urban activities, but implementation on the ground remained weak.

National Policy and Legal Instruments Relevant to UA Implementation

Findings in Table 7 show that Tanzania has several policy and legal instruments that provide entry points for guiding UA. However, the same table also shows that recognition has not been fully translated into practical planning, budgeting, awareness, and support systems at the city level. The problem is therefore not simply the absence of a policy framework, but the limited conversion of that framework into implementable city-level mechanisms.

The policy instruments in Table 7 reflect the balanced national position on UA: the activity is recognised for income, employment, and food supply, but it must be regulated to prevent land-use conflict, environmental degradation, and health risks (United Republic of Tanzania [URT], 2000). This balance is consistent with recent literature, which shows that UA can contribute to sustainable development only when its benefits and risks are deliberately managed (Pradhan et al., 2024; Evans et al., 2022).

Table 7: National Policy and Legal Instruments Relevant to UA Implementation in Dodoma City Council

Policy/legal instrument	Main relevance to UA	Observed implementation issue	Strategic implication
National Human Settlements Development Policy, 2000	Recognises UA as part of urban economic and settlement development while cautioning against environmental and health risks.	Recognition was not fully translated into practical planning and support systems.	Guide safe UA planning.
Urban Farming Regulations, 1992	Formally define urban farming and regulate plant and animal husbandry within township boundaries.	Regulations were weakly enforced, and many farmers were unaware of detailed requirements.	Update guidance and enforcement.
Urban Planning Act, 2007	Mandates planning authorities to guide and manage land use within their areas of jurisdiction.	UA was not adequately integrated into planning and budgeting processes.	Designate UA zones.
Land Use Planning Act, 2007	Provides a basis for preparing, administering, and enforcing land-use plans.	Land used for UA was often insecure, informal, or contested.	Protect suitable spaces.
Local government legislation and by-law powers	Allows local authorities to make bylaws for regulating urban activities.	Bylaws existed but were weakly enforced and sometimes inconsistent with observed realities.	Review bylaws.
Environmental Management Act, 2004	Provides a basis for managing pollution, waste, and environmental risks linked to urban land uses.	Environmental safeguards for UA were not fully linked to farming practices, such as wastewater use and animal waste management.	Integrate environmental standards.
Water Resources Management Act, 2009	Provides a framework for sustainable water use and protection of water resources.	UA water needs were not sufficiently integrated into water-use planning, safe reuse, or monitoring systems.	Strengthen water governance.

Note. The table links policy instruments with observed implementation issues and strategic implications.

By-law Design and Implementation Gaps

Findings in Table 8 show that by-law implementation suffered from both design and enforcement problems. Some rules, such as crop-height restrictions and animal-keeping requirements, were inconsistently enforced. At the same time, penalties were rarely applied, while monitoring and advisory systems were weak. This made the bylaws less effective as behavioural guidance tools.

Table 8: Implementation Gaps in City By-Laws Guiding UA Activities

By-law provision or expectation	Observed practice	Implementation gap	Required response
Crops exceeding three feet are restricted in specified wards.	Maize, sunflower, and other taller crops were cultivated in restricted areas.	Low compliance and weak enforcement.	Review crop restrictions and designate practical cultivation zones.
Livestock keeping is allowed under permits and specified conditions.	Animals were kept without adequate consultation or permits.	Permit system not fully operational.	Establish a simple livestock registration and advisory system.
Animals should be kept in enclosures and not free-range.	Indoor and residential animal keeping occurred with limited inspection.	Monitoring was weak, and some animal categories were not well defined.	Clarify livestock categories, numbers, and housing standards.
Animal waste should be properly managed.	Waste-management requirements were not consistently enforced.	Potential public-health and environmental risks.	Link by-laws with veterinary, health, and environmental inspections.
Penalties provided for non-compliance.	Penalties were rarely applied.	Bylaws lacked deterrence and legitimacy.	Use graduated enforcement: awareness, warnings, advice, and penalties for persistent violation.

The findings in Table 8 indicate that Dodoma City Council requires a facilitative and enforceable by-law framework. Such a framework should go beyond listing prohibitions and penalties. It should define permitted, regulated, and prohibited UA practices; provide simple permit procedures; communicate standards in Kiswahili; and link enforcement with technical advice. This would improve legitimacy and reduce resistance to implementation.

Qualitative complement from FGDs and farmer interviews: Participants and farmers who kept animals reported that animal keeping was mostly done at their own discretion rather than through permits or designated areas. They also observed that some officials and local leaders kept animals in ways inconsistent with bylaw requirements, which weakened public confidence in enforcement.

Policy Implementation Matrix for Strengthening UA Governance

Findings in Table 9 synthesise the main implementation issues, supporting evidence, current literature, and recommended actions. The matrix shows that UA governance is cross-sectoral. Weak enforcement, low awareness, land-use conflicts, inadequate services, and health risks cannot be addressed by one department alone. They require coordinated action among planning, agriculture, livestock, health, environment, water, finance, and local leadership actors.

Table 9: Policy Implementation Matrix for Strengthening UA Governance in Dodoma City Council

Implementation issue	Evidence from this study	Current literature supports	Recommended action	Lead actors
Weak enforcement	Bylaws existed, but crop and livestock restrictions were often not followed.	UA governance requires the removal of conflicting rules and stronger support (Puppim de Oliveira & Ahmed, 2021).	Apply graduated enforcement with awareness, warnings, advice, and penalties.	Planning, legal, agriculture, livestock, and health departments.
Low farmer awareness	Most farmers did not know what was allowed or prohibited.	UPA sourcebooks emphasise local guidance and knowledge support (FAO et al., 2022).	Conduct ward-level awareness and simplify by-law messages.	Ward offices, extension officers, and community development officers.
Land-use conflicts	UA occurred in areas not clearly protected or harmonised with planning schemes.	Urban planning should integrate food systems and climate resilience (Langemeyer et al., 2021; UN-Habitat, 2024).	Map and designate suitable UA zones in planning schemes.	City planning department and land-use planning institutions.
Inadequate services	Farmers faced constraints in land, water, credit, and extension.	UPA requires access to land, water, inputs, and institutions (FAO et al., 2022; Lee et al., 2023).	Budget for extension, water guidance, farmer training, and credit linkages.	Agriculture, livestock, water, finance, and community development actors.
Health and environmental risks	Wastewater use and poor animal-waste control created concerns.	UA must be managed to reduce public-health and environmental risks (Evans et al., 2022; URT, 2000).	Develop safe irrigation, composting, livestock housing, and waste-management standards.	Health, environment, livestock, and water departments.

Note. The matrix translates empirical findings into practical implementation responsibilities.

The findings in Table 9 also show that the implementation problem is not only legal. It is administrative, financial, participatory, and technical. For example, awareness campaigns may improve compliance, but awareness alone will not resolve water scarcity. By-law enforcement may reduce risky practices, but

enforcement alone will not provide extension, credit, or designated land. Therefore, the city needs integrated policy implementation rather than isolated enforcement campaigns.

Strategic Pathways for Improved UA Policy and By-law Implementation

The findings in Table 10 translate the study's evidence into practical pathways for the Dodoma City Council. The pathways should be implemented sequentially and in a coordinated manner. Bylaw review and UA mapping should come first because enforcement cannot be fair or effective without clear rules and designated spaces. Farmer awareness and support services should follow because farmers need to understand the rules and have the means to comply with them. Public-health safeguards and institutional coordination should operate continuously because UA involves ongoing risks and multiple departments.

Table 10: Strategic Pathways for Improved UA Policy and By-Law Implementation

Strategic pathway	Specific actions	Expected outcome	Time orientation
By-law review and harmonisation	Review crop, livestock, waste, permit, and penalty provisions; align them with city planning schemes.	Clear, realistic, and enforceable by-laws.	Short term
UA mapping and zoning	Map existing UA activities and identify suitable crop and livestock zones.	Reduced land-use conflict and improved planning control.	Short to medium term
Farmer awareness and participation	Use ward meetings, farmer groups, and extension officers to explain rules and services.	Improved compliance and trust.	Continuous
Support services	Provide extension, water-use guidance, veterinary support, training, and credit linkages.	Safer and more productive UA.	Medium term
Public-health and environmental safeguards	Introduce standards for wastewater use, animal housing, waste disposal, and drainage protection.	Reduced health and environmental risks.	Continuous
Institutional coordination	Create a city-level UA coordination platform.	Integrated implementation across departments.	Short term

Note. The strategic pathways are sequenced to improve policy clarity, participation, service delivery and enforcement.

The strategic pathways in Table 10 are consistent with recent literature that treats UA as part of urban food systems and climate-resilient planning rather than as a marginal informal practice (FAO et al., 2022; UN-Habitat, 2024; Hannah et al., 2025). They also respond to the evidence that urban agriculture can support several sustainability objectives, but only when its trade-offs and risks are managed through appropriate governance (Pradhan et al., 2024; Evans et al., 2022).

5.0 CONCLUSION AND RECOMMENDATIONS

Conclusion: This paper assessed the implementation of national policies and city bylaws governing UA activities within the Dodoma City Council. The evidence shows that UA is important for urban livelihoods, food access, and poverty reduction, but its governance remains weak. National policies and legal frameworks provide room for UA, yet implementation at the city level is constrained by low awareness, limited participation in planning, inadequate extension services, limited access to credit, unreliable water supply, and weak enforcement of bylaws. Findings in Table 2 show that most urban farmers were unaware of city planning initiatives and did not consider integrating UA into planning to be promising. Findings in Table 3 show that most farmers lacked access to extension services. Findings in Table 4 show that most farmers had no access to credit and relied primarily on their own capital. Findings in Table 5 show that more than half lacked reliable water for UA. Findings in Table 6 show that most farmers were unaware of city bylaws and regulations governing UA. Findings in Tables 7 to 10 further show that policy recognition, by-law design, and strategic pathways must be translated into practical implementation mechanisms. The overall conclusion is that Dodoma City Council requires an enabling, realistic, and participatory governance framework for UA. Such a framework should not ignore public-health, environmental, and land-use risks. Instead, it should regulate those risks while supporting safe, productive, and legally recognised UA. Urban agriculture should be treated as part of the city's food, livelihood, and climate-resilience systems.

Recommendations:

a) Dodoma City Council should review and harmonise city by-laws guiding UA so that they reflect current farming practices, including crop cultivation, zero-grazing, poultry, improved chicken, dairy animals, waste management, and safe water use. The revised bylaws should clearly distinguish prohibited practices from permitted and supported practices.

b) The Council should establish designated and legally recognised UA zones within appropriate urban and peri-urban spaces. These areas should be identified through participatory land-use planning involving farmers, mtaa leaders, ward leaders, planners, agricultural officers, land officers, health officers, and water authorities.

c) Awareness campaigns should be conducted in all wards and mitaa where UA is practised. Farmers should receive simplified information on by-laws, permitted crops and livestock, safe water use, waste management, penalties, permit procedures, and available support services.

d) Urban agriculture should be included in annual city plans and budgets. Budget lines should support extension services, farmer training, demonstration plots, livestock management, farmer registration, water-harvesting technologies, and safe wastewater-use guidance where applicable.

e) Dodoma City Council should strengthen extension services for urban farmers. Extension should include agronomy, livestock management, public-health safeguards, climate-smart practices, market information, input access, and compliance with city by-laws.

f) The Council should work with financial institutions, SACCOS, and development partners to design small-scale credit products suitable for UA. Finance should support compliant production systems such as proper animal enclosures, improved seeds, water-saving irrigation, composting, and hygienic production facilities.

g) Water governance for UA should be improved through rainwater harvesting, safe wastewater treatment, small-scale irrigation guidance, and monitoring of water quality. The aim should be to reduce unsafe water use while recognising that water scarcity is a major constraint in semi-arid Dodoma.

h) A multi-stakeholder UA coordination platform should be established at the city level. The platform should bring together departments responsible for agriculture, livestock, land, planning, water, health, environment, community development, and local leadership, together with farmer representatives and relevant institutions.

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