

Drivers and Determinants of Urban Agriculture and its Relationship with Planning Laws in Nakuru city, Kenya

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ABSTRACT

The study examines the drivers, determinants and socio-economic reliance on urban agriculture (UA) in Nakuru City, Kenya, contrasting its vital role in household survival against restrictive city planning frameworks. UA serves as a vital economic lifeline for households in the rapidly growing city, yet it remains hindered by prohibitive local regulatory frameworks. Based on empirical field data collected in 2024 from 398 household respondents and 135 schools, the study reveals that for 46.7% of households UA is a primary strategy for food security and income. It provides 25% to 50% of total earnings for 38.6% of practitioner households. However, a significant policy-practice gap exists in that 49.8% of practitioners view city by-laws as having a negative impact on their activities. The study findings highlights a severe gap between official city policy and local urban agriculture realities. The study advocates for harmonizing city planning laws to formalize UA as a recognized sustainable land-use category.

METHODOLOGY

To collect data the study adopted a household survey, Key Informant Interviews and Focus Group Discussions. The study analyzes empirical field data collected from a sample of 398 respondents and 135 local schools across Nakuru City. Households and schools were sampled based a stratified sampling frame. A multi-stage cluster sampling technique was used to stratify the study area into three clusters of population based on nature of residency status and distance from the city center. Each of the clusters was then sampled as an independent sub-population. In the created clusters, purposive sampling was used to select units from which to pick households for interview. Households to be interviewed were then picked based on a stratified random frame. To collect data from the schools, proportionate sampling was used to select 135 schools. To analyze data descriptive statistics tools were used. Further the study findings were subjected to statistical analysis using chi-square tests to assess significance of urban agriculture in enhancing household livelihoods. A 5-point Likert scale ranking was used to assess effects of planning and city by-laws on UA.

Primary keywords

Urban Agriculture; Food Security & Household Livelihoods; City By-laws; Spatial Planning & Land Tenure; Urban Poverty Alleviation.

DRIVERS OF URBAN AGRICULTURE

The study focused on drivers and determinants of UA and relationship with planning bylaws in Nakuru city. It evaluates the socio-economic reliance on UA. Urban agriculture in the City is primarily driven by economic survival, food security and urban waste reuse. Nonetheless, it is an illegally practiced survival strategy under the city bylaws (Foeken, D., & Owuor, S. O. 2006; Wang *et al.*, 2021; Chihambakwe *et al.*, 2019). Rapid urbanization and rising food costs push low and middle income residents to cultivate crops and vegetables such as kales and spinach and keep livestock on urban plots for direct consumption and for sale to supplement household incomes (Zezza *et al.*, 2010; Robineau, 2015; Nkurumah, 2018.) (Table 1). Urban farmers leverage on diverse spaces, including private residential plots, municipal housing estate grounds and transitional peri-

urban land for UA. Kitchen gardening and small-scale livestock systems provide manageable home-based livelihoods, particularly for women managing household food security (Santo *et al.*, 2016).

Table 1: Summary of UA drivers

Metric / Dimension	Finding in Nakuru City
Primary Motivation	Food security (46.7%)
Market Orientation	66.7% sell >50% of produce
Income Contribution	Supplies 25–50% of income for 38.6% of households
Perception of By-Laws	49.8% view municipal by-laws negatively
Institutional UA	47% of schools practice UA to cut costs

Source: Mutai (2026)

Relationship of UA with City Bylaws

Historically city bylaws strictly prohibits farming inside city boundaries. But often because enforcement capacity is limited, local officers adopt informal compromises-such as allowing short crops like leafy vegetables while discouraging tall crops like maize to maintain street visibility and security. The Nakuru County Government and city authorities do not recognize these activities and the by-laws prohibits it (County Government of Nakuru, 2004; Nakuru County Government, 2014). Nakuru should become one of Kenya’s pioneers in UA policy reform, replacing blanket prohibitions with consultative city bylaws that recognize farming as a legitimate urban economic sector (Zasada, I. 2011; Crush *et al.*, 2011; Orsini, *et al.*, 2013; Halloran & Magid, 2013; Bryld, 2013; Chihambakwe *et al.*, 2019).

Regulatory focus and county frameworks and bylaws should aim to balance UA activities with other concerns such as public health. It should focus on proper livestock waste disposal, food hygiene in markets, preventing irrigation with untreated wastewater and integrating UA into city physical planning and development. For example, organic waste recycling will turn market and kitchen waste into compost and organic fertilizers and will keep UA costs low while aiding city waste management (Karanja, 2015; Hallett *et al.*, 2016; Skar *et al.*, 2020; Amu, 2024).

Although legal recognition has slightly expanded under devolved county governance structure in Kenya and the development of Nakuru City Charter, spatial tension persists between city authorities and UA practitioners. Off-plot farmers often lack formal land-tenure security on public land and city authorities continue to navigate the friction between rapid real estate expansion and UA space allocation (Republic of Kenya, 2019).

FINDINGS AND DISCUSSION

The study reveals a fundamental conflict between informal survival strategies such as UA and formal urban planning. Food security serves as the primary driver for 46.7% of UA practitioners, while 66.7% sell over half of their produce, indicating a high degree of market orientation (Table 2). Furthermore, 38.6% of surveyed households depend on UA for 25% to 50% of their total income (Table 3).

Table 2: Uses of urban agriculture produce

% of produce	Home consumption		Sold	
	Frequency	Percent	Frequency	Percent
<25	169	48.1	44	12.6
25-50	96	27.4	73	20.7
>50	87	24.8	234	66.7
Total	351	100 %	351	100 %

Source: Mutai (2026)

Table 3: Household incomes from urban agriculture activities

Percentage of income	Frequency	Percent
<25	62	17.8
25-50	136	38.6
51-75	68	19.3
>76	52	14.8
Others	33	9.5
Total	351	100%

Source: Mutai (2026).

Approximately 47% of local schools in the city engage in UA to supply their institutional feeding programs and lower overall operational expenses.

To determine if the income from urban agriculture is significant, study findings in Table 2 and 3 were analyzed. Observed trend indicates that the produce sold constituted varying degrees of contribution to total household incomes. For the majority of the respondents $n=136$ (38.6%), the activities contributed between 25-50 percent of households' income and 34.1% earn more than half of their income from it (>51%). It can be deduced therefore that urban agriculture is not only a source of food at house hold level but also a source of income. Because the majority of respondents ($n=234$) 66.7% sell more than half of their produce, the income driver of urban agriculture is statistically dominant.

From the study findings UA is a major source of informal employment (Figure 1).

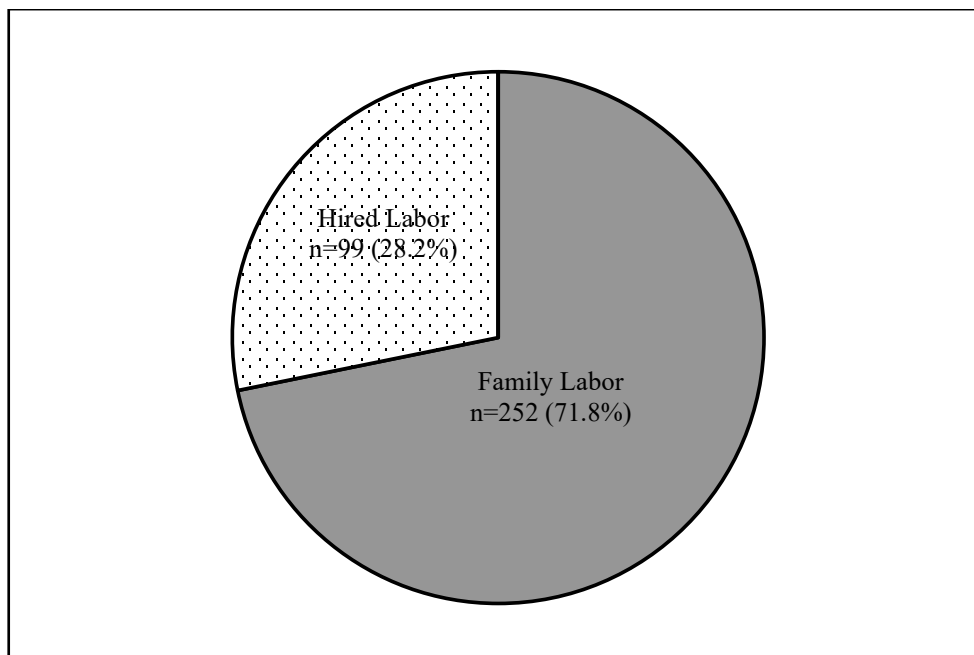


Figure 1: Labor types used in urban agriculture activities

Source: Mutai (2026).

The dominance of family labor in UA is highly statistically significant. Using a Chi-Square goodness of fit test to analyze study findings ($n=351$, with 71.8% using family labor vs. 28.2% hired labor), the result yields a p-value of $p<0.0001$. The preference for family labor (71.8%) over hired labor (28.2%) is found to be statistically significant ($p<0.001$), confirming that UA in Nakuru city functions primarily as a household based informal enterprise.

From the study findings, a cross-tabulation of the major urban agriculture production sectors such as livestock, poultry and crop cultivation against household reliance on internal family labor or external hired workers was done (Table 4). The computed Statistical Chi-Square Test for Independence yielded: χ^2 Statistic: 11.83; degrees of freedom (df): 1 and p -value: 0.00058. This result indicates a statistically significant difference in labor distribution. While family labor strongly dominates across the entire sample, capital intensive livestock ventures such as poultry and dairy cows require a significantly higher reliance on external hired labor (35%) compared to crop production (18.6%) due to the daily management demands of urban animal husbandry.

Table 4: Cross tabulation: Observed frequencies matrix

Primary UA Type	Family Labor Deployment	Hired Labor Deployment	Total Practitioners
Livestock Intensive (Poultry/Dairy Cows)	134	72	206
Crop Intensive (Vegetables/Maize/Beans)	118	27	145
Total	252 (71.8%)	99 (28.2%)	351 (100%)

Source: Mutai (2026).

From the study, based on tenure dynamics, property ownership emerged as a critical determinant of UA. Homeowners participate in and expand UA at significantly higher rates than renters due to space availability and secure land rights (Table 5).

Table 5: Observed frequencies matrix

Residency Status	Practicing UA	Not Practicing UA	Total
Own Plot (Homeowners)	272	7	279
Rental Plot (Tenants)	65	29	94
Total	337	36	373

Source: Mutai (2026).

From the study findings the computed Statistical Chi-Square Test for Independence yielded: χ^2 Statistic: 55.4; Degrees of Freedom (df): 2 and p -value: <0.0001. This result shows that the relationship is highly statistically significant. Homeowners participate more in urban agriculture than renters.

From the study findings, city bylaws also emerged as an impediment to UA. Study findings revealed that nearly half (49.8%) of UA practitioners view that city by-laws negatively affect their livelihoods (Table 6). This reflects a policy-practice gap or disconnect. Prohibitive regulations e.g. Section 180 of the Nakuru Environmental Management By-laws criminalizes food crop cultivation, while Section 176 bans animal rearing within council boundaries (Nakuru County Government, 2014).

Table 6: Respondents' opinion on whether by-laws Affects Urban Agriculture

Level of Agreement	Frequency	Percent
1. Strongly Agree	32	9.1
2. Agree	143	40.7
3. Neutral	46	13.2
4. Disagree	108	30.8
5. Strongly Disagree	22	6.2
Total	351	100%

Source: Mutai (2026).

To determine the overall sentiment of the respondents, a weighted mean score was calculated from the Likert data. The calculation yielded a mean score of 2.84. On a scale of 1 to 5, where 1 is "Strongly Agree" that by-laws are negatively affect urban agriculture, a mean of 2.84 suggests a general leaning toward the "Agree" category. This statistically supports the study finding that nearly 50% of residents feel negatively impacted. If the mean is significantly below 3.0, it provides a statistical basis to argue that the current city by-laws are perceived as a hindrance to urban agriculture sustainability. Despite routine prohibition, UA thrives under informal tolerance punctuated by periodic crop slashing, livestock confiscations and fines. National frameworks like the Physical Planning and Land Use Act (2019) delegate development control to local governments/authorities but which lack explicit provisions to zone or protect UA. This is a manifestation of a statutory misalignment.

Policy and Strategy Implications

The study notes that city regulations reflect outdated colonial-era urban planning rather than modern urban realities. Prohibition does not stop urban farming; instead, it forces it into a shadow economy characterized by periodic crop slashing, livestock confiscation and informal bribery. It highlights a legislative misalignment in that while national frameworks like Kenya's Physical Planning and Land Use Act (2019) delegate spatial control to local counties, city plans fail to explicitly zone land for UA, leaving practitioners without legal protection or infrastructure support.

The study highlights that while urban farming effectively recycles organic waste and cools microclimates, unmonitored practices-such as irrigating with untreated wastewater or planting tall crops along roadsides-introduce heavy metal contamination risks and public safety concerns-which are the reasons why city bylaws restrict UA.

Reconciling the policy-practice gap requires transitioning from punitive enforcement to a supportive spatial zoning framework that aligns and harmonizes local city planning with national legislation, such as the Physical Planning and Land Use Act (2019) and formalizing UA within Nakuru city structure plans (Table 7).

Table 7: Summary of findings and policy implications

Research Dimension	Key Empirical Finding	Policy & Urban Planning Implication
Economic Impact	38.6% gain 25–50% income from UA	UA functions as a critical economic buffer, requiring formal market inclusion.
Institutional Role	47% of schools practice UA	UA can be scaled through public-institutional partnerships.
Legal Framework	49.8% face legal friction	Direct need to transition from punitive by-laws to supportive spatial zoning.

Source: Mutai (2026).

CONCLUSION AND RECOMMENDATIONS

The study concludes that UA in Nakuru City is an indispensable engine of economic survival rather than an informal anomaly, requiring an immediate shift from punitive prohibition to formal city planning integration. It is a permanent, vital pillar of household food security and income generation and punitive by-laws that criminalize cultivation and animal keeping fail to curb the practice and instead generate systemic economic insecurity. Nakuru city authorities must repeal or amend restrictive regulations e.g. Sections 176 and 180 of local environmental by-laws and align city planning with national frameworks like the Physical Planning and Land Use Act to explicitly zone and safeguard land for UA. There is need for a national and city policy that recognizes, enables and regulates urban agriculture. It requires recognition, institutionalization and a suitable legal framework in Nakuru city to operate in because study findings demonstrates that it is an established practice; it provides economic security and it creates employment opportunities.

Land access acts as the single largest structural barrier for urban renters and low-income households to engage in UA. Equity-focused urban planning requires allocating public utility space, communal plots or peri-urban reserves to ensure vulnerable populations can benefit from UA. High adoption rates among public institutions like schools prove that UA can successfully offset city and institutional operational costs, serving as a blueprint for wider urban integration.

Therefore, for public schools, they should be enabled to access more land if there is adjacent public land. Public interest should override individual/private interests. Technical ministries also need intensify trainings in more schools on innovative urban agriculture practices such as vertical farming practices that use minimal space.

Formal legal recognition of UA is necessary to enforce environmental standards such as regulating wastewater irrigation, agrochemical usage and tall crop safety risks while maximizing the ecological benefits of urban greening and organic waste management as well as socio-economic gains such as food and incomes. Sustainable city growth in Nakuru depends on bridging the policy-practice gap, transforming informal UA into a recognized and regulated component of resilient city planning and management. The Nakuru city authorities need to review laws relevant to urban agriculture in terms of policy goals and formulate by-laws that are compatible with and attain the set policy goals

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