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ASSESSMENT OF URBAN POULTRY FARMING AND THE ENVIRONMENTAL IMPLICATIONS IN KANO METROPOLIS, KANO STATE

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ABSTRACT

Purpose: *Urban poultry farming is a popular and lucrative enterprise undertaken by many households in Nigeria, but it poses environmental challenges when improperly managed. The aim of this paper is to assess the environmental implications of urban poultry farming in Nasarawa and Kumbotso Local Government Areas of Kano Metropolis and to identify strategies for promoting sustainable practices.*

Design/methodology/approach: *The study employed cluster and purposive sampling techniques to select a sample of 231 urban poultry farming households, with an additional 75 non-poultry households included to capture community perceptions. Data on farming practices, waste management, and environmental conditions were collected through structured questionnaires and analysed using descriptive statistics, including frequency counts and percentages.*

Findings: *The study revealed that location of poultry farms, air quality, noise, and methods of poultry waste disposal constitute environmental challenges to varying degrees. While some households effectively utilised poultry waste for economic and agricultural purposes, there* ***is*** *no clear regulatory framework guiding urban poultry farming in the study area.*

Research limitations/implications: *Limitations include the focus on only two LGAs and the reliance on self-reported data from households. The study contributes to knowledge by highlighting the environmental risks and management practices of urban poultry farming in Kano metropolis.*

Practical implications: *To promote sustainable urban poultry farming, policies and regulations should be introduced to guide farm location, physical design, sanitation, and waste management practices.*

Originality/value: *The study provides a detailed assessment of the environmental effects of urban poultry farming and emphasizes the need for policy intervention to ensure sustainable practices in rapidly urbanising areas of Kano.*

Keywords: Urban poultry farming, Environmental implications, Sustainability, Kano Metropolis

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1.0 INTRODUCTION

The practice of poultry farming is gaining more recognition in urban areas and more urban dwellers are getting engaged in the practice. Urban residents who are into this practice keep poultry birds at the backyard, rooftops of their houses and so on. They mostly do this for either household consumption of eggs and meat, or to supplement household income through the sale of poultry products, to fulfil social obligations, or for ceremonial functions (Mougeot, 2000). Poultry farming also promotes self-sufficiency and a connection to food production within urban communities (Bamidele, 2021). The practice of urban poultry farming has several impacts on urban residents as well as the urban environment, it allows urban residents to have easy access to fresh eggs and meat, contributing to improved household food security and reducing dependence on industrial agriculture system and long-distance food production. Urban poultry farming provides educational opportunities especially for children to learn about where food comes from and the importance of sustainable food production, and it also promotes environmental awareness for responsible food consumption (Oyelami, 2022).

Despite these recognised contributions, some activities related to urban poultry farming give rise to environmental challenges in urban areas. For instance, the proximity of poultry farms to people living nearby raises health concerns; improper management of poultry and poultry wastes leads to noise, air pollution, and disease transmission from poultry (Maikasuwa, 2011). Urban poultry farming poses challenges that affect the urban environment some activities involved with it can be disruptive and unpleasant for urban residents. As poultry farming practices increase among urban dwellers and concentrate in urban areas, several environmental concerns arise. Direct consequences of concentration and intensification of poultry farming activities in urban areas, along with improper disposal of waste, give rise to environmental challenges (FAO, 2006a). Environmental challenges at the level of production and processing units at the local level are directly observed by farmers, neighbours, and policymakers. Several authors agree that there are environmental effects associated with urban poultry farming (Ahmed, 2012; Deelstra, 2010; Maikasuwa, 2011). This paper, therefore, seeks to assess the environmental effects of urban poultry farming in Kano metropolis. It considers the existing characteristics and nature of urban poultry farming practices in the study area, examines the environmental challenges posed by the practice, and makes recommendations on sustainable poultry farming.

2.0 LITERATURE REVIEW

Urban agriculture involves the cultivation, processing, and distribution of food and non-food products within cities, utilizing spaces such as rooftops, backyards, vacant lots, and other underutilized urban areas (Mougeot, 2000; Kankara, 2013; Deelstra, 2010). Among urban agricultural practices, urban poultry farming (UPF) has gained popularity as a small-scale, accessible, and profitable enterprise, providing households with fresh eggs and meat, supplementing income, fulfilling social obligations, and promoting self-sufficiency (Bamidele, 2021; Sulaiman, 2023; Oyelami, 2022).

Urban poultry farming contributes to food security, nutrition, and sustainable food production, reducing reliance on industrial agriculture and long-distance food supply chains (FAO, 2020; WHO, 2021). It also offers economic opportunities, creating employment, utilizing vacant urban spaces, and increasing profitability through reduced transportation costs (Ahmed, 2021; Esperance, 2019). Additionally, UPF fosters community engagement**,** education, mental and physical health benefits, and urban biodiversity**,** while promoting responsible environmental practices such as organic waste recycling and composting (Bamidele, 2021; Moula, 2018; Nkuwana, 2018).

Despite these benefits, UPF poses environmental challenges if poorly managed, including waste management issues, air and noise pollution, water stress, urban heat island effects, biodiversity

disruption, and landscape degradation (FAO, 2006a; Nkuwana, 2018; Odunsi, 2023). Effective mitigation strategies include proper waste disposal, composting, biosecurity measures, ventilation systems, water recycling, and adherence to urban zoning regulations (Anthonia, 2019; Binns, 2018).

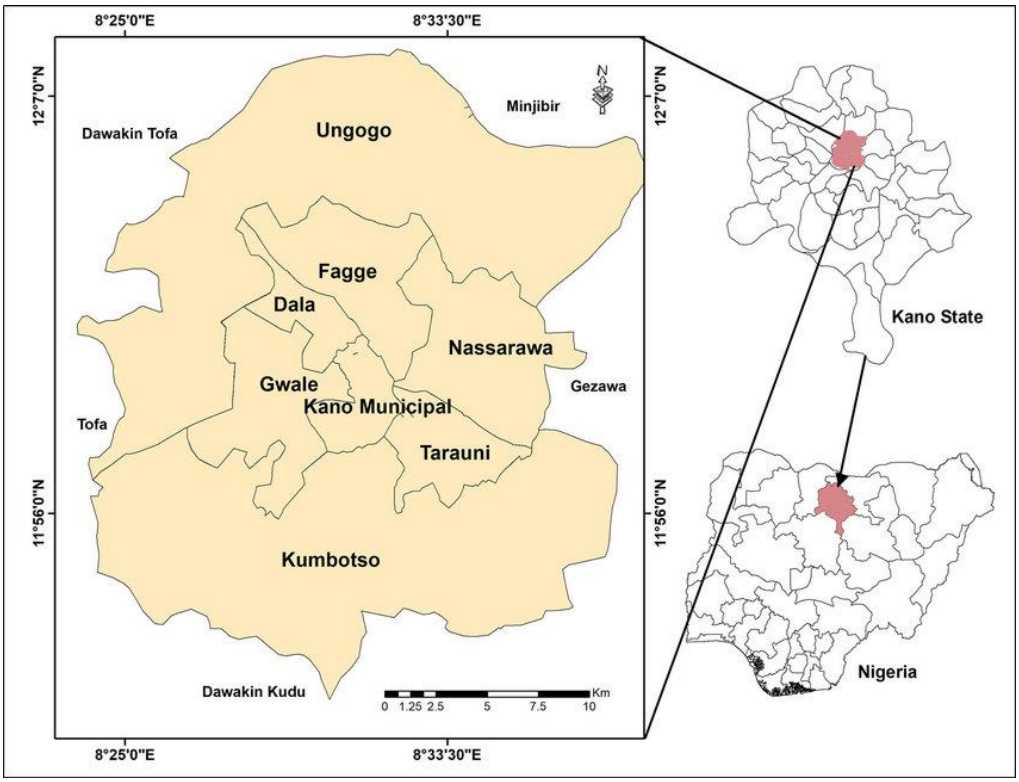
Globally, cities have adopted policies and legal frameworks to guide urban agriculture, such as zoning bylaws, plot size limits, and livestock regulations in Tanzania, Kenya, and the United States (URT, 1997; Nairobi Government Act, 1963; Mlozi, 2001). In Nigeria, the NESREA Act of 2007 and the Animal Diseases (Control) Act provide indirect regulation, emphasizing environmental protection, biosecurity, and disease control for urban poultry practices.

Overall, urban poultry farming is defined as: *"The practice of raising poultry within urban and peri-urban areas for household consumption, income generation, and economic sustainability, contributing to food security and urban livelihoods while requiring effective waste management and biosecurity measures to mitigate environmental and public health risks."*

3.0 AREA OF THE STUDY

Kano metropolis comprises of eight (8) Local Government Areas (LGA), with six (6) LGA's forming the urban core and two (2) LGA's at the peri-urban area. Kano Metropolis is bordered by Madobi and Tofa LGAs to the south-west, Gezawa LGA to the east, Dawakin Kudu LGA to the south - east, and Minjibir Local government to the north-east. Kano Metropolis has a total population of 2,826,307 (NPC 2006). The population of Kano metropolis projected at 3.5% growth rate for 2025 is estimated to be 5,432,000. The total land area covers about 200sq kilometres. Kano metropolis lies between latitude 11°55'23.93'N and 12° 3'53.10'N and longitude 8°27'42.26'E and 8° 36'41.62'E at 1549 feet above sea level.

Figure 1: Kano Metropolis within the context of Kano State



Source: Kano State Geographical Information System (KANGIS, 2021)

Table 1: Distribution of selected sample size.

S/N	Selected LGA's	Axis of practice (wards)	Selected Wards	Sample frame	Sample size (Poultry farmers)	Non-poultry farmers (Neighbors)	Total
1.	Nassarawa LGA	Giginyu ward	Giginyu	100	50	16	66
		Hotoron-arewa ward	Hotoron-fulani	80	40	13	53
		Tudun-Murtala ward	Tagarji	105	52	17	69
2.	Kumbotso LGA	Dan-Maliki ward	Medile	96	48	16	64
		Gurin-gawa ward	Tudun-Maliki	38	19	6	25
		Mariri ward	Farawa	45	22	7	29
	Total			**464**	**231**	**75**	**306**

Source: Authors (2025)

4.0 METHODOLOGY

The study employed a combination of cluster, purposive, and snowball sampling to select 231 urban poultry farming households in Nassarawa and Kumbotso Local Government Areas (LGAs), along with 75 non-poultry households to capture community perceptions (Pretty et al., 2011). As seen in Table 1, cluster sampling was used to delineate the study area into manageable geographical units, reducing cost, time, and logistical constraints while ensuring adequate coverage of the dispersed population (Cochran, 1977; Kothari, 2004). Purposive sampling targeted households actively engaged in poultry farming, providing specific insights into practices affecting the environment (Tongco, 2007; Etikan, Musa & Alkassim, 2016).

Snowball sampling addressed the challenge of identifying informal and hard to reach poultry farmers, as initial respondents helped locate others in the population (Biernacki & Waldorf, 1981; Noy, 2008). A total of 306 structured questionnaires were administered, focusing on the characteristics and environmental implications of poultry farming. The selection of Nassarawa and Kumbotso LGAs was guided by a pilot survey confirming higher concentrations of poultry farms, enhancing sampling efficiency and data validity (Kothari, 2004; Creswell, 2014; FAO, 2011). Data were analysed using descriptive statistics (frequency counts and percentages) and presented in tables and charts, capturing both spatial and socio-environmental dynamics of urban poultry farming.

5.0 PRESENTATIONAND DISCUSSION OF RESULTS

This section of the paper focused on the presentation of the data collected from the field, followed by the discussion.

5.1 Existing Characteristics and Nature of Urban Poultry Farming (UPF) Practices in Nassarawa and Kumbotso LGAs

Urban residents in the study area engage in poultry farming for multiple purposes. Income generation constitutes the primary motivation, as 71.0 percent of the respondents practice poultry farming as a source of livelihood (See Table 2). Household consumption accounts for 13.0 percent of the respondents, while 9.5 percent engage in poultry farming as a hobby. Other reasons, including cultural and social considerations, account for 6.5 percent of the responses. With respect to the types of birds raised, broilers and layers dominate poultry production in the area, accounting for 41.1 percent and 35.5 percent respectively. The duration of involvement in poultry farming varies among respondents. Those with one to two years of experience constitute the largest proportion at 31.6 percent, followed by farmers with three to five years of experience at 26.8 percent. Respondents with less than one year of experience account for 22.9 percent, while 18.6 percent have practiced poultry farming for more than five years. Most respondents keep 50 or more birds, indicating a shift from subsistence to more commercial-oriented production. This trend suggests increasing engagement of urban residents in poultry farming activities within Nassarawa and Kumbotso Local Government Areas.

Table 2: Basic reason for keeping poultry, types of poultry, poultry shelter, number of poultry birds and years of urban poultry farming experience

Basic reason for keeping poultry	**Frequency**	**Percent**
Household consumption	30	13.0
Income generation	164	71.0
Hobby	22	9.5
Other reasons	15	6.5
Non-poultry households	75	24.5
Total	**306**	**100.0**
Types of Poultry Birds raised	**Frequency**	**Percent**
Layers	82	35.5
Broilers	95	41.1
Turkey	18	7.8
Pigeons	10	4.3
Ducks	2	.9
Other birds	24	10.4
Non-poultry households	75	24.5
Total	**306**	**100.0**
Type of poultry shelter	**Frequency**	**Percent**
Deep-litter system	125	54.1
Rooftop	40	17.3
Normal cage	37	16.0
Deep Battery cage	21	9.1
Free-range system	8	3.5
Non-poultry households	75	24.5
Total	**306**	**100.0**
Experience	**Frequency**	**Percent**
Less than 1yr	53	22.9
1-2yrs	73	31.6
3-5yts	62	26.8
+5yrs	43	18.6
Non-poultry households	75	24.5
Total	**306**	**100**
Number of Poultry birds	**Frequency**	**Percent**
<10	28	12.1
10-30	72	31.2
31-50	47	20.3
51-70	36	15.6
71-100	31	13.4
100≥	17	7.4
Missing	1	.4
Total	**231**	**100**

Source: Authors (2025)

Note: the missing values indicates the 75 non-poultry farmers which were not captured in this section.

5.2 Location of Poultry Farming Activities and Perception of Acceptability of Poultry Farming in Their Neighbourhoods.

As shown on Table 3, poultry farming activities 71.9 Percent are majorly located inside home premises within the selected neighbourhoods. Ninety percent of neighbouring households complain of discomforts caused due to air pollution. Kareem (2012) had observed that the location of urban poultry farming activities determines the extent of impacts of the practice in the urban environment, this explains that poultry activities affect the people living in the urban environment. This corresponds with the discoveries of other studies (Benjamin et al., 2014; Salau, 2012; smith et al., 2001).

Table 3: Location of poultry farming activities and poultry farmer's perception of acceptability of poultry farming in their neighbourhoods

Location of UPF activities	**Frequency**	**Percent**
Inside immediate house premise	166	71.9
Located in a separate place	65	28.1
Total	**231**	**100.0**
Reaction of neighbors to the location of poultry farming activities.	**Frequency**	**Percent**
Indifferent	23	10.0
Complaints of discomforts	208	90.0
Total	**231**	**100.0**

Source: Authors (2025)

5.3 Measure of Discomfort Experienced by Neighbours

Poultry farming activities raise significant concerns among neighbouring residents in the study area. A large proportion of the neighbours, representing 90.0 percent of respondents, expressed discomfort with poultry farming activities within their neighbourhoods. The reported sources of discomfort include odour emissions from poultry waste, identified by 71.0 percent of respondents, noise generated by poultry birds, reported by 44.0 percent, and the presence of flies, noted by 33.0 percent. A considerable number of respondents, accounting for 60.0 percent, indicated that they experienced more than one of these nuisance factors simultaneously. In contrast, a smaller proportion of neighbouring residents, representing 23.0 percent of respondents, reported indifference toward poultry farming activities within their neighbourhoods. These findings highlight the environmental and social challenges associated with poultry farming in residential areas, as reflected in Table 4.

Table 4: Poultry farmers' response to their neighbour's reaction and their adopted ways of addressing complaint

Poultry farmer's response to their neighbor's reaction	**Frequency**	**Percent**
Concerned and tried to provide measures to reduce prevent disturbances	231	100.0
Adopted ways of addressing complaint from other residences.	**Frequency**	**Percent**
Applying saw dust on poultry shelter	152	65.8
Providing buffer to separate shelters from other residences	16	6.9
Other methods	63	27.3
Total	**231**	**100.0**

Source: Authors (2025)

Poultry farmers showed awareness of the discomforts experienced by their neighbours due to poultry activities and adopted various measures to address these issues, as presented in Table 4. The majority of poultry farmers, representing 65.8 percent of respondents, apply sawdust on poultry shelters to absorb moisture from poultry waste, thereby reducing odour emissions. A smaller proportion, 6.9 percent, provide buffer zones to separate poultry shelters from residential areas, which helps minimize both noise and odour disturbances.

Additional mitigation strategies are also employed, with 27.3 percent of respondents reporting the use of alternative methods, such as applying kerosene or other non-harmful substances to poultry shelters, to further reduce odour-related problems. Among neighbouring households, 45.3 percent of non-poultry farmers indicated that their complaints regarding poultry farming disturbances were being effectively addressed by the poultry farmers, as shown in Table 5.

Table 5: Whether neighbouring household's complaints are being addressed by poultry farmers in the studied neighbourhood

Is the complaint responded by poultry farmer	**Frequency**	**Percent**
Yes	34	45.3
No	24	32.0
Somehow	17	22.7
Total	**75**	**100.0**

Source: Authors (2025)

5.4 Bio-security measures and waste management strategies adopted by poultry farmers

Poultry farmers in the studied neighbourhoods implemented various biosecurity measures to prevent disease transmission between birds and humans. Disinfecting poultry shelters was the most common

practice with 65.4 percent, fumigation was carried out by 13.4 percent households, and 54.5 percent of farmers sanitized shelters after every harvest (Binns, 2018).

Although most farmers utilized poultry waste beneficially, a small proportion engaged in environmentally harmful practices, with 0.9 percent burning poultry waste and 15.6 percent disposing of it in garbage heaps. Dead poultry were managed through burning 40.3 percent, 15.2 percent buried in pit, and 44.6 percent disposes poultry waste in garbage heaps.

Practices such as burning or dumping dead birds can degrade the environment by causing air, land, and water pollution, potentially contributing to flooding and other hazards that negatively affect human health and the surrounding environment (Binns, 2018).

Table 6: Bio-security measures and waste management strategies adopted by poultry farmers.

Ways of sanitizing poultry shelters	**Frequency**	**Percent**
Sweeping and cleaning with water	49	21.2
Disinfecting with chemicals	151	65.4
Fumigation	31	13.4
Total	**231**	**100.0**
How often poultry shelters are being sanitized.	**Frequency**	**Percent**
Twice in a week	47	20.3
Weekly	58	25.1
After every harvest	126	74.5
Total	**231**	**100.0**
Method of poultry waste disposal	**Frequency**	**Percent**
Burning	2	0.9
Composting	193	83.5
Dumped in garbage heap	36	15.6
Total	**231**	**100.0**
Method of disposing dead poultry.	**Frequency**	**Percent**
Burning	93	40.3
Buried in pit	35	15.2
Dumped in nearest garbage heap	103	44.6
Total	**231**	**100.0**

Source: Authors (2025)

The management and utilization of poultry waste among urban poultry farmers in the selected neighbourhoods reflects both economic and environmental considerations. The study revealed that the majority of respondents, representing 75.8 percent, sell poultry waste to other urban farmers as a source of additional income. About 14.7 percent of respondents use poultry waste as fertilizer on their own lands, while 9.5 percent reported having no use for the waste, as seen on Table 7.

Table 7: Other methods of utilizing poultry waste

Other Methods	Frequency	Percent
Use as manure	34	14.7
Sale	175	75.8
No use	22	9.5
Total	**231**	**100.0**

Source: Authors (2025)

Interestingly, none of the poultry farmers utilize poultry waste as a source of fuel for domestic purposes, which may reflect a lack of knowledge or awareness regarding alternative uses for poultry by products. These findings align with the perspectives of Baumgartner and Belevi (2001) and Dubbeling et al. (2010), who emphasized that one of the potentials of urban agriculture, including poultry farming, in promoting sustainable urban development is the reuse of urban solid and liquid wastes to reduce environmental burdens and conserve resources. In this context, the practice of selling poultry waste or using it as fertilizer demonstrates how urban poultry farmers contribute to both resource efficiency and the local circular economy. However, the underutilization of poultry waste as a domestic energy source suggests an opportunity for awareness creation and innovation in urban waste management strategies.

5.5 Relationship between location of UPF activities and challenges encountered by neighbouring households

Cross-tabulation analysis between the location of poultry farming activities and the kind of challenges encountered by neighbouring households (Table 8) shows that poultry farming activities in proximity to residences (inside houses) causes more disturbance to neighbouring households than those located in a separate place (See Figure 2). The impacts are more severe when UPF are located inside houses than those located in a separate place.

Figure 3 also shows that number of poultry raised contributes to challenges faced by neighbouring households too, the higher the number of poultry raised the greater the effects faced by other residences in the neighbourhood. Table 9 shows the level of statistical significance between the correlated variables.

Table 8: Relationship between Location of Urban Poultry Farming Activities and Challenges Experienced by Neighbours

Location of UPF activities	Challenges faced					Total
	Odour release from poultry	Noise	Presence of flies	Both	None	
Inside house	49	35	25	34	23	166
Located in a separate place	22	9	8	26	0	65
Total	**71**	**44**	**33**	**60**	**23**	**231**

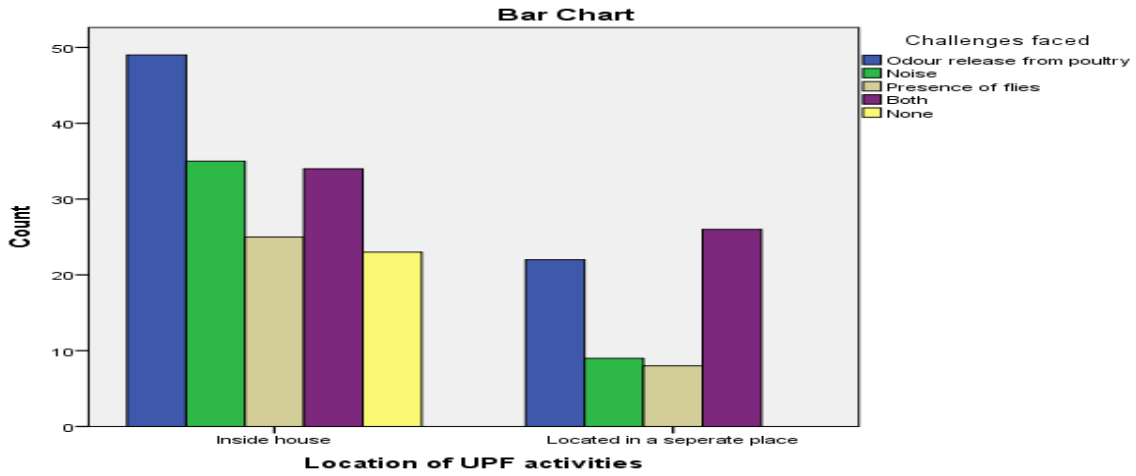
Chi-square (X^2) = 17.67, df = 4, p = 0.0014

Source: Authors, 2025

Note: The p-value (0.0014) is less than the significance level of 0.05, indicating statistically significant association between the location of poultry farming activities and the types of challenges experienced by neighbouring residents. This implies that the placement of poultry shelters has a direct effect on odour, noise, and fly-related disturbances in residential areas.

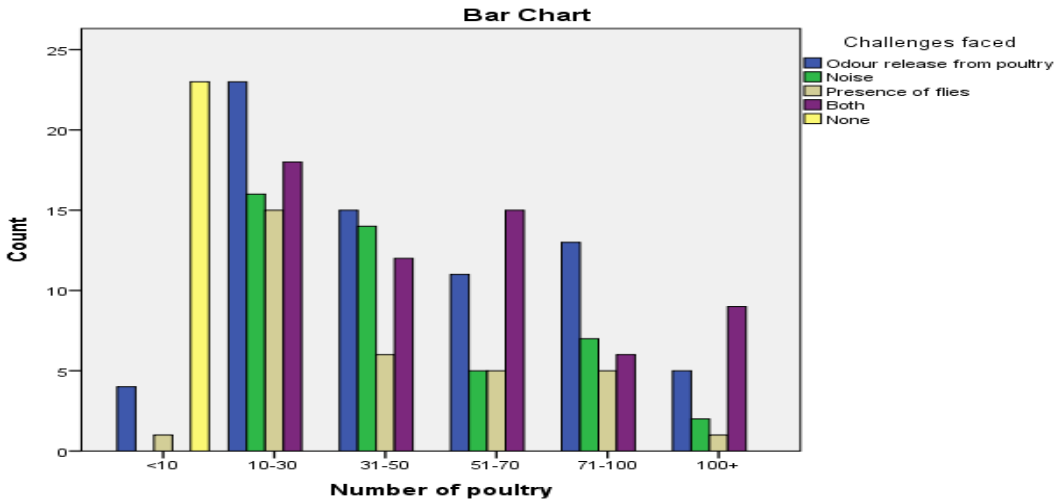
The analysis shows that the location of urban poultry farming activities is significantly associated with the type of challenges experienced by neighbouring residents. Poultry shelters located inside houses are more likely to generate odour, noise, and attract flies compared to those placed in separate locations. The Chi-square test confirmed this relationship, with $X^2 = 17.67$, df = 4, and p = 0.0014, indicating a statistically significant association at the 0.05 level. This finding suggests that proper siting of poultry shelters, such as locating them in separate areas away from residential spaces, can help reduce environmental disturbances and improve neighbourhood compatibility.

Figure 2: Location of UPF activities vs Challenges faced



Source: Authors (2025)

Figure 3: Number of poultry bird's vs Challenges faced



Source: Authors (2025)

The study examined the association between the location of urban poultry farming activities and the challenges experienced by neighbouring residents, including odour, noise, and the presence of flies. A cross-tabulation analysis (Table 9) was conducted, and the results were tested for statistical significance using the Chi-square (X^2) test.

Table 9: Relationship between Location of Urban Poultry Farming and Neighbourhood Challenges in Nassarawa and Kumbotso LGAs

Variables	Results (P-value)	Relationship/ Interpretation
Location of poultry practices * Complaints from neighbors	**0.060**	Positive relationship (not statistically significant at 0.05)
Location of poultry practices * Challenges faced	**0.0014**	Positive relationship, statistically significant at 0.05

Source: Authors (2025)

While poultry located closer to houses shows a positive but non-significant association with neighbour complaints, its proximity is significantly associated with environmental challenges such as odour, noise, and flies. These findings emphasize the need for properly siting poultry shelters in separate or designated areas to reduce disturbances and improve neighbourhood compatibility.

5.6 Social disputes due to UPF practices in the study area

Urban poultry farming activities often leads to social disputes or conflicts between poultry farmers and neighbouring residents in the study area. As shown on Table 10, most 74.7 percent neighbouring households have disagreements with poultry farmers, issues related to waste management such as waste disposal, constitute 34.7%, while 24.0% are as a result of the location of poultry shelters. However, there was no record or evidence of major conflicts as a result of disagreements between urban poultry farmers and their neighbours in Nassarawa and Kumbotso LGAs.

Table 10: Disputes or disagreements amongst Residents as a result of UPF practices in the Study Area

Dispute/disagreement due to UPF practices	Frequency	Percent
Yes	56	74.7
No	19	25.3
Total	**75**	**100.0**
Reason for dispute/disagreement	**Frequency**	**Percent**
Location of UPF	**18**	**24.0**
Smell release from poultry	**12**	**16.0**
Issues related to waste management	**26**	**34.7**
None	19	25.3
Total	**75**	**100.0**

Source: Authors (2025)

5.7 Regulation of urban poultry farming

Majority 62.3 percent of poultry farmers in neighbourhood studied expressed their concerns about poultry farming not being regulated by the relevant authorities; 93.5 percent of poultry farmers which are the majority stated to not receive any visitation from government officials (sanitation officers) to inspect their poultry farming activities. This signifies little concern from the relevant authorities and also proves the lack of government involvement in poultry farming practices. Government, non-governmental organizations, and other stakeholders have an important role to play when it comes to policy formulation, enabling legislation, technology, and facilities towards viability of this urban agricultural practice in urban areas (Kankara, 2013).

6.0 CONCLUSION AND RECOMMENDATIONS

The study has shown that poultry farming within residences in neighbourhoods has environmental implications. Most poultry farming activities in the study area are located inside houses, thus causing discomfort to neighbouring residents. The practice of open dumping, burning of poultry wastes and dead poultry birds adopted by some poultry farmers has the capacity of degrading the environment, causing air, land and water pollution which could possibly adversely affect human health and the environment directly or indirectly. Urban poultry farming practices still needs the attention of the authorities concerned to regulate its practices. Without the involvement of government and other stakeholders, poultry farming activities will continue to under-perform their relative potential and will continue to adversely affect the urban environment.

The following recommendations were made based on the findings of this study:

1. Large Scale Poultry farming is recommended to be in a separate place, away from residences. This will reduce discomfort or inconveniences to residents.
2. Poultry farmers should be sensitized and encouraged to adopt innovative technologies for poultry waste management that can keep poultry litters dry and odourless.
3. The importance and contributions of education to sustainable urban poultry farming practice cannot be overemphasized. Therefore, there is need for sustained public awareness on the aspect of sanitation in poultry farming.
4. Policies and regulations should be provided to regulate poultry farming practices. Also, authorities responsible should ensure the compliance of poultry farming activities with environmental laws and regulations provided to ensure the sustainable development of the practice. Fines can be introduced to make non-complying poultry farmers pay for causing discomfort to neighbours. This will encourage good sanitation practices in the study area.

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