

Poultry Production and the Risk of Zoonotic Diseases in Kubwa District of Bwari Area Council, Federal Capital Territory, Abuja Nigeria.

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ABSTRACT

The study assessed the biosecurity measure and risk of zoonotic disease from poultry production in Kubwa, Abuja. As a result of increasing human population and the need to meet food protein requirement, there has been corresponding increase in poultry production in recent time, with most of the poultry farms lacking basic biosecurity measures, hence likely to expose farmers and the general population to risk of zoonotic disease outbreak. A descriptive study design was adopted and purposive sampling technique was used to select sixteen (16) poultry farms with bird population of fifty or more as well as thirty-two (32) farmers aged 18-65 years. Spatial location coordinates were established using hand-held Global Positioning System Garmin GPSMAP 76 device to establish proximity of each farm in relation to built-up areas, while field observation, and questionnaire were used to obtain data for the study. Data obtained was analyzed using spatial epidemiological Geographic Information System Software and descriptive statistics; and the results were presented in percentages, tables, and charts as well as the map of geo-coordinates of poultry farms locations. The results revealed that 44% of the farms were located within ten meter radius of residential buildings and no farm was situated within the 500 meter radius bench mark established for the study. The use of Personal Protective Equipment (PPE) was none-existence as 45% of the farmers claimed to use them, while field observations proved otherwise. The use of disinfectants was dismally low as 56% of farmers never use disinfectant in their farms. Poor poultry waste management was also amplified as 37% of poultry waste was dumped in drainage and surface water bodies. The study concluded that the risk of outbreak of zoonotic diseases was high in the area. It is recommended that the Abuja Environmental Protection Board should issue and enforce regulations on proper siting of poultry farms within the city, while Agriculture Extension Workers should be empowered to monitor and train poultry farmers to adopt biosecurity measures in their farms.

Keywords: Poultry production, Risk, Zoonotic diseases, Biosecurity, Kubwa District, Poultry farmers; Built-up areas

INTRODUCTION AND BACKGROUND

This study was carried out to assess the biosecurity measures adopted by poultry farmers in Kubwa District to prevent the risk of zoonotic disease from poultry production to the general population. In recent time, food security has been greatly challenged due to rapidly increasing population. In particular protein intake has also reduced, hence the increase in poultry production of meat and eggs for human nutrition. Abreu, et al

(2023), stated that the world population's significant increase has promoted a higher consumption of poultry products, which must meet the specified demand while maintaining their quality and safety. Their study raised serious safety concern just like is noted in this study. The Food and Agricultural Organization (FAO) also noted that in recent times, production of chickens as a source of protein has witnessed massive growth over the last 50 years (FAO, 2020). The raising of poultry could either be for economic, social or family use. Most production are intensive-based in cities, while few free-range holdings are in the country-side and villages. The studies by Bilal, Khaled and Khatib (2017) and Yisheng (2019) pointed to the fact that poultry has dominated the meat's consumption in many developed and developing countries, and has become one of the most dynamic animal product globally.

In Nigeria, the poultry sub-sector accounts for more than 50% of total livestock production (Abiodun, et al, 2022). This was 50% increase from what was earlier noted barely seven years as at 2016. Tsado et al (2017) stated that in Nigeria's livestock production, poultry dominates a prominent position in providing animal protein as it accounted for 25% of local meat production. This finding further emphasized the fact that the poultry sub-sector offers the quickest returns on investment outlays in livestock enterprise generally by virtue of its short gestation and harvest time as well as high feed conversion ratio. It is also the cheapest sources of animal protein in the country.

In the Nigeria's Federal Capital Territory, Abuja, poultry farming has become a popular business venture, also providing employment and entrepreneurship opportunity for some unemployed individuals (Charles, 2021). It has been estimated that there were about eighty-eight (88) poultry farms in Abuja as at 1st December, 2024, (Smartscrapers, 2024). This appears to be gross underestimation, when compared with the one hundred and twenty-two (122) functional poultry farms sampled in three out of the six Area Councils (Abuja Municipal, Bwari and Kuje) in the territory by Tsado, et al (2017). The size of these farms vary from place to place and some of them were just freeholding with bird population of less than five hundred. This tandem with the finding of Tsado, et al (2017), who found out that most of the farms had bird population of 901-1100.

The rearing of poultry either for meat or egg comes with different health risk. The prevalence of emerging and reemerging diseases from animals to humans has been one of the greatest challenges to global health and food security today (Joanna and Xavier, 2018). Diseases of animal's origin remain a serious concern due to economic losses they usually caused and health emergencies, when transmitted to humans.

There are more than three dozen of zoonotic diseases that can be transferred from animals to man through touch and more than four dozen that may result from bites (CDC and WHO, 2017). This transfer of diseases from animal to man raises serious concern for biosecurity measures around poultry businesses. Observation within Kubwa and its environs, revealed that there was increase in poultry farms springing up in some places and residential backyards with little or no biosecurity measures.

Poultry birds are said to be one of the carriers of some kind of infections that can affects humans. Closeness of such farms to residential places could therefore exacerbate the spread, if there is outbreak of diseases like Avian flu, Newcastle disease, Fowl Pox, Gumboro disease, Avian encephalomyelitis, Pollorum disease, Avian mycoplasmosis, Infectious coryza, Aspergillosis, Coccidiosis, Syngamosis, etc., among the bird population. This raises serious concern for food safety and public health. This is because the mode of transmission of animal diseases to humans has taken disturbing dimension in the past few years. The prevalence and transmission of diseases of poultry origin in recent times has increased the level of concern for biosecurity due to related public health emergencies they have caused. Consequently, emerging technology such as Geospatial science has been used to track location of disease source-points, thereby enhancing public health surveillance. Abudukadir and Barder (2020) have confirmed that the use of GIS in public health has greatly enhance disease surveillance and mapping, hence, its wide application today. Therefore, this study was designed to assess biosecurity measures put in place by poultry farmers to avoid risk of zoonotic disease outbreak in the area.

METHODOLOGY

This study was conducted in Kubwa, a satellite town in Bwari Area Council of the Federal Capital Territory (FCT), Abuja, Nigeria. Descriptive design was adopted and the population for the study was the poultry farmers and their assistants, aged between 18 – 65 years. Purposive sampling technique was used to select sixteen (16) poultry farms with bird population of fifty (50) or more from eight wards (table 2) as well as thirty two (32) farmers, made up of sixteen (16) proprietors/owner and sixteen (16) assistants, who were either paid worker or family members rendering any service in the farm. Field observation, questionnaires and hand-held global positioning system device – (Garmin GPSmap 76) were used for data collection on poultry farms, slaughter points, biosecurity measures and zoonotic disease prevention measures. The base map of Bwari District from the survey department of the Council provided needed guide and clarity for the study.

Data obtained was subjected to descriptive analysis using Microsoft Excel spreadsheet and presented in percentages, tables, and charts. The spatial epidemiological tools (Geographic Information System Software (QGIS Version 3.14) and remote sensing imagery was applied to produce the map of geo-coordinates for location of poultry farms.

RESULT AND DISCUSSION

The result of the study was presented in two dimension: i) spatial presentation and mapping of the location of the poultry farms sampled for the study; ii) biosecurity measures among poultry farmers presented in tables and charts.

Table 1: Spatial Coordinates of the Distribution of Poultry Farms in Kubwa

Farms	Places	Spatial Coordinates	
		Latitude	Longitude
A	Bazango	9 ⁰ 17 ¹ 26.01”	7 ⁰ 22 ¹ 57.95”
B	Byazhin	9 ⁰ 17 ¹ 2.10”	7 ⁰ 24 ¹ 59.17”
C	FO1 area	9 ⁰ 9 ¹ 18.33”	7 ⁰ 20 ¹ 26.68”
D	Arab road	9 ⁰ 8 ¹ 15.41”	7 ⁰ 19 ¹ 59.49”
E	Kukwaba	9 ⁰ 9 ¹ 06.36”	7 ⁰ 22 ¹ 4.30”
F	FCDA Qtrs	9 ⁰ 18 ¹ 12.68”	7 ⁰ 16 ¹ 41.63”
G	Marocco	9 ⁰ 5 ¹ 59.86”	7 ⁰ 24 ¹ 57.31”
H	Kukwaba	9 ⁰ 12 ¹ 3.60”	7 ⁰ 18 ¹ 39.47”
I	Chikakorle	9 ⁰ 9 ¹ 34.49”	7 ⁰ 21 ¹ 11.26”
J	Marocco	9 ⁰ 53 ¹ 0.92”	7 ⁰ 23 ¹ 51.12”
K	FCDA Qtrs	9 ⁰ . 05 ¹ 1.01”	7 ⁰ 18 ¹ 20.21”
L	Bazango	9 ⁰ 23 ¹ 17.11”	7 ⁰ 24 ¹ 43.21”
M	Chikakore	9 ⁰ 45 ¹ 26.11”	7 ⁰ 32 ¹ 67.21”
N	Arab-Road	9 ⁰ 14 ¹ 66.51”	7 ⁰ 11 ¹ 21.03”
O	Byazhin	9 ⁰ 26 ¹ 12.08”	7 ⁰ 20 ¹ 34.01”
P	FO1 area	9 ⁰ 16 ¹ 42.65”	7 ⁰ 22 ¹ 28.72”

Two poultry farms were purposively sampled from each ward in the district. The Wards included Bazango, Kukwaba, Maroco, FCDA Quarters, FO1, Biazhin, Arab-road and Chikakore, thus, giving a total of 16 farms which locations are shown on the map with yellow dots. The coordinates result presented in table 1 above, was used to generate the spatial distribution of the poultry farms in Kubwa district as it revealed their various

locations. Some poultry farms were located at backyard of homes, some very close to drainage channels and others very close to access roads.

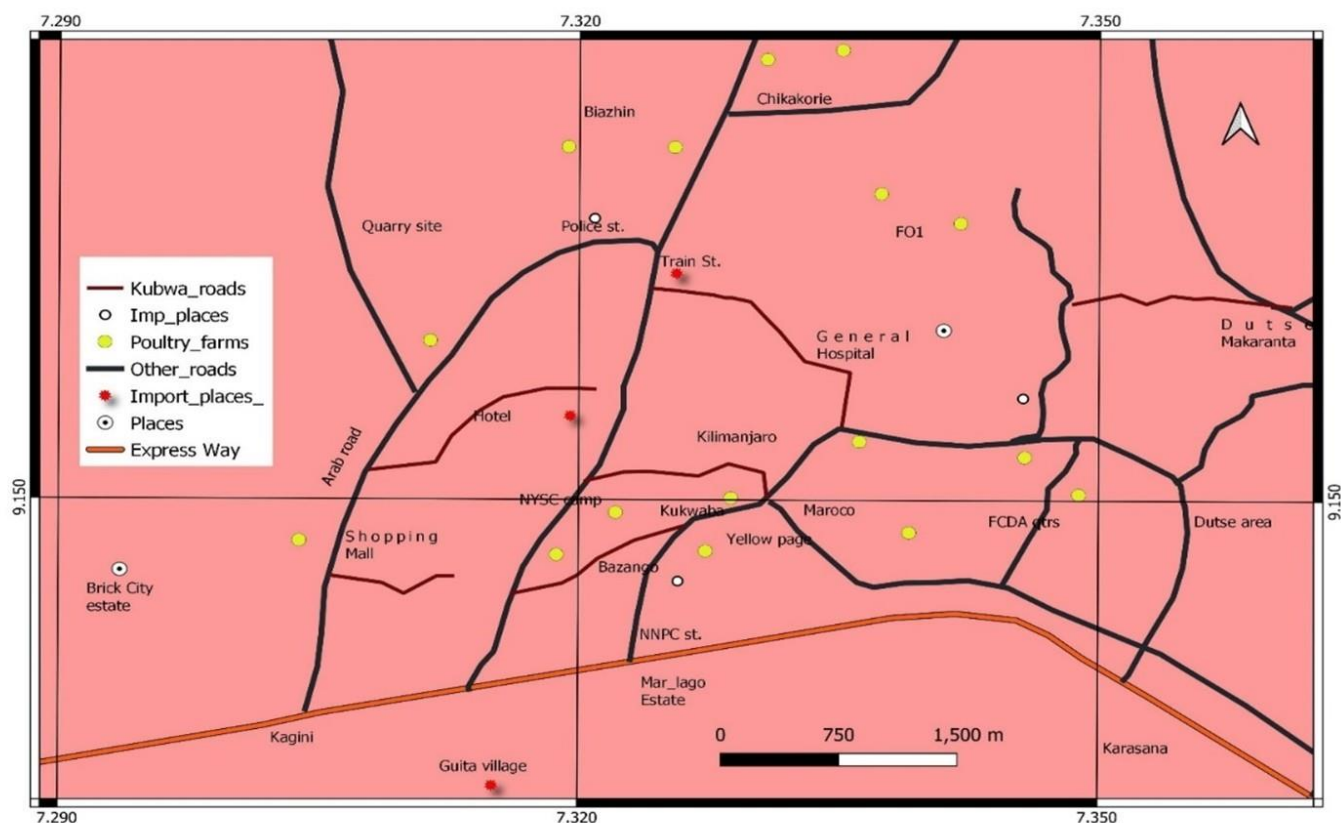


Figure 1: Map of Spatial Distribution of Poultry Farms in Kubwa Districts

Source: Field Work, 2022

The poultry farms plotted in figure 1 above show cluster of farms around residential areas and major roads. This practice was common in all the sampled locations. The implication of this is the possible breach of biosafety measures which could affect the bird population, thereby leading to the spread of poultry related zoonotic diseases to human. According to Marisa (2019), it was noted that certain bacteria and virus can be transferred from animals to humans if proper care was not taken. Intriguingly, although Section 12 of the Animal Diseases (Control) Act, CAP A17 Laws of the Federation of Nigeria (LFN), 2004 (as amended) provide for poultry farms of 250 birds or more to have a consulting Veterinary Surgeon and obtain license for its establishment from the Director of Veterinary Services (DVS); none of the farm studied met these requirements. This situation may have apparently existed due to the dearth of Veterinarians in FCT, lack monitoring, lack of surveillance and lack of enforcement of the law.

Data from the study revealed that most of the poultry farms (90%) were located at backyard of residential homes, close to road and some within neighborhood. Some of them (44%) have close proximate distance of 5-10 meters radius from residential buildings as in table 3. Ideally, poultry farms should be situated far away from residential buildings due to the offensive ordour that typically emanates from them, (Chenchuk, 2022). Indeed, Shelton (2022) and Meyer (2023) stated that poultry farms should be sited far away from residential building because of noise and offensive ordour nuisances.

Siting poultry farms close to residential buildings negate expected standard for biosafety. For instance, although the Regulations for Breeder Farms, Hatchery Operations and Day Old Chicks Quality in Nigeria, 18 of 2020; merely stated that poultry farmers shall construct poultry houses in compliance with guidelines issued by Nigerian Institute of Animal Science, without mentioning standard distance from residential

houses, there are strict measure and standard in other climes. The Municipal Ordinance No. 18 S. 2020, Regulating the Operation of Piggery and Poultry Farms in the Municipality of Burgos, Ilocos Sur of the Philippines; clearly stated in Article VII, that “Commercial piggery and poultry farms shall be at least 1,000 meters away from the built-up areas (residential, commercial, institutional and industrial)”. In this study, a 500 meters radius between poultry farm and built-up areas was adopted. Although there is no national regulatory standard as regard setback from poultry farm to residential building in Nigeria, the benchmark of 500 meters was set using standard available in countries like Philippines and India, with similar sociocultural settings like Nigeria, which expressly set 500 metres regulatory requirements as in Republic of the Philippines Resolution No. R. 674: the Implementing Rules and Regulations Governing the Processing of Applications for Locational Clearance of Poultry and Piggery, 2000 and Poultry Farms Establishment Rules of India, published by UPSC (2022).

The standard on minimum distance varies from countries to countries, but Myers (2023) pointed out that such standard requirements were very necessary to safeguard against nuisances such as ordour, noise, air pollution and water contamination. Crow (2021) further stated that as tens of thousands of birds were confined within a small space, there was smell nuisance and risks of the spread of disease pathogens like bacteria and viruses. Your Quick Advice (2021) also stated that poultry farms should be at least 500 metres from residential building because smell from poultry farms travels up to 610 metres. UPSC (2022) further confirmed that gaseous emissions and waste were major problems in poultry farming, as the feces of poultry birds emit gaseous ammonia, hydrogen sulfide, and methane, all of which produce odors. Despite all these observations for the need for adequate setback for poultry farms, none of the sampled poultry farms in the study area satisfied this buffer criteria. The spatial distribution of the poultry farms revealed how close they were to the various built-up neighborhoods.

Table 2: Bird Population in Farms in the Study Area

Location	Farm	
	A	B
Arab road	102	180
Bazango	260	255
Chikakore	1,006	412
Byazhin	220	350
FCDA Qtrs	68	505
FO1Layout	120	102
Kukwaba	211	116
Morocco	132	98

Table 3: Proximity of Poultry farms to Residential areas in Kubwa

Proximity of poultry to Residence	Frequency	Percentage
1 – 10 meters	7	44
11 – 50 meters	3	19
60 – 100 meters	4	25
101 – 200meters	2	12
200 – 400meters	0	0
500 – 1000	0	0
1001 – meters and above	0	0
Total	16	100%

The study took particular cognizance of the proximity of poultry farms to residential areas to determine the level of social, public health and environmental interaction, and noted the relationship of such proximity with possible outbreak of bird related zoonotic diseases. Findings from field observations revealed that most of the poultry farms were not appropriately located. For instance, in place like FCDA Quarters, thought to have standard housing regulations, it was discovered that most poultry farms were located at backyard of residential premises. This practice fall short of the biosafety requirements for siting poultry farms anywhere else in the world.

The implication of this close proximity is that several production activities like noise from laying birds could cause noise pollution to residents, release of ammonia gas and fumes from poultry decomposing remains could cause air pollution, while poor poultry waste management could result in the discharge of poultry waste by-products into drainages and water bodies which could lead to environmental health hazards. These backyard poultry farm practices increase the frequency of close contact between individuals in the residential areas, thus negating biosafety standard, thereby enhancing the risk of outbreak of poultry related zoonotic diseases in the area.

Use of Personal Protective Equipment (PPE)

Figure 2 presents the use of PPE by poultry farmers in the study area. The result showed that 30% of poultry farmers in Kubwa do not use personal protective equipment (PPE) at all, 25% utilized them sometimes while 45% claimed to have used any of the equipment on their farms at any time, but were unable to present for sighting during field observation.

The non-utilization of PPE by poultry farmers did not only exposed the farmers to biohazards while working in the farm, (Bulafu, et al, 2023), but a very dangerous practice that exposes the general population to health risk. This is because micro-organisms may be introduced into the bird population from foot wear, clothing materials, soiled hands, etc., which may trigger-off zoonotic infection, which could spread to humans. When this happen, the health of the birds will be affected and can lead to outbreak of Avian flu or such other disease among the bird population, capable of being transmitted to human. WHO (2018) and WHO 2019 have noted increasing number of Avian Influenza in recent time in some regions of the world. Most of the outbreaks well linked to lack of biosecurity measures in those farms.

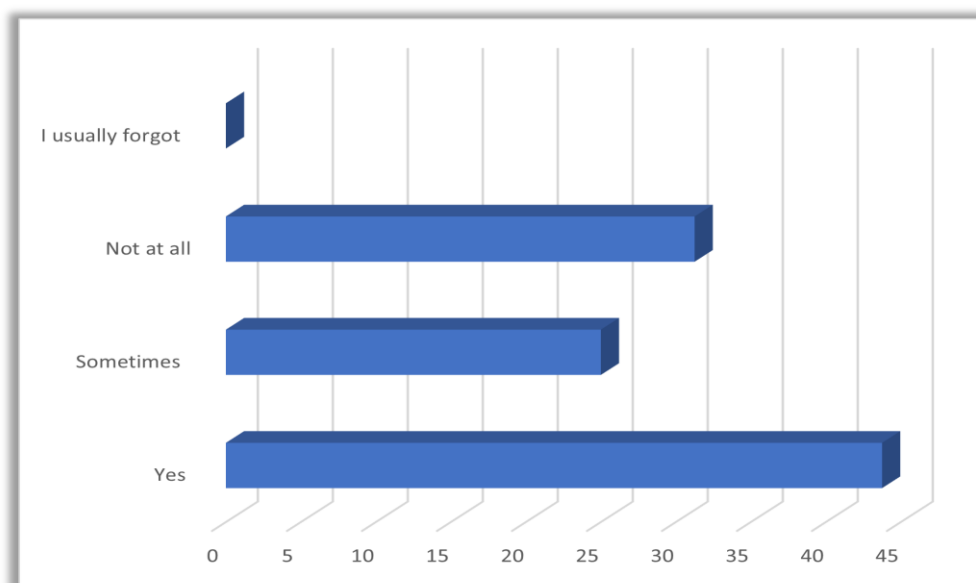


Figure 2: Use of PPE by Poultry Farmers in Kubwa Districts

It is obvious from the study that some of the farmers were not conscious of the possibility of spread of poultry related zoonotic infections from birds to human. Thus, the neglect of safeguarding oneself with PPE is of serious concern. Indeed, there appear to exist a gap in biosecurity knowledge and practices in the area.

Ameji, et al (2022) have identified poor knowledge of biosecurity measure as a major factor affecting poultry production and public health safety in Kogi state, Nigeria. Consequently, farm workers, poultry product vendors, transporters of birds, backyard poultry farmers, meat processors and consumers were at higher risk of contracting zoonotic infections due to lack of adequate knowledge of relationship between biosecurity measures and zoonotic diseases transmission. As stated, the real magnitude of poultry related zoonotic diseases remain unknown among majority of the poultry farmers, (FAO, 2017; Marisa, 2019). Akintunde and Adeoti (2014) have also noted that infectious diseases thrive in areas where hygiene measures are not considered during poultry production and consumption of poultry products. The same unhygienic practices were observed at chicken slaughter points, and point of sales around St. Luke Church Junction, Kubwa market, where bird slaughterers were not observing any personal protective measures. This lack of biosafety consciousness exposed them and the general population to the risk of pathogenic infections from the poultry birds. This is one of the factors Akintunde and Adeoti (2018) identified to be hampering zoonotic disease prevention and control in south west Nigeria.

Materials like overall, hand gloves, eye goggles, face or nose masks, booths and caps are very essential PPEs that should be used when handling birds or working in poultry farm to prevent direct physical contact from infectious pathogens like bacteria, fungi, protozoa and viruses. Observation of activities at the poultry farms and slaughter points were pointers to the fact that infectious pathogens could be transferred from these birds to humans during handling, collection, transportation to farms, place of brooding the birds and during purchase from farms and markets.

It was also observed that even the bird slaughterers do not use PPE. This practice exposes them to risk of Work-Acquired Infection (WAI) that can further be taken home and spread to their family members. A greater amount of risk during slaughter activity comes from the fact that most slaughterers are highly exposed to blood remains, sputum, flesh and waste from this meat been handled, couple with the poor sanitation around the various slaughter point. Obviously, there could be easy transfer of pathogens through fecal matters via touch to the face, mouth, nose and skin, and even taken to their homes. This could translate into a community-wide infection of zoonotic disease.

Personal Hygiene

Poor personal hygiene among poultry farmers was very common in the study area. This was observed from hand washing practices and disinfection measures around the poultry farms. Hand washing and disinfection of poultry environment are public health measures to prevent the transmission of zoonotic diseases. It is expected that hands should be washed or sanitized regularly and after an activity that can expose an individual to risk of infections. Results of data gathered from the poultry farmers on table 4, revealed that 38% of these farmers usually forget to wash their hands after an activity in the farms. Surprisingly, 62% claimed they wash their hands always after attending to the birds. The implication of poor personal hygiene around poultry is an increase exposure to microorganism that can cause spread of diseases in poultry farms, likely to spread outside the farm.

While 63% of the farm workers claimed to wash their hands always after attending to the poultry, field observation during the study revealed that many of them were not aware of the risk of direct handling of poultry birds without PPE and not washing their hands after such activities.

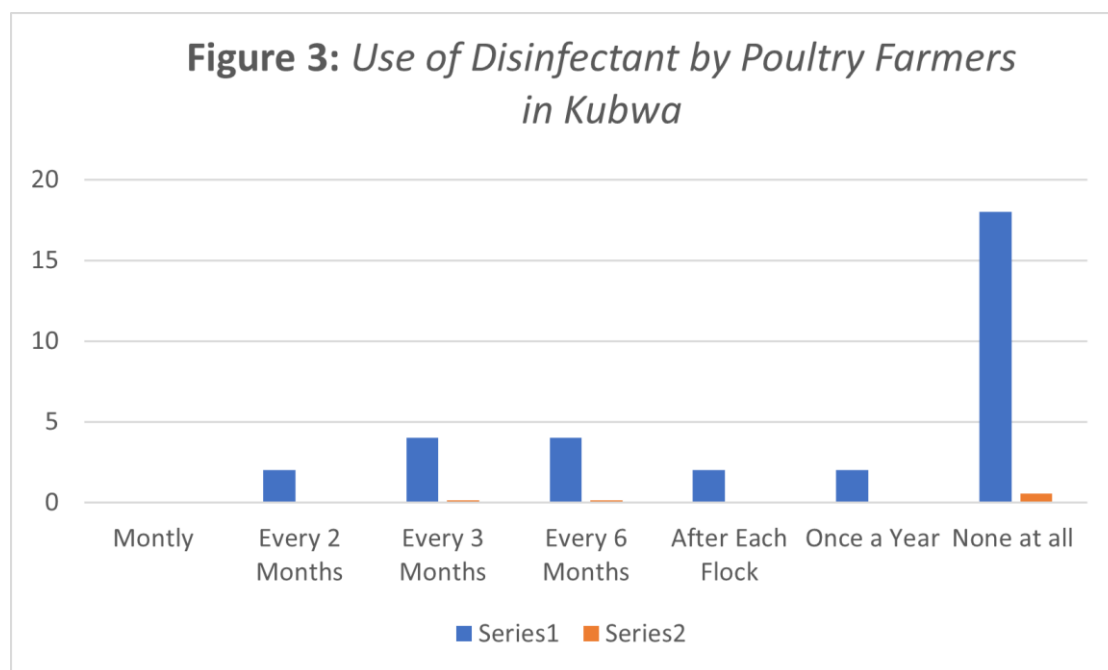
Table 4: Hand Washing Practices among Poultry Farmers in Kubwa

Hand washing	Frequency	Percentage
Always	20	62
Sometimes	12	38
Not at all	0	0
I usually forgot	0	0
Total	32	100%

If 38% of farmers only wash their hands sometimes after attending to their poultry and majority of the farmers do not even have PPE of any sort to use while working in the poultry house, there is a high level of risk of getting infected from such exposure. Regular handwashing is a recommended public health practice that should be observed during and after activities that will expose an individual to any contact with pathogenic agents. Observations from different poultry farms in Kubwa show that activity such as feeding of the birds, collection of poultry waste, cleaning of the poultry farms and administration of some medications were carried out without regular handwashing. This practice exposed the farmers to risk of spreading poultry related zoonotic disease within and around their communities.

Sanitation of Poultry Environment

Another factor which could contribute to the risk of poultry related zoonotic infections as revealed in the study is attitude of the farmers towards sanitation of poultry farm and the immediate environment. Field observation revealed that the environment surrounding the poultry farms were filthy and full of liters. Cleaning and disinfection of poultry house is a highly recommended poultry management methods to ensure biosecurity, protection of the environment as well as protection of public health. Disinfection and sanitation are components of hygienic environment. Frequent use of appropriate disinfectants helps to reduce the population of disease causing agents. However, regular use of disinfectant was abysmally low among the farmers.



Data gathered from the study as presented in figure 3, revealed that poultry farmers were not prioritizing disinfection in their farms. Analysis of sanitation and disinfection of poultry house revealed that 4 (13%) of poultry farmers disinfected their farm every three months and every six month respectively. Only 2 (6%) disinfected theirs after each flocks, while 18 (56%) did not practice disinfection at all. This result indicated poor attitude to poultry hygiene in the area.

Darre (2014) stated that decontamination of poultry house is crucial to prevent Marek's disease, Mycoplamosis, respiratory viruses, E-coli, Salmonella enteritidis, mites and other poultry health problems. By principle, disinfection of pen house should be carried out regularly, so as to bring down the microbial load in a poultry house and the farm environment. Darre (2014) recommended that poultry house should be washed and disinfected after each flock or a minimum of once a year. It is noteworthy that, application of disinfectants such as Polidine, Neodine and Iodersteryl, helps to reduce general microbial loads that can infects both poultry and humans. Not keeping to this standard gives opportunity to risk of spread of pathogens within such environment and put public health at risk of zoonotic infections.

Poultry Waste Management Practice in Kubwa

The study revealed poor poultry waste management in the district. Figure 4 shows the result of how poultry waste was being managed in Kubwa. Indeed, all the farms visited did not observe good waste management practices. Poultry wastes were left unattended for days. Some farms (25%) stored their waste in the pen house where the birds live with the hope of selling them later as manure for crop farmers, while others (25%) burnt them in the open. Yet few others (13%) spread them in the open to dry for manure. Most of the farms (37%) either dumped their poultry waste in the drainage and water bodies especially during rainy season when it was difficult to dry the waste for sale. The dangers of improper management of poultry waste have been documented. According to Rahman, et al (2022), poultry waste was contributing to global climate change by emitting greenhouse gases, such as nitrous oxide, CO₂, and CH₄, through microbial activity and changes in temperature, pH, moisture, and oxygen concentrations. They confirmed that these air pollutants could have a significant negative impact on both human and animal health, and may lead to a variety of illnesses like nose discomfort, breathing issues, and coughing; while long-term exposure may lead to allergic reactions and negative effects on life span. Nwanya, et al (2023) confirmed that poultry workers were at greater risk of lung function impairment and airway obstructions due to exposure to air pollution in their work environment. In their study, they observed that air quality in the selected poultry farms in Imo State (South East Nigeria), was very poor due to poor poultry waste management.

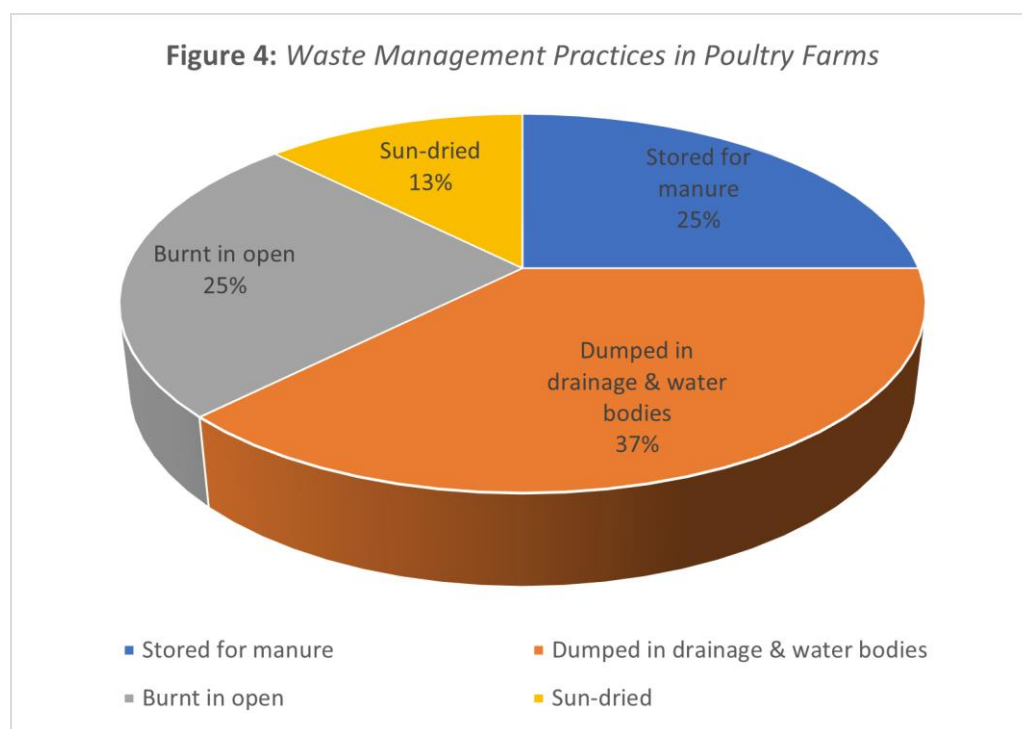
In Kubwa, the practices of burning of poultry waste in the open and dumping in drainage and bodies of surface water were very worrisome, with serious environmental health consequences. Open burning of waste of any kind is said to be responsible for 11% of global black carbon emissions and contribute to 5-12% of total global green-house gas emission (Climate Champions & Engineering X (2022). Indeed, Ramadan, et al (2023) observed that open burning of waste served as a source of particulate matter and black carbon possessed a greater greenhouse effect potential than CO₂. The health consequences of air pollution as a result of open waste burning are very serious. According to Seriki and Maag (2019), open burning of waste was responsible for high level of unintended Persistent Organic Pollutants (uPOPs) in the environment, capable of causing cancer, respiratory diseases, skin irritation, poor cognitive development in children, etc.

Akorube, et al (2023) observed that excessive production of waste from poultry farms and its improper disposal has led to air pollution and contamination of surface and groundwater, which has become a major public health concern to the society. According to them, improper disposal of poultry waste affects poultry farmers, individuals residing close to the farms, and the environment. Therefore, as highlighted by Seriki and Maag (2019) and Nwanya, et al (2023), there is obvious pending danger of health consequences due to air pollution as poultry farms in Kubwa were very close to residential buildings.

Dumping of poultry waste in drainage and particularly in water bodies in Kubwa is another major concern. This practice may lead to contamination of surface and ground water. Such has been the case elsewhere. Interestingly, Taiwo, et al, (2013) found some heavy metals including Nitrate, Phosphate, Lead, Cadmium, Zinc, etc, and high Coliform in body of water where poultry wastes were discharged in a study they conducted in Abeokuta, Nigeria; even after the farm has been closed down before their study. The poor management of poultry waste constitute nuisance and give room for microorganism and flies to act on them, leading to decomposition and transfer of pathogens from one point to another. Also, there were cases of contact of farm attendants with the wastes. Such practices may contribute significantly to the spread of poultry related diseases.

Furthermore, these wastes can pose serious social, environmental and public health problems. Ordour from exposed poultry remains can pollute ambient air quality. Decomposed and littered poultry wastes do release gases such as ammonia, carbon dioxide, methane, hydrogen sulphide and nitrous oxide, especially when exposed to water and heat, which may pollute the air. As noted, some of these gases may reach toxic levels if adequate ventilation is not maintained within the farm house, (FAO, 2021). The various antibiotic remains found in poultry waste could be possible triggers for antimicrobial resistance, which is yet a major public health concern today (Bamidele, et al, 2022 and Abreu, et al, 2023).

Rahman, et al (2022) have stated that the constant production of poultry waste causes environmental annoyances that were hazardous to animal and human health. This is more so when the poultry farms are close to human population as they are in Kubwa. They further stated that poultry farms have been linked to poor air quality and environmental degradation due to high atmospheric ammonia emitted from poultry litter.



Generally, it was overserved that even though Section 20 (a) of the Animal Disease (Control) Act, provide for all establishment (poultry farm with bird population of 250) shall comply to biosecurity plan, none of the farm visited complied with this legal provision. Furthermore, none of the farm also complied with the requirements of engaging a Veterinarian and obtaining a license from the DVS for their operations. Indeed, there is a yawning gap between legal provision and enforcement in the area as regard poultry production.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study confirmed that the increasing need to meet food protein requirement has led to increase number of persons venturing into poultry production as an economic stop-gap but with little or no biosecurity consciousness. This gap was capable of exposing large human and animal population to risk of zoonotic disease outbreak if care was not taken. All the farms studied were unable to meet basic biosecurity standard, thereby exposing the bird population, their immediate family members and the general public to bird-related infections. Unhealthy sanitary activities within and around the farms, non-utilization of PPEs by poultry farmers, poor poultry waste management, as well as location of poultry farms within build-up areas exacerbate this risk and is a call for concern. The utilization of spatial technology in this study has demonstrated how human-animal-environment interface can be better monitored to safeguard public health. Therefore, the study concludes that if the current state of affairs in poultry production persist in the area, there is great risk of poultry related zoonotic disease outbreak in Kubwa area.

Recommendations

From the data gathered and presented in this study, it is hereby recommended that the Abuja Environmental Protection Board (AEPB) should issue and enforce regulations on proper siting of poultry farms within the Territory, while Agriculture Extension Workers should be empowered to monitor and train poultry farmers to adopt biosecurity measures in their farms.

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