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Perceptions of The Health Risks of Local Poultry Farming and The Behaviour Of Urban and Peri-Urban Populations in The Town of Korhogo (Côte d'Ivoire).

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Abstract:

Poultry farming plays an important nutritional, economic and socio-cultural role in developing countries. The aim of this study is to analyse the perceptions of health risks associated with poultry farming activities in the vicinity of dwellings and the behaviour of the population of the town of Korhogo. To achieve this, a qualitative socio-anthropological approach was used. The data collected came from 97 semi-structured interviews and direct observation from 15 April to 27 May 2024 in the town of Korhogo. The main results show that local residents living near poultry farms are aware of the health risks to which they are exposed, but the balance of power between gains and risks explains their practices. Poultry farming close to homes has had an impact on local residents and their environment. Residents often suffer from respiratory ailments, allergies, soiling of their surroundings, odour nuisance and other noises. As for the environment, it has suffered pollution of its air and water quality, as well as soil degradation. The reasons why these poultry farmers decide to carry out their activities close to homes are environmental, economic, social and ethical. Hence the need to train young farmers to manage the nuisances generated by these poultry farming activities.

Keywords: Perceptions, health risks, poultry farming activities, impact

1. Introduction

In developing countries, there is growing interest in the use of poultry as a means of combating poverty. Many people raise poultry in both urban and rural areas for domestic consumption, sale and various socio-cultural uses (Mopate et al., 2009; Thieme et al., 2014; Nahimana et al., 2019). These activities help to boost the economies of both farmers and countries. However, these poultry farming activities have repercussions on health and the environment. The odours emanating from poultry farms are often as unbearable a nuisance for people as noise or air pollution. At global level, a study entitled 'The shadow cast by livestock farming' revealed the considerable responsibility held by these activities for climate change, air pollution, the degradation of land and water resources, and the reduction in biodiversity (Steinfeld, 2009; Idrissou et al., 2019). The aim was not simply to blame the intensive livestock farming sector for environmental degradation, but to encourage the co-option at technical and political levels of decisive measures to mitigate its impact. In fact, intensive livestock farming is a health hazard, since the high concentration of animals per square metre and their low genetic diversity encourage the development and transmission of potentially transmissible pathogens such as zoonoses to humans (AFSSA, 2006; Bodering et al., 2018). In France, it is estimated that intensive livestock farming is responsible for almost 75% of ammonia emissions, a gas that is responsible for around half of the fine particles that cause almost 48,000 premature deaths in France every year. In addition, certain pesticides widely disseminated on the crops used to feed the animals in these intensive livestock farms can also cause endocrine disruption. Livestock farming is responsible for polluting groundwater through infiltration and surface water through run-off, mainly through the spreading of slurry and manure.

Farm effluent can also contribute to the spread of antimicrobial-resistant germs, and therefore to the emergence of multi-resistant bacteria (Afssa, 2006; Leroy, 2013). In addition, the nuisances associated with these farms are numerous: visual pollution, nauseating odours, noise from the numerous lorries passing by, proliferation of flies, loss of property value, etc.

The main difficulty is to assess an acceptable distance for the nuisances generated by these livestock buildings close to homes. In no case, therefore, is it a question of a limiting distance for the perception or recognition of odours, or even a zero nuisance distance, but rather a distance that takes into account sociological factors linked to the acceptability of certain olfactory tones, depending in particular on the layout of the area and various parameters linked to the odour (frequency, duration, hedonic character).

Odour nuisance is considered to be one of the main environmental problems associated with poultry farms close to residential areas. To this end, several countries or regions are proposing methods for assessing the separation distances between livestock buildings and residential areas in order to make this nuisance acceptable to local residents. Three levels of assessment are suggested: fixed distances, guidelines based on empirical formulae or abacuses, or the use of an atmospheric dispersion model (Nicolas et al., 2002 p76).

In Côte d'Ivoire, the history of modern poultry farming dates back to the 1960s, with the creation of the Société de Développement des Productions Animales (SODEPRA) in 1972. From 1976 onwards, private or semi-public structures were set up to take over

from the state. As a result, there were 2,200 poultry producers, 1,500 retailers and around thirty agro-industrialists. As a result, Côte d'Ivoire's highly dynamic poultry sector offers enormous opportunities in terms of food security, the fight against poverty and the strengthening of social cohesion. To help develop local production, in 2005 the government increased the amount of the compensatory levy on all poultry products imported from outside the ECOWAS zone, and in 2012 adopted the Strategic Plan for the Revival of Poultry Farming (PSRA). As a result, between 2008 and 2015, the number of breeding birds produced fell from 200,000 to 690000, representing 170,000 jobs, 50,000 of them direct. Modern poultry farming is a short-cycle, fast-developing form of poultry farming, compared with traditional small-breed poultry farming. It is an effective response to growing demand, helping to create a large number of jobs in urban, peri-urban and rural areas for young Ivorians, with a strong propensity for industrialisation in the agricultural sector, thus meeting the first two objectives of the Ivorian poultry industry Sustainable Development Goals (SDGs), namely the eradication of poverty and the fight against hunger (Koffi-Koumi, 2019; Habboul, 2021; Fall et al., 2021).

In the town of Korhogo, where rearing capacity has increased, the poultry environment is undoubtedly the place where these living actors interact with nature, and their interactions should play a definite role in achieving the full production potential of broiler hens, layers and the quantity of eggs. However, most breeders forget this and seek to protect their own interests. More often than not, these breeders put their profitability and the stability of their production first, forgetting their own health and that of the surrounding population, as well as the environment that they should be protecting. However, it is important to know that we can all contribute to improving the environment without affecting production. This study therefore presents an analysis of conventional chicken farming practices and their impact on nature and human health. On the basis of this observation, it is appropriate to consider the perception of the health risks of poultry farming activities close to dwellings in the town of Korhogo, where these poultry farming activities are often carried out on concessions or close to dwellings (Koffi-Koumi, 2019). However, the existing literature only provides advice on industrial or semi-industrial production systems using exotic (imported) breeds under highly controlled conditions, or simple guidelines that give little of the necessary advice on the problems of cohabiting farms and human dwellings. Hence the following subsidiary questions: What is the local population's social perception of poultry farming close to dwellings?

What is the impact of poultry farming on the environment and human health in Korhogo?

What are the rationales that guide farmers' behaviour when it comes to poultry farming close to residential areas?

The aim of this study was therefore to describe the perceptions of health risks and the behaviour of people in the north of the country with regard to proximity poultry farming.

2. Materials and Methods

2.1 Study area

Located in the Poro health region in the north of Côte d'Ivoire, the geographical coordinates of the town of Korhogo lie between 9°53‘and 10° north latitude and 6°49’ and 8° west longitude. Korhogo is the capital of the Savannah District as a department, covering an area of 12,500 km², or 3.9% of the national territory, with a population of 440,926 inhabitants at an average density of 5.4 inhabitants per km², 91.55% of whom are nationals, made up of indigenous Senufo and non-natives from various regions of Côte d'Ivoire (RGPH, 2021). Data were collected from 43 farms located in the districts of Natiokobadara, Ossiéné, Téguéré, Nouveau-quartier, Belleville, Kassirimé and Mongaha.

2.2 Sociological field

The population that is the subject of this study is made up mainly of the social actors in the field of study capable of providing us with information on the phenomenon under study. These are: direct stakeholders, including the breeders of the 43 farms found in the above-mentioned neighbourhoods, and indirect stakeholders made up of the people living near the poultry farms and the veterinary services of the town of Korhogo. The use of this category of stakeholders is justified for the simple reason that they were likely to provide us with key information concerning our research subject and highlight their involvement in livestock farming close to dwellings.

2.3 Method and tools used

The methodology of this study was based essentially on a qualitative socio-anthropological approach. The use of participatory qualitative research techniques provides in-depth and substantial information on people's perceptions, behaviour and motivations. Two main techniques were used to collect the data. These were semi-structured interviews and non-participatory direct observation. In the first case, the data collection tool used was the interview guide. This tool has the particularity of sparking debate and deepening exchanges through follow-up, probing and clarifying questions that were not planned at the outset, but which emerge from the respondents' answers. As for the second technique, the tool used to record the direct observation was the smartphone, which was used as a camera. For sampling, the technique of reasoned choice was used in our investigations. This technique enabled us to interview the resource persons whose status and role were decisive in this study of livestock farming close to dwellings. These were forty-seven (47) local residents, including twelve (12) heads of household, forty-three (43) poultry farmers and seven (07) veterinary services or supervisory agency (ANADER). All in all, we interviewed ninety-seven (97) people as a sample size over the period from 15 April to 27 May 2024.

2.4. Data analysis methods

Data entry and analysis were made possible through the use of Microsoft Office software and thematic analysis. This type of analysis is appropriate given that the data was collected using an interview guide, as was the case for this study. In this case, the titles of the guides were also the themes of the analysis. However, given the nature of the study, i.e. applied rather than fundamental research, and the importance of the theme, we combined thematic analysis with content analysis. In other words, each theme of the study was the subject of a content analysis, the specificity of which is to carry out an in-depth analysis with the aim of filling in the probable inadequacies of the thematic analysis.

3. Results of The Study

The results of this study are based on three main points: people's perceptions of the health risks of poultry farming close to dwellings, the impact of these activities on human health and the environment, and the reasons why farmers choose this type of farming.

3.1. The population's social perceptions of neighbourhood poultry farming

Residents' perceptions of local poultry farming are a social fact that causes them to react differently to the nuisances produced by farms in the town of Korhogo. Residents' perceptions of local poultry farming vary according to various factors such as the proximity of farming facilities, environmental concerns and food preferences. For some residents, neighbourhood poultry farming is seen as a more sustainable and local approach to chicken production, while others are concerned about the potential impacts on air and water quality, as well as public health concerns associated with keeping poultry close to home.

When asked about awareness and knowledge of the health risks associated with local poultry farming, it was revealed that in the urban area of Korhogo, poultry farming exposes the lives of local residents to risks that are at the root of certain illnesses in housing estates. According to the city's veterinary services and poultry farmer support agencies, although poultry farms offer fresh, local produce, they have often been the source of health risks for local residents in communal housing yards. Poultry farms have often been hotbeds for bacteria and viruses that spread to humans and cause disease. To this end, they advise and recommend, as the following comments indicate: "*It is important to take precautions, such as personal hygiene and the proper handling of products' or 'properly manage litter and leftover feed that is harmful to the environment, humans and the poultry itself"* (Messrs K. S. and D. E. S. respectively, livestock supervisor at ANADER and veterinary officer at MIRAH). They also point out that waste from poultry farms, such as manure, urine and leftover feed, can cause health risks for the environment and human health if it is not managed properly. For people living near poultry farms, this is a nuisance and a source of conflict, despite the fact that these farms serve economic, food and socio-cultural purposes. Most of the people surveyed in this neighbourhood mentioned the nuisance of smells, dust and noise emanating from these farms. Others mentioned the presence of dangerous reptiles that eat poultry and harmful insects, which are the source of some of the problems they suffer. Some of them mentioned the recurrence of flu and lung infections: "*These hen houses, following the fermentation of food scraps and waste, give off a highly toxic gas that gives us flu and coughs all the time. So for me, poultry farming should be kept away from residential areas for our own safety and the safety of our children*", as stated by the head of a family who shares a yard in Téguéré (O.D. Téguéré station). Others mentioned allergies. In short, local people know and can identify the risks of exposure to the dangers of local poultry farming. Some local respondents who felt they knew more perceived chicken meat as tainted. In fact, these chickens are fed chemicals and fascinated with products of which they are unaware. This type of treatment creates a kind of mistrust of exotic poultry products, as indicated by a local teacher in the Natiokobadara district: "*The products that farmers give their chickens are chemicals that distort the normal growth of poultry, and the side-effects of these products kill humans slowly. I prefer local production*" (S, y. Riverain Natiokobadara).

On the other hand, some farmers, mostly illiterate men, are either unaware of these dangers or, if they are aware of them, they play them down by linking this state of affairs to poor poultry farm management. Other farmers recognise this situation but, given the risk of theft and the high cost of transporting poultry equipment to a distant farm, they opt for local breeding. This is the case for the operators of the two farms shown in Figure 1.

Figure 1: Local farms to avoid risks of theft and transport costs (source: study data)

These farmers are supported by some local residents, who justify the proximity of the farms by the fact that chickens are eaten during religious and end-of-year festivities, as well as in the home or when welcoming guests. Apart from these perceptions, what are the real impacts generated by these poultry farming activities close to homes in the town of Korhogo?

3.2. Local poultry farming and its impact on people and the environment

Poultry farming close to housing in the town of Korhogo has had an impact on both the neighbouring population and the environment of these farms.

3.2.1. Elements of the impact of proximity poultry farming on humans

Poultry farming in the vicinity of homes in the town of Korhogo has an impact at two levels. The first is the socio-economic and socio-sanitary impact on the farmers themselves, and the second is the impact on neighbouring populations.

As far as the socio-economic impact is concerned, local poultry farming has created jobs in local communities through the production, sale and processing of poultry products, thereby substantially improving people's incomes. As far as production is concerned, there are producers (breeders) of local and exotic poultry in the housing estates in the town of Korhogo. This local poultry farming provides them with employment. Indeed, following the country's military-political crisis from 2002 to 2011, many young people faced with employment problems saw poultry farming as a source of employment. Although there used to be a close link between the people of the north and poultry farming, the phenomenon of poultry farming in housing estates has been amplified by the emergence of a young and dynamic middle class. This demographic class has considerably increased the food requirements of the town's population, which have been characterised by an increase in the consumption of animal proteins, particularly poultry products. This cohabitation of people and poultry farms in the North stems from the fact that: "*Chickens are descended from a jungle bird whose hunter by nature, anxious to domesticate the bird, agreed to cohabit with chickens*" revealed a patriarch living near a farm. So the existence of this link between man and animals is a history of domestication and breeding of birds for food, economic and cultural purposes. As one respondent put it: "*I inherited this profession because my father was a poultry farmer and I used to go with him to look after the chickens. That's how I got to know them*" (K, S farmer in Ossiéné). In addition, poultry farming close to homes in the town of Korhogo offers poultry farmers a stable local market and closer relations with their customers, who are the people living near the farms. This has also reduced transport and distribution costs, as some farmers pointed out: "*... I don't need to go to the market to sell my products, even during festive periods*" or *"... most of my customers are neighbours"* or "*my customers are local restaurant owners who come to buy supplies at home*" (poultry farmers in Ossiéné, Nouveau-quartier and Mongaha).

With regard to the sale and processing of poultry products, it is worth noting the creation of jobs and improved incomes among local people who sell the inputs and fruits of poultry farming, as the following verbatim comments indicate: '*I earn my living from selling eggs...*" or "*.. I'm a chicken trader, I braise chickens and sell them alive*" (interview with farm residents).

As for the social and health impact of local poultry farming on the local population, this primarily concerns food security, i.e. locally accessible sources of protein. It has had an impact on human health by providing fresh, nutritious food and reducing dependence on processed foods. According to the veterinary officers and some of the heads of households surveyed, there has been an adequate supply of protein for even the poorest local people, which has improved their health. In addition, poultry farming in the town has strengthened social ties by encouraging cooperation and interaction between the community members involved in these activities. On the other hand, there are some negative effects on human health. These include the impact of droppings, noise and odours on the health of local residents.

In fact, the incineration of piles of droppings from poultry in the open air releases gases such as CO2 (carbon dioxide), SO2 (sulphur dioxide), C2H4 (methane) and dust that are harmful to the people living near these farms. When asked about the impact of poultry farming on their health, local residents reported respiratory problems. Unturned chicken droppings give off foul smells, which attract flies and mosquitoes, the vectors of many diseases such as malaria and influenza. Influenza (the common cold) is transmitted and is of particular concern because of its potential for mutation and rapid spread. This is what one local resident had to say: "*The farm next to my house doesn't suit me because my children go there several times and they often catch colds, which are contagious, and they end up infecting us in the house*" (comments by Mr S.D., a dressmaker in Kassirimé). Also, the parasites present in the poultry on some farms, such as mites and lice, have sometimes caused allergic reactions or skin infections, as reported by a local head of family: "*If the course wasn't for me, I'd move away from there because of everything I've suffered here, the smells come, I'm nauseous and I have frequent diarrhoea, so I have gastrointestinal problems ...*" (Mr Z; a teacher in Kassirimé). (Mr Z; a teacher in Belleville). What's more, reptiles, rats and mice like to feed and make their homes in the by-products.

3.2.2. Elements of the impact of community poultry farming on the environment

Neighbourhood poultry farming in the town of Korhogo has had both positive and negative impacts on the environment, depending on various factors such as waste management, the use of natural resources and livestock rearing practices.

The positive impact of community poultry farming in the town of Korhogo can be seen at various levels. Firstly, in terms of waste

management, some local poultry farmers have adopted more sustainable management systems, such as composting droppings and using them as a natural fertiliser, thereby reducing water and soil pollution. These local poultry farms have also encouraged the diversity of indigenous or local breeds, leading to the preservation of poultry biodiversity and the conservation of endangered species. Secondly, community poultry farming has enabled resources to be used more efficiently. It has made it possible to combine other activities such as organic farming. Subsequently, for this second activity, the farmer uses the poultry waste to enrich the arable land. As a result, livestock farming becomes a key driver of sustainable agricultural development. In this respect, a breeder who is also a farmer states: "*When I finish cleaning my farm, I use the chicken droppings as organic fertiliser for organic farming, so I don't have to go out and buy chemical fertiliser for my crops*" (Mr Y. T. breeder and market gardener). Thus, this aspect of poultry farming in the town has been beneficial for the environment by contributing to the population's food supply.

Local poultry farming has also had a negative impact on the environment. Firstly, poor waste management has led to water and soil pollution from substances such as nitrates and phosphates, according to an ANADER agent. Piling up chicken droppings in residential areas has led to congestion in housing estates. What's more, chicken coops in general are often a problem with the proliferation of flies, caused by the degradation of poultry by-products. A veterinary officer interviewed explained that "*the incineration of poultry droppings releases gases such as NO, NO2, CO and CO2, which contribute to seasonal disturbances in the area*". Piling up the droppings on site causes anaerobic fermentation reactions, producing methane, which is a greenhouse gas and destroys the ozone layer.

3.3. Reasons for proximity poultry farming

The main reasons given for keeping poultry close to homes in the town of Korhogo are, among others, better supervision (control) of farms, fewer journeys, less work and less time wasted.

The reason for better supervision of the farm is to have easier control over the animals by ensuring more efficient management of daily operations, such as proper feeding, cleaning, necessary medical care, and to avoid theft of the animals, as indicated by this farmer: When my first farm was in the bush, I wasted time and thieves only came to steal them from me at night. So I decided to have a space in my yard to build this farm and keep an eye on things day and night' (respondent S. N., new neighbourhood).

In addition, limiting travel means that farmers can stay close to their target market, reducing transport costs for poultry equipment and improving product quality. What's more, this proximity to farms means that farmers can maintain close relations with consumers, fostering trust and loyalty to their brand. As for reducing work fatigue and wasted time, the presence of farms in the home means that farmers can enlist the help of children and neighbours. Other poultry farmers mentioned the lack of means to buy a peri-urban space as a reason for practising local poultry farming. For this reason, one respondent, aware of the negative effects of the activity, made the following statement: "*I would like to keep poultry outside the homes, but the lack of money to buy another space on the outskirts of town is the reason for my backyard activity*" (Lady S. K., interviewee from Mongaha).

In short, the reasons for poultry farming in residential concessions in the town of Korhogo are better control of these activities, lack of funds, fear of theft and maintaining relations with neighbours, who constitute a target market. The different results were therefore discussed.

4. Discussion of The Results of The Study

At the end of the presentation of the results of this study, it is appropriate to discuss them in order to grasp the scientific contribution of our study to the field of sociology. The various results are based on three main themes: the social perceptions of health risks held by people living close to poultry farms, the impact of poultry farming on humans and their environment, and the reasons why farmers choose to practise these activities close to their homes.

4.1. The population's social perceptions of backyard poultry farming

Local poultry farming is an agricultural practice that involves raising poultry in urban or peri-urban areas. The practice has grown in popularity in recent years because of its proximity to consumers, its reduced environmental impact and its contribution to food security. However, the fact that it is practised in concessions with human settlements means that it is perceived as a nuisance activity. Our results showed that people perceive poultry farming close to dwellings as a risky activity for the health of residents and their environment. These results are in line with the work of Derel & Aubert, (2008) and Desailly et al, (2009) who have shown the health risks that remain a problem with regard to livestock rearing practices close to housing or who state that the most visible negative impacts, which often give rise to an unfavourable perception on the part of city dwellers, are animals, their droppings as well as foul odours and noise.

4.2. Poultry farming activities and their impact on people and the environment

The results concerning the impact of poultry farming activities on people and the environment showed that poultry farming activities have had both positive and negative impacts on people and their environment in this town in the north of Côte d'Ivoire. As far as the human population is concerned, poultry farming has been a job-creating sector, with the creation of three colleges of activity: retailers, producers and agro-industrialists. It offers protein-based food products that have ensured food security and constituted

major market centres for animal products. This is why the results of Kouassi et al (2020) show that the different types of production contribute to the food security that cities face. In terms of the environment, more sustainable management systems have been found to reduce air, water and soil pollution, and to preserve poultry biodiversity combined with organic farming. These results corroborate those of studies by Moerman et al (2019), which show that the sustainability of poultry farms cannot be separated from the optimization of organic farming.

Poultry farming close to housing seems to be incompatible with the urban environment. Historical, health and regulatory reasons may explain this lack of interest. In many countries, the urban development code regulates the minimum distance between farms and residential areas. Livestock farming is the cause of a great deal of environmental destruction, including air and water pollution and the deterioration of the quality of life. This finding is supported by studies by Buteau, (2019) who showed how odors produced by the various activities and areas on a poultry farm can be the cause of odour nuisance for neighbours. These odour and noise nuisances are sometimes a source of conflict between poultry farmers and local residents, and have been an obstacle to the installation of new farmers or the construction of new poultry farms.

4.3. The rationale behind local poultry farming

With regard to the rationale behind poultry farming close to home, our respondents cited better control of these activities, lack of resources, limiting travel, maintaining relations with the neighbourhood, which constitutes a target market, and sustainable management. According to the results from the various points of view, the quality of the products of local livestock farmers focuses on producing high-quality products using sustainable methods. This means that animals are reared in optimal conditions, which translates into better health and better quality animal products. In addition, environmental responsibility promotes the use of local agricultural land, reducing greenhouse gas emissions linked to the transport of animals and animal products. This helps to preserve biodiversity and protect local ecosystems. Local poultry farming also supports the local economy by creating local jobs and encouraging local purchases. This helps to strengthen local communities and promote food self-sufficiency. What's more, local poultry farmers are often involved in their communities and seek to promote sustainable farming practices. These findings are in line with those of (Porcher, 2014; Bories et al., 2016; Delfosse et al., 2017; Cesaro, 2020) for whom urban agriculture is often summed up in its plant dimension alone, whether for aesthetic, leisure, emotional or food reasons. However, the question of livestock rearing in urban agriculture is still little addressed in scientific debates, but has been the subject of an emerging body of literature in recent years.

Moreover, urban agriculture offers many possibilities and also covers a wide range of realities depending on the technologies used, the spaces used or even the type of city considered by the study by Aubry, (2015) who talks about urban agricultures and the research questions.

Conclusion

In summary, we note that perceptions of the health risks of poultry farming activities close to dwellings and the behaviour of people in the town of Korhogo show that people living near poultry farms are aware of the health risks to which they are exposed, but the balance of power between profits and risks explains their practices. The impact that local poultry farming has had on them and their environment has been to pollute the environment by affecting the quality of the air and water, as well as degrading the soil. The health problems suffered include respiratory ailments, allergies, soiling of the living environment, and odour and noise pollution.

The rationale behind poultry farming by farmers near their homes was environmental, economic, social and ethical. In view of these perceptions, impacts and reasons for practising urban poultry farming, young farmers need to be trained to manage the nuisances generated by these poultry farming activities.

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