



## Analysis of the local chicken farming system in the Poro region (Northern Ivory Coast)

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### Abstract

Traditional Ivorian poultry farming is marginalized in favor of modern poultry farming. A lack of understanding of it is undoubtedly one of the reasons. To understand the local chicken production system, a study was conducted in the Poro region. During this study, a survey was carried out using a questionnaire to highlight the production systems. The results showed that raising local chickens is practiced primarily by men (69.91%), who are illiterate (54.31%) and between 36 and 50 years old (45.63%). These farmers were also agricultural workers (73.28%), and 75.24% were married. The majority were animists (55.58%), and the main motivation for choosing this type of farming was the hardiness of local chickens (54.86%). The most common farming system was total free-ranging (85.13%) and the farming equipment was essentially salvaged equipment (59.71%). Most farmers purchased their initial flocks at the market (71.17%) to begin raising their birds. These flocks primarily housed young animals, with 42.17% of the flocks being juveniles and 33.70% being chicks. Regarding the causes of mortality, diseases (42.90%) and predators (49.44%) were the main factors. The majority (60.27%) cited the lack of veterinary services to support the sector. A broader and more comprehensive study of traditional poultry farming will identify its strengths and weaknesses, providing the ultimate avenue for improvement in this promising sector.

**Keywords:** Local Chickens; Traditional Farming; Households; Characterization; Korhogo

### 1. Introduction

In rural areas, poultry is of paramount importance as it represents the primary source of animal protein for the population. It constitutes a significant part of the national economy in general and the rural economy in particular (Smith et al., 2018). In Africa, traditional poultry, commonly known as "bicycle chickens," plays an important socio-cultural role in the lives of rural populations. It is one of the primary sources of protein from domestic animals available to vulnerable populations, namely women, children, and the elderly (Sodjinou et al., 2015; Nahimana et al., 2019). It is used in ritual and religious ceremonies, including births, baptisms, funerals, weddings, sacrifices, and end-of-year celebrations, as well as for treating certain illnesses. According to Gueye (2003), it contributes significantly to food security, poverty reduction, and the ecological management of natural resources. It also serves as a means of saving, investment, and insurance for small farmers (Moula, 2012). In Côte d'Ivoire, traditional village poultry farming provides approximately 70% of the protein consumed by Ivorians (Kouassi et al., 2019) and constitutes the largest share of the chicken population.

However, traditional poultry farming has very low productivity (Danho, 2008). In this system, the animals, constantly roaming, are exposed to various dangers such as predators, harsh weather, and disease (Abubakar et al., 2007). The zootechnical performance of traditional chickens is therefore poor, and very little research has been conducted on them.

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Furthermore, traditional poultry farming has not yet received significant attention from technical services, particularly in terms of development support, hence the continued weakness of its production systems. This leads to food security issues for the target populations and the high cost of products from traditional chicken farming in the markets. This study aims to contribute to the improvement of local traditional poultry production.

## 2. Materials and methods

### 2.1. Materials

#### 2.1.1. Study site

This study was conducted in two departments (Korhogo and Sinematiali) in the Poro region. In each department, five villages were selected for the survey. In the Korhogo department, the villages of Dokaha, Kapele, Katia, Djinmitinnin, and Lataha were chosen and visited. In the Sinematiali department, the villages of Sediogo, Bahouakaha, Pegnankaha, Peguekaha, and Daboungo were also selected and visited (**Table 1**).

**Table 1** Distribution of the different livestock farmers surveyed according to the areas

| Areas                     | Villages surveyed | Surveyed population per village | Total workforce |
|---------------------------|-------------------|---------------------------------|-----------------|
| Korhogo Department        | Djinmitinnin      | 21                              | 105             |
|                           | Dokaha            | 23                              |                 |
|                           | Kapele            | 20                              |                 |
|                           | Katia             | 20                              |                 |
|                           | Lataha            | 21                              |                 |
| Department of Sinematiali | Bahouakaha        | 21                              | 104             |
|                           | Daboungo          | 21                              |                 |
|                           | Pegnankaha        | 20                              |                 |
|                           | Peguekaha         | 19                              |                 |
|                           | Sediogo           | 22                              |                 |

#### 2.1.2. Target population

The target population consisted of 209 households raising local chickens. In the Korhogo Department, 105 households were selected and surveyed, while in the Sinematiali Department, 104 households were surveyed. The minimum number of households per village was 19, and the maximum was 23.

#### 2.1.3. Technical equipment

The technical material used consisted of a questionnaire for households raising local chickens. The questionnaire's structure related to the socio-demographic characteristics of the households concerned, the characteristics of local chicken farms, and the constraints associated with raising them.

### 2.2. Methods

#### 2.2.1. Selection of survey sites

The survey sites were chosen based on the distance between the villages and the departmental capital, accessibility, and prior authorization from the village chief. The minimum acceptable distance was 10 km. This ensures a good distribution of farmers across the different departments surveyed and greater diversity in local chicken breeds. This choice was made to better cover data collection based on available means of transport.

### 2.2.2. Choices of households surveyed

Households were selected based on three criteria: willingness to complete the poultry farming survey questionnaire, having been poultry farmers for at least one year, and owning at least 10 adult chickens. These selection criteria were chosen to ensure a good sample size and to better understand the local chicken farming system.

### 2.2.3. Data collection

The study consisted of a literature review, a preliminary survey, and the main survey. The preliminary survey took place over two weeks. Its objective was to test the questionnaire and make any necessary adjustments. It also allows scheduling appointments with local chicken farmers at their homes.

The main survey took place over two months. It was conducted using the list of villages established during the preliminary survey. It involved discussions with local chicken farmers in the various villages to gather information. The questions were both open-ended and closed-ended. Data was collected through individual interviews with household heads, based on the established questionnaire. The interviews were conducted in French, Senufo, and Malinke. Each interview lasted an average of 30 minutes. At the end of the interviews, a field visit was conducted to assess the situation on the ground.

### 2.2.4. Data processing

Following the survey, the collected data was organized using Excel 2016. The percentages of the parameters were first expressed per village. This allowed us to calculate the percentages that reveal the trends.

## 3. Results

### 3.1. Sociodemographic characteristics of livestock farmers

Local chicken farming was primarily practiced by men ( $69.16 \pm 5.99\%$ ), most of whom were illiterate ( $53.53 \pm 8.95\%$ ), with the majority aged between 36 and 50 ( $45.68\%$ ).  $75.07 \pm 6.74\%$  of these farmers were married and engaged in agriculture ( $72.47 \pm 10.43\%$ ). Animism was the most prevalent religion ( $54.58 \pm 11.65\%$ ). The main reason for choosing this type of farming was the hardiness of the local chickens ( $54.28 \pm 6.50\%$ ) (**Table 2**).

**Table 2** Sociodemographic characteristics of local chicken farmers

| Characteristics    |                           | Korhogo Department | Sinematiali Department | Average percentage |
|--------------------|---------------------------|--------------------|------------------------|--------------------|
| Gender (%)         | Female                    | 28.69              | 32.99                  | $30.84 \pm 5.99$   |
|                    | Male                      | 71.31              | 67.01                  | $69.16 \pm 5.99$   |
| Age (%)            | Under 35 years            | 19.11              | 27.18                  | $23.15 \pm 6.12$   |
|                    | 36 years < age < 50 years | 50.42              | 40.94                  | $45.68 \pm 6.16$   |
|                    | Age > 50 years            | 30.47              | 31.87                  | $31.17 \pm 7.87$   |
| Marital status (%) | Single                    | 6.55               | 10.64                  | $8.59 \pm 3.57$    |
|                    | Married                   | 78.21              | 71.92                  | $75.07 \pm 6.74$   |
|                    | Widower/ Widowe(ve)       | 15.24              | 17.44                  | $16.34 \pm 5.30$   |
| Profession (%)     | Peasant                   | 70.41              | 74.53                  | $72.47 \pm 10.43$  |
|                    | Trader                    | 25.73              | 14.68                  | $20.21 \pm 9.43$   |
|                    | Breeder                   | 2.90               | 7.93                   | $5.42 \pm 4.13$    |
|                    | Official                  | 0.95               | 2.86                   | $1.90 \pm 2.42$    |
| Religion (%)       | Christian                 | 23.45              | 18.41                  | $20.93 \pm 8.04$   |
|                    | Muslim                    | 23.10              | 25.90                  | $24.50 \pm 11.19$  |

|                       |                |       |       |               |
|-----------------------|----------------|-------|-------|---------------|
|                       | Animist        | 55.36 | 55.70 | 54.58 ± 11.65 |
| Educational level (%) | Uneducated     | 51.22 | 55.85 | 53.53 ± 8.95  |
|                       | Primary        | 26.02 | 28.40 | 27.21 ± 9.20  |
|                       | Secondary      | 15.85 | 9.83  | 12.84 ± 5.26  |
|                       | Koranic school | 6.90  | 5.92  | 6.41 ± 4.92   |
| Motivation (%)        | Rusticity      | 56.37 | 53.14 | 54.28 ± 6.50  |
|                       | Tradition      | 11.20 | 11.65 | 11.43 ± 5.06  |
|                       | Quality        | 31.47 | 36.16 | 34.29 ± 5.01  |

### 3.2. Characteristics of local chicken farms in the region

In the Poro region, the most common farming system was total wandering (84.98 ± 8.46%). Approximately 55.80 ± 13.59% used cages to house chickens at night, while 24.97 ± 6.82% kept them in a traditional chicken coop. Farming equipment was primarily salvaged (59.18 ± 5.03%), such as household utensils.

Most of the farms were over six years old (79.72 ± 7.82%). They primarily raised young poultry (34.07 ± 3.78% young poultry and 35.01 ± 3.34% chicks). The chickens were generally marked by feathering (37.52 ± 7.27%).

Most farmers bought their first chickens at the market (69.77 ± 11.66%) to start their flocks. Only 20.51 ± 8.04% and 9.73 ± 6.20%, respectively, acquired them from their parents or bought them from a breeder. All raised them for sale. Drilling water and well water were the most used, with 46.69 ± 17.50% and 40.07 ± 15.12% of farmers, respectively, providing their chickens with this water. The chickens were primarily fed kitchen and crop scraps (65.59 ± 14.55%). A significant number used termites as food (24.13 ± 11.16%). Farmers used three treatment methods: herbal medicine, chemotherapy, and a combination of both. Most farmers treated sick birds with plants (49.19 ± 10.78%). The others combined both types of treatment (32.26 ± 7.11%) or practiced Chemotherapy (18.55 ± 8.90).

**Table 3** Characteristics of local chicken farms in the region

| Characteristics           |                          | Korhogo Department | Sinematiali Department | Average percentage |
|---------------------------|--------------------------|--------------------|------------------------|--------------------|
| Breeding system (%)       | Claustration             | 18.06              | 6.07                   | 12.07 ± 9.70       |
|                           | Total wandering          | 81.94              | 88.02                  | 84.98 ± 8.46       |
|                           | Semi-Claustration        | 0.00               | 5.90                   | 2.95 ± 3.76        |
| Type of accommodation (%) | Modern chicken coop      | 4.73               | 20.49                  | 12.61 ± 8.59       |
|                           | Traditional chicken coop | 25.61              | 24.33                  | 24.97 ± 6.82       |
|                           | Uninhabited house        | 7.38               | 5.87                   | 6.63 ± 4.33        |
|                           | Cage                     | 62.28              | 49.31                  | 55.80 ± 13.59      |
| Livestock equipment (%)   | Modern                   | 18.10              | 21.48                  | 19.79 ± 4.31       |
|                           | Traditional              | 22.69              | 19.36                  | 21.03 ± 5.76       |
|                           | Recovery                 | 59.21              | 59.15                  | 59.18 ± 5.03       |
| Identification method (%) | Plumage                  | 39.18              | 35.85                  | 37.52 ± 7.27       |
|                           | Severed finger           | 35.16              | 43.84                  | 39.50 ± 5.52       |
|                           | Anneau                   | 0.87               | 3.81                   | 2.34 ± 2.55        |
|                           | Piece of fabric          | 24.79              | 16.49                  | 20.64 ± 4.64       |
| Livestock structuring (%) | Chick                    | 35.16              | 34.86                  | 35.01 ± 3.34       |
|                           | Rooster                  | 11.50              | 11.59                  | 11.55 ± 2.00       |
|                           | Chicken                  | 18.28              | 20.47                  | 19.37 ± 3.21       |

|                                              |                               |       |       |               |
|----------------------------------------------|-------------------------------|-------|-------|---------------|
|                                              | Young subjects                | 35.06 | 33.07 | 34.07 ± 3.78  |
| Age of breeding (%)                          | 1 to 5 years                  | 79.99 | 79.45 | 79.72 ± 7.82  |
|                                              | 6 to 10 years old             | 20.01 | 14.54 | 17.28 ± 9.01  |
|                                              | 11 to 15 years old            | 0.00  | 6.01  | 3.01 ± 3.82   |
| Origin of the first reproductive nucleus (%) | Breeder                       | 14.24 | 5.21  | 9.73 ± 6.20   |
|                                              | Market                        | 60.41 | 79.12 | 69.77 ± 11.66 |
|                                              | Parent                        | 25.35 | 15.67 | 20.51 ± 8.04  |
| Objective of livestock farming (%)           | Sale                          | 100   | 100   | 100 ± 0.00    |
| Feeding (%)                                  | Kitchen and harvest waste     | 81.59 | 49.59 | 65.59 ± 14.55 |
|                                              | Termite                       | 12.64 | 35.62 | 24.13 ± 11.16 |
|                                              | Provender                     | 5.76  | 14.79 | 10.28 ± 5.97  |
| Watering (%)                                 | Tap water                     | 9.11  | 7.62  | 8.36 ± 10.65  |
|                                              | Well water                    | 56.70 | 23.44 | 40.07 ± 15.12 |
|                                              | Backwater                     | 2.00  | 7.77  | 4.88 ± 5.39   |
|                                              | Drilling water                | 32.34 | 61.18 | 46.69 ± 17.50 |
| Care given to the chickens (%)               | Phytotherapy                  | 59.78 | 36.60 | 49.19 ± 10.78 |
|                                              | Chemotherapy                  | 13.52 | 23.57 | 18.55 ± 8.90  |
|                                              | Phytotherapy and Chemotherapy | 26.69 | 37.83 | 32.26 ± 7.11  |

### 3.3. Constraints related to raising local chickens

**Table 4** below presents the constraints mentioned by local chicken farmers. The majority ( $48.16 \pm 12.34\%$ ) cited the lack of veterinary services for the sector and  $32.69 \pm 7.37\%$  of those found them quite expensive. Only  $19.17 \pm 9.57\%$  had access to these services. Most farmers did not have housing construction standards for chickens ( $58.11 \pm 8.74\%$ ) and admitted that chicken feed was available year-round ( $86.10 \pm 7.59\%$ ).

Regarding the causes of mortality, diseases and predators were the main factors. These accounted for  $72.34 \pm 10.26\%$  and  $28.30 \pm 8.84\%$  of deaths, respectively.

**Table 4** Constraints related to mortality and veterinary services

| Characteristics         |                       | Korhogo Department | Sinematiali Department | Average percentage |
|-------------------------|-----------------------|--------------------|------------------------|--------------------|
| Veterinary service (%)  | Absent                | 59.83              | 36.50                  | 48.16 ± 12.34      |
|                         | Present               | 13.71              | 24.62                  | 19.17 ± 9.57       |
|                         | Expensive care        | 26.50              | 38.88                  | 32.69 ± 7.37       |
| Habitat (%)             | Lack of housing       | 32.48              | 31.96                  | 32.22 ± 5.64       |
|                         | High cost of material | 5.55               | 15.96                  | 10.75 ± 9.28       |
|                         | Lack of standards     | 62.02              | 54.19                  | 58.11 ± 8.74       |
| Causes of mortality (%) | Diseases              | 66.05              | 78.63                  | 72.34 ± 10.26      |
|                         | Drowning              | 0.87               | 0.00                   | 0.43 ± 0.71        |
|                         | Predators             | 33.12              | 23.48                  | 28.30 ± 8.84       |
| Food availability (%)   | All year round        | 88.49              | 83.71                  | 86.10 ± 7.59       |
|                         | Rainy season          | 11.56              | 16.29                  | 13.93 ± 7.77       |

#### 4. Discussion

This study identified key elements for understanding the local chicken production system in the Poro region. The sociodemographic characteristics of local chicken farmers revealed that local chicken farming was primarily practiced by men ( $69.16 \pm 5.99\%$ ), most of whom were illiterate ( $53.53 \pm 8.95\%$ ), with the majority ( $45.68 \pm 6.16\%$ ) being between 36 and 50 years old. This finding could be explained by the patriarchal family structure, which places the man at the head of the household. He is therefore the owner and manager of family assets. Furthermore, in rural areas, heads of households are often illiterate adults, and their main activity is agriculture. Similar results were obtained by Fall and Dieng (2017) in Senegal and Brou et al. (2020) in Côte d'Ivoire. These authors observed in their studies that most rural poultry farmers were men. Similarly, Boko et al. (2019) in Benin and Touré (2009) in Senegal noted that traditional poultry farming is also dominated by men of a certain advanced age.

Animism was the most widely practiced religion ( $54.58 \pm 11.65\%$ ), and the main motivation for choosing this type of farming was the hardness of local chickens ( $54.28 \pm 6.50\%$ ), followed by Organoleptic quality ( $34.29 \pm 5.01\%$ ). Despite the lack of proper treatment and the absence of efficient feed rationing, local chickens can provide a reasonable and satisfactory level of production for these farmers. This was confirmed by Tindano and Savadogo (2025) in Burkina Faso who showed during their work that meat from local chickens has better nutritional quality and better taste compared to broiler chickens from intensive farming.

Regarding the characteristics of local chicken farming practices, the results show that the dominant system is total wandering ( $84.98 \pm 8.46\%$ ). This traditional system, based on allowing the animals to move freely during the day, is widespread. At night, they are housed primarily in cages ( $55.80 \pm 13.59\%$ ) or traditional chicken coops ( $24.97 \pm 6.82\%$ ). According to some authors, local chickens are generally raised in an extensive system (Kouassi et al., 2019). There is practically no suitable habitat to protect the birds from harsh weather and predators. Furthermore, these farmers mainly used salvaged equipment ( $59.71\%$ ). This observation was also made by Pindé et al. (2020). These authors noted that most farmers in their study area used kitchen utensils as feeders and waterers. The use of salvaged equipment is likely due to farmers' lack of financial resources, leading them to prefer using readily available equipment. A lack of training could also explain this choice. Chickens were generally marked by their plumage ( $37.52 \pm 7.27\%$ ) or by severed finger ( $39.50 \pm 5.52\%$ ). These methods of identification indicate an age-old practice. These methods were identified by Loukou et al. (2021) during their survey in the country's forest and savannah areas. The spread of these methods is also likely due to their ease of application.

Most farmers purchased their first chickens at the market ( $69.77 \pm 11.66\%$ ) to begin raising them. This is explained by the fact that the market is the preferred location for commercial exchanges in the region. This finding contradicts that of Loukou et al. (2021). According to these authors, most farmers acquired their first chickens from another farmer.

Drilling water and well water were the most used sources for watering chickens, accounting for  $46.69 \pm 17.50\%$  and  $40.07 \pm 15.12\%$  of cases, respectively. Chickens were supplemented with kitchen and crop residues ( $65.59 \pm 14.55\%$ ). This unrational, free-ranging feeding system does not lead to improved livestock performance. Similar observations were made by Guèye (2014), who noted that the farmers did not employ any rational feeding system. According to him, the chickens fed on whatever they found while roaming.

The primary objective of all the farmers was sales. These results are consistent with those of Sodjinou et al. (2015) in Benin, who reported that 80% of traditional poultry farmers were motivated by selling their products on the market. According to the farmers, poultry farming plays a vital role in supporting the family economy. Most farmers practiced self-medication using herbal remedies ( $49.19 \pm 10.78\%$ ). These results corroborate those of Diarra et al. (2017), where most local chicken farmers (70%) use medicinal plants to treat their chickens.

The main constraints faced by poultry farmers concerned the absence of veterinary services ( $60.27\%$ ) to support the sector. Indeed, government policy is based primarily on modern poultry farming. This policy orientation, the lack of organization among farmers, and the small size of flocks prevent veterinary services from providing adequate support. Regarding the causes of mortality, diseases ( $72.34 \pm 10.26\%$ ) and predators ( $28.30 \pm 8.84\%$ ) were the main factors. These two factors were identified by Loukou et al. (2021) as the major constraints on chicken mortality. Damiba (2005) made the same observation and stated that the main constraints on mortality are diseases. This is explained by a lack of knowledge of farming techniques and the presence of predators.

## 5. Conclusion

This study was conducted in the Poro region to gain a better understanding of the local chicken production system. Analysis of the farming system reveals that local chicken farming is practiced predominantly by men ( $69.16 \pm 5.99\%$ ), who are illiterate ( $53.53 \pm 8.95\%$ ) and between 36 and 50 years old ( $45.68 \pm 6.16\%$ ). Free-range farming is the dominant system ( $84.98 \pm 8.46\%$ ), and the animals are housed mainly in cages ( $55.80 \pm 13.59\%$ ) or traditional chicken coops ( $24.97 \pm 6.82\%$ ). Most farmers practiced self-medication using herbal remedies ( $49.19 \pm 10.78\%$ ). Farming equipment was primarily salvaged ( $59.18 \pm 5.03\%$ ).

## Compliance with ethical standards

### *Disclosure Conflict of interest*

The authors declare that there are no conflicts of interests associated with this article.

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