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Breeding Poultry of Improved Strains in the Sub-Prefecture of M'Bengué in North of Côte d'Ivoire

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Abstract
This study was conducted in the sub-prefecture of M'bengué. The general objective of the study was to determine the level of production of Broilers chicken; laying hens in this locality, highlighting the profile of breeders, the characteristics of the farms, the management of the breeding, the system of marketing and the constraints encountered by these actors. To carry out this study, a survey was conducted in the poultry farms of the villages. At the end of our study, the results indicate that 80 % of breeders are men. Out of a population of 50 breeders, the village of Tongon accounts for 51 % of the livestock population. For technical and health monitoring, the majority of farms (80 %) receive instructions from poultry advisers. Pathologies due to poor sanitary conditions are often encountered. The most common disease is chronic respiratory disease (58 %), followed by Gumboro disease (30 %). Regarding the marketing of poultry products, the mining company of Tongon occupies an important place with 28% of purchases. Ultimately, the breeding of broilers chicken and laying hens is booming in the sub-prefecture of M'bengué even if many difficulties exist.

Keywords: Characteristics, Farms, Broilers Chicken, Laying Hens, Livestock Management, Côte d'Ivoire

1. Introduction

Poultry farming plays an important role in the ivorian national economy in terms of inter-regional balance, food status of rural populations, land management and jobs (MIRAH, 2014) [13]. Thus, the poultry sector contributes nearly 2% to national Gross domestic product (GDP) and nearly 5% to agricultural GDP (Boka, 2009) [5]. This sector has known considerable growth during recent years. This progress has been made mainly by the development of intensive commercial poultry farming. Poultry products, an essential link in the animal production system, is one of the ways to improve food safety in animal proteins and a source of substantial income for the populations (Abdou *et al*., 2020) [1].

This growing sector has developed, in recent years, in the region of Poro and particularly in the sub-prefecture of M'Bengué. However, despite its capacity for growth, the development of the poultry sector of the sub-prefecture remains enough brittle, due to technical, financial and food problems, but also because of the worry of marketing and especially poor health management on farms which lead to many deaths (Bitty, 2013) [4]. Added to this, the lack of data on the practice of poultry farming in this department is an essential problem.

The general objective of this study is to evaluate the production of broilers and laying hens in the sub-prefecture of M'Bengué in order to propose alternatives to the improvement of this sector.

2. Material and Methods

2.1 Study Area

The study focused on farms in the Sub-prefecture of M'Bengué. This locality is in the northern part of the Ivory Coast. A total of fifty (50) modern farms including 25 broiler farms and 25 laying hen farms have been investigated. It took place in the villages of M'Bengué, Sanhara, Sindjougou, Foundo and Souaha which constitute the communal area of M'Bengué, and in the villages of Poungbè, Tongon and Kationron which constitute the communal area of M'Bengué (Fig 1).

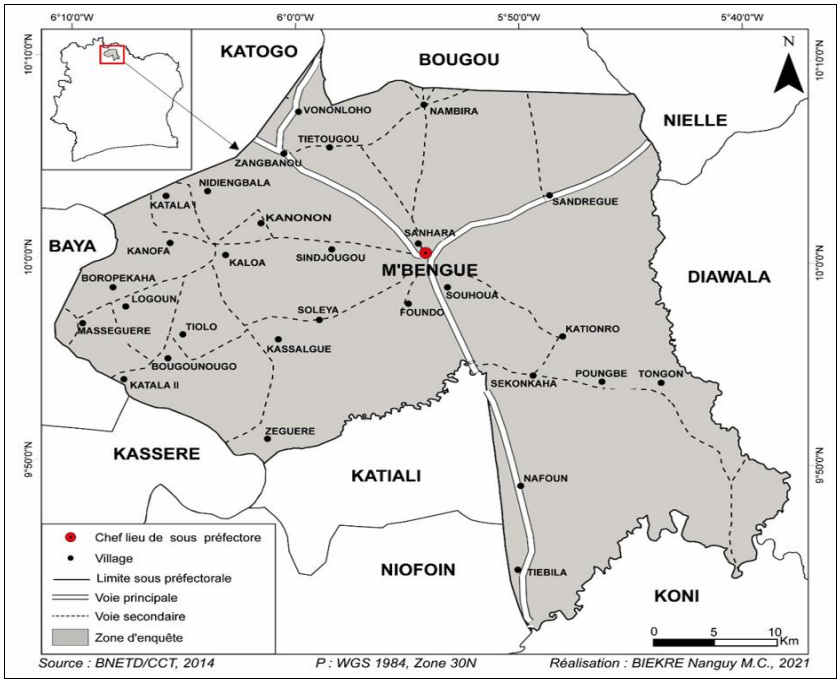

Fig 1: Geographical location of the study area

2.2 Collection of Data

2.2.1 Investigation

Table 1 presents the pre-investigation and investigation periods. The pre-investigation took place from January 23 to February 2, 2021. It consisted of locating and identifying poultry farms. The aim was to make a partial inventory of the breeding areas and to contact the actors, randomly, depending on their availability. It was also about seeing if the questions are well understood by the breeders in order to modify them in case, they were not easily understandable and then to validate the survey sheets.

The investigation, which enabled the collection of qualitative and quantitative data, took place from February 9 to March 12, 2021. It consisted of discussing with breeders and poultry farmers who work daily on farms through the administration of data sheets. Survey in the form of an interview. It consisted in exchanging with breeders through the survey forms. Also, the entire farm was visited to assess the quality of the responses obtained. These exchanges and direct observations made it possible to have an idea of the characteristics of the breeders and the breeding, in particular on the monitoring of the farms, the pathologies encountered, but also the marketing and the constraints encountered by the actors.

Table 1: Pre-investigation and investigation periods in the different localities

	Localites Visited	Pre-Survey Periods	Survey Periods
Communal area	M'Bengué	anuary 23 – January 24	February 9 – February 15
	Sanhara	January 25	February 16
	Sindjougou	January 25	February 16
	Foundo	January 26	February 17
	Souhoua	January 27	February 18
Non-municipal area	Poungbè	January 28	February 19 – February 23
	Tongon	January 29– February 1st	February 24– 10 mars
	Kationron	February 2	march 11 – march 12

2.2.2 Statistical Analyze

The various data collected were submitted to the R software (Version 3.5.3) in order to perform the statistical analyses. Thus, the Chi-2 test allowed the comparison of the different percentages in order to determine the P-value. All analyzes were performed at the 5% significance level.

3. Results

3.1 Socio-Demographic Profile of Breeders

3.1.1 Sociodemographic Profile of Broiler Breeders

The socio-demographic profile of breeders in this speculation shows significant differences at all levels (Table 2). The proportion of men (72%) is significantly higher (P-value=0.0014<0.05) than that of women (28%). And 61% of men are in the non-commune area and 39% of herders are in the commune.

The dominant age group (56%) was recorded among poultry farmers whose age is between 41 and 60 years. It is followed by that of breeders (24%) whose age varies between 18 and 40 years and finally that of breeders (20%) whose age is over 60 years. A significant difference (P-value=0.0084<0.05) was recorded between these values.

Regarding nationality, the results showed that 88% are nationals, including 40.9% in the communal area and 59.1% in the non- communal area. Of these numbers, only 12% are non-nationals (Burkinabe and Malian). Poultry farmers at the primary level and those at the secondary level are more numerous (with 36% of the workforce), followed by illiterates (24%) and at the university level (4%) with a significant difference (P-value=0.0026<0, 05). Breeders who carry out breeding full-time represent only 24% of the breeders surveyed against 76% whose activity is secondary.

Table 2: Sociodemographic profile of broiler breeders

		Commune of M'Bengué		Poungbè		Tongon		Kationron		Total		P-value
		Nb	%	Nb	%	Nb	%	Nb	%	Nb	%	
Age	18-40 years	2	20	1	33	3	30	0	0	6	24	0,0084
	41-60 years	6	60	1	33	5	50	2	100	14	56	
	More than 60 year	2	20	1	33	2	20	0	0	5	20	
Gender	Men	7	70	3	100	6	60	2	100	18	72	0,001
	Women	3	30	0	0	4	40	0	0	7	28	
Nationalities	Ivorian	9	90	3	100	8	80	2	100	22	88	
	Foreigners	1	10	0	0	2	20	0	0	3	12	
Educational level	Illiterate	2	20	2	67	1	10	1	50	6	24	0,0026
	Primary	3	30	1	33	4	40	1	50	9	36	
	Secondary	5	50	0	0	4	40	0	0	9	36	
	University	0	0	0	0	1	10	0	0	1	4	
Main activity	Agriculture	3	30	1	33	1	10	2	100	7	28	0,0073
	Trade	2	20	0	0	1	10	0	0	3	12	
	Breeding	3	30	0	0	3	30	0	0	6	24	
	Official/ Private	2	20	2	67	5	50	0	0	9	36	

Nb: Number

3.1.2 Sociodemographic Profile of Laying Hen Breeders

The socio-demographic profile of laying hen breeders in the sub-prefecture of M'Bengué presented a significant difference (Table 3). The proportion of men (88%) is higher than that of women (12%) with a significant difference (P-value=0.0038). Among these breeders, 36% are in the communal area. For the age group, a rate of 64% was recorded among poultry farmers whose age is beyond 60 years. However, 36% was recorded in people whose age varies between 40-60 years. These proportions are significantly different (P-value=0.0038).

Regarding nationality, the results showed that 92% are nationals and only 8% are non-nationals. Most poultry farmers are educated but with varying levels. Poultry farmers at the secondary level are more numerous with 60% of the workforce, followed by the university level (12%) and those at the primary level (16%). A significant difference (P-value=0.0029) was recorded.

Breeders who carry out this activity full time are estimated at 40% against 60% whose profession is secondary with a significant difference (P-value=0.001).

Table 3: Sociodemographic profile of laying hen breeders

		Commune of M'Bengué		Poungbè		Tongon		Kationron		Total		P-value
		Nb	%	Nb	%	Nb	%	Nb	%	Nb	%	
Age	18-40 years	0	0	0	0	0	0	0	0	0	0	0,0038
	41-60 years	3	33	1	33	5	38	0	0	9	36	
	More than 60 year	6	67	2	67	8	62	0	0	16	64	
Gender	Men	8	89	3	100	11	85	0	0	22	88	0,0016
	Women	1	11	0	0	2	15	0	0	3	12	
Nationalities	Ivorian	8	89	3	100	12	92	0	0	23	92	
	Foreigners	1	11	0	0	1	8	0	0	2	8	
Educational level	Illiterate	1	11	1	33	1	8	0	0	3	12	0,0029
	Primary	2	22	0	0	2	15	0	0	4	16	
	Secondary	5	56	2	67	8	62	0	0	15	60	
	University	1	11	0	0	2	15	0	0	3	12	
Main activity	Agriculture	1	11	0	0	2	15	0	0	3	12	0,001
	Trade	1	11	1	33	2	15	0	0	4	16	
	Breeding	4	44	1	33	5	38	0	0	10	40	
	Official/ Private	3	33	1	33	4	31	0	0	8	32	

Nb: Number

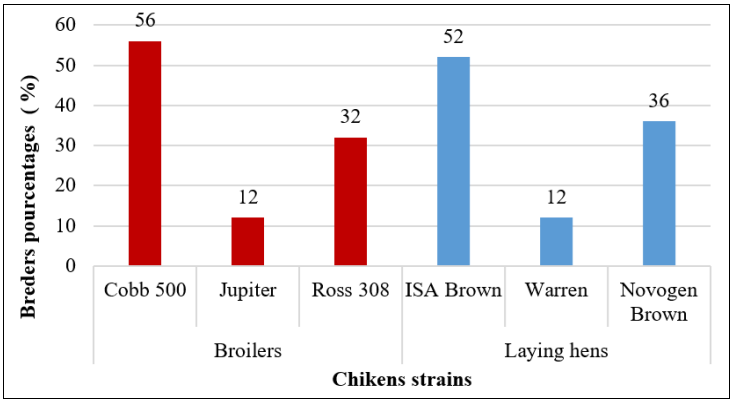

Fig 2: Different strains of chickens reared

3.2 Farms Characteristics

3.2.1 Raired Strains

In terms of broilers, most breeders (56%) use the Cobb 500 strain, followed by the Ross 308 strain (32%) and finally the Jupiter strain (12%). For laying hens, 52% of breeders use the ISA Brown strain; 12% of them use the Warren strain and finally 36% raise the Novogen Brown strain (Fig 2).

Table 4: Number of poultry livestock in the study area

	Localities surveyed	Speculations				Total		
		Broilers		Laying hens				
		Number of farm	Livestock	Number of farm	Livestock	Number of farm	Livestock	Pourcentage (%)
	M'Bengué	7	3 600	7	7 750	14	11 350	29
Communal area	Sanhara	1	500	0	0	1	500	1
	Sindjougou	1	300	0	0	1	300	1
	Foundo	1	500	1	500	2	1 000	3
	Souhoua	2	1 000	1	1 000	3	2 000	5
	Poungbè	3	1 300	3	1 300	6	2 600	7
Non communal area	Tongon	8	5 900	13	14 000	21	19 900	51
	Kationron	2	1 300	0	0	2	1 300	3
Total	8	25	14 400	25	24 550	50	38 950	100

3.2.2 Livestock Distribution

Table 4 summarizes the numbers according to the localities surveyed. They vary according to the type of speculation with an overall number of 38,950 head. According to the types of speculation, these numbers were 14,400 heads for broilers and 24,550 heads for laying hens. The village of Tongon includes 51% of the livestock surveyed with 19,900 heads compared to 11,350 heads for the village of M'Bengué (29%).

3.2.3 Technical Monitoring of Farms

Table 5 shows the status of the technical monitoring of the farms. Thus, for technical and medical follow-up, the number of farms that consult technicians from the veterinary services represents 20% of the workforce. This rate is lower than that of farmers who consult poultry advisers (38%). The presence of a footbath at the entrance to the buildings was observed in 38% of the farms surveyed. The crawl space is done on all farms and its duration varies from one farm to another. It is respected by 32% of broiler farms and by 72% of laying hen farms.

The daily cleaning of equipment, in particular waterers, is carried out in 84% of broiler chicken farms and in 36% of laying hen farms.

Table 5: Technical monitoring of farms

Type of farms			Number	Percentage (%)
Broilers	Presence of footbath	yes	9	36
		no	16	64
	Respect of the crawl space	yes	8	32
		no	17	68
	Daily cleaning of equipment	yes	21	84
		no	4	16
	Medical monitoring	Breeders	15	60
		Veterinary services	3	12
		Poultry advisors	7	28
Laying hen	Presence of footbath	yes	10	40
		no	15	60
	Respect of the crawl space	yes	18	72
		no	7	28
	Daily cleaning of equipment	yes	9	36
		no	16	64
	Medical monitoring	Breeders	6	24
		Veterinary services	7	28
		Poultry advisors	12	48

3.2.4 Source of Funding for Farms

At the level of broilers chickens, farms are financed with equity or family aid for 84% of the farms surveyed. Only 16% of the farms come from projects, in particular, the Tongon S.A. mine community project. For laying hens, 96% of farms are financed by equity or family aid and 14% are financed by bank loans (Fig 3).

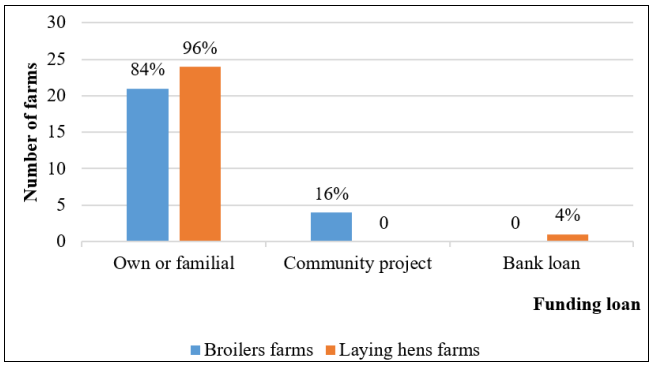

Fig 3: Source of funding for farms

3.3 Marketing and Constraints

3.3.1 Marketing

For all the speculations, five (05) types of buyers were identified in poultry products. These are resellers, processors, individuals, maquis-restaurants and the Tongon mining company (wholesaler). Their respective proportions are 14% for reselers, 6% for processors, 20% for individuals, 32% for maquis-restaurants and 28% for the Tongon mine (Fig 4).

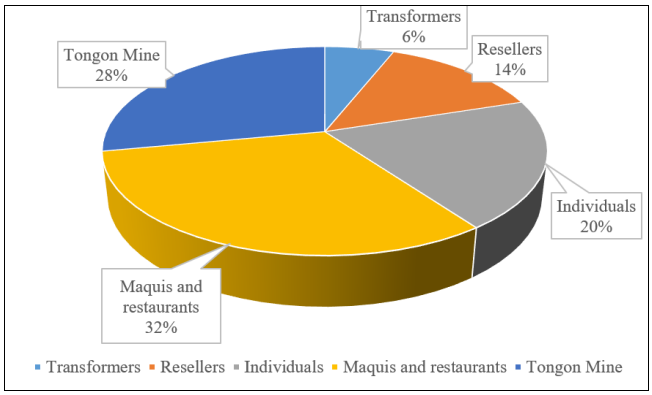

Fig 4: Customer of poultry farmers

3.3.2 Constraints

Several constraints exist in the poultry sector, however Table 4 lists those mentioned by breeders. The most important are the constraints related to the high cost of inputs, which are decried by 92% of broiler breeders and 100% of laying hen breeders.

The majority (80%) of broiler breeders mention constraints related to unsuitable means of transport and commercial constraints related to the sale of poultry products, while 76% of laying hen breeders report financials constraints.

Table 6: Constraints related to poultry production

	Broiler breeders		Laying hen breeders	
Contraints	Number	(%)	Number	(%)
Availability of inputs	16	64	11	44
High cost of inputs	23	92	25	100
Unsuitable means of transport	20	80	17	68
Pathological constraints	8	32	15	60
Commercial constraints	20	80	5	20
Financial constraints	15	60	19	76

%: Percentage

4. Discussion

The profession of broiler and laying hen breeders in the sub-prefecture of M'Bengué is practiced by both women and men. According to Brou *et al.* (2018) [6] modern poultry farming is an economic activity that interests both men and women. However, most breeders are men with 78% for broilers and 88% for laying hens. This situation can be explained by the fact that at the base, poultry farming is considered as a profession reserved for men (Boka, 2009) [5]. Broiler breeders aged between 40 and 60 are the most numerous (56%); and those of laying hens are over 60 years old (64%). This could be explained by the fact that individuals of this age group already have a main activity and have the means to finance livestock farming as a secondary activity (Bitty, 2013) [4]. As for the level of education of breeders, it is 40% in secondary school in broiler farms and 60% for laying hens. This can be explained by the fact that the poultry practice requires experience in the field at the risk of causing the bankruptcy of the promoter. These results are similar with those of Konan (2013) [10], where almost all the poultry farmers of Toumodi (94%) have studied and among them 44% have university level.

In terms of farm characteristics, the village of Tongon accounts for 51% of the surveyed numbers. This is explained by the presence of the mining company BARRICK Exploration in the said village. This company represents a potential market. Also, the owners of farms are often employees of the private or public sector. These employees would therefore have the concern to increase their income. Moreover, as indicated by M'bari (2000) [12], poultry farming can be seen as an effective means of diversifying income. Laying hens total 62% of the livestock surveyed and 52% of these farms are in the village of Tongon. This result is in order with that of Oulon (2010) [14] who identified, in the departments of Thiès and Rufisque (Senegal) 84,085 laying hens against 21,000 broilers respectively for 19 and 17 farms. This could be explained by the double resource generated by this speculation through the sale of eggs for consumption and reformed hens. For the source of financing, 8% of the farms surveyed come from the community project set up by the Tongon mining company. This could be explained by the social policy put in place by this company to create jobs for the benefit of the local population.

For health monitoring, most farms (80%) receive instructions from poultry advisers from feed companies or from the farmer's own initiative. The low percentage (20%) of animal health workers (veterinarians, engineers, and livestock technicians) used as poultry advisers could be explained by the high cost linked to the quality of their services. This result agrees with that obtained by Awono and Ly (2003) [3] who observed that 84% of poultry farmers in the peri-urban area of Dakar (Senegal) only call on a veterinarian when there is a problem that they consider serious. The health management of poultry farms by veterinarians reduces the impact of avian pathologies. However, given the high cost of providing them, biosecurity measures are almost absent as shown by other authors (Gueye, 2008) [9]. The pathologies are present and cause significant losses linked to mortalities and reduced performance in their poultry farms (Dosso, 2014) [7]. Thus,

in terms of pathologies encountered, the most dominant is chronic respiratory disease (58%), followed by Gumboro disease (30%). This could be explained by poor health prophylaxis conditions (Rabeson, 2010) [15].

In terms of marketing and constraints, 92% of broiler breeders and 100% of laying hen breeders mention the high cost of inputs. This observation is made by FAO (2008) who mentions that throughout the year, the prices of poultry products experience a usual fluctuation. According to the same source, the production of fishmeal increased by 22.1% in quantity and underwent a 23.5% increase in its unit value, over the period 2004-2006. It is produced and marketed by a single local company located in Abidjan. This leaves it a certain margin in terms of the pricing of its products. Commercial difficulties are often recurrent according to 80% of broiler breeders. According to Koné (2007) [11], this could be explained by the fact that with a variable demand during the year and the poor organization of the market, many poultry farmers limit themselves to specific operations linked to periods of religious or customary festivals. To easily sell their products. In addition, the poor knowledge and lack of control of the poultry market has led to a failure in the marketing circuit (M'bari, 2000) [12]. This situation has led, according to Essoh (2006) [8], to fierce and unfair competition from massive imports of frozen poultry from outside Africa, preventing national producers from selling their production.

5. Conclusion

At the end of our study, it is clear that poultry farming in the sub-prefecture of M'Bengué is growing despite some difficulties observed. Non-compliance with hygiene measures and pathological constraints could slow down the development of this activity. The main diseases encountered are Chronic Respiratory Disease (58%), Gumboro disease (30%). The absence of a footbath is noted in most farms (64%), as well as non-compliance with the crawl space (48%). A limited number of farms are monitored by agents of the Veterinary Services (20%).

The level of education of breeders guarantees the practice of good health and medical hygiene measures which would contribute to the improvement of zootechnical performance. Thus, additional studies on biosecurity will have to be carried out to assess the impact of health management on the income of breeders.

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