

Characteristics and Destinations of Indigenous Chickens Marketed in Guéra Region, East-Central Chad

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Abstract: The objective of the study was to assess zoeconomic parameters like age, weight, price and destinations of produced chickens that are sold on three main markets of Guéra, east-central Chad. Data were collected over six months on the market places of Mongo and Mangalme and four months on the market place of Bitkine. The transversal and retrospective survey was coupled with direct observations and weightings. For 1549 marketed chickens, the males made up 57% and the females 43%. The average values per chicken were found to be 16.2±9.9 months for age, 1082.4±371.2 g for weight and 1607.8±FCFA 414.6 for price. Average age and weight of sold chickens were significantly higher ($p<0.001$) on Mangalme market, with an average price significantly lower ($p<0.001$). On the whole, 52% of surveyed chickens were intended for sale in the capital N'Djaména, 39% in Mongo city, 7% in Bitkine and 2% in Mangalme. According to the final destinations declared by buyers, average age and weight of the sold chickens to be consumed in Bitkine were significantly lower ($p<0.001$) but with an average price significantly higher ($p<0.001$). The Mangalme sellers sold mainly old chickens in order to earn more money. The pressure exerted by N'Djaména traders to purchase chickens in Bitkine increases prices.

Key words: Chicken, market, main destination, Chad

INTRODUCTION

The keeping of family poultry is practiced in 90% of households in Chad (Mopaté, 2010). It contributes mainly to supply urban centres with chicken meat because of the low production of the semi-industrial or commercial broiler chickens. Guéra is a chicken-producing region. In end 2009, the poultry sector review of Chad reported a national poultry flock of 2.4 millions (especially chickens) in Guéra region (Mopaté, 2010). Producers, production practices, main constraints and the performances poultry farms are known (Mopaté *et al.*, 1998; Maho *et al.*, 1999; Mopaté *et al.*, 2000; Mopaté *et al.*, 2010). On the other hand, the characteristics (sex, age, weight and price) of the marketed chickens in that region are unknown. As for their destinations, some information reports that N'Djaména markets are supplied in chickens from Guéra region. The aim of the present study is to determine the zoeconomic parameters (age, sex, weight and price) and to identify destinations for produced chickens sold on three main markets (Mongo, Mangalme and Bitkine) of Guéra, East-Central Chad.

MATERIALS AND METHODS

Study site and targeted markets: The study was conducted in the northern part of the Guéra region, East-Central Chad. This part constitutes three of the four

administrative entities of Guéra. The three entities are called Bitkine, Mongo and Mangalme. Their GPS (Global Positioning System) coordinates are 11°56'18" (north altitude) and 18°16'11" (east longitude) for Bitkine, 12°09'30" and 18°40'30" for Mongo and 12°21'04" and 19°36'01" for Mangalme. Mongo is the capital-city of the region. The middle-sized towns and their respective markets bear the same names. These markets have a daily attendance with a fixed day in the week, as the great day of the weekly market. The weekly market is experiencing a special shopping rush.

Methods of data collection: Data were collected over six months on the markets of Mongo and Mangalme and four months on the market of Bitkine. The weekly market day in each city was selected for the data collection, which means four times a month. Investigators were posted at the entrance of the market on the main roads and points of sale of chickens in markets. These places are points of contact between buyers and sellers of chickens. The cross-sectional and retrospective study concerned the nature of the seller, his age and experience in the keeping of family chickens. Only sellers responsible for the farm management were surveyed. This choice was guided by the need to collect reliable data on the age of chickens intended for sale. Direct observations were made on 1549 chickens. They

were done for sex determination, consideration of health status, the sale price after conclusion of the transaction between seller and buyer and weight measured by the investigator. The final destination declared by the buyer was noticed.

To perform the weighing, the poultry weighing instrument of 3 kg with an accuracy of 20 g was used. Investigators were previously trained in reading the chicken weight, shackled by the legs with a cord and hanged to a hook of a weighing instrument. The cord used by each investigator was calibrated beforehand.

Data analyses: The data collected were entered on "Access" database management software and transferred to the "Winstat-ic" processing software developed by the French Agricultural Centre for International Development (CIRAD). Some characters variables were recorded in numerical variables with modalities. Analysis of variance was performed. The breakdown of average ages, of weights and of the price was done on factors associated with sex, market, destination area and the month of commercialisation. Data were expressed in percentages and mean values with their standard deviations. Significant differences on means were established at 5%.

RESULTS

Chicken sellers: Human demographic profile of chicken sellers was found to be adult women (75%), young people (20%) and adult men (5%). They all were producers of 37.4±12.2 years old and had experience in family poultry farm for 9.4±3.3 years.

Number, sex, weight and price of chickens: Out of 1549 marketed chickens, 57% were males and 43% females. The average age, weight and price were significantly dependent on the chicken sex ($p < 0.05$) (Table 1).

On the whole, 1459 marketed chickens (around 94%) were in good condition. On the other hand, 90 birds (around 6%) were infested with ticks or showed an early

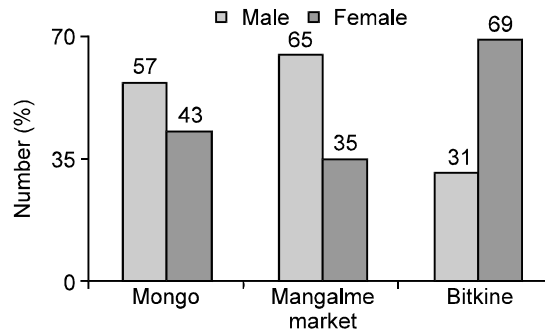


Fig. 1: Distribution (in %) of marketed chickens according to sex and market in Guéra region, East-Central Chad

stage of respiratory symptoms. Whereas the average weights of chicken in good condition (1082.5±372.1 g) and the ones of chickens in bad condition (1080.4±359.5 g) did not differ significantly ($p > 0.05$), the average price of birds in good condition (FCFA 1614.5±411.0) was higher ($p < 0.05$) than the ones of sick birds (FCFA 1499.2±457.7).

Number, age and price of chickens as influenced by the market:

The marketed chickens were distributed for 42.3% in Mongo market, 44.3% in Mangalme market and 13.4% in Bitkine market. The sex distribution has shown that, in contrast to Bitkine, more males were marketed than females in Mongo and Mangalme markets (Fig. 1). The average age and weight of chickens sold in Mangalme market were significantly higher ($p < 0.001$) but with a price significantly ($p < 0.001$) lower (Table 2).

The sale of chickens generated an income of about FCFA 2.5 millions in the region during the study period, distributed among Mongo (48%), Mangalme (38%) and Bitkine (14%) markets.

Number, age, weight and price of chickens as influenced by the destination:

Around 52% of all the marketed chickens were intended for the capital-city,

Table 1: Number, age, price and weight of the chickens marketed as influenced by sex of the birds at three markets of the Guéra region, East-Central Chad

| Parameter | Chicken sex | | Total |
|------------------------------------|---------------------------|--------------------------|--------------|
| | Male | Female | |
| Number | 884 | 665 | 1549 |
| Average age (month) | 18.9±10.9 ^a | 12.6±6.8 ^b | 16.2±9.9 |
| Average weight (g) | 1176±334.6 ^a | 957.0±380.6 ^b | 1082.4±371.2 |
| Average price (FCFA ¹) | 1700.8±385.7 ^a | 1484.1±419 ^b | 1607.8±414.6 |

¹€ 1 = FCFA 655,957. Mean values in the same row with different letters differ significantly at 5%

Table 2: Age, weight and price of sold chickens according to the market in Guéra region, East-Central Chad

| Market | Age (month) | Weight (g) | Price (FCFA) | No. of chickens |
|----------|------------------------|---------------------------|---------------------------|-----------------|
| Mongo | 13.4±08.4 ^b | 1069.6±310.9 ^b | 1843.9±303.5 ^a | 656 |
| Mangalme | 19.6±10.9 ^a | 1127.5±426.4 ^a | 1341.1±374.9 ^c | 686 |
| Bitkine | 13.5±06.9 ^b | 973.4±293.9 ^c | 1743.5±313.9 ^b | 207 |
| Total | 16.2±09.9 | 1082.4±371.2 | 1607.8±414.6 | 1549 |

Mean values in the same column with different letters differ significantly at 5%

Table 3: Age, weight and chickens average price by final destination declared by the buyer in Guéra region, East-Central Chad

| Market | Age (month) | Weight (g) | Price (FCFA) | No. of chickens |
|-----------|------------------------|---------------------------|---------------------------|-----------------|
| Mongo | 14.1±08.8 ^b | 1064.4±457.8 ^a | 1570.5±439.4 ^b | 601 |
| Mangalme | 15.6±06.7 ^b | 1044.7±190.7 ^a | 987.5±135.2 ^c | 30 |
| Bitkine | 13.2±07.2 ^c | 944.7±287.9 ^b | 1697.4±345.3 ^a | 114 |
| N'Djaména | 18.3±10.6 ^a | 1116.8±303.2 ^a | 1646.2±389.4 ^a | 804 |
| Total | 16.2±09.9 | 1082.4±371.2 | 1607.8±414.6 | 1549 |

Mean values in the same column with different letters differ significantly at 5%

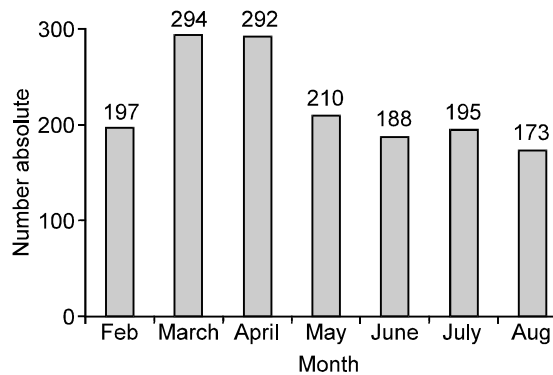


Fig. 2: Distribution of the monthly sales during the follow-up period of the three main markets of Guéra, east-central Chad

N'Djaména, 39% for Mongo town, 7% for Bitkine town and 2% for Mangalme town. Based on the final destination indicated by surveyed buyers, the average age and weight of chickens intended for Bitkine were significantly lower ($p < 0.001$) whereas their prices were significantly higher ($p < 0.001$) (Table 3).

It was found that 92% of marketed chickens in Mongo market, 55% in Bitkine market and only 4% in Mangalme market were conveyed towards N'Djaména for sale.

Number, age, weight and price of marketed chickens per month

Distribution of marketed chickens per month: The average sales amounted to 221 chickens per month. The monthly distribution showed that more sales took place during the months of March, April and May, compared to the other months (Fig. 2).

Age, weight and price of marketed chickens per month:

The age of marketed chickens was significantly lower ($p < 0.001$) in August (13 months) than the other months (≥ 15 months) (Table 4). The weights were significantly lower ($p < 0.001$) in February and June compared with other months. The prices were high, except for June, July and August ($p < 0.001$).

DISCUSSION

The study provided characteristics and destinations of the marketed chickens in the three main markets of the Guéra region, Chad. It confirmed the fact that chickens produced in Guéra supply mainly the market of

Table 4: Age, weight and price of the marketed chickens per month in the three markets of the Guéra region, East-Central Chad

| Month | Age (month) | Weight (g) | Price (FCFA) |
|----------|------------------------|---------------------------|---------------------------|
| February | 14.8±08.3 ^d | 1002.4±296.0 ^c | 1681.9±430.1 ^b |
| March | 15.6±09.7 ^d | 1092.1±334.3 ^b | 1711.9±372.8 ^a |
| April | 15.8±09.2 ^d | 1051.7±312.0 ^b | 1715.7±389.4 ^a |
| May | 19.5±12.9 ^a | 1156.5±272.4 ^a | 1795.0±278.4 ^a |
| June | 16.1±10.0 ^c | 1003.7±243.8 ^c | 1497.6±310.9 ^c |
| July | 18.5±09.5 ^b | 1143.0±652.8 ^a | 1314.7±420.0 ^d |
| August | 13.4±06.8 ^e | 1135.6±339.9 ^a | 1387.1±444.5 ^e |

Mean values in the same column with different letters differ significantly at 5%

N'Djaména, the capital-city of Chad. Thus, adequate vaccination against Newcastle disease (ND), a major constraint to family poultry production which has been occurring from October to June with the highest prevalence between December and February every year in the region, would increase the availability of marketable chickens (Mopaté *et al.*, 2000), thus additional income in poultry-keeping households. The same findings, notably the reduction in mortality rates, were reported in Malawi and Kenya (Gausi *et al.*, 2004; Kingori *et al.*, 2010).

Women constituted the majority of chicken sellers. These results are in accordance with those reported in some markets of the African countries. Thus, 88% of chicken sellers are reported to be women in Kalerwe market in Uganda (Emuron *et al.*, 2010), 74% in Botswana (Guéye, 2003) and more than 50% in Nigeria (Alabi *et al.*, 2006). But in Ethiopia, percentages of women ranged from 40-50% (Aklilu *et al.*, 2007). This information shows that the management of small flocks, notably backyard poultry in Sub-Saharan Africa, is in the hands of women and children. In 92% of households surveyed in the rift valley in Ethiopia, the husbandry and management of the family poultry flocks fall within the competence of women and children (Dinka *et al.*, 2010). In the Kwara State, Nigeria, they are between 50 and 73% (Ogunlade and Adebayo, 2009). The 9-year experience in the keeping of family chickens allows producers to give accurate information about the age of chickens intended for sale.

More males were marketed compared to the females. The same result was reported in Senegal (Guéye *et al.*, 1998) and Malawi (Gondwe *et al.*, 2005). Our percentages (57%) of the marketed males were slightly inferior to the value (60.7%) reported in Senegal (Guéye *et al.*, 1998). In general males are heavier than females

and are more in demand by households and restaurant owners. On the markets, purchasers weigh up several times chickens to estimate their weights. This practice indicates that bird's weight is determining criterion to choose chickens to purchase (Guéye *et al.*, 1998).

The inversion of the percentages between the marketed males and females in Bitkine could be associated with the offered good price. In contrast to the two others, this market is closer to N'Djaména and is more attended by the operators from that city. Thus, the demand pressure of chickens in this market is high. The average weight of chickens was the lowest (973 g) in Bitkine compared with the two other markets, but with a high average price. The lure of gain can explain the high number of female chickens sold in that market. The Mangalme market is not much attended, the city is less important and very far from N'Djaména, contrary to Bitkine and Mongo. Most marketed chickens were intended for the household consumption. Although the age and the weight of chickens are the highest in Mangalme, the average price remains lower. The distance of a market is a constraint to the marketing of chickens in Malawi (Gausi *et al.*, 2004). The marketing of old and heavy chickens would be a choice adopted by producers in order to get a higher income. In Mongo, the attendance of its market by traders from N'Djaména is moderate. In addition, Mongo as the capital of the region has many salaried people who have a good purchasing power. The high pressure from the demand explains expensive sales' prices of chickens in the Mongo market.

The average weights of marketed chickens in the region were close to the registered values in the Chad's urban markets of N'Djaména (1047g) and Bongor (1017.4 g) but superior to the one of the Moundou (938.5 g). Guéye *et al.* (1998) observed in two Senegal markets that an average weight is about 1243.5 g (out of 502 males and 325 females), superior to our results. As for the average price, it is below the national rate of FCFA 1840, estimated in 2008 (Mopaté, 2010). In Niger, the live chicken (1.5 kg) costs FCFA 1622 (Idi and Ganda, 2009).

The lower prices recorded in June, July and August compared to the other months can be associated with the rainy season and to the activities of the producers during that period. In fact, this season is characterized by a lower attendance of markets. The movements of traders have become difficult because of bad conditions of the roads and the numerous agricultural works by chickens producers. Akliu *et al.* (2007) and Emuron *et al.* (2010) reported that the level of sales and prices of poultry are influenced by the season and the feasts period. The sales of more than 200 chickens in March, April and May would explain the high market attendance by operators and producers. In Guéra region, these three months make up the dry season during which there are less agricultural activities. The high attendance

of markets by operators during the dry season influenced the prices of chicken which were higher than in the rainy season. The higher chicken prices during the dry season, compared to the rainy season, were similarly reported in Malawi (Gondwe *et al.*, 2005).

Our study was conducted directly with chickens producers, consumers or operators (traders, collectors and other middlemen). In addition to searched accuracy on chicken age, the choice was also done to bypass the middlemen and to have prices that reflect local realities. The increase in the numbers of middlemen in the marketing network has led to higher prices as a result of increased profits margins. This network without middlemen also helps producers to gain the biggest added value from marketed products.

Conclusion: The study provided characteristics and destinations of the marketed chickens in the three main markets of the Guéra region, Chad. The simultaneous study of the sex, the age, the weight and marketed chicken prices on the market is a novel method in the understanding of the animal value chain, especially family poultry. It would be interesting to determine the consumers preferences (restaurant owners, housewives, street vendors of grilled chickens, etc.) for the chicken types (adult or young). This knowledge would make it possible to guide the production upstream and the commercialisation downstream for specific types of chicken.

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REFERENCES

- Akliu, H.A., C.J.M. Hlmenkinders, H/M.J. Udo and A.J. Van Der zijpp, 2007. Village consumption and marketing in relation to sex, religion festivals and market access. *Trop. Anim. Health Prod.*, 39: 165-177.
- Alabi, R.A., A.O. Esobhawan and M.B. Aruna, 2006. Econometric determination of contribution of family poultry to women's income in Niger-Delta, Nigeria. *J. Central Eur. Agric.*, 7: 753-760.
- Dinka, A.M., R. Chala, F. Daw, S. Leta and E. Bekana, 2010. Socio-economic importance and management of village chicken production in rift valley of Oromia, Ethiopia. *Livestock Res. Rural Dev.*, 22(11), www.lrrd.org/lrrd22/11/dink22203.htm.
- Emuron, N., H. Magala, F.B. Kyazze, D.R. Kugonza and C.C. Kyarisiima, 2010. Factors influencing the trade of local chickens in Kampala city markets. *Livestock Res. Rural Dev.*, 22 (4), www.lrrd.org/lrrd22/4/emur22076.htm.

- Gausi, J.C.K., A.C.L. Safalaoh, J.W. Banda and D.H. Ngongola Ntcheu, 2004. Characterisation of the smallholder poultry marketing systems in rural Malawi: A case study of Malingunde Extension Planning Area. *Livestock Res. Rural Dev.*, 16 (12), www.lrrd.org/lrrd16/12/kaus16097.htm.
- Gondwe, T.N., C.B.A. Wollny and W. Kaumbata, 2005. Marketing system and channels for scavenging local chickens in Lilongwe, Malawi. *Livestock Res. Rural Dev.*, 17 (3), www.lrrd.org/lrrd17/3/gond17024.htm.
- Guéye, E.F., A. Ndiaye and R.D.S. Branckaert, 1998. Prediction of body weight on the basis of body measurements in mature indigenous chickens in Senegal. *Livestock Res. Rural Dev.*, 10 (3), www.lrrd.org/lrrd10/3/sene103.htm.
- Guéye, E.F., 2003. Methodes et strategies de formation et de vulgarisation en aviculture familiale. *Livestock Res. Rural Dev.*, 15 (12), www.lrrd.org/lrrd15/12/guey1512.htm.
- Idi, A. and O. Ganda, 2009. Revue du secteur avicole du Niger. FAO, April 2009, pp: 61, www.fao-ectad-bamako.org/fr/IMG/pdf/Niger_FR_.pdf.
- Kingori, A.M., A.M. Wachira and J.K. Tuitoek, 2010. Indigenous chicken production in Kenya: A review. *Int. J. Poult. Sci.*, 9: 309-316.
- Maho, A., L.Y. Mopaté and G. Kebkibaye, 1999. Enquete serologique sur quelques maladies aviaires dans la region du Nord-Guéra. *Tropicultura*, 16-17: 197-200.
- Mopaté, L.Y., P. Hendrikx, M. Imadine and A. Idriss, 1998. Socio-economie de la production aviaire dans la region du Nord-Guéra au Centre-Est du Tchad. *Revue Scientifique du Tchad*, 5: 29-32.
- Mopaté, L.Y., P. Hendrikx and M. Imadine, 2000. Contraintes sanitaires à la production des poulets dans la region du Centre-Est du Tchad. In: *Issues in Family Poultry Research and Development*. Sonaiya, E.B. (Ed.) Proceedings of Workshop of International Network for Family Poultry Development, held at M'Bour, Senegal, 9-13 December 1997, pp: 89-95.
- Mopaté, L.Y., 2010. Revue du secteur avicole au Tchad. FAO, Union Europeenne, May 2010, pp: 72, www.fao-ectad-bamako.org/fr/IMG/pdf/Chad_FR_.pdf.
- Mopaté, L.Y., N. Djimtoloum and V. Zeuh, 2010. Elevage familial des poulets au Centre-Est du Tchad: Pratiques d'elevage et performances zootechniques. *Communications en Aviculture Familiale*, 19: 32-39.
- Ogunlade, I. and S.A. Adebayo, 2009. Socio-economic status of women in rural poultry production in selected areas of Kwara State, Nigeria. *Int. J. Poult. Sci.*, 8: 55-59.