



Supply and marketing of small ruminants in N'djamena's Livestock Markets, Chad

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Abstract

The study aimed to assess the supply and marketing of small ruminants in the markets of N'Djamena city. It was carried out by random survey of 42 traders distributed in 6 small ruminant markets in N'Djamena city. The results showed that the traders were 37.21 ± 7.74 years old. They had little education (69%) with 11 years of experience. All the small ruminant traders originated from pastoral regions where breeding represented a dominant activity. The most traded species were sheep (90.5%) and goats (9.5%). Diguel's markets ensured the supply of animals to other markets. Animals are transported to other markets by minibuses (57.1%) and vans (33.3%), at an average price of 1,100 CFA francs per head. The expenses incurred were around 2,376 CFA francs / head / day. Average selling price was $26,577.33 \pm 3,801.08$ CFA francs for sheep and $19,583.33 \pm 1,878.84$ CFA francs for goats. With three (3) sheep and two (2) goats sold per day, the average net margin achieved was 7,752 CFA francs and 6,840 CFA francs for sheep and goats, respectively. The organization of stakeholders and the development of livestock market infrastructure will allow a better supply of small ruminants to the markets.

Keywords: Small ruminants; Supply; Marketing; Markets; N'Djamena; Chad

1. Introduction

The world population suffers from malnutrition linked to food deficiency, particularly in animal proteins. This problem mainly affects the population of sub-Saharan African countries, despite the relatively large herd presence. In these countries, livestock constitutes a precious asset serving as savings, a source of income, food security for breeder families, social integration and confers a place in society [1]. Chad is a Sahelian country with a pastoral vocation where breeding represents one of the main activities in the rural world [2]. Chadian herd size is estimated being over 94 million head and 34.6 million poultry [3]. This will position Chad as one of the largest herding countries in sub-Saharan Africa [3]. Like other African cities, N'Djamena, Chad's capital, is experiencing rapid urbanization. The various conflicts, socioeconomic and food insecurity were the main factors that pushed a large part of the rural population to migrate to the capital.

The strong demographic and urban growth pose the problem of food insecurity and makes more and more difficult the availability and the accessibility of animal proteins. Meat demand growth forecasts are worrying given the continent's production capacities [4]. The various conflicts that the country has known together with food insecurity have been the main factors that have pushed many of the population to migrate to the capital. The strong demand for small ruminants in the markets improves its exploitation. To satisfy the protein needs of this population, analysis of the supply and marketing of small ruminants is indispensable. The objective of the present work was to contribute to the knowledge of the small ruminant sector importance and its role in supplying the Ndjamenan livestock markets and in improving the actors' income.

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2. Material and methods

2.1. Study area

The study was carried out in N'Djamena, the political and administrative capital of Chad. It lies between latitude 12° and 13° north, and longitude 15° and 16° East. N'Djamena is located in the center-west of the country, at the confluence of the Chari and Logone rivers, on the right bank of the Chari. Its climate is tropical dry with two seasons; dry and wet. Annual average temperature is around 37°C, with an 18°C minimum in January and February and 45°C maximum between April and May.

2.2. Sampling and data collection

The study was carried out from August 08 to September 11, 2016 by random survey using a questionnaire. It was conducted in six (6) small ruminant markets which bore the names of the neighborhoods that house them, including two main markets (Diguel Ngabo and Diguel Ndjare) and four secondary markets (Farcha, Dembe, Karkandjie and Amtoukougne).

The markets surveyed were distributed in four (4) among ten (10) districts of the N'Djamena city. The choice of markets surveyed was guided by the presence of small ruminant trade activities. Thus, all the major markets for the sale of small ruminants were surveyed. The choice and number of small ruminant traders interviewed was made at random. Out of a total of 252 traders identified, 42 traders were surveyed, implying a survey rate of 22% (Table 1).

Table 1 Markets location and number of traders identified and surveyed by market

Borough	Market	Number of traders	Number of traders surveyed	Sounding rate (%)
8e	Diguel Ngabo	100	15	15
8e	Diguel Ndjare	100	14	14
1er	Farcha	15	4	26.7
7e	Dembé	8	3	37.5
5e	Karkadjié	14	3	21.4
7e	Amtoukougne	15	3	20
	Total	252	42	22.4

The gross average gain was calculated by subtracting the sale price from the purchase price. While the average net gain has been assessed by reducing the various charges (food, water, security, municipal tax, transport), the average gross gain is less.

2.3. Data analysis

The data collected was coded and typed into the Microsoft spreadsheet for Excel 2007. The descriptive analysis, averages and standard deviations were processed using the Statistical Package for the Social Science (SPSS version 10 software).

3. Results

3.1. Socio-economic profile and distribution in livestock markets and of traders

The traders surveyed consisted of 42 muslim men. They were 37 years old and married. They have 11 years of experience in the small ruminant trade (Table 2).

The percentage of small ruminant traders surveyed was higher in Diguel Ngabo and Diguel Ndjari markets (Figure 1).

The results in Table 2 showed that the traders belong to the Gouran, Arab and Kanembou language groups. The majority were married and came from the provinces of Kanem and Batha. Most of these traders have not been schooled. Their previous activities have been agriculture, labor, commerce and the military. The conversion to the small ruminant trade was motivated by profitability of this activity (Table 3).

Table 2 Age, number of wives and children of traders surveyed

Variables	Average	Ecartype	Minimum	Maximum
Age (year)	37.21	± 7.74	22	58
Number of wives	1.19	±0.50	0	2
Number of children	5.46	±2.75	0	12
Number of assets	5.34	±2.65	0	12
Experiences (years)	11	±3.49	6	19

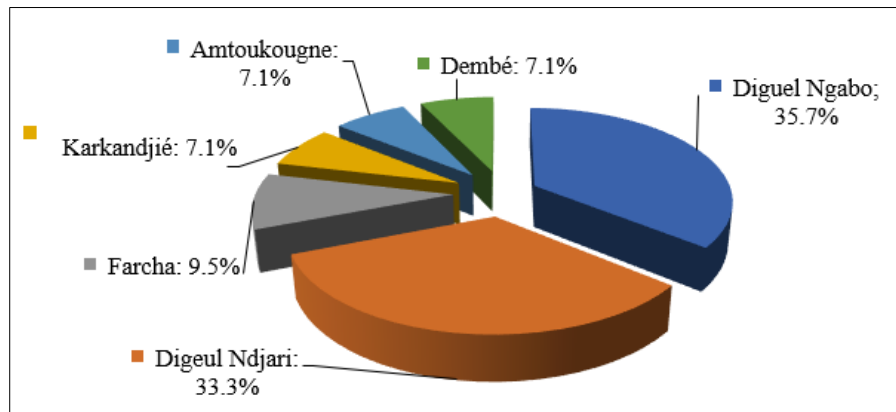


Figure 1 Distribution of traders in the markets

Table 3 Profile of small ruminant traders surveyed in the different markets

Variables	State	Effective	Percentage (%)
Ethnic group	Gouran	26	61.9
	Arabe	13	30.9
	Kanembou	3	7.1
Marital status	Married	34	81
	Divorced	4	9.5
	Single	3	7.1
	Widower	1	2.4
Regions of origin of traders	Kanem	19	23.8
	Batha	10	23.8
	Salamat	4	11.9
	Other	9	9.5
Level of education	Illiterate	29	69
	Primary	12	28.6
	Secondary	1	2.4
Past activities (n=20)	Agriculture	6	30
	Workforce	6	30
	Trade	4	20
	Armed	4	20
Reason for changing previous activity	Profitability	42	100

3.2. Supply markets and marketing of animals

The marketing of small ruminants has been dominated by the sale of sheep compared to that of goats. The supply of small ruminants to the Diguel markets was enabled by the availability of animals from production areas (Batha, Hadjar-Lamis and Ouaddai). The other markets received their supplies from Diguel markets. The animals were transported to other markets by minibus and van (Table 4).

Table 4 Supply and types of animals sold

Variables	State	Effective	Percentage (%)
Small ruminant species traded	Sheep	38	90.5
	Goat	4	9.5
Reason for choosing the species marketed (n=34)	High demand for meat from small ruminants	34	100
Procurement markets	Production areas	29	69
	Diguel markets	13	31
Means of transport	Minibus	31	57.1
	Van	9	33.3
	Other	2	4.8

The price determinants of small ruminants in the markets were sex and fattening, sale period and origin of the animal (Figure 2).

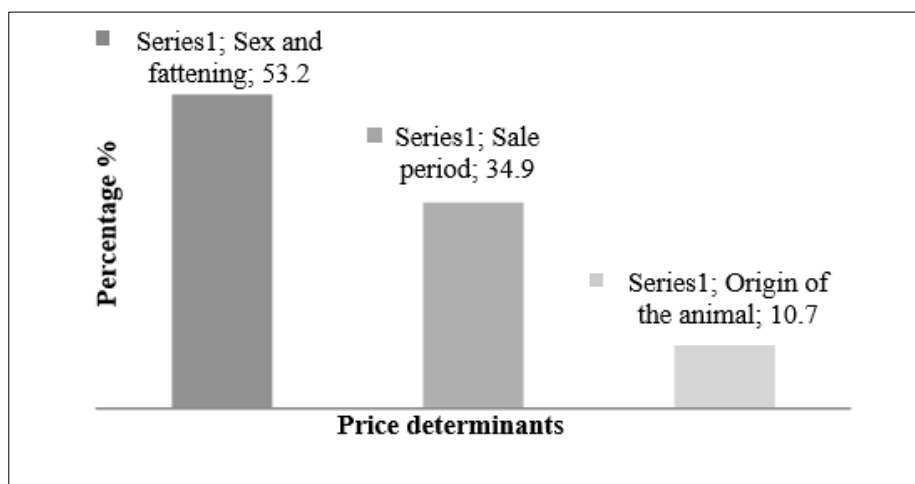


Figure 2 Determinants of animal prices in markets (n=252)

Table 5 Average purchase and sale prices in CFA francs of animals according to their provenance

Province	Sheep		Caprins	
	Buying price	Selling price	Buying price	Selling price
Hadjer-Lamis	22,470±4,132a	32,380±5,276a	18,125±2245a	26,250±2,362a
Batha	27,291±5,156b	37,619±5,978b	20,625±3119a	30,000±4,082a
Ouaddai	29,971±5,910b	40,119±7,147b	20,000±4472a	28,333±6,783a
Average	26,577.33± 3 801.08	36,706.00± 3,949.46	19,583.33± 1,301.04	28,194.33± 1,878.84

The average number of animals sold per day was 3.38 sheep and 2 goats. However, the price of buying and selling animals varied depending on the species and Provinces of supply. Thus, the purchase price of sheep from Ouaddai Province was higher than the purchase price of sheep from Batha Province and Hadjer-Lamis ($p < 0.05$). Conversely, the purchase price of goats from Batha Province was higher than the price of this species in other provinces (Table 5).

The various average expenses incurred per animal during the activity relating to the payment of tax, the costs of feed, water, guarding and transport were 2,376 CFA francs (Table 6).

Table 6 Average expense per animal in small ruminant markets

Nature of load	Cost CFA francs
Town hall tax	202,37±76,05
Head feed cost (CFA)	696,42±200,15
Cost of water, poor sales (CFA) head	100
Guarding cost	210,91±65,31
Transport fee	1166,66±239,59
Total	2376, 36 ± 581,1

The average net gain from animals sold varied from one province to the other. Thus, for sheep, this gain was higher for animals from the Province of Batha (7,952 CFA francs) than for sheep from other provinces. On the other hand, goats from the Province of Ouaddai generated more benefits in terms of profits than those of the other Provinces (Table 7).

Table 7 Average gains per head sold according to their provenance

Variable	Gross average gain in CFA francs		Average net gain in CFA francs	
	Sheep	Goat	Sheep	Goat
Hadjer-Lamis	9,910a	8,125a	7,534a	5,749a
Batha	10,328a	9,375a	7,952a	6,999a
Ouaddai	10,148a	8,333a	7,772a	7,772a
Average net gain of the regions			7,752	6,840
Average monthly net gain			697,680	410,400

3.3. Constraints related to trade in small ruminants

Feeding and watering constituted for the respondents the major constraints to the activity of the small ruminant trade in the market (Table 8).

Table 8 Difficulties encountered by small ruminant traders in the markets

Variables	Nature	Effective	Percentage (%)
Difficulties	Food and water scarcity	32	72.2
	High taxes	5	11.9
	Animal sale	4	9.5
	Care	1	2.4
Total		42	100

4. Discussion

The results show that all of the small ruminant traders were muslim men. The absence of women in the practice of trading in small ruminants is linked to customs and traditions in certain regions of the country. It would be also linked to the practice of the activity itself, which requires a lot of physical effort. The majority of traders come from pastoral regions in which breeding constitute the primary activity (Gourane, Arab and Kanembou).

The two main markets of Diguel Ngabo and Diguel Ndjari located on the northern axis hosted most of the traders. These collection and distribution markets supply other secondary markets in the city of N'Djamena with small ruminants. Their strategic geographical position, located at the northern entrance to the city, places them as the main collection and distribution markets.

the market value of sheep was higher than that of goats [5]. The choice of this species was motivated by the high demand and the quality of its meat, but also by the purchase of live animals. However, Goats are one of the most important sources of meat in some environments where it is not common to slaughter cattle during social and ritual events [1]. Their small size and low carcass weight correspond to daily consumption requirements and avoid problems associated with meat preservation [6]. The animals in the markets are fed fodder and complementary food purchased on the spot. The duration of sale of animals in a market varies from a day to a week. Animals not sold can be directed on the following days to other markets in the city. Thus, every day, we note the arrival of animals in a particular market while others leave for other markets.

The purchase prices of animals vary according to provinces. These prices take into account transport costs and other expenses that wholesalers pay. Thus, the average purchase price for the sheep is 26,577 CFA Francs and 19,583 CFA francs for goats. The Arabian ram is sold in the N'Djamena market at an average price of $49,812.50 \pm 13,768.97$ CFA francs [7]. The average purchase price of goats is slightly higher than the purchase price of a goat in Bangui which is 17,530 CFA francs [8]. The cost of transporting animals from supply markets to markets in other districts varies between 1,000 to 1,500 CFA francs. For transport, traders use minibuses, pick-ups and vans. This further increases the variable costs which are passed on to the selling price and therefore to consumers. The number of animals sold varies depending on the period and season. Our observations show the average number of animals sold per day in the markets is low. It is two for goats and three for sheep. This may be since the surveys took place during the rainy season (August) when economic activities are slowing down. The price difference recorded during this study did not show significant differences between the provinces. However, the high price of animals from the Ouaddaï Province can be justified on the one hand by the distance traveled (900 km) and on the other hand by the quality of fatty meat particularly prized by customers. In Ivory Coast, the average price of a local breed sheep is 55,000 CFA francs on the markets of Abidjan and 42,500 CFA francs in outback of the country but the price of a Sahelian sheep rises to 102,500 CFA francs on average. Local breeds of goats in the markets are sold at an average price of 47,500 CFA francs [9] which is higher than our selling price. This difference in animal price is explained by the importation of animals by Ivory Coast. In the Central African Republic, the selling price of a live sheep is 75,000 CFA francs or even 100,000 CFA francs for sheep during the Tabaski period and 30,000 CFA francs for goats [10]. These recorded prices are higher than the prices observed during the study.

The net gains made by traders vary from around 7,752 CFA francs / head / sheep and 6,840 CFA francs / head / goat. This gain is greater than that achieved in Senegal which is 5,700 CFA francs / head [11] and in Bangui which is 3,808 CFA francs / head / goat [8].

Our observations show that food and water are major constraints to the activities of small ruminant trade. The cost of 1,000 CFA francs / head / days is relatively high. This cost affects the income of Sahelian herders whose livestock is the main means of subsistence [12]. The same observations are made by Aboulmali [13] who observes that food is the major constraint in peri-urban farming.

5. Conclusion

The study showed the importance of supply and marketing of small ruminants in different markets of N'Djamena. The small ruminant's trade presents a definite economic interest. The traders are mainly men, native from areas where breeding is a dominant activity. The supply of small ruminants to various markets in N'Djamena is facilitated by the markets of Diguel (Ngabo and Ndjari). Interurban transport from supply markets to other markets is carried out mainly by minibus and Pick Up. The net gain per sheep and goat head is substantial. Feeding and watering animals are the major constraints to the sales activity in the various markets. Technical support, the organization of the various actors in the sector as well as the establishment of adequate infrastructure will improve the supply and marketing of small ruminants

in the city of N'Djamena. In view of these results and in view of the many constraints and difficulties faced by small ruminant traders in N'Djamena, it is important that improvement actions and prospects be considered. Thus, a regular supply of small ruminants to the town of N'Djamena will be ensured.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

No conflict of interest.

Statement of ethical approval

The manuscript does not contain studies involving human participants, human or animal data.

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