



Research Article

Consumption of Small Ruminant Meats in Households and Outside the Home in the City of Abéché, Chad

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Abstract

This study concerns the consumption of small ruminant meats in households and outside the home in the city of Abéché. The surveys were conducted among 100 families, 75 out-of-home consumers, 25 butchers and 25 livestock sellers. The data collected included the profile of consumers, consumption patterns, preferences of species, socio-economic factors impacting the demand and perceived effects of urbanization and population growth. The results show that the consumption of small ruminant meat is predominantly concentrated among a young group of economically active males. 68% of families consume it daily and 65.3% outside the home. Consumption frequency is high. The most valued meat is that of sheep, both at home (81%) and away from home (87.67%). In families, the consumption declines with the rise in the number of family members, going from 5.3 ± 0.6 Kg per month for households of 1 to 3 people to 3.5 ± 2.02 Kg for those with more than 10 persons. In contrast, outside the household, consumption increases with income from 0.9 Kg/month for incomes less than 100,000 FCFA to 2.63 Kg/month for incomes more than 200,000 FCFA. Taste is the most important criterion for meat choice (50% homes, 84% outside the home). The study also found that 93% of those surveyed think consumption has increased over the previous ten years and 99% consider that urbanization has a direct impact on demand. These results show the increasing importance of small ruminant meat in the urban food habits of Abéché and the necessity to better organize the supply chain.

Keywords

Abéché Meat, Small Ruminants, Consumption, Households, Out-of-home

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1. Introduction

Livestock farming is a highly dynamic sector in Chad and plays a significant role in the national economy [1, 2]. Small ruminants, such as sheep and goats, play an important role in traditional farming systems because of their adaptation to Sahelian conditions, low maintenance costs, and relatively short reproductive cycles [3, 4]. Their meat is a significant source of animal protein and income for households, and it is actively used to supply urban markets [5, 6].

The food systems of African cities are being significantly transformed by population growth and urbanization [7, 8]. The demand for animal products, particularly meat, is on the rise in tandem with the urbanization of the population [9]. This situation places a greater burden on the supply chains of cities and animal production systems.

Abéché is the primary urban center in eastern Chad, is undergoing rapid urban and demographic growth, similar to other African cities. The population of Abéché was anticipated to be 138,684 inhabitants in 2009 [10]. According to the data from the commune of Abéché the population was 178,893 in 2016 and is currently estimated to be 443,793 [11, 12]. This expansion

modified dietary habits and has contributed to an increasing demand for small ruminant meat [13].

However, the lack of information regarding the consumption of foodstuffs, whether they are plant or animal, in Chadian cities persists, despite the significance of the livestock sector and the rapid expansion of urban centers [14]. The analysis of the impact of urbanization and population growth on meat consumption in secondary cities of Chad, such as Abéché is not feasible due to the absence of information [15]. However, meat is the primary source of animal protein worldwide, despite the fact that the World Health Organization (WHO) has established a 42 kg annual requirement for each individual [14, 16]. To ensure a sustainable supply of animal products in urban markets, enhance the organization of animal supply chains, and guide livestock development policies, it is imperative to have a more comprehensive understanding of these dynamics. This study is situated within this context, with the objective of analyzing the habits of consumption of small ruminant meats (sheep and goats) in households and outside the home in the city of Abéché Chad.

2. Materials and Methods

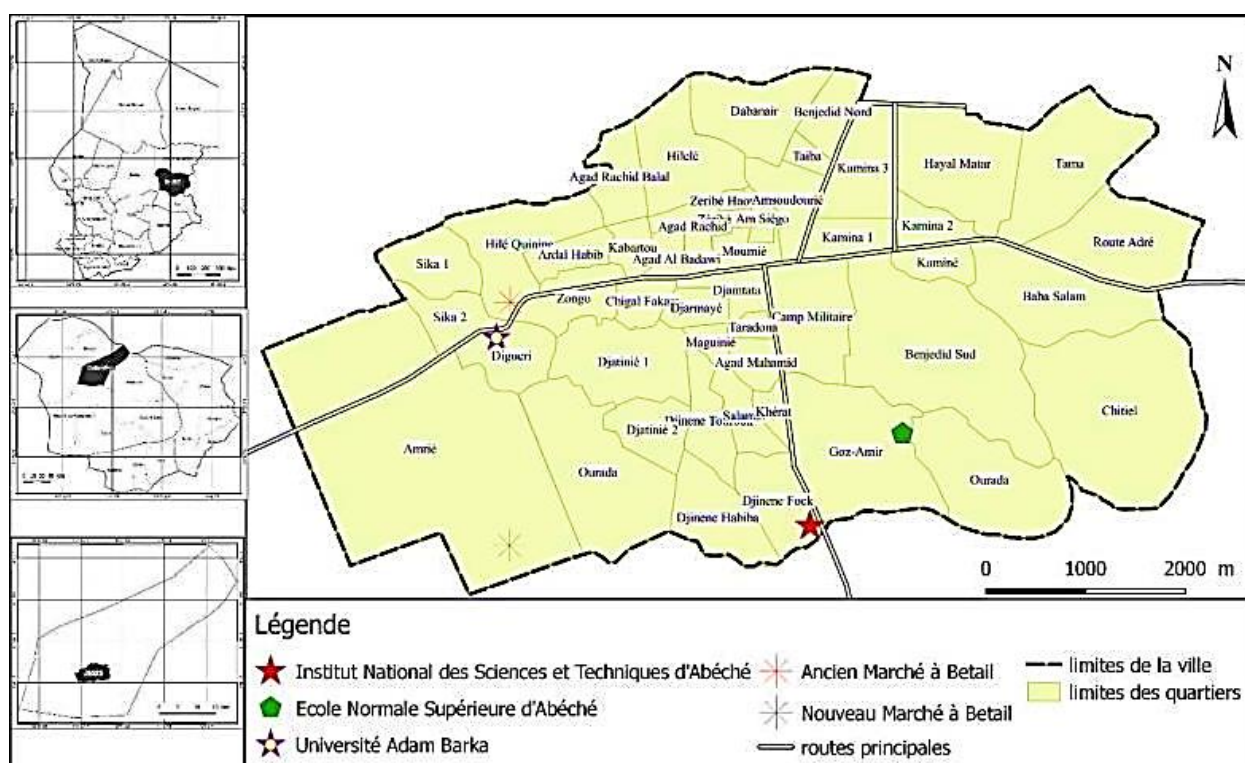


Figure 1. Map of the study area [17].

2.1. Area of Study

This study was conducted in the urban and peri-urban areas

of Abéché which is a city that is situated approximately 960 kilometers from N'Djamena. The capital of the Ouaddaï province, the city of Abéché is located between 13°45'0" and

14 °0'0" north latitude and 20 °40'0" and 21 °0'0" east longitude (Figure 1). It is situated in a moderately high altitude region of the massif, with an elevation between 500 and 600 meters. The area experiences an intertropical climate, which is characterized by a dry season that spans nine months (October to June) and a rainy season that spans three months (July to September). The average annual precipitation is approximately 300 millimeters. The temperature of the region fluctuates in accordance with the seasons. The average annual temperature in Ab éh é is approximately 28 °C, with a range of 16 to 35 °C during the cold season (December to February) and 25 to 41 °C during the dry season (April and May) [11].

2.2. Collection of Data

A cross-sectional survey and direct observations were conducted to target consumers in their homes and at various off-home preparation locations (grilling spots). In accordance with the categories of actors: households, out-of-home consumers, butchers, and livestock traders, four survey forms were devised for the survey, which was conducted from August 1 to September 30, 2025. The sample consisted of 100 households, 75 out-of-home consumers, 25 butchers, and 25 livestock merchants. The households were selected from five districts using probabilistic sampling methods that were influenced by the methods described by Sal ès-Wuillemin [18]. The

variables examined were the socio-professional profile of the respondents, consumption frequency, species preferences, quantities consumed, perceived effects of urbanization, market demand, and factors influencing meat choice.

2.3. Statistical Analysis

The data were entered into Microsoft Excel and then analyzed with SPSS 20.0. A descriptive analysis was conducted and the results were expressed in frequencies, proportions, means, and standard deviations. The comparison of means was performed using a two-way analysis of variance (ANOVA), while the Chi-square test was used for qualitative variables. The significance level was set at 5% ($P < 0.05$).

3. Results

3.1. Socioeconomic Profile of Home Consumers

Home consumers are predominantly men (72%), mostly married, young, and active (mainly in the age group of 24 to 33 years), with a strong representation of tradespeople. Households of 1 to 6 people are the most common, and 62% of respondents have a monthly income between approximately 50 000 and 100 000 FCFA (Table 1).

Table 1. Profile of home consumers.

Variables	State	Effective (n)	Percentage (%)
Sex	Male	72	72.00
	Female	28	28.00
Age group	24- 33 years	54	54.00
	> 34 years old	46	46.00
Household size	1-6 persons	67	67.00
	> 7 persons	23	23.00
	None	41	41.00
Level of education	Went to school	37	37.00
	Koranic	22	22.00
Marital status	Married	75	75.00
	Single	25	25.00
Profession	Trader	48	48.00
	State employee	24	24.00
	Farmer	1	1.00
	others	27	27.00
Income level	< 50 000 (FCFA)	10	10.00
	50 000-100 000 (FCFA)	62	62.00

Variables	State	Effective (n)	Percentage (%)
	> 100 000 (FCFA)	28	28.00

3.2. Socioeconomic Profile of Out-of-home Consumers

Out-of-home consumers are exclusively male (100%), predominantly married (65.3%), mostly belonging to the age group of 24 to 43 years, with a strong representation of merchants (42.7%) and civil servants (31.30%) (Table 2).

Table 2. Profile of Out-of-Home Consumers.

Variables	State	Effective (n)	Proportion (%)
Sex	Male	75	100.00
Marital status	Married	49	65.34
	Single	26	34.66
Age group	24-33 years	33	44.00
	34-43 years	32	42.70
	44-60 years	10	13.30
Level of education	Illiterate	16	21.33
	Primary school	10	13.33
	Secondary school	23	30.66
	High school	06	8.00
	Trader	32	42.70
Profession	Farmers	2	2.70
	State employee	31	31.30
	Others	10	13.30

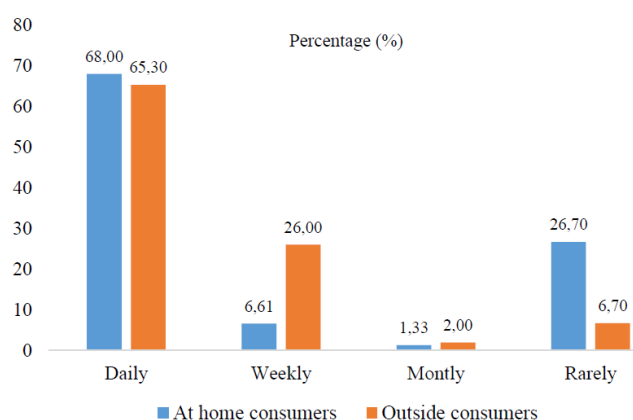


Figure 2. Frequency of meat consumption at home and outside the home.

3.3. Frequency of Meat Consumption at Home and Outside the Home

The frequency of consumption of small ruminant meat is high in both settings (at home and out-of-home). A daily consumption was reported by 68% of households and 65.3% of out-of-home consumers (Figure 2).

Sheep meat is the most appreciated, both at home (81%) and outside the home (87.67%). Only 19% of home consumers and 12.33% of out-of-home consumers expressed a preference for goat meat. This preference for meat consumption varies significantly depending on the species of small ruminants ($p < 0.05$).

3.4. Quantity of Meat Consumed Based on Household Size and Outside the Home

In households, the average amount of meat consumed decreases significantly with family size: 5.30 ± 0.60 Kg/month

for households of 1 to 3 people, 4.90 ± 0.46 Kg for those of 4 to 6 people, 4.26 ± 0.57 Kg for households of 7 to 10 people, and 3.50 ± 2.02 Kg for those of more than 10 people. Outside

the home, the quantity consumed is higher ($p < 0.05$) in groups of more than two people (2.46 ± 0.10 Kg) than in isolated consumers (Table 3).

Table 3. Quantity of meat consumed based on household size.

Parameter	Size	Quantity consumed per month (Kg)
In household	1-3 persons	5.30 ± 0.60^a
	4-6 persons	4.90 ± 0.46^a
	7-10 persons	4.26 ± 0.57^b
	>10 persons	3.50 ± 2.02^b
Outside the home	1 person	0.90 ± 0.00^a
	>2 persons	2.46 ± 0.10^b

The means in the same column marked with different letters indicate a significant difference ($p < 0.05$).

3.5. Quantity of Meat Consumed Based on Income

The effect of income is contrasted depending on the consumption framework. In households, the highest consumption

is observed among those with incomes below 100,000 FCFA (6.44 ± 0.55 Kg/month), then it significantly decreases ($p < 0.05$) with the increase in income. Conversely, outside the household, consumption increases with income, reaching 2.63 ± 0.19 Kg/month for individuals earning more than 200,000 FCFA (Table 4).

Table 4. Quantity consumed based on income (Kg/month).

Variables	Income per month (FCFA)	Quantity consumed per month (Kg)
In household	< 100 000	6.44 ± 0.55^a
	100 001 -200 000	4.80 ± 0.43^b
	> 200 000	4.20 ± 0.52^b
Outside the home	< 100 000	0.90 ± 0.00^a
	100 001 -200 000	2.26 ± 0.12^b
	> 200 000	2.63 ± 0.19^b

The means in the same column marked with different letters indicate a significant difference ($p < 0.05$).

According to profession, for home consumption, household families exhibit the highest domestic consumption (6.58 Kg/month), followed by merchants (4.92 Kg) and civil servants (4.08 ± 0.45 Kg/month). Outside the home, private sector employees show the highest consumption (2.97 Kg), followed by civil servants (2.91 Kg).

3.6. Period and Factors Influencing the Choice of Meat Consumption

Religious holidays constitute the main period of high consumption of small ruminant meat (76%), ahead of week-ends (Figure 3).

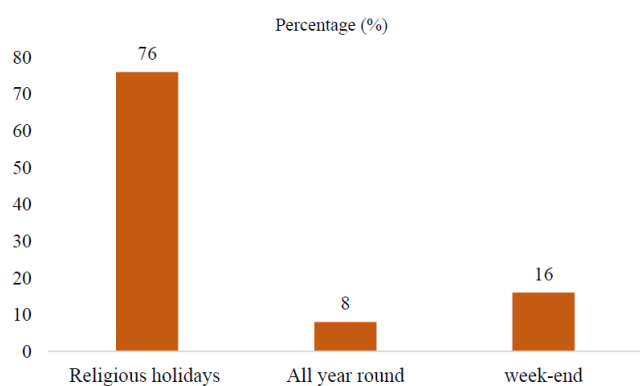


Figure 3. Period of high consumption of small ruminant meats.

Taste is the main factor influencing the choice of meat. 50% of respondents in households and 84% outside the home stated that they consume small ruminant meat for its taste. Nutritional value ranks second in households (39%), while price, availability, and dietary habits play a secondary role outside the home.

3.7. Demand for Animals in Livestock Markets and Meat at Grilling Spots

The demand for meat and live animals is strong. In the markets, 88% of the sellers of live animals sell between 10 and 30 small ruminants per day. At the grilling points, 40% report grilling more than 6 animals per day and 32% 3 to 5 per day.

Furthermore, 93% of respondents believe that meat consumption has increased over the past ten years. The main factors cited are population growth (48%) and income increase (41%) (Table 5).

Finally, 99% of respondents believe that urbanization influences the demand for meat, particularly through the increase in points of sale (90%) and growing pressure on prices, deemed high or very high by 90% of respondents.

Table 5. Factors Influencing the Consumption of Small Ruminant Meat.

Variables	Indicator	Proportion (%)
Current consumption and trends over last ten years	Increase	93.00 ^a
	Decrease	1.00 ^b
	Stable	8.00 ^b
Factors leading to the increase in consumption	Increase in income	41.00 ^a
	Population growth	48.00 ^a
	Change in habits	4.00 ^a

Variables	Indicator	Proportion (%)
	Market accessibility	7.00 ^a

The means in the same column marked with different letters indicate a significant difference ($p < 0.05$).

4. Discussion

The results of this study show that the consumption of small ruminant meats in the city of Ab éh éis contingent upon a variety of variables, such as gender, age, profession, income, household size, and dietary patterns. Overall, the meat of small ruminants is a significant component of domestic diets and out-of-home consumption, which is indicative of its economic, social, and cultural importance in the region under investigation [6]. Consuming animal-origin food products outside of the home is indicative of the growing urbanization of a region, as evidenced by the consumption of traditional chickens in the city of N'Djamena [19].

The majority of home consumers are young, married men who are members of small to medium-sized households (1 to 6 people). This structure demonstrates that the primary driver of consumption is economically active individuals who are capable of purchasing meat on a regular basis. This outcome affirms that family structure has an impact on the consumption of meat products and purchasing habits, as has been previously reported in other studies [20].

The results indicate a substantial representation of merchants and civil servants, as well as a strong male dominance in out-of-home consumption. This can be attributed to the time spent away from home, business trips, and frequenting dining establishments during the day. This result can also be attributed to the sociocultural realities of the country (Chad), where males generally have a higher purchasing power and eat their meals outside the home more frequently. This observation is consistent with the findings of Landais et al. [21], which indicate that out-of-home consumption is more prevalent among urban residents, educated individuals, men, and those with a higher socioeconomic status. In a study on the out-of-home consumption of traditional chickens in the city of N'Djamena, Issa et al. [19] reported the same observations. FAO [22] documented comparable findings, emphasizing that active men are more likely to incur meat expenditures in numerous Sahelian countries.

The study demonstrated that the daily consumption of small ruminant meat is substantial, regardless of whether one is at home or away from home. The high frequency observed in Ab éh émay be attributed to the cultural significance of these species in the diet of the local populations, the strong local availability of small ruminants, and the proximity of pastoral areas. In both domestic and outdoor settings, sheep meat is the

most highly valued meat. This preference is in accordance with the dietary habits of Sahelian populations, who place a high value on sheep during religious ceremonies, festivals, and family events. Sheep are the most devoured species in numerous Sahelian countries as a result of their strong symbolic value and organoleptic qualities, as per the FAO [23]. Also, this preference is explicated by the fact that the selection of meat frequently is contingent upon economic and sensory factors. Taste, smell, texture, price, and dietary habits are among the primary factors that influence meat consumption, as per Font-i-Furnols and Guerrero [20]. Consequently, the results obtained in Ab éh é are consistent with one another, indicating that flavor continues to be the primary criterion for selection.

The results indicated that the quantity ingested at home decreases as the size of the household increases. This implies that small households typically possess a greater quantity of meat than larger households. The logical conclusion is that the distribution of dietary resources among a greater number of individuals is necessitated as the size of the household increases. It is discovered that in Chad in general and in Ab éh é in particular, the head of a sizable household lacks the financial resources to purchase meat on a regular basis to meet the needs of their family. This observation aligns with the conclusions of Ruel and Garrett [24], which highlight that household size is a major determinant of food consumption in developing countries. Conversely, income correlates with an increase in out-of-home consumption. This finding suggests that individuals with higher incomes have a greater number of opportunities to consume meat at restaurants, grilling spots, or other dining establishments. This trend demonstrates that dietary behaviors are significantly influenced by economic status, particularly in urban areas. The findings are in agreement with those of Landais et al. [21], which demonstrate that the frequency of meals consumed outside of the household increases as income and urban lifestyles increase. The economic and social logics that are evident in the disparities between consumption at home and away from home are distinct. The quantity of meat available in households is influenced by the size of the family. Conversely, income and profession are more influential outside the home, as they are influenced by individual spending capacities and constraints associated with urban mobility, work, and social mobility.

Religious holidays represent the main period of high consumption of small ruminant meat. This observation is consistent with Muslim cultural practices (Ab éh é has a strong Muslim majority), particularly during Eid al-Adha, where the slaughter of sheep is a deeply rooted tradition. According to FAO [23], religious holiday periods lead to a significant increase in the demand for sheep across all Sahelian countries.

The primary consideration when selecting meat, whether at home or overseas, is taste. Households also prioritize nutritional value. This finding substantiates the notion that consumers do not only select meat based on its price or availability, but also on the satisfaction it offers and the quality image

it carries [20, 25]. Font-i-Furnols and Guerrero [20] also underscore the fact that meat consumers' preferences are determined by economic, cultural, and sensory criteria.

The results indicated that the demand for small ruminant meat is significantly influenced by urbanization, as nearly all respondents agreed. According to Pica-Ciamarra and Tasciotti [26], rapid urbanization promotes the expansion of marketing channels for animal products in African cities. Consequently, the city of Ab éh é's increase in the number of grilling spots and points of sale is indicative of a growing demand. Simultaneously, the majority of respondents believe that meat has become costly, indicating that the rise in demand is accompanied by price pressure.

Lastly, this investigation demonstrates that the consumption of meat has increased over the past decade as a result of urbanization, population growth, and rising national incomes. These findings are in accordance with the food transition theory [9], which posits that the demand for animal proteins increases gradually as a result of population growth, urbanization, and advancements in living standards. The respondents also note an increase in meat sales points, which is indicative of the sector's adaptation to the expanding needs of the urban population.

5. Conclusions

The consumption of small ruminant meats in the city of Ab éh é is socially differentiated, high, and regular, contingent upon whether it occurs within households or outside the home. The primary determinants of demand are household size, income, profession, cultural practices, and urbanization, with sheep flesh clearly dominating preferences.

The results highlight an increase in consumption in the context of accelerated urbanization and population growth. This development not only underscores the economic significance of the small ruminant meat sector, but also presents obstacles in terms of accessibility, pricing, and the organization of marketing channels.

Abbreviations

FCFA	Franc of the African Financial Community
FAO	Food and Agriculture Organization
ILRI	International Livestock Research Institute
MEPA	Ministry of Livestock and Animal Production
WHO	World Health Organization

Author Contributions

Ahmota Romain Daiba: Conceptualization, Data curation, Methodology, Writing – original draft, Writing – review & editing

Abdelsalam Adoum Doutoum: Conceptualization, Supervision, Validation, Writing – review & editing

Ousmane Issa Abdel Djali: Data curation, Writing – review & editing

Ousman Abdelkader Ngaba: Conceptualization, Methodology, Resources

Issa Youssouf Adoum: Supervision, Validation, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

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