Camel Trade and its Profitability Analysis in Chad

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The study was conducted to characterize camel trade and analyze its profitability in Chad. A survey was implemented among 102 stakeholders at Digueul and Goudji markets. The data collected was focused on stakeholder’s profiles, previous activities and dromedary supply sources, purchase price, fees, customer types, realized profit, perspectives and constraints. This collected data was analyzed using XL-STAT Pro software (6.1.9). The activity was performed exclusively by men at 44 years old on average, married and mostly illiterate. Four supply circuits were identified of which Abeche - Oum Hadjer - Ati circuit was the main one. Purchase price was lower at Am Timan-Gama-Mongo circuit but selling price was higher at Dourbali - Moito circuit. The customers were slaughterhouses and grills. Monthly player profit was 920 USD for 22.48 ± 2 camels sold. It was higher for wholesalers and animals from the Moussoro - Mao - Massakory circuit. This net trader profits have been positively correlated with the stakeholder experiences. The camel trade in Chad is profitable and the income varies according to supply circuits and stakeholders’ experience. A survey on restaurants of grilled camel meat will determine the number of camels consumed daily in N’Djamena city and profitability of this activity.

Keywords: Trade, Dromedary, Profitability and N’Djamena.

INTRODUCTION

In Chad, the rural sector (agriculture and livestock) is occupying prominent place by its strong participation in the national economy. It is one of the main pillars of national development, which contributes to 40% of the national GDP, including 18% for livestock. The rural sector is employing 80% of the labour, more than half being women (MERA, 2008). Livestock is a major contributor to poverty reduction (income from the sale of animals) and ensures food security (milk and meat) of Chadian population. Chad has a large herd with nearly 94 million head of cattle including 6,413,521 camels (ME, 2015). More than half of this number (56.39%) is high in pastoral systems (transhumant and nomadic). These systems are characterized by extensive and varied mobile productions. These productions depend on natural resources that vary in time and space. Sahelian and Saharan communities live from these production systems. This makes it possible to value arid and semi-arid areas by pastoralists (Reounodji, 2011; ME, 2015). Chad exports livestock (cattle, sheep, goats and camels) to neighboring countries. Unfortunately, regional security crisis has hampered these exports, which generate income for livestock farmers and various stakeholders involved.

Rapid urbanization of N’Djamena city and growing demography of its human population boosted city's supply in animal proteins, camel are representing an important part (Koussou and Amine, 2012). However, the estimation of the contribution of camel products in economy, and the coverage of Chadian population food requirements by those products are poorly documented. Yet, camel commercial transactions are sometimes destined to export of live camels by foot, and regularly to N’Djamena camel market and other important towns. This trade involves different types of stakeholders living thanks to this activity.

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Moreover, due to its dietetic qualities and expected medicinal properties (Rayimbek et al., 2015), camel meat is very popular among Chadian consumers (Abrhaley & Leta, 2017, Faye et al., 2013ab). The grilled meat is particularly popular in N’Djamena city (Koussou and Amine, 2012). Moreover, dromedary has notable ecological assets: it can valorize the poor pastures of arid zones and adapt itself to the high temperatures (Bornstein, 1990; Pacholek et al., 2000). Thus, camel turns out to be the future animal species in the vast territory of Chad as well as in other Sahelian countries where camel population is growing fast (Faye and Bonnet, 2012).

Our study on camel trade in N’Djamena city would allow assessing the market supply circuits, to identify the different categories of stakeholders and to evaluate their incomes and profits from this activity.

**METHODOLOGY**

**Study Area**

The study was conducted in N’Djamena city, capitale of Chad, located at 12°07 North latitude and 15°03 East longitudes and 295 m altitude. The town it is located on the right branch of Chari River and at its confluence with Logone River at Cameroon border. The city is shared into ten municipal districts and its population is estimated at more than one million inhabitants. N’Djamena city has two main livestock markets, one of which is located in Goudji (10th district) and the second in Diguel (3rd district). In these markets are selling cattle, small ruminants (sheep and goats) and camels). All livestock trader categories can be represented as: traders, intermediaries, guarantors, conveyors, etc.

**Data Collection**

The study was conducted through field survey on 102 consenting stakeholders among 150 including 63 at Diguel market and 39 others at Goudji market from July 1st, 2016 to September 30th, 2016. The data survey consisted of collecting information from different stakeholders (retailers, wholesalers, intermediaries, guarantors etc.). The participants to the survey were randomly selected and participated to a previous visit to get formal information and then, the second visit consisted to survey properly with a questionnaire every Wednesday at Goudji Market and Sunday at Diguel Market. The information sought was: socio-professional profiles of stakeholders including sex, age, educational level, marital status, types, previous activities, category and experience in camel trade; and sale activities (purchase price, fees, sales prices and circuit supplies) and customer categories.

**Statistical Analysis**

Descriptive statistics using XL-STAT Pro (9.1.6) were used to determine the dispersion parameters (mean ± standard deviation, extremes, and frequencies). The analysis of variance (ANOVA) for multiple comparisons of means was applied on Newman keuls test at 5% threshold. The profit was analyzed according to stakeholder categories, their experience and supply circuits of camels sold at N’Djamena city markets. Then, Pearson correlation between profit realized and stakeholders experience was calculated at 5% threshold. The costs were made up of different fees (conveyance, feed and municipal tax). The net profit was obtained from the difference between selling price and cost price (purchase price + fees). It was analyzed according to the stakeholder categories and supply circuits.

**RESULTS**

**Profile of Camel traders**

The camel trade in N’Djamena city was held by men of average aged 44.04 ± 1.41 years (25-70), all Muslims (100%) with educational level ranging from uneducated (67.31%) to primary school (32.37%). These people are either single (9.62%) or married (90.38%) with family composition describe in Table 1. Camel traders usually started to practice other activities before switching to camel trade (Figure 1). The former activities were all in relationships with agricultural or livestock activities. The main reason for abandoning previous activities to camel trade was to get expected increase incomes (Figure 2; p < 0.05).

**Supply Circuits and Different Fees**

The camels sold in N’Djamena city markets come from four supply chains (Figure 3): Abeche-Oum Hadjer - Ati (41.38%), Am Timan - Gama - Mongo (24.14%), Dourbali - Moïto (17, 24%) and Moussoro - Mao - Massakory (17.24%). The purchase prices, fees and selling prices of camels varied according to the origin of circuits (Table 2). The highest purchase price was for camels from the Doubali-Moïto circuit followed in descending order by those coming from circuits: Abeche - Oum Hadjer - Ati, Moussoro - Mao - Massakory and Am Timan - Gama - Mongo (p < 0.05). For sale, the lowest selling price was for camels from the Dourbali - Moïto circuit followed by those of circuits: Abeche - Oum Hadjer - Ati, Am Timan - Gama - Mongo and the highest selling price was reported in camels from Moussoro - Mao - Massakory circuit (p < 0.05). The average selling price of a Camel was 240,702 ± 493 CFA F (approximately 400 USD).

**Experience of Camel traders and Profitability Analysis**

The average profit per camel was 20,801.54 ± 26,611.94 CFA F (35 USD). For 5.62 ± 3.20 camels sold per week or 28.90 ± 13.14 camels sold monthly, the profit margin was 603,692.31 ± 840,790.14 CFA F (920 USD) with a variation according to the supply circuits (Figure 4). The
lowest profit was recorded for camels from Dourbalı - Moito circuit, intermediate for those coming from Abeche - Oum Hadjer – Ati and Am Timan - Gama - Mongo circuits and the highest was recorded for camels coming from Moussoro - Mao – Massakory circuit (p < 0.05). Camels sold in N'Djamena city markets come more from Abeche - Oum Hadjer – Aticircuit, followed in descending order by Am Timan - Gama - Mongo, Moussoro - Mao - Massakory and Dourbalı – Moito circuits.

Stakeholder experiences had a strong influence on the profit: before 5 years of experience, they are sensitive to the consequently losses of 1,270,000 CFA F (2,130 USD) monthly. On the other hand, traders having an experience of around 10 years, rarely make losses. At reverse, their profit increased considerably up to 3,450,000 F CFA (5,780 USD). On average of 5.62 ± 3.20 camels sold weekly the highest number was from wholesalers and the less number from intermediates. The sellers' experience was 8.92 ± 4.92 years and varied according to other parameters (Table 3). The profit margin was higher for wholesalers (p < 0.05) and this benefit was positively correlated with the stakeholders’ experience (Figure 5). The most experienced people got higher profit and the less experienced (less than 15 years old experience) got lower profit (sometimes recorded losses). The benefit was then positively correlated with the stakeholders’ experience (R = 0.427, p < 0.05).

Customer Categories

Camels sold at N'Djamena city markets were purchased by different types of customers (Figure 6). The main customers in camel were slaughterhouse, grilled, household and broiler.

DISCUSSION

Profile of Camel Traders

The traders are relatively young. At this age, if they did not get their camels by inheritance, they will not have means and relations to engage trade activities. The large proportion of uneducated traders was related to the fact that majority of traders were pastoralists before engaging their trading activity. Indeed, pastoral activities in Chad are practiced in remote areas where access to school is difficult. Most of them were formerly pastoralists and/or traders of other ruminants (cattle and sheep). The latter abandoned their previous activity because the closing of cattle export route to Nigeria following cross-border security threat of “Boko Haram”. The traders were mostly breeders and cattle traders. Those who abandoned other activities (guarantors, agriculture, grilling meat and conveying) were in smaller proportions. These previous breeders who became camel traders were inspired by experience and their relations with customers (trade) to abandon their previous activities. The most stakeholders changed their activities to increase their income while the others changed to camel trade because of its high demand or cattle slump in sales. The camel trade in Chad is not specialized as it is the case in Tunisia where some butchers are specializing in camel slaughtering exclusively. However, those who like to consume camel meat are their main customers because they are reassured to have quality meat (Refik-Concina, 2014). The previous activities in camel trade were abandoned by traders to increase their income.

Supply Circuits and Different Fees

The dromedaries sold at N'Djamena city markets were provided by four supply circuits. The number of camel supply circuits is comparable to those reported in Algeria (Oulad-Belkhir et al., 2013). Two-thirds of camels sold at N'Djamena city markets come from two circuits (Abeche - Oum Hadjer - Ati circuit followed by Am Timan - Mongo - Gama circuit) whereas previous studies have shown that camels sold at N'Djamena city markets come largely from transhumants who camp around N'Djamena city (Koussou and Serge, 2010).

The camel purchase prices varied according to circuit origins. Camels from Am Timan - Gama - Mongo circuit were the cheaper because Am – Timan is an isolated city, and the traders’ access to this city is not permanent and therefore the demand is less. Purchase price, fees and selling price varied according to camels’ origin. The selling price was lower than 301,754 ± 82,534 CFAF (520 USD) reported in the same markets by Koussou and Serge (2010). This fall in prices can be explained by the fall in demand for animals following widespread economic crisis in recent years and borders’ closing because of insecurity in neighboring countries (Cameroon, Nigeria, Sudan and Libya) which is a handicap for Chadian livestock export sector.

Experience of Camel Traders and Profitability Analysis

Before 5 years of experience, the stakeholders are sensitive to monthly consequent losses. At reverse, those having an experience around 10 years make rarely losses and even a considerable increase was observed. Indeed, camel trade requires knowledge of sales channels (relationships), to alleviate the risks. The average profit was in line with that reported in Niger of 20,000 CFA F (33 USD) (Pacholek et al., 2000). Although purchase price is low, camel cost prices in this circuit were high because of conveyance costs. Consequently, a decline in profit was observed. The camel trade activity was practice dequally between rainy and dry seasons. This equality is linked to transhumant encampments in rainy season in recent year around N'Djamena city. The arrival of these transhumants makes camel trade continue because of easy access to traders. On the other hand, the most favorable period of camels’ sale corresponds to the dry season in Mali.
(Bourdanne, 1998). During this period, camel prices are the highest. In addition, the highest rate of slaughtering at Farcha slaughterhouse is reported in dry season (Koussou and Amine, 2012).

**Customer Categories**

The grilled meat proportions tend to be equal to slaughterhouses because of consumption development of camel meat in N’Djamena city. The out-of-home catering linked to urban life style justifies grilled meat increase in N’Djamena city (Koussou and Amine, 2012). The craze for Camel meat consumption is related to its expected virtues: dietetic, therapeutic (Faye, 2009, Faye et al., 2013). This result was different from the observations reported formerly by Koussou and Serge (2010) who has indicated that camel purchases was made by butchers for local consumption and a portion was exported to Nigeria. The closing of Nigerian border leads to the reorientation of camel meat market to N’Djamena city’s consumers. Moreover, due to the better adaptation of camels to drought, the body conditions of camels appeared better than the other species. The relatively good carcass yield in camel, compared to cattle could play a decisive role in food security and, as such, contribute effectively to food self-sufficiency access in animal proteins.

**CONCLUSIONS**

Camel trade in Chad is not only an income source for different stakeholders and for the State, but also contributes to population food security. The Camel market system profitability in N’Djamena city was dominated by the most experienced wholesalers and varied according to the different circuits providing the live camels. The popular development of grilled camel meat establishment (“camel grilleries”) in the town is quite original and contributes to boost camel trade, competing even the supplying of camel meat by independent butchers via the slaughterhouse. The incomes generated by this booming trade allow the stakeholders to live and to invest in various activities.

**REFERENCES**


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**Table 1:** Mean ± Std Family Composition of Camel Traders in N’Djamena city

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wives (n)</td>
<td>1.58 ± 0.11</td>
<td>0.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Children (n)</td>
<td>4.85 ± 0.50</td>
<td>0.00</td>
<td>17.00</td>
</tr>
<tr>
<td>Active persons (n)</td>
<td>1.40 ± 0.19</td>
<td>0.00</td>
<td>5.00</td>
</tr>
</tbody>
</table>

**Table 2:** Change in Purchase Price (CFA F), Fees and Selling Price Depending on the Origin of camels sold to N’Djamena City Markets

<table>
<thead>
<tr>
<th>Supply Circuit</th>
<th>Purchase price</th>
<th>Fees</th>
<th>Selling price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abeche - Oum Hadjer - Ati</td>
<td>199,714.286 ± 5,838.09a</td>
<td>15,638 ± 2,478.43a</td>
<td>238,571 ± 10,203.11a</td>
</tr>
<tr>
<td>Am Timan – Gama - Mongo</td>
<td>193,500 ± 11,087.77a</td>
<td>12,833 ± 9,110.06a</td>
<td>238,833 ± 10,203.11a</td>
</tr>
<tr>
<td>Dourbali – Moito</td>
<td>211,600 ± 10,514.75b</td>
<td>11,707 ± 587.87b</td>
<td>235,000 ± 16,046.81a</td>
</tr>
<tr>
<td>Moussoro – Mao - Massakory</td>
<td>199,000 ± 9,924.78a</td>
<td>13,542 ± 1,090.04a</td>
<td>244,000 ± 12,688.58b</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>199,069 ± 23,148</td>
<td>13,922 ± 303.57</td>
<td>239,000 ± 3,057.40</td>
</tr>
</tbody>
</table>

*The different letters between the columns of the same variable indicate a significant difference at p≤0.05.*

**Table 3:** Profit (CFA F) According to Actor Experiences in N’Djamena City Markets

<table>
<thead>
<tr>
<th>Stakeholder Categories</th>
<th>Experience (years)</th>
<th>Staff sold per week (n)</th>
<th>Benefit per Camel</th>
<th>Monthly Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>5.83 ± 0.95a</td>
<td>3.67 ± 0.56a</td>
<td>9,916.67 ± 1,954.34a</td>
<td>166,000.00 ± 57,498.985a</td>
</tr>
<tr>
<td>Retailer</td>
<td>7.69 ± 0.64a</td>
<td>4.50 ± 0.40a</td>
<td>15,774.27 ± 4,589.36ab</td>
<td>295,923.08 ± 92,842.728a</td>
</tr>
<tr>
<td>Wholesaler</td>
<td>11.55 ± 1.36b</td>
<td>7.65 ± 0.85b</td>
<td>30,602.46 ± 5,096.28b</td>
<td>1,135,100.00 ± 235,591.06b</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>8.92 ± 4.92</td>
<td>5.62 ± 3.20</td>
<td>20,801.54 ± 3,135.71</td>
<td>603,692.31 ± 840,790.14</td>
</tr>
</tbody>
</table>

*The different letters between the columns of the same variable indicate a significant difference at p≤0.05.*

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