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Pastoral livestock farming in the Eastern Malian Sahel (Hombori): Survey on flows in two livestock markets

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Pastoral livestock farming is a major activity in the Sahel. In the eastern Malian Sahel, in addition to its contribution to the household economy, this type of livestock farming plays an important role in enhancing the value of an environment that is not very conducive to rain-fed crops because of its low rainfall. This study was conducted in the district of Hombori to assess marketed livestock production through the share of livestock sales and purchases by Hombori herders in the district's two markets. The methodology used is based on the recording of trade flows, which specifies for both presented and sold animals, in addition to the species, sex, age class, price, origin and destination for sold animals. The results show an overall strategy of capitalization of the herd from the end of the rains until March, followed by destocking that peaks between the end of March and mid-April and diminishes at the end of the dry season. The study of trade flows shows that the markets in the district are oriented towards three livestock marketing channels: a short channel that contributes 79.46% and 87.02% of the livestock presented on the markets of Hombori and Wami respectively, a medium channel for which these figures are 19.79% and 8.52% of the livestock, and a long channel that is essentially oriented towards the export of livestock to certain neighbouring countries.

Key words: Animal productions, livestock markets, commercial channels, livestock flows, Sahel

INTRODUCTION

In the Sahel, pastoral farming is the main activity on which the household economy is based (de Haan, 2016). In the district of Hombori, located in the eastern part of the Malian Sahel, in addition to its contribution to the

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household economy, pastoral farming contributes to the development of an environment that is not very conducive to rainfed crops due to the low and irregular distribution of rainfall (Frappart et al., 2009).

Given this temporal variability in rainfall, farmers grow early millet and sorghum varieties with growth cycles of up to 3 months. Producing about 76 kg/year/person, for an estimated consumption need of 176 kg/year/person (Aguilhon, 2009), agricultural production is not sufficient to cover the needs of the rapidly growing population. This has forced them to carry out other activities besides livestock such as trade, handicrafts, market gardening, fishing in ponds, and charcoal production (Gangneron, 2013). Also, some families cover their minor expenses by selling small ruminants and their major expenses (weddings, vaccination of herds, purchase of cattle feed, etc.) by selling cattle (Aguilhon, 2009).

The district of Hombori has an important zootechnical potential with a livestock population estimated in 2010 at 57601 cattle, 21075 sheep, 31205 goats, 2750 asins, 545 camels and 55 horses (Diawara, 2015). The Bororo zebu and the Moorish zebu are the main cattle breeds; the Moorish long-haired and black-wool sheep; and the red-haired Fulani sheep are the sheep breeds, while the Moorish hair or wool goat and the southern dwarf goat are the goat breeds (Aguilhon, 2009). The productivity of its herds is modest but similar to what can be observed elsewhere in the Sahel (Diawara et al., 2017). However, this type of livestock farming is confronted with, among other things, the spatiotemporal variability of forage availability (Hiernaux et al., 2015), difficulties in accessing food supplements, and the insecurity that affects the entire region, which limits the mobility of people and their livestock (Benjaminsen and Ba, 2021).

However, pastoral farming production in Hombori, as elsewhere in the Sahel, must cope with the ever-increasing demand for animal products (Robinson and Conchedda, 2014) linked to population growth and changing dietary habits (Faye and Alary, 2001). Despite this importance and the dynamism of its livestock markets (Bonnassieux et al., 2013), the management of animal flows has been the subject of very few studies.

This study proposes to assess the share of livestock production marketed at the district level and the contribution of livestock markets to the variation in livestock population through the difference between purchases and sales of animals.

MATERIALS AND METHODS

Study area

The data were collected in the district of Hombori (15° 17′ 00″N, 1° 42′ 00″W), Douentza administrative region. The land area *of* Hombori is 2923 km² and its population is 23,099 (Census 2009). The predominant ethnic groups are Dogons, Tamasheqs, Songhays, Peuhls, Kel Bellas and Riimaybés. Part of this population lives mainly from livestock and is nomadic or transhumant. In these highly constrained spaces, populations move with the annual rhythm of the seasons, depending on the two main parameters that influence their vulnerability: water and pasture availability (Hiernaux et al., 2015). In Hombori, livestock production is mainly cattle, sheep, and goats with relatively small herds (Diawara et al., 2017). The two livestock markets in the district, which are held every Tuesday (Hombori) and Saturday (Wami), are real magnets for many herders and livestock traders (Bonnassieux et al., 2013). The Hombori market is a national or even international market for both cattle and small ruminants, whereas the Wami Market, which is much more recent and is being monitored for the first time, is of local importance, mainly for sheep and goats (Hiernaux et al., 2011).

Monitoring of livestock markets

Weekly monitoring of the two livestock markets in the district was carried out in collaboration with the veterinary station and in agreement with the breeders' cooperative by investigations. Carried out by the head of the veterinary station in Hombori, this weekly monitoring focused on the recording of trade flows, which specifies, for both the animals presented and the animals sold, in addition to the species, sex, age class, price, origin and destination for the animals sold. The count of animals by species, sex, and age class is determined by the herder, with other variables collected from the herder or livestock trader as appropriate.

Data analysis

The data analysis covered twenty-one trade fairs in Hombori and forty-six in Wami. Data collected weekly at the two livestock markets (Hombori and Wami) were processed using statistical processing software (https://cran.r-project.org/Card), including descriptive statistics and multiple correspondence analysis. Descriptive statistics were used to estimate the percentage contribution of the different localities that supply these markets, but also the main destinations of the animals sold in these markets. As for the multiple correspondence analysis tools, it was used to estimate qualitative variables (origins and destinations) to identify the following trends: origins and destinations by species. Other monitoring parameters such as the rate of sale, animal prices (by category and by species) and market attendance dynamics were estimated through simple operations.

RESULTS AND DISCUSSION

Livestock markets attendance dynamics

In Hombori, attendance at the livestock market is divided into three steps (Figure 1a):

1. The first step covers the first half of the dry season, between the end of the rainy season and mid-April, when the market is heavily supplied. It takes place after the cereal harvest, which is the best time to buy cereals;
2. A second step between the end of April and the beginning of the rainy season saw a sharp drop in market attendance due to animals' moving to other regions, the poor condition of the animals and the high price of grain;
3. A third step covers the rainy season (July – September), a period during which the sources of income

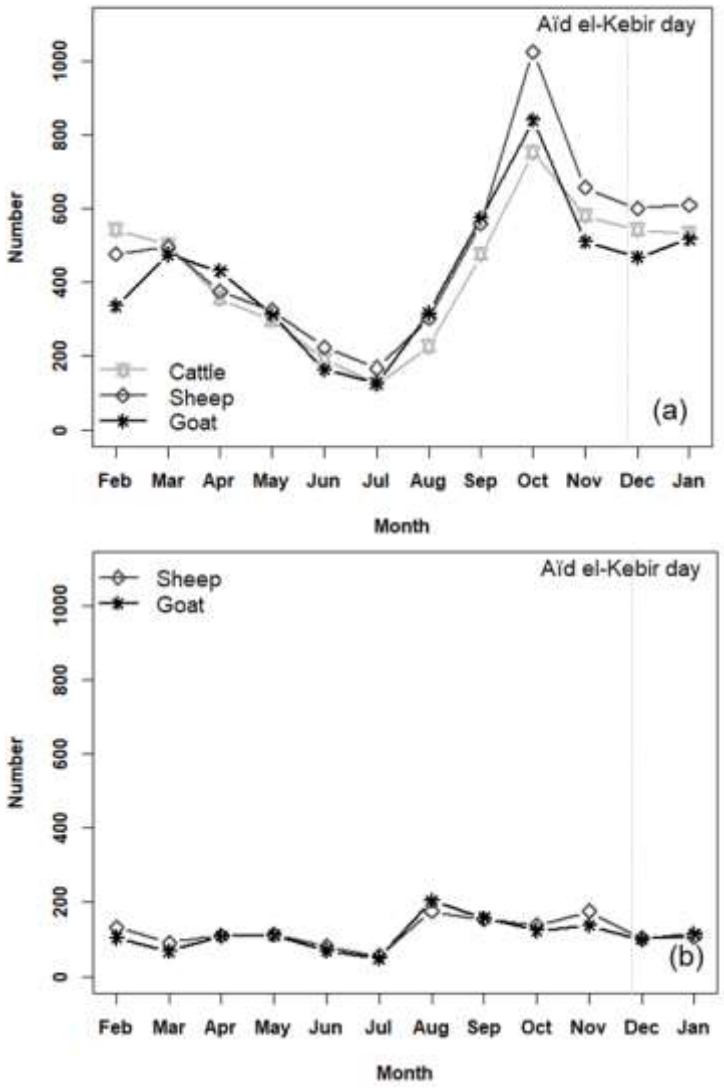

Figure 1. Livestock brought to the (a) Hombori and (b) Wami markets, by species and by month in 2010.

of the herder families are diversified (Thébaud, 2017), and attendance stabilized.

For all these steps, the sale of animals is mainly focused on cattle and small ruminants, the other species being very weakly presented. These phases are far from fixed as shown by the large fluctuations in the livestock presented (45.64% on average during the follow-up period). They depend on several factors such as the Aïd el-Kebir day, the state of the fatness of the animals, availability of fodder in the community and neighbouring areas, and sometimes even in Mali's neighbouring countries such as Niger and Burkina-Faso (Gautier et al., 2007).

The Wami livestock market concentrates mainly on small ruminants and is much less important in terms of attendance, with the number of animals presented remaining fairly stable over the period observed (Figure 1b). The minor fluctuations in livestock presented (34.21% on average) are, however, in line with the greater seasonal variations observed in the Hombori Market. The market of Wami is the place of supply of the butchers of the district and many other localities (Gossi, Mondoro and sometimes Burkina-Faso). This market complements the one in Hombori (30% of the animals sold).

Trade flows

The trade flows show that the markets in Hombori and Wami are oriented towards three livestock marketing channels (Figure 2):

i) A short channel: which is articulated around the two

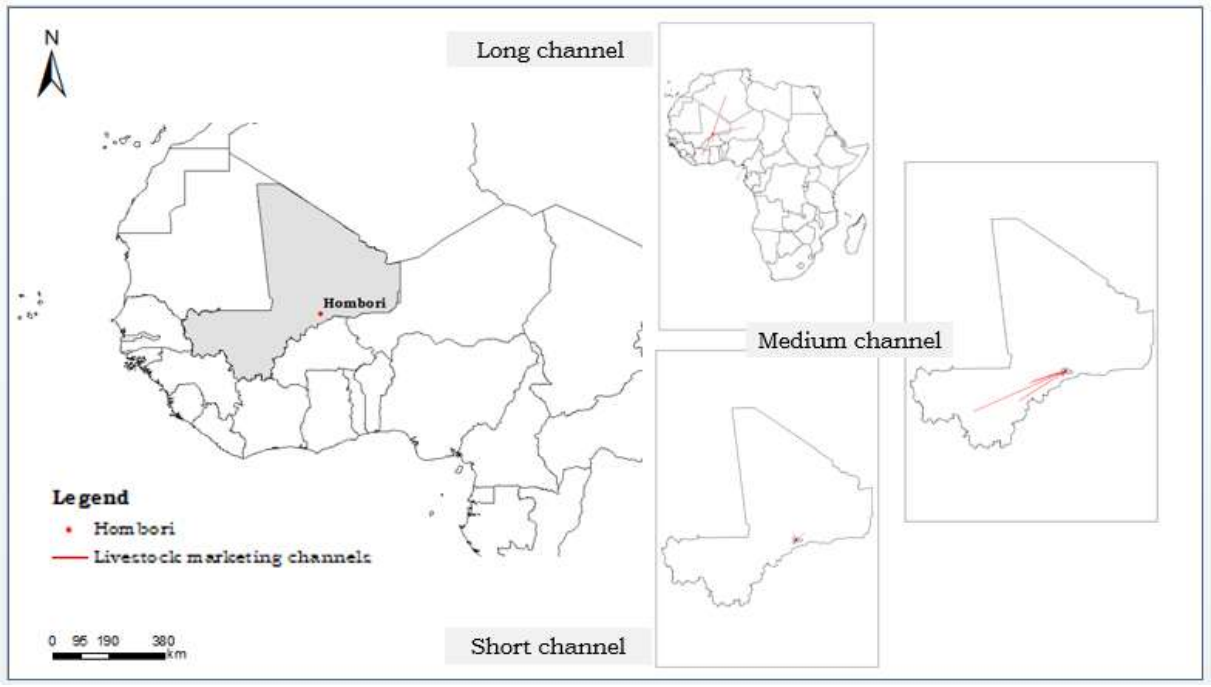

Figure 2. Hombori livestock marketing channels in 2010.

markets of the district. It is constituted by the 'local' actors (breeders, butchers, livestock traders, privates) who reside in the commune. This system contributes 79.46 and 87.02% of the livestock presented on the Hombori and Wami markets respectively, as well as 83.57 and up to 90.67% of the livestock purchases on these two markets.

ii) A medium channel: made up of actors from neighbouring districts such as Inadiatafan, Gossi, Mondoro, Boni and a few large cities further away such as Fatoma, Douentza, San and Bamako. This circuit contributes to 19.79% of the livestock presented at Hombori and 11.29% of the livestock purchases at this market. In Wami, these figures amount to 8.52 and 4.27% respectively for the supply and destination of animals sold in this market.

iii) A long channel: made up of livestock traders aiming essentially at exporting to certain countries of the sub-region. The main destinations for livestock sold on these markets are Burkina Faso, Ivory Coast, Ghana and Niger. This third marketing channel contributes to the purchase of 5.14% of the livestock presented on the Hombori Market and 1.01% of the livestock sold in Wami. Okike et al. (2004) show that the intra-regional livestock marketing channel generates margins 2 to 5 times higher than those of domestic channels. These livestock marketing channels are in line too with the typology of regional livestock markets proposed by Guibert et al. (2009).

The contribution of animals' categories to the supply of livestock markets in the district is presented in Figure 3. The categories frequently presented in Hombori are adult males, which represent on average 23.2, 29.3 and 23.11% for cattle, sheep and goats respectively. The other categories that contribute most to market supply are weanlings followed by mature females. Their contributions averaged 21.52 and 18.97% for weanlings and adult females respectively. Some lactating females, especially in sheep, are also presented with their offspring. On the other hand, we note the quasi absence of young unweaned females (only 0.1% of the numbers in this category).

Animal prices and trends

One of the particularities of the Hombori livestock market is the drop in prices between May and July, which is considered the lean season in the Sahel, in contrast to what is observed elsewhere, particularly in agro-pastoral areas (Lhost, 2004). From August to February, prices rise for the three main species (Figure 4). This increase is particularly spectacular for male sheep and goats a few weeks before the festival of Eid el-Kebir. For cattle and sheep (Figure 4a and 4b), except for unweaned youngsters that are poorly presented on the markets, price variations are more important for adult males (15.63 and 11.98% respectively for cattle and goats).

The sale of unweaned cattle is exceptional in our study area and involves only the continuation of a few old females. The average price charged for this category is 36,000 CFA/head, with an 82% variation due to its under presentation. Globally, cull animals (generally fattened)

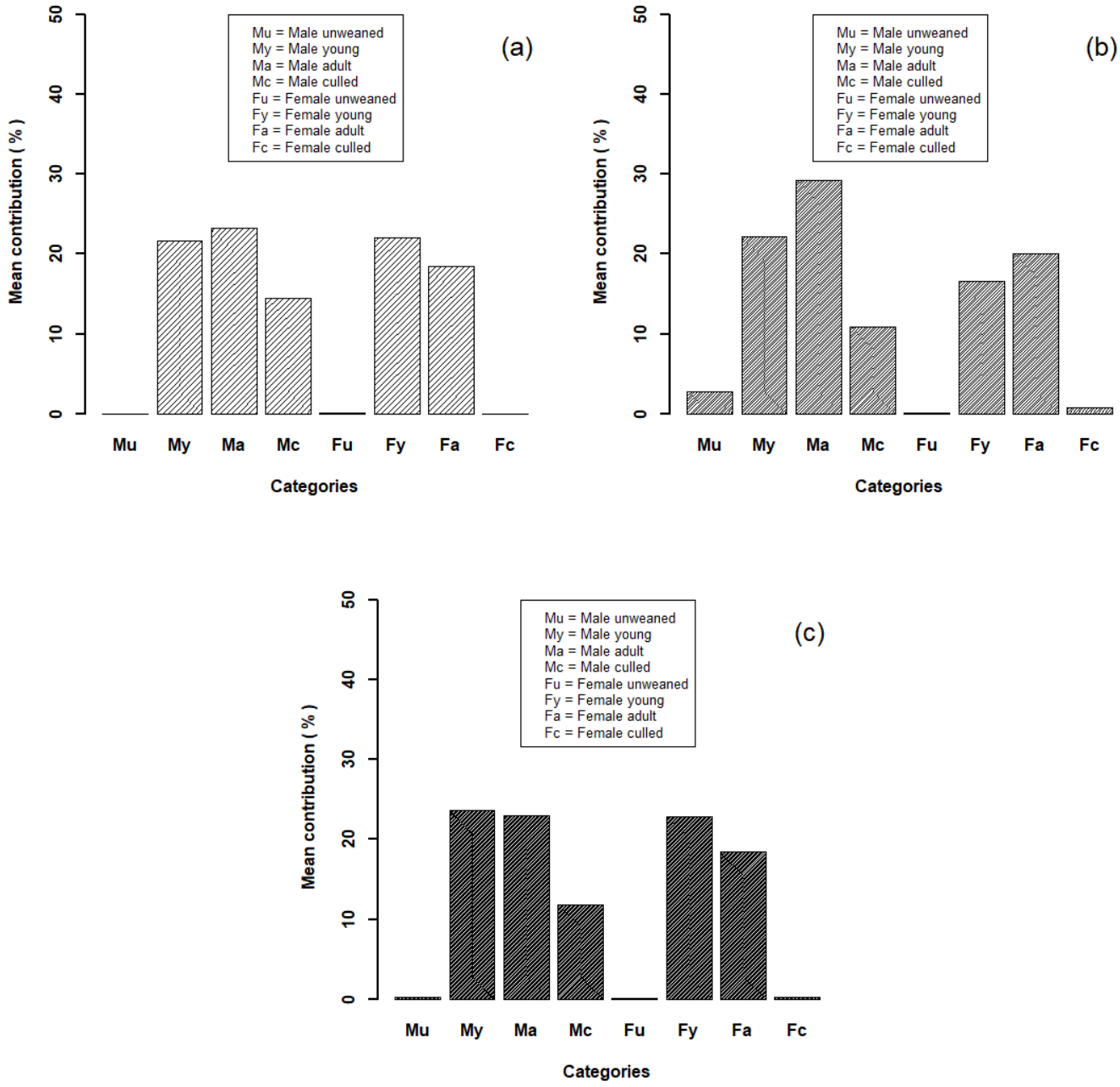

Figure 3. Mean contribution of sex-age classes in (a) cattle, (b) sheep and (c) goat brought to the Hombori Market.

and castrated males are, together with whole adult males, the most expensive of the categories considered. Sales rates show that demand is very high. Prices for goats (Figure 4c) are much lower (between 21,000 CFA/head for adult males and 9,000 CFA/head on average for non-weaned). The price of whole males is slightly lower than the price of castrated males (21,000 versus 30,000 CFA/head). Prices for adult sheep are higher than those for goats (34,000 CFA/head on average for adult males) and similar for non-weaned animals.

More broadly, prices for the top three species are lower than in the last three years (2018, 2019 and 2020). The increase recorded in Hombori is not exceptional in Mali (DNPIA, 2020). It is due to the difficulties in supplying the markets with livestock. Insecurity in the region has led many herders to migrate to the south of the country or even to Ivory Coast (Simonet and Carabine, 2021). According to a study by Simonet et al. (2020) in three Sahelian countries (Burkina Faso, Mali and Niger), rainfall deficits and armed conflicts play a large role in national price variation.

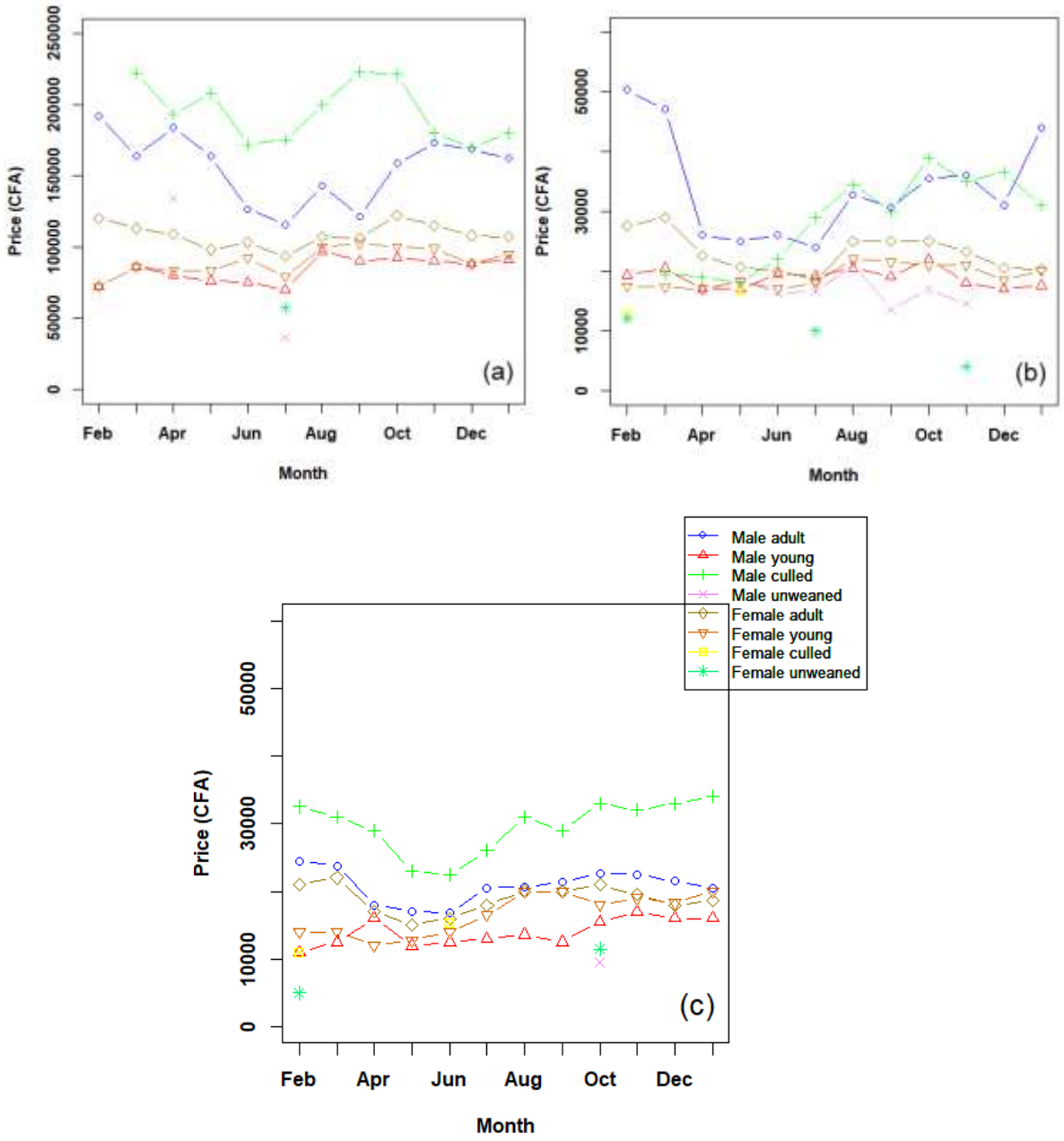

Figure 4. Prices by sex and age categories in (a) cattle, (b) sheep and (c) goat brought to the Hombori Market in 2010.

The number of livestock presented at the Hombori and Wami markets, as well as the prices charged, is subject to significant seasonal variations. Similar trends have been observed elsewhere in the Sahel (Robinson and Conchedda, 2014).

Contribution of livestock markets to the variation in the livestock numbers

The balance sheet of livestock purchases and sales by herders in the district shows an overall strategy of capitalizing on the livestock from the end of the rains until March, followed by destocking that peaks between the end of March and mid-April and subsides at the end of the dry season. This livestock management strategy has been observed in similar regions (Hesse et al., 2013).

The weekly balance sheet of livestock purchases and sales by herders in the district, calculated by species, shows two contrasting periods. A period of capitalization(30 head per week on average for cattle and 20 for small ruminants) until March, followed by a period of destocking that peaks between the end of March and

mid-April (shifted by one month for goats) and subsides at the end of the dry season. This strategy of seasonal destocking by the districts herders, observed in the second half of the dry season, helps to relieve the pastures, even if this is not the herders' intended objective (Thébaud, 2017; Simonet et al., 2020).

CONCLUSION AND RECOMMENDATIONS

This study aimed to evaluate the share of livestock production marketed in Hombori and the contribution of livestock markets to the variation in livestock numbers through the difference between purchases and sales of animals. The study identified the livestock territories that supply the district livestock markets. The analysis of livestock flows established three main marketing channels. Despite the presence of a herders' cooperative, there is no livestock marketing organization in Hombori based on group sales. The dynamics of the livestock market observed in recent weeks in the district show that despite the crises experienced (security and climate), its pastoral livestock farming is resilient and continues to be a major economic activity for many families. The surveys were conducted before the current security crisis and cover only one year with specificities inherent to pastoral livestock farming in the Sahel. It is therefore necessary to conduct a post-crisis study to assess the impact of the crisis on livestock marketing channels and the contribution of livestock markets to the change in livestock numbers. For this purpose, it would also be necessary to take into account certain intermediate and terminal livestock markets.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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