



Drivers of bushmeat trade around Mont Sangbé National Park, Côte d'Ivoire

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Abstract

The bushmeat trade and consumption are prevalent in various regions worldwide, especially in Africa, where they provide both economic income and a crucial source of protein for local communities. In Côte d'Ivoire, information about bushmeat trade and consumption around protected areas is seldom documented. This study investigates the dynamics of bushmeat consumption and trade in villages surrounding Mont Sangbé National Park, emphasizing socio-economic and ecological factors. Through a structured approach, we surveyed hunters, household heads, and restaurant owners, uncovering significant cultural preferences for bushmeat, with 46.88% of household heads emphasizing its importance. In total, 21 animal species from seven orders—Rodents, Artiodactyls, Primates, Carnivores, Galliformes, Lagomorphs, and Pholidotes—were hunted, sold, and consumed as bushmeat in the surveyed villages. The proximity of these villages to the park increases dependency on bushmeat, impacting one Endangered species, the white-bellied pangolin (*Phataginus tricuspis*), and two Near Threatened species, the African buffalo (*Syncerus caffer*) and the patas monkey (*Erythrocebus patas*). Persistent hunting pressures in the study area highlight the need for better enforcement of regulations and community engagement strategies for sustainable practices. We suggest that integrated conservation strategies are essential, recognizing local livelihoods and promoting sustainable wildlife management. Environmental education campaigns and income-generating projects can help reduce bushmeat consumption in rural communities.

Keywords: Wildlife trade, bushmeat consumption, hunting practices, ecological sustainability, Mont sangbé national park

Introduction

The transition from early humans, who were hunter-gatherers meeting their nutrient resource requirements^[1, 2], to the development of human civilizations centered around livestock farming and agriculture, has significantly transformed humanity's relationship with nature. Despite this evolution, the consumption of bushmeat remains prevalent across various populations worldwide, driven by religious, economic, cultural, and social factors. In regions such as the Neotropics and Africa, cultural attributes and social norms are major determinants of bushmeat consumption^[3, 4]. Economic indicators, including income and wealth, further influence these preferences, with wealthier households demonstrating a lower likelihood of consumption^[5]. In sub-Saharan Africa, bushmeat consumption is closely linked to food security, particularly in households that depend on a diverse array of species for their nutritional needs^[6].

For all these reasons, bushmeat has emerged as a key product whose commercialization boosts the financial income of many communities, whether in rural or urban areas. Its trade benefits an entire chain of economic actors, including hunters, transporters, and vendors^[7]. The significant revenue generated from bushmeat commercialization, along with its religious and cultural importance, makes this trade very active in certain regions of sub-Saharan Africa such as West Africa countries like Côte d'Ivoire, Ghana and Benin^[8, 9]. This dynamic is a major driver of wildlife overexploitation, leading to an alarming decline in biodiversity^[10, 11].

In response to this threat, several governments have implemented measures such as regulating hunting and

establishing protected areas. In Côte d'Ivoire, restrictions extend to a formal ban on hunting across its entire territory, where hunting has been prohibited since 1974^[12]. Despite this ban, poaching and the marketing of bushmeat remain widespread and even affect protected areas, where parks and reserves are subject to several intrusions by poachers^[13, 14]. The increase in the scale of human activities, in particular extensive agriculture in the country, has destroyed the habitat of biodiversity and probably confined most of the fauna to protected areas. This is particularly evident in the Mont Sangbé National Park (MSNP), located in the central-western part of Côte d'Ivoire, which has experienced and continues to experience significant human pressures^[15, 16]. To date, to our knowledge, no comprehensive study on the bushmeat trade has been conducted in the MSNP area. Detailed information on the dynamics of this trade in the surrounding villages could greatly aid in guiding wildlife conservation efforts for the park. Thus, this study aims to understand the foundations of the bushmeat trade around MSNP. Specifically, the study seeks to (1) identify the key players in the bushmeat trade around MSNP; (2) determine the factors motivating poaching in the villages surrounding MSNP; and (3) identify the most frequently hunted animal species.

Methodology

Study area

Mont Sangbé National Park (MSNP) is located in western Côte d'Ivoire (Figure 1), between latitudes 7°51' and 8°10' North and longitudes 7°03' and 7°23' west, covering an area of 97,000 hectares^[17]. This park lies in a transitional zone between subequatorial and tropical climates, characterized

by a shift from a bimodal rainfall pattern (two rainy seasons) to a unimodal pattern (one rainy season). The region experiences an average annual temperature of 25°C, with local variations due to altitude. The average annual rainfall is approximately 1200 mm, and the mean annual relative humidity is 75% (Ivorian Office of Parks and Reserves, 2014, unpublished). The park's vegetation primarily consists of forest habitats, including forest islands, the Sassandra gallery forest, semi-deciduous humid forests, and savanna portions characterized by woody stands and a shrub layer. This unique habitat attracts a diverse range of animal species, including mammals, birds, and reptiles [18, 19].

Choice of villages

The study was conducted in several villages around the MSNP. Villages were selected based on four criteria: proximity to the MSNP (within 15 km), number of households (more than 10 households), ease of bushmeat trade (proximity to main roads), and suspicion of involvement in poaching activities. Six villages that met all four criteria were included in the study, divided into three groups based on the main towns surrounding the MSNP. These villages are Sifié and Dangrezo in the department of Séguéla, Kokialo and Waloukoulikoro in the department of Biankouman, and Sorotona and Betema in the department of Touba.

Data collection and analysis

We conducted a survey over one month in the villages of Sifié, Dangrezo, Kokialo, Waloukoulikoro, Sorotona, and Betema, which are situated around the PNMS. These villages were selected in pairs from each department around the PNMS to balance the flow of information. Surveys were carried out with household heads, hunters, and bushmeat vendors (restaurant owners). The respondents were all over 18 years old and gave their informed consent voluntarily to participate in the study. A tailored questionnaire was developed for each group. Hunters were questioned about their reasons for hunting, hunting locations, tools used, hunting periods, the number of hunting days per week, distances traveled to hunt, as well as the species and quantities of animals killed. In households, the focus was on their preferences for animal protein sources, the places where they procure game meat for those who consume bushmeat, and their weekly frequency of bushmeat consumption. Restaurant owners were primarily asked about their involvement in the bushmeat trade, the number of bushmeat suppliers, the mode of acquisition (directly from hunters or through intermediaries), the animal species sold, and customer preferences.

A descriptive analysis of the collected data was conducted based on the categories of respondents and villages. The frequency of responses from hunters (33), household heads (32), and restaurant owners (17) were calculated based on the average occurrence of each piece of information.

Results

Sample size

During the study period, we surveyed a total of 85 individuals in the villages surrounding the PNMS. The villages of Sifié (n=29) and Kokialo (n=20) had the highest

number of respondents, and it was in these two villages that we encountered the most hunters (Table 1). In Dangrezo (9) and Betema (7), we were able to interview fewer than 10 people per village.

Table 1: Number of people interviewed per village and per category

Village	Hunter	Head of Household	Restaurant	Total
Sifié	13	10	6	29
Dangrezo	3	5	1	9
Kokialo	10	5	5	20
Waloukoulikoro	5	5	2	12
Sorotona	3	5	0	8
Betema	4	2	1	7
Total	38	32	15	85

Interviews with hunters

Three-quarters of the hunters interviewed stated that they hunted to protect their farms while a small number mentioned hunting for food or for selling game (Figure 2). A smaller proportion hunted due to inheritance (3.12%). Hunting in the villages surrounding the PNMS occurred both during the day and at night. Individuals who hunt during both periods of the day represent 60.60% of respondents while those who hunt only during night represent 18.18% of respondents. Most hunters interviewed (87%) used shotguns, while 13% used traps. They mainly hunt 2 to 4 days a week, with some of them (12%) hunting every day.

All hunters confirmed they hunted in plantations covering distances ranging from 2 to 10 km to reach their hunting grounds (Figure 3). Hunters from Sifié and Kokialo were found to cover the longest distances for hunting.

Household interviews

Out of the 32 household heads interviewed, preferences regarding the origin of animal proteins consumed were relatively balanced, with 46.88% preferring bushmeat and 53.12% preferring domestic animals. Factors influencing protein source preferences included accessibility to the resource and taste. Among those preferring domestic animals, accessibility to the resource was the primary determinant, whereas for bushmeat enthusiasts, taste played a significant role in their choice (Figure 4).

Regular consumers of bushmeat consumed it between 2 to 5 times per week, their preferred animals for consumption included the greater cane rat, *Thryonomys swinderianus*, representing 31% of preferred animals consumed and the crested porcupine, *Hystrix cristata*, representing 13% of preferred animals consumed (Figure 5).

Interviews with restaurant owners

Fifteen of the eighteen restaurant owners interviewed procured bushmeat directly from hunters in their respective villages, while the remaining purchased bushmeat from vendors. The meat was delivered to them between one to five times per week, with the majority receiving deliveries once a week (64.70%) and the rest receiving deliveries between two to five times per week.

Farmers constituted the main clientele for bushmeat in 42.42% of cases at the main restaurants followed by pupils and students, and teachers for about 18, 18% of cases.

A total of 21 animal species categorized into 7 orders—Rodents, Artiodactyls, Primates, Carnivores, Galliformes, Lagomorphs, and Pholidotes—are hunted, sold, and consumed as bushmeat in the villages surveyed around the MSNP (Table 2). Rodents were the most frequently mentioned animals by respondents, with 48 occurrences for the greater cane rat and 25 for the crested porcupine.

However, a greater number of artiodactyl species (six) were sold and consumed compared to rodent species (five). Except for *Phataginus tricuspis* an Engendered species and *Syncerus caffer* and *Erythrocebus patas*, which are listed as Near Threatened (NT) according to the IUCN Red List, all other animal species of bushmeat interest to the sampled population are of Least Concern (LC).

Table 2: Animals sold and consumed as bushmeat in the villages interviewed around the PNMS

Order	Scientific name	Common name	Recurrence	IUCN status
Rodents	<i>Thryonomys swinderianus</i>	Greater cane rat	48	LC
	<i>Hystrix cristata</i>	Crested porcupine	25	LC
	<i>Cricetomys gambianus</i>	Gambian pouched rat	14	LC
	<i>Atherurus africanus</i>	African brush-tailed porcupine	11	LC
	<i>Xerus erythropus</i>	Ground squirrel	6	LC
Artiodactyls	<i>Tragelaphus scriptus</i>	Harnessed bushbuck	18	LC
	<i>Potamochoerus porcus</i>	Red river hog	6	LC
	<i>Phacochoerus africanus</i>	Warthog	5	LC
	<i>Syncerus caffer</i>	Buffalo	4	NT
	<i>Cephalophus rufilatus</i>	Red-flanked duiker	2	LC
	<i>Philantomba maxwelli</i>	Maxwell's duiker	13	LC
Primates	<i>Erythrocebus patas</i>	Patas monkey	8	NT
	<i>Cercopithecus aethiops</i>	vervet monkey	7	LC
	<i>Papio anubis</i>	Olive baboon	4	LC
Carnivores	<i>Crossarchus obsurus</i>	Brown mongoose	2	LC
	<i>Lupulella adusta</i>	Side-striped jackal	1	LC
	<i>Civettictis civetta</i>	African civet	1	LC
Galliforms	<i>Ortygornis sephaena</i>	Crested francolin	15	LC
	<i>Guettera pucherani</i>	Blue guinea fowl	13	LC
Lagomorpha	<i>Lepus victoriae</i>	Savanna hare	4	LC
Pholidotes	<i>Phataginus tricuspis</i>	Small-scaled pangolin	4	EN

LC, least concern; NT, near threatened

Discussion

Our study provides insights into the dynamics of bushmeat consumption and trade in six villages surrounding Mont Sangbé National Park, highlighting important socio-economic and ecological aspects. The preference for bushmeat among a significant portion (46.88%) of household heads underscores its cultural significance in these communities. Although hunting has been prohibited in Côte d'Ivoire since 1974, local populations continue the practice due to ingrained habits. In our study area, the preference for bushmeat is driven primarily by taste, emphasizing the cultural factors influencing dietary choices. Furthermore, proximity to MSNP likely enhances dependency on bushmeat, as protected areas are prioritized by hunters [13, 14]. Conversely, a considerable proportion of interviewees (53.12%) prefer domestic animals, mainly due to their accessibility. The availability of bushmeat is relatively low in these households, which typically engage in subsistence hunting, as observed in 20 villages around Taï National Park in Côte d'Ivoire [20]. This preference dichotomy suggests that while cultural significance influences dietary preferences, practical considerations such as availability also heavily impact consumption patterns. Both aspects must be considered in strategies to combat poaching and bushmeat consumption. Understanding the cultural foundations of these communities and intensifying actions with those closest to protected areas is crucial. We also found that in the surveyed villages, restaurant owners sourcing bushmeat directly from local hunters indicate a direct economic link between hunters and the restaurant sector in these villages. Indeed, as observed in other studies, bushmeat trade is a significant source of income for hunters

and vendors [21, 22]. The clientele of those restaurants are primarily farmers, highlighting a specific market niche influenced by economic factors and dietary habits within rural settings. Our study showed that most of restaurant owner receive bushmeat at least once a week, this frequency of deliveries underscores the regularity and volume of bushmeat commerce in the area, potentially having a significant negative impact on the wildlife of MSNP. Our sample size, although relatively small, provided a meaningful overview of the animals hunted around the MSNP, in line with the assertion that bushmeat trade is one of the main drivers of biodiversity loss [23]. The wide diversity of animal species hunted for bushmeat in the villages around MSNP, categorized into seven orders, illustrates the ecological impact of bushmeat extraction in this area. Rodents, particularly the greater cane rat and the porcupine, are prominently targeted due to their abundance and accessibility. Even though most species hunted in our study areas are categorized as Least Concern (LC) on the IUCN Red List, the presence of Near Threatened species such as *Syncerus caffer* and *Erythrocebus patas*, along with the Endangered (EN) *Phataginus tricuspis*, raises significant conservation concerns. This is particularly troubling given the indirect pressures from bushmeat hunting. The establishment of protected area in Côte d'Ivoire such as Mont Sangbé National Park do not fully mitigated bushmeat hunting pressures, as evidenced by ongoing hunting activities even within protected areas in this country [15, 16, 20]. Moreover, the MSNP is in a region of Côte d'Ivoire where bushmeat trade is highly prevalent [16]. The persistent bushmeat hunting pressures around and within protected areas suggest the need for enhanced enforcement of

regulations and community engagement strategies to promote sustainable practices and biodiversity conservation. Environmental education campaigns and the development of projects with income-generating activities can help raise awareness and reduce bushmeat consumption in these rural communities [14, 22, 24].

Conclusion

By employing a structured approach and surveying hunters, household heads, and restaurant owners to capture diverse perspectives on bushmeat consumption and trade, we were able to provide meaningful insights into local behaviors and preferences, despite the relatively small sample size. However, future research could benefit from larger sample sizes and longitudinal studies to assess temporal variations in bushmeat consumption and hunting practices assessing the determinants of bushmeat supply sources around the MSNP. Our study underscores the relationship between cultural, economic, and ecological factors influencing bushmeat consumption and trade around Mont Sangbé National Park. Addressing these dynamics requires integrated conservation strategies that acknowledge local livelihoods while promoting sustainable wildlife management practices.

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