

The Bushmeat Commodity Chain: patterns of trade and sustainability in a mature urban market in West Africa

Guy Cowlshaw, Samantha Mendelson and J. Marcus Rowcliffe

Bushmeat can be an important component of household food security and income in West and Central Africa. However, there is growing concern that current levels of bushmeat extraction are unsustainable and will lead to the loss of bushmeat as a natural resource and to the extinction of many threatened species. Policy development to mitigate this risk is impeded by a dearth of information on the structure of the bushmeat trade and its biological sustainability. In this study, we tackle these problems by exploring the structure and sustainability of a bushmeat commodity chain supplying the city of Takoradi in Ghana.

Policy Conclusions

- The bushmeat trade comprises many different actor groups along the commodity chain (hunters, wholesalers, market traders, chopbars). In Takoradi, there is no optimal entry point for management intervention. Here, management policy may be most likely to succeed when all actor groups are involved.
- In Takoradi, rural hunters appear to make more profit per transaction than urban traders. Bushmeat sales might therefore play an important role in rural livelihoods.
- Urban demand for bushmeat has had a major impact on wildlife around Takoradi. However, following the disappearance of vulnerable species, the remaining robust species appear to be harvested sustainably. Such 'post-depletion sustainability' may be typical of mature urban bushmeat markets.
- Once an extinction filter has been passed, bushmeat markets such as Takoradi should no longer be treated as high conservation priorities. Scarce conservation funds should be concentrated on new markets where vulnerable species may be under threat, but have not yet disappeared.
- The Takoradi evidence suggests that large urban centres can be sustainably supplied in bushmeat by robust species from an agricultural landscape. Properly managed, such a supply could permit the bushmeat trade to continue without threatening the survival of protected species of conservation concern.

Introduction

Bushmeat, the meat of wild animals, is one of the most valuable tropical forest products after timber. It is an important food source, consumed in both rural and urban areas, and can make a significant contribution to the cash income of rural households living in extreme poverty. Estimates of the national value of the trade range from US\$42-205 million across countries in West and Central Africa (Davies 2002). However, relatively little is known about the market structure of the bushmeat trade. In addition, there is growing concern that the trade in bushmeat, a renewable natural resource, is currently unsustainable, posing a threat both to user communities and to the survival of many threatened species of conservation concern.

This study explores the social, economic and biological dimensions of the bushmeat trade supplying a major urban centre in West Africa, namely Takoradi, Ghana's third largest city. Our intentions are twofold. First, to present a detailed case study of the structure of a bushmeat market: the actors along the commodity chain and their patterns of trade. Second, to investigate the biological sustainability of a mature bushmeat market. Takoradi is a typical West African city and these findings should have wide application. The information we present was collected in a snapshot survey of the Takoradi bushmeat market in early 2000, using semi-structured interviews conducted with 73 different actors encompassing 2,456 bushmeat transactions. This policy brief summarises our main findings and their policy implications. Our full analyses and results are available in three research papers: Cowlshaw *et al.* in press; Cowlshaw *et al.* under review; and Mendelson *et al.* 2003.

Overview: the bushmeat trade in Ghana and Takoradi

The bushmeat trade in Ghana and Takoradi has a long history, making bushmeat a well-established market commodity (**Box One**). In Takoradi, bushmeat is widely available alongside domestic meat and fish. Whilst consumers prefer the taste of bushmeat, domestic meat and fish are less expensive and thus more widely



This series is an output of a project on 'livelihoods dimensions of the wild meat trade in the tropics' funded by the John D & Catherine T MacArthur Foundation. The views expressed are not necessarily those of either ODI or the MacArthur Foundation.

eaten. Bushmeat is eaten throughout the year, but its high price means that it only tends to be purchased in small amounts. Its consumption peaks during festivals and holidays. Most bushmeat is sold processed (i.e. dressed and smoked): smoked meat has a longer shelf life, but is nearly twice as expensive. Overall, the monthly volume of bushmeat sold by retailers is 15,859 kg with a retail value of US\$48,000, subject to seasonal variation. If additional sources of bushmeat are incorporated (from informal sales, gifts, and personal captures), total bushmeat consumption in the city can be estimated at 21,410 kg per month, or about 0.01 kg per person per day.

Box One: The bushmeat trade in Ghana and Takoradi

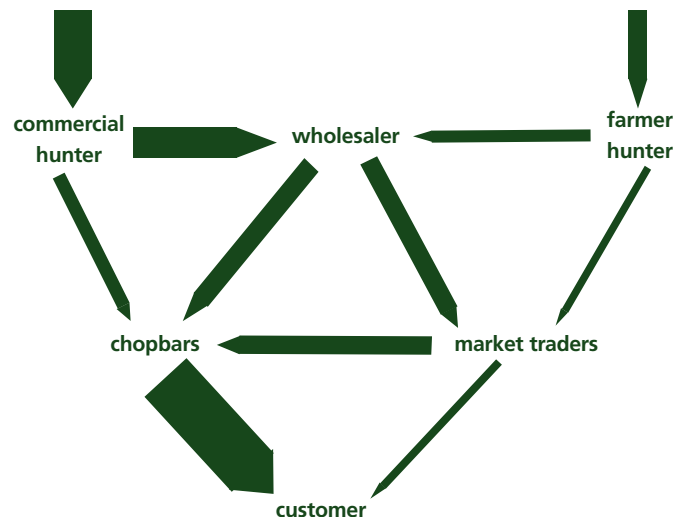
As long ago as the fifteenth century, De Marees recorded smoked game and snails being traded over long distances in Ghana. In 1856, Daniell listed various commodities traded in the capital Accra, including 'smoked deer'. More recently, Asibey (1977) has suggested that the growth of cocoa as the primary export of Ghana would not have been possible without bushmeat, given the essential role it plays in supporting smallholder farmers as a source of food and cash income. Bushmeat is now captured and traded across the country from the humid southern forests to the dry northern savannas. Ntiemoa-Baidu (1998) estimates that every year 385 million kg of bushmeat are harvested (US\$350 million) and 92 million kg are marketed (US\$83 million), with 60% of all sales occurring in urban areas.

Unfortunately, the massive scale of the bushmeat trade in Ghana has not been without cost. Over the past four decades, concerns have been repeatedly raised about the sustainability of the trade, and a recent national survey now indicates that bushmeat is becoming increasingly scarce (Ntiemoa-Baidu 1998). The impact on wildlife populations has also been devastating, with high rates of local mammal extinction reported in Ghana's protected areas and the threat of global extinction of the critically endangered Miss Waldron's red colobus monkey. The wider biodiversity impacts of the trade are also of serious concern, since Ghana's tropical forests comprise part of the internationally recognised Upper Guinea Forests global biodiversity hotspot.

Little is known about the history of the bushmeat trade in the coastal city of Sekondi-Takoradi (hereafter Takoradi), in Ghana's tropical Western Region. Nonetheless, it is likely to be similar to that reported elsewhere in the country, and to reflect the growth and development of the city and its population. The locality of Takoradi has experienced a long history of settlement that predates the colonial coastal forts built in the 17th century. In the last century the city grew rapidly through the development of gold mining, railways and harbour facilities. Now, as Ghana's third largest city, Takoradi has a strong industrial economy associated with a high proportion of immigrant blue-collar workers in its population. Takoradi's economic growth over the last century has also transformed the city's surrounding hinterland into an extensive farmbush matrix: a mosaic of plantations, mixed bush fallow (predominantly cocoa, coconut and oil palm), and remnant tropical forest (including secondary forest).

Figure One: The Takoradi bushmeat commodity chain.

The width of the arrows is proportional to the weight (kg) of bushmeat traded between the actors.



I. The Structure and Operation of a Bushmeat Market Actors and trade along the commodity chain

There are five main actor groups: farmer hunters, commercial hunters, wholesalers, market traders and chopbar operators. All hunters are men, whilst all other actors are women. Hunters live and work in the rural areas and capture their prey using snares and shotguns. Commercial hunters depend entirely on bushmeat for their livelihood, whereas farmer hunters sell bushmeat to supplement their income from agricultural produce. The women traders – wholesalers, market traders and chopbar operators – live and work in the city. Wholesalers work from home. They buy meat in bulk from the hunters and sell to the retailers: the market traders and the chopbars (cafes). Market traders operate from stalls in the market, whereas chopbars are scattered across the city. Chopbars vary in size, but some are extremely large and most require several staff to run: these assistants, cooks, waitresses and cleaners are also invariably women. The main clientele for market traders are women, whereas for chopbars they are men.

The pattern of trade between these actors is shown in **Figure One**. The primary route of trade is from commercial hunters to chopbars via wholesalers, although there is also substantial trade along other routes. Two actor groups stand out (**Box Two**):

- *Chopbars* are by far the most numerous group in the chain and make the bulk of retail sales: 85% of all sales (by weight) to the public. In comparison, market traders (the traditional focus of the bushmeat trade) only make 15% of public sales.
- *Wholesalers*, in contrast, are the least numerous group in the commodity chain. However, their central position means that individually they handle a larger market share (4%) than any other actor.

Market entry and profit

The financial costs of participation in the bushmeat trade are relatively low for hunters, who have no need for premises or staff and have minimal equipment requirements. However, transport costs are significant, at about 11% of the hunter's sales price: more than an order of magnitude higher than for other actors. This is because hunters are usually responsible for conveying their bag from the point of capture to the city (see also **Box Two**). In contrast, chopbars are relatively expensive to run, incurring costs of staff employment, equipment (cookers and freezers) and premises. Wholesalers and market traders incur intermediate costs, largely related to the purchase of freezers and cookers for storage and processing. In all cases, operating costs are minimised through the support of other family members. Amongst urban

Box Two: Actors in the Takoradi bushmeat commodity chain

Actor group	Number of actors in chain	Fraction of sales made to public	Fraction of city bushmeat sales handled, by weight		Fraction of sales incurring significant transport costs	Fraction of sold weight smoked
			Per group	Per actor		
Farmer hunter	75	0.00	0.38	0.005	0.59	0.40
Commercial hunter	50	0.00	0.62	0.012	0.78	0.68
Wholesaler	14	0.00	0.58	0.041	0.49	1.00
Market trader	16	0.15	0.41	0.026	0.19	0.95
Chopbar operator	143	0.85	0.85	0.006	0.00	0.83

traders, for example, 40-45% of actors inherit their business from a female relative (usually the mother). Moreover, once businesses are established, close kin lend support through a variety of means such as making loans available, participating in cooperatives that share operating costs (common amongst hunters), and directly providing labour (for example, the majority of chopbar assistants, cooks and co-owners are also mothers, sisters or daughters of the owner).

Profits are difficult to estimate precisely. Nevertheless, hunters are likely to make the most profit (per kg), since their overheads are relatively low yet they acquire 74% of the final chopbar sales price of bushmeat. This also suggests that bushmeat can make a substantial contribution to the income of rural households.

Regulation and management

The bushmeat trade in Takoradi, and elsewhere in Ghana, is largely unregulated by either state or local institutions (Holbech 1998, Ntiemoa-Baidu 1998). The use of bushmeat is governed by the Wild Animal Preservation Act 1961 (Act 43) which names those species protected from hunting and the extent of protection by age (young/adult) and period (all year/closed season only). However, knowledge of this legislation is poor among all actors. No illegal sales were detected in Takoradi, but this is most likely due to the historical depletion of protected species rather than the law. Bushmeat use is further regulated by a system of licences involving three autonomous institutions: the Police, who issue shotgun licences; the Wildlife Department, who issue hunting licences; and the District Assemblies, who issue bushmeat trade licences (although it is currently unclear whether chopbar operators require such trade licences, they do require a restaurant licence). However, these licences are very rarely issued, and individuals and business are rarely sanctioned for the lack of them. Traditional authorities play a minimal role in regulation, whilst unions, guilds and associations of hunters or bushmeat traders are scarce in Ghana and absent from Takoradi. The position of bushmeat 'market queen' (a trader elected by other traders to act as a general representative and an arbitrator in disputes) is also absent from the Takoradi market, presumably because bushmeat is a relatively low-volume commodity in comparison to most types of agricultural produce.

Similarly, although individual actors can also exert control over the conditions of trade, there is little evidence for this in the Takoradi market. On the contrary, it appears to be a free market with no restrictions on sale or purchase between traders. All actor groups trade with one another (**Figure One**) and individual hunters and traders 'shop around' until they obtain the best price. This is in notable contrast to the bushmeat trade in Kumasi (Ghana's second largest city), where wholesalers have developed a patron-client relationship with both hunters and market stalls through a system of credit dependency (Falconer 1992). Why two such divergent market systems should have developed in two similar market places in the same country is unclear, but

suggests that it may be difficult to generalise about patterns of trade freedom and control in bushmeat commodity chains.

Entry points for management

What do these data tell us about entry points for management intervention? In markets such as Takoradi, where no one actor group appears to exert overall control, the best entry point for management intervention is not straightforward:

- Chopbars make most retail sales (and are therefore the most important retailers);
- Wholesalers handle the largest per capita share of the trade (and are therefore the most cost-effective group to work with);
- Market traders are gathered together in a single public place (and are thus the easiest group to identify and monitor);
- Hunters, in contrast, do not enjoy any of these advantages. Yet management policy cannot afford to overlook them due to the strong incentives that they have to harvest bushmeat (arising from their substantial profits).

These observations indicate that a management policy that incorporates all actor groups may be the most effective way of managing the bushmeat trade. Such an approach also has the advantage that any repercussions of management interventions along the commodity chain will be detected more quickly, facilitating a more rapid response.

II. Post-Depletion Sustainability in a Mature Urban Market

Sources of bushmeat

Most of the bushmeat sold in the Takoradi market comes from terrestrial mammals, namely rodents and ungulates (84% of total retail weight). However, the relative contributions of these taxa is highly uneven (a common pattern in bushmeat markets). Two species alone, the cane rat (grasscutter) and brushtailed porcupine, comprise 50% of the total weight traded. The cane rat is also the most popular meat with consumers. Invertebrate taxa (bush crabs, snails and giant snails) comprise a further 15%. None of the species in the Takoradi market are obligate-forest species, but rather forest-edge and farmland species, and many are also likely to be significant crop pests. These patterns reflect the agricultural landscape of the city catchment (**Box One**). The catchment area is relatively large, with the average capture distance from market exceeding 20km for most species, and 50km for eight species. This reflects the extensive road network around the city.

Sustainability in a mature bushmeat market

The biological sustainability of the Takoradi bushmeat commodity chain is of fundamental importance. Urban population centres generate a high demand for bushmeat, yet the persistence of a local bushmeat trade indicates that there must be some element of sustainability otherwise the market would have collapsed. Four independent lines of evidence suggest that the current bushmeat trade in Takoradi is sustainable:

1. The annual harvest of terrestrial mammals does not currently

exceed the estimated sustainable yield in the catchment.

2. Larger mammals are not more heavily depleted closer to the city than they are away from the city.
3. The price of bushmeat has not outstripped inflation over the last four decades.
4. The price of alternatives such as domestic meat and fish has not fallen relative to the price of bushmeat (over the same period).

Box Three: Species present and absent from the Takoradi bushmeat trade.*

Taxon	Reproductive rate (r_{max})	Presence in market
Flying squirrels	1.09	present
Pel's flying squirrel	0.85	present
Royal antelope	0.68	present
Brush-tailed porcupine	0.68	present
Maxwell's duiker	0.46	present
Black duiker	0.37	present
Bay duiker	0.37	present
Bushbuck	0.29	present
Yellow-backed duiker	0.26	absent
Red river hog	0.24	absent
Giant hog	0.20	absent
Lesser spot-nosed monkey	0.18	absent
Mona monkey	0.17	absent
African buffalo	0.16	absent
Red-capped mangabey	0.15	absent

* Local farmbrush-matrix primates, ungulates and rodents on the second schedule of the Wildlife Laws of Ghana (i.e. could be legally hunted and sold during the study). Brush-tailed porcupine, cane rat and giant rat are not listed (hunting is unrestricted for these species).

Operation of an 'extinction filter'

The current pattern of sustainability appears to be the outcome of a historical period of overexploitation. A comparison of local species that are present and absent in the market indicates that all those with low reproductive rates and hence a poor ability to sustain high levels of harvesting (namely primates and large ungulates) are absent from the market (**Box Three**). The absence of these profitable species suggests that they have already been hunted to low levels and may now be locally extinct. Following the disappearance of these taxa, the only species that are now left to supply the market are robust species with high reproductive rates that can therefore sustain heavy exploitation. Hence the Takoradi bushmeat trade currently exists under conditions of 'post-depletion sustainability'.

This conclusion is an important one and merits two qualifications.

1. The extent to which these conditions will persist in the future is difficult to determine. Changes in the current circumstances, such as the habitat quality of the catchment or the size of the urban population, may influence the supply and demand of bushmeat and this will affect the pattern of sustainability.
2. The extent to which these conditions can be generalised to other localities is also unclear. Takoradi is probably typical enough to ensure that these results have wide application, but it is still possible that local circumstances have had an influence. For example, Takoradi's coastal location makes fish a widely available substitute, which might reduce bushmeat consumption. Further research should help to clarify these areas of uncertainty.

Implications of post-depletion sustainability

The phenomenon of post-depletion sustainability has two key implications. First, whilst urban bushmeat markets may be sustainable, such conditions may only have resulted from the historical depletion of vulnerable species. Consequently, such markets are unlikely to be high priorities for conservation action. Rather, limited conservation funds should have a greater impact in new markets where vulnerable species may be experiencing rapid depletion but have not yet disappeared (e.g. markets supplied from new logging concessions). Second, and most importantly, the fact that the Takoradi bushmeat trade can be sustainably supplied from the local farmbrush matrix indicates that a sustainable trade is possible, even for large urban centres. Moreover, this sustainable trade is based on robust species (fast reproducers) and therefore does not require the incorporation of vulnerable farmbrush species or obligate forest species. This suggests that, at least in theory, species of conservation concern can be protected and coexist alongside a sustainable bushmeat trade.

Acknowledgements

This research was funded by NERC and ESRC, and carried out in affiliation with the Wildlife Department (PADP), Ghana. We thank L Holbech, K Homewood, F Hurst, C MacKenzie, C Mends, EJ Milner-Gulland, J Robinson, P Symonds, D Wilkie, and the Takoradi bushmeat hunters and traders. This paper is a contribution to the ZSL Institute of Zoology Bushmeat Research Programme (www.zoo.cam.ac.uk/ioz/projects/bushmeat.htm).

References

- Asibey E. O. A., 1977. Expected effects of land-use patterns on future supplies of bushmeat in Africa south of the Sahara. *Environmental Conservation*, 4: 43-50.
- Cowlshaw G, Mendelson S & Rowcliffe JM. (Under review) Evidence for post-depletion sustainability in a mature bushmeat market.
- Cowlshaw G, Mendelson S & Rowcliffe JM. (In press) Structure and operation of a bushmeat commodity chain in Southwestern Ghana. *Conservation Biology*.
- Davies G. (2002) Bushmeat and international development. *Conservation Biology* 16: 587-589.
- Falconer J. (1992) 'Non-timber forest products in southern Ghana'. Kent: Natural Resources Institute.
- Holbech L. (1998) 'Bushmeat survey: literature review, field work and recommendations for a sustainable community-based wildlife resource management system'. Accra: Wildlife Department, Ghana.
- Mendelson S, Cowlshaw G & Rowcliffe JM. (2003) Anatomy of a bushmeat commodity chain in Takoradi, Ghana. *Journal of Peasant Studies* 31: 73-100.
- Ntiama-Baidu Y. (1998) 'Sustainable harvesting, production and use of bushmeat'. Accra: Wildlife Department, Ghana.

Guy Cowlshaw, Samantha Mendelson, & J. Marcus Rowcliffe are at the Institute of Zoology, Zoological Society of London, Regent's Park, London.

Corresponding author: <guy.cowlshaw@ioz.ac.uk>.

Series editor: David Brown
Administrative editor: Zoë Parr