

Wild Meat Harvest and Trade in Liberia: managing biodiversity, economic and social impacts

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Liberian forests and the fauna they contain are a conservation priority within the Upper Guinea Forest block. However, the rate of bushmeat consumption in the country is potentially a threat to its biodiversity. Wild meat and the bushmeat trade represents a resource from which a wide range of Liberians benefit, unlike the timber and mining industries. The challenge ahead is to find a compromise that meets the nation's biodiversity conservation goals, while integrating the management of this valuable natural resource into a broader framework that increases national and community management capacity.

Policy Conclusions

- Wildlife management plans should focus on species that are particularly vulnerable to over-harvesting, with an emphasis on regions of the country of conservation priority. Industry and communities should be included in wildlife management strategies, for the expansion of the protected area system.
- Whereas few Liberians receive financial rewards from the timber industry, the benefits of the bushmeat trade, with an estimated commercial value of US\$24 million, are distributed throughout Liberian society.
- Due to the significant contribution of the bushmeat trade, as an important source of meat protein and income, to local and national economies, the government should make wildlife resources a central component of broader natural resource management plans.
- Alternative sources of meat protein should be part of the development agenda, with an emphasis on improving access to inexpensive sources of domestic meat and fish.
- Community-based management of natural resources can be supported in cooperation with government authorities and NGOs, by defining rights to the use and ownership of wildlife.
- Controls on the urban bushmeat trade should be implemented through cooperative management strategies between government authorities and market associations.
- Research is needed to investigate the dynamics of the bushmeat trade, monitor impacts on both wildlife and society, and develop and evaluate management options.

Wild meat harvesting and trade

Retaining as much as 42% of its original forest cover, Liberia is a conservation priority within the Upper Guinea Forest block of West Africa. Many endemic or endangered species of the region, including: pygmy hippopotamus, Jentink's and zebra duiker, Diana monkey, forest elephant and chimpanzee are found within its forests. Liberia represents the best hope for the conservation of these and many other species in the sub-region.

Wildlife harvest rates for subsistence use and the commercial bushmeat trade may represent a threat to the maintenance of this biodiversity. The on-going civil conflict from 1989 to 2003, and the resulting collapse of the national economy, may have promoted the expansion of the wildlife harvest. During the height of the conflict, domestic meat availability declined and demand for bushmeat is likely to have increased. Many county authorities reported an increase in commercial hunters over the last decade. They attributed this to the high unemployment rate (est. 85%) in urban centres much of which results from the conflict. Low entry level costs and a high demand for bushmeat makes the trade particularly attractive as an income source.

The wildlife harvest and trade in Liberia are not represented by a linear commodity trail from hunter to consumer, nor are the delineations between subsistence and commercial harvesting always obvious. Several categories of hunter may be recognised and may be classed by the level of effort that is committed to hunting.

Hunters take their catch directly to a local or urban market, have their wife or family member sell it, or sell it to a market woman. In some cases supply-product agreements exist, whereby a hunter receives ammunition and other supplies from a market woman or transporter in exchange for a percentage of the hunter's harvest. Transporters (bush taxis, logging trucks, government and NGO vehicles) serve as links in the commodity chain between the hunter and marketer. Often security personnel (police and military) ensure the safe passage of bushmeat through security and wildlife authority checkpoints to the market. This system also works in reverse for the delivery of ammunition to hunters.

Biological impacts of wild meat harvest and trade

The trade in wild meat has been identified as among the greatest threats to the maintenance of biodiversity, second only to habitat destruction. In Liberia, there is a paucity of data related to harvest rates, but it is clear that the wildlife harvest is significant. Anstey (1991) estimated the total wildlife off-take to be 150,000 tonnes per year, one of the highest per capita off-take in Africa. He recorded 35 species for sale in markets throughout Liberia, of which 15 were protected species. These remits are similar to those from the author's more recent surveys which found 34 species for sale, 18 of them protected.

During both Anstey's (1991) and the author's surveys, the majority of the animals reported in the markets were common crop pest species (black duiker, Maxwell's duiker, bushbuck and Red River hog). Although rare species did appear in the market, the frequency at which they were reported was related to the proximity of source forests. For example, pygmy hippopotamus was reported by consumers to be seen in all eight communities surveyed. However, the greatest observed frequency was from communities located in the southeast, closest to high forest hunting areas.

The content of village harvests was significantly related to proximity to high forest (see **Table One**). Antelopes represented the majority of the harvest at 68% (range 65-71%), followed by pigs at 12% (range 11-13%), and then primates at 8.7% (range 7-11%). The harvest was dominated by common crop pests (black duiker, Maxwell's duiker, Red River hog, and bushbuck) but relatively high off-takes of protected species were recorded at sites adjacent to high forest habitat.

Table One: Species Offtake from Six Villages Adjacent to Sapo National Park

Village Location	Species Diversity	Protected Species	% Offtake of Protected Species
High Forest	30 – 36	17 – 21	27 – 39 %
Agricultural	15 – 21	6 – 10	17 – 19 %

Source: Author

Anstey (1991) found the wildlife harvest to be significant, but he did not conclude that any species was at immediate risk of extinction. He did suggest that the wildlife harvest poses a potential long-term threat to the survival of the most vulnerable species. The author's research generally supports Anstey's conclusions. The majority of the meat sold in Sinoe County, adjacent to Sapo National Park, was from common species but a significant amount of a hunter's catch and sales may have come from protected species. Overall, 27-39% of the animals harvested by three villages were protected species, and they represented 21% of the total biomass sold.

Several species, including the bushbuck, black duiker, Ogilby's duiker, Red River hog, and giant pangolin are thought to be unsustainably harvested at one or more of the locations. The lack of off-take of rare species (e.g. giant pangolin) may represent local extinction of the species or inappropriate habitat rather than a sustainable harvest rate. Taste preferences and species taboos (discussed in further detail below) may further impact those species that are particularly vulnerable to over-exploitation due to intrinsic and / or extrinsic factors.

Economic and social impacts of wildlife harvest and trade

Anstey (1991) estimated the volume of bushmeat harvested for both subsistence and commercial purposes as 150,000 tonnes per year. Bushmeat may represent 75% of Liberia's meat production, with an approximate replacement value of US\$100 million. With an estimated commercial value in 1989 of US\$24 million, the bushmeat trade reaped more income for Liberia than the timber trade. Hardcastle (2001) noted that at the harvest

rate in 2001, only US\$20 million was available to the government from the timber industry. With very little employment in the timber industry available to local people, the overall value of logging activities to rural communities is probably negative. By comparison, the economic value of the bushmeat trade is distributed much more evenly across Liberian society.

Bushmeat is particularly valuable to rural communities. It provides cash for the purchase of household supplies and school fees, and is essential to meeting protein needs, especially for those communities isolated from the coast or large waterways where fish is more available.

Recent village off-takes were used to extrapolate the value of the catch to each hunter. The total off-take reported by 12 hunters in the author's surveys represented an estimated 30,864 kg of edible meat (70% of average body weight), of which 45% was sold. The sale of this meat is estimated to represent an average income of US\$27 per hunter per month. In this area of extreme poverty, where the average villager makes less than US\$0.50/day, bushmeat thus represents a significant source of cash income. And with one study estimating that hunters took 16.5 kg of meat per month, bushmeat is also an important protein source for hunters and their families [Stephens 1988].

The economic value of the bushmeat trade to commercial hunters, transporters, security personnel, marketers and restaurants in urban areas, is more difficult to calculate. Anstey (1991) reported mark-ups on bushmeat to be 100-200% above prices paid to hunters, and that the profit margin of an urban market woman was between US\$120-200 per month. It is possible that profit margins are less in the current economy, but are still likely to represent a better than average income. With an estimated 40% of Liberia's population living in urban communities (Anstey, 1991), bushmeat is a part of nearly every urban Liberian's lifestyle, with an overwhelming 97% reporting that they eat it.

There is also an international component to the trade. Anecdotal data collected by the author indicates substantial cross-border trade to Ivory Coast. With much higher market prices there, there is considerable incentive for hunters and marketers to illegally transport their goods across the border. This may also be true of trade to other countries within West Africa.

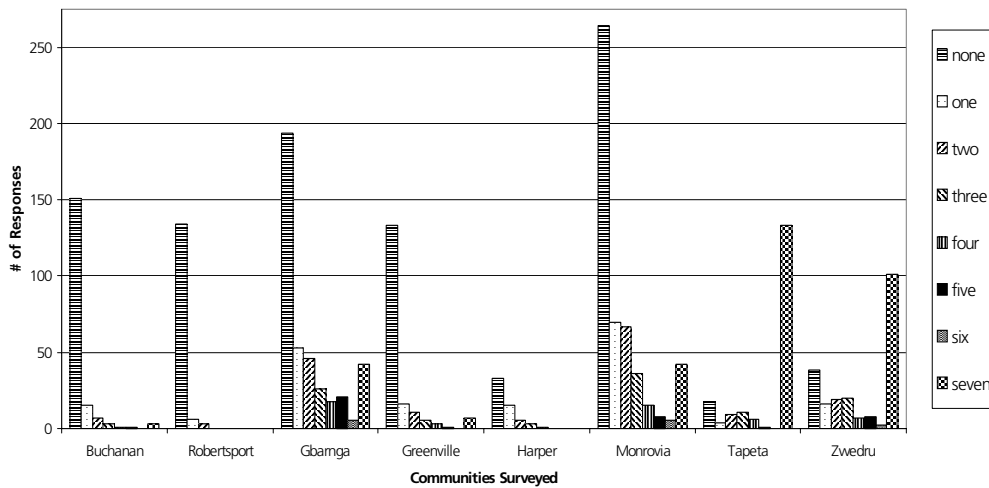
Alternatives to bushmeat?

Many have suggested that reducing the bushmeat trade depends on finding alternatives sources of protein for dependent communities. Increasing the availability of domestic livestock to rural villages is a frequently mentioned option. Villagers in Liberia typically keep chickens and goats, but domestic livestock is not commonly used to meet daily meat protein needs. Instead, it is used for special occasions or to serve as a source of emergency cash in times of great need. It is often not cost-effective for villages to invest heavily in domestic livestock, given their other preoccupations and constraints upon their time. Moreover, these alternatives are capital intensive, and would only serve to benefit the minority who can access the cash resources and technology required to benefit from the replacement of the trade.

The captive husbandry of wild species, such as cane rat and duikers, has also been suggested as an alternative. But captive husbandry of wild species in Liberia, faces several challenges:

- The husbandry of many wild species is insufficiently developed to become commercial at the rural level;
- Rural villages do not have the capital necessary to embark on commercial husbandry;
- Heavy investments in captive rearing may not be economic, given that the same species are likely to be easily available in the surrounding bush;
- There are few incentives for rural villagers to take such risks;
- Community support for the rearing of wild species that are considered crop pests is likely to be low.

Figure One: Days per week bushmeat was consumed during the previous week



Fish is a common source of meat protein in rural villages, but as fish farming tends to be capital and labour intensive, the activity may benefit a few entrepreneurs, rather than the broader community. Given the estimated cost of US\$100 million to replace bushmeat with a domestic substitute, it is not realistic to assume that rural communities can forego bushmeat consumption in the short-to-medium term.

By comparison, the dependency upon bushmeat for meat protein appears to be low in more urbanized areas. The author's survey (Hoyt & Frayne, 2002) found that the majority of urban respondents (52%) reported no bushmeat consumption at all in the previous week (Figure One). Communities furthest from the sea and poorly connected by transportation routes to Monrovia (Tapeta and Zwedru) reported much higher consumption rates.

Within those communities with low consumption rates, the majority of respondents (64-80%) felt that they could do without bushmeat. In Tapeta, where bushmeat consumption was the highest recorded, this fell to only 38%. When asked if 'assuming availability and costs were the same, what meat protein source would you prefer?', respondents generally preferred fish or chicken over bushmeat. Alternative protein sources may therefore be a greater possibility in urban areas.

The Liberian public appears to value wildlife even if it does not recognise the significance of wildlife resources to national and global conservation goals. While many people are unaware of which animals are being protected by Liberian law, most (61%) recognised that bushmeat should not be purchased if it is protected. Few respondents (24%) knew of any unique animals in West Africa, and the majority (65%) did not believe that species can become extinct. Respondents recognised that Liberia has protected species, and felt that not enough was being done to conserve Liberia's wildlife. Most (63%) believe they have a role to play in conserving Liberia's forests and wildlife.

Of the top 15 most preferred bushmeat species, five are protected under Liberian law (see Table Two). Variations in ranked preferences from different locations were likely to be related to availability of the species in the local markets. Only one primate species, the sooty mangaby, appeared in the top 15 taste preferences. Public awareness efforts, focused on selected species and habitats, could therefore be effective.

Management of wildlife harvest and trade: What might be done?

Wildlife management is nearly non-existent in Liberia. Under the failed government of President Charles Taylor, financial support to the Forest Development Authority (FDA) and its Division of Wildlife and National Parks was cut to 20% of pre-

war levels. Staff often work without pay for long periods of time, and receive little support to enforce existing wildlife laws.

The FDA operates several checkpoints around Monrovia, but there is little impact upon the trade. Law enforcement efforts tend to encourage rent-seeking behaviour by poorly trained and under-paid employees. They may also be negated by the protection afforded by security personnel accompanying bushmeat shipments to market, or letters provided by influential members of government to prevent prosecution.

Attempts to ban bushmeat in Liberia in 1988 by presidential decree were totally ineffectual (Anstey, 1991). In 2003, the county commissioner of Grand Gedeh County banned the commercial sale of bushmeat. There were initial reports of reduced bushmeat availability in Zwedru. More likely, the trade simply went underground. A more pragmatic approach is needed to manage the harvest and sale of wildlife.

Table Two: Taste Preference Ranking from Eight Urban Communities

Ranking	Species	% of Respondents
1	Cane Rat	18.1%
2	Water Chevrotain *	12.6%
3	Giant Pangolin *	9.3%
4	Black Duiker	8.1%
5	Brush-Tailed Porcupine	7.8%
6	Bushbuck	6.9%
7	Forest Hog *	4.7%
8	Long-Tailed Pangolin	4.5%
9	Maxwell's Duiker	3.2%
10	Red River Hog	3.1%
11	Ogilby's Duiker *	2.0%
12	Tree Pangolin	1.9%
13	Sooty Mangaby	1.7%
14	Royal Antelope *	0.5%
15	Crested Porcupine	0.3%

* Denotes Protected Species (Hoyt and Frayne, 2002)

1. The production end of the chain

There is significant potential for community-based management in rural Liberia. Conflicts between villages and ethnic groups in the more forested areas, and the turbulent recent history of the country has tended to reinforce community solidarity. Rural land tenure is rather less problematic in Liberia than other parts of West Africa, though uncoded and to a large degree unsupported by the state.

Giving local communities rights to control their wildlife resources would thus be a more promising strategy in Liberia than in many comparable situations. There are frequent conflicts between hunters linked to natural resource extraction (logging and mining), commercial hunting, and local communities. Outside commercial hunters may represent a particular threat to a rural community's income from wildlife resources, as they are believed to harvest wildlife at grossly unsustainable rates with no benefit coming to the community. Currently rural villagers have no legal rights to manage wildlife populations. Attempts by communities in Grand Gedeh County to exclude commercial hunters were recently rescinded by county authorities as being unlawful. Modest international support could make the necessary policy changes feasible.

Beyond this level, there is also a need for a change in approach. Management efforts related to protected species could significantly negatively impact income generation in these villages. Managers must be aware of both the biological and economic impacts of the harvest when setting policy and developing management plans.

2. Bushmeat Markets

There have been several calls in recent years for the Liberian bushmeat trade to be completely outlawed. In the light of the above discussion it is evident that such a policy would be neither practicable nor just. Horizons need to be kept more limited and efforts focused only on the reduction in the sale of selected protected species. Development of cooperative agreements between the FDA and market associations may be a positive step in reducing the consumption of protected species. Public awareness campaigns could educate people as to why these species are protected and why they should not be eaten. However, it must also be recognised that protected species represent a significant portion of the harvest and sale for some rural villages. In the longer term, conservation and development NGOs could assist targeted communities in finding alternative sources of meat protein and income.

Conclusion

Currently, there is little recognition of the significant contribution bushmeat makes to the local and national economies and nutritional well-being of the people of Liberia. Government needs to make wildlife resources a central component of its broader natural resource management planning system. Development agencies must also recognise the impact of wildlife harvesting on the health and economic development of rural people, and incorporate wildlife management into its development programming.

Conservation efforts should focus on those species that are identified as most important to wildlife managers, and in those areas of the country where those species are most affected. The development of a protected area system should promote protection of these species but cannot be relied upon entirely to meet conservation goals. On the one hand, with huge areas to cover and very small human populations resident nearby, over-reliance on an exclusion-oriented protected area policy would be expensive to implement (and unrealistic given current dire straits the Liberian economy is currently in). On the other, there

would be dangers in allowing conservation to be seen as only relevant in protected areas. Protection should also be afforded to priority species outside of protected areas through cooperative management plans that include communities.

Wildlife management must become as central to the goals of the Forestry Development Authority (FDA) as is timber and its economic importance justifies such a shift of emphasis. At the same time, wildlife management should become integral to the development of the timber sector. Timber concession management plans should include wildlife management goals, and logging companies should be held responsible for the implementation of conservation measures. The FDA must also bring wildlife research to the forefront, and implement programmes that monitor harvest rates, the bushmeat trade, and species status as an on-going part of their research agenda.

Given the limitations of the FDA and the low probability for success of overly stringent regulations, a pragmatic approach that focuses on a selected number of particularly vulnerable species is more likely to be successful. The decentralisation of wildlife management may be the best hope of maintaining Liberia's biodiversity. Bushmeat should be made a component of a broader plan to promote community-based management of natural resources in cooperation with the FDA. To do this, the issue of community rights and ownership of wildlife must be addressed.

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