

Boabeng–Fiema Monkey Sanctuary – an example of traditional conservation in Ghana

Patrick J. Fargey

*Villagers who live in the Boabeng–Fiema Monkey Sanctuary have traditionally had a taboo against killing the black-and-white colobus *Colobus polykomos* and mona monkey *Cercopithecus campbelli*, which inhabit the forest around their villages. The sanctuary is an important example of how traditional values in Ghana have resulted in wildlife conservation. The author, partly funded from the Oryx 100% Fund, carried out an assessment of the current status of the forest and monkey populations. He found that the monkeys are not immediately threatened but that some of the forest that the monkeys rely on has become degraded or destroyed. Further erosion of the forest should be minimized by careful planning of future village expansion, constructing fire-breaks and controlling farming activities along the forest perimeter.*

Introduction

The traditional life-styles and cultural practices of indigenous peoples in the developing world often complement the aims of modern wildlife conservation (Hanks, 1984). By reinforcing and encouraging cultural practices that favour wildlife conservation, wildlife managers can successfully accomplish conservation objectives and encourage the participation of local people in the conservation process. McNeely and Pitt (1985) call this 'conservation from below' and argue that this approach is more successful in developing countries than the typical, and frequently criticized pattern of having the central government proclaim punitive laws to protect wild lands and animals (Anderson and Grove, 1987).

Wild animals are an important component of Ghanaian culture (Ntiama-Baidu, 1987). Wild meat (locally known as bushmeat) features prominently in the diet of Ghanaians and the sale of bushmeat is an important contributor to the rural market economy (Asibey, 1974; Ajayi, 1978). In addition, animal skins are important symbols of chieftaincy in northern tribes (Kyerematen, 1964). Wild animals also make non-consumptive contributions to Ghanaian culture. For example, some tribes

have animals as clan totems and clan members are prohibited from harming or eating these animals. Animals also feature in religious festivals, such as the annual Aboakye Festival at the town of Winneba, during which a bushbuck *Tragelaphus scriptus* is captured alive by hand and taken to the Chief. There are also examples of small areas of sacred land (sacred groves) where the killing of animals or the felling of trees has been prohibited by the traditional authorities. The main types of sacred groves are watershed groves and burial groves, the former usually being associated with the water supply of the village while the latter is where traditional rulers are buried. Although they are often only a few hectares in size, the conservation importance of sacred groves is increasing because in the more densely populated regions of Ghana they may contain some of the only remaining intact forest.

The Boabeng–Fiema Monkey Sanctuary (BFMS) is an interesting example of how traditional cultural values have resulted in conservation. The BFMS surrounds two villages, Boabeng and Fiema, in the Brong-Ahafo Region of Ghana (Figure 1). Western black-and-white colobus *Colobus polykomos* (Booth, 1956) and Lowe's mona monkey *Cercopithecus campbelli* (Booth, 1956; Oates, 1988) live in

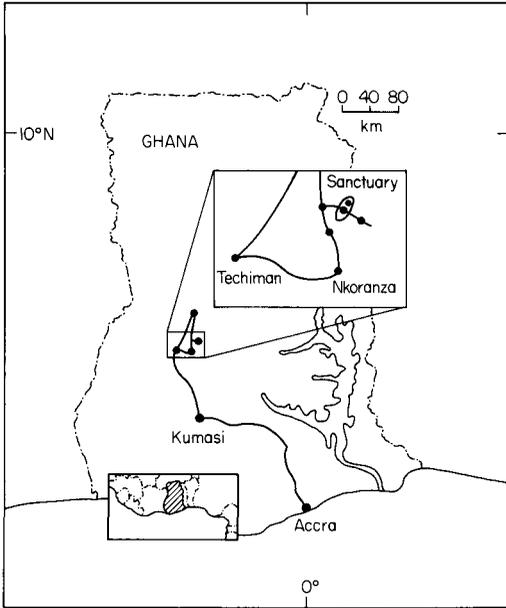


Figure 1. Location of the Boabeng–Fiema Monkey Sanctuary in Ghana.

patches of forest immediately adjacent to the villages. The villagers, believing that the monkeys are associated with local gods, have a strong taboo against killing them. This association with the gods appears to be deeply rooted in the legends about the origins of the villages. Because the villages have quite different histories, each has its own version of how the monkeys came to be associated with the gods. It is clear, however, that the villagers' traditional belief is that the monkeys are the offspring of the god Daworoh, a female god from Boabeng, and Abodwo, a male god from Fiema.

By the early 1970s missionaries had established Christian churches in the two villages and about this time some members of the Savior Church began killing monkeys in order to demonstrate that they were no longer constrained by traditional beliefs. In 1975 the Department of Game and Wildlife intervened, working with local authorities to pass a by-law prohibiting the killing of monkeys within a 4.8-km radius. Since the mid-1970s there have been only a few isolated instances of people killing monkeys within the sanctuary. The combination of traditional taboo and

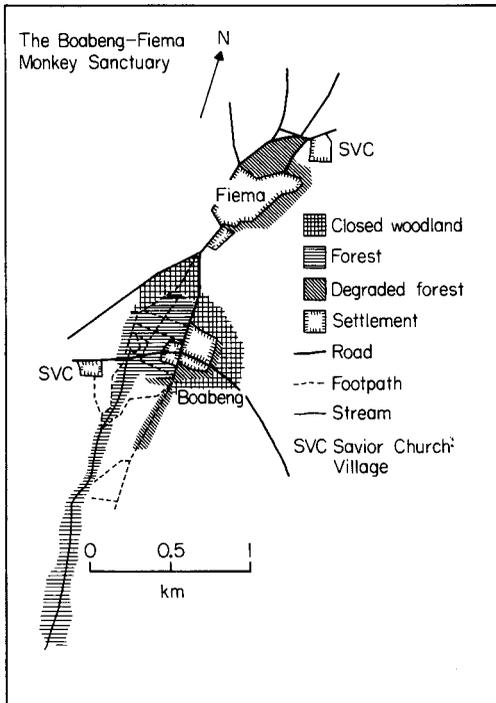


Figure 2. Tree cover around Boabeng and Fiema as determined during a ground survey in 1990.

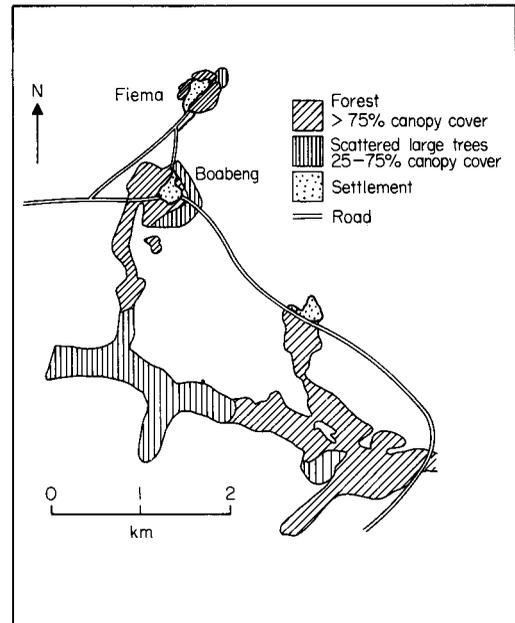


Figure 3. Tree cover around Boabeng and Fiema in 1968 as determined from aerial photographs.

modern law appears to have been quite effective.

No baseline data have been collected at the sanctuary despite the fact that it is an important and well-known example of how traditional beliefs have resulted in the conservation of wildlife in Ghana. In this paper I report on the current status of the monkey populations and the forest around the villages of Boabeng and Fiema.

Sanctuary description

The BFMS is located at 350 m above sea-level within the forest-savannah transitional zone of Ghana. The topography is flat with a gentle slope into a groundwater spring adjacent to the village of Boabeng. The mean annual rainfall from 1985–1990 was 1250 mm, most falling between March and October, with peaks in June and September (Ministry of Agriculture records, Nkoranza station). The dry season runs from November to the end of February, during which much of the countryside is burned in bush fires.

In May 1990 I enumerated the members of a random sample of households from Boabeng and Fiema and estimated the population sizes (sample size in parentheses) of the villages to be 931 (28.7%; $n = 25$) and 1434 (23.4%; $n = 30$), respectively. In addition, each village has a small satellite village within which a total of 157 parishioners of the Savior Church live. The villagers are farmers, growing yam, maize, groundnuts and cassava as main crops and tobacco as a cash crop on a small scale.

While each village has its own chief, the Fiema Chief is distinguished by being the Bosomfo (Priest) for Abodwo. This deity has regional importance and it is believed that Abodwo abhors the sight of blood so that people may escape persecution by taking refuge near his shrine.

Forest status

The forest around the villages was mapped by locating 14 parallel 1-km long survey lines

250-m apart. The lines were used to locate boundaries of the different vegetation cover types (described below) and physical features.

The forest near the villages covers only 36.5 ha, most of it west and south of Boabeng along the groundwater spring (Figure 2). Hall and Swaine (1981) classified the forest in this region as dry semi-deciduous, but distinguished it as a fire zone subtype. Many of the tree species that are restricted to this forest type (e.g. *Khaya grandifoliola*, *Aubrevillea kerstingii* and *Parkia filicoidea*) are found in the forest near Boabeng. The forest canopy is quite large and impressive, with over 25 per cent of the trees taller than 40 m. The semi-deciduous forest within the BFMS also has the sparse tree understorey characteristic of the fire zone subtype, which is caused by the periodic ground fires that kill trees with diameters at breast height of less than 20–30 cm (Hall and Swaine, 1981). The sparse understorey makes for excellent viewing of the monkeys.

The 15.3 ha of semi-deciduous forest that occurs along the forest–village interface has been degraded (Figure 2) and has many openings in the canopy. The degradation has resulted from the digging of latrines and garbage pits and the invasion of bush fires, which start in the surrounding savannah. For example, bush fires during the 1990 dry season were observed burning well into the small strip of degraded forest to the east of the village of Fiema.

In the surrounding derived savannah there is much evidence of farming and most of the area burns every dry season. Grasses dominate, with the tree canopy composed of relatively small (most less than 25 m) savannah trees, such as *Anogeissus leiocarpus*, *Daniellia oliveri*, *Terminalia glaucescens*, *Burkea africana* and *Detarium microcarpum*.

Closed woodland, the third vegetation type, is a transitional phase between the forest and the savannah, which results from the absence of ground fires for several decades. As a consequence, savannah trees (typically *Anogeissus leiocarpus*) are able to form a closed canopy, effectively shading out the grasses. Given sufficient time and protection from fire, the forest trees will replace the savannah trees.

There is 19.5 ha of closed woodland surrounding Boabeng, but none around Fiema, indicating that the frequency of fire and/or farming along the outer forest margins has been much higher at Fiema than at Boabeng.

Many changes in the quantity and quality of the forest cover appear to have occurred during the last 20 years. Comparing the current distribution of the forest (Figure 2) with aerial photographs taken in 1968 (Figure 3) clearly shows that the forest around Fiema has shrunk dramatically. For example, large patches of trees to the west and north of the village, which were clearly visible in 1968, had completely disappeared by 1990. Furthermore, the area to the east of Fiema, which was classified as degraded forest in 1990, appears to have been closed canopy forest in 1968. In contrast, the closed woodland north of Boabeng and west of the Boabeng–Fiema road, which was observed during the 1990 survey, was indistinguishable from derived savannah on the 1968 aerial photographs. Two important conclusions can be drawn from this: (i) the area that now contains closed woodland vegetation has received considerable protection from fires during the last 20 years, in part perhaps because the roads have served as fire breaks; and (ii) closed woodland can develop rapidly from savannah when given protection from bush fires.

There have also been changes in the composition and size of the villages within the sanctuary. Between 1968 and 1990 the number of households in both Boabeng and Fiema approximately doubled, but only Fiema increased in area, and in the area it occupies (Table 1). Undoubtedly, Fiema’s large increase in area contributed to the destruction of the forest along its edges.

Monkeys

Monkeys were counted by a single observer, who familiarized himself with each troop in the sanctuary during 24 days in November 1989 and February 1990. The final enumeration occurred from 1 to 19 May 1991. Each troop was counted in the early morning, or in

the evening as it congregated at the roost tree(s). At the same time, each troop member was placed into one of the following categories: (i) adult, large animal that is at least three-quarters the size of the largest individual in the troop; (ii) subadult, greater than one-half, but less than three-quarters adult size; (iii) immature, small, independent animals less than one-half the size of an adult. The monkey biomass was calculated by multiplying the number of individuals in each size class by the weights reported for these classes by Oates *et al.* (1990). The biomass per unit area of monkey habitat was calculated by assuming that all 71.3 ha of the semi-deciduous forest, degraded forest, and closed woodland in the sanctuary were available as primary habitat.

The troop numbers and population sizes for the black-and-white colobus and mona monkeys were estimated to be 8 and 127, and 13 and 216, respectively. Approximately one-third of the black-and-white colobus and mona monkey populations in the sanctuary were composed of immature individuals, which suggested that these populations are reproducing without difficulty.

The biomass of the black-and-white colobus and mona monkey populations per unit area of habitat in the sanctuary were 1342 kg and 839 kg per sq km, respectively. These estimates are substantially higher than the highest monkey biomass reported for West Africa (Oates *et al.*, 1990) but should be interpreted

Table 1. The number of households and the area occupied by the villages within the Boabeng-Fiema Monkey Sanctuary as determined from aerial photographs taken in 1968 and a ground survey in 1990

Village	Households		Area (ha)	
	1968	1990	1968	1990
Boabeng	40	87	6.8	6.7
Fiema	60	125	10.4	13.7
Savior Church				
Boabeng		6		1.2
Savior Church				
Fiema		21		2.1

with caution, because both species of monkey, and in particular the mona monkeys, were observed using some of the derived savannah areas that bordered the forest. As a consequence, the monkey biomass was likely to be overestimated because none of the savannah was included in the estimate of habitat. Future research should assess what contribution the derived savannah makes to the habitat requirements of the monkeys.

The food preferences of the mona monkey and the black-and-white colobus are quite different. The mona monkey primarily feeds on fruits, young leaf shoots, and insects (Gautier-Hion, 1988). This species is a common sight on the periphery of the villages and often steals food from the villagers. This behaviour is normally tolerated, sometimes even encouraged, by villagers deliberately leaving food out for the monkeys. The mona monkeys were often observed feeding on the village garbage heaps, apparently feeding on the food wastes (cassava and yam peels) found there.

The black-and-white colobus, like other colobines, feeds mainly on tree foliage, although flowers and fruit are sometimes eaten (Oates, 1977; Struhsaker, 1978). This species is able to digest foliage much more effectively than the mona monkey because it has a ruminant-like foregut, (although it does not ruminate) within which microbes break down cellulose into volatile fatty acids that can be utilized as an energy source by the monkey (Bauchop, 1978). Black-and-white colobus were never observed feeding on the village garbage heaps, although they occasionally ventured out of the forest and into the village to lick the earth walls of the huts, presumably to obtain minerals and salts.

Conclusions

There are no immediate threats to the monkeys. They are protected by a strong taboo as well as by local and national laws. There is strong evidence that some parts of the forest have been lost or degraded because of the expansion of the villages. While the amount of forest that has been lost is not large, the prob-

lem will certainly become more severe in the future as the villages expand to accommodate an increasing human population. Because the monkeys are inextricably linked with the forest, the long-term conservation of the monkeys can be assured only if the forest receives adequate protection.

To ensure the protection of the forest the Department of Game and Wildlife should work with the villagers to demarcate a forest boundary, within which tree-felling and farming would be prohibited. It would be ideal if this boundary were maintained as a fire-break. Given sufficient protection from fire, the forest would expand with time, increasing the amount of habitat available to the monkeys. In addition, future village expansions need to be planned to minimize damage to the forest, a goal easily accomplished by directing the expansion away from the forest.

The monkeys in the sanctuary are probably part of a larger population of monkeys that inhabit the riverine forest along the nearby river drainages. The status of the monkey populations around the BFMS is unknown, but they are probably under severe pressure from hunting and habitat loss. As the monkeys around the BFMS become extirpated, the sanctuary will become an isolated habitat fragment susceptible to extinction from inbreeding depression and stochastic extrinsic factors such as contagious diseases and severe fires (Soulé and Simberloff, 1986). While it is difficult to determine precisely the minimum population size needed to ensure that inbreeding depression does not occur, it is clear that the current populations within the BFMS are at the low end of what would be a sustainable population size (Frankel and Soulé, 1981; Soulé and Simberloff, 1986). Maintaining the monkeys that live in the riverine forest in the vicinity of the BFMS would enhance the chances of survival for the monkeys within the BFMS. Further research into the status of the monkey populations within the vicinity of the BFMS needs to be undertaken. One encouraging development is that the inhabitants of the nearby village of Busanya have tolerated the black-and-white colobus monkeys that colonized the forest next to their vil-

lage in the early 1980s and several troops are now living there.

Similarly, increasing the size of the monkey populations within the BFMS would help protect the monkeys from extinction. Because the density of monkeys within the BFMS is already quite high, it is probable that the population of monkeys will increase only if the amount of suitable forest habitat also increases. As previously discussed, this can be accomplished by protecting the forest margins from bush fires.

The villagers currently receive no economic benefit from tourism despite the fact that approximately 100–150 tourists visit the sanctuary annually. Recognizing that the villagers could realize some revenue from tourism, village leaders, working with the Tourist Board and the regional and district authorities, plan to develop a rest-house where tourists could stay. It would be a small-scale operation, maintained and managed by the villagers. The generated revenue would be used in community development projects.

Acknowledgments

I would like to acknowledge the assistance of M. Adu-Nsiah, A. S. Asamoah, B. Asamoah-Boateng, K. L. Bahain, and M. K. Sam (students), N. Donkor (teaching assistant) and K. Osum (technician) from the Institute of Renewable Natural Resources, University of Science and Technology, Kumasi, who collected most of the field data. I would also like to thank the villagers of Boabeng and Fiema for the hospitality they extended to us; in particular, I would like to thank D. Akowuah and his family for allowing us to share their compound. Financial support for the project was provided by the Fauna and Flora Preservation Society. I would also like to thank two anonymous reviewers for their useful suggestions that helped improve this paper.

References

Ajayi, S.S. 1978. Pattern of bushmeat production preservation, and marketing in West Africa. *Nigerian J. Forestry*, 8(1 & 2), 48–52.
 Anderson, D. and Grove, R. (eds) 1987. *Conservation in Africa: People, Policy and Practice*. Cambridge University Press, Cambridge.
 Asibey, E.O.A. 1974. Wildlife as a source of protein in Africa south of the Sahara. *Biol. Conserv.* 6, 32–39.

Bauchop, T. 1978. Digestion of leaves in vertebrate arboreal folivores. In *Ecology of Arboreal Folivores* (ed. C. G. Montgomery), pp. 193–204. Smithsonian Inst. Press, Washington DC.
 Booth, A.H. 1956. The distribution of primates in the Gold Coast. *J. W. Afr. Sci. Assoc.* 2, 122–133.
 Frankel, O.H. and Soulé, M.E. 1981. *Conservation and Evolution*. Cambridge University Press, Cambridge.
 Gautier-Hion, A. 1988. The diet and dietary habits of forest guenons. In *A Primate Radiation: Evolutionary Biology of the African Guenons* (eds A. Gautier-Hion, F. Boulière and J.-P. Gautier), pp. 257–283. Cambridge University Press, Cambridge.
 Hall, J. B. and Swaine, M.D. 1981. *Distribution and Ecology of Vascular Plants in a Tropical Rain Forest Vegetation in Ghana*. Geobotany 1. Junk, The Hague.
 Hanks, J. (ed.) 1984. *Traditional Life-styles, Conservation and Rural Development*. Commission on Ecology Papers, No. 7, IUCN, Gland.
 Kyerematen, A.A.Y. 1964. *Panoply of Ghana*. Longmans, Green & Co Ltd, London.
 McNeely, J.A. and Pitt, D. 1985. Culture: the missing element in conservation and development. In *Culture and Conservation: the Human Dimension in Environmental Planning* (eds J. A. McNeely and D. Pitt), pp. 1–9. Croom Helm, London.
 Ntiamao-Baidu, Y. 1987. West African wildlife: a resource in jeopardy. *Unasylva*, 39, 27–35.
 Oates, J.F. 1977. The guereza and its food. In *Primate Ecology: Studies of Feeding and Ranging Behaviour in Lemurs, Monkeys and Apes* (ed. T. H. Clutton-Brock), pp. 275–321. Academic Press, London.
 Oates, J. F. 1988. The distribution of *Cercopithecus* monkeys in West African forests. In *A Primate Radiation: Evolutionary Biology of the African Guenons* (eds A. Gautier-Hion, F. Boulière and J.-P. Gautier), pp. 79–103. Cambridge University Press, Cambridge.
 Oates, J.F., Whitesides, G.H., Davies, A.G., Waterman, P.G., Green S.M., Dasilva, G.L. and Mole, S. 1990. Determinants of variation in tropical forest primate biomass: new evidence from West Africa. *Ecology*, 71, 328–343.
 Soulé, M.E. and Simberloff, D. 1986. What do genetics and ecology tell us about the design of nature reserves? *Biol. Conserv.* 35, 19–40.
 Struhsaker, T.T. 1978. Food habits of five monkey species in the Kibale Forest, Uganda. In *Recent Advances in Primatology, Volume 1* (eds D. J. Chivers and J. Herbert), pp. 225–247. Academic Press, London.
 Patrick J. Fargey, PO Box 1083, Stettler, Alberta, T0C 2L0, Canada.