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WHOSE FOREST?
MODERN CONSERVATION AND HISTORICAL LAND USE IN GUINEA'S ZIAMA RESERVE

James Fairhead and Melissa Leach

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James Fairhead is a Research Fellow at the Department of Sociology and Anthropology, School of Oriental and African Studies, University of London, Thornhaugh Street, Russell Square, WC1H 0XG, UK.

Melissa Leach is a Fellow of the Institute of Development Studies, University of Sussex, Falmer, Brighton BN1 9RE, UK.

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Introduction

Many of West Africa's high forest areas were reserved during the colonial period for commercial or environmental reasons. Today these are seen as important sites for the conservation of biodiversity, wildlife, climate, soils and hydrology – concerns which satisfy global and regional environmental agendas (see, for example, Martin, 1991; Miller & Tangley, 1991), but which are not necessarily shared by local populations who have other needs to use land and resources within reserves. The wisdom of colonially-derived forest conservation approaches based on policing externally-imposed reserves has recently been questioned, not least because of their expense and the politically unsustainable conflicts they have provoked between forest-edge communities and reserve administrations. Instead, attempts are now made to secure the support of forest edge populations by linking conservation to the provision of socio-economic benefits, whether in the form of reserve products (eg, non-timber forest products, shares of eco-tourism revenues), or of `compensatory' rural development activities. These socio-economic possibilities are seen to provide grounds for establishing more `participatory' forms of conservation planning.

Thus socio-economic studies which identify local attitudes and interests in forested land and resources are now considered essential in planning for `people oriented' forest conservation. Such studies, and the wider policy literature which supports them, commonly attribute deforestation to recent immigration and other demographic and economic pressures; pressures which can force even local inhabitants with supposedly forest-benign cultures to degrade the forest. It is concerns with modern livelihood needs which dominate analyses of the origins of forest conservation conflicts, and solutions to them.

Within conservation circles, West Africa's remaining forest areas are usually portrayed as undisturbed or minimally disturbed prior to these modern pressures. Indeed, the idea of forests as `natural' patrimony has provided a powerful justification for conservation, and those considered `pristine' or `primary' have been accorded particularly high value for the preservation of habitats and biodiversity.

Histories of previous land-use in West Africa's forests

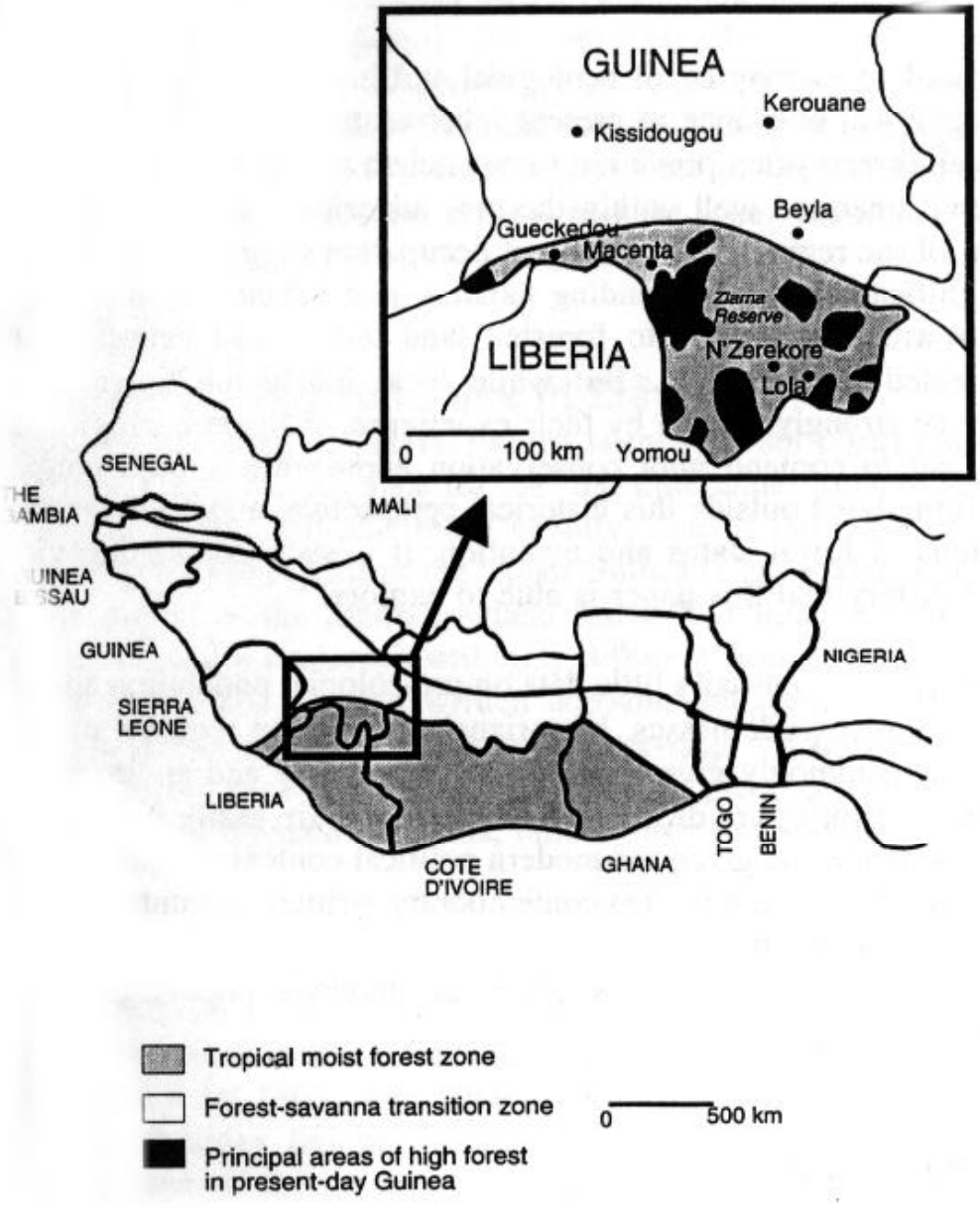
It is the case, however, that most of West Africa's high forests contain old abandoned village sites, testifying to periods of greater occupation and use and calling into question their pristine status. Indeed, major clearance and modification in the past mean that very few of today's forests anywhere can be considered virgin (McNeely, 1993; Wood, 1993). As Richards (1993) points out for Gola, Sierra Leone and Thompson (1911) for southern Nigeria, today's West African high forests commonly owe their origins to depopulation linked to warfare, slavery and disease. Such forest histories have important implications for how one understands both forest ecology, and people's social and political relationships with currently forested land. Furthermore, the case examined here suggests how far overlooking such histories can undermine constructive dialogue between local people and conservation agencies.

Evidence emerging from many parts of the world suggests that present-day forest quality and biodiversity patterns reflect the influence of past land use practices; of fallowing methods in

shifting cultivation, and of selective vegetation clearance, preservation and enriching with preferred species. The coming and going of forest could be seen as cyclical, reflecting the going and coming of populations who cleared it, (McNeely, 1993) periodically allowing and suppressing the `natural' succession to a climatic climax vegetation. But this overlooks how the long-term legacy of past habitation and land management influences future vegetation possibilities, notably through its impact on soils and species distribution. Ecologists have normally considered this legacy only in negative terms: land use degrades soils and species diversity, reducing the potential of forest to regenerate.

Nevertheless, it has been noted in Amazonia (Balée, 1989) and Ghana that following inhabitation or cultivation, certain soils can have improved nutritional and structural properties, that they can support denser woodland and forest vegetation, and that these effects can endure for hundreds, if not thousands of years. If one considers how land use interacts with both climatic change and environmental shocks (eg, drought years or major fires) to influence vegetational possibilities, vegetation change begins to appear as a history of continual transition, rather than as one of divergences from a single climatic climax. And vegetation patterns are the unique outcomes of particular histories, not predictable divergences from characteristic climaxes (Sprugel, 1991). Within the humid forest zone, such unique histories primarily affect forest quality, but in areas marginal for forest growth they may affect the very existence of forestvis-à-vis savanna vegetation forms. Although intensive human use has often been blamed for the savannisation of forest, it can have the opposite effect; past or

Figure 1: The Ziama Reserve among the remaining ares of high forest in Guinea, West Africa



present land use practices can enable forest to develop in savanna where otherwise this would be unlikely for want of the necessary conjecture on particular soil, moisture, fire limitation and seed conditions. The islands of forest which have developed in savanna on or around inhabited, once-inhabited or cultivation sites provide a striking case in point, noted in the forest-savanna transition zones of Guinea (Leach & Fairhead, 1994), Ghana (Davies, 1964), Nigeria (Abimbola, 1964) and in the Amazon (Anderson & Posey, 1989).

Ancient disturbances may be of ecological and historical interest, but of little social and political relevance to present inhabitants. But the settlement sites in West African forests often prove not to be ancient relics of a forgotten past, but to have been inhabited well within the oral historical memory of present-day populations of the region. The recency of occupation suggests that past land use may be significant for understanding existing populations' relationships with, attitudes towards and claims to forested land today; and hence for modern `people-oriented' conservation. But while local inhabitants' own views and values may be strongly shaped by their experience of forest ecological history, they have had to contend with conservation approaches – both colonial and modern – formulated outside this historical perspective, and with very different interpretations of forest status and evolution. It is such contrasting views and readings of history that this paper is able to explore.

Unfortunately, there is usually little data on pre-colonial population and land use in these new forest wildernesses. Historians' research on regional political and trade relations commonly gives little detail of land use and environment. Oral environmental histories are difficult to interpret and are easily disputed without supporting evidence and given the modern political context shaping descriptions of past ecology and economy. Yet contemporary written accounts usually begin only with colonial occupation, and while they may outline the dates and causes of depopulation, they rarely give detail of previous populations and their livelihoods.

The Ziama forest

The Ziama forest in Guinea (Figure 1) offers a rare exception. Considered by conservationists as a relic of the diminishing Upper Guinean forest formation, this was designated a forest reserve in 1932, made a Biosphere reserve in 1981, and is now the subject of a major internationally-funded conservation project. Fortunately two famous groups of Americo-Liberian explorers visited the area in the third quarter of the nineteenth century and extensively documented their travels. Seymour and Ash walked from Monrovia to Kuankan in 1858[1] and Anderson walked twice from Monrovia to Musardu, first in 1868-9 (Anderson, 1870) and then again in 1874 (Starr, 1912). Coincidentally, several of the villages which they passed through and described are precisely those attracting the attention of today's forest conservationists.

The written evidence of these explorers, coupled with the oral evidence of today's inhabitants and the works of regional historians, enables us to gain a sufficiently good idea of the Ziama area's past populations, their land use, the chain of events which led to their decline, and their relationship with present-day populations. This provides a context in which to review local attitudes towards conservation strategies pursued during the colonial period and in the present day. It throws into sharp relief the contrast between the perception of people-forest relations underlying conservation policy, and the local experience underlying responses to it.

Past population and land use in Ziama

The Ziama forest biosphere reserve which is today often portrayed today as a pristine forest at risk of clearance for the first time under modern demographic pressures was, in the mid-nineteenth century, one of the most populous and agriculturally prosperous parts of the Upper Guinean region. Benjamin Anderson crossed the region of the Ziama lowland forest four times between 1968 and 1874, and described a landscape strikingly different from the high forest which exists there today. His detailed written accounts support the oral testimonies which elders in two of the present-day reserve-edge villages presented to us, which describe the area to have been highly peopled, economically vibrant, heavily farmed and covered by farms, fallow bush and grassland.

High population density

Anderson's descriptions of the fortified settlements which he passed through give a strong impression of the magnitude of mid-nineteenth century populations. On his first journey in 1868, after describing his journey from Monrovia to Bokkasah which today lies on the modern Liberia-Guinea frontier, Anderson entered the region of the modern forest reserve. He found generally that "the Bonsie [sic] country is densely populated"[2] (Anderson, 1870, p.81). Indeed, he mentions a whole series of villages in the region with populations of between 2,500 and 7,000 (Anderson, 1870, pp 66-113). Reconstruction of historical demography is, of course, fraught with methodological difficulties. Estimates from contemporary written sources do avoid the problematic tendency of retrospective oral histories to glorify a highly peopled past (or conservationist histories to glorify an unpeopled one), but may be inflected by contemporary perceptions. If anything, Anderson is more likely to have overestimated than underestimated populations, since he was interested in demonstrating the commercial value of the region he traversed. Nevertheless, the large size of villages described by Anderson at this period is also suggested in Seymour's descriptions from 1858 and by the earliest French sources. Seymour describes the `Boosey' town of Solong as having 2,200 people. French military documents describe N'Zappa as having a population of 3,000 in 1900[3].

Information on settlement patterns, settlement construction, trade and land use add weight to the picture of a densely populated country. In addition to the towns themselves, many had smaller dependent settlements. Not only was Boo [Anderson's Boe] a large town but it had at least 22 satellite villages which Anderson alluded to, and one of which he visited (Anderson, 1870, pp 73-4). Such a pattern of parent war towns with dependent permanent settlements as well as farm camps was typical of nineteenth century political conditions in the Upper Guinean region (see, for example, Murphy & Bledsoe, 1987, pp 121-48). That these villages were substantial and fortified was evident when their ruins were observed in the reserve by early colonial foresters[4].

Markets

The numerous large markets described by Anderson support the picture of substantial populations, and of vibrant production and trade. On his first journey he wrote that in Ziggah Porrah Zue,

> "We were conducted to the market-space in the central town, which was spacious and convenient for holding large crowds.....It is generally attended by six or seven thousand people...On Saturdays, sitting under the shade of large acacia-trees, I

> have watched the almost uninterrupted stream of people with their bundles and packs coming from every neighbouring town and village to market. The bridge crossing the St. Paul's River would be laden or occupied from one end to the other, for hours." (1870, pp 79-80).

Ziggah Porrah Zue was by no means exceptional; Anderson noted "several large markets held in the Wymar country," (1870, p.79). Mandinka traders regularly moved between these markets, which lay on the main savanna-forest-coastal trade route, passing produce along the trade route by relay from market to neighbouring market.

Intensive farming in the savanna

Although Anderson does not describe the farming around Boo, just south-west in Toma land (over the modern Liberian frontier) he documented intensive farming and its relatively short fallow periods, allowing the regrowth of only low farmbush vegetation:

> "Standing upon an elevation, it seemed to me that the people had attempted to cover the whole country with their rice fields. Toward the west could be seen the rice hills enveloped in showers; succeeding that, whole mountain sides of rice partly buried in vapour; next to that could be seen a brilliant sunlight, spread over the brown and ripening plains of rice below.... Only here and there could be seen patches of large forest-trees. So completely had this section of the country been farmed over and over that only saplings of three or four years' growth covered the uncultivated parts. Nor will they be allowed to attain a greater age or size before the requirements of agriculture will clear them for rice and cotton fields. This is the chief reason why all the barricades, or walls of towns, in this section of the country are formed of earth and clay, instead of the large stakes that are used by the natives living in the vicinity of Liberia." (1870, pp 61-2).

Oral accounts confirm that land in the intervening Ziama area, too, was very heavily farmed. Furthermore they suggest that the fallow vegetation at this time was largely savanna. In Boo, elders suggest that savanna once covered not only the village's and its satellites' territory, but also extended much further south and west. They point out the silk cotton trees (*Ceiba pentandra*) which their ancestors planted as lookout posts to see over the savannas and from which one could clearly see Koima Tongoro (Anderson's Ziggah Porrah Zue). In both villages, native cotton – which thrives in savanna soils – was of central economic importance, spun by women and woven by men into cloths for trade as well as local clothing.

The existence of abundant savanna pasture is also suggested by accounts of cattle-keeping at this time. Elders recall that the Toma of Ziggah Porrah Zue maintained substantial cattle herds. In Boo cattle were also kept but their numbers were limited for fear of attracting raids, not for any want of pasture.

Walking up into the Ziama mountains west of Kuankan, today heavily forested, Seymour observed that:

> "The common growth of the plains and mountains is grass, with here and there a clump of forest trees left standing apparantly [sic] for fear their species will

> become extinct. There were more on the mountain sides and near the streams on the mountain than on the plains." (endnote 1).

Anderson gives no direct vegetation description of the area of Waima Toma country now covered by the Ziama reserve. However moving north-east from it, he described elephant grass as the dominant vegetation:

> "We left Ziggah Porrah Zue November 30th 1868, taking a direction ENE. The country was open, and covered with tall grass, cane-brake, and wild rice. In an hour's walk we came to the town where the King formerly resided, passed on, and halted at Pellezarrah ... Trees now indeed began to be scarce, the country being covered with cane brake, wild rice, and very tall palm trees. Some trees of that short, stunted species which grow on our beach at the Cape, were seen sparsely scattered here and there. We travelled over a hard soil of red clay, pebbles, and iron ore... (1870, pp 81-2)

Comparing these accounts, it would appear that in the mid-nineteenth century the boundary between young farmbush and savanna fallows lay somewhere between Boo and what is now the Liberian frontier. Most probably, even around Boo savanna and low farmbush vegetation co-existed as a mosaic, with certain patches of large forest trees. Indeed Anderson contrasts the uniformly treeless savannas he encountered further north with the more patchy landscape of Toma country:

> "In passing through Boozie country, extensive views were frequently obstructed by dense vegetation that hemmed in the sight on each side of a narrow foot path. Here [around Musardu] the peculiar features of the country are visible for miles. The towns and villages seated in the plains, people on foot and people on horseback can be seen at a great distance, and have more the air of light, life and activity, than many parts of Boozie country, where the sombre gloom of immense forests conceals all such things" (1870, p.88).

The maintenance of forest patches

These patches of high forest were almost certainly those maintained by Toma inhabitants around their settlements in the otherwise savanna/farmbush landscape, as well as gallery forests along watercourses where these were not regularly cleared for farming. Village-periphery high forest patches were noticed by Seymour and Ash, for example in visiting a:

> "...little mountain town [on the Ziama mountain]...surrounded with Plantain and Benanna [sic] trees, with corn and cassava patches near; and rice farms a few hundred rods distant down the mountain slopes, and on the path near the town were some forest trees around the outskirts of the town very large... Elsewhere on the mountains are to be seen low scattering scruble [sic] looking trees, in connection with dark naked rocks, projecting from among the grass, .. land marks to the traveller in the grassy mountains of Kong [5]."

Oral history suggests that many Toma villagers may have encouraged and managed the growth of forest `islands' around their villages (Leach & Fairhead, 1994). Where, as we know for Boo, for

example, there was high settlement density, there would have been a high density of such forest islands. In many cases, the initial trees of these forests may partly have originated from the suckers of stockade poles used with mud walls for fortification. Such high forest patches provided useful protection from fire and wind, shade for tree crops such as the kola characteristically produced in this area, and a convenient source of forest products (food, medicines, etc) not available in the savanna and farmbush fallows otherwise used for gathering. They also provided sites for the `secret society' initiations and activities practised by the Toma then as now, in common with other peoples of the Upper Guinean region.

Depopulation and forest growth

Between the time of Anderson's last visit in 1874 and 1909, this once populous and prosperous region was the site of continued warfare. It was the ensuing depopulation, probably in the context of climatic rehumidification, reduced elephant pressure and the soil and vegetation legacy of previous land use practices, which enabled the rapid establishment of high forest.

Warfare and depopulation

During the eighteenth and nineteenth centuries, Mandinka from the Konian region to the north-east had been pushing south into this part of the Toma region, situated on the ancient trade route from Musardu to Bopolu, Cape Mount and the sea. This movement can be considered within the general context of southwards Mande expansion from the fifteenth century or before, and the long established use of this coastal forest savanna trade route – for "hundreds and hundreds of years" as Almada had already suggested in 1560 (Massing, 1978). It was largely competition for control over the trade route which precipitated political instability in this region during the nineteenth century[6].

By the mid-nineteenth century a Mandinka chiefdom called Buzié had established itself on the right bank of the Diani (St Paul's) river with its capital at Kuankan. It was ruled until 1867 by Dyankan Kamara – whom Seymour and Ash met in 1854 – and thence by his son, Kama Tiekura. To its south were the Waima [Anderson's Wymar] Toma under the leadership of Anderson's friend Dowilnyah Bilivogi, with their capital at Ziggah Porrah Zue. To the west of the Waima Toma were the Ziama Toma whose capital was just south of Kuankan in Busedu.

The wars which depopulated the region involved the Waima Toma inhabitants (already at war during Anderson's 1868 visit) in conflicts first with Mandinka groups from the north, notably from Kuankan, and then with the French forces of occupation which the Toma notoriously resisted for ten years, until 1909.

The following table compares the pre-war populations of those villages whose size we can estimate from Anderson's account with their more recent population sizes, according to the census conducted at the time of the forest reservation in 1932, and the 1991 census carried out by the modern forest conservation project.

Table 1:
Comparative village population estimates in the Ziama area

Village	**Population**			
	1868/74	**1894/ 1900**	**1932**	**1991**
Boo (Boe)	c.5000		543	1742
Koima Tongoro (Ziggah Porrah Zue)	c.6000		600	846
Kpagna/Baimani (Pynyah)				
Nonbohouota (Nubbewah's town)	c.3500		370	334
N'Zappa (Sappah)				
	3000		338	807
	c.5000	3000		

In short, the Toma villages which had survived or reestablished were by 1932 more or less a tenth of the size they had been during Anderson's visit. Furthermore, a very large number of smaller dependent villages present during the nineteenth century had disappeared completely. Boo lost 21 satellite villages and Koima Tongoro at least 4. The important fortified nineteenth century village of Kothia, which may itself have had dependent villages, also no longer exists. Its site lies within the proposed strict nature sanctuary of the modern Ziama reserve.

The establishment of the Ziama forest

The first forester visited the Ziama region in 1909. This was already more than 30 years after the first and complete devastation of the Waima Toma country on the right bank of the Diani river. The forester's description strongly suggests the secondary character of these forests regenerating on the farm, fallow and settlement sites of the depopulated Toma region.

> "To the south [of the mountain], the forest is continuous over a very large area; from Soundedou to Fassangouni one travels under an uninterrupted verdant canopy. Very large trees in the dominant canopy are extremely rare. But the second layer is complete. Its cover is always light enough to have permitted the establishment of a fairly dense understorey which, however, does not completely prevent passage. Lianas are quite rare [7]."

By 1942, when the forest botanist and administrator Adam described the Ziama forest, there were still significant areas of savanna within it. Adam listed the principal vegetation forms to be found as follows (endnote 4):

> Primary montane forest;
> Secondary montane forest;
> Secondary valley and plain forest;
> Secondary swamp forest;
> Savanna of granite, laterite and other outcrops;

Plateau savannas (elephant grass);
Anthropogenic and fire-derived savannas;
Edaphic savannas on mountain slopes;

Notably there was no primary forest anywhere on the plains; neither did it cover the mountains entirely. The various large patches of savanna lay on the plains as well as on the thin mountain soils. The region between N'Zebela, Bayema, Koima Tongoro, Subatono and Goboela, especially, was characterised by large areas of herbaceous savanna. Adam was aware of the historical explanation for this vegetation pattern:

> "The secondary forest which could be 40-60 years old dates for the most part from the Mandinka invasion...at this period, successive indigenous wars, and southward migration reduced the population and obliterated numerous villages – the presence of clearly visible paths in certain places leading to ancient settlements reveals this. The sites of these villages, whose names are still known by elderly inhabitants, is marked by lighter vegetation, the presence of large silk cotton trees, and sometimes ruined fortifications" (endnote 4).

High forest established itself as regrowth from farmbush once this was no longer held within a regular farm-fallow cycle. But it is not necessarily the case that such areas had originally been forest prior to their incorporation into bush fallow cycles by local populations. Equally the savannas had not necessarily been derived from the savannisation of such forest through the extended cultivation and short fallows of dense populations.

The influence of climate

Situated as the Ziama area is, on the extreme northern edge of the forest zone, small changes in the rainfall quantity and distribution which influence fire patterns can have large influences on vegetation patterns. Studies of West African climate change suggest that the region's climate was generally drier between the eleventh and mid-nineteenth centuries, after which it became more humid again (Brooks, 1986; Nicholson, 1979). Studies in other parts of the forest-savanna transition zone have documented the advance of forest over savanna in the context of this climatic rehumidification, despite increasing population (Spichiger & Pamard, 1973; Leach & Fairhead, 1994). Indeed, these studies show how certain local cultivation, fire and livestock management practices deflect vegetation succession from savanna to forest; effects enhanced under population growth. It is conceivable, therefore, that local management under high population density in the Ziama area before the mid-nineteenth century was partially responsible for the spread of woody vegetation, from earlier more savanna-like conditions under a drier climate. This hypothesis is suggested by the oral histories which we collected that indicate the past existence of even more extensive savannas than Anderson described, perhaps making reference to an earlier period.

Soil quality

Studies in the forest-savanna transition zone also indicate the importance of appropriate soil-water and fertility conditions for permitting forest establishment where climate is marginal for it (Morgan & Moss, 1965; Avenard *et al*, 1974). In many instances, forest patches owe their existence to the ways local inhabitants have altered soil conditions through fertilisation, cultivation or termite activity-enhancing practices (for example, Anderson & Posey, 1989). Such practices are integral to the ways the neighbouring Kissi establish forest islands in savanna around

inhabited villages. In Nigeria, the fertility and soil structural legacy of habitation and gardening has been responsible for the establishment of forest patches on the ruins of abandoned villages, surrounded by annually burned savanna vegetation (Abimbola, 1964). And in the Amazon, Hecht and Posey comment that, "If....forest ecosystems are cultural artifacts, many of the features of soils that underlie these forests are also the outcome of human intervention" (Hecht & Posey, 1989).

Soil-improving practices may have been important to Toma farmers when creating high forest patches around or near their villages during the high population density period. Equally, the legacy of such practices across old village territories may have influenced patterns of forest regrowth after depopulation, not only in the relative distribution of forest and savanna, but also in the relative quality, density and speed of forest growth. The large number of villages and dependent settlements with their habitation and garden sites which came to lie abandoned within the present reserve probably constitutes a significant proportion of the land area; the proportion itself probably influencing the development of vegetation elsewhere. The species composition of forest growth would also have been influenced by prior local vegetation management, including the maintenance of silk cotton trees, kola and selectively-preserved wild fruit trees (eg, *Spondias mombin*) near settlements. As the forest grew, abandoned village sites and their forest patches retained their distinctive vegetation, which is still noticeable within today's reserve.

Reductions in elephant numbers

Reductions in elephant pressure during the last decades of the nineteenth century may have been a further factor influencing the growth of forest. Elephants, in association with fire, are known to be capable of maintaining savanna vegetation or even converting forest to open scrubland and grassy savanna (Buechner & Dawkins, 1961; Dublin *et al*, 1990). The apparently large elephant populations in the Ziama area and region to its north were decimated during the Toma campaigns in the region, when ivory was traded for armaments first to Freetown and then to Cape Mount. Much of this decimation took place between 1891 and 1894 when the Toma acquired modern repeater carbines, traded through the Ziama region (Person, 1968).

Forest reservation

In 1932 the Ziama forest was reserved for the first time, by the French colonial administration. While the administration was well aware that the forest was new, it regarded this forest in terms which contrasted strongly with the views of the remaining Toma inhabitants. The contrast between these views, whose economic, cultural and political aspects are addressed here in turn, have underlain subsequent reserve conflicts.

Contrasting economic interests

The Ziama forest was initially reserved for reasons shaped by the particular visions of environmental processes current in colonial and French national circles at that time. Forests were considered to protect climate and regional hydrology. The letter which justified reservation to the Governor General of the AOF also pointed to the forest's "great scientific interest", and its position at the northerly extreme of the dense forest zone[8]. Since the 1900s, administrators had been convinced that ongoing deforestation and the spread of bush fire were responsible for the

increasing climatic aridity which they perceived. Savannas were deemed to be spreading progressively southwards into the forest zone, linked to the southwards expansion of Mandinka and their use of fire, and threatening colonial economic interests in crops requiring forest conditions. The Ziama reserve was conceived of as part of a forest curtain to stop this supposed southward savannisation, and formed part of a chain of similar but smaller reserves established with this aim between 1932 and 1935. It was argued that, "the advance of the savanna, which is an evident fact, could be prevented in this region" (endnote 4).

Specific colonial economic (and wartime) concerns also came to justify the reserve's existence and its enlargement in 1942. While the region's infrastructural isolation made it unsuitable for timber exploitation, the Ziama forest's climate and altitudes rendered it valuable for the production of quinine, and during the Second World War plantations were established on the mountain.

But while forest regrowth served colonial economic interests, it actually represented an economic loss for the Toma. Toma social and economic life had been dependent not on high forest but on the maintenance of regularly-cycled fallows, whether for farming or for their diversity in species and size of useful gathering products. As such fallows became high forest, they became less useful because subsequent clearance was prohibitively labour demanding, and because high forest provided a less useful range of non timber forest products[9].

Contrasting cultural views

Contrasting cultural visions also differentiated colonial and Toma attitudes towards the regrown forest. For the administration, the maturation of secondary forest approached the ideal of primary forest as an African wilderness. While recognising the forest's history, they saw it in terms of nature fortuitously allowed to reconstitute itself; a process which reservation would assist and stabilise. But from a Toma perspective, the colonisation by high forest of once populated and productive fallow and farmland was, and remains, an ever-present symbol of desolation and lost social power. To the villagers, the abandoned settlement sites with their relic walls and silk cotton trees engulfed and disguised by forest vegetation are constant reminders of social and political downfall.

Contrasting perceptions of tenure

While the administration understood the forest's environmental history, they saw its linked social history as largely irrelevant to – dismissable from – the reservation process. With its authority and modernising agenda, the colonial regime had little administrative sympathy for local land claims and even less for local cultural viewpoints. In maintaining the reserve, they had to maintain at least minimal cooperation with local populations, but conceived of their obligation only in terms of ensuring that their basic subsistence needs were met.

Despite the depopulation, surviving villagers attempted to maintain their tenurial claims. Their descendants continue to uphold claims over their ancestral lands on abandoned village sites to the present. Such local land-holding rights, linked to claims to a family founder's relative status as a `firstcomer' or `latecomer' to the territory in question, signify not only control over an economic resource but also position in the political hierarchies and kin relationships between village families. As Currens has described (1979), `land' for the Toma is

> "...a concept that encompasses not only the terrain ... but also the active concern of the community, including the ancestors who settled the area, farmed it, and still retain some control over its productivity."

In local perspective, therefore, and in common with peoples throughout the Upper Guinean region (cf Murphy & Bledsoe, 1987), land tenurial claims are integral to other social and political relationships.

From the administration's viewpoint, the reserved land became legally part of the state's public domain. Felling trees, clearing vegetation, burning and field preparation were forbidden. Gathering was allowed of wild fruits, medicines and grass for thatching, and swamp rice cultivation was tolerated on authorisation, granted once all local swampland outside the reserve was already in intensive use. Similarly, except for a list of protected animal species, hunting for subsistence and local sale was permitted.

Nevertheless, villagers lost effective control over huge land areas that they associated with particular families and policies. Depopulation removed their capacity to manage their lands within the productive farm-fallow cycle, and the legal alienation of their lands in 1932 added insult to injury by removing control a step further. This loss was made even more poignant by the fact that the land was alienated by the French colonial state which had partially caused the depopulation, defeating them only twenty years before.

In the face of local conflict, the 1932 reserve boundaries had to be altered. The 1943 reclassification accorded local inhabitants more cultivable land in the vicinity of villages, although it also extended the reserve as far as the Diani, thus turning several villages (notably Boo and Kpagna/Baimani) into enclaves. Colonial officials considered that in the consultations with local populations concerning this reclassification, local interests had been satisfied. They saw these interests in terms of immediate agricultural needs, not long-term territorial rights. As Adam saw it, all was well because, "this forest does not inhibit the development of indigenous cropping" (endnote 4). That from a local perspective all was not well is indicated by the `encroachments' into reserved lands which the forest department had cause to deal with over subsequent years. In several cases farmers cleared land inside the reserve despite their access to adequately fallowed land outside it, in attempts to re-stake old social and political claims to ruined village territory now within the reserve.

In 1955, when Guineans acquired representation at the national level, villagers once again voiced their claims to land which had been alienated by the reserve. The claims were not legally recognised during the pre-independence years; nor were they in the subsequent First Republic under Sekou Touré. But the relative weakness of the forest administration during the 1970s and early 1980s did permit some farming within the reserve and it is this relatively recent `encroachment' that characterises the `reserve-population' problem for modern forest conservationists.

Much of the encroachment during the 1960s-1980s was by Mandinka immigrants, and involved land ceded semi-legally by government forestry agents. The rights they allocated acquired some credibility from the national tenurial principle upheld during the First Republic that those who improved land (eg, through plantation establishment) acquired enduring rights to it. These bases

for land acquisition all conflicted with Toma land tenure concepts and relationships, in which control over land was established through claims to firstcomer status in a given territory, and only such firstcomers had the authority to allocate land use rights, whether short or long-term, Thus tensions were exacerbated not only between the Toma and the reserve, but also between the Toma and the Mandinka.

Modern forest conservation

The Ziama forest was made a Biosphere reserve in 1981. From 1988, the World Bank initiated the funding of a project whose emphasis came to be placed firmly on forest conservation (Bourque & Wilson, 1990). In its inception, the Ziama project exemplifies modern approaches to African rainforest conservation, aiming to link forest protection with buffer zone rural development activities intended to secure local support. But despite the proclaimed differences from colonial conservation approaches, and the implied potential for greater cooperation between local people and the reserve administration, to an even greater extent than in the colonial period modern conservationists and Toma inhabitants are divided by contrasting values and readings of history.

A major modern justification for the conservation of the Ziama forest is its place in an international network of Biosphere reserves valued for the preservation of global biodiversity. Within tropical rainforest preservation concerns, supported by northern donors and their home constituencies, the Ziama forest is accorded importance as one of the remaining relics of the Upper Guinean forest block. Within similarly-supported wildlife interests, the animals of Ziama have also been publicised to attract international concern. Rare mammal species identified within the modern reserve include the forest elephant (*Loxodonta africana cyclotis*), pygmy hippopotamus (*Choeropsis l. libericus*), golden cat (*Profelis aurata*), zebra duiker (*Cephalophus zebra*) and bongo (*Tragelaphus euryceros*). Several rare bird species have also been identified, including the bald-headed rock fowl (*Picathartes gymnocephalus*) and the yellow-throated olive greenbul (*Criniger olivaceus*).

The a-historical nature of modern forest conservation and socio-economic studies

In valuing the apparently `pristine' characteristics of the forest, modern conservationists overlook its secondary nature and the history of land use which that implies. The long-term vegetation history of the Ziama forest is unknown to today's reserve administration. Even in 1950, Adam had noted the difficulty of distinguishing between the Ziama reserve's primary and secondary forests. To modern conservationists this distinction is even less relevant, since the old secondary forests fulfil their conservation aims. In a contribution to the Guinea Forestry Biodiversity Study, a discussion of the Ziama forest found it appropriate to group primary and old secondary forest formations into the single category `high forest' (Bourque & Wilson, 1990). Precise differences in floral and faunal populations have yet to be determined, but areas identified as the habitats of key wildlife species – including elephants and pygmy hippos – include parts of the (once heavily farmed) Diani plains. Classificatory ambiguity shows itself in modern reports: in the national forestry action plan, for example, the lowland forest is described as, "secondary forest, locally very old or regenerating" (République de Guinée, 1990) but another recent report considers the reserved zone of Ziama to be covered with primary forests, except in the enclaves (MARA, 1990).

Crucially, where the forest is noted as evidently secondary, the disturbance is seen as incidental

intrusion of shifting cultivation into high forest at various times in the past, but not as questioning of the overall integrity of the `natural' forest formation itself.

The project's activities have been directed towards forest protection and the reconstitution of disturbed sites. The reserve's old limits have been reimposed and cultivated areas found to lie within it have been planted with rows of fast-growing *Terminalia* spp. trees which will eventually shade out the crops and force the farmers to abandon the land to the reserve. Expatriate administrators have plans to extend the reserve, and to delimit part of it as a strict nature sanctuary in which no local use of any kind will be permitted. Other zones of the reserve will be managed for sustainable logging, and, outside the sanctuary, local hunting and gathering rights will be maintained, if regulated. Promised rural development activities in the buffer zone (`agroforestry zone') have been slower to materialise, and in this context, the antipathy of local populations to the reserve administration has only increased, involving not merely passive resistance but in some instances physical violence.

The project considers such conflicts to arise from the clash between modern local subsistence needs and long-term conservation interests. Supported by its commissioned short-term socio-economic studies, especially Baum & Weimer, 1992, the project interprets modern local needs in terms of recent and growing population and economic pressures, and considers the solutions to lie in rural development activities such as agricultural intensification and the provision of off-farm employment. The principal socio-economic study ignores the region's history in favour of a short-term, unilineal view of population and environmental change, and a narrowly economic approach to people's use of and attitudes to forest resources. The historical social and political relationships which link people with their forest environment and with forest administrations are not examined.

The socio-economic mission focused on the area where greatest encroachment on the reserve was apparent, the large valley between the Ziama mountain range and the enclaves of Boo and Kpagna. This was precisely the area described by Anderson and then depopulated. The study, however, assumes pre-twentieth century population to have been low, and considers the forest to be undergoing steady colonisation, with the population initially penetrating from the north along the river Diani, and spreading out into the plain from there. The reserve edge and enclave villages are said to be gradually growing from an initially small size. Boo, for example, is said to have had an initial small population of 500 people, which has now expanded to 1742 (Baum & Weimer, 1992).

The authors of the socio-economic report consider populations in the 41 villages in the vicinity of the reserve to have risen by a factor of more than 4 in 60 years; a growth attributed to both increase in indigenous Toma populations and Mandinka immigration. The influx of Liberian refugees since 1990 is found to have further dramatically increased the population in total (Baum & Weimer, 1992). In response, the authors urge a `crash programme' to reduce pressure on the forest, involving the radical restructuring of local land tenure and economy. It is telling, however, that the dramatic population increases portrayed are inconsistent even with the population data presented in the report's appendix[10].

The Ziama socio-economic study explains people-reserve conflicts almost exclusively in term of the evolution of population:land ratios. Current levels of forest encroachment are thus explained, and future encroachment projected. But in the villagers' perspective, as we have seen, it is often

socio-political claims, not land pressure per se, which motivate encroachments into the reserve. Equally, political issues were at stake in the socio-economic study's inquiries, casting doubt on the conclusions drawn. Villagers were unlikely to report their land as less than fully used, given their historical and recent experience of the reserve's appropriation of it.

Corresponding to the image of a once little-disturbed forest, the socio-economic study also constructs for the Toma an assumed cultural past as a `forest people' who once lived harmoniously with the high forest environment. The Toma are portrayed as originally hunter-gatherers, and as having once conformed to modern images of environmentally-benign `indigenous peoples' (Baum & Weimer, 1992, p.13)[11]. They are said to have undergone profound changes in their economic orientation towards a dependence on forest clearance for agriculture as a result of demographic and material pressures during the present century.

Thus this socio-economic study provides a rather extreme example of a recurring premise in modern conservation literature: that it is in part `cultural degradation' which leads to environmental degradation (for example, Clad, 1985). In the Ziama case, this analysis lies in flat contradiction with past realities.

The supposed threat of savannisation

One of the reasons why conservationists consider Mandinka immigration as a particular threat to the forest is that the Mandinka are stereotyped in contrast with the Toma `forest people' as `savanna people' whose fire-setting, hunting, cattle raising and savanna farming practices are thought to lead to savannisation. Such reasoning, dominant when the Ziama reserve was created in 1932 to block savannisation, persists today among professionals working in and around the reserve, as elsewhere in Guinea's forest-savanna transition zone (see Leach & Fairhead, 1994). So just as high forest is seen as undergoing recent, ongoing conversion to farmbush, so farmbush is thought to be degrading, in turn, to savanna. Modern conservationists, like their 1930s predecessors, portray savannisation as a relentless southward process.

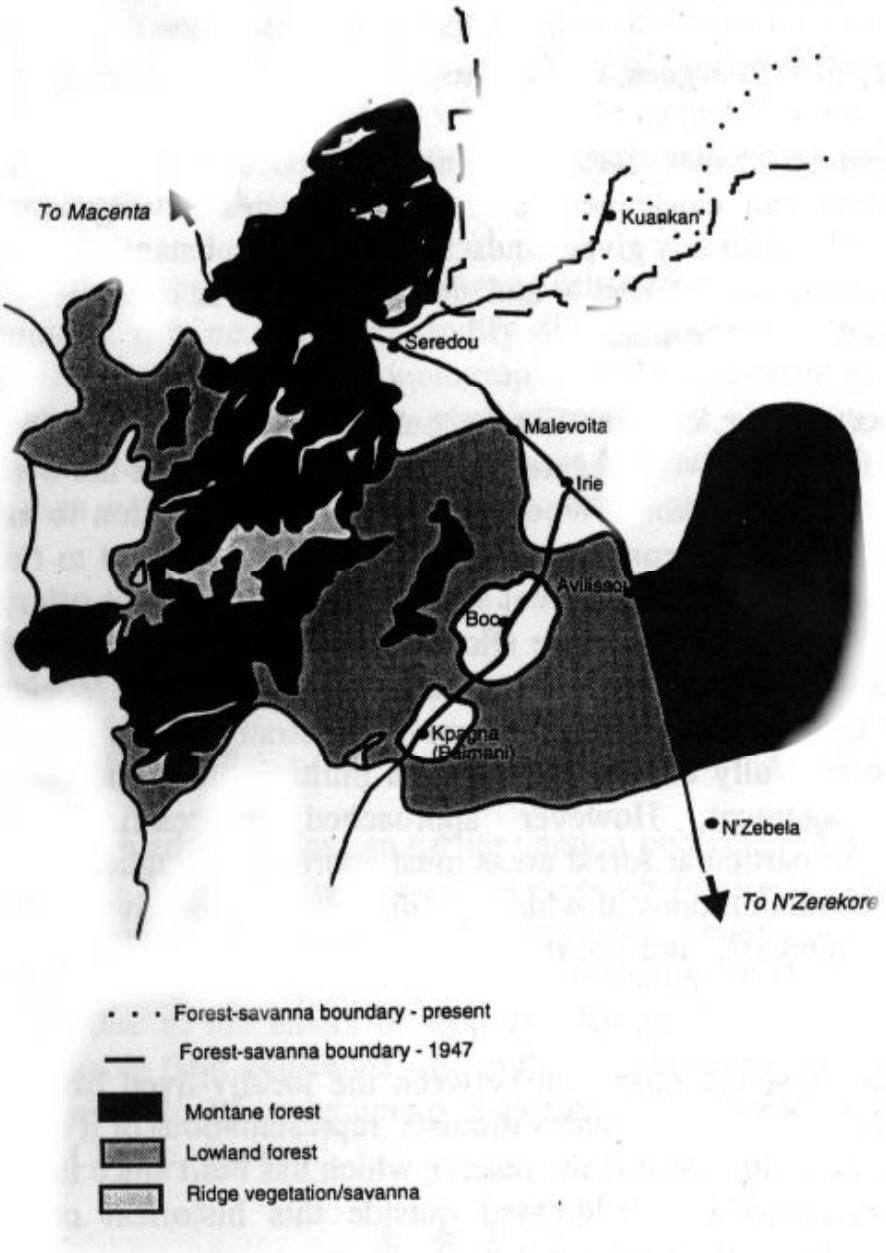
But there is, in fact, no firm evidence for savannisation over the long-term. Indeed, as we have seen, oral histories and documentary evidence suggest that there was much more savanna within and around the reserve during thenineteenth century than there is today. Indeed, when Anderson's description of the mid-nineteenth century forest-savanna boundary is compared with its present-day position, one is forced to conclude that it has moved north, not south.

No detailed comparative analysis of the air photographic coverage of the region in 1952/3 and modern images has yet been undertaken. However FAO's 1990 comparative analysis of 1979 1:100,000 air photomosaics and 1990 satelliteimages finds no evidence of savannisation. Our preliminary comparison of the boundaries described on the 1939-1942 1:200,000 map and 1990 satellite (SPOT) images show a clear advance of forest and forest fallow vegetation over savanna (see Figure 2). This finding is consistent with research elsewhere in the forest-savanna transition zone of Guinea and Cote d'Ivoire (Leach & Fairhead, 1994; Adjanohoun, 1964; Miège, 1966; Guillaumet, 1967). It is also consistent with climate historians' suggestions that this region underwent rehumidification between the mid-nineteenth century and the 1960s. Thus the forest-savanna boundary has almost certainly been moving north during the period when policy-makers have been responding to its presumed southern movement.

Conclusions

The case of Ziama offers insights into the origins of West Africa's modern forest wildernesses, and the ways they are regarded by the populations now living near them. Like many others, this area of high forest owes its origin to late nineteenth century warfare (Richards, 1993) and its persistence to colonial land alienation. It is this history which helps explain the nature of modern land use conflicts. In such new forest wildernesses, local cultural attitudes to the forest may depend less on traditions as a `forest people' or the uses of material forest resources, and more on particular and culturally-inflected experiences of land use and political history. That portraits of ancestors who were killed or fled during the Toma wars are displayed prominently on Boo village houses today shows clearly that these past events are not forgotten. When village families stake claims to land within the reserve, they are also attempting to re-establish social control over their ex-social domain.

Figure 2: Present-day vegetation in the Ziama Reserve and changes in the forest-savanna boundary



The Ziama case may also shed light on West African ecological transitions. While its longer-term vegetation history remains unknown, the transition from savanna to forest may be due not only to removal of intensive human pressure but also to the positive legacy of land use and habitation on vegetation in forest-savanna transition areas. Conservationists interested in the biodiversity patterns of areas like Ziama today may also have to appreciate how far they are the legacy of past human use. As Richards points out for the nearby Gola forest, past habitation patterns may partially account for the presence of today's biological riches (Richards, 1993).

As McNeely (1993) argues, and as the Ziama case exemplifies,

> "...because chance factors, human influence and small climatic variation can cause very substantial changes in vegetation, the biodiversity for any given landscape will vary substantially over any significant time period – and no one variant is necessarily more `natural' than the others."

From this perspective, conservation becomes very clearly a question of social or political choice about what vegetation or biodiversity forms are desirable at any given time in social history. Wood (1993) takes this position to an extreme in arguing that large-scale conversion of currently forested land to fields for food production might best fulfill current societal needs – as future priorities shift, so selective forest regrowth could be allowed. Rejecting positions implying such a firm close-off of future biodiversity options, others argue that `society' would be best served by multi-level forest conservation strategies combining protection according to carefully chosen criteria with multiple use zones and sustainable product management. However approached, successful people-oriented conservation in particular forest areas must address not vague societal goals but socially-differentiated ones in which the differing perspectives and priorities of community members, and local communities and conservationists, must be negotiated.

In the Ziama case, the mismatch between the locally-lived history which has shaped local priorities, and conservationists' representations of it is extraordinary. The local antagonism towards the reserve which has built since its establishment cannot be understood or addressed outside this historical context. As the senior-most elder of the region put it:

> "This forest problem is complicated. If you see that we no longer have control over the forest, it is because of the forest agents who come with their papers and delimit the forest. If we are given responsibility for the forest, we are ready to act in the interests of conservation.... If we had full responsibility for the management of the forest, we could give you the assurance of protecting it. But as long as control is left in the hands of the state, we can do nothing[12]."

`Participatory' forest management will not prove possible until such historical claims to land and political authority are on the agenda. It is inadequate to consider only modern economic needs and pressures, important as these might be. If conservation projects pursuing global and regional agendas are to compensate local communities with rural development activities, the calculation of costs and benefits will need to take full account of what they have lost to the reserve. Following the recommendations of N'Zebela's elders, they may need to consider conservation arrangements which cede tenurial control to local landholders, within the context of management agreements which fully recognise the value their lands now have for others.

And if conservation programmes are to engage sensitively and productively with local communities, it is necessary to modify discussions which locate conflicts over forest reserves within modern demographic and socio-economic pressures, and approaches which confine their conflict-resolution attention to them. If modern local environmental attitudes are in part a legacy of past people-forest interactions, then understanding them demands serious attention to ecological and social history.

* * *

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Notes

1. Detail of the Seymour and Ash voyage is published in a series of articles in the *Liberia Herald*, for example, `George L Seymour's Journal', *Liberia Herald* XII, No 22 (January 4 1860). A Synopsis of his journal was published monthly in editions of the *New York Colonization Journal*, for example `Synopsis of Mr Seymour's Journal of Liberia Interior Exploration', *New York Colonization Journal* 9:12, December 1859 (Whole No 108) p. 1. Their voyage was also reported in De Grey, `Address at the Anniversary Meeting', *Proceedings of the Royal Geographical Society*, IV, 4, 28 May 1860.

2. Anderson refers to the populations known today as Toma (in Guinea) and Loma (in Liberia) variously as Bonsie and Boozie.

3. Notice Historique du Capitaine Duvalier, Senegalese National Archives, IG 284.

4. Eaux, Forêts et Chasses, Inspection Forestière de la Haute Guinée, Rapport de M. Adam (1942) sur le Project de reclassement du forêt du Ziama, Archives de Seredou.

5. `George Seymour's Journal', *Liberia Herald* 12 (no 22) January 4, 1860. One notes that Seymour considered the Ziama mountains west and south-west of Kuankan to be the fabled `Mountains of Kong'.

6. The brief account here of warfare in the Ziama region has been compiled from the works of regional anthropologists and historians: Holsoe, 1976; Massing, 1978; Person, 1968. A more detailed version is given in Fairhead & Leach (1994).

7. Rapport sur les forêts de Kissi et de Beyla (1909), Archives Nationales du Senegal, NS 1R23. This, as all subsequent French citations, has been translated by the authors.

8. Eaux et Forêts, Projet de Classement du Massif du Ziama, Lettre du Gouvernement de la Guinée Française à Monsieur le Gouverneur Général de la Haute Guinée, Rapport de M. Adam, (1942) sur le Projet de reclassement du forêt du Ziama, Archives de Seredou.

9. This argument is advanced for the neighbouring Mende by Davies & Richards (1991).

10. On closer examination, these extreme latter estimates prove to be based on fraudulent analysis which generalises from 4 selected villages, one of them the exceptional new village of Avilissou which was non-existent in 1932 but has a largely immigrant population of 4500 today.

11. For this imagery see, for example, Kemf, 1993.

12. Declaration of village of N'Zbela, after the notes taken by M A Barry, in Baum & Weimer, *Participation et Dévéloppement*, annex 4, p.3.

References

Abimbola, (1964), `The Ruins of Oyo Division' *African Notes* (Nigeria) 2 (1), pp 16-19

Adjanohoun, E, (1964), `Végétation des Savanes et des Rochers Découverts en Côte d'Ivoire Centrale', Mémoire ORSTOM no.7, Paris.

Anderson, A B & **Posey, D A**, (1989), `Management of a Tropical Scrub Savanna by the Gorotire Kayapo of Brazil', *Advances in Economic Botany* 7, pp 159-173.

Anderson, B, (1870), *Narrative of a Journey to Musardu: capital of the western Mandingoes*, S.W. Green, Printer, New York.

Avenard, J M, Bonvallot, J, Latham, M, Renard-Dugerdil M & **Richard J**, (1974), *Aspects du Contact Foret-Savane dans le Centre et l'Ouest de la Cote d'Ivoire: etude descriptive*, Abidjan: ORSTOM.

Balée, W, (1989), `The Culture of Amazonian Forests', *Advances in Economic Botany* 7, pp 1-21.

Baum, **G A** & **Weimer, H J**, (1992) `Participation et Dévéloppement Socio-économique comme Conditions Préalables Indispensables d'une Implication Active des Populations Riveraines dans la Conservation de la Forêt Classée de Ziama', Deutsche Forst-Consult/Neu-Isenburg/RFA/KfW.

Bourque, J D & **Wilson, R,** (1990), `Rapport de l'Etude d'Impact Ecologique d'un Projet Amenagement Forestier Concernant les Forêts Classées de Ziama et de Diecke en République de Guinée, IUCN.

Buechner, H K & **Dawkins, H C**, (1961), `Vegetation Change Induced by Elephants and Fire in Murchison Falls National Park, Uganda, *Ecology* 42, pp 752-766.

Brooks, G E, (1986), `A Provisional Historical Schema for Western Africa based on Seven Climatic Periods', *Cahiers d'Etudes Africaines*, 101-102, XXVI-1-2, pp 43-62.

Clad, J C, (1985), *Conservation and Indigenous Peoples: a study of convergent interests, in Culture and conservation*, (eds.) J McNeely & D Pitt, Croom Helm, London & Sydney, pp 45-62.

Currens, G, (1979), `Land, Labour and Capital in Loma Agriculture', in Dorjhan, V R & Isaac, B L, (eds), *,Essays on the Economic Anthropology of Liberia and Sierra Leone*, Philadelphia: Institute for Liberian Studies, pp 79-102.

Davies G & **Richards, P**, (1991), `Rain Forest in Mende Life: resources and subsistence strategies in communities around Gola North forest reserve', Report to ESCOR, ODA, London.

Davies, O, (1964), `Archaeological Exploration in the Volta Basin', *Bulletin of the Ghana Geographical Association*, 9 (2), pp 28-33.

De Grey, (1860), `Address at the Anniversary Meeting', *Proceedings of the Royal Geographical Society*, IV, 4, 28 May 1860.

Dublin, H, Sinclair, A & **McGlade, J,** (1990), `Elephants and Fire as causes of Multiple Stable States in the Serengeti-Mara Woodlands', *Journal of Animal Ecology* 59, pp 1147- 1164.

Fairhead, J & **Leach, M**, (1994) `Contested Forests: Modern Conservation and Historical Land Use of Guinea's Ziama Reserve', *African Affairs*, 93:481-592.

Fairhead, J & **Leach, M**, (1993), `Degrading People? the misuse of history in Guinea's environmental policy', Paper presented in the History of Land Use in Africa conference at the African Studies Association (ASA) meeting, Boston, 4-7 December 1993.

Fyle, C M, (1988), `Population Patterns, Labour Mobilization and Agriculture in Northeastern Sierra Leone: a diachronic perspective', in C.M. Fyle (ed) *History and Socio-economic Development in Sierra Leone: a reader*, SLADEA, Freetown, pp 197-212.

Guillaumet, J L, (1967),`Notice explicative de la carte de la végétation au 1/500 000 de la Côte d'Ivoire', Centre ORSTOM d'Adiopodoumé.

Hecht, S B & **Posey, D A**, (1989), `Preliminary Results on Soil Management Techniques of the Kayapo Indians', in D.A. Posey and W. Balée (eds) *Resource Management in Amazonia: indigenous and folk strategies, Advances in Economic Botany* 7, pp 174-188.

Holsoe, S E, (1976), `The Manding in Western Liberia: an overview', *Liberian Studies Journal* VII(1) (1976-77), pp 1-12.

Kemf, E, (1993), *The law of the Mother: protecting indigenous peoples in protected areas*, WWF, European Union and IUCN, Sierra, San Francisco.

Leach, M & **Fairhead, J**, (1994), `The Forest Islands of Kissidougou: Social Dynamics of Environmental Change in West Africa's Forest-Savanna Mosaic, Report to ESCOR, Overseas Development Administration, July 1994.

MARA, (1990), `Notes sur la Carte 1:100,000 de Guinée Forestière', Ministère d'Agriculture et des Ressources Animales, République de Guinée.

Martin, C, (1991), *The Rainforests of West Africa: ecology - threats, conservation*, Birkhauser Verlag, Basel, Boston & Berlin.

Massing, A W, (1978), `Materials for a History of Western Liberia: Samori and the Malinke frontier in the Toma sector', *Liberian Studies Journal*, VIII, 1 (1978-79), pp 49-67.

McNeely, J A, (1993) `Lessons from the Past: Forests and biodiversity', Unpublished paper.

Miège, J, (1966), `Observations sur les fluctuations des limites savanes-forêts en basse Côte d'Ivoire', *Annales de la Faculté des Sciences*, 19, pp 149-166, Dakar.

Miller, K & **Tangley, L**, (1991), *Trees of life: saving tropical forests and their biological wealth*, World Resources Institute Guide to the Environment, Beacon Press, Boston.

Morgan, W & **Moss, R P**, (1965), `Savanna and forest in Western Nigeria', *Africa* 35 (3), pp 286-293.

Murphy, W P & **Bledsoe, C H**, (1987), `Kinship and Territory in the History of a Kpelle Chiefdom' (Liberia), in I. Kopytoff (ed) *The African Frontier: the reproduction of traditional African societies*, Indiana University Press, Bloomington and Indianapolis, pp 121-148.

Nicholson, S E, (1979), `The Methodology of Historical Climate Reconstruction and its Application to Africa', *Journal of African History*, 20, 1, pp 31-49.

Person, Y, (1968), *Samori, une Révolution Dyula*, vols. 1-3, Dakar, Institut Fondamental d'Afrique Noire.

République de Guinée, (1990), `Politique Forestière et Plan d'Action', Conakry.

Richards, P, (1993), `Biodiversity and the Dynamics of African Anthropogenic Landscapes: case studies from Upper Guinean forest formation', Paper presented at the African Studies Association 36th Annual Meeting, Boston.

Spichiger R & **Pamard, C**, (1973), `Recherches sur le Contact Forêt-Savane en Côte d'Ivoire: Etude du recru forestier sur des parcelles cultivées en lisière d'un ilôt forestier dans le sud du pays baoulé', *Candollea* 28, pp 21-37.

Sprugel, D G, (1991), `Disturbance, Equilibrium, and Environmental Variability: What is `natural' vegetation in a changing environment?', *Biological Conservation* 58, pp 1-18.

Starr, F, (ed), (1912), *Narrative of the Expedition Despatched to Musahdu by the Liberian Government under Benjamin K. Anderson Esq. in 1874*, College of West Africa Press, Monrovia.

Thompson, H, (1911), `The forests of Southern Nigeria', *Journal of the African Society* 10 (38), pp 120-145.

Wood, D, (1993), `Forests to Fields: restoring tropical lands to agriculture', *Land Use Policy*, April 1993, pp 91-107.

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