

NATURAL RESOURCE MANAGEMENT: THE REPRODUCTION AND USE OF ENVIRONMENTAL MISINFORMATION IN GUINEA'S FOREST-SAVANNA TRANSITION ZONE

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1 INTRODUCTION

An erroneous analysis of environmental change has informed environmental policy in part of Guinea, West Africa for almost a hundred years. In examining how such error has persisted, in this case concerning ongoing savannization of tropical forest which is not in fact taking place, one is forced to examine critically the relationship between the information produced about environmental problems, and the external institutions which have assumed responsibility to deal with them. The range of concerns to which environmental policy responds influences not only how information is (or is not) used, but also how it is constituted. In short, inaccurate information and the methodology producing it can persist and drive policy because of the institutional structures they serve.

In this article we explore how inaccurate assessments and explanations of environmental change and local people's roles in it, based on particular sorts of data and analysis, are generated and validated by the external institutions involved with environmental policy. These institutions include not only local and national forestry and agricultural administrations and NGOs, but also foreign donors responding to global and regional concerns. We examine some ways in which institutions, policies and the information on which they depend have co-evolved within particular relationships to scientific and popular opinion about environmental processes.

An attempt is made to explain how certain views and explanations of change have gained credence and acquired validity, while others have been excluded from consideration and investigation. This involves tracing not only the relative dominance of particular disciplines in investigating environmental trends, but also the priority accorded to particular methods and data sets within those disciplines, and the deductive theories which guide data interpretation. We find that such dominance can only be understood in the context of the socio-political and financial structures within which environmental

policy institutions have evolved and operate. While this short article cannot consider these issues more than schematically, it does suggest and exemplify important parameters for the sort of analysis needed.

The vegetation of Guinea's Kissidougou prefecture reflects its position in West Africa's forest-savanna transition zone, and consists of patches of humid forest in more or less wooded savanna. The forest 'islands', which surround old and new village sites, have been considered by environmental policy-makers to be the relics of a once extensive natural forest cover now destroyed by local farming and fire-setting; a destruction which they have sought to redress. But village experience, archival and air photographic comparisons do not support this view. Instead, they show forest islands to be the result of human management, created around villages in savanna by their inhabitants. They also show that the woody vegetation cover of savannas has been increasing during the period when policy-makers have believed the opposite (Fairhead and Leach *et al.* 1992a, Leach and Fairhead 1993). In the Kissidougou case, therefore, 'official' interpretations of environmental change and of local responsibility for it, dependent on and reinforcing the agendas of state institutions, have been upheld at striking odds with local experience.

2 ENVIRONMENTAL DEGRADATION PERCEIVED

West African vegetation maps, showing the forest zone, forest-savanna transition zone, guinean, sudanian and sahelian savanna zones, and desert in more or less horizontal bands easily lend themselves to interpretation as temporal, as well as spatial transitions. Whether from desertification, sahelianization or savannization of forest, observers have been tempted to see each zone as the anthropogenically degraded derivative of a vegetation type now found further south. On many maps, the forest-savanna transition zone is marked as a 'derived savanna' - or ex-forest - zone. In Guinea, policy-makers since the turn of the century have been convinced of this southwards shift, as the conflation of spatial and

temporal transitions has been incorporated into the scientific canon informing Guinea's and West Africa's environmental policy. The first forest reserves established in Kissidougou in 1932 were conceived of as a protective 'curtain' to halt the southwards spread of fire and farming-induced savannization, on the grounds that: 'everywhere, the cultivation of dryland rice with intensity ruins the forest and causes it to disappear. In Kissi country, one has arrived at such an advanced stage that the level of afforestation certainly does not exceed one-tenth (Guinée Service Forestier 1932).

In 1993, the conflation of spatial with temporal zones provided the logic which led a major donor-funded environmental rehabilitation project to take 40 Kissidougou farmers on a journey to northern Mali, to see the future of their own landscape if protective measures were not undertaken.

The assumption of anthropogenic degradation of a prior natural forest formation was integral to the first delineation of West African vegetation zones in the early colonial period by the botanist Chevalier. This analysis was transferred directly into contemporary policy since Chevalier was, at the time, the senior most advisor to the French West African colonial administrations responsible for environmental concerns. Subsequently, deductions made from analysis of the botanical composition ('phytosociology') of vegetation in these zones by botanists such as Aubreville and Adam reinforced the hypothesis that the forest-savanna mosaic was in temporal transition. Observing the tree species characteristic of the boundary between these different vegetation forms, botanists deduced that this 'transition woodland' represented savannized forest (e.g. Adam 1948, 1968). They did not consider other possibilities: that transition woodland could represent a stable intermediate form, the establishment of forest in savanna, or the complex outcome of local management strategies.

As Aubreville and Adam, in turn, became senior figures in French West Africa's forestry administrations, so their phytosociological analysis, interpreted within the logic of degradation, became institutionalized as the principle methodology for assessing regional vegetation change. At the same time, their publications became key texts in comprehending West African environmental history more generally (e.g. Aubreville 1949). In their characteristic approach, these botanists directly observed landscape features and deduced landscape history and the

impact of local practices from them. Their disciplinary position and the social conditions of their fieldwork reinforced their pejorative vision of the environmental impact of local farming and fire management practices, rendering it both difficult and seemingly unnecessary properly to verify change with local people themselves.

The acceptability of interpreting vegetation history and anthropogenic impact from snapshot landscape observations still persists, not only in phytosociology but also in deductions from plant and other indicators, vegetation surveys, and in the use of remotely-sensed imagery. For example modern observers of Kissidougou often consider the presence of oil palms to indicate that forest has retreated from the area, while the team preparing Guinea's forestry action plan (République de Guinée 1988) deduced from their air photographic 'snapshots' and vegetation surveys that southern Kissidougou was a 'post-forest' zone. Similar social distance and pre-conviction as characterized the colonial botanists enables today's analysts, too, to overlook both local people's environmental experiences and management, and the use of historical methods (e.g. oral histories and archive consultation) to understand environmental influences and trends. In the Kissidougou case, historical methods lead to quite different conclusions; local management has caused palms to advance into long-established savanna, and the bushy vegetation now in the south of the prefecture has replaced grassland, so the area is actually a 'post-savanna', not 'post-forest' zone.

It is only more recently that past and present survey data and remotely-sensed images have been available for comparison, adding time depth to these scientifically acceptable data sources. Yet in Guinea, environmental services have been so convinced of the degradation they are combatting that they have not thought it necessary to compare the air photographs and satellite images they have commissioned with those available from 1952. Furthermore comparative interpretation, even when carried out, is frequently not independent of preconceived ideas of vegetation change. In Kissidougou, the incredulous reactions of forestry staff when presented with 1952-1990 air photograph comparisons showing increased woody vegetation led them to a sceptical search for ways to render the comparison invalid (the photographs were taken in atypical years, or incomparable seasons...). In other parts of West Africa, similarly surprising results have simply been disbelieved

and dismissed: for example 'A comparison of the information from the two surveys gives an increase in woody biomass in the early 1980s. This is highly improbable, and is undoubtedly an artefact of different research methodologies. It is therefore very difficult to estimate trends in land use' (Price 1992).

In contrast, and despite the authors' own warnings, such justifiable scepticism was cast aside when a comparison of eastern Guinea satellite images taken ten years apart seemed to show significant vegetation degradation, and on which basis funds for a regional environmental rehabilitation programme were secured (Grégoire *et al.* 1988).

The images of environmental change derived from these 'scientific' analyses have been incorporated not only into Guinean environmental institutions, but also into formal sector education and the popular consciousness of state functionaries. They are regularly reproduced in school geography lessons and national university theses. For those educated within this vision, casual readings of the landscape serve as confirmatory evidence; dry season bush fire is taken as proof of a worsening problem, and the conversion to farmland of a few forest islands near the town for intensive gardening to serve the urban market are taken to suggest forest island diminution everywhere.

Interpretations of vegetation degradation are reinforced not only by local observation, but also by the global and regional level analyses with which they are in keeping, and which carry the weight of international authority. Given FAO figures concerning rapid forest loss in West Africa (FAO 1990), for example, it appears inconceivable that Kissidougou should be experiencing anything else. Such figures, so frequently publicized in the more glossy development literature and on the radio, are far more accessible to the environmental administrations and urban public concerned with Kissidougou than are analyses of the locality itself. Equally the rhetoric of shared environmental crisis, made so apparent in the 1992 UNCED conference in Rio, appeals far more powerfully to local officials than the statements of the villagers supposedly experiencing these problems. Thus in a recent conference designed to raise awareness of Kissidougou prefecture's environmental problems, both the prefect and Kissidougou's urban-based environmental NGO framed their speeches in terms of global concern with biodiversity loss and the common West African struggle against

desertification. While the projection of global and regional concerns onto Kissidougou's environmental management has recently heightened, it has driven administrative perceptions of environmental change since the early colonial period. A concern that deforestation in Kissidougou would damage regional climate and hydrology was apparent in the earliest writings of Chevalier (e.g. 1909), for example, and underlay a major watershed rehabilitation programme outlined in the 1930s, and funded first in the 1950s following the 1948 Goma inter-African soil conference, and again in 1991.

This analysis of environmental change which informs local policy cannot be separated from the financial context in which environmental institutions operate. In Guinea, the concern of early colonial administrations with the perceived destructiveness of African environmental management arose because the colonial economy was heavily dependent on 'threatened' natural resources; first wild rubber and then, in Kissidougou, on palm products and tree crops grown in forest patches (Fairhead and Leach 1993). In the later colonial and post-colonial periods, to these national economic concerns with environmental degradation were added more regional and global ones. In the 1950s new administrative funding possibilities were made available for regional soil, climate and hydrological conservation following the heightened Africa-wide environmental concern epitomized by the 1948 Goma conference. More recently, administrative solvency and development activities have come to rely even more heavily on foreign aid, and have thus become subject to various forms of 'green conditionality' (Davies 1992; Davies and Leach 1991). This greening of aid, and the specific forms it takes, reflects donors' needs to satisfy home political constituencies heavily influenced by media images and northern environmental NGOs, as well as their own institutional assessments of African environmental problems.

In Guinea, a large proportion of foreign assistance is now allocated, sectorally and by region, directly to environmental rehabilitation. A new generation of heavily-funded environmental projects has emerged, including, in Kissidougou, two component projects of the internationally-funded Niger river protection programme. In agricultural and other development activities, as well, overt environmental sustainability components are important for attracting future funds. Kissidougou's prefecture administration, agriculture and forestry services are well aware of the packages

which satisfy the donors in this respect: agroforestry programmes, forest conservation and improvement, bush fire control, and rationalization and reduction of shifting cultivation in favour of intensive wetland rice. The emergence of local, urban-based environmental NGOs, such as Kissidougou's 'Friends of Nature' society, has been encouraged by recent donor interest not only in environmental issues but also in the capacity of NGOs to achieve 'participatory' development. In short, presenting a degrading or threatened environment has become an imperative to gain access to donors' funds.

Considering the environment as degrading and threatened is equally crucial to the solvency of state environmental institutions when they do not receive donor support. Since their inception, francophone West African forestry services have derived revenues from the sale of permits and licences for timber and wildlife exploitation, and fines for breaking state environmental laws. They have been able to do this only by removing control over the management of natural resources (e.g. fire and trees) from local people. This has been done through deeming the latter inadequate resource custodians whose destructive activities are in need of repressive regulation. Revenues are thus ensured by a reading of the landscape as degraded and degrading; of forest islands as disappearing relics in an increasingly grassy savanna, not as created in an increasingly woody one. The importance to forestry staff of informal receipts derived by applying policies of repression only accentuates the imperative for this environmental reading, while the antagonistic relationship between forestry agents and villagers which is thus engendered bars communication about local people's own experiences of environmental change and management. Thus at local and national, as well as international levels, the economic structures within which environmental agencies operate frame the ways that information is derived.

The attitudes of forestry staff relate not only to their financial and educational status as members of the forestry service, but also to their socio-cultural positions. They share with many other formally educated urban-based Guineans a particular vision of villagers' resource management capabilities. The image of the rural farmer as environmental destroyer, and of the need for modernization of resource management and farming techniques, conforms to and helps to justify the self-distinction of urban intellectuals as 'modern'. Generalized

notions about 'man's destructive impact on the environment', projected locally, have entered the numerous processes through which such people understand themselves as relatively more 'civilized' or 'globalized' (cf. Bledsoe 1990).

Distinctions between urban-institutional, and rural villagers', perceptions of environmental change also derive from different valuations of vegetation quality. For urban observers and the forestry service, high value is accorded to large forest trees, whether for recent global reasons or for the commercial gains to be made from timber exploitation, which has recently become big business in Kissidougou. Villagers do not share this valuation, not least because the forestry laws designed to regulate timber exploitation (preserve the environment) deny them all but an insignificant royalty from trees cut by outsiders in their forest islands. Their values are conditioned, instead, by the importance of different vegetation types and species in agriculture, gathering, settlement and tree crop protection and cultural practices, and in which lower bush fallow vegetation is frequently more useful than high forest (Leach and Fairhead 1993). The large trees of forest islands are, in fact, more the 'fortuitous' consequence of villagers' environmental management for other reasons than a deliberately encouraged feature. While the felling of these trees may be of little consequence to villagers (or to forest area in the long term), to urban and official observers it epitomizes, and thus reinforces their conviction of, environmental destruction.

In short, information about the nature of environmental change is constituted and maintained within the exercise of political and institutional power.

3 ENVIRONMENTAL DEGRADATION EXPLAINED

The image of environmental degradation in Kissidougou is supported by apparently successful explanations for it in terms of local land use practices and their changing socio-economic, demographic and institutional context. Just as the prevalent socio-cultural, institutional and financial structures lead certain readings of and methods for investigating environmental change to dominate, while excluding others from consideration, so these same structures influence the methods and theories brought to bear in understanding why the environment has changed.

The view that local land use converts forest to savanna and reduces savanna tree cover and soil quality has long dominated policy-makers' thinking. These apparent processes of degradation seem readily observable in the short term; in, for example, the clearing and burning of wooded lands for farming, and the setting of fire by hunters and herders. But less attention is paid to processes of regeneration and the impact of local practices on them. In villagers' experience, their land use has, in the long run, tended to maintain or enhance woody vegetation and soil quality. The logic of local cultivation practices which encourage the advance of forest in this region has been documented both by ourselves (Fairhead and Leach *et al.* 1992b) and in neighbouring Cote d'Ivoire (Blanc-Pamard and Spichiger 1973). Villagers generally consider themselves to be improving once less productive lands, rather than reducing the productivity of once 'naturally' productive ones.

The contrasting external image of local land use as inevitably degrading is combined with the use of particular theories about the impact of demographic and social change to account for the long-term degradation which policy-makers believe has taken place. Discussions in development circles of the links between population and environment, poverty and environment, and social organization and environmental management have set the terms of debate which guide causal interpretations by development personnel, consultants, and national institutions. Given that it is explanations of supposed environmental degradation which are being sought, and given the prevailing intellectual, social and fiscal structures which condition causal analysis, all but the dominant strands of thinking within these debates tend to be suppressed at the project level. Thus it is Malthusian views of the relationship between population and environment, the deduction that impoverishment forces villagers to draw down their natural resources, and the notion of a 'tragedy of the commons', which are used to explain increasing environmental degradation in Kissidougou.

Environmental degradation is attributed to assumed demographic trends by policy-makers who believe that, since local land use is degrading, more people must mean more degradation, principally through extra upland use. An image of low pre-colonial population densities is commonly linked to the supposed previous existence of extensive forest cover in the prefecture, and rapid population growth during this century (and now refugee settlements) are held

to account for forest decline. Short fallows and long cultivation periods on savanna uplands are often taken as evidence of modern population pressure. That local farmers use intensive cultivation practices for positive ecological and economic reasons, unrelated to population pressure (Fairhead and Leach 1992b), is not considered. Nor does the possibility of population growth enabling environmental improvement receive attention (cf. Boserup 1965). Yet in Kissidougou where there are more villages, there are more forest islands, and more people can mean more intensive, soil- and vegetation-enhancing savanna cultivation, and more generalized fire control.

Socio-economic theories to explain supposed recent environmental degradation attribute it partly to modern poverty, forcing villagers to sacrifice sustainable long-term resource management in favour of short-term uses which are seen as inevitably degrading. Recent environmental degradation is also explained through the idea of modern resource exploitation as disorganized and individualistic: subject to a tragedy of the commons. This view justifies arguments both for more state control (e.g. over timber cutting and fire), and for the privatization and registration of land tenure. The supposedly better state of the environment in the past is sometimes simply linked to the idea that fewer people were then using (damaging) the commons. But social scientists in Kissidougou have also invoked more recent strands of the commons debate (cf. Ostrom 1990), considering that local institutions can and once did control environmental management effectively, and that recent degradation is due to their breakdown. In this, a picture of people in greater 'harmony' with their forested environment is projected onto the pre-colonial period; a harmony maintained either by efficacious traditional authority (Green 1991, Stiegelitz 1990) or, in more sophisticated terms, by the integration of fire control within intra and inter-village social, cultural and political relationships (Zerouki 1993). An armory of factors is held responsible for the loss of this controlled harmony including the effects of colonial and post-colonial policy, socio-economic change, the weakening of traditional authority, new economic and cultural aspirations and social divisions, and the alienation of local resource control to state structures. The logical policy implication is that resource use can be rendered sustainable by improving forms of 'regulation', 'authority' and 'organization', although from within this perspective, a role is seen for new or reinforced local institutions as well as state ones.

These dominant social and demographic causal explanations for degradation, and the phenomenon of degradation itself, are mutually supporting and sustaining. From within this complex the actual history of people's use of the environment, and the complex factors influencing it, do not receive serious examination.

The institutional and financial structures in which social science is applied to environmental problems in Guinea strongly support such uncritical explanations of degradation. Studies are commissioned by donor agencies and projects who need (or at least, must be seen to have sought) socio-economic information to help them tackle more appropriately and participatorily the environmental problems on which their institutional survival depends. Often, then, the environmental problem is built into the very terms of reference of consultants who have neither the time nor the social position to investigate village natural resource management and its changes on any other terms. This problem is not necessarily solved when consultants are Guinean, or even working in their own areas; indeed it can be compounded by the urban intellectual images which such local consultants bring to bear. Furthermore as the dominant social and demographic explanations of environmental degradation are the stuff of academic debate, consultancy reports phrased in their terms gain easy acceptance and credibility.

The interface between environmental development organizations and villagers, which has developed over a long period and often in antagonistic ways, renders the proper transfer of information about local environmental experiences highly problematic. Villagers, faced by questions about deforestation and environmental change, have learned to confirm what they know the questioners expect to hear. This is not only through politeness and awareness that the truth will be met with incredulity, but also through the desire to maintain good relations with authoritative outsiders who may bring as yet unknown benefits; a school, road or advantageous recognition to the village, for example. In such discussions, the historical ecology that villagers portray is as politically inflected as in their oral histories concerning settlement foundation, where images of initial vacancy (high forest, empty savanna, or abundant wild animals) often justify the firstcomer status of current residents (cf. Dupré 1991; Hill 1984).

4 CLOSURE

The intellectual, social, political and financial structures which sustain the external vision of environmental degradation in Kissidougou form a constellation in which each element reinforces the others. It is too simple to suggest that mistakes are made in Kissidougou because erroneous information is uncritically inherited, although this has sometimes been the case. It is more that the same basic analysis is perpetually reconstituted over and over again within prevailing institutional, financial and explanatory climates. Nor is it the case that particular people or institutions are pursuing conscious and direct personal interests in using information for political or economic ends; rather, all are subject to and are the vehicles of the same conjuncture of intellectual, institutional and economic structures (cf. Foucault 1976).

Challenge to the dominant analysis in Guinea is rare. This is partly because the scientific information which questions the forest-savanna transition model, and which often proves to support the farmers' explanations which we have investigated, is dispersed among different disciplines and their specialist academic journals which are largely inaccessible to policy makers. Information from each discipline alone (e.g. botany, hydrology, soil science, population and climate history) is insufficient to break the paradigm. The lack of inter-disciplinary criticism is, indeed, one of the origins of consistency. In any case, little such discussion enters the information bulletins of multinational organizations (e.g. FAO), NGOs, development journals and the media; the sources on which most development personnel rely for environmental science information.

It has been surprising to us how little the personal lifetime experiences of local development workers influence the way that Kissidougou's environment has come to be perceived. This may be because personal environmental histories have too limited a spatial coverage to challenge a generality, or because unbroken personal histories are themselves rare: state officials are transferred frequently and are in preference posted to areas with which they are unfamiliar, so they have commonly been away from their childhood village environments for long periods. Such people almost invariably justify their perceptions of historical deforestation with examples drawn from roadsides and urban peripheries, with which they have more continual familiarity but which in Kissidougou are the proverbial exceptions to the rule.

The dominant analysis has also remained unchallenged by rural villagers. The precepts basic to local science are not easily apprehended by researchers, and they can be surprising even to European science per se. Local environmental experience and history are, as we have seen, not easily accessible across farmers' interface with environmental agencies and urban intellectuals. Recent attempts to overcome

problems of information transfer at the interface through taking a more participatory approach to research and development (e.g. PRA) - as current in Kissidougou as elsewhere - are not the unproblematic answer they may first appear, without serious attention to altering the intellectual, institutional and financial structures which are implicated in the production of knowledge and of confidence in it.

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