



LANDSCAPES OF DIVERSITY: A LOCAL POLITICAL ECOLOGY OF LIVELIHOOD DIVERSIFICATION IN SOUTH-WESTERN NIGER

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The landscapes created by livelihood diversification in rural Africa result from human activity, from biophysical processes, and from their interrelations. The paper explores these interrelationships through analysis of 'productive *bricolage*' – the ways in which rural people in one of Africa's most disadvantaged countries have constructed a livelihood system that is a response to local constraints and opportunities, and to broader patterns of income-generating possibilities. Zarma farmers in south-west Niger inhabit a region where the political economy has helped fuel economic migration and a partial withdrawal from agriculture, and has significantly altered social relationships and labour patterns in and between households. Zarma responses to these conditions include income diversification, and these activities are expressed in their fields and their farms, as well as in their economic and locational choices. Attempts to build bridges between the concerns of a geographically aware 'local political ecology', concerned with these patterns of livelihood dynamics and resource use, and the new cultural geography of landscape must continue to pay attention to material practices enacted through human agency. Social and environmental change is a fluid, non-linear, and dynamic process in drylands that are marginal to the globalized economic system.

Introduction

The majority of small-scale farmers and their agricultural communities in rural Africa choose to exploit market opportunities, engage in trade and sell surplus farm products as part of their annual cycle of activities.¹ They build 'sustainable livelihoods' by combining reliance on local and distant sources of income, and by deploying their labour.² This paper offers an analysis of the trajectory, significance and impacts of the ways in which rural people 'get by' or 'get on' as they create and maintain viable livelihood strategies in south-west

Niger, West Africa. The mixing of income sources by rural households constitutes 'productive *bricolage*'. This term refers to the multitude of ways in which farmers enter into non-agricultural activities with the hope of realizing cash income, and also integrate subsistence agriculture with the production of crops for sale or barter.³ These activities – their range, scope, meaning and persistence – have a major role in shaping the African landscape. The paper begins, therefore, with a discussion of how landscape dynamics of agrarian systems may best be interpreted, and of whether the different models provided by landscape geographers and political ecologists are able to pick up on the effects of adaptive choices and income diversification processes upon local environmental change. While the remainder of the paper is primarily concerned with the environments of south-western Niger, my arguments have wider currency in the human–environment subfield of geography. I conclude that the relationship between place, nature and socioeconomic trajectories must begin with 'grounded' analysis of what people do in particular communities. From this starting point, a critical geography of such environments can emerge.

Understanding landscapes

A classical object of inquiry in academic geography is the dialectical relationship between the rural landscape and the human activities that help create it. Understanding the interactions between people and places, and the processes that give rise to landscapes, is a disciplinary core. From Vidal de la Blache's studies of the *genre de vie* embedded in France's rural *terroirs* to the twentieth-century labour struggle etched into the agrarian landscapes of California, landscape is understood as the intersection of the realms of natural environment, of production processes and social relations and of meaning.⁴ The term 'landscape' has broadened in use. Following in particular the line of enquiry developed by Denis Cosgrove and Stephen Daniels,⁵ landscapes are now understood as 'not just . . . physical environments, but as outcomes of particular ways of thinking about places, depicting them and giving them meaning'.⁶

Particular visions of landscapes reflect the will and the desires of their originators, and the challenge is to decode the ways in which material processes – labour struggle, repression of expressive freedoms, everyday activities or redevelopment of built environments – are portrayed.⁷ For example, James Fairhead and Melissa Leach's accounts of the Eurocentric visions of the colonial officials responsible for forestry policy in West Africa shows how officials 'saw' indiscriminate deforestation and ascribed it, inaccurately, to farmers; a misapplication of what James Scott refers to as dominant ideas of 'scientific forestry'.⁸ While rural landscapes in Africa and elsewhere are shaped in part by the 'power to determine meanings or identities', they are also strongly influenced by structural and historical processes of agrarian change, viewed through the lens of class, caste or economic power.⁹ But, as this article demonstrates, the everyday agency of people living in rural communities also gives rise to landscape form and dynamics.¹⁰ An understanding of landscape as 'discursive, narrative, and even rhetorical' need not, therefore, supplant the study of local political ecol-

ogy, and a description and analysis of land covers is also vital.¹¹ The flourishing interest in cultural landscapes is, I would argue, more powerful when combined with other viewpoints.

Structural-historical perspectives on rural landscapes stress how landscapes are shaped by the appropriation of labour, images, time and control by powerful groups, and by counter-struggles. In Niger, this perspective has highlighted the effects of political acts that include inter-group warfare, the legacy of slavery, patron–client relations and the effects of six decades of French colonial rule. But Niger has entered the new millennium with a weak state, a declining French postcolonial influence and weakened patron–client relations, and many rural development programmes have withdrawn their operations. What Akhil Gupta calls rural ‘postcolonial developments’¹² are increasingly directed by rural people themselves in the absence of strong and active external institutions, and for this reason, local decisions by individuals about survival, coping and associational activities really matter. In many rural areas there are few powerful politicians, merchants, landowners or project managers who make overt resistance necessary. Local people are, as Mayers and Bass suggest, ‘incrementally muddling along’,¹³ and control their ‘power to decide’ and have an ‘ability to make choices’.¹⁴ As I will argue below, the everyday activities of an individual may be as much the result of personal skill, astute management and access to a technological repertoire as they are the playing-out of power politics between ‘strong’ and ‘weak’ actors. The same is true of decisions to migrate or, for rural households, to engage in other non-agricultural activities.¹⁵

How may we best comprehend a potentially complex array of landscape outcomes, and the forces driving them? The political ecology approach is a useful entry point to these questions, since it remains ecumenical about the driving forces of change, and explains landscape features like excessive soil erosion or widespread deforestation as the result of a suite of processes all operating at different scales and with different underlying forces. It is a ‘bridging’ framework of the type favoured by B. L. Turner II, because it is based on sensible realist assumptions about the power of human agency (i.e. power manifests itself, but there is room for manoeuvre in people’s actions), the integration of biophysical process and social relations and the multidimensionality of landscape outcomes. Piers Blaikie’s formulation of political ecology, developed in the 1980s and since refined, situates local landscapes within scale-dependent processes that are amenable to analysis through interdisciplinary tools.¹⁶ International commodity price changes or national policies on agricultural extension cascade down through the agrarian economy to influence decisions about labour allocation and crop mixes by farmers, and are enmeshed with local-level decision-making and environmental characteristics. The actions of land users, therefore, must be studied in great detail, since these in turn influence outcomes at local and regional (and perhaps national) scales.

This form of analysis has, in recent work, been combined with some elements of the ‘landscape school’ in human geography.¹⁷ Landscapes can be seen as the outcomes of the interplay of forces over time (i.e. they have an environmental history), but they also emerge as a result of scaled processes that interact in a

world that is ecologically complex: they have a nested political ecology. The environmental history of land use may be viewed as a result of intentional human activities, of the interplay of different institutions, of changes in the mode of governance over land, water, animals and plants, and of the way that powerful narratives produce visible outcomes.¹⁸ As Rocheleau *et al.* (see also pp. 465ff. below) suggest in relation to the forest landscapes of the Dominican Republic,

The landscape pattern, physical structure and species composition of trees in forests, fields, gardens and pastures all interact with the structures and processes of social differentiation and solidarity at the national, local and household level.

A suite of methodologies, including scientific techniques and geomatics, are required to understand the patterns generated by these processes. It is too easy to overlook biophysical agency as a backdrop to the interplay of politics and institutions – a perspective that conveniently diminishes the need to engage with the methodological and technological advances that now permit reasonably accurate measurement of environmental factors and their change. Land cover may be calculated from historical air photography and remotely sensed imagery. Spatial relations can be ascertained using GPS technology. Net soil erosion rates may, within limits, be appraised, sediments given accurate dates, and forest composition assessed. This type of data matters to the sorts of story that social scientists tell and the narratives they weave. A political ecology shorn of its ecology is less powerful, and potentially misleading.¹⁹

Understanding diversification and productive *bricolage*

The last two decades of the 20th century stand out as a period of momentous change for sub-Saharan African economies. Amidst high levels of material uncertainty and risk, rural populations have become more occupationally flexible and spatially mobile.²⁰

There is considerable insight to be gained from a ‘grounded’ view of landscapes as embedded in processes that begin with the locality and with land users’ agency, but are nested within broader structures and forces. Agriculture and pastoralism remain the West African Sahel’s primary productive activities, land is sometimes scarce or unproductive, and efforts to create a strong commercial agricultural sector have not benefited the majority of rural households. There has been a substantial influx of aid and development projects following the Sahel’s emergence on the world stage as a ‘poverty-stricken’, ‘famine-prone’ and ‘desertified’ region in the 1970s.²¹ Development policy has ‘localized’ over the last quarter-century, to tackle management questions including local soil and water conservation, credit schemes, reforestation in village wood lots and agricultural extension. There is enthusiasm for decentralized governance structures (although critical scholarship casts considerable doubts over their efficacy), and there is a strong move to reform antiquated or exploitative land tenure rules.²² Yet understanding local variation, and the complexities of decisions taken about management of trees, crops, land and animals is often deficient.

Under such conditions, rather than privilege the (valid) post-structural criti-

cisms of political ecology which ask for a more nuanced and historicized treatment of struggle and politics,²³ I think there is a need to move beyond 'landscape as representation' or 'landscape as politics' arguments, to see the evolving human and natural landscape as the result of a true combination of processes and decisions. For example, mid-slope soils in south-western Niger are farmed by people exposed to the ebb and flow of the seasons, attuned to nature and wishing to adapt cultivation and farming styles to the micro-conditions of soils and water regimes. But what makes a viable farm in these locations is also a function of political realities, labour allocation and land access.²⁴ Tenure regimes, forestry and farming practices result in a heterogeneous pattern of clearance, seeding, growth and death of different land covers. Labour availability, regional non-farm opportunities, tools, personal choice and decisions, soil quality and climatic factors all help give rise to these patterns.

The term I introduced at the outset, 'productive *bricolage*', is useful to describe the actually existing pattern of diverse productive activities practiced by rural households. And 'diversification' is defined as 'the process by which rural families conduct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living'.²⁵ Rural diversification is, therefore, an 'active social process' in the African drylands, and it raises important analytical questions.²⁶ Authors including Reardon *et al.* have claimed that 'diverse' livelihood systems generally benefit their participants more than occupational specialization, but in other cases this claim has been hard to sustain.²⁷ Individuals in a rural community may have successfully 'diversified out' of poverty by strategic investment, clever juggling of resources or exploiting their comparative advantage.²⁸ Yet that same community may show high aggregate poverty levels and a lack of access to formal safety nets for coping with hardship, for reasons that have more to do with its position in the broader political economy. It is unwise to 'scale up' individual success in *bricolage* to assume that successful livelihood enhancement has occurred at the community or village scale.

Diversification away from agricultural production, therefore, 'occurs for survival' (i.e. it is driven by constraints) as much as for its potential for individual or household accumulation (driven by capability).²⁹ Voluntary diversification – investing in a small business enterprise, for example – occurs under less arduous economic or environmental conditions. It can therefore be seen as a way to spread risks, but also to enlarge opportunities for economic gain through juggling different forms of 'capital'.³⁰

In order to explain what drives households to diversify, it is important to query the micropolitics of livelihood decision-making, since this provides the necessary evidence upon which a scaffold of broader understandings may be based.³¹ We now move to a discussion of diversification in Niger under conditions of hardship, and from there to describe the sorts of landscape outcome to which it contributes.

Responding to change through diversification in Fandou Béri

As mentioned above, rural Niger has experienced a significant ‘withdrawal’ of state actors in the 1990s and a ‘retreat to the local’ in many areas, due to a crisis of national political legitimacy and fiscal shortfalls. These changes have altered the economics of market opportunities and long-distance migration. As state support, NGO activity and commercial opportunity have been scaled back, farmers in the south-west of the country have fallen back upon adaptive strategies built around their own rural and urban activities. This situation permits a critical analysis of whether, in ‘post-development’ Niger, rural people have been able to respond effectively to the lack of significant state and donor support that they once had.

Fandou Béri (*grand plateau en sable*, ‘sandy plateau’) is a nucleated Zarma (or Djerma) village located about 55 km east of Niamey (the capital since 1927), in a relatively lowly populated part of the Zarma cultural area (Figure 1).³² Rainfed agriculture is dominated by millet, the staple crop, grown in the short wet season from June to October. Livestock ownership by the Zarma is widespread, and a few Peulh pastoralist families live permanently close by the settlement. The village was settled by Islamic Zarma farmers who migrated from the Dallol Bosso in the nineteenth century, driven by land pressures.³³ Raiding and skirmishes occurred among different Zarma groups.³⁴ The new settlers laid claim to land, settled, and created a village that now numbers over 400 adults with an estimated population density of 20 people/km² (Figure 2).

As in other parts of West Africa, the French colonial administration (from 1896) effectively halted inter-tribal warfare and raiding, banned slavery, and

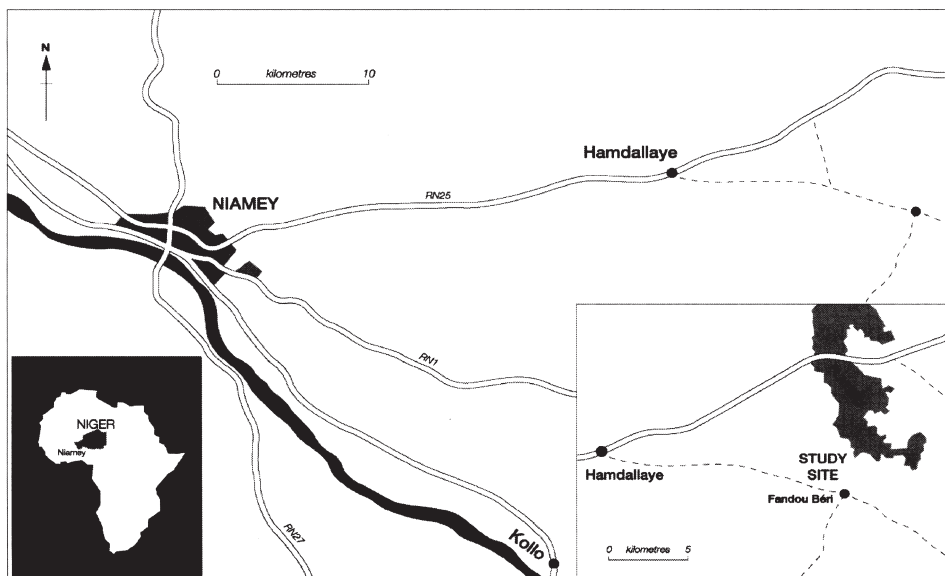


Figure 1 ~ Fandou Béri, south-western Niger



Figure 2 ~ The village centre of Fandou Béri in 1996 (photo S. P. J. Batterbury)

implemented taxation and some forced labour within a decade.³⁵ Fandou Béri had a close but uneasy relationship with the colonists: a colonial road was built just north of the village centre, also by forced labour, and it was chosen as a staging post for troop movements and passing convoys. The road provided for more rapid movement, and enhanced trading possibilities. Vehicles appeared in the middle of the century, and donkey carts by the 1960s. Today, bush taxis and trucks now pass several times a day to link to the local market and to Niamey. This relatively good transport linkage has been a factor in the adoption of trading and non-agricultural activities.

Due in part to continuing discord between the founding lineages and newer arrivals, Fandou Béri has always suffered land conflicts. Zarma customary law is the major arbiter of land allocation. In the 1950s and 1960s, the colonial regime adjudicated disputes with a neighbouring village, and installed concrete markers (*bornes*) to delimit boundaries.³⁶ Although several large plots of land have remained in the control of lineage heads and have been used by the same families for cultivation for over 40 years, land is also loaned, left in fallow, and is still subject to disputes that are now resolved through internal negotiation, and sometimes in local tribunals.

Monetization of the economy occurred in the first decade of the twentieth century. The capacity of women in particular to earn and spend their own income, independent from men, has increased since that time. Men's domestic responsibilities are primarily the provision of food and the construction and repair of houses, granaries and water sources. They also have a range of income-generating activities, as described below. They carry out most aspects of farm-

ing. Women are responsible for domestic activities including cleaning, cooking, collecting water and washing, and caring for children. Although constrained by loose interpretation of Islamic *purdah*, they assist with planting and harvesting of crops and may be provided with portions of their husbands' fields for cultivation of their own crops, usually ancillary cultivars like hibiscus and other sauce ingredients.³⁷ Women and men collect and sell firewood, which is potentially lucrative, given the village's location within a day's donkey cart ride from urban wood and charcoal markets.

The political and economic context in which the village residents develop their livelihoods is one of ongoing strife and economic hardship. President Diouri ruled Niger from 1958, but from 1975 a new political regime (President Kountché's 'rural development society' with its anti-corruption campaigns) 'woke up' Niger, as one villager explained, fuelled by uranium revenues. Uranium exports collapsed again in the 1980s. These revenues had supported the state apparatus: extension agents, medical services, a reliable primary education system and rural cooperatives. Much of this was later relinquished or scaled back, and Niger remains the Sahel's least urbanized nation. An IMF structural adjustment programme (SAP) commenced in 1987, resulting in national increases in taxation, wage freezes and price reforms. There is an unremitting balance of payments crisis; there have been frequent changes of government (with two military coups since 1996 alone); and infrastructure in the rural hinterlands could best be described as 'decaying'.³⁸ New structural adjustment loan packages introduced in 1994 reduced public spending even further, and increased taxes. Devaluation of the regional currency, the CFA,³⁹ in 1994 raised the cost of imports, but benefited the international livestock trade and Niger's few exports. Under these conditions, a hybrid of Zarma and postcolonial formal political institutions have endured. A village chief is an 'administrative magistrate', presiding over local matters, and reporting to the *chef de canton*⁴⁰ at the next highest administrative level. There are local political parties, but these come and go with the changes in national regime, as do expressions of local party politics. Political and religious institutions, some revolving around the mosque, are often stressed by the high tide of male outmigration in the long dry season.

Zarma assessments of historical change in Fandou Béri are reported in Table 1. In the 1950s, male outmigration was rare, land more abundant than today, and market activities were constrained. Particularly since that time, whether out of choice or necessity, people have adopted a multitude of dry-season activities including trading, seasonal migration and livestock rearing. Over the last 40 years there have been several droughts, with two leading to local famine (*Bandabaré* in the mid 1960s and *Cogaguiré* in 1972–4). These, and persistent climatic uncertainty, provoke farmers to seek other livelihood options. However 'productive *bricolage*' has also been a rational response to a withdrawal of state services – particularly following the ousting of President Kountché's uranium-fuelled development efforts in the 1980s – and it was aided by improvements in 'connectivity' through transport improvements and roadbuilding.

Bricolage and diversification away from agriculture involves a multitude of activities that potentially earn cash income or contribute to household food secu-

Table 1 ~ Changes in Fandou Béri noted by men and women since the 1950s

BY MEN

The worst period for the men of the village was 1954–64, when the village was isolated from services; there were food deficits, many medical problems and a high death rate. But in 1975 Niger ‘woke up’ under President Kountché’s rural development efforts and his new government. The best period was 1978–87, when the laterite road was built, as well as a school, a market, a borehole and a seed cooperative. State support to the village was greatest in 1984 during a famine, when government grain was delivered to each household. Food deficits prior to the 1960s were less numerous than today, but were more serious in their effects.

Agriculture and land

Black and fertile sandy soils still existed in 1950, but are now all gone.

In the 1950s, surplus grain was produced, which was sold to buy animals.

In the 1950s most cultivation took place close to the village, and there were 20 large lineage-held fields plus some individual ones; now there are many more (usually 3–5 plots to each household), and the loaning of land to others has increased.

Crop yields have declined, particularly since the mid-1960s. More quick-maturing millet varieties are used today. Cotton, once used mainly for local production of clothing, is no longer grown.

There has been limited adoption of Islamic inheritance laws for land over time.

Business

Prior to the 1950s, trips were made on foot to Hamdallaye or Niamey to buy kola (*Cola vera*, a stimulant), salt, spices and tobacco.

Migration

Migration in the 1950s was usually by camel, horse or foot to Ghana, Côte d’Ivoire or Nigeria. But in 1950 only 2–3 men migrated (to Ghana or Côte d’Ivoire) – by contrast, now almost all the adult male population is involved.

BY WOMEN

There was almost no contact with the state or development programmes in the 1950s up to the early 1970s. Some women reported that life was ‘easier back then’, but childbirth and illness caused many fatalities. After 1975, however, government edicts (the reform programmes of President Kountché) eased travel and social controls on women’s activities, and there was some state support. Men once retained much greater control over domestic activities, but this has been relaxed to allow women much more freedom to decide.

There are now more wells in the village, reducing women’s burdens.

Agriculture and land

In the 1940s–1950s the surrounding bush contained many wild animals: lions, hyenas, monkeys, antelopes. Bush meat was eaten and sold, but now there is none. ‘Forest’ surrounded the village in the 1950s, making wood collection easier.

Livestock

In the 1950s households had the same range of domestic animals as today, and women retained the animals given to them at marriage.

Hyenas once attacked domestic animals within enclosures. This is no longer so.

Table 1 Continued

Business

For women, restrictions on trading and market visits were enforced in the 'old days'. For example, only milk, butter and sauce ingredients were sold by women, usually by those past reproductive age (this is no longer so strictly enforced*). There was no village market until the 1970s. Donkey carts and trucks eased transportation and mobility from the 1960s onwards. Prior to that, all women's journeys were on foot. Traditionally woven black cloth (usually only one *pagne* was owned by a woman) has been replaced by cotton printed cloth.

Migration

In the 1950s, husbands generally migrated for short periods (weeks) in times of food stress.

Source: Household interviews and group discussions, 1996–7, conducted with Simon Batterbury, Judy Longbottom, Nik Taylor and Micha Weigl.

*One woman had control over the lucrative fuel wood market in the late 1990s. She was also the leader of the opposition political party in the community, until it was banned in 1996.

ity.⁴¹ These activities differ in the amount of start-up capital required, and therefore vary by the capabilities of individuals, their ability to command labour and their social position. In broad terms, older men and women (particularly male lineage elders and the senior wives of polygynous households) have always been able to command more labour and capital. Young Zarma women generally lack these assets and social power, which can set off intra-household conflict over their daily workloads and labour inputs.⁴²

While this brief history of changing livelihoods is unremarkable, an added twist is the withdrawal of sustained 'development' in this community. Some assistance was given by the colonial state and again since the 1970s, but assistance has dried up since that time.⁴³ Villagers' views of development are coloured by their limited experience of externally driven initiatives, as Table 1 shows. Important changes occurred in the 1970s, despite a drought and a food shortage. A small village market was established in 1973 after villagers lobbied the *chef de canton*, but today it is not particularly buoyant. In 1978 Fandou Béri joined an agricultural seed supply scheme (*projet céréalière/multiplication des semences*), where a few farmers were given seed and fertilizer packages to grow improved millet and cowpea varieties. The project bought back part of the farmers' harvest at three times the market price, to sell onward as seed stocks. It was set up with USAID funding and ran until widespread corruption forced closure in 1989. The legacy of this initiative is that farmers are nostalgic about the benefits of 'NPK' fertilizers, which gave easy millet yield gains in years of adequate rainfall (sometimes 1000 kg ha⁻¹, three times the average). After the termination of the seed project, fertilizers were only available at (high) market prices, forcing many to revert to cultivation without inorganic inputs. Farmers in Fandou Béri still imagine agrarian modernization, through inorganic inputs, as one way to

combat declining yields and recurrent food stress, and they identify the project with the Kountché political regime. But for the moment, many respond to low crop yields by combining agriculture with other work.

The major 'realms of diversification' developed to sustain household reproduction in Fandou Béri, are described in the next section.

The scope of current diversification activities

Against this historical background, I wish to demonstrate that all households have significant non-agricultural activities: they are not just farmers. Accumulation is occurring through the remittances, sales and other non-farm activity of most adults.

There are at least four ways in which diversification commonly occurs: through ownership of livestock, by working for others, engaging in business activity, and long-distance, seasonal or long-term migration.⁴⁴ These activities are not mutually exclusive, since individuals may practise them in sequence or in parallel, or indeed all may be present in a single household unit. In the larger households, labour of the household members can be deployed more easily to minimize risk, resulting in easier 'switching' between these activities; building up some but de-emphasizing others, depending on profits and labour availability. Strategies are therefore mixed and matched by individuals to maintain a portfolio of income sources, and some people fare better than others at productive *bricolage*.

Data for several households is shown in Table 2 to illustrate this point. Note how the village chief (household 2) experienced a harvest shortfall in 1997, but his large livestock herd acted as a tradable asset. Household 6, efficiently managed by a prominent (female) entrepreneur, invested in fuel wood collection and sales to maintain an above-average income. Peulh families (households 14-16) have traditionally responded to uncertain land tenure on small, loaned plots by maintaining large animal herds, rather than through economic migration or trading. This cultural difference and their poor land access actually meant that their food production outpaced demand, through large inputs of manures and careful crop management. These data, taken as a whole, seem to support Bryceson and Jamal's identification of African 'de-agrarianization',⁴⁵ insofar as only two households met their food requirements from their own agricultural production. Many Zarma depend, in greater or smaller measure, on non-agricultural activities. Money earned by adult women, for example, is used to augment the millet stocks and for sauce ingredients, health needs for the family, and for clothes, shoes, bedding items and kitchen utensils. Family ceremonies must be financed, and contributions towards family expenses made when the husband is 'in difficulty'.⁴⁶ Meanwhile men's cash is primarily used to buy millet, sauce ingredients, firewood, livestock and cloth (on which a high social value is placed⁴⁷). Women rank the rearing of animals for sale as their most profitable activity, followed by petty commerce and selling prepared foods from the house, then cultivating crops for sale, gathering wild foods for sale and lastly artisanal activities like making mats and baskets.

Table 2 ~ Comparing farm and non-farm activities for households in Fandou Béri in 1997

Household no.	Millet harvest (bottes, a local grain measure)	Household millet requirements (bottes)	Soil flux on main field (bulked samples) (t ha ⁻¹ yr ⁻¹)	Annual household income (CEA)	Annual household expenditure (CEA)	Household financial balance (CEA)	Household animal ownership (Tropical Livestock Units)	No. of migrants in family	Total household size	Local petty trading?	Remarks: household status
1	146	300	41.09	179 425	188 650	-9 225	2	0	12	Son	Some influence
2	153	400	41.48	542 125	507 450	+34 625	73	1	8	No	Chief. Cash income from taxation.
3	191	360	44.23	250 825	820 100	-569 275	12	4	27	No	Religious leader
4	146	300	40.27	208 300	351 800	-143 500	6	2	8	No	Religious leader
5	129	300	38.85	119 225	169 000	-49 775	3	3	12	By household head	
6	178	250	37.66	375 875	246 700	+129 175	13	1	8	No	Wife is prominent entrepreneur
7	161	200	26.43	137 475	110 900	+26 575	7	0	8	No	
8	235	200	35.28	215 925	227 350	-11 425	5	0	7	By household head	
9	174	330	42.73	183 225	264 100	-80 875	9	0	9	No	
10	270	250	45.28	262 025	320 575	-58 550	22	3	16	By household head	
11	191	360	46.46	209 800	224 885	-15 085	5	2	10	No	
12	74	150	40.06	N/A	N/A	N/A	18	2	8	No	Religious leader
13	187	200	33.12	196 050	200 750	-4 700	10	1	3	No	
14	144	300	38.95	224 125	316 600	-92 475	74	2	5	No	Peulh
15	67	300	41.89	206 925	136 600	+70 325	51	0	6	No	Peulh
16	210	450	N/A	414 825	366 000	+48 825	141	1	4	No	Peulh
17	288	300	N/A	N/A	N/A	N/A	13	N/A	17	N/A	
18	290	300	N/A	N/A	N/A	N/A	17	N/A	13	N/A	Chief's son
19	150	300	N/A	N/A	N/A	N/A	90	N/A	14	N/A	
20	291	500	N/A	N/A	N/A	N/A	12	N/A	15	N/A	

Source: see n. 32. In 1997, \$1 = 625 CFA (approx.).

Let me provide some context to the separate income generating activities favored by individuals and households in the village.

First, the ownership of livestock. In Fandou Béri, like so many other Zarma villages, livestock ownership ranges from a single sheep or goat to large herds of cattle or even camels. All are 'bankable' investments, and 75 per cent of household heads in our sample buy and sell livestock (primarily sheep and goats, but some cattle). Livestock provide financial security and are easily liquidated when cash is required urgently. In some cases, men who are unable to afford the cost of transport to seasonal work in Côte d'Ivoire will purchase one or more animals for rearing and eventual sale. Purchase of cattle is sometimes shared between brothers or other kin. One prominent farmer confirmed the importance of livestock ownership: 'I keep two bulls for the cart, which I rent out. Animals balance the household economy.' Another obtained a small herd through trading; 'I had nothing when I married, but now by my trading, I have some animals.'

The Peulh herders, who have settled in the village alongside the Zarma, operate a different system: they have larger herds (Table 2) and small, loaned fields with high crop yields. They are also entrusted with the feeding and watering of Zarma animals, and manure 'contracts' are struck between Peulh and Zarma. These involve the Peulh corralling (kraaling) their livestock in and around certain Zarma fields for some days, in exchange for payment from the farmer; the resulting deposits of manure and urine help to augment soil nutrients and to support agricultural production. A lack of cash currently prevents the full exploitation of entrustment systems and kraaling (which costs from 5000 to 10 000 CFA (\$6.90–\$13.80) for a modest plot) for the mutual benefit of Peulh and Zarma. The Zarma see the logic in increasing livestock ownership because of its relative stability in relation to uncertain agricultural yields, but resist adopting a true agropastoral livelihood system since, culturally, it is farming and attachment to land that distinguishes them from the Peulh. In addition, Zarma frequently lack the ability to purchase smallstock or cattle, and this acts as a restraint on herd size. Nonetheless there is evidence of increasing livestock ownership over time among certain survey households.

Women commonly raise sheep for sale to men, and even to their own husbands, at elevated prices prior to the Islamic religious festivals (e.g. *Tabaski*) and other special events. In a region north of Fandou Béri, Matt Turner highlights the fact that after the droughts of the mid-1980s, Zarma animals were sold off in great numbers, and he suggests that this was a region-wide phenomenon. But women were able to keep their herds intact, invoking their husband's Islamic duty to care for the family to force men to sell their stock first.⁴⁸ Particularly in households where conjugal relations have become strained, Turner argues, livestock wealth has become 'feminized' over time. In Fandou Béri, women are primarily engaged in rearing sheep and goats, which they view as less risky investments than cattle. Smallstock prices are highly variable depending on the season.

Secondly, a small market for male wage labour is available, mostly in the cultivation season. Agricultural labour was first hired during the drought of

1953–4, but then at a very modest scale since the Zarma were accustomed to deploying family labour (or in some cases, slaves) on their farms. In our survey, a quarter of adult men worked as paid labourers on the fields of others by 1997, mainly doing essential weeding work and harvesting. During the dry season there is a limited amount of paid work harvesting *andropogon* grass or forage grasses, turning down millet stalks to protect the soil after harvesting, clearing land for cultivation or looking after animals. Young men, in particular, operate a work group during the farming season to earn money. Agricultural labour pays about 750–1000 CFA a day (\$1.20–\$1.60); one son earned 22 500 CFA (\$36.00) this way in a single season. Put in perspective, this sum would purchase one and a half sacks of millet in July 1997, or alternatively, two male sheep.

Thirdly, business activity. The Zarma have always engaged in some production for the market, even if this has often been minimal in comparison with the specialized trading activities of other groups like the Hausa.⁴⁹ The Zarma trade and sell agricultural and domestic goods, and some have specialist knowledge that is also ‘traded’, such as *maraboutage*, Islamic prophesy and healing, to obtain cash payments (three household heads are *marabouts*). Business activity frequently requires travelling to Niamey and other market centres to exploit price differentials. Local market trading and livestock sales are also important, and clearly most activities are seasonal. Some 25 per cent of household heads trade locally at market, often through marking-up and reselling products like paraffin, matches, kola nuts or foodstuffs (their sons engage more infrequently in this activity, preferring the migration option).

Challenging a regional stereotype, women’s net profits from business frequently exceed those of their men. Girls begin their income earning activities at an early age. Some sell their mothers’ or grandmothers’ produce on head trays around the village. Jewellery made from beads bought in the local market are made and sold by young girls. Older girls find paid work drawing water for others and some may make food for sale at the local market. Others collect seasonal fruits, and a local herb called *foyutto* (*Ceratotheca sesamoides*), which is gathered early in the dry season for home cooking and for sale. Crickets, a seasonal snack, are also collected and sold at the regional market. In adulthood, crops such as groundnut, sesame and *pois de terre* are grown by both men and women separately but in small quantities, and are either consumed or sold depending on how much is produced. Although the cash generated belongs to the grower, many adult women are reliant on their husbands or male relatives actually to sell the produce, as there are restrictions on women’s freedom to circulate at markets. In reality most selling of produce goes on in women’s compounds, as does cooking and the preparation of food for sale (Figure 3). Incomes vary between 5000 and 10 000 CFA on average per month for a woman engaging in petty commerce and other income-generating activities. A woman selling ‘galette’ snacks from the home, for example, made 8000 CFA (\$12.80) a month in 1997; a seller of bed frames made 2500 CFA (\$4) a month on average. Making *sumbala*, a popular, pungent sauce ingredient made from hibiscus seeds, yields about 250 CFA (40c) per transaction. Old women specialize in making mats and baskets from local grasses.⁵⁰ Fuel wood sales – the first stage of the *filière* sup-



Figure 3 ~ Zarma woman preparing snacks for sale in her compound, 1996 (photo J. C. Longbottom)

plying the Niamey market – are dominated by one woman in the village, and are lucrative.

Lastly, migration. Many men are absent from the village in the dry season: ‘leaving’ is a common response once the harvests are in. Seasonal migration is one important route that relieves reliance on the locality and its sporadic rainfall and undercapitalized markets, and is one of the main strategies employed by men to earn money.

The Zarma have complex migration histories that once took them as far afield as the West African coast as warriors, mercenaries, workers and religious leaders.⁵¹ By the late 1990s it was most common for men of this region to travel to northern Côte d’Ivoire to work as traders in the dry season, since moving close by to Niamey yields scant financial reward.⁵² Some 34 per cent of all men in the village in 1997 had migrated seasonally out of the area, primarily to Côte d’Ivoire

but also to northern Nigeria. According to all the men interviewed, this migration stream has increased since the 1950s (see Table 1).⁵³ Money earned by men overseas goes to pay for food, rituals and social obligations, especially cloth for wives and bridewealth payments. Local textiles were once the sole source of clothing, when cotton was still widely grown in the region prior to the 1960s, and cloth was vital for gift-giving or exchange prior to marriage. The search for cash to buy printed cloth is one reason for the increased incidence of migration by young men; several individuals in the village mentioned that it was a major purchase item during Côte d'Ivoire trips.

Remittances obtained from migration are variable. Two household heads revealed annual remittances of 250 000 CFA (\$400) and 50 000 CFA (\$80) respectively for a single year, and yet some men cannot even marshal the necessary resources to depart at the beginning of the dry season, because money is needed for transport. In Côte d'Ivoire the migrant will stay with other Zarma and live communally, borrowing start-up funds, if necessary, and begin to trade locally in textiles or other head-loaded goods, either on foot or on a bicycle, moving from village to village. Some men enjoy the challenge of migration; others only go by necessity because their families push them or they require capital. All agree that migration is not as lucrative today as it was only a few years ago. A strongly held view is that, sad as it is, a migrated male means 'one less mouth to feed' in the household that remains in Niger.

Migration is therefore not always profitable, and it is arduous. For example, attacks on foreign migrant workers in Côte d'Ivoire increased markedly in 2000, resulting in many Sahelians returning to their home regions to await events.⁵⁴ Incomes are dependent on the economic and political situation in the destination countries. The men interviewed are emphatic that only in Fandou Béri do they hold hereditary rights to land, and thus to return home eventually is important.⁵⁵ Although most men do return with cash and goods, some stay away for a long time, sending for their families to join them, and a few do not return at all.

Landscapes of livelihood diversification

Having reviewed the structure of diversification activities pursued by men and women, we can begin to assess their impacts on the physical landscape. Following Rocheleau *et al.* (this issue), there are dimensions of local and regional social differentiation that both shape and are affected by the structure and composition of biotic assemblages at landscape and plot level. The point here is that the intentional mix, or *bricolage* of agriculture, migration, livestock, and market trading are imprinted in the local landscape, and particularly in land cover. Semi-arid ecosystems are well adapted to cope with and to respond to disturbance, since plant communities are usually subject to considerable perturbation.⁵⁶ Fandou Béri farmers identify significant alteration in vegetation cover and soil characteristics of their lands over the last 50 years, and do link these in part to their own activities.⁵⁷ But if anything, the meaning they ascribe to these changes is fatalistic; they 'happen', or they are 'God's will'. Our analysis of diverse data,

ranging from soil flux measurements through to oral histories of vegetation change, pinpoint relatively elevated soil erosion on agricultural land and loss of soil quality and organic matter content, as well as the disappearance of certain trees and shrubs since the 1950s. In particular it is worsening soil quality that drives difficult livelihood decisions, and forces some households to 'switch' from primary reliance on 'natural capital' (their soil) to other forms of livelihood activity.

Land within easy walking distance from the settlement is farmed most intensively, and receives more manure inputs and household sweepings. But each year, different 'patches' of land can be cultivated. For example, Farmer 1 (see Table 2) owns three fields. The one nearest the village has been continuously farmed for over 50 years, and receives most of the available manure inputs from his livestock. A poor harvest in 1997 did not meet food needs, which impelled him to seek income from trading in Côte d'Ivoire, and this provided just enough capital to purchase millet seed in February 1998. He prepared his fields and protected the soil surface against strong, eroding winds by laying down millet stalks and *sabare* (*Gueira senegalensis*) bushes, and then burned the vegetation to release nutrients. Extra time, that he could ill afford, was taken to clear a field boundary, because of a long-standing dispute with the owner of adjoining land.⁵⁸ He carried manure 2 km to an outlying field that year and sowed it, but after a misjudgement of the onset of the rains, the area he was actually able to hoe and later cultivate with his sons was smaller than he had prepared, giving a 'fuzzy boundary' to the cropped area. A large percentage of the field had to be abandoned because he lacked the labour to clear it of weeds. The resulting millet yields (and those of his wife's adjoining plot) were fortunately good, because of the strength of late season rains in that year.⁵⁹

This example illustrates how land cover is linked to the micropolitics of decision-making, but also to biophysical realities. The farmer considered labour, and lack of access to manure, to be the major constraints facing him, a story I had first heard from him back in 1995, when he had also harvested too little millet to feed his family. A decision to migrate was based on the *constraint* of poor agricultural yields in 1997, which imperilled household reproduction. But, although working with limited *capability* and poor labour availability, there was some room for manoeuvre in his decisions to clear and manure certain fields. The result was that only a portion of the field was sown to millet, and on wetter *botogo* soils there was some additional production of hibiscus and sorrel. Beliefs concerning the likelihood of rain and soil quality (i.e. his interpretations of environmental parameters, based on prior knowledge) interacted with the effects of biophysical change (rainfall patterns and spatial differences in soil quality) and social relations (ongoing disputes with a neighbour, and labour availability) to influence land cover.

We have compared measures of soil erosion (see Table 2) and detailed 'field histories' with households' use of the different diversification strategies described in the last section.⁶⁰ In this region, the erosion of topsoil by strong winds in the late dry season is very severe, and to avoid this, land with friable soils must maintain ground cover. The analysis identified lower erosion rates in

those fields close to the village centre that benefit from continued farming and use of organic inputs. Distant fields can suffer winds that remove, or indeed deposit, thick layers of wind-blown sand from, or on, the field surface.⁶¹ Input of labour is lower on the sandy, mid-slope *tassi* fields further from the village, and these show higher erosion rates; they are now farmed frequently but with short fallows. Yet, interestingly, it is the fields of households where migration is widely practised (expressed as a percentage of available labour in the household) that erosion rates are greatest (often above 40 t ha⁻¹ yr⁻¹). Alternative income streams therefore allow the sacrifice of agricultural investment – such as the early-season field preparation discussed above – and this can have the incidental effect of creating elevated erosion rates. Comparisons between sample fields also show that families able to afford to hire in some labour do not farm a wide range of plots on diverse soil types, which means that they can have less flexibility in conditions of rainfall shortage or of localized erosion.⁶²

The influence of diversification activities on farmed plots appears to show some regularities, therefore; erosion is accelerated incidentally as households choose to invest their labour in a wider range of activities than agriculture. Over time, it is only the richer of the ‘diversified’ households who are able to hire labour for land preparation and protection, or weeding the millet crop – but this itself does not ensure attentive land management, as Møller also found in a similar study in Nigérien Hausaland.⁶³ Some poorer ‘diversifiers’ (e.g. household 1) have not been able to hire labour in this way, for lack of capital, and erosion has resulted.

In the past, low population pressures meant that ample land was available for all entitled to it, and long fallows of 10 years or more were common across the region. In these times of moderate land pressures however, 80 per cent of Zarma farmers reported gradually declining soil fertility and crop yields on their sandy (*tassi*) soils.⁶⁴ As the cultivated area has increased from around 10–15 per cent to over 30 per cent of the village lands from 1950 to 1992, at the expense of uncultivated land (Table 3), so household fields have become spatially dispersed. Farmers reported that in-fields had become lighter in colour and coarser in texture, indicating a decrease in organic matter – fewer areas of black sandy soils with high organic matter (*tassi biri*), and more areas of red or white sandy soils (*tassi kirey* and *tassi kware*). They attributed these changes to the increase in the area of permanent cultivation and the corresponding decrease in fallow (which can expose soil to high winds), as well as to uncertain rainfall since the 1960s.⁶⁵ The generally held view that biotic changes have accompanied the spread of agriculture and increased fuel wood demands for both domestic consumption and the Niamey market is supported in Table 4, suggesting the loss of several important tree species over this period. Wild game, once important for food preparation, is now absent.

In summary, while local people’s views of landscape change in this one community are far more circumspect than a still-pervasive dominant Sahelian ‘crisis’ discourse, which remains, in many quarters, wedded to notions of ‘population pressure on resources’,⁶⁶ the increased use of the *terroir* for agriculture over time has diminished other land covers. This is not necessarily perceived as

Table 3 ~ Land cover change, 1950–1992

Land use category	% of the 35 km ² Fandou Béri <i>terroir</i>	
	1950	1992
Scrub/bush	76.3	34.1
Tiger bush*	4.7	4.1
Current fields	11.3	23.4
Recent fallows	4.1	27.4
Older, detectable fallows	3.5	10.9
Settlement	0.1	0.1
Total	100	100

Source: Air photo interpretation and ground-truthing, 1996.

*Characteristic linear vegetation bands, found on plateaux.

Table 4 ~ Women's perceptions of vegetation change, 1960s–1990s: Species less plentiful than 40 years ago: (t) = tree (s) = shrub

Local name	Scientific name	Perception of availability
<i>Kulu kulu</i> (t)	<i>Strychnos spinosa</i>	Disappeared
<i>Sageye</i> (t)	<i>Calotropis procera</i>	Disappeared
<i>Táásá</i> (s)	<i>Grewia bicolor</i>	Disappeared
<i>Fântú</i> (t)	<i>Detarium microcarpum</i>	Greatly decreased
<i>Hàwji-ba-zàmbù</i> (s)	[<i>arbustre à fruit rouge</i>]	Decreased
<i>Fôrgò</i> (t)	<i>Bombax costatum</i>	Decreased
<i>Sàtàrà kòsì</i> (t)	<i>Heeria insignis</i>	Decreased
<i>Samarây</i> (s)	<i>Cochlospermum planchonii</i>	Decreased
<i>Korkordo</i> (t)	[not known]	Decreased

Source: Batterbury and Longbottom, 'Social and environmental change in a Nigérien village' (see n. 57).

(t) = tree; (s) = shrub.

detrimental, but declining average crop yields and some species loss have resulted. As households have responded to these changes through diversification out of agriculture (or in simply continuing a diversified livelihood system in new ways), labour and time run short for them. While this again imperils sustainable agricultural yields, in a context of low inputs and no agricultural extension activity, it can lead to increased wind erosion on agricultural land but also to less land cover being devoted to crops.

Discussion and conclusion

Livelihood activities are important drivers of change in the landscape, as writers of various theoretical persuasions have argued.⁶⁷ In societies dealing with difficult choices to ensure their survival and welfare, social, economic and environmental forces work together and overlap. The paper has accounted for the processes driving productive *bricolage*, and then related them to some aspects of landscape change.

We have shown that residents of Fandou Béri have responded to change through a suite of strategies that share common elements with other dryland communities. Their logic frequently involves giving up the struggle to subsist from the land alone, through diversification.⁶⁸ Over recent decades, farmers have consistently responded to an adverse physical environment through differentiated investment in rainfed cultivation 'at home', and economic diversification 'at large'. Yet there is little evidence (yet) that poorer farmers are being made dependent on waged income, or being rendered landless by this process.

Nonetheless, farming households with some wealth or assets retain more diversification options. They are, perhaps, more able to weather some of the macro-level political and economic changes that influence the terms of trade for migrant income possibilities in northern Côte d'Ivoire, the availability of agricultural inputs and services, the possibilities afforded by local trading and, to a certain extent, the market price of livestock. Yet everybody feels the effects of Niger's difficult political and economic situation. The early colonial administration may have improved transportation, and uranium revenues fed through into local level development activities in the 1970s and 1980s under the Kountché regime. Yet in the recent context of fiscal shortfalls and political uncertainty, there is now no state support for villagers in terms of credit, advice or guaranteed earning possibilities, rendering local income generation essential.

At the local scale, the micropolitics of social change and decision-making has led to household units gaining increased autonomy over livelihood decisions. There has been some population growth, coupled to disputes with neighbouring communities and between households over land access and ownership. Women's arenas for economic activity have widened to include market transactions (following improvements in transportation and the market system), but their capacity to capitalize on economic opportunities is still constrained.

In environmental terms, farmers have faced periodic drought, fluctuating rainfall, and soil erosion and soil fertility problems in recent decades. It is impossible to dismiss these factors as unimportant in an explanation of productive activity – they structure so much of everyday life. Environmental change is both an 'input' and 'output' of making a living. As 'output', a marked decline in agricultural productivity per unit area and population growth in the twentieth century has been associated with the decline of a long bush fallow system, worsening soil fertility in many areas, continued and perhaps even accelerating erosion, and the removal of tree cover. As 'input', erosion and declining soil fertility have

driven a general lack of incentive and capital to reinvest in land and agriculture.⁶⁹ Anticipated tenure changes at the national level have fragmented fields, and contributed to their intensive use.⁷⁰

In conclusion, rural people in Africa are busy carving out spaces between the market and the state, and between modernity and local tradition, while some geographers and social scientists have sometimes failed to address the key questions about how and why this is done.⁷¹ The study has demonstrated the potential of an ecumenical view of landscape change. As Croll and Parkin argue in their work on *bricolage*, livelihoods are pieced together, changeable, may not always work as well as planned, and have multiple components that are a product of learning and experience. While post-structural writers and agricultural economists blame, in turn, powerful actors and international development – or outdated technology – for rural poverty and degraded landscapes, neither argument is really sufficient in Fandou Béri. Rather, farmers have *already* responded to a reproduction squeeze,⁷² as external support to them has been scaled back from its always modest levels. The theoretical task, therefore, is to analyse the actions and the logics of a ‘moving target’ of innovative and mobile people.⁷³ For geographers, a ‘landscape as representation’ view, or a broad ‘politics as constraint’ perspective needs to be combined with analysis of livelihood dynamics and everyday resource use. We must understand local realities of resource access and livelihoods, the contexts in which these negotiations take place, and broader processes and institutions. Putting this knowledge to use requires first recognizing the pernicious nature of poverty in a region where poor policy-making and inappropriate development assistance have gone hand in hand, and the importance of productive *bricolage* to the people of some of the world’s harshest and most unforgiving environments. Agencies intervening in such areas must try to offer people additional options from which they themselves can choose. Understanding landscapes of diversity is just a small contribution to a local political ecology of Africa’s marginal places.

Acknowledgements

The work reported here was supported by the UK Economic and Social Research Council through its Global Environmental Change Programme (grants L320253247 and L320223003). I would like to extend my thanks to the villagers of Fandou Béri, and to our research assistants, students and local collaborators. The team members include Christie Allen, Simon Batterbury, Adrian Chappell, Judy Longbottom, Stephen Matthews, Nik Taylor, Siddo Seyni, Henny Osbahr, Trevor Piper, Andrew Warren, Dominic Waughray and Micha Weigl. Logistical support from the Institute of Hydrology and ICRISAT helped us complete this work. Helpful comments from Tony Bebbington, Don Mitchell, Henny Osbahr, Rick Schroeder, Andrew Warren and a reviewer are gratefully acknowledged.

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- ² On a growing literature on de-agrarianization and livelihood diversification, see D. F. Bryceson and V. Jamal, eds, *Farewell to farms: de-agrarianisation and employment in Africa* (Aldershot, Ashgate Press, 1997); F. Ellis, 'Household strategies and rural livelihood diversification', *Journal of development studies* **35** (1998), pp. 1–38. On sustainable livelihoods concepts and their elaboration in development thinking, see D. Carney, ed, *Sustainable rural livelihoods: what contribution can we make?* (London, Dept for International Development, 1998); K. Neeffjes, *Environments and livelihoods: strategies for sustainability* (Oxford, Oxfam, 2000); I. Scoones, *Sustainable rural livelihoods: a framework for analysis* (Brighton, Institute of Development Studies, 1998), and the 'Livelihoods connect' website, www.livelihoods.org
- ³ E. Croll and D. Parkin, 'Cultural understandings of the environment', in Croll and Parkin, eds, *Bush base, forest farm: culture, environment and development* (London, Routledge, 1992), pp. 11–36. They say: 'It is worthwhile . . . retaining the term, productive *bricolage*, to refer relatively to tasks over which agents see themselves as having some control, as distinct from work controlled by others outside the home' (p. 12).
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- ⁵ D. Cosgrove and S. Daniels, eds, *The iconography of landscape: essays on the symbolic representation, design, and use of past landscapes* (Cambridge, Cambridge University Press, 1998).
- ⁶ C. Nash, 'Landscapes', in P. Cloke, P. Crang and M. Goodwin, eds, *Introducing human geographies* (London, Arnold, 1999), p. 217. See also R. Sack, *Homo geographicus* (Baltimore, Johns Hopkins University Press, 1997).
- ⁷ See the stocktaking and discussion in D. Mitchell, *Cultural geography: a critical introduction* (Oxford, Blackwell, 2000). Mitchell's account of cultural geography and landscape is largely confined to Western capitalist societies – see p. xvii.
- ⁸ J. Fairhead and M. Leach, *Misreading the African landscape* (Cambridge, Cambridge University Press, 1996); J. C. Scott, *Seeing like a state* (New Haven, CT, Yale University Press, 1998). See also P. Robbins, 'Paper forests: imagining and deploying exogenous ecologies in arid India', *Geoforum* **29** (1998), pp. 69–86, for an effort to tackle the representations and the social facts of deforestation together.
- ⁹ Quotation from J. Harriss, 'The making of rural development: actors, arenas and paradigms', paper presented at the Anniversary Symposium of the Dept of Rural Sociology, Wageningen Agricultural University (mimeo, June 1997, no page numbers). See also N. Long, 'From paradigm lost to paradigm regained? The case for an actor-oriented sociology of development', in N. Long and A. Long, eds, *Battlefields of knowledge: the interlocking of theory and practice in social development* (London, Routledge, 1992), pp. 16–43. For materialist perspectives on agrarian change, see J. Harriss, ed., *Rural development: theories of peasant economies and agrarian change* (London, Hutchinson, 1982); P. Woodhouse, H. Bernstein and D. Hulme, eds, *African enclosures? The social*

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- ¹² A. Gupta, *Postcolonial developments: agriculture in the making of modern India* (Durham, NC, Duke University Press, 1998).
- ¹³ J. Mayers and S. Bass, *Policy that works for forests and people* (London, IIED, 1999), p. 227.
- ¹⁴ N. Kabeer, 'Resources, agency, achievements: reflections on the measurement of women's empowerment' *Development and change* **30** (1999), pp. 435–64.
- ¹⁵ See Michael Mortimore on diversity, flexibility, and adaptability in Sahelian land use systems, using an approach that begins with the behavioural ecology of farmer activity; M. J. Mortimore and W. M. Adams, *Working the Sahel: environment and society in northern Nigeria* (London, Routledge, 1999), and Mortimore, *Adapting to drought*.
- ¹⁶ P. Blaikie and H. C. Brookfield, eds, *Land degradation and society* (London, Methuen, 1987).
- ¹⁷ As a matter of historical record, however, it should be noted that political ecologists, up until the mid-1990s, generally sought different answers from the 'landscape' school and, later, the new cultural geographers. In the 1980s 'new cultural geography' was dismissed by some political ecologists as an agile investigative approach to power and space, distanced from practical development questions. Early political ecology sought (some believed) to work out why people are poor and environments are degraded, and what processes at what scales held the key to liberating human capacities to bring about social change. But as intellectual mergers have occurred and the language of social constructionism and poststructuralism has entered political ecology, Piers Blaikie still questions the utility of the former, because 'post-structural political ecology . . . seldom attempts to fill the vacuum which results from deconstruction with its own version of environmental or social truth': 'A review of political ecology: issues, epistemology and analytical narratives', *Zeitschrift für Wirtschaftsgeographie* **43** (1999), pp. 131–47 (quotation on p. 142).
- ¹⁸ See the special issue: S. P. J. Batterbury and A. J. Bebbington, eds, 'Environmental histories, access to resources and landscape change', *Land degradation and development* **10** (1999), pp. 279–396.
- ¹⁹ P. Stott and S. Sullivan, eds, *Political ecology: science, myth and power* (London, Arnold, 2000).
- ²⁰ D. F. Bryceson, *Sub-Saharan Africa betwixt and between: rural livelihood practices and policies* (Leiden, Afrika-Studiecentrum, 1999), p. 1.
- ²¹ S. P. J. Batterbury and A. Warren, 'The African Sahel 25 years after the great drought: assessing progress and moving towards new agendas and approaches', *Global environmental change* **11** (2001), pp. 1–8 (special issue on the Sahel).
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- ²⁵ Ellis, 'Household strategies'.
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- ²⁸ They may also have been lucky. Davies *et al.* make a useful distinction between households that 'get on' from those that merely 'get by'. See S. Davies, P. Bhargava, B. Jena, K. Mathur and M. Mukerjee, *Making livelihoods work: women, men and children in Rajasthan* (London and Brighton, Dept. for International Development and Institute of Development Studies, 1998).
- ²⁹ D. Bryceson, 'Peasant theories and smallholder policies: past and present', in D. F. Bryceson, ed, *Disappearing peasantries: rural labour in Africa, Asia and Latin America* (London, Intermediate Technology Publications, 2000), pp. 1–36; D. Cordell, J. W. Gregory and V. Piché, *Hoe and wage: a social history of a circular migration system in West Africa* (Boulder, CO, Westview, 1996); T. Reardon *et al.*, 'Determinants and effects'.
- ³⁰ On capital theory, see A. J. Bebbington 'Globalized Andes?' (this issue); A. J. Bebbington, 'Capitals and capabilities: a framework for analyzing peasant viability, rural livelihoods and poverty', *World development* **27** (1999), pp. 2021–44.
- ³¹ See, for a classic statement of the need to study at this scale, Berry, *No condition is permanent*.
- ³² Teams of British and Nigérien researchers have been studying Fandou Béri since 1995, examining how social and environmental change interrelate in the late twentieth century. See S. P. J. Batterbury and A. Warren, *Land use and land degradation in south-western Niger: change and continuity*, Final Report to the Global Environmental Change Programme of the ESRC (www.lse.ac.uk/depts/destin/simon/serida.html, Aug. 1999). The Zarma, linguistically related to the Songhai, are a politically powerful, numerical minority in Niger. Their social structure once comprised nobles with their own slave class, and there were also Zarma 'captives' taken by the Tuareg nomads and the Peulh. These social distinctions have some symbolic value today, but slavery and warfare are no longer practised. For information on Niger, see R. B. Charlick, *Niger: personal rule and survival in the Sahel* (Boulder, CO, Westview, 1991).

- ³³ Islam follows the Maliki branch of Sunni Islam, which prescribes the ritual of prayer five times daily, fasting during Ramadan, and giving alms (*ibid.*). Fandou Béri recently constructed a large Friday mosque built with remittances and gifts.
- ³⁴ Today, minority ethnic groups present in the region include Peulh, Bella, Hausa and Tuareg.
- ³⁵ J.-P. Olivier de Sardan, *Les sociétés songhay-zarma: chefs, esclaves, guerriers, paysans...* (Paris, Karthala, 1984).
- ³⁶ The village appeared in a French study of land tenure in the 1960s: H. Raulin, *Mission Niger 1961: études nigériennes* (Niamey, Institut de recherches en sciences humaines, 1961); and again in the 1990s: T. A. Kelley III, 'Report to the Trent Foundation on research related to customary justice in Zarma villages' (mimeo, University of North Carolina School of Law, 1996).
- ³⁷ Zarma society is patrilineal, polygynous and virilocal. See, for Fandou Béri, J. C. Longbottom, 'Productive bricolage: changing livelihoods and gendered strategies in response to food insecurity in south-west Niger' (MA, School of Oriental and African Studies, London, 1996).
- ³⁸ In the study area agricultural extension has all but ceased, primary education is almost nonexistent outside the towns (Fandou Béri's primary school, for example, is frequently vacant and without a teacher) and veterinary services no longer operate.
- ³⁹ One US \$ = 760 CFA, Sept. 2000.
- ⁴⁰ Senior administrative official of the region, residing in Hamdallaye.
- ⁴¹ Six households were surveyed by the author and Judy Longbottom in 1996 using semi-structured interviews, supplemented by a number of group discussions and participatory research exercises. In 1997, 20 households and their farms were studied for a farming year through monitoring forms, interviews, yield measures, soil analysis and informal observations, with separate studies of soil fertility, by Christie Allen and Henny Osbahr in 1997 and 1998. See Batterbury and Warren, *Land use and land degradation*. Note that 'households' refer here to married individuals (a man and up to four wives), and their dependants. More complex arrangements do exist, and are recognized in our data. But fissioning of a household through marriage or relocation does not necessarily sever financial or social ties between its component members. The conjugal unit and its offspring were the obvious focus of inquiry for our ethnographic and survey work; obligations to lineage heads and powerful family figures are far less important now than in the past.
- ⁴² If young women are married but do not have children, they report that they sometimes feel like the *petite esclave* (little slave) of other household members. See Longbottom, 'Productive bricolage'; F.-A. Diarra, *Femmes africaines en devenir: les femmes Zarma du Niger* (Paris, Editions Anthropos/Centre Nigérien de Recherches en Sciences Sociales, 1971), p. 90.
- ⁴³ Development programmes do exist in the region but not in Fandou Béri. A large rural development programme, PURNKO, supports the survival of West Africa's last herd of giraffes as well as community development around Kouré to the south. See M. M. Sani and N. M. Barning, 'Broadening the focus: linking wildlife conservation to rural development in Niger', in J. Abbot *et al.*, eds, *Promoting partnerships: managing wildlife resources in Central and West Africa* (London, IIED, 2000), pp. 117-38.
- ⁴⁴ Although laying themselves open to public scrutiny and the risk of censure under Islamic norms, several men also mentioned asking for credit or borrowing money from relatives as a means either to buy grain or to invest in other activities. Men also

- mentioned that, being an Islamic community, traditional reciprocal help with food is available 'for a day or two' if a person is experiencing severe hardship.
- ⁴⁵ Bryceson and Jamal, *Farewell to farms*.
- ⁴⁶ Diarra, *Femmes africaines*, p. 108.
- ⁴⁷ This point is also made in J.-P. Olivier de Sardan, *Anthropologie et développement: essai en socio-anthropologie du changement social* (Paris, Karthala, 1995).
- ⁴⁸ M. D. Turner, 'Merging local and regional analysis of land-use change; the case of livestock in the Sahel', *Annals of the Association of American Geographers* **89** (1999), pp. 191–219. Turner also argues that land use analysis in the Sahel – which tends to paint a broad-brush, regional view of the driving forces behind land cover change – needs to focus on the micro-politics of conjugal relations and gendered resource struggles.
- ⁴⁹ Olivier de Sardan, *Anthropologie et développement*.
- ⁵⁰ There are many more old women than old men in the village. Men will often not marry until they are over 30, and take girls of between 15 and 20 as their first wives. Childless old women continue to pound millet and draw water, but will live with relatives and are cared for if necessary. Widows with daughters-in-law are the more advantaged.
- ⁵¹ See J. Rouch, 'Migrations au Ghana', *Journal de la Société des Africanistes* **26** (1956), pp. 33–196. Jean Rouch was one of the first ethnographers of the Songhai and Zarma. See also T. M. Painter's work on Zigi, *Migrations, social reproduction and development in Africa: critical notes from a case study in the West African Sahel* (Milton Keynes, Open University, 1987).
- ⁵² Men were adamant that working on plantations is 'not for the Zarma', implying that it is inferior work. Only one village member has obtained a secure post as a government *fonctionnaire* in Niamey in recent times.
- ⁵³ See also D. R. Rain, *Eaters of the dry season: circular migration in the West African Sahel* (Boulder, CO, Westview Press, 1999) for information on the circular migration of the Hausa. Widespread xenophobic reactions to migrant labourers in Côte d'Ivoire from 2000 have now slowed, perhaps temporarily, the migrant stream to that country.
- ⁵⁴ This has disturbed household dynamics in another sense. In some cases, Zarma migrants have other partners and even children requiring support in Côte d'Ivoire, but I was not able to substantiate this.
- ⁵⁵ Under Niger's national land tenure code, instituted in the mid-1990s, land must be cultivated every 3 years or more, to prevent other claims on it. See C. Lund, *Law, power and politics in Niger: land struggles and the rural code* (Hamburg, LIT Verlag, 1998).
- ⁵⁶ A. J. Dougill, D. S. G. Thomas and A. L. Heathwaite, 'Environmental change in the Kalahari: integrated land degradation studies for nonequilibrium dryland environments', *Annals of the Association of American Geographers* **89** (1999), pp. 420–42.
- ⁵⁷ S. P. J. Batterbury and J. C. Longbottom, 'Social and environmental change in a Nigérien village 1950–1996' (mimeo, 1996); H. Osbahr and C. Allan, 'Soil management at Fandou Béri, south-western Niger 1: ethnopedological frameworks and soil fertility management', mimeo, submitted to *Geoderma* (2000).
- ⁵⁸ Changes in land tenure systems partially account for these trends. Relations between father and sons, and between brothers, determine traditional practice. Two generations may farm together, or brothers may all farm a large field. Land can also be divided between brothers, or some sons may request additional land from their father during his lifetime. Islamic law dictates that land should be divided between sons on the father's death, but recent work by Tom Kelley suggests that customary law still predominates. See Kelley, 'Report to the Trent Foundation'. Against this, Niger's

- 'Rural Code' (*Code Rural*) will – if fully implemented – formalize land rights for those who can prove long-term occupation or inheritance. In the last 3 years there have been cases of roughshod clearing and cultivation in order to assert ownership, pre-empting any claims on land by tenant farmers or other community members. See Lund, *Law, power and politics in Niger*.
- ⁵⁹ See H. Osbahr, 'Livelihood strategies and soil fertility at Fandou Béri, south-western Niger' (PhD, Dept of Geography, University College London, 2001).
- ⁶⁰ See Warren *et al.*, 'Soil erosion in the West African Sahel'. Bulked soil samples were collected and analysed in the UK for ¹³⁷Cs, an indicator of net soil flux. ¹³⁷Cs (Caesium) is an artificial isotope produced in nuclear reactions. Large quantities of it were released into the atmosphere by bomb testing in the mid-1960s. They were distributed worldwide and most of the isotope was adsorbed to clays in the upper part of soil profiles. Measures of present ¹³⁷Cs content in a soil profile (compared to a reference sample) give a measure of soil loss (or gain) over a 30-year period. To calculate net erosion rates, field boundaries were traced out with farmers using a base-station GPS and interpreted using ARC/INFO. Farmers on the same fields were included as part of the social survey, as described in Batterbury and Warren, *Land use and land degradation*. See also A. Chappell, A. Warren, N. Taylor and M. Charlton, 'Soil flux (loss and gain) in south-western Niger and its agricultural impact', *Land degradation and development* **9** (1998), pp. 295–310.
- ⁶¹ E. Taylor-Powell, A. Manu, S.C. Geiger, M. Ouattara, and A. S. R. Juo, 'Integrated management of agricultural watersheds: land tenure and indigenous knowledge of soil and crop management', *Tropsoils bulletin* **91-04** (Soil Management Collaborative Support Program, North Carolina State University, Raleigh, NC, 1991).
- ⁶² H. Osbahr, 'Indigenous knowledge, fallow systems and indicator species: a case study from Fandou Béri, south-western Niger' (MRes. thesis, Environmental Science, University College London, 1997).
- ⁶³ Møller, 'Changing roles'.
- ⁶⁴ Osbahr, 'Livelihood strategies'.
- ⁶⁵ The Peulh, however, reported no such declines in soil fertility on their own fields, which they attributed to their constant use of manure.
- ⁶⁶ See e.g. a study just to the east of Fandou Béri which assesses population–resource relationships with little explanation of migration or business activity: A. Amissah-Arthur, B. Mougenout and M. Loireau, 'Assessing farmland dynamics and land degradation on Sahelian landscapes using remotely sensed and socioeconomic data', *International journal of geographical information science* **14** (2000), pp. 583–99.
- ⁶⁷ D. J. Campbell, 'Strategies for coping with severe food deficits in rural Africa: a review of the literature', *Food and foodways* **4** (1990), pp. 143–62; H. C. Brookfield, 'Intensification and disintensification in Pacific agriculture', *Pacific viewpoint* **13** (1972), pp. 30–41; A. Arce and N. Long, 'Reconfiguring development and modernity from an anthropological perspective', in Arce and Long, eds, *Anthropology, development and modernities* (London, Routledge, 2000), pp. 1–31.
- ⁶⁸ Olivier de Sardan, *Anthropologie et développement*.
- ⁶⁹ See I. Scoones and C. Toulmin, *Policies for soil fertility management in Africa* (London, Dept for International Development, 1999). This book argues that developing local livelihood options, rather than soil recapitalization, is indicated in such cases.
- ⁷⁰ Lund, *Law, power and politics in Niger*.
- ⁷¹ Points made in A. J. Bebbington, 'Re-encountering development: livelihood transitions and place transformations in the Andes', *Annals of the Association of American Geographers* **90** (2000), pp. 495–520.

⁷² H. Bernstein, 'Notes on capitalism and peasantry', *Review of African political economy* **10** (1977), pp. 60–73.

⁷³ Bryceson, 'Peasant theories and smallholder policies'.