



Rural populations and
agrarian transformations
in the global South



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PRIPODE is a programme launched in 2003 with support from the French Ministry of Foreign Affairs to foster research initiatives on PED issues in developing countries. It has sponsored 20 different research projects in 17 countries. Description of the programme and of its findings is available on PRIPODE website (pripode.cicred.org).

RURAL POPULATIONS AND AGRARIAN TRANSFORMATIONS IN THE GLOBAL SOUTH

Simon Batterbury

1. Introduction¹

This paper offers an overview of agrarian change and resource management in developing countries. Most of the case studies in the paper are drawn from PRIPODE, a research programme funded by the French Government from 2002-2007 that supported teams of researchers in developing countries to explore population-environment-development (PDE) interactions on a regional basis.²

I first identify the major themes in the literature on agrarian change (including the sub-theme of population-environment relationships), as they emerge in the case studies. I focus on three observable trends across the PRIPODE studies: diversification of livelihoods (termed *productive bricolage*), inten-

¹ This CICRED Policy Paper is based on a longer, more detailed background paper prepared for the PRIPODE International Colloquium held in Paris in March 2007. The original draft paper is available from the Colloquium's webpage: <http://pripode.cicred.org/CONF/UNESCO2007/EN/Presentation.htm>

I would like to thank the funders of PRIPODE, CICRED personnel, and Peter Dwyer (Melbourne) for comments on the manuscript.

² "PRIPODE studies are referred to by code number (e.g., VN5 for Ho Chi Minh, Vietnam, GH1 for Accra, Ghana). A full list is given in the appendix to this Policy Paper, and more detailed findings for each study can be found at <http://pripode.cicred.org>.

sification or dis-intensification of agricultural production, and changes in the political economy of agriculture, including new conditions of production brought about by factors that are largely external to the society in question. I identify the major currents of theoretical and practical debate, before illustrating these with case study material or from other comparative work.

The argument of this overview is that it is impossible to separate out population-environment relationships from other drivers of change - most importantly the commoditization of agrarian systems and the increasing complexity of livelihood dynamics in the light of globalization, new risks, conflicts, and the profitability of particular agricultural and non-agricultural activities. The range of methodological tools developed in the PRIPODE case studies are rich and support the claim that it is essential to conduct interdisciplinary and "grounded" methodologies rooted in "place" (*milieu*) but that acknowledge influences and processes at other scales.

2. From Cases to Theories

2.1. Eclectic Systems and Problems

Despite the popular perception that our globalized modern world is predominantly urban, agriculture uses one third of the earth's land surface and employed 45% of the working population in the 1990s (Grigg 1995: 1). Our understanding of agrarian issues in developing countries is based on a great number of case studies of local systems, regional and national level comparative studies, and sectoral investigations of particular commodities and their supply and consumption.

The task of understanding agrarian change in rural areas is a valuable one – agriculture still "matters", despite the increasing substitution of labour by new agricultural technologies, and the incorporation of local farming systems into global spheres of influence through trade and migration (Turner & Brush 1987). An overall picture of the direction and scale of agrarian change, and the human and environmental transformations involved, does emerge in several global assessments (Hornborg 2005, Grigg 2002, FAO 2003). Yet a finer grained analysis is also essential, focussing on particular regions and communities. Consider several such cases.

In south-eastern Australia, prolonged drought driven by El Nino has been causing the failure of family farms over the last few years, and the potential loss of European "settler" agriculture that dates back to the late 1700s.

Already threatened by the rise of agro-industrial industries in Australia and beyond, the situation for family farms is currently grave, and rural areas are continuing to depopulate. The situation is mixed, and depends particularly on whether farms have access to irrigation water.

Meanwhile the farmers of Niger and Burkina in the West African Sahel, faced with rising population densities, are also experiencing drought – particularly severe in 2005-6 in Niger (NE1). They continue to "fight back" (Batterbury and Forsyth, 1999) despite no government assistance of the type available in Australia, and only patchy development aid. They are battling severe challenges, not only drought but also the intensification of labour demands in and outside agriculture. They also receive remittances from absent household members working elsewhere, including those now based in West and North African towns and cities (DZ1).

Many Sahelian migrants to south-western Burkina Faso and Mali, and some groups indigenous to those areas, face diminishing returns from their important cotton crop, as international trading relationships dominates world markets. Their "petty commodity production" is entirely dependent on unstable farm gate prices (see case studies ML2, BF5).

Then again, further again from the world's core economic regions, Connell (2006) has charted thirty years of change among traditional, indigenous farmers of the island of Bougainville, Papua New Guinea (PNG), where farmers have experienced several "booms" and "busts" for crops like cocoa, punctuated by political violence. The majority remains poor and market conditions have recently worsened. He concludes that in some parts of the world, "modernity" is fast slipping away – agricultural development can retreat, as well as advance.

What unifies these stories, however, is the first of three important processes identifiable in rural areas in developing countries: process of livelihood diversification, or "*productive bricolage*" on the part of the most important actors on the stage – farmers (Batterbury 2001, Netting 1993). *Bricolage*, or mixing and combining activities, is an almost universal response to livelihood pressures, to hazards, and to falling income. The "centrifugal forces associated with occupational experimentation" (Bryceson 2000) are driven by the need for cash as well as food in a globalized world, leading to vulnerability as well as to some new opportunities. Of course, rural households always need to "get by", to reach subsistence thresholds in some way. "Getting by" is a matter of meeting necessities and many of the PRIPODE case studies explored how this is achieved.

But, in addition, many individuals also desire to "get on" and to advance their livelihood prospects or wealth, while escaping poverty or disadvantage.³ Families in Australia, in Burkina, in PNG, and elsewhere are always using new ways to secure livelihoods. Poverty, conflict, environmental disadvantages, or just a desire to experiment, are important forces of innovation. Those that "get on" aspire to greater income or more security, and they tend to have a higher risk threshold and act in a more entrepreneurial way. Early innovators often have the advantage (Toulmin & Guèye, 2005, ML2). Obviously some pre-existing wealth in a household, or luck, cushions the risk of such efforts being unsuccessful. In rural Australia, "getting on" might mean selling some farm holdings that have been in the family for generations, and combining agriculture with tourist ventures, running small businesses, hiring labour or machinery, or taking urban or town employment.⁴ In the Sahel, it may mean sheer opportunism – finding more distant but more lucrative markets for produce, grabbing the benefits accruing from international development projects, borrowing heavily to invest in machinery or tools or seeds, or being an early mover into new cotton production or horticultural production in irrigated areas (ML2, BF5).

2.2. Population and the Environment

Globally, the population threat is receding. The latest assessment by the UN gives a population of 5.9 billion in 1997/99, 7.2 billion in 2015, 8.3 billion in 2030 and 9.3 billion in 2050, constituting a lessening annual growth rate, but with little chance of food security being achieved across many of the regions discussed in the PRIPODE studies because of rising calorific demand in developing countries (see FAO, 2003).

The population-environment relationship (P-E) has dominated analysis of agrarian change for many years. The publication of Malthus's work in the 1790s set out the potentially negative effects of demographic pressure on environments and societies. He described the "trap" of exponential growth in human populations faced with arithmetical growth in food supplies. Ester Boserup's oppositional account of population growth, showing how house-

³ The "getting by" and "getting on" division is simplistic. Others have suggested "enterprising people, money people, stingy people and village people" or defining farmers by their position over a life course (de Haan and Zoomers 2005: 40).

⁴ Non-agricultural livelihoods are defined as those that do not directly involve plant or animal husbandry.

holds innovate most strongly and work harder where there are more mouths to feed and invariant land resources, provided a burst of enthusiasm for anti-Malthusian reasoning. It suggested that farmers "adapt" successfully to pressured conditions of production (*pression créatrice*), and particularly under demographic increase. The relationship she stressed between rising population pressures and intensification of land use while sustaining output, formed the core of subsequent studies of the close relationship between farmer knowledge and husbandry of natural resources (e.g. Netting 1993).

Tiffen *et. al.*'s "Machakos thesis" developed in highland Kenya in the early 1990s tested some of Boserup's assertions, broadly concurring with them. The authors pointed to a positive relationship between regional population growth (from 1930-1990), and an increase in environmental quality over that same time, expressed in terms of species diversity, land cover, land management, and crop yields (Tiffen, Mortimore and Gichuki, 1994; Batterbury & Forsyth 1999). The authors identified human experimentation, shared efforts to restore agricultural terracing, and beneficent aid programs and western education (supported by local non- governmental organizations and the church) as important contributors to productive agrarian landscapes. The same research team has identified similar processes in West Africa. Yet even among the small range of studies I presented at the outset, it is clear that positive feedbacks between population growth and environmental quality relationships are not always synergistic. In particular in Australia and Bougainville "innovation under population pressure" cannot explain all of the local forms of agricultural innovation.

Population densities, the prime variable of interest to rural demographers, are nonetheless important at certain scales. Population growth places pressures on land access, and land is the heart of all farming systems. Providing security over land is vital if "autonomous" intensification is to occur to meet wealth and investment expectations. Without security of land tenure and land access, individuals have to seek other options to meet their everyday needs.

2.3. Agrarian Political Economy – a Different View

Political and economic drivers of change constitute the third major area of agrarian change studies, providing the context in which agrarian livelihoods unfold. For example, the "Machakos thesis", which has been much-discussed by researchers interested in African peasant innovation and farming, did not address very well the broader political economy in which

Akamba households were embedded. The 1980s and 1990s saw the unfolding of structural adjustment loans from the IFIs to the global South, and a market-led search for optimised returns on investment (Bryceson 2000). In this global market, African agricultural exports like cocoa and cotton declined, leading to increased levels of economic migration and a pronounced rural-urban drift in many countries. The benefit of the global availability of affordable foodstuffs, proposed as a benefit of greater market engagement, has not filtered back to the same producers.

This suggests that we need to move beyond the debate between Malthusians and Boserupians to look at the trajectory of political and economic forces that in turn determine, structure, or limit agricultural creativity and "capabilities" (as Amartya Sen terms them). These forces vary across individual farming systems, and they can include severe conflict, resettlement without adequate resources, and coercive labour use (Turner & Brush 1987). The range of livelihood activities varies markedly from place to place, ranging from modern to traditional, high to low income-earning, and from formal to informal. Some of this variation can be explained by these forces, and less so by environmental conditions or demographic variables alone.

The different weightings placed on "drivers" of agrarian change illustrate a changing research foci among scholars. Agrarian change in Northern Nigeria is illustrative. The region's producers of subsistence crops and groundnuts (most for sale) are, for Mike Mortimore, able, agile, inventive, and resilient individuals who shuffle their sometimes limited assets to make a living, combining crops with livestock herding, business activity, and occasional economic migration to sustain their livelihoods under demographic pressure (Mortimore and Adams 1999). They also do well under high population densities, particularly around Kano where intensive cultivation without fallowing has occurred for over 500 years (Mortimore & Adams 2001). The Kano region has experienced change in farming practices largely without the benefit of international development assistance or agricultural extension. Farmers have maintained high agricultural yields through a process of agricultural intensification, despite population densities in excess of 200 people per square kilometre. For Michael Watts, however, British colonialism in northern Nigeria coupled to widespread mismanagement and poor governance, disturbed centuries-old Hausa farming systems and rendered farmers much more vulnerable to natural hazards. In addition the postcolonial Nigerian government has been, for Watts, a kleptocracy, in league with big business and very scared of secessionism (Watts, 1983, 2001). In this climate, Watts sees various millenarian social movements and

widespread corruption accompanying the locally adaptive strategies that Mortimore has correctly identified.

The northern Nigeria debate – theories of human innovation under demographic pressure on the one hand, and theories of human marginalization and profiteering under oppressive or exploitative systems on the other – has not been resolved, in part due to the differing research foci and scales of analysis used by researchers. Both can contribute to an understanding of agrarian landscapes and their social relations, although the same processes do not always manifest themselves in the same regions. One thing remains clear: neoliberal markets now have greater and greater penetration into rural hinterlands. While this may provide opportunities for rural producers (as with cotton in West Africa) it simultaneously increases competition with more distant producers to capture a share of local demand (as with manufactured cotton clothing imports into West Africa).

3. Livelihoods Thinking

Livelihoods approaches, introduced in the last section, study what rural household members actually *do*.⁵ Livelihood "strategies" are what people do to make a living, and they can be broken down in different ways, for example to show how livelihood priorities change over a life course in different "styles and pathways", even within the same community or geographical region (de Haan & Zoomers 2005). "Sustainable Livelihoods", a term that was elaborated by Scoones (1998) building on the work of Gordon Conway and others (Chambers & Conway 1992), emphasises the long-term durability of a given livelihood system. The approach gives recognition to vulnerability, the political economy of agrarian change, and the different institutions through which livelihoods take place, such as land tenure arrangements, gender relations, and customary obligations. Demographic variables are part of the long-term context guiding decisions in an individual house-

⁵ In simple terms, "livelihoods" may be defined as the capabilities, assets (stores, resources, claims and access) and activities required for making a living. A 'sustainable livelihood' is one which "can cope with and recover from stress and shocks, maintain and enhance its capabilities and assets and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term" (Chambers & Conway 1992).

hold, but are seen as "mediated" by individual or collective decision-making.

The implications of "livelihood" as a conceptual tool are widely debated. The approach was particularly popular with development agencies in the 1990s (including the UK's DfID, and the international NGO, CARE) and has spawned many research studies.

The pace of agrarian change in many of the regions studied by PRIPODE researchers implies that important livelihood adaptations are being made by individuals, households, and communities. These take different forms (Table 1). In particular, economic diversification is rapidly occurring in several of the PRIPODE cases studies, notably in Niger (NE1), Burkina Faso (BF5) and Mali (ML2).

Table 1 Local adaptation strategies – responses to transitions

Transition	Components	Arbiter of change
Land use intensification	Labour / capital intensification, crop-livestock integration, natural resource management, tree husbandry	Population density, technologies / tools, inputs, investment resources, knowledge of new practices, value of products, enabling climatic conditions and the biophysical environment
Economic diversification	Monetization / commoditization, income diversification and the informal sector, employment (local or and non-local), population mobility	Knowledge of financial opportunities, urbanization, markets, transport, finance, time and labour availability. Individual assessments of risk, social networks, displacement, intra-household dynamics
Institutional change	Internal or externally imposed changes in law, or custom, social differentiation by gender, class, ethnicity, wealth, new division of labour, development interventions, government incentives	Institutional reform, wealth distribution, gender and age roles, access to education and knowledge, availability of social welfare from government, NGOs or other organisations to cushion risky opportunity-seeking
Demographic transition	Fertility behaviour, demographic interventions (family planning, etc.),	Mortality and health, fertility preferences, migration, perceptions of poverty and wealth, actual poverty and wealth, the social importance of childrearing

Adapted from Mortimore (1998: 184)

Several PRIPODE studies hint at changing household responses along these lines. *Productive bricolage*, and diversification, can lead to increased social differentiation, gender differences in livelihood dynamics, as well as broad household change. These changes can be positive or negative, but their adoption certainly challenges the classical forms of "peasant" behaviour

(farming households rooted in place, in exploitative social relations) and the social and cultural norms associated with this form of livelihood.

Bryceson (2000) has identified the specific responses made by households under processes of de-agrarianisation and livelihood diversification. These tendencies include the long or short-term "separation" of family members in order to insure incomes; a reduction in the size of extended families; the weakening of "dependency ties" and thus greater autonomy within families; and the use of matrilineal ties by women to improve their income security (Bryceson, 2000). She finds that in Africa, 55-80% of household incomes she surveyed in the late 1990s were "non-agricultural". This is a remarkably high figure, given that Africa is still predominantly rural. She offers a threefold typology of African rural space⁶:

Rural world/Monde rural A: Characteristically, subsistence and near-subsistence agriculture, for example in remote parts of Africa. Non-agricultural activities in remote areas are primarily about providing local services, as well as some handicraft activities, catering to a restricted local market. Regions have limited penetration by modernist forms of technical change, but state-sponsored agricultural extension may reach some farmers. Agro-pastoral and pastoral societies also retain a focus on localized trade. See, for example, rural Mozambique.

Rural world/Monde rural B Regions that have had colonial histories of active participation in labour migration and/or agricultural commodity production over decades. Migration and trade have been the most important livelihood activities. There is a possibility of new transgenic crops and other technical innovations reaching commodity-growing areas, but urban growth may also absorb some of the intensely farmed peri-urban areas.

Rural world/Monde rural C – Labour reserves: areas that have been historically dominated by rural labour out-migration and the *absence* of peasant agricultural commodity production. The non-agricultural earnings are transferred back to remaining rural households. See in particular study ZA1 in South Africa, and, increasingly, parts of the Sahel and North Africa.

⁶ Adapted from Bryceson (2000) and Toulmin and Guèye (2005). It should be noted that there are plenty of worldwide exceptions to these categories. Areas of former commodity production can depopulate, for example, and agricultural frontiers like Lao PDR have their own dynamic. The Vietnam study, VN6, develops different, locally appropriate classifications.

4. Livelihood Change around the World - Pressures and Trajectories

4.1. Rootedness? Sustained by Movement?

The PRIPODE studies generally confirm that agricultural societies have deep roots in tradition, and are attached to territory. This may seem counter-intuitive given the diversification and migration trends alluded to above, but it is not. Agricultural knowledge *resides in places (milieux)* (Netting 1993, Richards 1985). The intensification of agricultural or agro-pastoral production is deeply rooted in place. Yet, if we compare the cases of Morocco and Lao PDR, we can see how attachment to place also must involve *movement*. In the former case (MA2) people leave to seek less punishing livelihood conditions and income opportunities, and in Lao, there is a movement from highland border areas close to China to lowland locations, driven by modernizing influences like roads, new settlements, and central government encouragement (LA1). Territorial attachment is increasingly to these new locations.

In Lao PDR (LA1), then, agricultural knowledge moves with people and adapts to new circumstances. Livelihood diversification has included the reorientation of cash crop production (away from opium, grown in the highlands, towards lowland rubber plantations and contract sugar cane sold in China). Opportunities for contract labouring have been exploited. Democratic growth in lowland areas has been accompanied by increased densities. Conversion to rubber plantations in these lowlands has increased the percentage of private tenure over formerly communal land, leading to conflicts. In Morocco (MA2) however, out-migration has been sufficient to depopulate Souss-Massa, where local environments are extremely degraded. *Argania spinosa*, a multifunction tree species unique to this area, is fast disappearing. This is largely due to economic realities in the lowlands, but in the mountains, a "polyvalent" livelihood system is still practiced, with less immediate threats to the species. Here agro-pastoralism predominates along with irrigation, and population densities approaching c 50 persons/sq. km. in places. Out-migration is very high, some of it to neighbouring Agadir but often further away and into the European labour market as well. Out-migrants generally seek non-agricultural work, often ending up in cities or in manual waged labour. Their "adaptive path" is therefore very different to the types of systems describe in Mortimore's studies south of the Sahara (Mortimore & Adams 1999, 2001). There is also a strong argument that the

"globalization and modernity" of Souss-Massa is being hastened by migrant remittances and the occasional return of these migrants with their new knowledge and aspirations.

One of the most marked examples of "livelihood adaptations" in the PRIPODE studies is trans-Saharan movement, usually among young males, seeking work on the Saharan edge or eventually in Europe. While West Africa has seen pulses of migration in a North-South trajectory usually allowing Sahelian peoples access to coastal labour markets, today's "globalization" of the Sahel has led to some extraordinary knowledge and skills developing among young out-migrants travelling very long distances – they are developing new links, new entrepreneurial knowledge in North Africa and further afield, and new migration possibilities (DZ1).

In all of these cases, then, rootedness and movement reinforce each other. The tensions between them constitute the new reality for millions of rural households, across the PRIPODE studies and elsewhere.

4.2. The Fragility of Commodification

Most of the PRIPODE case studies also suggest that economic and political change is forcing people to change their lifestyles and productive activities. Economic change and the globalization of markets may, indeed, be a contributing factor to demographic increase or decrease. Certainly commodity markets lead to important land use changes, usually towards permanent agriculture and often reducing the land cover of communal lands and tropical forests as this happens (in the south-east Asian case studies in particular, as well as the Amazon).

In Mali (ML2) in the Sahel, political change (decentralization) and local development (through support to cotton production) has also led to social differentiation, favouring some groups over others. But the real problem discovered in ML2, also reported in several other studies, is fragility of cotton markets, coupled to rising land pressures and arguments over land "loaned" for exploitation. This has impelled movement into a new cotton frontier, where autonomous intensification is less advanced than in the areas where it has been grown since the early 20th century. As Toulmin and Guèye (2005) report, animal traction for cotton production is generally afforded by middle income and richer farmers, leaving poorer households to

rent ploughs, often too late in the season to plant cotton on time. This reinforces rich-poor difference.⁷

4.3. Environmental Change

Ecological variables structure several of the case studies, reflecting the fact that "population-environment" linkages formed part of the remit of the PRIPODE studies, and the P-E relationship has been widely debated in literature on agricultural productivity, demography, and food security. Farmers in the case study zone from central Madagascar (MG2) are some of the poorest described in the various PRIPODE studies. The vulnerabilities they face are environmental (weather conditions, drought, cyclones etc.), insecurity resulting from lack of assured land tenure, and a lack of financial capital, resulting part from a fear that they will be unable to reimburse any loans offered for development or credit. A period of collectivist politics (1970-80) has also held back individual innovation. Despite knowledge of in-situ intensification techniques including composting, farmers reported they do not have the resources to begin using these (MG2). This suggests Boserupian synergies between demographic growth and investment are yet to be achieved, despite evident population pressures and diminishing land resources. In general, a staged model of adaptive behaviour is evident here (MG2), as Mortimore suggests in other regions of Africa. Firstly, limited in situ intensification of crop production is practiced. Secondly, faced with pressures, households diversify revenue streams and take on paid labour where possible. Lastly, there is some evidence that poor young couples are keen to reduce birth rates, because of their poverty. In addition, the presence of a major road (a form of "physical capital" in the livelihood model) provides new opportunities for trading and movement. Population-environment relationships, while important, cannot be understood in isolation from other drivers. Land pressures, for example, also lead to social conflicts.

The northern part of Togo (TG4) has long had total cultivation of its agricultural lands, and a population density of approximately 80 people per sq.

⁷ Although I have not focused on it in this essay and neither have the PRIPODE authors, it is worth remembering that commercial agriculture is undergoing significant changes with the arrival of genetically modified crops, engineered for certain qualities like pest resistance.

km. (with an average of 112 people per sq. km. in high density areas away from tsetse-ridden valleys, etc). Fallowing the land is now extremely rare, so the region has already seen the early stages of intensification but without a major urban settlement in its midst (as in the Kano close-settled zone of Nigeria and other more densely populated areas of Africa). Poor soil fertility and fuel wood cutting has meant sorghum and maize stalks are often used for firewood. There are major efforts at agricultural extension funded by the European Community and the NGO RAFIA among others, but inhabitants already practice high levels of out-migration, moving to the south and especially to Lomé. In addition, during the troubled political moments of the 1990s (not discussed in TG4), they travelled north to Burkina Faso and Ouagadougou. This exodus reduces local food demands but diminishes agrarian labour and knowledge pools, suggesting the region is located, like the Mossi Plateau of Burkina Faso, in the median-population density category – rising populations, a tendency towards permanent cultivation, some investment in new modes of agrarian production, but little economic "development" or economic advance. The argument that the region is "stuck" en-route to intensification is a plausible one, given that over half the population is in an economically precarious situation and with low socioeconomic indicators (TG4). Yet the region is also subject to regional disadvantage. It is not a politically favoured part of the country, Togo has seen significant governance challenges, and it has significant ethnic conflicts, despite good links in the Savane region to three neighbouring countries through which a variety of illegal and legal trading relationships and population movements have been established. All of these things have to be factored into a "livelihood model" for northern Togo, and in discussions about its future.

4.4. The Exceptional Sahel?

The Sahel has 22% of the population and 15% of the land area of sub-Saharan Africa and is thus important in development terms (Mortimore 2007). It puzzles scholars of Africa, because it seems to rebound from crises, and it meshes well with regions beyond its borders through markets and through labour movements (Batterbury & Warren 2001). And yet, a standard argument has been that ecological degradation is severe. This was evident to observers of the drought-prone regions in the 1970s, and during a second run of drought years and hardship in the 1980s. Technical interventions designed to boost agricultural and rangeland productivity and to usher in "modern" resource-use techniques have been combined with centuries-

old agricultural knowledge. Research into Green Revolution-style higher yielding food grains and pulses, improvements in infrastructure and distribution, and major funding for "natural resource management" have characterised the Sahel (Sanders *et al.* 1996). A tide of development projects, their technical apparatus, and their ideas and vision, has washed up upon an unrelenting but not impervious shore of time-honoured beliefs, political hierarchies, and livelihood systems (Batterbury 2005a,b).

Farmers in the two zones studies in the Niger PRIPODE study (NE1) departed on migration as a result of environmental factors, namely poor crop yields – and unlike in my own studies near Hamdallaye (Batterbury, 2001), most of their earned income seemed to be reinvested in agriculture in their host communities, but without noticeable effects on poverty alleviation. The structural context of this region explains why: poor governance, a lack of possible sources of wealth accumulation locally, limited services and markets, some crop-livestock integration options, and a very unyielding climatic regime.

Scholars of Sahelian development are currently excited by evidence of "Greening" visible in NDVI (Normalized Difference Vegetation Index) satellite data that measures biomass. This suggests positive human modification of landscapes that previous generations have regarded as highly eroded by over-cultivation and grazing. Parts of the Sahel in Niger (Maradi), and central Burkina Faso are showing unexpectedly high biomass levels, resulting from the regeneration efforts of Nigerien farmers, and long-term, large scale landscape restoration efforts on the Central Plateau of Burkina (Reij *et al* 2005). While the former region has experienced autonomous intensification in response to changes in land tenure/rural code laws that now permit ownership of trees, the latter are "project induced", i.e. they have resulted from international development support. *Diguettes* (stone lines built across contours), built with project assistance in Burkina Faso, are hybrid structures reflecting both indigenous and external processes of experimentation and inputs of labour and time (Atampugre 1993). The driving forces behind their construction have less to do with population growth than with the desire of external actors to do something about extensive land degradation and "desertification" on the Central Plateau (Batterbury 2005a). Yet it is important to recall they don't solve major agrarian problems. The massive movement of labour around and out of the Sahel, that residents of the Central Plateau have developed as an economic response to local poverty (particularly to land shortage), is partially driven by lack of access to land for younger household members. As Lesley Gray and

others have shown, the absence of young and middle aged men that leave to find incomes elsewhere, affects the gender balance of those that remain, such that women performed most household duties, but without the ability to 'own' land (Gray 2002, Bryceson 2000).

5. Concluding Thoughts

Agrarian change is a function of several different drivers that, in the livelihoods model, structure every day life and decision-making. These decisions have real and visible effects, acting recursively to change the structural conditions of farming, mediated by social institutions. But also, I have identified different starting points for understanding agrarian change: the nature of the society in question, its population-environment relationship and pressures on resources, and its history of engaging in commodity markets, levels of technology, and other aspects of political and economic history.

The first conclusion is that it is important to consider all of these areas of research, if we are to inform better policies for rural producers in developing countries. Previous aid to small farmers, like "one size fits all" agricultural extension strategies and technology packages, never recognized diverse livelihoods, or sometimes discounted peoples' own histories as unimportant to the desired goal of productivism. Such efforts were bound to fail. Instead, support to livelihoods needs a rather different set of policy measures, largely to do with continuing to allow human capacities to find their own solutions, while stepping in to minimize the worst excesses of disadvantage, greed, and grievance (Scoones & Wolmer 2002). Rural development interventions of various forms have played a role in all of the places discussed in this paper – especially in Madagascar and in Mali, and across the Sahel in general, given its place in popular consciousness and the depth of the earlier famine episodes. But formal "development" assistance is a rare thing, confined in space and time, and the subject of considerable debate and contestation. Much rural "development" will continue to occur without the assistance of international NGOs, or even governments.

Secondly in terms of methodology to study agrarian change, the PRIPODE studies offer a marvellous resource, one of the most comprehensive examinations of P-D-E relationships conducted in the last few years. The teams have operated with a range of approaches. The majority are survey based, while some have done comparative work or more detailed local histories as well. Multi scaled work on livelihoods are essential as "political ecologists" like

Piers Blaikie have identified (Blaikie 1985, Zimmerer 2007). To "ground in place and territory" is an important starting point for what is becoming one of the key methodological challenges for the natural and social sciences – tracking and understanding very complex assemblages of land use and social change in places strongly affected by economic, climatic, and social changes. Multi-sited ethnographies based on particular communities - and PRIPODE has only made a start here - allow the tracing of migrants and the exploration of livelihoods and their links to "place".

Thirdly, the argument that population growth (or decline) influences livelihood decisions has some merit, as I have shown. But the link between population intensity and agriculture intensification, measured in term of land use or labour input, is still unclear. That relationship is mediated through other factors, such as land availability, levels of available technology (agricultural and otherwise) and the presence or absence of different exit options for rural households. Where land is ample, there can still be intensification, or indeed higher stocking rates for livestock. But as the agricultural frontier becomes closed, as is happening in West Africa today and fallowing or rotation options diminish under population growth or near to cities, residents pursue a range of strategies.⁸ At higher population densities we find more intensive use of inputs to maintain soil fertility – "working the land harder" (Mortimore and Adams 1999). This does not halt out-migration, but it provides a firm subsistence basis to extend into it.

Fourthly, as PRIPODE studies have shown, communities typically gravitate towards dual-demand production to meet both subsistence and market, *where such market possibilities are available* (Turner *et. al.* 1993). Farmers can alter production, migrate, or change their main livelihood activities, but few households abandon agricultural activities entirely. Of course, with the agricultural labour market seriously perturbed today and commodities from developed countries often disadvantaged on the world stage, their choices are more constrained - certainly more constrained than proponents of the free market for agriculture suggest. Dual-demand farming systems have, however, emerged over time in the West African Sahel, across much of East Africa, in the lower density areas in South Asia, and some other less developed areas of

⁸ For example in Burkina Faso, societies with approx. 50 persons per sq. km. have reacted to such pressures by diversifying their livelihoods, but with limited land use intensification at the same time. In Niger, the major response by Zarma farmers has been to conduct business or to migrate in search of paid work (Batterbury 2001).

S.E. Asia like East Timor, where subsistence needs have always had to come first because of decades of conflict and an absence of regional markets.

Fifth, poverty, environmental degradation, and social and economic change interrelate in complex ways that provide lessons of hope as well as despair for rural areas. There are always opportunities as well as new vulnerabilities. Human adaptations to social and economic change still take place where systems appear on the surface to be vulnerable or unsustainable. Farmers who invest in business activity or practice out-migration, are doing so for similar reasons to those who stay on the land and intensify production. Both are responses to vulnerability and risks, and in doing so they are juggling the mental, physical, and economic assets that they control in their individual livelihood systems.

In conclusion, livelihood systems are in constant flux. The rural places described in the PRIPODE studies, and their people, continue to thrive, despite the many hardships undoubtedly experienced by their residents. It is unfortunate that analysts and well-meaning policymakers cannot resist the urge to tinker with rural livelihoods, to design new crop mixes or land uses on their behalf, or to point to emerging crises that may affect them in the future. Local land users have already proven they can fight back against particular forms of environmental degradation as well as marginalization in a growing world economy. The future effects of the former are unknown: the latter is unlikely to loosen its grip on them. Rural households are also fighting back against the social and economic factors that impel them to seek a *bricolage* of activities other than agriculture. For some, diversification and a post-productivist livelihood is desirable: for others its necessity is a source of regret. Of course "people do make their own livelihoods, but not necessarily under conditions of their own choosing" (De Haan & Zoomers 2005:43), but human adaptations to risk and *productive bricolage* are endless, and both have to be assessed in terms of their place within livelihood systems that may not be based on local resources and capital alone.

If anything, it is by building local institutional capacity – and developing an enabling policy environment that permits the accumulation of a range of capital assets – that people will forge their own paths, sometimes with outside assistance. This is particularly important as households juggle remittances, new knowledge, and spatial movements in the new world neo-liberal order.

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List of PRIPODE's Teams

Code	Country	Principal investigator	Research programme
BF5	Burkina Faso	OUATTARA Ardjouma	<ul style="list-style-type: none"> • Mobilité spatiale de la population : nécessité de développement et risques de dégradation de l'environnement dans l'Est et le Sud-Ouest du Burkina.
CG1	Congo	DEFOUNDOUX Hyacinthe	<ul style="list-style-type: none"> • Brazzaville, pauvreté et problèmes environnementaux.
CM1	Cameroon	NGWE Emmanuel	<ul style="list-style-type: none"> • Les déterminants socio-environnementaux de la morbidité diarrhéique des enfants de moins de 5 ans en milieu urbain camerounais : les villes de Ebolowa et Maroua.
DO1	DominicanRep.	MEYRELES Lourdes	<ul style="list-style-type: none"> • Environmental degradation, disaster risk construction and vulnerability in the Caribbean.
DZ1	Algeria	SPIGA Sassia	<ul style="list-style-type: none"> • Circulations migratoires transsahariennes et développement urbain au Sahara Central.
GH1	Ghana	ANARFI John K.	<ul style="list-style-type: none"> • Population, development and environment in metropolitan Accra: a two-phase study.
LA1	Laos	THONGMANIVONG Sithong	<ul style="list-style-type: none"> • Study on dynamic resource use and land cover transition in Northern Laos.
MA2	Morocco	CHARAF Mohamed	<ul style="list-style-type: none"> • Interaction entre migrations internationales, croissance urbaine et développement durable au Maroc.
MG2	Madagascar	RAKOTONDRAFARA Charles	<ul style="list-style-type: none"> • Perception de l'environnement et attitudes des paysans malgaches face aux projets de développement rural.
ML2	Mali	CISSE Ibrahima	<ul style="list-style-type: none"> • Croissance démographique, développement de la culture du coton, et gestion durable des ressources naturelles en zone Mali-Sud.
NE1	Niger	BANOIN Maxime	<ul style="list-style-type: none"> • Quelles transitions agraires en zones semi-arides à forte croissance démographique : le cas du Niger.
NG1	Nigeria	OKUNEYE Peter Adebola	<ul style="list-style-type: none"> • Rural-Urban migration, poverty and sustainable environment: the case of Nigeria.

Code	Country	Principal investigator	Research programme
NG2	Nigeria	OLOMOLA Aderibigbe	<ul style="list-style-type: none"> Population dynamics, real sector development and environmental consequences: a comparative analysis of the Nigerian agricultural and industrial sector.
PL8	Palestine	JAD E. Issac	<ul style="list-style-type: none"> Policy tools towards sustainable land use and urban environmental management at municipal level under a transitional political context-the case of Bethlehem district, Palestine.
TG4	Togo	VIGNIKIN Kokou	<ul style="list-style-type: none"> Peuplement, mobilité et développement dans un milieu défavorisé : le cas de la région des savanes au Togo.
UG1	Uganda	MUWANGA James	<ul style="list-style-type: none"> Population, development and environment linkage at farm level in Uganda.
UG4	Uganda	NYAKAANA Jockey Baker	<ul style="list-style-type: none"> Urban Development, Population and the Environment in Uganda. The Case of Kampala and its Environ.
VN5	Vietnam	Le Van Thanh	<ul style="list-style-type: none"> Développement économique, urbanisation et changements de l'environnement à Hô Chi Minh Ville, Vietnam : interrelations et politiques publiques.
VN6	Vietnam	DAO Thê-Tuân	<ul style="list-style-type: none"> Développement économique et problèmes de l'environnement au Vietnam dans un contexte de forte pression démographique.
ZA1	South Africa	TWINE Wayne	<ul style="list-style-type: none"> Household characteristics in rural South Africa: implications for natural resources and development.