**Department for International Development**

**Strategy for Research on Renewable Natural Resources**

# NATURAL RESOURCES SYSTEMS PROGRAMME

## *FINAL TECHNICAL REPORT*[1]

DFID Project Number

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Project title

**Environmental policies and livelihoods in the forest margins of Brazil and Ghana**

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Organisation

The University of Reading

NRSP Production System

Forest-Agriculture Interface

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## *Contents*

**Abbreviations and Acronyms**

| ***Brazil*** | |
|---|---|
| AMCAT | Associação dos Municípios Consorciados do Araguaia e Tocantins<br>Association of Municipalities of Araguaia and Tocantins |
| BASA | Banco da Amazônia<br>Bank for Amazonia |
| CPATU, EMBRAPA | Centro de Pesquisa Agroflorestal da Amazônia Oriental<br>Centre for Agroforestry Research of Eastern Amazonia |
| EMATER | Empresa de Assistência Técnica e Extensão Rural<br>Agency for Technical Assistance and Rural Extension |
| EMBRAPA | Empresa Brasileira de Pesquisa Agropecuária<br>Brazilian Corporation for Agricultural Research |
| FETAGRI | Federation of Agricultural Workers (Pará State) |
| FINAM | Fundo de Investimentos da Amazônia<br>Investment Fund for Amazonia |
| FUNAI | Fundação Nacional do Índio<br>National Foundation for Indians |
| IBAMA | Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis<br>Brazilian Institute for the Environment and Renewable Natural Resources |
| IBGE | Brazilian Institute of Geography and Statistics |
| IDESP | Institute for Economic and Social Development of Pará State |
| INCRA | Instituto Nacional de Colonização e Reforma Agrária<br>National Institute for Settlement and Agrarian Reform |
| MIRAD | Ministério da Reforma e do Desenvolvimento Agrário<br>Ministry for Agrarian Reform and Development |
| MST | Movimento Sem Terra<br>Movement for the Landless |
| PEMA | |
| POEMA | Programa Pobreza e Meio Ambiente na Amazônia<br>Poverty and Environment in Amazonia Programme |
| Real R | Brazilian currency. In 2002, US$1 = R2.9, July 2002 |
| SAGRI | Secretaria Executiva de Agricultura, Governo do Pará<br>Secretariat for Agriculture, State of Pará |
| SECTAM | Secretaria Executiva de Ciência, Tecnologia e Meio Ambiente, Governo do Pará<br>Secretariat for Science, Technology and the Environment, State of Pará |
| SUDAM<br>ex 2001: ADA | Superintendência de Desenvolvimento da Amazônia<br>Agência de Desenvolvimento da Amazônia<br>Superintendency/Agency for Development of Amazonia |

| ***Ghana*** | |
|---|---|
| AR | Ashanti Region |
| BAR | Brong-Ahafo Region |
| Cedi | Ghana's currency. In 2001, during the survey, US$1 = Cedis 7,000. |
| CFC | Community Forest Committee |
| CFMU | Collaborative Forest Management Unit, RMSC< FSD |
| CR | Central Region |
| CRI | Crops Research Institute |
| CSIR | Council for Scientific and Industrial Research |
| DA | District Assembly |
| DEMC | District Environmental Management Committee |
| DFO | District Forest Officer |
| EPA | Environmental Protection Agency |
| ER | Eastern Region |
| FC | Forestry Commission |
| FD | Forestry Department |
| FSD | Forest Services Division, FC |
| ha | hectare |
| ITTO | International Tropical Timber Orgnaisation |
| LI | Legislative Instrument |
| ME | Ministry of Energy |
| MEST | Ministry of Environment, Science and Technology |
| MLF | Ministry of Lands and Forestry (and Mines) |
| MLGRD | Ministry of Local Government and Regional Development |
| MoFA | Ministry of Food and Agriculture |
| NEAP | National Environmental Action Plan |
| NGO | Non-Governmental Organisation |
| NRMP | Natural Resources Management Programme |
| NTFP | Non-Timber Forest Products |
| RMSC | Resource Management Support Centre, FSD |
| SRA | Social Responsibility Agreement |
| TUC | Timber Utilization Contract |
| WR | Western Region |

## 1. Executive Summary

The project was intended to lead to a better understanding of how policies to manage natural resources affect the livelihoods of people in the forest-agriculture interface (FAI), thus allowing policy to be designed that conserves resources while enhancing welfare and reducing poverty in this zone.

Two country cases were studied: Brazil and Ghana. In each case environmental policy at national and sub-national levels was reviewed. The livelihoods of people living in the forest margins, in a cluster of three communities in south-eastern Pará State of Brazil and in four communities in Ashanti and Brong-Ahafo Regions in Ghana, were investigated through both participatory exercises and household surveys. The impact of environmental policy was either studied directly through interviews, or the potential impact inferred from a comparison of the requirements of occupations and the policy instruments in existence.

In both cases, there was a wide range of policies and programmes affecting the use of natural resources, designed to conserve them. Most of this had been formulated centrally, some with donor encouragement and financing. But little of this policy was effectively implemented in and around the communities studied. Even when, as in the case of Ghana, there were local norms to conserve the environment, these were almost always set aide when they conflicted with economic activity. In both cases, some administrative responsibility for these policies had been decentralised to local government. But the local bodies lacked the resources, capacity and experience either to implement national environmental policy or to produce local by-laws appropriate for their jurisdictions.

Hence the impact of environmental policies on livelihoods was limited. That said the existence of rules and regulations that could be applied sporadically, often in campaigns, constituted a hazard to some local occupations, a potential source of corrupt payments, and risked bringing national regulations into disrepute. In large part, trying to apply policy made centrally had failed. One implication is that, difficult though it may be, developing environmental policies from the local level is a better way to get policy that respects local circumstances and, equally, will be respected by local communities.

In Ghana these lessons were fed back to policy makers at regional and national level through meetings and personal interviews. Response was good, partly since the government was also committed to re-invigorating decentralisation. The results have not yet been fed back in Brazil, although the context of new administrations at national and state levels in early 2003 following the elections of late 2002 makes this a good moment to do so.

The project has fulfilled its indicators of purpose in Ghana, but the work of dissemination has still to be done for Brazil, and for the wider development community.

Making full use of the results of this work would ideally involve collaboration with researchers on other NRSP projects (above all R7870 and R7957) carried out in areas close to the two study areas who have similar or complementary results from their work.

Some contribution has been made to the NRSP purpose, but to have a substantial impact, the results of this work need to be brought together with those from other complementary projects.

## 2. Background

This project contributed to the goal of: *'strategies to secure the livelihoods of poor people dependent on agricultural systems near the receding forest margin developed and promoted.'*

The margins of tropical forests in the developing world are characterised by, on the one hand, concern over loss of tropical forest, and on the other by the struggle for livelihoods and profits in areas that are often remote and only recently have seen human settlement on a substantial scale.[1]

Tropical forest, especially primary cover, is being lost rapidly owing almost entirely to human action. Those who contribute to forest clearance include a diverse mixture of groups, including longstanding hunters and gatherers, poor settlers looking to farm in the forests, and rich settlers and corporations who see in the forests opportunities to profit from logging, plantation agriculture, cattle ranching and mineral extraction.

By and large, the benefits of removing forest both for the value of the timber and for the value of the cleared land seem, in most cases, to outweigh heavily any benefits to forest conservation.

Thus forest is cleared, often removed entirely and quickly, a process that is only limited by two factors — the access to capital and labour of those using the forests, and the cost and difficulty of reaching the market. But there is a third, crucial factor, and that concerns the returns to activities in the economy not linked to the forests. If people can make a better living outside of the forests, they generally do so and leave the forests undisturbed.[2]

For many users the cost of land is only that of the investment in clearing. It is not then surprising that when forests are relatively abundant, and labour is relatively scarce, use of the cleared land is often extensive. Low-input farming systems are common, including extensive grazing of livestock. As population builds up and land ceases to be quite so abundant, land values rise and create considerable windfall gains to those holding the land. More intensive land use systems then become more attractive.

The literature on the record of environmental policies in the forest is relatively scarce (see Annex C). There are many studies that discuss what policies might be used to correct the kind of outcomes reported above, and especially how to conserve forest and improve the livelihoods of the poor. These are essentially normative. But there are few studies that report the impact of policies designed specifically to protect the environment of the forests and their margins on those making their livelihoods in these areas (Brown & Rosendo 2000 is an exception).

Governments and international agencies have varying policy objectives for the forests, including, on the one hand, making use of them to promote economic growth, produce exports, and create jobs, and, on the other, controlling the rate of their clearance and conserving forests for the various public goods that tropical forests offer. These include environmental services in soil and water conservation, stocks of biodiversity, climate

[1] Much of this is documented in a review of the literature on policy affecting tropical forests (Wiggins 2000).

[2] Indeed, they may do more. Urban dwellers who are comfortably or well off, and who do not depend on the forests for their livelihoods, often set a premium on the maintenance of the forests — valuing them for their environmental functions, amenity, and for their existence value as havens of wildness.

regulation; as well as recreation, opportunities for scientific study, the values of all future such uses and cultural heritage. In most cases, although the values of these public goods is clear, they are also diffused over space and time, and often non-monetary. In contrast the financial gains from forest clearance are immediate, specific and tangible. Policy-makers in relatively poor countries thus struggle to give conservation equal consideration with economic use. Worse, some of those who gain directly from clearing forests are both politically influential and capable of bribing policy-makers.

Government policy has, then, more often than not, encouraged forest removal. Governments have facilitated access to forests through road building and settlement schemes, they have encouraged the conversion of the forest through grants, tax breaks and cheap credit, and they have made formal property rights in land contingent on forest conversion.

In the process, the rights to use of forests by indigenous forest residents have been set aside in favour of the economic interests of powerful actors. Worse, conserving some portions of forest in national parks and conservation areas has sometimes involved taking away the use rights of longstanding users of the forests.

Well-meaning efforts to encourage more intensive use of forest lands through technical innovation have often foundered on a misunderstanding of economic motivations. In particular, it has not been appreciated that it is usually labour and capital, not land, that are scarce in the forest margins. So, for example, multi-storey cropping systems that mimic the previous forest ecology typically offer lower returns to labour and capital than do extensive ranching. That they generate higher returns per hectare, as well as offering environmental benefits, is, in most cases, irrelevant to the land users.

All in all, the combination of economic motivations and government policy with a narrow perspective has all but guaranteed two significant problems: the loss of tropical forest and the alienation and marginalisation of the poor dwelling in and around the forest margins.

This, then, is the context of this research, designed to examine the policies intended to conserve the environment in the forest margins, and to assess their impacts on the livelihoods of the poor living in such areas.

The demand for this work came directly from NRSP, that is a concern within the donor community. It was unlikely to come from the communities living in the forests themselves, since the pay-offs to having better information for policy-making are intangible, arise in the longer run, and are difficult to appreciate from the village level. Although more likely, it was still not that likely to arise from national policy-makers. Under pressure from international donors both to alleviate poverty (for example, drafting PRSPs), and to conserve the environment; and equally pressed by national priorities to create jobs and to allow business to make profits, it was unlikely that they would put priority on a study to examine the intersection of environmental and poverty concerns. Hence in this case it was appropriate that this question be set by the donor, as a matter of the wider public interest and to reflect the interest of stakeholders who are not only poor, but also lack political power and voice in debates.

## *3. Project Purpose*

The project was intended to lead to a better understanding of how policies to manage natural resources affect the livelihoods of people in the forest-agriculture interface (FAI), thus allowing policy to be designed that conserves resources while enhancing welfare and reducing poverty in this zone.

Specific indicators included:

- By Sept/Oct 2000, specific policies and linked livelihoods in three contrasting forest-agriculture interface communities identified and plan for quantification and assessment made, in each of the study areas of eastern Amazonia and southern Ghana.
- By January 2001, continuous discussion of findings and policy implications with key policy-making institutions initiated.
- Lessons and guidelines on policy-livelihood linkages and policy implications prepared and promoted within Brazil, Ghana and more widely by end of September 2001.

In the case of Ghana, most of this was done, and largely to schedule although the promotion of findings only took place in May 2002.

But the work in Brazil was seriously and repeatedly delayed due to a variety of factors: most recently the difficulties of conducting policy-focused research when elections at both local government and national levels were taking place (October 2002). Thus the Brazilian report has been finished now only in March 2003. That means that it was not been possible (yet) to synthesise the lessons from the two cases and disseminate findings beyond the two national contexts.

## *4. Outputs*

**Research findings**

### *Brazil*

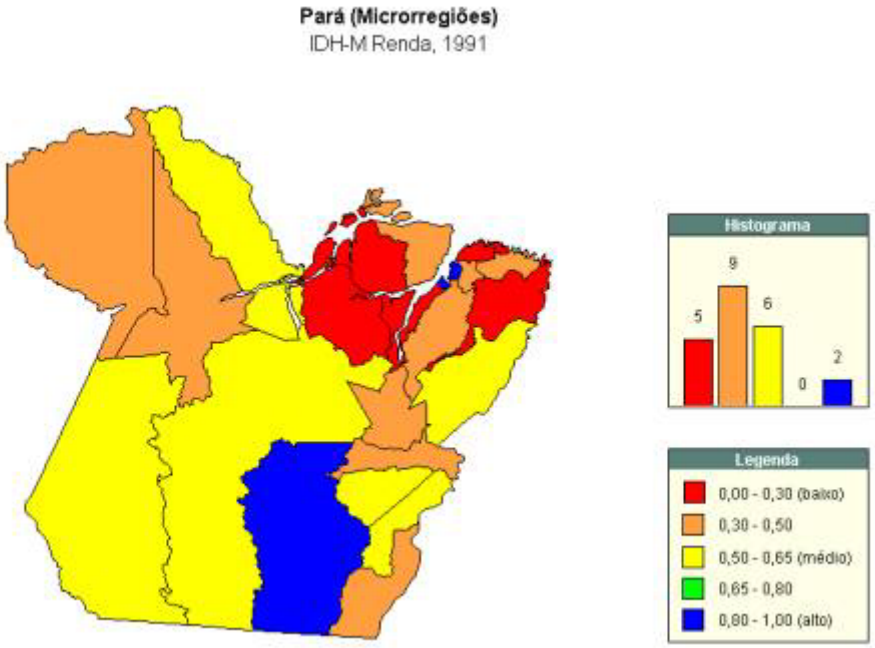
#### *Context*

The study area is located within the State of Pará in northern Brazil, a huge area (more than 1.2M $km^2$) that makes up much of Eastern Amazonia.

Most of the State consists of tropical forests. The wood industry constitutes about 13% of the regional gross product of Amazonia: most logging activities are concentrated in the State of Pará, which retains about 95M ha of potentially commercial upland forest (Verissimo & Souza Junior 1997, Thompson & Yared 1997). Most of the wood produced goes to the national market. Forest use in the State of Pará, however, has been mainly primary extraction with a low level of further processing.

South Eastern Pará corresponds to 24% of the State territory, incorporating several micro-regions and 35 municipalities. It is currently the third largest sub-region in the State in terms of population and is noted for its important mineral resources (Serra de Carajás) with deposits of iron, gold, manganese, copper, bauxite among others. Since the 1970s mineral exploration and cattle ranching alongside logging have changed the face of the region, physically and socially.

**Map 1: State of Pará – Micro Regions and Human Development Index**




In Eastern Amazonia, specifically in the agricultural frontier zones of southern Pará, the landless and small producers migrate in search of new opportunities and a piece of land. However, without access to capital and other inputs they can only survive from their agricultural production or forest products with difficulty. The migratory/itinerant agriculture, based on clearing and burning, accelerated after 1987 after pressure from strategic land occupations encouraged by MST (Movimento Sem Terra) and responded to by INCRA. Between 1987 and 2001 in this region 292 Settlement Schemes were approved, involving 45,028 families and an area of 3.5M ha (INCRA).

*Policies*

In the 1980s, before Rio 1992, a tentative environmental alternative was emerging in Brazil (based on earlier work done by NGOs). This alternative presented a critique of policies adopted in the earlier period which stressed development and modernisation. In the 1970s there were US$5 billion of subsidies given to cattle farmers alone: rubber tappers, small farmer colonisers, inland fisheries all were struggling to secure or retain access to natural resources. Since Rio 1992 attitudes have shifted and Brazil has put in place legislation and policies including those to protect the environment in Amazonia.

Since 1992 the government has developed a National Environmental Programme, a National Biodiversity Programme and a National Integrated Policy for the Legal Amazon. Internationally, there is a G7 Pilot Programme to Protect the Brazilian Forest.

The State Policy on the Environment (PEMA) was issued in 1995 and among its six priority programmes was 'Sustainable development of rural communities'.

A process of decentralisation of power was set in motion under the Constitution of 1988: however the majority of municipalities still depend on the Federal Government for funds so this process will take time and is uneven. The Integrated National Policy for the Legal Amazon, issued in 1995, requires major participation from local populations, municipalities and state governments.

Important policy instruments for development in the region include the following: Fundo de Desenvolvimento de Amazônia (FDA) created in 2001 from FINAM has mainly a financial and fiscal role to encourage development; Fundo Constitucional do Norte (FNO) created in

1988 provides credit to small and mini producers (74% of loans 1989–2000 were to such producers). The Programa Nacional de Fortalecimento de Agricultura Familiar (PRONAF) created in 1996 provides an integrated service to family farms in settlement supported by INCRA. Most farmers and ranchers (76.7%) are small by Brazilian standards — under a hundred hectares (IBGE 1996).

Environmental policies (at Federal, State and municipality levels) have been integrated to an extent by the Lei dos Crimes Ambientais (1998) which sets out regulations and sanctions for activities harmful to the environment. Implementation of legislation (licensing, monitoring and control) despite recent changes is still largely centralised at Federal level. At the State level SECTAM is the coordinating and controlling agency for the protection/conservation of the environment (1998).

**Table 1: Environmental and Natural Resource Policies in Pará State**

| ***Policy*** | ***Specific aspects*** | ***Possible areas of Impact*** |
|---|---|---|
| State and Federal Environmental Legislation | Zoning and land use<br>Conservation areas<br>Control and monitoring of land use and industries<br>Impact Assessment and Licensing | Use and access to land including primary or secondary forests<br>Control of deforestation process through controls over logging, mining,<br>Control of pollution<br>Impact of large projects and infrastructural development (industry and roads) |
| Land Reform Policy | Land ownership and re-distribution of lands<br>Land ownership and title<br>Access to support programmes and infrastructure | Encourages migratory cycles of landless and squatters who open up new forest areas in expectation of settlement<br>Certain kinds of land use are promoted to guarantee land title as 'productive'<br>Clearing and deforestation of forest |
| Forestry Legislation | Legislation for access and management of forests<br>Control and monitoring of forestry management plans, reforestation, logging industries, burning and transport<br>Control of National Forest Areas and conservation areas | Regional capacity to manage and supervise forest activities<br>Existence of clandestine or illegal operations<br>Restrictions and controls related to access and/or use of resources (burning, indigenous areas) |
| Rural Credit | Access to credit,<br>Setting interest rates and establishing priority activities or priority groups<br>Administration of and support to credit programmes | Promotion of certain agricultural or productive practices<br>Credit for machines & equipment<br>Access linked to land title and form of social organization |
| Regional and State Level Development Policies | Fiscal incentives<br>Priorities for productive activities and infra-structure | Promotion of predatory or sustainable activities, employment, value added production, regional markets/export |

| | | |
|---|---|---|
| Agricultural Assistance and Extension | Promote land use and agricultural practices appropriate for the region | Use of technologies and agricultural inputs<br>Expansion of certain crops within Amazon ecosystems,<br>Promotion of alternative farming systems |

*Livelihoods*

The study area spreads around the borders between the Municipalities of Eldorado de Carajás and Sao Geraldo de Araguaia — see Map. Though the town of Novo Paraiso is situated much closer to the centre of Eldorado where major traffic tends to flow, it is politically part of São Geraldo de Araguaia, which was emancipated from Xinguara in 1988 and belongs to the South Eastern Para Meso-region and Micro-region of Redenção in the Sate of Para (IDESP, 1996: SECTAM 1999).

**Map 2: Study area location, Pará**


The area is formed by the town of Novo Paraiso and surrounding fazendas (ranches) and the communities of Santa Ines, Pau-Ferrado, Lagoa do Ouro, Pau-Preto, Tona, Sao Felix, Fazenda Limão, Tauba and Bamerindus. These surrounding nucleos are socially and economically connected to the town of Novo Paraiso. Novo Paraiso farmers own lands in the surrounding areas, and those who live in these surrounding communities cattle ranching often have jobs in commercial or manufacturing sectors in the town.

The settlement of Novo Paraiso was initiated to overcome the uneven land distribution in rural areas as part of the agrarian reform process. However, the results of the study show that the community is going through the same process of land concentration that results in the creation of large ranches and provides the rationale for continuation of the agrarian reform process. So the cycle continues.

The majority of migrants to this region came attracted by the forest, but with the dream of becoming 'landowners', increasing their land, settling, and benefiting from land distributions. From its beginning the region has been a "frontier" land where productive resources are disputed by peasants, loggers, landowners and, more recently, by charcoal makers. However, the process of settlement on the frontier in Pará follows a somewhat different pattern: one part of the forest is cleared for sale of timber; the land is burned and planted for annual crops (rice, corn, beans, manioc), at times for perennial crops or pasture. This area, on average

three ha, is generally used for a period of 1 to 2 years depending on the fertility of the soil. A new area is opened, leaving the first as a fallow area and so begins the process of land rotation. Those farmers who succeed in establishing a herd of cows as a strategy of securing economic stability can then engage in off farm activities having one or two persons to look after 50–60 head of cattle. Those who cannot reach this stage are obliged to sell or rent their land to cattle ranchers or other small producers who can expand their pasture and herds.

**Map 3 – Vegetation Change in the Brazil Nut Polygon – 1984 to 1997**


Source – Embrapa 1997

**Table 2: Quantification of the Vegetation and Land Use in the Brazil Nut Polygon, South Eastern Pará, 1984/1997**

| | *1984* | | *1997* | |
|---|---|---|---|---|
| ***Vegetation Class*** | ***Ha*** | ***%*** | ***Ha*** | ***%*** |
| Primary Forest | 791,773 | 84 | 316,672 | 34 |
| Secondary Vegetation 1 | 29,543 | 3.1 | 116,67 | 12 |
| Secondary Vegetation 2 | 11,797 | 1.25 | 142,598 | 15 |
| Pasture 1 | 49,901 | 5.3 | 112,882 | 12 |
| Pasture 2 | 37,813 | 4.0 | 231,491 | 25 |
| Exposed or burnt Lands | 12,285 | 1.3 | 12,797 | 1.3 |
| Water | 7,705 | 0.8 | 7,705 | 0.8 |
| *Total* | *940,818* | *100* | *940,818* | *100* |

Source: EMBRAPA Amazônia Oriental 1997

According to IBGE in 1986, the vegetation of the area was classified as 'dense forest'. The area was covered with a natural forest of predominantly Brazil nut stands. In 1996, the vegetation was re-classified as 'dense forest with mixed secondary forest'.

In the same year the cutting trees of brazil nut trees became illegal. However, as Novo Paraiso is situated on the periphery of the municipality, the intensive projects of cattle ranching with systematic deforestation continue with neither adequate monitoring nor implementation of the regulations. As the result, the vegetation of the study area is now classified mainly as 'unproductive pasture' (EMBRAPA 1999.)

*Population*

Population of the study area is growing and transient. Through the land reform settlement called 'Grotão dos Caboclos' of MIRAD, initially 656 families settled in the area and in the beginning of the 1990s, about 150 families were living in the town of Novo Paraiso (POEMA, 1994). A survey by the Ministry of Environment in 1996 gives the number of families of the town of Novo Paraiso as 230.

Today, according to this research, there are already more than 800 families settled in Novo Paraiso with an average family size of 5. The community of Novo Paraiso and surrounding areas have already a large enough population to be 'emancipated', that is to form a new municipality.

As the community itself is a settlement of the colonization policy of the Brazilian government, the population mainly consists of migrants from other states. The main migratory routes are shown in the following table.

Route 1. Northeast(CE, MA, PI, AL, BA, PE, PL) – Sao Geraldo do Araguaia – Novo Paraiso.

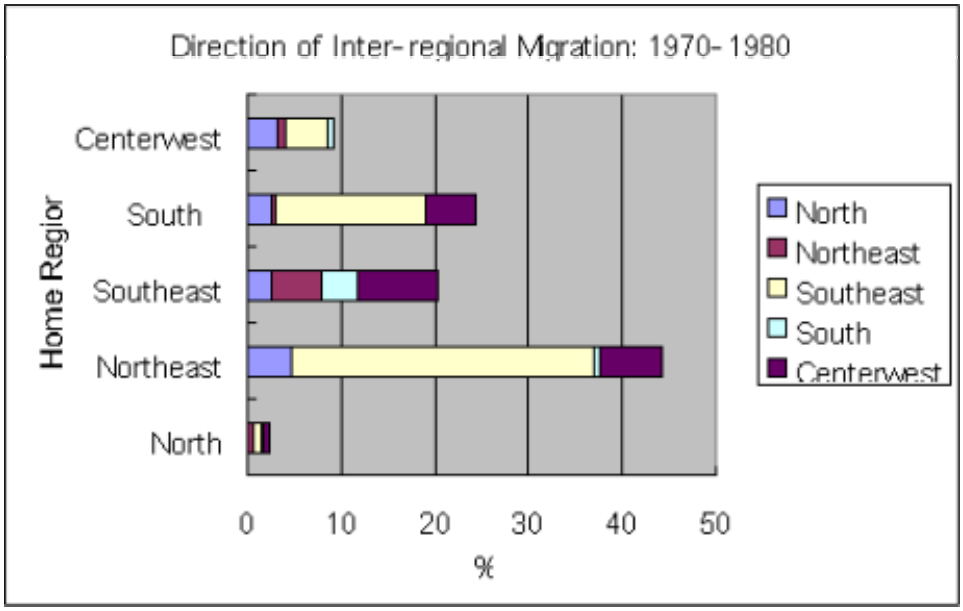
Route 2. Northeast – Centre west (GO, TO) – Sao Geraldo – Novo Paraiso

Route 3. Northeast – Carajas, Serra Pelada – Novo Paraiso

Route 4. Northeast – Maraba – Eldorado – Novo Paraiso

Route 5. South-southeast – Centre east – Sao Geraldo – Novo Paraiso

**Figure 1: Migration routes to the Study Area**




***Economic activities***

Employment in the community includes seasonal work in the logging company and sawmill, on construction sites, and as hired labour for clearing land for ranches. As a result of this diversification, estimation of household income along with the migration process has become complicated.

**Table 3: Occupation Classification (total=315)**

| ***Males (over 15 years old: total=168)*** | | ***Females (over 15 years old: total=147)*** | |
|---|---|---|---|
| ***Category*** | ***Contents*** | ***Category*** | ***Contents*** |
| Self-employed: Farm (Full-time 36) | Production (36)<br>Cattle 34 | Self-employed: Farm (0) | 0 |
| Self-employed: Non-farm (32) | Commerce (7)<br>• Butcher/ Pharmacy 2<br>• Bar/Restaurant 3<br>• Retailer 2<br>Service (17)<br>• Carpenter/Blacksmith 8<br>• Construction 2<br>• Mechanic 2<br>• Motorbike taxi 4<br>• Repairman 1<br>Rural Intermediary (8)<br>• Cattle trader 1<br>• Chainsaw worker 5<br>• Rice mill 2 | Self-employed: Non-farm (8) | Commerce (4)<br>• Bakery 2<br>• Bar/Restaurant 2<br>Service (4)<br>• Laundress 2<br>• Sawing/embroidering 2 |
| Hired work (67) | Farm hired work (22)<br>• Cowboy 1<br>• Rural labourer 21 | Hired work (16) | Farm hired work (1)<br>• Rural labourer 1<br>Rural Industry (4) |

| | | | |
|---|---|---|---|
| | Rural Industry (33)<br>• Factory worker2<br>• Milkman3<br>• Sawmill 28<br>Commerce (3)<br>• Supermarket 3<br>Service (9)<br>• Driver 2<br>• Guard 2<br>• Mechanic 3<br>• Representative/ Town councillor 2 | | • Factory worker 2<br>• Sawmill 2<br>Commerce (6)<br>• Deposit selling 3<br>• Supermarket 3<br>Service (5)<br>• Cook 1<br>• Health care worker 1<br>• Housemaid 3 |
| Education (2) | Teacher 2 | Education (6) | Secretary 2<br>Teacher 4 |
| No job (31) | Pensioner (5)<br>Student 23<br>Unemployed 3 | Others (117) | Pensioner 6<br>Housekeeping 75<br>Student 29<br>Unemployed 7 |

The striking feature is that only 58, roughly one third, of the men, and just one woman, work full time in agriculture. Logging provides another 33 jobs for men.

**Table 4: Average Age, Average Income, and Average Years Spent in the Village of Novo Paraíso in Each Occupation Classification, Males and Females (Total=315)**

| | *MALES (168)* | | | *FEMALES (147)* | | |
|---|---|---|---|---|---|---|
| | ***Average Age*** | ***Av. Years in Novo Paraíso*** | ***Average Monthly Income (R$)*** | ***Average Age*** | ***Av. Years in Novo Paraíso*** | ***Average Monthly Income (R$)*** |
| Self-employed: Farm | 36.7 | 6.1 | 287.5 [1] | - | - | - |
| Self-employed: Non-farm | 36.7 | 4.0 | 198.6 | 41.6 | 4.1 | 92.5 |
| Hired work | 32.6 | 4.1 | 249.5 | 31.2 | 4.4 | 124.9 |
| Education | 30.0 | 6.5 | 151.0 | 28.0 | 5.3 | 239.0 |
| Others | 25.6 | 4.7 | - | 30.3 | 3.9 | 3.9 |
| Total | 32.9 | 4.2 | 237.5 | 30.9 | 4.0 | 152.2 |

**Table 5: Characteristics of Farm and Non-farm Population -Males (Total=168)**

| | ***Number (%)*** | ***Average age*** | ***Years in Novo Paraiso*** | ***Average Monthly Income (R$)*** |
|---|---|---|---|---|
| Farmer | 34 (20) | 34.0 | 4.1 | 180.7 |
| Rancher | 14 (8) | 43.3 | 5.6 | 412.0 |
| Logger | 39 (23) | 33.5 | 3.1 | 298.7 |
| Rural worker | 21 (13) | 31.7 | 2.5 | 121.8 |
| Non-farm worker | 60 (36) | 30.0 | 5.5 | 175.4 |
| *Total* | *168 (100)* | *34.5* | *4.2* | *237.54* |

**Table 6: Profile of the population interviewed**

| ***Description*** | ***Lagoa do Ouro*** | ***Fazenda Bamerindus*** |
|---|---|---|
| 1. Average age, years | 49 | 44 |
| 2 – Place of Origin | | |
| • 2.1 – North Eastern States | 30% | 53% |
| • 2.2 – West – Central States | 70% | 47% |
| • 2.3 – Amazon States | | |
| 3 – Time of residence in the region | | |
| • 3.1 – Less than 10 years(decade of the 90s) | 82% | 60% |
| • 3.2 – More than 10 years | 12% | 40% |
| 4. Motives for Migration to the region | | |
| • 4.1 – Access to better land | 23,5% | 50% |
| • 4.2 – to improve their livelihood | 47% | 33,3% |
| • 4.3 – to work with livestock and ranching | 5,9% | 10% |
| • 4.4 – to work in logging | 11,8% | - |
| • 4.5 – Other reasons | 11,8% | 6,7% |
| 5. – Present Living conditions | | |
| • 5.1 – Consider that conditions have improved since coming to the region | 76% | 70% |
| • 5.2 – Consider that living conditions have stayed the same | 24% | 30% |
| 6. Participation in producers associations | | |
| • 6.1 – Producers affliliated to associations | 29% | 63% |

**Table 7: Lot size and means of acquiring lots**

| ***Details*** | ***Lagoa do Ouro*** | ***Fazenda Bamerindus*** |
|---|---|---|
| 1. Size of Lots | | |
| • 1.1 – smallest and largest lot in (acres) | 7 ½ a 58 | 5 a 40 |
| 2 Means of acquiring lots | | |
| • 2.1 – occupying the land | - | - |
| • 2.2 – buying | 82,3% | 33,3% |
| • 2.3 – Occupying and then buying | 11,8% | 13,4% |
| • 2.4 – Occupying then becoming registered as a settler by INCRA | 5,9% | 53,3% |

The majority of residents in these two settlements come from outside the area. Most small farmers have acquired their land by purchase after occupation. Access to financial help continues to be a problem for a significant number.

In relation to environmental policies and farming practices, farmers acknowledge that burning causes damage, however 66% continue to burn without the required permit from IBAMA. NGOs working to explain the processes and the legislation have also had limited impact on changing behaviour.

Individual statements and photographs taken by residents present a contradictory picture. On the one hand, the forest is mentioned or appears in 40% of interviews as a problem. Some photos show the forest destroyed and the difficulties of living from agriculture. On the other hand, photographs of other farmers also show productive, successful pictures of vegetables, beans, chickens as signs of pride and their achievements.

Photographs of the sawmill and charcoal production did not appear in any resident's choice of image. However, the Table shows the significance of both in employment generation. While young men earn a reasonable wage at the sawmill, charcoal workers are often children and very poorly paid, as well as suffering appalling work conditions. While young sawmill workers hope to follow the dream and acquire land, charcoal workers barely earn enough to survive.

Field research demonstrated the rapid pace of change in the frontier zone of South Eastern Pará and the inability of fiscal authorities to implement regulations in such a fast-changing society.

Policies relating to environmental/forestry/livelihood issues in Amazonia were identified and synthesised and their impact in relation to livelihoods investigated.

**Table 8: Land use: forested areas, management practices, frequency of the use of fire and livestock activities**

| ***Details*** | ***Lagoa do Ouro*** | ***Fazenda Bamerindus*** |
|---|---|---|
| 1. Land use and forested areas | | |
| • 1.1 – Cultivate perennial crops | 23,5 | 63,3% |
| • 1.2 – Cultivate temporary crops | 100 | 90,0% |
| • 1.4 – Lots with forest reserves | 47,0 | 46,6% |
| 2 – Management practice and average size of area cleared and burned for agriculture and/or pasture | | |
| • 2.1 – Producers who clear a strip of land to control burning | 100% | 100% |
| • 2.2 – Producers who have not cleared and burned land or have burned less than one acre in the last year | 52,9% | 10,4% |
| • 2.3 – Producers who burned 2 acres in the last year | 23,5% | 34,5% |
| • 2.4 – Producers who burned 3 acres in the last year | - | 17,2% |
| • 2.4 – Producers who burned 4 acres in the last year | 5,9% | - |
| • 2.5 – Producers who burned 5 acres in the last year | 11,8% | 24,1% |
| • 2.6 – Producers who burned more than 5 acres in the past year | 11,8% | 13,8% |
| 3. Livestock production | | |
| • 3.1 – Producers who own cattle | 58,8% | 73,3 |
| • 3.2 – Average number of beef cattle per property | 52 | 40 |
| • 3.3 – Average number of dairy cattle per property | 26 | 18 |
| • 3.4 – Average production of Milk per property, litres | 32 | 38,3s |

**Table 9: Opinion, level of knowledge and practices of producers in relation to environmental legislation**

| *Details* | *% responses* |
|---|---|
| 1. Request authorization from IBAMA for clearing or burning | |
| • 1.2 – Make requests | 21,3% |
| • 1.2 – Sometimes make requests | 12,8% |
| • 1.3 – Do not make requests | 65,9% |
| 2. Main points of contacts for producers regarding laws related to burning | |
| • 2.1 – Farmers | 34,7% |
| • 2.2 – neighbours, members of Associations | 22,4% |
| • 2.3 – Other people (loggers, etc.) | 2,0% |
| • 2.4 – No effort to contact others is made on these questions | 32,7% |
| • 2.5 – Nothing is known about the question | 8,2% |
| 3. Spontaneous opinions on the use of burning | |
| • 3.1 – Harmful and causes reduced yields over time | 53,2% |
| • 3.2 – Helps to produce more | 21,3% |
| • 3.3 – Necessary as without burning production is low | 25,5% |
| 4. Spontaneous opinions about the presence of logging companies | |
| • 4.1 – Responsible for the poor state of roads | 42,5% |
| • 4.2 – Devastate the environment | 36,5% |
| • 4.3 – Do not bring any benefits | 8,5% |
| • 4.4 – Do not fulfil agreements and/or cause problems | 12,8% |

### *Conclusions*

Southern Pará is marked by very recent settlement, mainly of poor people from Northern North-Eastern and central Brazil. For most of the residents it is not their first experience of occupation of settlement. Some came to find jobs in mining or logging, but most came to find land: to open farms in the forest, or on recently cleared land, growing their own food crops and then converting fallowed land into cattle pastures on which they can gradually build up herds that can generate cash incomes. A minority of settlers have capital and can rapidly open or acquire enough fallow land to run cattle ranches of several hundred hectares or more. They benefit from the presence of the small farmers or landless who clear land and can often be persuaded to sell fallow land for low prices, as well as providing a supply of cheap labour.

The limits to this process are defined by access to land from a road — recent research shows that three-quarters of deforestation between 1978 and 1994 occurred along the major highways in Amazonia — and the lack of capital and credit that prevents many settlers from opening more forest and converting it to cattle pasture. Access to credit and phasing of credit supply are currently under consideration.

Government policy for natural resource conservation is quite comprehensive. The old policies of the 1970s and 1980s that stimulated migration and forest clearance through grants, credit subsidies, and tax breaks have been much reduced. But although the laws, rules and regulations on land use may exist, implementation is weak and legislation is poorly understood and therefore largely ineffective.

Decentralisation of policy to municipal level is taking place, but local assemblies lack capacity to implement environmental policy. Stronger local leadership and channels for popular participation are needed as well as adequate resources for implementation.

People are ill-informed on environmental issues and local NGOs have been active in education and raising awareness.

Given the lack of enforcement of regulations in southern Pará, the impacts of environmental policy on local livelihoods are very limited. Proposals currently at a pilot stage include discussions on integrated planning schemes to develop urban nuclei in the rural area together with the restoration of forest frontiers and social investment. Grotão dos Caboclos provides an example of an area which might benefit from such an integrated approach to rural-urban planning.

## *Ghana*

### *Context*

Southern Ghana consists mainly of areas that would naturally be tropical forests. But the extent of forest has been much attenuated over the last 150 years or so, as increasing areas of forest have been converted to farms, some for the subsistence of the growing population, others to grow cash crops such as oil palm and cocoa. Some of the forest has been set aside by legislation as forest reserves and conservation areas. But much of the rest of the landscape now shows a mosaic of cleared plots and secondary forest regrowth.

Land tenure is largely under usufruct from communal land ownership administered by local chiefs. Consequently it is difficult for individuals to amass land beyond the area considered sufficient to grow food and earn some cash, and that which the household can clear and maintain. Thus farms are typically one to two ha: farms of over ten ha are rare, and large estates are almost unheard of.

The main larger-scale activity is logging, carried out by a plethora of companies of varying sizes. Cutting is reasonably well controlled in the forest reserves from which around half the timber originates. But off-reserve the regulations are widely flouted as loggers strike deals with chiefs and landholders, regardless of official regulations. Thus the total annual cut is estimated to be two to three times what is sustainable and off-reserve forests are rapidly being lost.

### *Policy*

There is no shortage of policy that aims to exercise stewardship of resources on behalf of society as a whole, both to stimulate human development and to conserve the environment (see Tables 1 to 3). For example, as concerns the forested areas of southern Ghana, the country has policies for forestry protection and sustainable logging. It has measures to conserve wildlife and biodiversity. There are rules and regulations governing land use, such as burning and cultivation close to water courses. And there are policies governing the safe use of pesticides and water pollution.

**Table 10: Typical policies affecting natural resources in southern Ghana**

| *Type of policy* | *Examples* |
|---|---|
| Land use regulations in rural arms | Rules about farming within specified distances from watercourses, burning bush, about the application of pesticides and fertilisers In certain areas. |
| Restrictions on access and exclusion of access rules | Rules that prevent people from having access to designated lands, or from using them In particular ways, or from settling on land. |
| Rules on the disposal of wastes and effluents | Restrictions on the drainage of chemically- and biologically-contaminated waters into watercourses and groundwater, on the dumping or burning of waste material. |

| | |
|---|---|
| Incentives to encourage particular uses of land | Subsidies, grants, tax exemptions given for using land in a particular way (e.g. planting trees, maintaining livestock stocking densities, using organic chemicals, etc). |
| Rules and refutations may be differentiated by area and land type, and by season. | |

**Table 11: Key organisations that formulate and implement natural resources management policy in southern Ghana**

| ***Ministry*** | ***Sub-entity*** |
|---|---|
| Min. Lands, Forests & Mines (MLF) | Includes: Lands Commission Forestry Commission<br>Includes DFID-funded Forest Sector Development Programme |
| Min. Environment, Science & Technology (MEST) | MEST is responsible for the: Environmental Protection Agency<br>The EPA is responsible for Environmental Regulation and ensuring implementation of government policies on the environment EPA advises ministries on standards and guidelines. |
| Min. Food & Agriculture (MoFA) | Divided into Directorates: Policy Planning, Monitoring and Evaluation; Statistics, Research and Information; Crop Services; Plant Protection and Regulatory Services; Extension Services; Women in Agriculture; Animal Production and Health; and Agricultural Engineering Services.<br>Irrigation Development Authority (IDA) is an autonomous institution within MoFA with responsibility for the policies and development of watercourses for agricultural use. |
| Min. of Energy (ME) | Policies cover commercial fuels, but not 'traditional fuels', such as charcoal. |
| Min. Local Government & Regional Development (MLGRD) | Oversees regional, district and local government. In particular, MLGRD arranges for scrutiny and legal appraisal of District by laws, prior to their publication in the official gazette — at which point they have legal backing. |
| Regional | Regional Co-ordinating Council presided over by a Regional Minister coordinates the work of the regional offices of the central ministries and agencies. |
| District Assemblies (DA) | The DAs consist of an elected assembly, including some nominated members, and Is headed by a District Executive (a central government nominee). The Assemblies have the power to levy some local taxes, pass by laws and implement some projects. They are also meant to coordinate and supervise the work of central government agencies in their Districts. By law, each DA has a set of sub-committees. One of these is concerned with environment health. The District Environment Management Committee (DEMC), set up under the GERMP in the early 1990s, is not however a legal requirement. |

**Table 12: Key policy documents for natural resource management**

| ***Date*** | ***Title*** | ***Notes*** |
|---|---|---|
| 1990 | Control and Prevention of Rush f res Law (PNDCL 1 92) | Shifted emphasis from punishment of offenders to regulation and prevention |
| 1993 | Forestry Commission Act (Act 453) | Established the Forestry Commission, superseded by 1999 Act |
| 1994 | Ghana National Environmental Action Plan (NEAP) | Environmental Protection Council |
| 1994 | Environmental Protection Agency Act (Act 490) | Establishes the EPA. |

| | | |
|---|---|---|
| 1994 | Forest and Wildlife Policy | Ministry of Lands and Forestry Signals commitment to forestry that serves more than just the timber industry |
| 1994 | Trees & Timber Amendment Act (Act 493) | Provides for the bi-annual renewal of property marks and the use of levies and other forest fees in the regulation of the timber trade |
| 1995 | Interim Measures to Control Illegal Timber Harvesting Outside Forest Reserves | Introduces the farmer's right of veto and payment of compensation for crop damage. |
| 1995 | Vision 2020, MoFA | Sets out alms of agricultural policy. |
| 1996 | Forestry Development Master Plan | Drawn up by Forestry Commission |
| 1996 | Pesticides Control and Management Act, Act 528 | All pesticides must be registered and classified. All those dealing In pesticides must be licensed. |
| 1996 | Water Resources Commission Act (522) | Establishes the Commission. |
| 1997 | Timber Resources Management Act (547) | Introduces Timber Utilisation Contracts (TUC) for any timber harvesting, and obliges concession holders to negotiate with local communities to produce Social Responsibility Agreements (SRA) |
| 1997 | Accelerated Agricultural Growth & Development Strategy, 1997 | MoFA |
| 1998 | Timber Resource Management Act | |
| 1998 | Timber Resources Management Regulations, LI 1649 | Covers the procedures for the grant of timber rights, sets timber stumpage fees and contract area rent, and the registration and use of chain saws. |
| 1999 | National Land Policy, (ex. Draft Land Policy 09/08/96) | Lands Commission, Ministry of Lands and Forestry Sets out the intent of fostering equity and security of access to land, and its sustainable management |
| 1999 | Environmental Assessment Regulation, U 1652 | Defines those activities for which an environmental permit is needed [does not cover farming of areas under 40 ha], and the procedures necessary |
| 1999 | Forestry Commission Act, 1999<br>(NB: This replaced the proposed 1998 Forest Service Bill) | Establishes the current FC with its four Divisions. |
| | National Action Plan on Desertification | |
| 2001 | Crop Protection Policy, first Draft Sept 2000; revised May 2001 | |

Source: Project work as well as Kotey et al. 1998

Despite the wide range of policy objectives for environmental conservation, when policy is considered in terms of means, and above all, in terms of effective implementation, those policies that have an impact at field level are relatively few. This is because there are only a few agencies that have the staff and resources to implement policy, the main agency being the Forestry Commission. Indeed, with only a little simplification, it seems that just two areas of policy have substantial impact at field level.

One concerns commercial forestry. Much attention and effort has been directed to most aspects affecting the commercial timber industry, from the designation of forest reserves, to the allocation of timber contracts, and to monitoring and controlling the cutting, transport and

sawing of logs. A large fraction of the resources of the Forestry Commission is devoted to these tasks.

The other area concerns local rules on resource use, such as those on bush burning, protection of river banks, and the use of dead wood to make charcoal. These may be incorporated in national policy statements, but most of them also reflect local concerns and local codes of practice. National declarations of intent aside, few if any additional resources are provided by central government to develop such codes or to implement them. They are left as matters for the District Assemblies. These bodies lack staff and budgets to enforce District by-laws and so depend mainly on the efforts of village bodies.

There appears to be widespread popular consent within villages to such rules, but in practice they are often breached whenever economic imperatives bind. Thus, for example, when vegetable producers need to irrigate their crops by hand, they often cultivate on river banks. Charcoal producers may use dead wood when readily available, but in the absence of this, they use live wood. When land needs to be cleared, the bush may be burnt without the necessary safeguards and precautions. Some measures for forest protection, such as the ban on use of chainsaws to cut lumber, are also often ignored when they conflict with economic priorities.

Despite frequent pronouncements during the 1990s in favour of local participation in making policy affecting the use of natural resources, as seen, for example, in the 1994 Forest & Wildlife Policy, policy-making for the environment in southern Ghana remains highly centralised. The announced and intended moves towards local community engagement have been tentative.

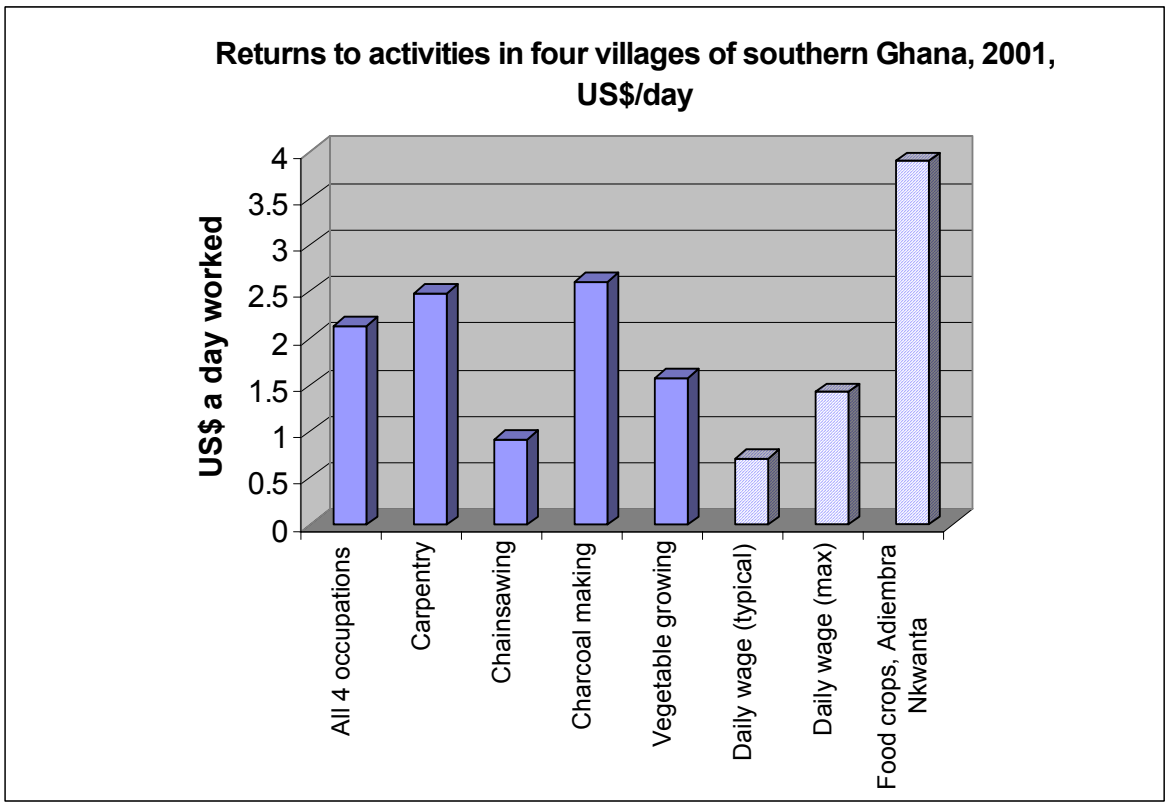
One particular policy initiative, that of community forest committees (CFC), was studied in more detail. A pilot of 13 such CFC in three Districts was run by the Collaborative Forest Management Unit (CFMU) of the Forestry Commission during a three-year ITTO sponsored project to develop and help institutionalise collaborative forest management systems.

The evaluation showed that CFCs appear to have gained community acceptance, even if they lack legal backing. As with so many local organisations, there are the seemingly inevitable problems with representation, accounting and honesty in some cases. The roles of the CFCs are not always clear: whether they are meant to represent local opinion in policy-making and negotiations, or to be active promoters and implementers of forest-based projects, or both. The experience recorded above seems to show the CFCs to have made most progress with the latter role, rather than the former. This is worrying, since the idea of strengthening local governance of forestry was a prime motive to establish the CFCs. Even with the latter (i.e. productive function), there are problems with marketing seedlings and running nurseries on commercial lines.

### *Livelihoods in the Forest Margins and the Impact of Environmental Policies*

Livelihoods are built almost entirely on the use of local natural resources in farming, forestry, charcoal production, and hunting and gathering. Other activities were carried out either infrequently or else occupied only a small amount of time. Surprisingly slight involvement in labouring on other farms and in other occupations was found.

The key occupations that appear vulnerable to current environmental policies are carpentry, chainsaw operations, charcoal burning, and irrigated vegetable growing. In the four villages surveyed there was widespread involvement in one or other of these occupations. That said, for most households, these occupations took up only a fraction of their labour time. There are some signs that the young tended to be more engaged than the older cohorts, and that men depend on these jobs more than women do.




Returns to the four key occupations varied greatly, see Figure 2, but with a median return of Cedis15,000 a day (US$2.15), these compared reasonably well to other possibilities. They were for the most part better than daily wage rates in the villages, and not far short of the estimated returns to growing food crops seen in the case of one village. Above all, the four occupations do not seem to be so badly rewarded as to be occupations of last resort.

**Figure 2: Returns to activities in four villages of southern Ghana, 2001, US$/day**

Looking at the impact of environmental policy on these and other activities, there were mixed reports as shown in Table 4.

**Table 13: Impacts on livelihoods of environmental policies**

| Affected occupations | Policy and impact<br>[Village in question in parentheses: AA=Aboabo, AN=Adiembra Nkwanta, BO=Botenso, TO=Tanoso] |
|---|---|
| | **Ban on chainsawing for timber** |
| Chain saw operators | Some lost income as services no longer required; some operators moved into farming while others have emigrated. Loss of Income reduces capital for farming. But chainsaws still much used for cutting timber and lumber. [AA]<br>Chainsawlng of timber and lumber apparently ceased in TO. |
| Wood carriers | Lost wages from transporting sawn timber from fields to assembly points. [AA] |
| Sawn wood dealers | Lost income from reduced sales [AA] |
| Carpenters | Lack of sawn wood drives up price for furniture, doors, window frames — and hence:<br>Less demand for construction works (new buildings), less demand for furniture [AA]<br>In TO, carpenters have moved from using bush-cut lumber to sawmill wood |

| | |
|---|---|
| | (often rejects). |
| Masons | Less demand for services as mud houses (the most common) unable to stand rains for long without roofing; less people building because of higher prices for roofing timber [AA] |
| Charcoal makers | Production cut drastically, Incomes down, as left-overs from felled trees no longer available for charcoal production. [AA]<br>Little impact: chainsaw operators from Ejura visit to fell trees. [AN]<br>Little impact only 2 men so employed. [BO]<br>Overall, reports that wood is Increasingly difficult to find and that live wood is used. |
| Consumers of timber (Building, furniture) | Higher prices for products [AA] |
| | **Bush fire control** |
| Farmers | Loss of crops prevented [AA], [AN], [BO]<br>Improved soil fertility through organic matter conservation [AA], [AN], [BO] |
| Hunters | Less game caught since setting of fire makes catches easier (little adverse impact — few hunters and bullets also very expensive) [AA] |
| | **Riverain protection** |
| Farmers | [Farmers with fields by rivers] Little impact [AA]<br>Little Impact: a traditional practice [AN], [BO] |
| | Safe use of pesticides |
| Vegetable producers | Little impact — few people, no knowledge [AA]<br>Little impact follow old practices, no education [AN], [BO], [TO] |
| | Confinement of livestock |
| Livestock keepers | Little impact — livestock not important [AA], [BO]<br>Little impact livestock not contained [AN] |

Source: Initial reconnaissance, survey data

Although the impacts reported were diverse, most policies had not had a substantial impact, with the exception of the 1998 ban on using chainsaws to cut commercial lumber. But even this measure seems to have had only a short-lived impact in reducing jobs in chainsawing and pottering, and in pushing up the price of lumber and timber in the domestic market, to the detriment of carpenters and their customers. Subsequently, the evidence suggests that chainsawing continues where it is an essential component of rural livelihoods — as in the cases of cutting trees for carpentry lumber in Aboabo or in sawing timber to be made into charcoal in Adiembra Nkwanta. This pattern of continuity in defiance of policy seems reflected in the wider economy: supplies of chainsaw lumber carry on flowing to rural economies and the national market at volumes similar to those preceding the ban.

Hence the main finding in this study is that environmental policy has not had much impact on livelihoods in the forest margin communities, largely since so little policy is effectively and consistently implemented or enforced.

### *Conclusions*

Does it matter what the impacts of environmental policy may be, when the policy is barely implemented at village level? It does, for the following reasons. First, while policy is on the books but not enforced, it brings policy and government into disrepute. Second, there is a need for effective environmental policy. Without policy to safeguard the wider interests of society, valuable natural resources can be squandered to no great economic gain and still less social equity. Third, since livelihoods in the forest margins depend so heavily on the use of

local natural resources, they are vulnerable to changes in the environment and in environmental policy. Environmental policy thus matters, in both sustaining the resource base for rural livelihoods and in not riding roughshod over the livelihoods of local people.

If then policy for managing the rural environment matters, there is a need to improve policy-making and its implementation. Making policy centrally, without popular consent, will always be extremely costly in staff and operating budgets. Given the lack of knowledge about the changes and processes in the environment of southern Ghana; even less knowledge of the impacts on livelihoods; and the absence of information on the preferences that local people might express on the balance between threats to the environment and their livelihoods — the chances of making good policy for local management of natural resources at central level is low.

The challenge, then, lies in decentralising policy processes and encouraging wider participation. On the other hand, it can lead to incoherent and uncoordinated policy and to policy made in almost complete absence of any accurate information and without the benefits of professional analysis. There is clearly a delicate balance between centralised and decentralised policy making and implementation to be struck. At the moment, however, the balance is clearly in favour of the centre. Hence some shift towards a more decentralised and participatory approach should yield benefits.

### *Brazil and Ghana compared*

The two **contexts** differ in important respects.

The forests of Southern Pará, like those of much of the rest of Amazonia, have only seen large-scale clearance and human settlement in the last forty years or so. Until that time they were, for the most part, inaccessible by land transport, inhabited by only small groups of hunters, gatherers, rubber-tappers, and the like. Even with the opening of roads and the large numbers of migrants that have cleared forest adjacent to roads and tracks, the area remains remote from the urban centres of Brazil. In contrast, the south of Ghana is the heartland of the nation, where most Ghanaians live. Farming in and around the forest has been practised, albeit with smaller populations in the past, for several hundred years.

Land tenure is the other major difference. In Brazil, most land is held freehold with wide-ranging rights to the owner, although land title and ownership are sources of constant dispute. There are few limits to the area held by those with the means to acquire land. Turning forests into pasture is one of the most effective ways to make use of the land when land is abundant and labour is relatively scarce. In Ghana, most land is held under communal arrangements, where occupiers have rights largely limited to usufruct. Few have access to more land that they can cultivate with household labour, using hand tools for the most part. Large estates scarcely exist. Owing to tsetse fly infestation, few cattle can be kept in the forest zone.

Otherwise there are similarities. In both cases, the forest margins provide the basis for livelihoods based on the use of natural resources — above all, farming, logging, and, in Brazil, ranching. The majority of those living in the forest margins make relatively limited demands on the natural environment since they lack the capital (and technology) to do more than clear and farm small areas. In both cases, there are some with more capital — larger farmers and ranchers in Brazil, logging companies in both cases — who are capable of much greater impact. This socio-economic distinction derives from practical considerations, rather than any differences in attitudes or motivations. If the smaller farmers had access to capital, it is likely that they would expand their activities, clearing more forest as and when necessary.

In both cases, there is an extensive panoply of environmental **policy** in the form of laws, rules and regulations to conserve resources and mitigate resource degradation. In both cases, some of the environmental policy, and in particular funding for conservation, comes from the pressures and advocacy of international donors. To some extent Ghana differs from Brazil in

that there are well-established local community norms concerning burning of bush, farming close to watercourses, and using only fallen wood to make charcoal.

But in each case, few of the regulations are applied systematically and rigorously. The government of Ghana puts most of its efforts into controlling the logging industry, and even then is only mainly effective in regulating the use of the forest reserves. In both cases, measures to decentralise administration to municipalities in Brazil and to Districts in Ghana, have been undertaken in the 1990s. But the ability of local administrations to carry out their functions has been severely hampered by lack of capacity in staff, experience, decision-making, and funds. Exercising control over the use of natural resources has not been a priority.

Very little of the environmental policy that might affect the livelihoods of forest dwellers in the two zones is implemented, either by central agencies or those of local government. Even more striking is that local norms for resource use in Ghana are often set aside when they may prevent some economic opportunity from being pursued. Similarly in Brazil, where local norms barely exist, people may be well aware of the losses to burning forest and scrub, but that does not apparently prevent nor mitigate the extent of the annual burn. While legislation requires permits for burning, two-thirds of the respondents have not asked for permission.

**Livelihoods** in both areas are based heavily on the use of land, water and forests. In Brazil there may be a more diverse set of occupations, owing to the greater degree of trading in consumer goods, and apparently to the presence of sawmills and other agricultural processing plants. But in both cases, the economy is based on the use of natural resources.

To date, environmental policy has had little impact on local livelihoods. These have been much more affected by market forces, general economic conditions and policies, and the (particularly in the case of Brazil) the processes of population growth, migration and settlement in tropical forests, encouraged, some would say, by settlement policies.

That said, were the policies in place to be implemented as intended, the impacts on livelihoods that have, for the most part, been constructed around the use of natural resources, the impacts would be considerable. The logging industry in both cases would have to reduce activity and it is likely that the costs of logging would rise. Control by certification would reduce the type and quality of wood extracted. Jobs would be lost, payments to farmers for trees, already very low in Brazil, would be reduced. Farming and ranching (in Brazil) would also face restrictions on some activities, most notably clearing land by burning, and in some cases, on cultivation in specific places such as along the margins of watercourses. Reductions in the area cultivated and a fall in the output would be the most likely consequences. Charcoal burning would be restricted, with losses of jobs and incomes — and in the case of Ghana, loss of revenues to local government.

The size of these impacts cannot be forecast. They would vary by zone, depending on the local mix of activities, and by household, again depending on livelihood portfolios. There would, in addition, be second-round effects from both the knock-on effects of job and income losses, but also the possible redeployment of labour and capital to activities not constrained by environmental rules.

In the longer run, there would be some local benefits from the application of policy that conserves natural resources. The size of these would, however, be only a fraction of the total value of conservation, since part of the benefit accrues to the operations of supra-local ecologies, and in values to people living beyond the forest margins.

If the size of the potential impacts cannot be predicted, the direction can. Almost all the impacts would reduce economic activity, with loss of jobs and incomes. The livelihoods of

the poor would almost certainly suffer.[3] In these studies, there were few if any environmental policies that were likely to confer any immediate and direct benefits to those living in the forest margins.

The **implications** for policy-makers include:

- There is little point in formulating environmental policy at central levels if this is not implemented locally. Moreover, there is little evidence that such policy takes local circumstances, be they ecological, economic or social, into account;
- Having regulations on the books that are rarely applied carries the danger of random and arbitrary implementation, particularly in 'campaigns', with policy being seen locally as oppressive and unfair. It creates uncertainty and thus probably reduces investment. It also creates opportunities for corruption;
- The challenge in both cases is to find ways to build environmental policy from local levels, albeit with technical advice and legal support from central government.

**Research products**

Specific outputs to date include:

| | Brazil | Ghana |
|---|---|---|
| Workshops and meetings | Sep 2001: workshop held for State policy-makers to report Phase 1 findings (Belém)<br><br>Poster at annual rice festival, Novo Paraiso<br><br>Individual meetings with officials at key institutions in Belém were conducted during coordinators visits.<br><br>Meeting in Marabá during coordinator's visits with municipality officials and NGOs in 2001 and 2002.<br><br>March 2003 distribution of summary report in Belém and Marabá and consultation. | Sep 2000: workshop held for regional and district policy-makers to report Phase 1 findings (Kumasi)<br><br>Sep 2001: workshop held for regional and district policy-makers to report overall findings (Kumasi)<br><br>Dec 2001: presentation to policy-makers in Accra<br><br>May 2002: round of visits to key ministries in Accra, speaking to senior civil servants, distributing summary report — see Annex D. |
| Reports | Final Report on Brazil study, March 2003 | Final Report on Ghana study, March 2002 (Marfo, Anchirinah & Wiggins 2002)<br><br>Summary Report (6 pp), March 2002<br><br>Article submitted to *World Development* (Aug 2002), request for revisions received Feb 2003 |

To date (early March 2003), there are no joint outputs from the project.

[3] The exceptions would be those cases where economic opportunity leads the poor and powerless losing access to resources as the richer and more powerful seize land, water and forest for their own gain. But the existence of such cases is hardly a reason to enforce environmental policy. Far more pertinent would be action to protect the rights of ordinary citizens.

One other result of this work was the opportunity for colleagues in Ghana and Brazil to have the chance to meet in each other's field areas and gain greater understanding of the similarities and differences of development in the humid tropics.

**Relation of outputs to those planned & further work**

In summary, the situation is:

| ***Planned output*** | ***Progress*** |
|---|---|
| Link between local livelihoods and environmental policies in Ghana and Brazil understood. | Completed |
| Strategy for engaging with key policy-making institutions developed and implemented. | Completed for Brazil and Ghana, plans only for UK and international audience |
| Lessons and guidelines promoted. | Completed for Ghana, in progress for Brazil, plans for UK and international audience |

Plans for further work centre on the overall conclusions of this work, comparing the two cases and deriving more general lessons. For the UK, the plans include:

- Submission of an ID21 Highlights piece;
- Seek meeting in DFID, Rural Livelihoods with concerned advisers to make a brief presentation and discuss implications;
- Prepare an ODI natural resources briefings.

A more ambitious programme would be to co-ordinate with programmes that have been working on similar issues, above all with *R7957, Poverty dimensions of public governance and forest management in Ghana*, and those RNR research projects in Amazonia, above all *R7870:Policies, Institutions and Interventions for Sustainable Land Management in Amazonia*. Briefings that were joint products would have greater impacts than those coming from just one research study.

## *5. Research Activities*

Choice of countries arose from the initial call for proposals where three countries were indicated: Brazil, Ghana and Nepal. As the proposal developed it became clear that within the time and budget, only two countries could be covered. Nepal was omitted since there was no clear research partner.

In both countries the approach taken was heavily empirical. The main task were to review environmental policy and its implementation, to examine occupations and livelihoods of people living in the selected areas of forest margins that would be likely to be affected by such policy, and subsequently to draw inferences about the effect of the policies on livelihoods.

The work was to be carried out in two phases. In the first a preliminary review of policy was matched by participatory appraisal of livelihoods in selected case study villages. The findings from this phase were presented and discussed in workshops with local stakeholders. This allowed for detailed planning of a second phase with more detailed and formal studies of both policy and livelihoods.

More details of the work carried out in each country follow.

**Brazil**

The decision was taken to focus the field research in South Eastern Pará in a settlement area known as Grotão dos Caboclos in the Municipality of São Geraldo de Araguaia. While the research plan encouraged comparison between three distinct communities, the team decided to focus on one area of South Eastern Pará, for both logistical and conceptual reasons. Pará State is larger than Ghana or the UK: available resources were insufficient to study 3 scattered communities. POEMA had experience of community development interventions in the area and strong local contacts. Given the study focus on impact, it was decided to take as the unit of study three settlement at different stages of development and time in the same area, to allow the process of settlement and livelihood diversification unfolding on the frontier zone to be seen. Another complementary reason was the involvement of governmental and non-governmental agencies in the area, as it has been a focus of land disputes and violent struggle for at least 30 years.

### *Phase 1*

The objective of Phase 1 was to collate the documentary evidence available on the theme; to identify and consult with the main agencies in the area and to design and implement field research, including an initial survey of the study area of Novo Paraiso.

a) A review of documentary sources was carried out, including national, regional and district plans; strategic and consultative documents as well as policy reviews.

b) Interviews were conducted with officials from the main state agencies; these included environmental agencies, forestry and natural resource departments (agriculture, wildlife and conservation) as well as BASA (credit/loans). In the interviews discussion focused on the ways in which policies which are nationally defined are implemented and expressed at State level.

Interviews/meetings with leading environmental NGOs also took place.

c) A review of natural resource management policies was undertaken, especially of those specifically designed to have a direct impact on management including:

- Land use regulations in rural areas — distance from water courses, application of pesticides/fertilisers etc.;
- restrictions on access and exclusion in relation to designated lands or settlement (conservation zones, national parts etc.);
- regulations on burning
- regulations on land ownership/settlement;
- Controls on extraction and harvesting of resources - regulations applicable to logging, hunting, fishing, rubber tapping etc.;
- Disposal of wastes and effluents;
- Incentives to encourage particular uses of land — subsidies/grants/exemptions in relation to trees/livestock densities/organic chemicals etc.

d) The field research team started investigation to collect data needed to characterise the study area including community surveys regarding main economic activities and land use patterns.

e) To mark the end of Phase 1 a Workshop was held in Belém to discuss preliminary findings from the literature review. Field research findings were presented to start discussion on issues of environmental legislation and rural communities. Participants in the Workshop prepared short presentations on the summary programmes of their agencies related to environmental policy and their implementation in the frontier zone.

Participants included the following institutions: SECTAM, CPATU, INCRA, BASA, FUNAI, SAGRI, EMATER, AMCAT, SUDAM, POEMATEC: and the team from University of Reading and POEMA.

Issues of concern addressed at the Workshop included:

- title to land and security of ownership
- forest management and the problems of implementation of existing legislation to control wood extraction and carbon production
- means of production and size of lots distributed in land reform settlements (INCRA);
- relationship between those production systems initiated or encouraged by government agencies (credit and agriculture principally) and the strategies of the settlers/landowners;
- impact in the forest/woodlands of infrastructures required on the settlements

From the Workshop several themes emerged for further research:

- the role of government in the implementation of new policies faced with the proliferation of new municipalities and their limited resources to implement certain actions;
- the fragility of extension/research in farming systems in the area;
- fragility of control and fiscal systems in relation to environmental policies
- -the need to develop alternative/eco-friendly productive systems for small farmers in the region

Individual meetings were held in Belém at the institutions headquarters discuss some of these issues in depth with key officials (INCRA, IBAMA, BASA, EMBRAPA, SECTAM)

### *Phase 2*

Field research was planned to investigate three areas at different stages of settlement, including Novo Paraiso, characterised in the first phase, and Fazenda Bamerindus and Lagoa de Ouro, surveyed in the second phase. The objective was to investigate the impact of environmental policies in the economic activities/livelihoods of small producers engaged in subsistence agriculture, livestock and forestry (charcoal and timber) in the study area. Selection was based upon discussion with agencies, the experience of POEMA and other NGOs. It also reflects variations in certain key characteristics such as: vegetation; access roads/distance from the market; land utilisation; pattern of settlement; and economic activities/livelihoods.

A variety of research methods was used, both quantitative and qualitative, including: survey questionnaire, focus group discussions; rapid rural appraisal; mapping; photographs; and, interviews with key informants. In more detail this work included:

- A profile and map of each settlement was drawn up, covering; population; principal economic activities; history of settlement; land use and forest use. A provisional list of occupations and activities was drawn up based upon a community and household survey.
- Key informants and local leaders were interviewed and an initial appraisal of livelihoods in the local economy and interaction with the physical environment was carried out. Participatory methods were used (rapid rural appraisal, mapping, focus group discussions).

- Data were also collected from secondary documents; through mapping; the use of time lines; and through a household questionnaire.
- Semi-structured interviews were conducted with individuals on the main economic activities.
- Photographic documentation carried out by key respondents was also used as a method to present their views about the environment in which they live and work.

**Ghana**

The following research activities were carried out.

***Review of environmental policies.*** Information on policies was gathered through a review of existing documents and interviews with policy-makers and implementers in the key government agencies at national, regional and district levels.

***Livelihoods in forest margins and the impact of environmental policies.*** To assess the livelihoods of forest-margin dwellers, an initial reconnaissance was carried out in three villages of Ashanti and Brong-Ahafo Regions, namely Aboabo No. 2 in Adansi East District, Adiembra Nkwanta in Ejura-Sekyedumasi District, and Botenso in Wenchi District. The locations were selected from among a list of possible villages identified on the basis of personal knowledge, reports of past studies, and maps. The criteria used for the selection of locations were that the settlements should be close to substantial areas of forest, have a substantial number of households, and differ in terms of physical condition or market (road) access. Participatory rural appraisal, village census and formal survey were used to collect information on livelihoods. Tanoso, in Techiman District was added as a fourth location after the PRA. It was selected for its involvement in irrigated vegetable production.

Participatory rural appraisal (PRA) in three communities. A team of six researchers comprising two agricultural economists, a rural sociologist and three agronomists used participatory rural appraisal (PRA) techniques to collect information during the period August-September 2000. A total of four days were spent in each community using a combination of methods including key informant interviews, focused group discussions, transect walk and mapping of physical resources and facilities in the communities. In addition, officials of the District Assembly, Forestry Service and Ministry of Food and Agriculture at the district capitals were interviewed.

Census of household composition and occupations. A census of all the households within the selected communities was undertaken to identify the structure and composition of households, and the livelihoods engaged in by the household members. This was to provide quantitative measure of the importance of the environmentally sensitive occupations in the general livelihoods of the people.

Formal survey of households involved in each of the key livelihood activities identified. A sample of households stratified on the basis of the four key livelihoods that are expected to have environmental policies impacting on, were selected from the four communities. The target was to cover 15 households for each of these livelihoods. The number of households for each livelihood selected in each village was to be in proportion to the total number of households engaged in the respective livelihood in each village. However, it was difficult getting enough chainsaw operators to be interviewed. This was due to the tag of chainsaw operation being an "illegal activity", although the possession of a chainsaw is not necessarily illegal. The total number of households covered was 55.

***Case study: Evaluation of community forestry management.*** Undertaken as a complementary study, this evaluated the potential impact of a policy that had been implemented, although as a pilot project. Thirteen CFCs that were being piloted were reviewed. This aspect of the study covered the review of secondary information on the CFCs - guidelines on CFCs, livelihood survey reports, and field and training reports; and field surveys, both formal and informal. The surveys focused on all CFC members and other stakeholders. The pilot programme was implemented in the Dunkwa, Offinso and Nkoranza districts.

## 6. Environmental assessment

The study had no direct impact on the environment.

Indirectly, it should contribute to preparing environmental policy that meets environmental concerns, can be implemented and which does not unnecessarily harm the livelihoods of people living in forest margins.

## 7. Contribution of Outputs

The relevant purpose and goal to which this study contributed were:

- *Impacts of environmental policies on livelihood security assessed and lessons promoted in relevant institutions; and,*
- *Strategies to secure the livelihoods of poor people dependent on agricultural systems near the receding forest margin developed and promoted.*

The results of this study, that is that most environmental policies are not being implemented at local levels, that decentralisation to date has not contributed to more effective local environmental policy, and that impacts on livelihoods are thus minor, are not unexpected. But the study does confirm those hypotheses and provides insights into the details of the issue.

Reporting such findings in Ghana found an echo in government, where there is an interest in trying to make decentralisation more effective. In Brazil, the findings may be even more welcome, in that they enter a political landscape that has seen a major change in governing party at national level .Although dissemination in Brazil is behind schedule this is not totally negative. Federal and state elections last year meant that authorities were unable to commit themselves to policy decisions for several months. Now with new governments at State and Federal levels the discussion document can make a more useful contribution to policy debate.

For sustained uptake of these findings, two steps are indicated.

One would be to bring the insights of this study together with those from other similar and complementary studies. That would help develop a more substantial body of knowledge, supported by more evidence that addresses a wider range of questions and issues.

The other would be to then feed that work into a community of policy practice, an arena where insights from theory, reflection and empirical research are compared with the results of active learning by practitioners, so as to produce new syntheses and inspirations for practical initiatives. In this case, there are perhaps two such arena, one on democratic decentralisation, the other on environmental policy.

The first step might be to convene a meeting that brings together researchers (and some practitioners accustomed to reflection) to compare results, leading to the production of appropriate briefings and other summary material.

The second step involves finding the arena — or even constituting them — and contributing to the debates.

## *8. Publications and other communication materials*

### 8.2.3 Journal articles, drafted, pending acceptance

Wiggins, S., Marfo, K. and Anchirinah, V. 2002, 'Protecting the forest or the people? Environmental policies and livelihoods in the forest margins of southern Ghana', submitted to *World Development*, reviewed, (moderate) revisions requested

Article on the Brazil study (PG et al) will be drafted for an academic publication

### 8.5 Newsletter articles

Article in the POEMA Newsletter will appear in 2003.

### 8.6 Academic theses

Otsuki, K. 2000. Community and Sustainable Development in the Amazon frontier MSc Thesis in International Environmental Economics, Graduate School of Agriculture and Life Sciences, University of Tokyo; 120 pages (based on one part of the Phase 1 field study)

### 8.10 Project reports and data records

#### 8.10.1 Citation for the project Final Technical Report (FTR)

Wiggins, S. 2003. *Final Technical Report for R7577: Environmental policies and livelihoods in the forest margins of Brazil and Ghana*, (Unpublished report), Overseas Development Institute, London

#### 8.10.2 Project technical reports including project internal workshop papers and proceedings

Marfo, K., Anchirinah, V. and Wiggins, S. 2002. *'Environmental policies and livelihoods in the forest margins of southern Ghana'*, (Unpublished report), Crops Research Institute, Kumasi & Department of Agricultural and Food Economics, University of Reading

Goldey, P., Schreiber, V. and Vasconcelos, D with Imbiriba, N., Otsuki,K., Galvao, G. and von Atzingen, P.R. 2003. *'Environmental policies and livelihoods in the forest margins of Brazil'*, (Unpublished report), POEMA, Belém & Department of International and Rural Development, University of Reading

#### 8.10.3 Literature reviews

Wiggins, S. 2000. 'Literature Review. Environmental policies and the livelihoods of people living in the forest margins', (Unpublished report), Department of Agricultural & Food Economics, University of Reading

## *9. References cited in the report, sections 1-7*

Brown, K. and Rosendo, S. 2000. Environmentalists, rubber tappers and empowerment: the politics and economics of extractive reserves, Development and Change, 31, 201-227

Kotey, N. A, Francois, J., Owusu, J.G.K., Yeboah, R., Amanor, K.S. and Antwi, L. 1998. **Falling into place**, Ghana Country Study, Policy that works for forest and people series no. 4, International Institute for Environment & Development, London.

## *10. Project logframe*

**Logical Framework, as at November 2000**

| Narrative Summary | Measurable Indicators (OVI) | Means of Verification (MOV) | Important Assumptions |
|---|---|---|---|
| ***Goal*** | | | |
| Strategies to secure the livelihoods of poor people dependent on agricultural systems near the receding forest margin developed and promoted. | By 2002 interaction between the crop, livestock and agro-forestry components of the system in two targeted areas understood and constraints identified.<br>By 2002 new approaches to husbandry and resource management which improve the sustainability and productivity of bush fallow rotations validated.<br>By 2002 new approaches to improve fragile soils of low fertility in humid forest zones validated.<br>By 2003 integrated natural resource management strategies validated in relevant systems in three target countries and adopted by target institutions. | Data collected and collated by the programme manager. | Sustainable sedentary systems for poor and fragile soils can be devised.<br>Land ownership issues can be overcome. |
| ***Purpose*** | | | |
| Impacts of environmental policies on livelihood security assessed and lessons promoted in relevant institutions. | By Sept/Oct 2000, specific policies and linked livelihoods in 3 contrasting FAI communities identified and plan for quantification and assessment made, in each of the study areas of eastern Amazonia and southern Ghana.<br>By January 2001, continuous discussion of findings and policy implications with key policy-making institutions initiated.<br>Lessons and guidelines on policy-livelihood linkages and policy implications prepared and promoted within Brazil, Ghana and more widely by end of Sept. 2001. | Reviews by Programme Manager.<br>Reports of research team.<br>Appropriate dissemination outputs. | Enabling environment that allows discussion with policy makers exists. |
| ***Outputs*** | | | |
| 1. Link between local livelihoods and environmental policies in Ghana and Brazil understood.<br>2. Strategy for engaging with key policy-making institutions developed and implemented.<br>3. Lessons and guidelines promoted. | Literature review and locally Important livelihoods and policy links made and discussed with relevant policy institutions by Sept. 2000.<br>Detailed livelihood studies planned by Sept 2000 and initiated by November 2000.<br>Individuals in key policy institutions identified by Jan. 2001.<br>Final data analysis and discussions with policy institutions completed by mid August 2001.<br>Guidelines prepared and promoted by mid October 2001. | Reviews by Programme Manager.<br>Reports of research | Willingness of different national institutions to collaborate |

| *Activities* | *Project Milestones* | | |
|---|---|---|---|
| 1.1 Complete literature review.<br>1.2 Select 3 communities and identify local livelihoods and economy linked with specific environmental policies<br>1.3 Implement workshop and design stage 2.<br>1.4 Implement individual, household and community-level data collection on specific income-earning activities and livelihood building.<br>2.1 Identify individuals in key policy relevant institutions.<br>2.2 Final data analysis and discussions with policy institutions on lessons learned.<br>3.1 Prepare guidelines. | 1.1 First draft completed Sept 00. ☞ Second Draft ready by May 00.<br>1.2 Completed Sept 00<br>1.3 Workshops held Sept 00. Stage 2 designed Oct 00.<br>1.4 Preparations for second round surveys [Includes drawing of samples from sample frame, drafting questionnaires and piloting them] completed by end week 3, Dec 00.<br>Data collection complete by mid April 01.<br>Complementary studies complete by end May 01.<br>2.1 Individuals identified and initial discussions held with them by mid Jan 01.<br>2.2 Data analysis complete by end week 1, Aug 01.<br>☞ Country reports ready end Aug 01.<br>☞ Final report ready mid Sept 01. [include Summary c 15 pp, Exec Summary 1–2 pp]<br>3.1 ☞ Guidelines ready by end Sept 01.<br>Presentations held in Brazil, Ghana, UK Oct 01. | | |

☞ = Deliverable output

## 11. Keywords

Brazil, Ghana

Environmental policy, livelihoods, forestry, decentralisation

## 12. Annexes

Annex A: *Environmental policies and livelihoods in the forest margins of southern Ghana*

Annex B: *Environmental policies and livelihoods in the forest margins of Brazil (forthcoming)*

Annex C: *Literature Review. Environmental policies and the livelihoods of people living in the forest margins*

Annex D*: Report on visit to Ghana, 05-09 May 2002, Summary Report distributed*