

# ***RURAL DEVELOPMENT FORESTRY NETWORK***

BUFFER ZONES IN LOWLAND BOLIVIA:  
CONFLICTS, ALLIANCES AND NEW OPPORTUNITIES

*Penny Davies and James Johnson*

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***Penny Davies*** worked with the British Tropical Agricultural Mission, Bolivia between 1986 and 1994 and is currently taking an MSc at the Oxford Forestry Institute, South Parks Road, Oxford OX1 3RB, UK.

***James Johnson*** is a Technical Cooperation Officer on the British Tropical Agricultural Mission (Overseas Development Administration), Casilla 359, Santa Cruz, Bolivia.

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# BUFFER ZONES IN LOWLAND BOLIVIA: CONFLICTS, ALLIANCES AND NEW OPPORTUNITIES

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## Introduction

The creation of protected areas has often been top-down, based on elitist concepts of land use and surrounded by restrictive legislation (Colchester, 1994; TCA, 1993). Many protected areas in Bolivia, as in other countries, have existed only on paper. The guidelines for their control are not viable and they lack management plans. Some of the reasons for this are:

- unilateral intervention by centralised public sector institutions (eg forestry departments, conservation projects, etc)
- few incentives to manage natural resources sustainably
- incentives in place which promote the unsustainable management of resources, eg high interest rates, lack of land taxes, under priced timber
- decision-making and concepts based on technical criteria and conservation ethics imported from the northern hemisphere
- undefined property rights making resources openly accessible, which may have been managed previously under traditional law and custom
- exploitation of legal loopholes and unpoliced natural resources by a state-allied elite
- increasing pressure on land from resource-poor populations, who have often been marginalised to land unsuited to agricultural production, even in a land abundant society such as Santa Cruz, Bolivia

Intervention in development and conservation activities in and around protected areas in developing countries is on the increase. This is partly driven by northern donor countries responding at home to a public, who are preoccupied with the plight of wildlife and biodiversity.

Arguments for involving rural communities in the management of parks/reserves use the concept of 'buffer zones'<sup>1</sup> and are based on the following assumptions that:

- the management of legally designated protected areas is made more effective and

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<sup>1</sup> Buffer zones: adjacent to a protected area where neighbouring or resident communities can use the natural resources subject to defined conservation or management measures. Sometimes called multiple use areas. Such use does not conflict with the objectives of the protected area and provides benefits to the local people. 'Buffering' of the core area extends its range in terms of biodiversity and protects it against human exploitation and degradation (Lusigi, 1981 and KacKinnon, 1981 cited in MacKinnon *et al*, 1986)

- efficient if inhabitants of buffer zones are involved
- resource users with secure rights protect their resources
- conflicts between all the different actors (or stakeholders) can be resolved.

Our discussion here focuses on colonist settlement in Santa Cruz, Bolivia, in and around two protected areas near the Ichilo river: the Chore Forest Reserve (Category VIII), which contains the Ichilo Wildlife Refuge, and Amoro National Park (Navarro Sanchez, 1992, IUCN, 1990). See Box 1.

Below we give examples of conflicts generated and/or resolved during:

- the history of settlement and park/reserve creation
- negotiations over resource rights
- the process of project planning and technology development.

We describe which actors are involved and what their roles in the conflict and/or resolution were. Finally, we draw out some implications for project design and implementation in buffer zones.

## History

Santa Cruz covers most of the eastern lowlands of Amazon Bolivia<sup>2</sup>. In the 1950s areas to the north and west of the city were settled for small scale farming under directed colonisation schemes. Since the mid-60s the main thrust of peasant colonisation has been spontaneous, mostly by Quechua/Aymara migrants from the Andean highland plains and high valleys. Colonists settled along roads opened up by logging and petroleum companies. Two large protected areas are located close to Santa Cruz city to the west and north west. Both areas are relatively accessible, pirate logging activities are common in both and peasants colonists farm land in and around their boundaries.

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<sup>2</sup> Santa Cruz Department lies at the meeting point of four large ecological zones: The arid Chaco forest and spiny shrub to the South, semi-humid forest and seasonally flooded savannahs or pantanals to the east, inter-Andean montane forest to the west and humid rain forest to the north. It covers an area of just over 370,000 km<sup>2</sup>.

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Box 1: TYPES OF PROTECTED AREA

| Cat-egory | Protected Area Management Guidelines (IUCN, 1990)   |
|-----------|---|
| I         | <i>Strict Nature Reserve</i> : no intervention, scientific research and monitoring  |
| II        | <i>National Park</i> : highest competent authority responsible for preventing or eliminating exploitation, but restricted occupation in zones; management for conservation, scientific and educational purposes |
| III       | <i>National Monument</i> : managed for conservation of specific features  |
| IV        | <i>Managed Nature/Wildlife Reserves</i> : managed for conservation of specific habitats and species   |
| V         | <i>Protected Land/Seascape</i> : managed to conserve distinct interaction between humans and landscape, and for recreation  |
| VI        | <i>Resource Reserve</i> : interim conservation while determining future resource management for sustainable human use of ecosystem and maintenance of biodiversity  |
| VII       | <i>Natural Biotic/Anthropological Reserve</i> : maintenance of habitat for traditional societies  |
| VIII      | <i>Managed Resource/Multiple Use Areas</i> : planned management of resources for sustained yield in perpetuity  |
| IX        | <i>Man and Biosphere Reserves</i> : where human functioning is vital to the ecosystem; might include conservation, research, monitoring, training & demonstration   |
| X         | <i>World Heritage Sites</i> : conservation of natural features of universal value   |

The Amboro National Park, covering tropical humid lowland and montane cloud forest on hilly land, existed first as a forest reserve (1973) and then received Category II protected area status as a National Park in 1984. The stated functions of the Park are:

- protection of 3 important river catchments
- protection of endemic and endangered species
- as a centre for environmental education and ecotourism (it lies about 50 km from the city).

In 1991 the Park was expanded from 180 000 ha to 637 600 ha by national decree and without consultation with local inhabitants. Significant farm settlement in Amboro pre-dates the 1970s and certainly existed prior to the creation of the Park. A census carried out in 1989 within the old limits of the Park showed a population of about 1 000 families, some highland settlers but many traditional *camba* (mestizo smallholders of tropical lowland origin) communities and ranches. The expansion of the Park has affected many more peasant farmers, possibly another 2 000 families, some of whom have land titles over 40 years old. At least 2 large local logging companies have been extracting timber from the Park until quite recently.

The Chore Forest Reserve, an area of sub-tropical humid forest, was created in 1966 for sustainable forest production. At that time there was very little human settlement within the Reserve and it was rich in mahogany. It covers an area of 1.08 million ha. Since its creation about 1 000 colonist families have settled within the Reserve mainly in and to the south. Unlike some of the colonists in Amboro, none have legal land title. At least 25 private logging companies have legal concessions in the Reserve and an unknown number (possibly as many again) pirate timber. No forest management plan yet exists for the Reserve. By the 1980s all mahogany had been 'high-graded' out. Rural communities have no rights to timber although they are employed as labour by the logging companies.

Over the past ten years it became obvious that belts, within and around the boundaries of both areas, would have to accommodate existing settlement. However, it was unclear to what extent these belts would buffer against new migration. The concept of 'buffer zone' was not a generally accepted paradigm. Initially colonist farmers were not involved in buffer zone establishment nor did they understand its purpose, which had been conceived outside the rural community. Indeed, some of the official authorities concerned were not clear either about what role and conditions should be attached to the buffer zone. However, communities were certainly affected by its creation and were made aware of its existence through meetings informing them about the proposed boundary lines – what came to be known as the 'Red Line' meetings. The Red Line meetings were a response to the spontaneous settlement in the two areas, but within the context of two very different establishment histories. In the case of Amboro National Park, the Park invaded areas already colonised whereas the Chore Forest Reserve was affected by peasant settlement after its creation.

#### Actors, conflicts and alliances

##### Logging companies – civil society – rural communities

In the case of Amboro Park the logging companies operating there illegally were openly linked to the "highest competent authority of the country" (IUCN, p11, 1992) responsible for Park control. Conservation bodies and local development institutions publicised this through the media, whereupon they were accused of 'watermelon' environmentalism<sup>3</sup> by officials. The public confrontation resulted in the withdrawal of these logging companies from the Park. Local communities were also caught in the conflict and felt pressured either to support the denunciation or to collude in the cover up. In some cases, communities resented the fact that officials had free access to resources, which were restricted to peasants; in others, employment as labourers by the logging industry was an important source of off-farm income. All this caused internal conflict within some communities, who questioned the roles played, on one or other side of the conflict, by their community leaders. However, communities had watched a continual flow of high value timber pass their doorsteps. The debate within the communities highlighted various issues related to timber: that potentially timber is a valuable income earning product, it is depleting, and communities should have rights over it, particularly in buffer zones.

##### Logging companies – commercial farmers – rural communities

In the northern part of El Chore Reserve, logging companies are not monitored. Their role in the Reserve has been slightly different than that in Amboro. By allowing their labourers to clear

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<sup>3</sup> Green on the outside and red on the inside, ie 'communists' disguised as 'environmentalists'.

subsistence farm plots around the logging camps, they indirectly stimulated a wave of new farm settlement in the northern Reserve. Word spread about the quality of farm land. On the flood plains north of the Reserve a group of Andean colonists have become relatively affluent. Mechanisation has encouraged expansion of the extensive arable margin. Colonists who have mechanised have accumulated land, but expansion within their original area of colonisation is limited by two large rivers and problems of increased soil compaction. Some of these larger scale farmers, from outside the Chore Reserve, have looked for land investment opportunities further afield. Taking advantage of political and economic instability during the 80s and early 90s, they have exploited the state's institutional weakness by opportunist colonisation. They began to encourage new colonisation by smaller farmers within the Reserve along the new logging road and around the remnants of old logging camps. In this case larger colonists from older settlements felt that a spearhead of colonisation formed by small peasant farmers would expand the agricultural frontier into the Reserve and thereby strengthen their claims to fertile land officially assigned to forest production. In this way small farmer settlement within the buffer zone became a tool for expansionist mechanised colonist farmers who also wished to gain access to more land in the future.

Grassroots organisations – rural communities – NGOs

This fuelled conflict between the new northern settlement and older peasant colonist communities lying in the Chore buffer zone to the south. The new colonisation was supported by a political alliance within the peasant colonist syndicate movement from which the southern colonist syndicates were excluded. Colonists to the north of Santa Cruz had stronger representation in the umbrella syndicate federation. The southern communities felt that their long-standing negotiations for land title and rights had been placed in jeopardy both by the increase in numbers of settlers within the Reserve and by patronage which had bypassed the negotiation channels they had so painstakingly set up with the state authorities.

These communities had been negotiating land title with the support of a local NGO, CIPCA, since the late 70s. This had also involved negotiating the demarcation of new buffer zone limits. Negotiations were complicated because the buffer zone was affected by a series of separate laws (Forestry, Land, Environment) none of which were completely compatible. During the late 80s and early 90s inter-organisational co-ordination and communication for rural development in the region improved. Firstly mechanisms were created or strengthened to stimulate more participatory technology generation (Velasco *et al*, 1988; Davies *et al*, 1990; Bebbington *et al*, 1993). This created a forum for technology-orientated debate and activity. It grew to become a forum where all local actors (official development institutions, NGOs, farmer representatives) could start to involve themselves in regional planning for integrated rural development. This forum does not just cover the Chore area but all the more accessible areas of the Ichilo province, including Amboro Park. Amboro, because it has older communities and because it receives wider coverage in the local media, has attracted more institutional actors than the Chore. These, mainly NGOs (eg CEDICA, Proyecto San José, PROBIOMA, FAN, UNAPEGA, CARITAS, CARE) have entered the forum.

The Law for Popular Participation passed in 1994 allows for nation-wide devolution of power and financial control over rural development to local municipalities and recognised 'territorial grassroots organisations' (OTBs). This has created potentially more space for community participation in project planning, design and implementation. Unofficial communities within protected areas can form recognised OTBs, those with land titles probably have a higher legal

status under the land reform law than the protected areas themselves, which were established by lower order decree. Under the Law for Popular Participation the final and legal delimitation of any buffer zone will depend on agreement by the nearest town and provincial municipalities. It is most likely that the municipality will be responsible for buffer zone management. The nearest municipalities to both protected areas do represent some of the peasant colonist syndicates outside the buffer zone. But, unless sufficient colonist syndicates can get representation on these councils, the balance of power continues to be held by lowland *camba* ranchers and farmers with strong links to the logging trade.

#### Rural communities – conservation scientists – ecotourism

In Amboro the dynamic of settlement and conflict was slightly different. Scientists were already perceived as ‘opposition figures’ by communities based in the northern part of the Park. In the late 80s some naturalists, who had advocated the expansion of the Park to the government, also called for the resettlement of colonists. Oral tradition locates rich veins of gold in the Park area. Visits by tourists and researchers strengthened this local belief. Rumours became rife that the Park had been created by and for *gringos* (foreigners) for the purpose of secretly monopolising and exploiting the gold. If private ecotourism initiatives, at present planned by local conservationists and business interests, do not involve rural communities in and around the Park at an early stage in their making, then rumours that the “pot of gold” has been looted may become true.

#### Rural communities – public authorities

At about the same time in the south-eastern part of Amboro Park there was new spontaneous colonisation of even steeper sloping land. Ironically land degradation and drought in the inter-Andean valleys pushed settlement northwards into Park land which is highly marginal for agriculture, clearing the very cloud forest responsible in part for stabilising local rainfall patterns. In addition, well-organised colonist syndicates, under pressure from coca control authorities moved south-eastwards from the Chapare into the humid cloud forest area. The newer colonists have settled on the watershed slopes and upstream of the older settlements lying in the buffer zone. Older communities now claim that erosion is affecting their water supplies and destabilising water courses. They have attempted to bar newcomers from entering further in to settle on the few remaining slopes which are cultivable.

In some senses the more established communities have reacted in similar ways in both Amboro Park and the Chore forest Reserve. Older colonists feel that the admission of newer settlement to core areas places their own tenure within the buffer zone in jeopardy. Resource degradation reinforces this concern. In another sense the conflicts in Amboro and Chore have been very different. In Chore the peasant communities are keen to define and defend the Red Line in order to gain and strengthen their legal status. In Amboro, however, good agricultural land is comparatively scarce. The escarpments rising out of the lowland plains present natural barriers which limit the possibilities of much future colonisation. The drawing of the Red Line is an issue which is thought to conflict with the interests of peasants who already have land titles, confounding existing rights.

In both areas conflict and rumour have formed the background to Red Line meetings held by public sector authorities (development institutions, the forestry and agricultural departments) with communities. At these meetings communities were asked to provide free labour for cutting the Red line, the buffer zone boundary, through the forest and were persuaded by promises that

community interests and status would be furthered or confirmed. When they weren't, communities closed up to outsider intervention. In very recent years the formation of integrated rural development planning mechanisms has resulted in new negotiations between communities and the public authorities.

The sectors of society involved in conflict have also differed in the two areas. Although peasant communities have confronted logging interests in both Amboro and Chore, powerful logger representation from the latter area in the government today is blocking any resolution of ground level Red Line negotiations. Amboro, considered a time bomb of social conflicts at the time of the Amboro confrontation, has now cooled to a gentle simmer with a defined government position on peasant settlement, redefinition of Park limits and the creation of an effective buffer zone. In Amboro this has created the legal context which now permits local institutions to operate in an adequate and stable framework.

It may seem, at first glance, that development to improve living standards and access to resources of buffer zone settlements, could stimulate increased migration into protected areas. However, it seems more likely that, if the political framework exists and if communities have both the authority and the mechanism to control their resources, then they will try and protect against encroachment by new settlement and by other resource users. Colonists come from a history of organised political activity in the highlands. In addition, conflicts during the process of negotiation over land title and buffer zone boundaries have encouraged strong participation within the syndicate organisations. This also provides a reasonable social context within which to build future community activities based on the management and processing of forest resources.

#### Appropriate technology

This chronicle of conflict and negotiation has also influenced the approach which NGOs now take in the Amboro Park. Communities were wary of outsiders generally after the Red Line meetings. Social development NGOs, such as CARITAS and UNAPEGA, based in the northern buffer zone of Amboro, found it difficult to develop close working relationships with communities. On the positive side, this obliged them to approach community work with great sensitivity and to use a participatory approach early on, in some cases for the first time. NGOs found it hard, in particular, to include on their agenda conservation and environmental education activities which did not respond to immediate needs.

FAN, a conservation-orientated NGO with a strong eco-mandate, was involved in some of the top down Red Line meetings in the southern Park area. This experience led FAN to broaden its own mandate and include development as well as conservation objectives. It started up a new technical assistance programme, which was aimed at improving relationships and communication with some of the more disillusioned communities by responding directly to farm constraints. Many communities, settled on slopes and fragile soils in both the northern and southern buffer zones, are concerned about declining yields caused by degrading management practices. The programme later developed an environmental focus by including low input conservation practices to maintain or recover farm productivity.

In the early 90s an incipient and informal local 'agroforest alliance' began to form between small NGOs, the public sector (CIAT/BTAM) and grassroots organisations (eg the Federation of Women's Clubs). Many of the initial experiences with agroforestry occurred within and around

the Amoro buffer zone. Communities on marginal sloping land with poor road access are interested in lower input systems and conservation technologies. Fallow crisis has been exacerbated by soil erosion and many farmers are locked into a degrading system based on extensive grazing of poor pastures.

On the other hand in the Chore Reserve, colonists with road access and flat land consider mechanisation and extensive livestock to be necessary components of any future farming system. This is the visible farm model provided by the commercial farm sector (National, Japanese, Mennonite) settled round the Chore Reserve. The NGO, CIPCA, has supported the introduction of intensive mechanised arable farming and livestock as a way of improving the livelihood of colonists traditionally cultivating under slash and burn systems. Unlike FAN, CIPCA's main objective is transformation of the peasantry through technological change. Its focus is anthropocentric rather than eco-centric and it places limited importance on both low input and indigenous technologies. It is a large national NGO, operating throughout Bolivia. CIPCA and its Jesuit founders are influential in determining local NGO network policy. Although CIPCA has invested in staff training to build up its technical capacity in both animal production and intensive monocropping it has little technical know-how outside these areas. The public sector CIAT/BTAM Agroforestry programme began to train CIPCA's key farmer extensionists and its technical coordinator in nursery and agroforestry management. It also invited them to visit agroforestry systems and research in the Brazilian Amazon (Camargo *et al*, 1993). This visit highlighted both the innovatory capacity of farmers to manipulate trees in the landscape and the possibilities of giving market value to the forest resources used by them. After this, colonist syndicates and CIPCA invited CIAT/BTAM and other public institutions to participate in discussions about alternative paths for farm development within the buffer zone (Davies & Hoyos *et al*, 1993, CIAT/CIPCA, 1994). Here more intensive livestock production, small scale mechanised arable farming (using small machines or animal traction), agroforestry and alternative swidden fallow systems were all considered to be possible farming options within the buffer zone. Joint field work on agroforestry, farm forestry and silvi-pastoral systems was carried out<sup>4</sup>. (See Annex 1). This kind of technology development involved actors who had previously been excluded. CIPCA, supported by the forestry department, has now added a forester to its team in response to the interest in agroforestry and forest management expressed by the communities in the Chore. In effect it has started to include 'green' issues on its agenda.

Although farmers in the buffer zone reject suggestions that land use under the two key enterprises of livestock and mechanised arable production should be restricted, they do accept the possibilities of modifying systems by incorporating trees into ploughed and grass landscapes. Where land tenure is uncertain farmers feel that planted trees strengthen their land tenure claims. Farmers in both the Chore and Amoro are demanding technology and assistance for tree management. These demands have become more explicit as the framework which facilitates community access to timber becomes legal. The new forestry law, blocked at present, allows for forest management by communities as well as by private concessionaires<sup>5</sup>. NGOs are scrabbling

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<sup>4</sup> eg improved forest fallow, living fence posts, multi-storey alley grazing, multi-layered tree gardens.

<sup>5</sup> Any commercial community and farm forestry will be subject to forest fees and require management plans. However, the Santa Cruz federation of peasant and workers' syndicates has made a surprising alliance with the logging and timber industry to oppose the centralised capture of forest fees

for technology, both hard and soft, for farm and community forest management. Small farmers certainly need to carry out adaptive research on this. It also remains to be seen whether the agroforestry technologies under development are sufficiently economic to compete, in the medium term, with existing agricultural land use. If resources, in the form of community forests, become available under the new law, then both farmers and NGOs recommend that the following incentives be introduced which encourage modified land use: participatory planning and inventory techniques, technical know-how, hardware, eg portable sawmills, accompanied by credit for long term development, processing skills, eg in turnery, and market access.

In addition to the technologies themselves, the framework of incentives for technology development and adoption also need to be tailored to the conditions imposed on resource management within a buffer zone (eg credit, channelled by CIPCA) for community sawmills might be conditional on the community participating in defining its management plan. The credit lines of UNAPEGA, traditionally given for livestock and barbed wire, are conditional on the establishment of silvi-pastoral systems. However, even if the availability of these incentives is conditional on farmers changing management practices now, they are not enough in themselves to prevent farmers from reverting to exploitative or 'mining' practices later on (in agriculture or forestry), particularly if external counter-influences exist or choices become limited. In addition to structural change (which includes user rights), long term sustainable land use requires technologies which are robust (ie flexible) economically as well as environmentally. Farmers must participate not in technology development alone but in technology development accompanied by long term planning. The communities also need to participate in the environmental as well as the development debate, so that they can create the links needed for one to fortify the other. However, appropriate alternative technologies are necessary to carry out 'buffering' activities, even if alone they are not sufficient. That is to say, initially effective buffer zone management is technology dependent.

## Conclusions

Certain conditions are necessary for the assumptions implicit in buffer zone development to work. The following points draw out implications for project intervention in buffer zones.

- 1 The boundaries, aims and content of any project need to be developed and controlled by the communities, ie the planning process has to be participatory.
- 2 The probable constraints and trade offs also need to be clarified with all actors although not necessarily agreed upon. This is time consuming so project phasing will have to be reasonably flexible, and extra time costed.
- 3 Buffer zone development and resource protection requires 'scaling up' of action from the individual community level to the catchment area. This involves inter-community co-ordination and participation of the grassroots at both organisational (village, syndicate) and super organisational (federation, regional assembly) levels. Links between these two levels are often weak and need strengthening.

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and the division between land and tree tenure which are still enshrined in the proposed law (draft Forestry Law Project, February 1994; CIC *et al*, 1994).

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- 4 Conflict is part and parcel of negotiation. Projects in buffer zones have to take this on board and facilitate mechanisms for permanent communication and co-ordination between all parties. They also need, as part of project design, to develop strategies for occasional troubleshooting.
- 5 Technology development, the putting in place of incentives and the definition of a legal framework (with reference to, eg natural resource laws, popular participation) need to evolve in parallel. These are all aspects considered by the project.
- 6 Although much has been said about the need for community participation, projects also need support at policy level. In some circumstances developing contacts with a godfather in government may be more effective initially than relying on any formal policy statement.
- 7 Above all, without complementary policies and development affecting unprotected areas outside buffer zones, buffer zone development itself is constrained.

Finally, suitable farm systems for the area should fulfill the following criteria:

- accumulate capital
- provide a diversified source of income
- make economic use of all the land available on the parcel
- be rational in intensity of land use according to, on the one hand, location – house, road, forest – and, on the other, family labour supply
- occupy labour during slack seasons
- accord with the aims of a forest reserve (the aims were not agreed upon!)
- provide the farmer/community with added value
- operate on a scale convenient for subsequent processing in the zone (minimum/maximum volumes, inputs for full capacity)
- orient type and volume of production towards markets which are realistic in both the short and long term
- be feasible, taking into account limited access to credit for small farmers.

Annex 1: Technology options

| <b>No</b> | <b>Options</b>  | <b>Technological components</b>   | <b>Availability/Comments</b><br>(February 1994)  |
|-----------|---|---|--|
| 1         | Mechanised arable cropping  | Includes adequate rotations and implements  | <i>Not appropriate within a forest reserve</i>   |
| 2         | Manual continuous arable cropping over 2-4 years                            | Includes winter cropping & leguminous cover crops   | To be validated in the Chore area  |
| 3         | Community forest management of secondary forest and primary forest residues | All activities communally carried out, block rotation   | Appropriate technology available from Mexico, Ecuador, Costa Rica  |
| 4         | Farm forest management of secondary forest and primary forest residues      | Individual farmer management but communal harvesting, processing and marketing  | Examples in Central America; few examples in South America   |
| 5         | Secondary forest fallow enrichment  | Via abandonment of alley systems; direct sowing into forest   | To be validated in the Chore area  |
| 6         | Extensive livestock on sown pasture (1 head/ha)                             |   | Possible degradation of system over time; inflexible – once established difficult to change to other productive land use systems; <i>not appropriate in a forestry reserve</i> |
| 7         | Multi-storey annual cropping systems  | Rice/maize between legume hedges, includes continuous annual leguminous cover crops at start and high storey timber trees; later might develop into perennial crops in alleys (see 8) | Under validation at present in the Chore; concrete results in 2-5 years  |
| <b>No</b> | <b>Options</b>  | <b>Technological components</b>   | <b>Availability/comments</b><br>(February 1994)  |

|   |   |   |  |
|---|---|---|--|
| 8 | Structured tree gardens with fruit, palm and timber           | Tembe, coconut, <i>Rheedia spp</i> , cashew, macadamia, tamarind, coffee, cacao, banana, citrus, anatto, asai ( <i>Euterpe spp</i> ), jipijapa ( <i>Cardludovica palmata</i> ), hatata ( <i>Geonoma deversa</i> ), mango, avocado, amabaibo blanco ( <i>Cecropia spp</i> ), guapuru ( <i>Myrciaria cauliflora</i> ), guapomo ( <i>Salacia elliptica</i> ) | Under trial and validation at present in the Chore; potential to expand number of validation plots.<br>Lacking formal research |
| 9 | Semi-intensive livestock production in silvi-pastoral systems | Forage alleys (including timber storey); dispersed trees in pastures; live fence posts; windbreaks  | Under validation at present in the Chore; concrete results in 2-5 years  |

Terms used

|                   |  |     |
|-------------------|--|-----|
| BTAM              | British Tropical Agricultural Mission  | PS  |
| CARE              |  | NGO |
| CARITAS           |  | NGO |
| CEDICA            | Centro de Educacion y Desarrollo Integral Campesino<br>(Centre for Integrated Peasant Education and Development) | NGO |
| CIAT              | Centro de Investigacion Agricola Tropical<br>(Tropical Agricultural Research Centre)                             | PS  |
| CIPCA             | Centro de Investigacion y Promocion del Campesinado<br>(Research and Promotion Centre for the Peasantry)         | NGO |
| FAN               | Foundation Friends of Nature<br>(Fundacion Amigos de la Naturaleza)  | NGO |
| IU                | Intermediate user  |     |
| NGO               | Non-governmental organisation  |     |
| ODA               | Overseas Development Administration<br>(UK Technical Cooperation)  | PS  |
| OTB               | Organizacion Territorial de Base<br>(Grassroots territorial organisation)  |     |
| PROBIOMA          | Biosphere and Environmental Productivity Organisation<br>(Produccion, Biosfero, Medio Ambiente)                  | NGO |
| Proyecto San José | San José Project   | NGO |
| PS                | Public Sector  |     |
| UNAPEGA           | A Calf for a Calf (originally supported by Heifer Project)   | NGO |

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