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I. Project Description

The Central African Regional Program for the Environment (CARPE) is a five year project, funded by the United States Agency for International Development (USAID), and implemented by a group of U.S. NGOs, universities and U.S. Government agencies with experience in the region.

The strategic objective of CARPE is to reduce the rate of deforestation of the tropical forests in the Congo Basin, in order to conserve the biological diversity contained in these forests, and in the long run, to avert potentially negative changes in the global and regional climate. It is designed to identify and begin to establish the conditions and practices required for the conservation and sustainable use of the biological resources of the Congo Basin in a manner that addresses local, national and international concerns.

IR1 seeks to gather information, about the conditions under which local forest resource management systems (LFRMSs) can be effective in conserving forest resources outside of protected areas in the Congo Basin. The IR1 workplan seeks to broaden the framework of analysis regarding promising vestiges of beliefs, practices and institutional structures that result in forest and/or biodiversity conservation outside of protected areas in the Congo Basin, and to reinforce what appears cogent. It is felt that through this strategy, methods and activities will be identified that will promote socio-cultural and local-level socioeconomic conditions that will, in turn, reduce deforestation and promote biodiversity in key forest ecoregions and habitats outside of protected areas in the Congo Basin.

IR1 has completed Phase 1 and 2 of its 4 Phase project design.

- **Phase 1: Pre-identification of action research themes**; identification of from 3-4 action research zones in the Congo Basin; identification of a Core Team (CT) of local consultants to be involved in subsequent phases.

- **Phase 2: Identification of the action research sites within the designated zones**; selection of 3 action research sites, the proposal of 3 tier thematic program for IR1, identification of specific hypotheses to be tested at each site, definition of level of collaboration between IR1 and other projects or organizations working on the same issues, analysis of relative strengths and weaknesses of the proposed work model vis a vis its potential to impact the region.

- **Phase 3: Design, implementation and monitoring of the action-research program.**

  The core program activities under this phase: establishing baseline research in 3 action–research sites, participatory mapping of local forest resources at three sites, market incentives at three sites, and lessons learned are currently underway and expected to continue until the end of project (Dec. 31, 1999).

- **Phase 4: Evaluation to determine what can be replicated from IR1, and how during future phases of CARPE**

  The distillation and synthesis of lessons learned from CARPE IR1's action-research program began in early March. This phase will continue through to the end of CARPE 1 (December 1999).

II. Activities for the Reporting Period

This quarter CARPE IR1/Theme 4 continued in its implementation of the action-research program at Mount Cameroon, Djoum and the Tikar Plain. Participatory Mapping (PM) was completed in Mokoko and Djoum, and preparation began for the mapping in the Tikar Plain. The maps from Mokoko and Djoum are currently being digitized and printed in England and Washington, DC respectively.

IR1 and its Theme 4 partners USDA Forestry and Peace Corps, along with Diane Russell worked together throughout the spring to draft a preliminary lessons learned document for the CARPE SOT Lessons Learned retreat held in Washington DC May 12-14. Also presented at that meeting was a collective Theme 4 vision for participation in the next phase of CARPE.

Project Director Michael Brown traveled to the Cameroon project sites to meet with the Congo Basin Coordinator and project partners to plan for future activities and collaborations, get feedback on work to date and solicit input for lessons learned as well as strategic planning for the next phase of CARPE. To this end, IR1 will organize a workshop in early September in Cameroon which will host IR1 project partners (Government and non-profit), community representatives, as well as IR1 consultants, SOT members and CARPE Advisors. The workshop will be an opportunity to discuss the work of the past year, lessons learned, and will be an opportunity to hear from to help solidify the strategic planning for CARPE 2.

a) Participatory Mapping

As the final component of the original Participatory Mapping methodology, CARPE IR1 Project partner The Mount Cameroon Project (MCP) facilitated a final evaluation workshop for the Mokoko mapping exercise. The Congo Basin Coordinator (CBC), local cartographers and community data collectors participated in the workshop. MCP authored a report of findings and an evaluation of the workshop itself.

Participatory mapping work was completed in the Mokoko region. The set of 4 maps are now in England and are being digitized and printed by IR1 consultant Illanga Itoua. Copies of the maps are expected to be available to the CARPE SOT, Cameroonian project partners, and participating communities by the end of August.

Mapping of the Djoum region has also been completed. Because of the vast area of difficult terrain to be mapped, an increased number of participants, poor communications etc, this exercise presented a test to both IR1 and the methodology itself. Despite these factors the participating communities were very pleased with the process and proud of the resulting maps. The set of 6 maps is now in Washington and will be digitized at the University of Maryland with the help of SOT member Nadine Laporte. Maps will be scanned onto CD-ROM and will also be printed. Final copies of the maps will be distributed to CARPE, CED and the communities of Djoum in the fall.

Mapping of the final site, the Tikar Plain, is expected to begin in July. IR1 is in the process of developing of a Memorandum of Collaboration with the European Union, to map the Ngambe and Bankim regions of the plain. Tikar represents a vast transition zone and like Djoum lacks quality roads and communications, however local communities have sent representatives to both Mokoko and Djoum and are extremely well prepared to carry out the mapping in Tikar.

b) Market Incentives

Consultants Terry Sunderland and Jonathan Greenham completed their reports from fieldwork conducted last quarter and submitted them to IR1. Jonathan Greenham continues to collaborate with CARPE consultant Charles Stathacos in the ongoing non-timber forest product (NTFP) market research. This work will result in an assessment of natural product development opportunities in both domestic and international markets, a draft plan for targeting market opportunities for potential products, and will identify potential U.S. purchasers for natural products from the Theme 4 sites.

c) Information Dissemination

Innovative Resources Management (IRM) has completed the installation of a "Threaded Message System", hosted on the IRM website. Designed by CARPE consultant Don Anderson, this system represents the evolution of the idea of an on-line discussion group to debate and discuss the IR1 work. The purpose of this system is to provide the web community with a managed forum to discuss topics and ideas proposed by IRM.

The threaded message capability allows for web users to log on to the site, read the document posted for discussion and write comments directly to the site. These comments are then displayed in a "real time" discussion that users can either follow or actively participate in. Innovative Resources Management is currently hosting a discussion on the March 1999 Alain Karsenty, Daou Joiris paper entitled *Les Systems Locaux de Gestion dans le Bassin Congolais*.

In addition, IR1 hosted consultant Alain Karsenty at a May 4 meeting attended by the CARPE SOT. The goal of this meeting was for Mr. Karsenty to present his paper and findings directly to the SOT and to facilitate an informal discussion and exchange of ideas on the subject of resource management systems in the Congo Basin. The interest

generated by this paper is in large part responsible for its selection as first discussion topic on the Website. Hopefully a broader international audience will be able to participate in the discussion and exchange ideas through this new technology.

III. Accomplishments/Results

a) Objectives from last period

At the end of last quarter, IR1 CARPE foresaw the completion of the following activities for the quarter ending June 30, 1999:

- Print and distribute Mokoko maps
- Print and distribute Djoum maps
- Complete Baseline study in Tikar
- Complete Baseline study in Mokoko
- Continue with Market Incentives work
- Develop Memorandum of Understanding with the European Union for collaboration of the PM in the Tikar Pain
- Continue synthesis of Lessons Learned
- Begin Strategic Planning for Theme 4 activities in CARPE II

b) Objectives Achieved

- Mokoko and Djoum maps being digitized and printed
- Mokoko Baseline study by Henry Ebong of the Mount Cameroon Project near completion
- Market Incentive work continues
- First draft Lessons Learned completed, along with strategic plan for Theme 4

d) Objectives unmet

- Develop Memorandum of Understanding with the European Union for collaboration of the PM in the Tikar Pain
- Baseline study in Tikar

IV. Problems/Lessons Learned

Once again, the primary problem experienced by IR1 this quarter were delays in work implementation. This was due in part to overly ambitious planning but also in large part to unforeseen circumstances including: difficulty in sending necessary funds to the field, poor communications and difficult work conditions (poor roads, vehicle breakdown etc.)

While many of these problems are unavoidable and in many cases inevitable due to poor infrastructure, IR1 has learned that project time horizons need to be lengthened due to the inherent difficulty in communications and time delays necessary to affect international bank transfers to Cameroon. In one case a wire transfer took over one month to reach the field. Discussions with the bank revealed this to be a standard time delay for the region and must be anticipated in the future in order not to unnecessarily delay the project.

V. Objectives/Workplan for the Next Reporting Period

The IR1 objectives for the next quarter include:

- Begin Tikar mapping
- Begin Tikar desk study
- Complete distribution of Mokoko and Djoum maps to CARPE and project partners
- Conduct Forest Inventory work in Djoum
- Begin synthesis of Market Incentives work
- Finalize September workshop in Cameroon

VI. Financial report (see Annex 1)

VII. Annexes

1. Monthly financial report for the period ending 6/30/99.
2. Sunderland, Terry C. H. and Peguy Tchouto. *A Participatory Survey and Inventory of Timber and Non-Timber Forest Products of the Mokoko River Forest Reserve, SW Province, Cameroon.* April 1999.
3. Greenham, Jonathan. *Non-Timber Forest Products used in Three Sites in Cameroon.* April 1999.
4. Ebong, Harrison. *Report on Participatory Landuse Mapping in Djoum Sub-Division, South Province of Cameroon.* May 1999
5. Ebong, Harrison, Henry Ekwoge, Godlove Vissi and Paul Lontchi. *Report of Participatory Land Use Mapping in the Boa Plain Area, South West Province, Cameroon.* January 1999
6. Ebong, Harrison, Henry Ekwoge, Glory Mbong. *Proceedings of a Participatory Land Use Mapping Training Workshop.* May 1999
7. *Theme 4 Lesson Learned.* May 1999
8. *Theme 4 CARPE II Vision.* June 1999

A PARTICIPATORY SURVEY AND INVENTORY OF TIMBER AND NON-TIMBER FOREST PRODUCTS OF THE MOKOKO RIVER FOREST RESERVE, SW PROVINCE, CAMEROON

A report for IR1/CARPE
April 1999

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&

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A PARTICIPATORY SURVEY AND INVENTORY OF TIMBER AND NON-TIMBER FOREST PRODUCTS OF THE MOKOKO RIVER FOREST RESERVE, SW PROVINCE, CAMEROON

March / April 1999

ABSTRACT

Recent legislation in Cameroon now means that forest-based communities can, with technical support from the State, manage and legally take control of their own forest resources. However, the development of pilot community forest area has been hindered by a lack of field-based efforts to implement appropriate methodologies for the development of suitable management plans that allow for community-based management of forest resources. Whilst the need for participatory resource surveys and inventories has been highlighted, there are few examples, nor indeed an established protocol that allows these to take place. Recent work by CARPE has highlighted the potential of non-timber forest products to contribute to conservation and development initiatives, especially when managed in conjunction with timber resources; there is no exclusivity to forest management, many species have a wide range of, often over-lapping uses. This work presents the results of a participatory survey and inventory undertaken in the Mokoko River Forest Reserve, in collaboration with the Mount Cameroon Project; the first of three such studies to be undertaken by IR1/CARPE in Cameroon. Based on a rapid ethnobotanical survey, key timber and non-timber forest resources were identified and enumerated in two key sites. Whilst essentially a methodology-testing exercise, enough data was gathered to determine the effects of current exploitation levels a population structure of each taxa. Based on these data, rough estimates regarding the potential harvest of these key resources are proposed. Recommendations for domestication and/or better management are also outlined. This work could also form the baseline from which an integrated community-based ecological monitoring programme could be established.

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LIST OF ACRONYMS

BA	basal area
CARPE	Central African Regional Programme for the Environment
CDC	Cameroon Development Corporation
Dbh	diameter at breast height
DfID	Department of International Development (UK)
GDF	Global Environment Facility (World Bank)
GTZ	German Aid Agency
IR1	Intermediate Result 1
LFRMSs	Local Forest Resource Management Systems
MCP	Mount Cameroon Project
NTFPs	non-timber forest products

1. Introduction

1.1. Background to the Intermediate Result 1 (IR1) / Central African Regional Programme for the Environment (CARPE) Objectives and Programme in Cameroon.

The IR1 component of CARPE is working in three geographic areas in Cameroon: Mount Cameroon in SW Province, Plaine Tikar in Centre Province and Djoum in the South Province. These sites were chosen because they represent a cross-section of forest ecosystems which, while found in Cameroon, are ecologically representative of key Congo basin forest ecosystems. These include montane forest, Congolian forest-savannah transition zone and lowland evergreen forest respectively. These areas also contain representative forest based economic systems, which together with the ecological elements, form the core of IR1 CARPE's "local forest systems". The choice to select stratified zones was premised on the belief that results from these program areas would be representative of social, cultural and ecological variables found in large areas of the Congo Basin, and therefore relevant to the CARPE partners working throughout the Basin.

IR1's premise is that it is possible to promote socio-cultural and socio-economic conditions that will reduce deforestation and promote biodiversity in key forest eco-regions and habitats outside of protected areas in the Congo Basin. Within the three program sites, IR1 is focused on three activities: local forest resource management systems (LFRMSs), forest resources and incentives. The IR1 approach targets identification of strategies, methods, and action research activities to determine how, if at all, LFRMSs can be strengthened to promote the larger CARPE objective of reducing deforestation throughout the Congo Basin and maintaining the region's biodiversity.

IR1 CARPE is investigating the interaction between local institutions, forest resources and incentives to determine what kind of approaches are effective in mobilising communities to take conservation actions. Through its strategic approach, IR1 hopes to determine what the components for a "sustainable forest resource utilisation ethic" could be in the Congo Basin, identifying factors under which communities could contribute to a grassroots environmental advocacy consistent with CARPE objectives in the region.

1.2. The Mount Cameroon Project and the Mokoko River Forest Reserve

The Mount Cameroon Project (MCP) evolved from the former the Limbe Botanic Garden and Rainforest Genetic Conservation Project which itself was launched in 1988. The Project is managed by the Cameroon Government in co-operation with the British Government's Department for International Development (DfID) and the German Overseas Aid (GTZ). Additional funding to support biological and socio-economic surveys is also provided by the World Bank's Global Environmental Facility (GEF). The mission of MCP is to maintain the richness and diversity of plants and animals in the Mt. Cameroon region, by helping people and institutions to manage the forests wisely, so that they continue to provide benefits forever. Due to the complex and highly unpredictable socio-economic context of forest conservation in the area, sustainable management system and participatory approaches that link biological, social and economic factors are being developed and tested in pilot villages.

Since 1994, the new forest legislation of Cameroon has changed, allowing more community participation in management of forest and forest resources. This is a welcome change for MCP's activities since it allows a greater flexibility as to the choice of forest management and legal tenure that would be appropriate for the Mt. Cameroon region. Together with the local

population and the various stakeholders, MCP is developing an appropriate and adequate form of participatory management plan in which the social and the economic needs of the local people are given much more consideration.

The Mokoko River Forest Reserve, one of the focus areas of MCP activities, is of high conservation value for both its flora and fauna (see **section 2**, below). Land use in the area in changing rapidly due to both population increase and agricultural encroachment. As a result, the majority of the lowland forest at the vicinity of the reserve has been degraded and fragmented. Although encroachment into the reserve itself is not significant at present, MCP is currently developing participatory conservation approaches with the local communities and all stakeholders involved in order to ensure the sustainable management of the Mokoko Forest Reserve.

2. Background to the Mokoko River Forest Reserve

2.1. Introduction

The Mokoko River Forest Reserve (4°21'-4°28'N; 8°59'-9°07'E) is situated to the north-west of the Bambuko Forest Reserve and touches the edge of the Boa Plain and covers an area of 9,100ha. The reserve is bordered in the south-east by the Onge River, to the north-east by the Meme River estuary, to the north, the Mokoko River and to the west by the River Boaba. The reserve was created in 1952 as a production forest and this legal status has remained unchanged by the successive Forestry Laws of 1983 and 1994. Currently, the reserve has no management plan.

2.2. Climate

Annual precipitation on the Western flank of Mount Cameroon varies between 3,000mm and 4,000mm and declines further east of Mokoko in a rain shadow caused by the Mount Cameroon massif. There is a single rainy season between March and October. December, January and February are relatively dry months, often with no rain falling at all. The annual mean temperature is 27°C.

2.3. Geomorphology and Soils

The Mokoko Forest Reserve is situated at an altitude between 120 to 360m, on the north-west inferior slope of Mount Cameroon. The majority of the reserve is seated on ancient volcanic rocks, basalts and trachites. Nearer the sea, there are small areas of more recent alluvial deposits. The soils that predominate within the reserve have been formed by an association between ancient and recent volcanic material with a small area of non-volcanic sedimentary sandstone-derived soil nearer to the Boa Plain.

2.4. Vegetation

The forest of the Mokoko Forest Reserve, along with that of the Onge River Valley, today constitute the most intact and extensive forest of the foothills of Mount Cameroon with the majority of the lowland forest in the having been converted to industrial plantations in the early colonial period. As such, they are extremely important, both in terms of biodiversity value (Cable and Cheek, 1998) and for indigenous use and management (Sharpe, 1997).

TABLE 1. Forest cover and land use in the Mokoko River Forest Reserve and its Environs. (Modified from ERM, 1998).

Forest cover	Area (hectares)
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Land use	
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Total	[illegible]

The vegetation of the Mokoko Reserve was originally described by Letouzey (1985) as being of the "Atlantic Biafran evergreen forest with numerous Caesalpiniaceae" formation. Whilst this general description certainly encompasses the general physiognomy of the area, Letouzey's classification, at 1:500,000 scale with limited ground-truthing, does not allow for more subtle variations in vegetation that are characteristic of the forests around Mount Cameroon. Subsequent field work and observations have built upon Letouzey's original classification (Gartlan, 1989; Thomas, 1994).

Based on preliminary Mount Cameroon Project inventory results, Thomas (1994) suggests that the vegetation of Mokoko is comprised of two forest types that inter-grade completely. To the south, where the rainfall is higher, is what Letouzey (1985) described as Atlantic Biafran Forest with Caesalpiniaceae with *Oubangia alata* (Scytopetalaceae) and other coastal indicators such as *Protomegabaria stapfiana* (Euphorbiaceae), *Dichostemma glaucescens* (Euphorbiaceae), *Octoknema affinis* (Octoknemataceae), *Tapura africana* (Dichapetalaceae) and many Olacaceae.

Moving progressively northwards, the coastal forest grades into Atlantic Biafran forest with Caesalpiniaceae well represented by gregarious genera such as *Didelotia*, *Hymenostegia afzelii*, *Microberlinia bisulcata*, *Monopetalanthus*, *Plagiosiphon* and *Tetraberlinia bifoliolata*. The Myristicaceae are also an important component of this forest, represented in particular by *Coelocaryon preussii*, *Scyphocephalium mannii* and *Staudtia stipitata*. The narrow endemic *Medusandra richardsiana* (Medusandraceae) along with *Oubangia alata* (Scytopetalaceae) dominate the understorey along with *Garcinia mannii* (Guttiferae) and *Lasianthera africana* (Icacinaceae), both important NTFP resources. The genera *Cola* (Sterculiaceae) and *Diospyros* (Ebenaceae) are also important components of the lowland forests of northern Mokoko. Cable and Cheek (1998) state that the forest types found in the northern Mokoko area in particular, show clear affinities with the southern Korup area and, to a lesser extent, to the forests immediately south of the Sanaga.

[1] The majority of the Mokoko Forest Reserve falls under this category.
[2] Despite the relatively small area actually planted with commercial crops, CDC actually lease 16,740ha in the Mokoko and Boa Plains area (see Table 3).

TABLE 2. Floristic summary (dominant families and numbers of species) in the Mokoko River Forest Reserve. (Modified from Thomas, 1994).

Family	No. of species	% of total trees	% of total basal area
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
TOTALS	[illegible]	[illegible]	[illegible]

FIGURE 3. Dominant families in the Mokoko Forest Reserve in terms of relative density. (Modified from Thomas, 1994).

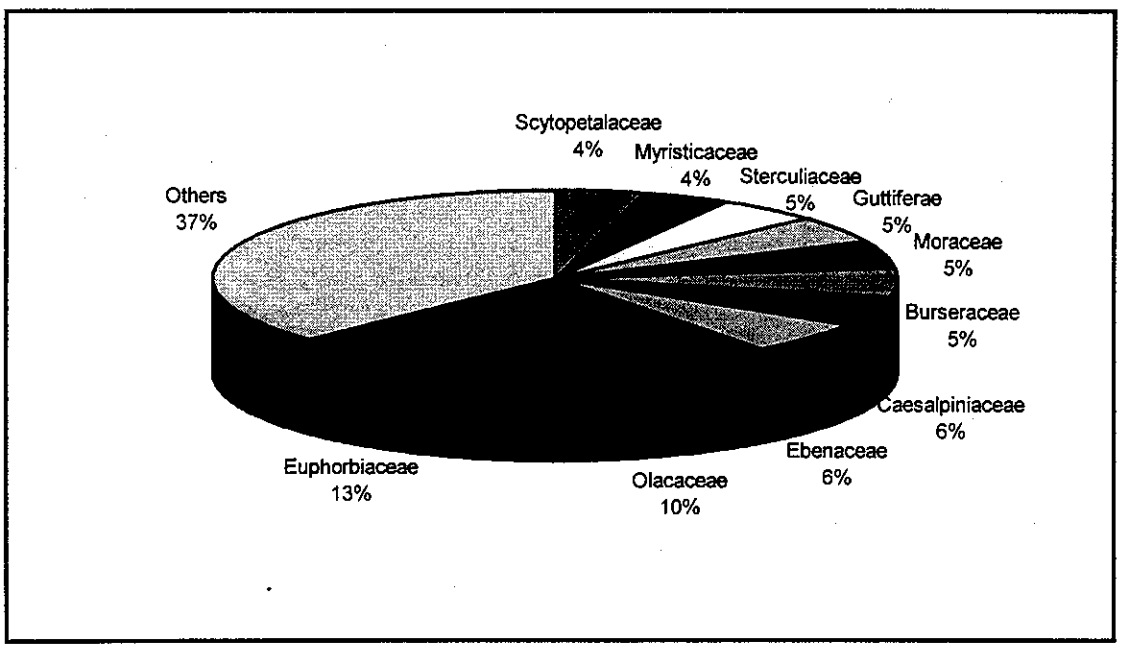
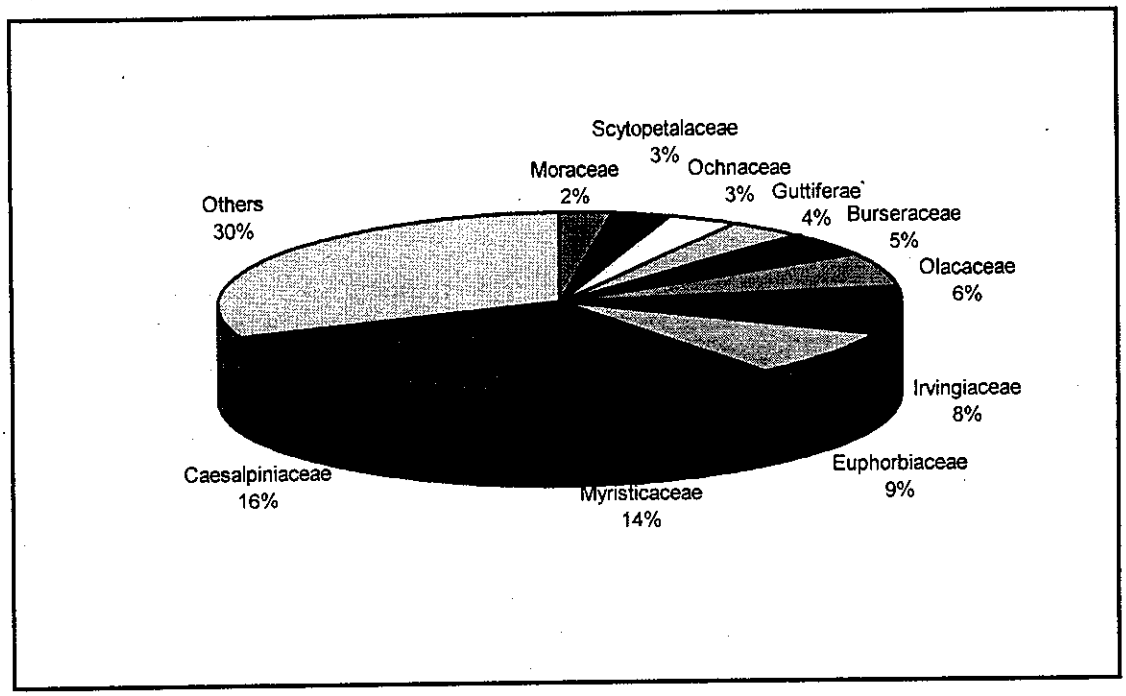


FIGURE 4. Plant families in the Mokoko Forest Reserve in terms of relative dominance. (Modified from Thomas, 1994).



In addition, the vegetation was described by Gartlan (1989) as having certain semi-deciduous elements at its western edge. These latter elements originate from the rain shadow present to the north of Mount Cameroon which has species communities present more often associated to those of the drier, eastern parts of Cameroon such as *Triplochiton*, *Ceiba* and many other representatives of the Meliaceae and Sterculiaceae. The presence of these species more commonly associated with drier forest, was confirmed by the MCP inventory and subsequent field observations (Thomas, 1994).

Another interesting component to the flora of the Mokoko area is the presence of the sub-Sahelian palm, *Borassus aethiopum*, which is at the southern-most edge of its range. These *Borassus*-dominated savannahs occur on deep ash soils, and are a highly unusual formation in what is, essentially, a forest zone.

2.5. FAUNA

Along with the flora, the fauna of the Mokoko River Forest Reserve is reported to have affinities with the Korup National Park and the Rumpi Hills area (Gartlan, 1989). Oates (cited in Gartlan, 1989) also describes four centres of endemism in Africa based on forest refuges. The Cameroon Refuge corresponds to the Cameroon Faunal Region, one of nine areas in Africa with a distinct primate community. The Cameroon Faunal Region is centred on Mount Cameroon, and includes the Mokoko River Forest Reserve.

Although a recent faunal inventory has been undertaken, the results are not as yet available. However, Gartlan (1989) states that a number of key species; the drill (*Mandrillus leucophaeus*), red-capped mangabey (*Cercocebus torquatus*), red-eared monkey (*Cercopithecus cephus erythrotis*[3]), putty-nosed monkey (*C. nictitans nictitans*), the potto (*Perodicticus potto*) and the Calabar angtwanibo (*Arctocebus calabarensis*), are present in the

[3] Scientific names have been revised after Kingdon (1997).

Reserve, but are under threat from continued hunting pressure. Chimpanzees (*Pan troglodytes*) are also present, but are also subject to hunting (Gadsby and Jenkins, 1992).

A number of large mammals occur in the Mokoko Reserve which do not occur anywhere else in the Mount Cameroon region. These are listed by Gadsby and Jenkins (1992) and include the West African manatee (*Trichechus senegalensis*), hippopotamus (*Hippopotamus amphibius*), water chevrotain (*Hyemoschus aquaticus*), forest buffalo (*Syncerus caffer nanus*), sitatunga (*Tragelaphus spekei*) and the yellow-backed duiker (*Cephalophus sylvicultor*). It is clear that the Mokoko River Forest Reserve is a repository of a wide range of fauna, much of which is endemic to the area.

During the course of the field work, two recent chimpanzee nests were sited (one each on transects 1 and 2). Signs of the red river hog (*Potamochoerus porcus*) were widespread throughout the sample area where large areas of disturbed soil indicating where they has been grubbing for roots and fallen seeds. In addition the uncommon sleeping deer (probably *Cephalophus silvicultor*) was spotted twice, being disturbed during its daylight slumber.

2.6. Socio-Economy and Human Perspectives

2.6.1. Introduction

The total population within the villages surrounding the Mokoko Forest Reserve is estimated to be over 49,500 (ERM, 1998). The majority of these people depend on the forest to sustain their livelihood. An average household contains about 5-10 people. The people indigenous to the area are from three natives clans: the Balondo, Barombi and Bamusso (or Bakolle), each with different historical patterns of settlement. Also found in the area are small pockets of people with Bomboko origins. In addition to these native groups, there is a large number of immigrants from other parts of Cameroon and particularly from Nigeria who have settled in the area to practice agriculture, fishing, but predominantly, to work in the commercial plantations of the Cameroon Development Corporation (CDC).

2.6.2. Land Tenure

In the majority of the Mokoko area, land is formally owned by the State. However, in practice, the native community collectively owns most land. This community-owned land is administered by the chief and elders, within patrilineal groups, according to customary laws which vary slightly from village to village These parcels of land are handed down to the younger generations who must maintain them for the unborn. The head of the family is responsible for allocating land to family members. Mature unmarried men can apply for land from the community and will only own the land after one year of work. Furthermore, widows can also inherit their husbands' land. However they can only lease this land and are not authorised to sell it.

The leasing of farmland to non-natives is a major source of income for many natives. Immigrants have no right to buy land and can only rent land on a yearly basis for food crops, and are not allowed to plant long-term economic crops. Trees are not planted on leased land, unless the lease runs for a long period, which is rare, as the trees become the property of the landlord once the lease expires. This insecurity over land tenure reduces the long-term planning potential and generally result in planting products that generate quick returns.

2.6.3. Subsistence Agriculture

The major economic activity of the people in the Mokoko area is farming. More than 90% of households are actively involved in farming both for cash (cocoa, oil palm, cassava and

egussi) and for subsistence (plantains, yams, banana, cocoyams, groundnuts, beans, fruit trees, vegetables, etc.) (Mbani, 1996). Close to the village, the forest is interspersed by small-scale farmers who are mainly natives who grow food crops for subsistence or for sale in local markets. Shifting or "slash and burn" agriculture is practised in the area by many subsistence farmers. This traditional farming method where a patch of forest is cleared and burnt, cultivated for a short time then left to recover for a short period is a major cause of forest destruction.

At the beginning of the planting season, a mixture of crops such as plantain, egusi, coco-yams, cassava and maize is planted. After a couple of harvests, another plot of the forest is then selected while the first is left fallow. This practice involves more land conversion from forest to farmland and fallow thus reducing the soil fertility and the vegetation cover.

2.6.4. Commercial Agriculture and Plantation Development

The total area of the Cameroon Development Corporation (CDC) leasehold in the Boa Plain, Illoani and Mokoko area is about 16,700 ha out of which 3,700 ha are covered by existing plantations, 4,100ha by degraded forest and chop farms and the remaining 8,900 ha by intact forest or good forest (ERM, 1998). The forest at the vicinity of the reserve is under serious threat of deforestation since a large portion of the lowland forest in its hinterland has been cleared for large-scale industrial plantations and hence depriving the local population with land available for subsistence agriculture. On the Boa Plain CDC have lease holding a large track of forest for palm oil and rubber plantation and they propose to clear part of the remaining leasehold land (up to some 5,000ha), much of which is lowland forest. Although the reserve is not yet significantly affected by agricultural encroachment, further CDC expansion in the Boa Plain area would cause land shortages in nearby villages and drastic social problems since land needed for current and future crop production will be taken (Tchouto *et al*, 1998). The threat of future encroachment into the forest reserve is imminent if this expansion continues.

Table 3. Land use on CDC-leased land within the Mokoko / Boa Plain area. (Modified from ERM, 1998).

Land use type		Area (hectares)
Non-plantation		
Degraded forest & chop farms		[illegible]
Undisturbed forest		[illegible]
	Sub-total	[illegible]
Industrial plantations		
Oil palm		[illegible]
Rubber		[illegible]
[illegible]		[illegible]
	Sub-total	[illegible]
Total CDC [illegible] area		[illegible]

2.7. Current Forest Exploitation

2.7.1. Timber and Non-Timber Forest Products

The Mokoko River Forest Reserve possesses an enormous variety of timber and non-timber forest resources. These forest products form an integral part of the rural economy and contribute to all aspects of rural life including primary health care, construction, nutrition, crafts, ritual etc. Both timber and non-timber forest products are covered in more details in **Sections 3 & 4** (below).

2.7.2. Hunting

As discussed in **Section 2.5**, hunting is a major activity in the Mokoko Forest Reserve. Several households are known to rely on hunting for subsistence or for sale (Gadsby and Jenkins, . Pressure on wildlife also comes from local and immigrant hunters who use destructive and unsustainable methods such as wire traps to meet the high demand from local and urban markets. MCP is in the process of assisting the villages around the Mokoko Reserve to establish a Hunters Union to begin to manage the wildlife resources in the area on a more sustainable basis, concentrating on those animals that are more abundant, proposing moratoria on those that are considered endangered (Etuge *et al.* 1998).

2.7.3. Fishing

In the coastal villages, fishing is a major economic activities which is almost exclusively carried out by Nigerians. Small-scale freshwater fishing is practised in local rivers by natives, often with the use of nets, or large fish traps.

3. Non-Timber Forest Products

3.1. Introduction

A wide range of non-timber forest products are exploited from the Mokoko Forest Reserve. Many of these are utilised at the household level, but certain key resources contribute significantly to the rural economy. In addition, a number of key resources contribute to a thriving export market, usually to Nigeria, in forest products. Management and control of forest resources varies widely; some resources, despite their value are "open-access" resources (e.g. rattan, **njansang**), whilst others are "owned" and managed by individuals and families (bush mango). Other resources are not managed at all and are exploited solely by outsiders (e.g. chewstick, Hausa stick) who pay the village a levy before entering the forest. Attempts by Cameroonians to enter the thriving trade in these products have often been thwarted by the dominant Nigerian control of the market.

Often the levy paid to a village is paid directly to the Chief and/or the village council, but sometimes the fee is paid to other groups who traditionally manage the resource (e.g. the compensation of women's groups - **mosembe** - for the exploitation of bush mango). Indeed the majority of local NTFP exploitation is undertaken by women (Etuge *et al.*, 1998), especially that of fruit collection (bush mango, **njabé, njansang**) whilst men undertake the more arduous collection of rattan and timber resources. Exploitation of high value resources such as chewstick by outsiders is almost exclusively a male activity. As exploitation of NTFPs is concentrated in farm bush and secondary forest, certain products are becoming rather scarce and in order to harvest them, it is now necessary to travel further into the bush. Because of this, the reliance on NTFPs for household incomes has lessened somewhat in some communities (*ibid.*).

3.2. Criteria and Methodology for Species Selection

The species to be enumerated for this inventory were preliminarily based on those selected by the CARPE non-wood forest product workshop held in May 1998 in Limbe. One of the major outputs of this expert workshop was to identify the most important non-timber forest products of the Central Africa region and determine priorities for further work for these, and other important taxa. The recommendations included the development of appropriate methods for baseline data collection and monitoring of key NTFPs as well as the need to understand the process, benefits, constraints and impacts of domestic production and promote domestic production (cultivation) of over-harvested NTFPs where appropriate.

Whilst this list provided a list of key taxa for the whole Central African region, it is clear that not all species occur in all forested areas of the region. In addition, in some areas other taxa are of more economic importance than the so-called key species, although they might not have been initially included on the CARPE species wish-list.

To that end, prior to the field work commencing, in order to enumerate those high-value NTFPs that truly reflected those exploited from the Mokoko region, it was necessary to determine exactly what plant resources are of importance. This was undertaken in three main stages:

- Consultation with LBG botanical staff who have a long history of botanical field work in the Mokoko area;
- Village-based consultation with the Chief, village elders, traditional council, farmers groups and youth representatives;
- Forest-based consultation with village technicians immediately prior to the commencement of field work.

During each consultation, the CARPE wish-list of desired taxa was presented and discussed, along with the aims and objectives of the study and subsequent inventory. Many taxa on the CARPE list were not considered of particular importance in Mokoko (either because they do not occur there, or are simply not exploited on any appreciable level) and others, which are important for both household and commercial consumption, were added. In essence, the first two consultations provided a rapid ethnobotanical overview of NTFP resource use in Mokoko, whilst the final consultation confirmed the list produced from these previous consultations and provided the field staff with a final, definitive resource list of those species to be included in the inventory.

TABLE. 4. NTFP resources identified as being the most important, in terms of value, in the Mokoko Forest Reserve.

Species	Family	Vernacular name	Uses	Edible fruit	Forest type
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* See detailed description below.

3.3. General Species Accounts

3.3.1. *Baillonella toxisperma* (Sapotaceae) - **njabé, moabi**

A large tree up to 40m tall, often predominant in farm bush and late-secondary forest. The seeds produce a viscous oil used as a condiment and as a medicine and they are widely traded throughout the Central African region. Cameroon, in particular, exports large quantities of whole seeds to Gabon and Equatorial Guinea (Yembi, in press; Sunderland and Obama, in press). The seeds are also used in the manufacture of foot-rattles in traditional dances and celebrations. The tree is also prized for its timber, the exploitation for which has caused considerable scarcity in some areas in Central Africa (IUCN, 1998). Felling for timber is often the cause for considerable local conflict when the tree, managed by local communities for its valuable seed, is felled by outside concerns for immediate timber revenues.

3.3.2. *Cola acuminata* (Sterculiaceae) - kola nut

Cola acuminata is a medium-sized slender tree occasionally reaching to 12m, but is more commonly between 6-9m tall. It is naturally found in secondary forest and in the farm / forest interface, probably due to a long history of cultivation.

There is considerable confusion between this species and that of *C. nitida*, which produces similar fruits; in fact the fruits of both species are widely traded and have been cultivated on both subsistence and commercial scales. Originally, *C. nitida* was distributed in West Africa from Sierra Leone to Benin with the highest frequency and variability occurring in Ghana and Côte d'Ivoire; an area now accepted as its centre of origin (Opeke, 1997). This area remained for long the only source of kola nuts (**gbanje kola**) to the African trade routes, with the majority of the nuts originating from wild populations. *C. acuminata* (**abata kola**) on the other hand, has its original distribution from Nigeria to Gabon. Around 1900, widespread cultivation of both species led to the introduction of *C. nitida* as far as Zaire[4] (now the Democratic Republic of Congo) and *C. acuminata* as far as Côte d'Ivoire. Hence, the original distribution of these species has become significantly wider, and geographical distinction is a little blurred. Although the species are very similar (the fruits are impossible to tell apart) there are certain differences between these species in the field (see Russell, 1955) which are often recognised by local harvesters who use the vernacular names listed above (**abata kola** for *C. acuminata*; **gbanje kola** for *C. nitida*).

Kola nuts can vary considerably in colour, ranging from white to dark red with a single tree often producing the full range of seed colours. Planted stock of *Cola acuminata* often

[4] Plantations of *C. nitida* were also established in Jamaica; the nuts were a major ingredient of Coca-Cola but have subsequently been replaced by a synthetic stimulant.

produces fruit within five to seven years. Harvesting activities include the collection of fallen fruit or by pulling down semi-mature fruits with hooks attached to long poles. The large green fruits are cracked at the harvesting site and the nuts are then transported back to the village where the thin outer seed coat is removed. Occasionally, if the nuts are to be transported a long distance, this seed coat is left on to be removed later by the market traders. Kola nuts can be stored for up to two years if kept free from moisture.

In the Mokoko area, only **abata kola** is recognised; descriptions of the species commonly encountered in farm fallows confirm this. Unfortunately, no individuals of *C. acuminata* were encountered during this inventory probably due to lack of sampling in the appropriate forest type.

3.3.3. *Cola lepidota* (Sterculiaceae) - monkey kola

The fruits of monkey kola (*Cola lepidota*) are commonly collected in the Mokoko forest for household consumption or spontaneous forest use. The mesocarp is sweet, and the whole, young seed is often consumed. It is an understorey tree to 10m, more often encountered in primary forest.

3.3.4. *Dacryodes edulis* (Burseraceae) - bush plum

The bush plum is a medium-sized tree more often associated with home gardens and permanent cultivation systems; the trees are planted both for shade as well as their edible fruit[5]. Much selection has been undertaken to obtain improved cultivars that provide both high yields as well as larger and more pulpy fruit. However, the species still occurs in the wild, albeit with a smaller, and less fleshy fruit. These wild bush plums are also harvested and consumed at the household level. In both cases the savoury fruits are boiled or roasted, and are often consumed with fish.

3.3.5. *Enantia chlorantha* (Annonaceae) - yellow bark

A medium-sized forest tree to 25m, more commonly found in late secondary forest and, less commonly, in high forest. A small quantity of the bark is stripped and is used to treat malaria, yellow fever and other many "fevers". This species is a dominant component of primary health care throughout Central Africa and substantial quantities of the bark are traded to Gabon and Equatorial Guinea from Cameroon (Yembi, in press; Sunderland and Obama, in press). The bark of *Enantia* is an open-access resource and is harvested both at time of need as well as more spontaneously when encountered in the forest. It is rare for an individual of *Enantia* to be stripped such that it ring-barks the tree causing long-term senescence and subsequently, death and, in general, harvesters remove enough for their immediate use only. The bark regenerates well and enough callus tissue form to allow re-stripping within 6-12 months.

3.3.6. *Garcinia mannii* (Guttiferae) - chewstick

Along with bush mango, this is the most important NTFP of the Mokoko Reserve. *Garcinia mannii* is a dominant component of the lower-mid canopy in closed-canopy forest, but occasionally reaches heights of 30m. The split wood is used as a chewstick and is used by the majority of rural (and increasingly urban) populations for dental care. The market for chewstick is particularly strong in SE Nigeria and there is a strong trade in raw logs of *Garcinia mannii* from the Mokoko area to Calabar and Oron. The logs are transported by canoe via the river creeks. The collection and trade of *Garcinia* logs is undertaken exclusively

[5] This species has become so inextricably interlinked with cultivation that Ibo farmers in Nigeria wait until the tree produces flower buds before planting their field crops (Dalziel, 1937).

by Nigerians who pay the village council a standard fee for access to the forest. The collectors of the *Garcinia* logs often stay in the forest for weeks at a time, prospecting for suitable stems and then felling and stacking the boles before head-portering them to the village for transportation. *Garcinia* logs are also recovered during farm clearance operations during the dry season each year; often they would be simply burned along with the rest of the felled woody vegetation. The preferred size class for exploitation is 8-20cm dbh.

3.3.7. *Gnetum* spp. (Gnetaceae) - **eru**

There are two species of *Gnetum* in Central Africa; *G. africanum* and *G. buccholzianum*, with differentiation of the two species being particularly difficult in the field. Both species are slender vines, up to 60m in length that are more common in mid to late-secondary forest. The young leaves of this species are finely shredded and added to soups and stews and, again, are widely traded, not only in Central Africa, but there also exists a complex trade route from Cameroon to Nigeria and from there, to Europe and North America (Tabuna, in press). Up to 400 tonnes a year are exported via the port of Idenau in SW Province alone (Bokwe and Ngatoum, 1994). The vines are pulled from the canopy, and tied with the leaves being stripped and shredded later. Due to this destructive harvesting, **eru** has become very scarce in many areas, especially where good transport routes facilitate its trade. Although identified as an important NTFP by many people in the Mokoko area, and is undoubtedly present, none was encountered during this inventory, almost certainly due to the lack of sampling in the appropriate forest type.

Despite the relative ease of cultivation of eru as proven by IRA at Kumba and the Limbe Botanic Garden, both in SW Province, there are currently no known community-based initiatives supplying the buoyant market for this product. Local scarcity has led to substitution with other leafy vegetables (see below).

3.3.8. *Heinsia crinita* (Rubiaceae) - **atama**

A shrubby forest species, more commonly encountered in closed-canopy forest. The young leaves were traditionally collected and eaten as a vegetable by the Efik people of Nigeria. However, with the scarcity of **eru**, its substitution with *Heinsia crinita* and *Lasianthera africana* has become commonplace on the Cameroon side of the border as well. Both species are also now being used to adulterate and bulk-up shipments of **eru** from Cameroon to Nigeria.

3.3.9. *Irvingia gabonensis* (Irvingiaceae) - bush mango

Bush mango, a large forest tree to 40m, is one of the most important NTFPs that contributes directly to household incomes in the Mokoko area. The seeds are cracked open to reveal a flat, brown kernel that is used as a soup thickener. Bush mango seeds are also widely traded both nationally and internationally (Ladipo, in press; Sunderland and Obama, in press; Yembi, in press; Kimpouni, in press; Tabuna, in press). The major markets supplied by the Mokoko resource are those of Calabar and Oron in SE Nigeria.

There are two major species of bush mango (Harris, 1996; Ladipo, in press). The sweet bush mango, *Irvingia gabonensis*, produces its fruit in July, and is commonly encountered in the Mokoko Forest Reserve. The bitter bush mango, *I. wombolu*, produces fruit in the dry season (January-February). Whilst the latter is the preferred species for trade due to its more mucilaginous nature, the widespread distribution of *I. gabonensis* means that it is more commonly traded (Ladipo, in press). Indeed, *I. wombolu* is not present in the Mokoko Forest Reserve (Thomas, 1994; Harris, 1996) although both *I. robur* and *I. grandiflora* are present, local indigenous knowledge of these resources is sufficient to differentiate these species from the harvested *I. gabonensis*.

The fruiting season of bush mango (July) heralds a normally unprecedented time of community collaboration when whole families go to the bush to harvest the fallen fruits. The resource is wholly community managed with each family making claim to their "own trees" within the forest under which they harvest each year. The location of good fruiting trees of bush mango is widely known by the majority of the community and they are often used as landmarks in the forest. During the harvesting season the freshly fallen fruits are gathered into piles and then cracked open to reveal the kernel. The kernel is then removed with a gouge of some sort (usually a filed cutlass or knife) and are then transported to the village where they are sun-dried, reducing them to about half of their fresh weight. The advantages of processing the kernels in the forest are obvious; freshly-processed kernels weigh about one-tenth of a whole fruit.

Although the kernels are able to be stored for some time, they are often transported as soon as they are dry. Local harvesters often sell the product direct to Nigerian buyers, who then transport the kernels by canoe to Oron and Calabar. Attempts by Cameroonian traders to enter the valuable Nigerian market themselves have been thwarted by the close control that the Nigerian traders have on the market.

3.3.10. *Lasianthera africana* (Icacinaceae) - **eritan**

This species is a medium-sized shrub or, less commonly, a treelet, and is a common component of closed canopy forest in Mokoko. Along with *Heinsia crinita*, the young leaves of this species are used as a vegetable and provide an adequate substitute for *Gnetum* leaves. *Lasianthera* leaves are also commonly found in **eru** shipments to Nigeria (Bokwe and Ngatoum, 1994) to bulk-up the consignment.

3.3.11. *Massularia acuminata* (Rubiaceae) - Hausa stick

An understorey shrub, or treelet that sometimes reaches the mid-canopy, more often encountered in closed-canopy forest. The young flexible branches of this species are exploited by Hausa traders who transport large bundles of them to Nigeria where they are used for cattle fencing and, less commonly, chewsticks. The Hausa cattle drivers who transport cattle from the savannah grazing plateau's to the lowland areas also use the sticks to control the herd as they are both durable and flexible. The wood is also resistant to insect attack, particularly termites. The sticks are harvested by Hausa traders, who often employ local youths to assist in the removal of the bundles from the forest. Subsequent transportation to Nigeria is by canoe. The sticks are transported for sale as far as the Kano market in northern Nigeria.

3.3.12. *Piper guineensis* (Piperaceae) - bush pepper

Bush pepper is another important exported forest product (Sunderland and Obama, in press; Groves and Maisels, 1999). *Piper guineensis* is a slender climber that occurs in both secondary and closed-canopy forest but has also undergone some attempts at cultivation. The small black fruits of bush pepper, once dried, form the basis of pepé soup, a traditional staple of SW Cameroon and SE Nigeria which is a reputed cure for hangover, and other forms of over-indulgence. Large quantities of the fruits are packed and transported to Nigeria from both Cameroon and Bioko (Equatorial Guinea) and the trade is extremely profitable; probably the highest value of any NTFP in both areas (Sunderland and Obama, in press; Ambrose-Oji, 1997). Some commercial bush pepper exploitation occurs in Mokoko but is again restricted to outsiders, mostly Nigerians, who pay a considerable (although unspecified) levy to the village council before entering the forest.

3.3.13. Rattans (Palmae)

Rattans are climbing palms exploited for their flexible stems which occur in a wide range of forest types (Sunderland, 1998 & in press). These stems are used either split or whole and utilised for the manufacture of a wide range of household products; from bridges to baskets, from fish traps to furniture. Raw cane is often traded and cane from Mokoko supplies many of the local community-based artisans in the area (Etuge *et al.*, 1998). Although a number of different species occur in the Mokoko area, only two, *Laccosperma secundiflorum* and *Eremospatha macrocarpa* are of economic importance. However, the other species are used, albeit spontaneously, by local communities and have also been included in this inventory.

It is important to note that for the purposes of any inventory including rattan, the most important criteria for measurement is not only the number of stems per hectare, but the stem length. Furthermore, this stem measurement should also take into account the actual harvestable part of the stem. This is usually the lower portion of the stem where the leaf sheaths have sloughed off and the stem is essentially free of conspicuous junctions. Stems with the nodes in-tact are not easily worked and harvesters thus discard these parts of the plant. Hence, when determining the rattan resource and its potential yield and sustainability stem length is the most important criteria for measurement, along with the actual harvestable length.

Other species that occur in the Mokoko Forest Reserve that are exploited on a more spontaneous basis include:

Eremospatha hookeri
E. wendlandiana;
Laccosperma laeve;
L. opacum;
L. acutiflorum;
Oncocalamus sp.;

Harvesting rattan is currently undertaken solely from the wild and is an unpleasant and often dangerous occupation with dead branches being dislodged as well as ants and wasps being disturbed. The raw cane is bundled and then head-portered out of the forest and either used at the village site or transported further afield to urban centres of production. The majority of harvesting for commercial trading is undertaken by individuals, usually farmers, hunters or other people primarily involved in other occupations.

Rattan harvesting provides an extra revenue, especially at time of need such as for medical expenses or the payment of annual school fees. Many cash-crop farmers also harvest rattan to obtain extra capital to purchase chemicals, planting stock and other necessary items for their primary occupation.

In general, rattan harvesters often exploit in the same forest area. If the harvester is not an indigene of the area, the Chief of the local village is usually paid a small retainer for providing access to the forest. The harvesters prefer to collect as close to a motorable road as possible to avoid head-portering the bundled canes too far. In the case of the Mokoko area, this means that the rattan resource within the forest is maintained whilst the individuals growing in more accessible secondary forest and farm fallow, are more heavily exploited.

3.3.14. *Ricinodendron heudelotii* (Euphorbiaceae) - **njansang**

R. heudelotii is a large forest tree, up to 30m tall, which predominates in late secondary forest and farm fallows. The seeds are used as a condiment for soups and fresh fish and has a slightly spicy/peppery taste, as well as imparting a mucilaginous texture to soups and stews.

The large, green, kidney-shaped fruits drop towards the end of the rainy season and are collected into piles under the tree, usually by the women and children of the village. The piles signify both ownership of the fruits (the tree is harvested on a first-come first-serve basis) as well as allowing the pulp to rot, revealing the yellow nuts. Removal of the nuts from the fruit is undertaken by women and children over a period of six weeks to two months and is extremely labour intensive. The seeds can be stored for up to several years and are widely traded from Cameroon to Congo Brazzaville (Kimpouni, in press); Equatorial Guinea (Sunderland and Obama, in press) and Gabon (Yembi, in press). Seeds of *Ricinodendron heudelottii* are also found in urban European markets supplying African ex-patriots (Tabuna, in press).

3.3.15. *Tetrapleura tetraptera* (Leguminosae) - **eseke-seke**

A deciduous forest tree to 25m that may attain a diameter of up to 1.5m. Large individuals possess conspicuous sharp buttresses. This species is more common in late-secondary and closed canopy forest. The long pod-like fruits have a curiously caramel-like odour and are widely used as an additive to soups and stews. They are also sometimes added to palm wine to impart extra flavour. In addition, the fruits are also sometimes used as a fish poison and as a medicine, often for a wide range of ailments (Dalziel, 1937; Laird *et al.*, 1997) and, as such, are widely traded (Sunderland and Obama, in press).

3.4. The Effects of Seasonality

There is a marked seasonality in the collection of and benefits accrued from a number of the NTFPs targeted during this survey, notably, *Irvingia gabonensis*, *Ricinodendron heudelotii*, *Baillonella toxisperma*, *Tetrapleura tetraptera* and the *Cola* species. This is due to the fact that their NTFP value is from their reproductive parts, in all these cases, fruits and/or seeds (although *Piper guineensis* seems to produce fruits all year round). Seasonality is not an issue for those species whose NTFP value is based of vegetative parts of the plants (bark, stems, leaves, wood etc.). However, in general, most NTFP (and farm) activity is avoided during the rainy season. The effects of seasonality are mitigated in some instance through the processing and storage of some products (e.g. bush mango, **njansang**).

Table 5. Seasonality of NTFP activity in the Mokoko River Forest Reserve.

Species	Jan	Feb	Mar	Apr	May	*June*	*July*	*Aug*	*Sep**	Oct	Nov	Dec
B. toxisperma												
Cola lepidota												
Cola acuminata												
Dacryodes edulis												
E. chlorantha												
Garcinia mannii												
Gnetum spp.												
Heinsia crinita												
I. gabonensis												
L. africana												
M. acuminata												
Piper guineensis												
Rattans*												
R.. heudelottii												
T. tetraptera												

* Months in *italics* represent the rainy season.

4. Timber Resources

4.1. Commercial Exploitation

Currently, there is no commercial-scale timber exploitation in the Mokoko area. However, between 1980 and 1990 there was some commercial timber exploitation on a rotational selection basis which is purported to have had very little effect on the forest (Thomas, 1994; ERM, 1998) aside from a distinct network of logging roads throughout the reserve. Because of the topography, these roads and associated skid trails tend to follow the more gentle ridges. As such, most of the forest remains unexploited and, as the remaining timber resources around Mount Cameroon are becoming increasingly scarce, is extremely attractive to commercial timber concerns.

4.2. Local Timber Exploitation

In contrast, localised timber exploitation continues. Local timber exploitation is usually undertaken by individuals who exploit under the following conditions (Mbani, *et al.*, 1994):

- Wealthy individuals, often village élite's who are able to obtain felling permits from the Forestry Department, then contract chainsaw operators to fell the desired tree. More often than not, the quota stipulated by the exploitation license is not adhered to and more trees are felled than originally authorised. The wood is usually transported and sold to urban centres (Limbe - for fuelwood for fish drying - or to Kumba or Douala for construction purposes).

- More recently, easier access to chainsaws has meant that a number of operators are undertaking illegal felling with no attempt to procure a license. The majority of the wood processed by these individuals is sold or bartered locally both for fuel wood and timber construction purposes.

In essence, selection felling of individual trees over a wide area has a minimal impact on the structure and composition as a whole (Johns, 1997; Struhsaker; 1997; Sunderland *et al.*, 1997) especially as the logs are processed *in situ* and the planks are then head-portered to the roadside. The lack of machinery damage often associated with even low-impact harvesting is thus avoided. The fact that the preferred species are essentially those that occur mainly in secondary forest systems is not a coincidence; the labour costs of exploiting trees closer to the roadside are obvious, rather than felling in closed-canopy forest some kilometres from vehicular access.

4.3. Preferred Timber Species

Whilst many arborescent taxa are known to have a number of over-lapping uses (Laird, in press), this does not seem to be the case in the Mokoko Forest Reserve where the majority of preferred timber species do not have any particular non-timber uses regarded as valuable by the Mokoko-based communities. In Mokoko, there is not the traditional conflict between prioritisation of resources that seems to be commonplace in other regions of Cameroon where timber species are exploited, thus denying local communities the non-timber (and long-term) values from that species, often with little or no remuneration for their loss from community lands. Hence, this report has identified relatively mutually exclusive lists of species for timber and non-timber forest products considered as priority resources in the Mokoko River Forest Reserve. However, there are two exceptions:

- The recovery of timber by CDC during its expansion has led to the felling of a number of taxa of some importance to local people. The worst example of this is that of *Baillonella toxisperma*, the nuts of which have been harvested from many individuals for many years and contribute significantly to some household incomes. Protests by villagers have led to negotiations with CDC to retain some valuable NTFP species on plantation land. At the time of writing no agreement had been reached on this. However, it is important to note that this issue does not affect the Mokoko Reserve itself, and is an issue on CDC land only, as yet.

- The oleaginous nuts of *Poga oleosa* are widely consumed, they are collected for household use only (more often only as a food supplement for those hunting or farming in the bush) and are not considered of great importance for their non-timber value. Hence there is little conflict when deciding to maintain the resource for fruits; the timber value is ultimately considered to be the greater.

The most commonly used (and hence exploited) timber species were identified by Mbani *et al.*, (1994), based on Forestry Department statistics, and Etuge *et al.* (1998), based on resource-use interviews. This species identification was confirmed during the course of this survey through the consultation process described above. The most commonly-exploited timber species are presented in **Table 6**.

TABLE 6. Most commonly exploited timber species of the Mokoko River Forest Reserve - not in rank order. (Mbani *et al.* 1994; Etuge, *et al.* 1998)

Species	Family	Vernacular name	Forest type	IUCN Conservation status
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[6] The relative abundance of *Lophira alata* in coastal lowland forest is misleading. Over-exploitation for commercial timber is affecting the long-term health of most **azobé** populations.

5. Inventory Methodology

5.1. Introduction

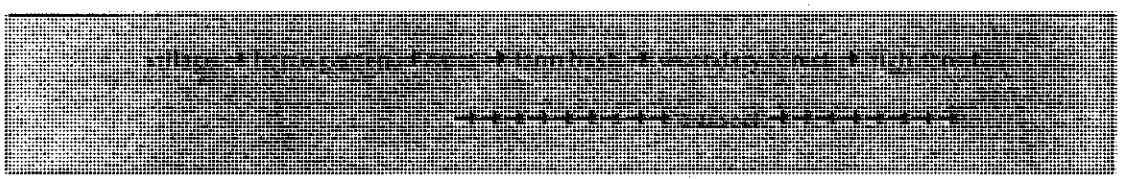
The basic objective of the inventory design is to quantify the number and size distribution of selected plant resources, in this case, NTFPs, within the forest. In general, the results from the inventory can be used to:

- Examine the effect of habitat on the distribution and abundance of particular taxa;
- Assess the impact of harvesting a particular resource;
- Record seedling abundance and regeneration status;
- Document the relationship between resource use and village proximity.

5.2. Layout

Based on considerations outlined in Peters (1994 & 1999) this inventory consisted of a series of parallel, 10m-wide transects. The transects were established along a baseline at pre-determined intervals of 100m (10% sampling) and were 1km in length[7]. The baseline was run perpendicular to the village; the general concept is to walk out from the village in straight lines (the transects), and count and measure all of the stems of the sample species above a certain size. The intention is also to ensure that the full range of forest types is included along the length of each transect.

Figure 5. Transect establishment and forest type.



The transects were laid out exactly 10m wide and were run out along a pre-determined bearing using a compass. Maintaining a constant and correct bearing along the transect is critical in ensuring that all of the strips are parallel.

5.3. Slope Correction

It is essential to obtain the correct horizontal distances through slope correction. This is especially the case on particularly rough or difficult terrain, as is the case in Mokoko. Some of the relief problems were overcome through the use of electronic rangefinders which, although are easy and quick to use, are not appropriate for every situation, nor are they easily available, especially to poorly resourced forestry departments nor local communities. In certain

[7] Ideally, these would have been longer (2-5km, see Peters, 1994 & 1999) but time constraints dictated the need for more numerous, shorter transects.

circumstances during the field work, slope correction was also undertaken by using the traditional method of measuring the slope angle and distance and recompensing using the equation presented in **Appendix 1**[8]:

5.4. Enumeration

Once the transects are laid out, the enumeration team then moved slowly along the transect and carefully searches within 5m either side of the central line for individuals of all the species selected for this inventory. The 5m distance was periodically checked for individuals considered borderline. After some practice, the field workers began to become very adept at estimating which individuals were in the transect and those that were outside. For trees, the lower dbh limit for inclusion was 4cm dbh whilst for rattans, treelets and shrubs, the lower height limit was 50cm.

Each individual of the appropriate species was spotted and checked by the field botanist[9]. The village representatives in particular proved to be the best spotters of the desired taxa. Each individual of the target species was then measured for dbh and/or height; this information was included on the recording sheet, along with the approximate distance along the transect. Further information was also noted, such as life form, phenology and evidence of harvest.

5.5. Tagging

Each individual measured was then tagged with its own unique number. The aluminium tags were fixed to the individual by attachment with nails (larger trees) or by the use of wire (shrubs and treelets). The use of semi-permanent tags allows re-measurement at specified intervals to determine the effects of harvesting on specified individuals. The tagging of those sampled species with considerably assist the Mount Cameroon Project in their objectives in monitoring the long-term effects of NTFP harvesting.

5.6. Regeneration

At 100m intervals along each transect, nested 5m x 5m regeneration plots were established. On these plots, all seedlings of the desired species below 50cm in height were counted and recorded. The recording sheets for the regeneration plots were separate from the general recording sheets for the transect data.

5.7. Site selection

The two village sites were selected for the inventory field work, Dikome and Bonjare were selected by the Mount Cameroon Project based on their close proximity to the forest and because of the known short gradation between farm bush to secondary forest to high forest and for the high NTFP collection activities there.

5.7.1. Dikome Gazeteer

Dikome is situated at: 04°29'19"N: 09°00'21"E on a N or NNW direction from the Mokoko Reserve. The centre of the baseline (04°28'41"N: 09°00'48"E) is exactly 1.5km from the centre of the village on a bearing of 164°; a trekked distance of 2.6km. The baseline runs on a direct east-west bearing of 90° with each transect running perpendicular to this on direct north-south bearings of 180°

[8] A table for slope correction also occurs on the side of many clinometers which negates the need to calculate the equation in the field.
[9] In cases of doubt, herbarium collections were made.

Unfortunately, significant land clearance by the people of Dikome has disturbed the graded interface between farm fallow and high forest and at least 1km of farm fallow and secondary forest was cleared in December and January leaving a very marked distinction between farmland and high forest. Hence, it was not possible to sample across the range of forest types as intended and undoubtedly this affected the data set considerably through the unintentional exclusion of certain desired species.

5.7.2. Bonjare Gazeteer

Bonjare is situated WNW of the Mokoko Reserve. The baseline and transect sample area followed the design as for Dikome and the baseline was placed 2km from the village in an area of stratified vegetation from farm bush to secondary forest to high forest at 4°27'11"N; 8°59'51"E.

5.8. Training and Sensitisation

Mount Cameroon Project staff informed the villages of the desire for this work to be undertaken with them. Through meetings with village Chiefs, councils and representatives of youth groups, the outputs of the survey and inventory were outlined, especially with reference to the Community Forestry Management legislation of the 1994 Forestry Code and the implications of the Code with respect to the management of NTFPs. The communities were given the option to participate or not. Both villages decided that this inventory would be beneficial to them, and were particularly keen to have some of their youth (most of whom are essentially unemployed) trained in inventory techniques.

By the time the field team arrived at each site, the village councils had nominated individuals to participate in the work. After initial introductions of personnel and a further detailed discussion of the outputs, specific discussions centred on forest resource use and current management issues. Further discussions confirmed which resources were of economic importance to the village and the final list of target species were drawn up.

At the forest camp, the details of the inventory methodology were outlined to the village representatives and the rest of the field team. A schematic drawing illustrated the transect system to be used and each item of equipment was introduced to the team. Practice in the use of the equipment was made in the environs of the camp for one afternoon. During the field work, job allocation was rotated so that the entire team, including MCP staff, Forestry Department representatives and villager representatives, each had an opportunity to undertake each activity. By the end of the field work, this constant skills re-enforcement ensured that each member of the team could undertake the majority of the tasks required during this (and any future) inventory. Most important than learning skills by rote was the fact that each activity was explained so that the purpose of each was understood.

5.9. Personnel / Task Allocation

A team of seven to nine core staff are the minimum needed for the completion of this work. However, extra staff were available for our own field work which allowed certain tasks to be split, or doubled up (e.g. two dbh tapes in use at any one time) hence the tasks were completed more efficiently.

Table 7. Inventory task allocation and responsibility.

Activity	Task	Responsibility
[illegible]	[illegible]	[illegible]
[illegible]		[illegible]
[illegible]		[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

* These tasks can be split if enough personnel are available.

For a list of the actual personnel who undertook the field work for each site, refer to **Appendix II.**

Box 1. Community Forest Management

[illegible]

[illegible]

6. General Summary of Results

6.1. Data Analysis

Preliminary analysis of the data collected during this survey and inventory, along with further analysis of the MCP 1994 inventory data, was undertaken using a number of computer programmes. Data was entered and managed using Microsoft Excel; graphs and charts were also generated using Excel. Statistics analysis of the data was undertaken with the use of the scientific software programme, Jandel Scientific[10].

6.2. NTFPs

The following table and diagrams present a summary of information for the NTFPs encountered and enumerated as part of this survey and inventory. Further discussion of stocking and the effects of exploitation are discussed in the following species accounts.

As stated in the summary, this inventory provides a baseline for populations of key NTFP resources and summarises the impacts of current harvesting on these taxa. Based on these data, it is also possible to suggest the number of individuals in each taxon group that could be harvested. However, these figures are no guide to sustainability; this can only be measured through a long-term monitoring programme looking at the impacts of harvesting *versus* growth and reproductive rates over a long-period. It is possible though, to state how many reproductive individuals of a species there are in an area and, as such, how many might be currently harvested. The need to quantify forest product use and values is an important component of the community forest legislation. These data are presented in **Table 7**. (below). For rattans, these data are presented in **Table 8** (below).

TABLE 8. Results of inventory for woody NTFPs, and potential number of stems/ha.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[10] All equations used as part of the data analysis are provided in Appendix 1.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Harvestable size
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 9. A summary of the stocking of the commercially important rattans.

Species	Total # of stems	Clump # ha	Mean # of stems clump	Total # of stems	Mean # of stems ha	Total stem length	Mean stem length (m/ha)	Total harvestable length	Harvestable length (m/ha)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 10. Non-commercially harvested rattans <3m in height (includes seedlings and juveniles) - sampled on 4 ha only.

Species	Total # of stems	Mean # of stems/ha
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

TABLE 11. Stocking of *Piper guineensis* in sample area.

Total stems enumerated	Total stem length	Mean # of stems/ha	Mean stem length/ha
[illegible]	[illegible]	[illegible]	[illegible]

6.2.1. *Baillonella toxisperma*

Only one individual of *Baillonella toxisperma* was encountered during this inventory. Accordingly, no data exists for the MCP 1994 inventory. The reasons for not encountering this species is undoubtedly due to sampling in the type of forest not preferred by this species; it is a mid- to late-secondary species.

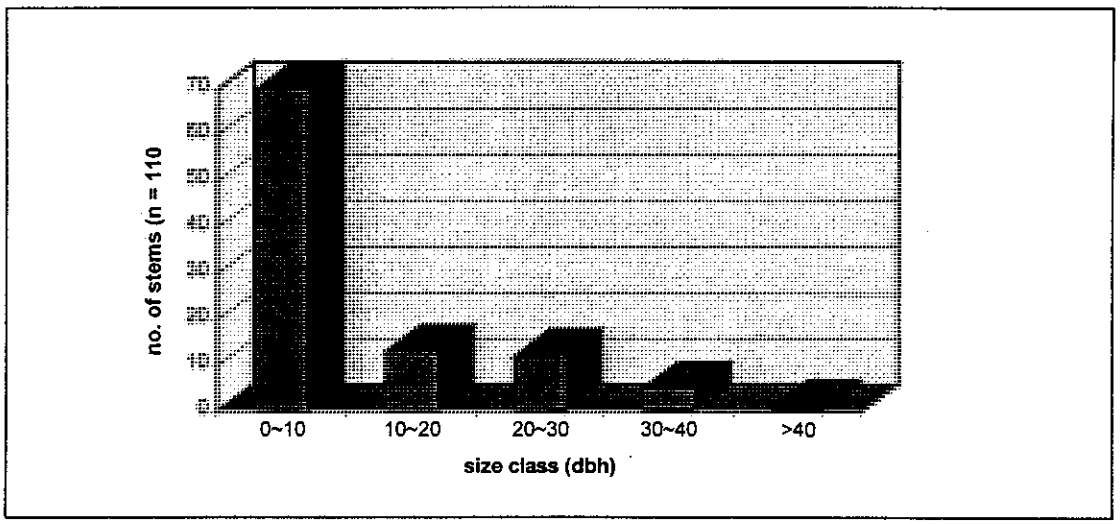
6.2.2. *Cola lepidota*

Despite *C. lepidota* being a common component of the Mokoko Forest Reserve, this species is more frequent in the southern part of the reserve (Thomas, 1994). However, it does occur in the northern part of the reserve in number to warrant it being considered an important forest product. The tree produces fruit at a seemingly early age and is harvestable in the smaller size classes. The low impact of seed harvesting does not affect regeneration and this species cannot be considered to be over-exploited.

6.2.3. *Dacryodes edulis*

As this species is more commonly encountered in a semi-domesticated state in home gardens and compounds, the pressure on the wild resource is low, and the wild population is healthy (see **Figure 6**). *Dacryodes edulis* also produces fruits at a relatively juvenile stage and, consequently, the number of harvestable stems (>10cm dbh) per hectare is high.

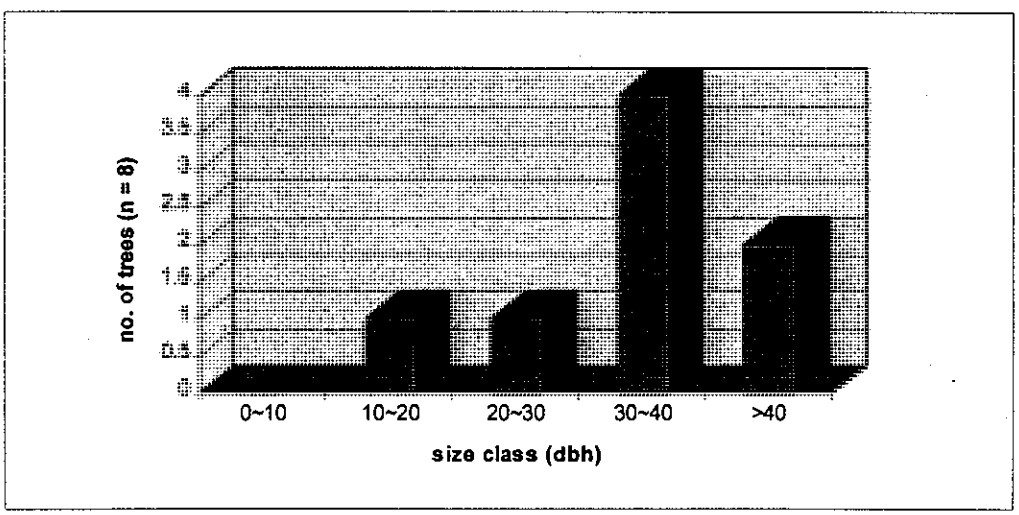
FIGURE 6. Size class distribution for *Dacryodes edulis*.



6.2.4. *Enantia chlorantha*

Only a few individuals of this species were encountered. Again, this is undoubtedly due to sampling forest unsuited to the presence of *E. chlorantha*. The lack of seedling regeneration or pole stages encountered is probably an indication of this; this species regenerates in early- to mid-secondary forest and not in the dense, closed canopy forest that formed the majority of this inventory, although with only limited data, it is not easy to extrapolate. Harvesting impact of the sampled populations is low, with the majority of the bark harvested originating from individuals nearer to the villages, in secondary forest and farm fallow.

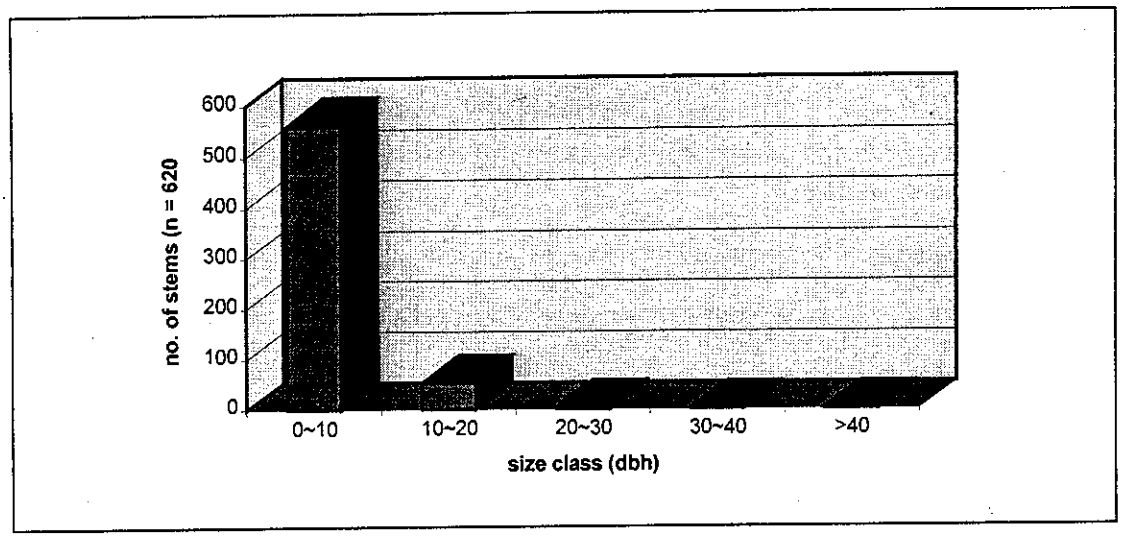
FIGURE 7. Size-class distribution for *Enantia chlorantha*.



6.2.5. *Garcinia mannii*

This species is not only one of the most valuable and important NTFP's of the Mokoko forest, but also one of the most abundant, in terms of both frequency and dominance. However, the exploitation of stems in the middle size classes (8-15cm dbh) is seriously affecting the populations of this species and it is being significantly over-exploited (see **Figure 8**, below). This exploitation is of concern for not only the biological and sustainability implications but also because the local communities actually benefit very little from the revenues accrued through its trade. Both situations need to be addressed.

FIGURE 8. Size-class distribution for *Garcinia mannii.*



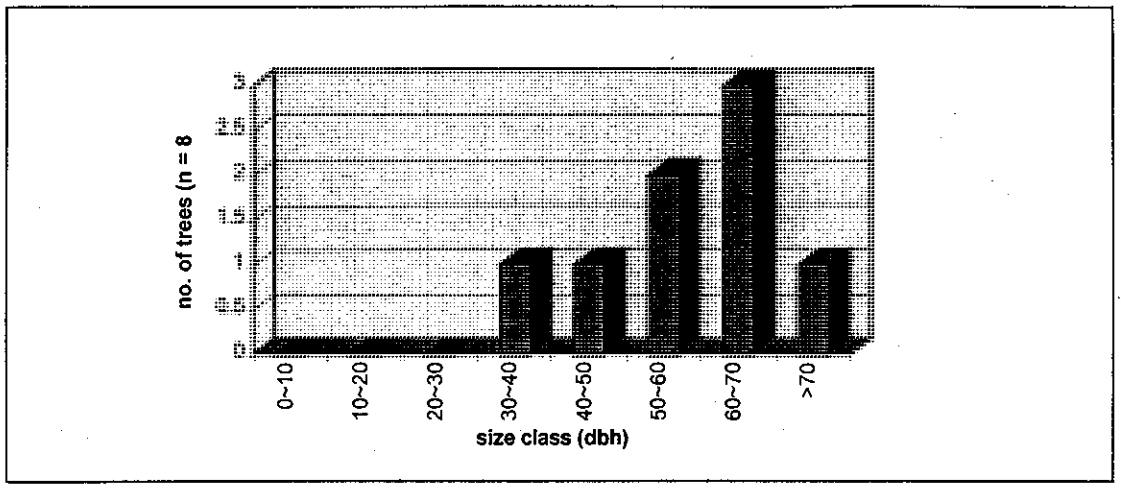
6.2.6. *Heinsia crinita*

This is another species that prefers early- to mid-secondary forest and is not a common component of closed-canopy forest. Hence very few individuals were encountered. The harvesting pressure of these individuals is very low indeed and they recover well from the removal of the young leaves.

6.2.7. *Irvingia gabonensis*

Only large individuals of bush mango were encountered during this survey. The lack of seedlings and pole stages is undoubtedly an indication of the unsustainable practice of the annual harvest of nearly each and every viable seed, thus not allowing for any future regeneration (see **Figure 9**). The current levels of harvest can only be considered high, even though the trees are not necessarily damaged. The only significant regeneration observed by the field teams were of individuals alongside the paths from the forest to the village. It was explained that the presence of seedlings of bush mango along these transportation routes is the result of fruits falling from the head-portered baskets and germinating. These "bush mango alleys" are highly characteristic of area where the fruits are exploited on a commercial basis.

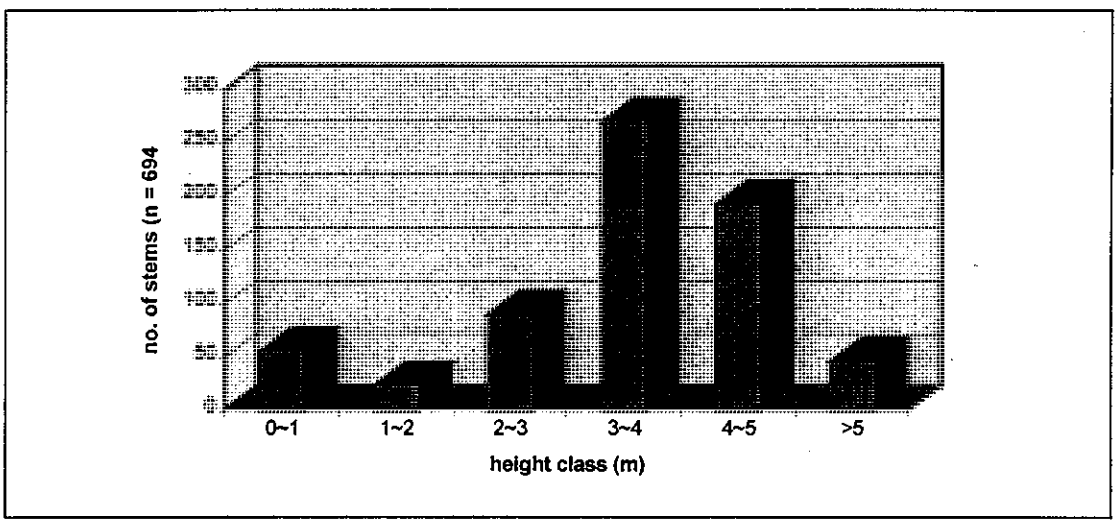
FIGURE 9. Size class distribution for *Irvingia gabonensis.*



6.2.8. *Lasianthera africana*

This species is the most frequently encountered NTFP in the Mokoko Forest Reserve. In general, the impact of harvesting the leaves of *L. africana* is low and there appears to be very few effects of exploitation. However, the species has a rather strange size-class distribution in both the dbh and height classes, which cannot really be explained (**Figure 10**). Speculation ranges from the fact that fertile material might be removed when the leaves are harvested so that the species never produces seeds, or that the species prefers to regenerate in less dense forest; or indeed a combination of these two factors. Increased sampling is needed to determine which might be the case.

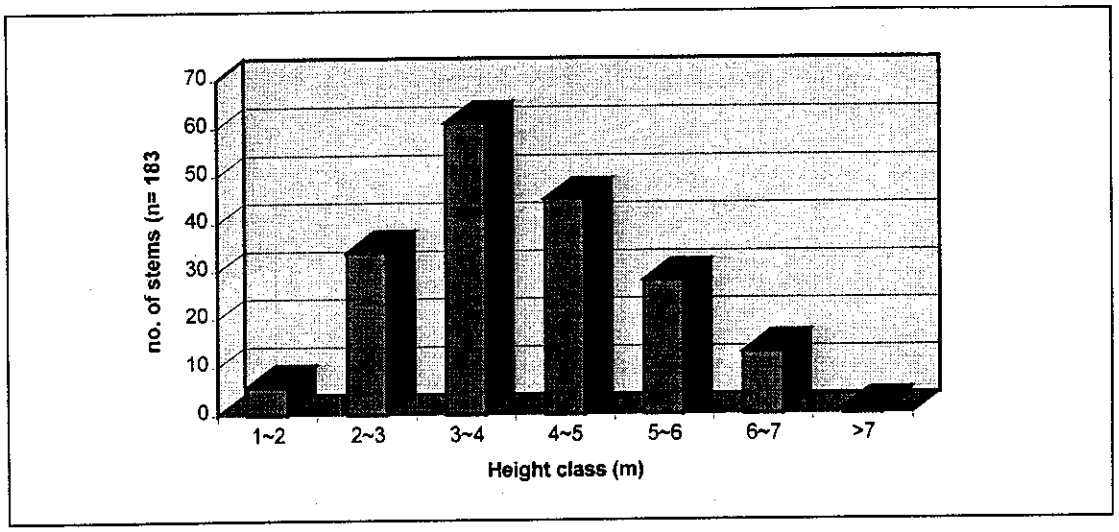
FIGURE 10. Height class distribution for *Lasianthera africana.*



6.2.9. *Massularia acuminata*

Despite the reputed high exploitation of *M. acuminata* leading to significant scarcity, it is not evident from field observations that the exploitation is having a particularly detrimental effect on the species. However, closer analysis of the inventory data indicates that the removal of the younger stems for is affecting the population structure in as much as there are fewer stems in the lower size classes than expected. This is the case for both dbh and height classes.

FIGURE 11. Height class distribution for *Massularia acuminata.*



6.2.10. *Piper guineensis*

This species was more commonly encountered in gap vegetation. Only adult individuals of this species were encountered and enumerated. The exploitation of the fruits of *P. guineensis*, whilst being of commercial importance, is not causing cause for concern about local populations and their sustainability. It seems that farm fallow and secondary forest are the predominant areas for bush pepper collection; the impact of forest populations is relatively low.

6.2.11. Rattans

The stocking of rattans in Mokoko, especially the commercial species, *Laccosperma secundiflorum* and *Eremospatha macrocarpa* is less in high forest than in secondary forest or farm fallow, and the inventory results reflect this. Additionally, the high recorded numbers of species that occur in the forest type sampled, *Laccosperma laeve* and *L. opacum*, indicate the climax-type nature of the inventory area. In the main, the harvesting pressure on rattans is fairly low. However, the means of harvesting is having a detrimental impact on those populations exploited, compromising their ability to regenerate.

From each rattan clump, harvesters tend to cut only the mature canes; young stems are often left for a later harvest. The stems selected are those without lower leaves and usually only the bottom 6m are cut and harvested. Often a long portion of cane (sometime up to 30 meters) is left in the canopy due to the difficulty of harvesting and the fact that upper part is often not mature. Thus, previously harvested rattan clumps are often marked by the presence of many dry stems up in the canopy. The major disadvantage of this harvesting procedure is that the top sections of the stems, remaining *in situ*, obstruct light penetration to the clump. This often means the rhizome has little chance of regeneration and, when all of the adult stems have been cut, the clump often dies. This means of harvesting rattan in Mokoko is affecting the more accessible rattan clumps and harvesters are complaining that they have to travel further into the bush to obtain the resource.

6.2.12. *Ricinodendron heudelottii*

As with *Baillonella toxisperma*, only very few juvenile individuals of *R. heudelottii* were encountered during this inventory. Accordingly, no data exists for the MCP inventory of the area (Thomas, 1994). The reasons for not encountering this species is undoubtedly due to sampling in the type of forest not preferred by this species; it is a mid- to late-secondary species.

6.2.13. *Tetrapleura tetraptera*

Only one individual of this species was encountered during this inventory although some data exists from the MCP 1994 inventory. The reasons for not encountering this species in the northern half of Mokoko is undoubtedly due to sampling in the type of forest not preferred by this species; it is a mid- to late-secondary species.

6.3. Timber Species

TABLE 12. Most commonly exploited timber species from the Mokoko Forest Reserve and estimated number of harvestable stems/ha. (Modified from Thomas, 1994; Mbani *et al.*, 1994 & Etuge *et al.* 1998).

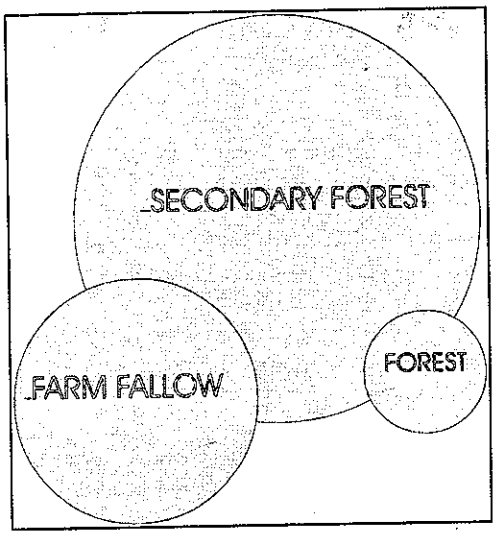
Species	Trade name	Mean # stems/ha [illegible]	Mean # stems/ha [illegible]	Notes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

7. Discussion

7.1. NTFPs

In Mokoko, there is undoubtedly a general trend of imbalance in resource use with both timber and non-timber forest products being exploited mainly from secondary forest and farm fallow, often at unsustainable levels, in contrast to the relatively low impact experienced for some products in high forest. Resource use concentrates on secondary forest and farm bush with only limited excursions deeper into the forest for resources not commonly available in the other forest types. High forest is regarded as a repository of resources that have become more scarce in areas nearer the village or for products that only occur there.

FIGURE 12 represents a more theoretical representation of resource use around Mokoko, with secondary forest being of primary importance for forest products, followed by farm bush and then forest.



The survey and inventory methodology utilised as part of this fieldwork, although limited, did manage to capture enough raw data to enable an adequate assessment of the NTFP resources of the Mokoko Forest Reserve to take place. With further refinement, it could provide enough information to contribute significantly to the development of management plans for community forest areas. Although figures on species composition and stocking are preliminary, it is possible to extrapolate to provide rough estimates of harvestable populations; the sustainability of which will have to be determined through long-term monitoring. For those resources already being over-exploited, continued harvesting at the current rate will undoubtedly lead to local scarcity and possible extirpation and strategies will need to be developed to ensure that harvesting pressure is lessened.

In general, exploitation of individual resources range from relatively high and unsustainable (*Garcinia mannii*); to relatively benign but unsustainable in the long term (*Irvingia gabonensis*); to low impact with little or no effect on the wild populations (*Dacryodes edulis*). Resource tenure appears to have very little or no effect on the potential sustainability of certain products and, where the value and demand is the greatest, whether the exploitation is undertaken by local people or outsiders, the effects are the same; over-exploitation. When local people are asked why they do not practice more sustainable means of exploitation for certain products, despite relatively secure tenure (at least for some products), their response is usually:

"*... if I don't harvest it now and gather the benefits, someone else will harvest before me and benefit themselves*".

Without doubt, the majority of benefits for a number of the most commonly exploited (and most valuable) NTFPs do not accrue to local people. This inequity in the distribution of benefits is a hindrance to coherent forest management and will affect future plans for community management of the resource. The major disadvantage that perpetuates this inequity is the relatively low value placed on such resources. For example, Nigerians coming to harvest stems of *Garcinia mannii*, pay a maximum of 20,000 CFA to the village (usually village council) before entering the forest. This amount is considered a good fee by the village (Etuge *et al.*, 1998). However, the value of the raw logs sold at Oron and Calabar in Nigeria, greatly exceeds this. The villagers end up with an impoverished resource base and are not compensated accordingly.

7.2. Timber Species

In general, the trend is that exploitation of secondary-forest species is more commonly encountered due to their proximity to transport routes. The 1994 inventory confirmed the presence of a wide range of desirable taxa in the interior of the reserve and exploitation there is very low indeed (Thomas, 1994). This imbalance in exploitation levels is causing significant local scarcity whilst there are ample timber resources that might be exploited more sustainably further into the forest. A future management plan for Community Forest status will have to address this imbalance.

In summary, despite the benign nature of low-impact timber exploitation, as outlined in **Section 4.2**, field observations indicate that there are three major ecological and sustainability issues regarding current timber exploitation in Mokoko:

- The minimum exploitable size-class of 60cm dbh is often ignored; hence good quality smaller trees are removed, often to the detriment to future regeneration;

- Field observations and comments by Forestry Department officials confirm that considerable "creaming" has taken place where the best quality individuals of a species have been removed, leaving genetically inferior individuals to provide future mature trees through regeneration. In its extreme, all the sexually active individuals above a certain size class have been removed (notably the case with *Afzelia bipindensis*) thus affecting long-term regeneration of the species.

- Concentration of timber exploitation activities around villages and associated farm bush has led to areas becoming devoid of marketable timber at all (the presence of large populations of the non-utilised *Ceiba pentandra* in almost monospecific stands in farmland is testament to this).

7.3. Levels of Exploitation and Prospects for Domestication or Substitution

Whilst the levels of exploitation for many wood and non-wood forest products are considered as being relatively benign, the long-term impact on many taxa, albeit difficult to forecast and quantify, is quite significant. The constant removal of propagules (such as fruits of *Irvingia gabonensis*, *Ricinodendron heudelottii* and other species) is having an undoubted impact on the population structure, as shown by our own, admittedly preliminary, data. Furthermore, unsustainable exploitation of vegetative parts such as the removal of bark of *Enantia chlorantha* or harvesting the stems of rattan, also have an immediate and long-term effect on their ability to reproduce and replace the individuals killed or removed through the effects of harvesting. In many cases the impacts of harvesting one or two individuals in a seemingly limitless population are considered extremely limited and this is certainly the case for many products, especially those that occur deep inside the Mokoko Forest Reserve itself. However, local scarcity in more accessible areas is leading to the increase in range for the collection of some products and hence increasing the pressure on the existing resources. Without adequate management, many of these will become even more scarce.

Table 13. Impacts of harvesting selected NTFPs in Mokoko and the potential for domestication.

Species	Current harvesting impacts in Mokoko	IUCN Vulnerability	Prospects for domestication/supplementation/substitution (see text)
Rattan (*Laccosperma*)	High especially because of [illegible] species	Vulnerable: [illegible] exploited for timber	None
[illegible]	Low	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Low	[illegible]	[illegible]
[illegible]	Low	[illegible]	[illegible]
[illegible]	Low	[illegible]	[illegible]
[illegible]	High [illegible]	[illegible]	[illegible]
[illegible]	Low	[illegible]	[illegible]
[illegible]	[illegible]	Not threatened	[illegible]
[illegible]	Low	[illegible]	[illegible]
[illegible]	Medium	[illegible]	[illegible]
[illegible]	Medium	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

In the most extreme cases of forest resource exploitation, local extirpation is a real prospect, as has already happened with *Gnetum* spp., notably, *Garcinia mannii*, and even *Irvingia gabonensis*. More drastic interventions will be needed to mitigate the long-term effects of current harvesting practices and this may include better management of the wild resource, domestication, or substitution.

7.3.1 Land Clearance and Resource Tenure

In the past, and it is often still the case, during land clearance, many potentially valuable tree species are often felled and burned along with the rest of the woody vegetation. This is especially the case when the land is cleared by "strangers" who often do not recognise the value of certain trees and other NTFP species. Forest cleared recently around Dikome is a good example of this; many individuals of *Garcinia mannii* and *Tetrapleura tetraptera* have been felled, despite their real and potential values. Most people cannot explain this, other than through ignorance;

"*..if I had known it was valuable, I wouldn't have felled it*".

In addition, the felling of a product known to be of value to Nigerian traders is not considered a particular problem. Local people, when pressed as to why they do not retain valuable resources such as *Garcinia mannii* during farm clearance and then sell them to Nigerian traders, said that the Nigerians discouraged Cameroonians from entering the trade at all and preferred to harvest and transport the products themselves. The clear monopsonistic nature of the chewstick trade in particular discouraged Cameroonians from selling raw logs of *Garcinia mannii*, and hence they merely burned them when clearing farmland; for them they have no value.

Box 2. Case study of Cameroonian traders trying to break the chewstick trade to Nigeria

[illegible]

The fact that little control of land and forest resources is exercised is also contributing to this problem;

"*.. what is the point of looking after a tree on the farm when someone else will harvest it before I do*".

Lack of resource tenure is a common problem, especially amongst migrant families, and one that has been well reported around Mount Cameroon (Jeanrenaud, 1991; Carter, 1992; Ambrose-Oji, 1997; Etuge, *et al.*, 1998).

However, in the case of many people with long-term control over their land, and as people become more aware of the values of certain products, beyond the subsistence level, some farmers are indeed retaining valuable NTFP resources on their farms, notably *Irvingia gabonensis*, *Baillonella toxisperma*

and *Ricinodendron heudelottii.* Whilst some levels of traditional management and control exist for these species the reality is that the lack of coherent social structure is leading to many forest resources to become common property and they are being managed on a "first-come, first-served" basis. Growing, or maintaining, these products on farmland is viewed by many farmers as a means of ensuring access to a regular supply and hence a share of the market.

As well as tenure issues, cultivation of some NTFPs of farmland reduces the inputs (time, discomfort) of searching for and harvesting the product in the wild. In contrast to other tree crops such as coffee or cocoa, NTFP species retained on farms require little or no labour input other than collecting the fallen fruits, harvesting the young leaves or whatever the product may be. It is claimed that the retention of trees on farmland creates too much shade for many crops and thus large areas of land are needed if mullet-cropping is to be a possibility. In reality, the low densities of many NTFPs if retained on farmland is very low. If planted material is to be included on farmland, the planting densities would also be low enough to allow sufficient light penetration and those with access to small tracts of land would not necessarily be excluded from benefiting from this type of crop diversification.

Not all NTFPs can be cultivated in the same manner. They have different requirements. Rattans, bush pepper and the *Gnetum* vines are all climber that require trees or some other formal framework to grow on; *Gnetum* also requires shade. The potential suitability and complexity of cultivation of a product is also a prime consideration for farmers when considering whether to introduce a product into their own systems, no matter what the potential benefits might be.

Despite the real and perceived over-exploitation of resources, there are few attempts to cultivate those products that are particularly valuable or scarce. Tenure is undoubtedly a disincentive to most farmers. However, ignorance on exactly how to cultivate certain high-value resources is also discouraging more innovative farmers who would like to diversify their cultivated resource. This shows a surprising lack of transfer from government agencies who indeed possess the technology and know-how of how to propagate and cultivate a number of high value forest products (e.g. *Gnetum* spp.), and yet remain blissfully ignorant of the need for extension. Although there is no guarantee of adoption of many of these resources, the indications are that the perceived scarcity of many products could be alleviated at the local level by incorporating them into agroforestry systems.

7.3.2. Summary of Agroforestry Status and Domestication Potential of Selected NTFPs

Table 14. A summary of the current situation regarding the domestication status and potential of the NTFPs of Mokoko.

Species	Current cultivation status and potential	Notes
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

7.3.3. Domestication versus Substitution

As discussed in **Section 3.3**, the over-exploitation of *Gnetum* leaves has led to it being substituted locally with leaves of other woody forest species, such as *Lasianthera africana* and *Heinsia crinita*. *Gnetum* leaves, when encountered in the villages, are often bought from elsewhere. Substitution of a product is often easier than cultivation despite the relative ease of growing large quantities of the product on both subsistence and semi-commercial scales. Lack of knowledge of how to incorporate a product into home/farm cultivation systems also contributes to the urge for substitution.

8. Recommendations

Based on the findings of this report, the recommendations are summarised below:

- Now that a general methodology has been developed and refined for the measuring of NTFP resources, a wider survey should take place elsewhere in Mokoko to obtain a wider picture of resource use and population levels.

- The baseline data gathered as part of this survey, could be utilised for the establishment of a long-term monitoring programme. The data presented here on stocking and exploitation levels, provide the means of determining changes in population structure (in an order of magnitude), growth rates and recruitment, over time. Monitoring allows for the establishment of harvest quotas to ensure that the levels of exploitation are with sustainable limits; an integral component of the Community Forest legislation.

- Controls on the exploitation of the most unsustainably exploited resources in Mokoko should be implemented (notably, *Garcinia mannii* and *Irvingia gabonensis*). These controls could centre on the establishment of realistic exploitation levels, based on further monitoring. In the meantime, controls might include a moratorium on the harvest of certain reproductively-active individuals. However, in reality, this might not be workable.

- Local communities, especially non-natives, should receive guidance from

Forest Department officers when clearing land for farmland to avoid felling valuable NTFP resources.

- Attempts should be made to accrue realistic benefits from the exploitation of certain NTFP resources by outsiders (notably *Massularia acuminata* and *Garcinia mannii*). Either a system of village based exploitation and sale be introduced, or outside exploiters should pay a more equitable levy to the village prior to exploitation. This levy should be set and monitored by the Forest Department and should be linked to the harvest yield.

- Government agencies should be more effective in transferring the technology of how to cultivate certain high-value NTFP resources. There is considerable interest in the inclusion of some resources into agroforestry systems and a more pro-active approach by government agencies (through the provision of planting stock, and technical know-how) would benefit both conservation (less pressure on existing resources) and development (income generation) objectives.

- The complicated land tenure issue around Mokoko needs considerable further study. More clarification will be needed before any Community Forest zone can be established there.

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APPENDIX I

FORMULAE USED FOR FIELDWORK AND STATISTICAL ANALYSIS OF DATA FOR THIS REPORT

1. **Slope correction:**

1/cos arctan (%slope/100)

2. **Relative density:** the number of individuals of a particular species as a proportion of the total number of individuals of all species.

$$\frac{\text{No. of individuals of a species}}{\text{Total no. of individuals of all species}} \times 100$$

3. **Relative dominance:** the combined basal area of a single species as a proportion of the total basal area for all species.

$$\frac{\text{Combined basal area of a single species}}{\text{Total basal area of all species}} \times 100$$

4. **Basal Area (BA):** is the area occupied by an individual at breast height (in m^2).

$BA = \square d^2/40{,}000$
(where d = the diameter at breast height -dbh)

(Many forestry mensuration books often include quick reference guides tabulating dbh and BA.)

5. The **mean:** is calculated by dividing the sum of an observation (dbh, stem length) by the number of samples. This is the **arithmetic mean**. However, as we are sampling all of the individuals in a population, we are calculating the **population mean** which is symbolised by O.

$$O = \frac{\blacklozenge x}{N}$$

(Where ♦ is the "sum of"; x is each observation and N is the number of items in a population).

6. The **standard deviation** (represented by ♦) is used to measure the variation of data (e.g. dbh, stem length) and is based on the calculation of the mean.

$$\blacklozenge = \text{square root of: } \frac{\spadesuit(x - \bigcirc)^2}{N}$$

(Where x is the value of the observation; ❍ is the population mean; ♠ is the "sum of" and N = the number of items or sampling units in a population).

7. We expect that large samples provide more reliable estimates of parameters than small ones and, conversely, small samples are less reliable than large ones. Several small samples drawn from the same population generally provide different values of the same statistic, yet they are all estimates of the same population parameter. The variation between these individuals is due to sampling error. The standard deviation of sample sets of means, such as ours, is called the **standard error** (S.E.). It is calculated as follows:

$$\text{S.E.} = \text{the square root of } \frac{\text{standard deviation}}{\text{number of observations}}$$

8. The standard error of the mean gives us an indication of how good an estimate a sample mean is of a population mean and we want to b sure that a population mean lies between indicated limits. To meet this need, **confidence limits** of **95%** or 99% are used (the former in our own data analysis). These can be obtained by multiplying the standard error by the standard deviation units.

APPENDIX II

List of staff involved in participatory survey of timber and non-timber forest resources of the Mokoko River Forest Reserve.

Mount Cameroon Project

Peguy Tchouto, Herbarium Curator*
Nouhou Ndam, Research Co-ordinator
Mukete Wilfred, Herbarium Technician
Betafor Maurice, Herbarium Technician
Ekoi Manfred, Driver

MINEF Staff

Ondoa Tobias, Chief of Post, Bamusso
Esaw Felix Onori, Chief of Post, Iloani

Other

Terry Sunderland, CARPE consultant
Anacletus Koufani, National Herbarium

* Team Leader

Village representatives

Ekpe Victor (Dikome)
Bau Clement (Dikome)
Achia Bernard (Dikome)
Mara George (Dikome)
Arrey Nelson (Bonjare)
Allego Sunday (Bonjare)
Itobo Damasius (Bonjare)
Idam Benjamin (Bonjare)
Enoh James (Bonjare)

APPENDIX III:

METHODOLOGICAL CRITIQUE

As stated in the summary of this report, the methodology implemented for this fieldwork was essentially being tested to determine its suitability for NTFP resources. In essence, it can be stated that the methodology is indeed appropriate for the measuring and monitoring of NTFPs in a given area and providing adequate data for the development and implementation of a suitable management plan. However, the methodology should be refined for the other two IR1 study sites, Djoum and the Tikar Plain, as follows:

- The sampling area should be increased. This inventory provided a sampling of 10% of 80ha; a large enumerated sample of a small area. The two future inventories should provide a more adequate sampling through the establishment of more transects. This will entail spending longer in the field and the necessary cost implications should be addressed.

- The transects should be longer (2-5km), rather than 1km long. This will ensure that the sampling area is increased. It will also enable a wider range of forest t ypes to be more easily sampled (farm bush to secondary forest tohigh forest).

- Data should be tallied in 20m plot along the transects which should ease data management.

- The use of electronic range-finders should be discouraged; technology implemented should be accessible and transferable.

NTFPs use in IR1 sites in Cameroon
(Consultant's Report)

IR1/Theme 4 CARPE

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Introduction

This report, comissioned by IR1/CARPE is based on a rapid survey of the literature and a brief visit to Cameroon from the 15th March to the 27th March, 1999. It is a first attempt to summarize and present some of the large body of information that already exists on some non-traditional forest products (NTFPs) found in Cameroon with particular reference to their occurance in three sites where IR1/CARPE is working: Mt. Cameroon, Djoum and Tikar Plain.. The starting point was the list of NTFPs drawn up by the USDA workshop held in Limbe in 1998. Field visits were made to the three IR1 sites in Cameroon; Mount Cameroon, (16th-18th), Djoum (19th-21st), and the Plain of Tikar, 23rd -25th). The existing reports and research findings were reviewed, followed by a windshield survey of the three pilot areas where IR1CARPE has been working in Cameroon.

This report starts to lay out some of the main issues around the use and marketing of some NTFPs by local communities specifically in the areas IR1/CARPE is working. It may be possible to draw out conclusions for how NTFP development may (or may not) contribute to conservation in other areas of the Congo Basin as well. It approaches this subject from the perspective of trying to work with communities to further commercialize the sustainable harvest and use of selected NTFPs, and improving their marketing on the local, domestic, regional and world markets.

Preamble

The underlying hypothesis to this approach is that community based conservation of the Congo Basin forest in the IR1 sites can be encouraged by adding value to the products of the forest. The hope is that the village communities in Mt. Cameroon, Djoum and Tikar will become the guardians and custodians of the resource if they perceive the forest as a major source of valuable products and/or income. There is a certain irony in encouraging the economic exploitation of the forest, as excessive consumption, much of it driven by communities away from the forest, appears to be one root cause of its continuing degradation. Certainly however any conservation by forest communities in the IR1 sites is unlikely without a sense of ownership; without knowledge of the value of the forest; and without some sort of control over the resource.

There is also the possibility that the argument that use leads to conservation and protection may be founded on a weak or non-existent link, particularly as the more than casual users of the forest in a community are few in number, i.e. specialist exploitators are in the minority in the village; also a number of the NTFPs come from secondary forest species or semi-domesticated trees on farms rather than from primary forest.

There is a shift to domestication of NTFPs , for obvious reasons of convenience, quality and yield improvement etc. This has and is being done by the forest communities themselves , as in the case of *Dacroydes* and *Cola*, but is also being encouraged more and more by international and local organizations. Domestication is another route that

somewhat undercuts the rationale behind the argument that use of the forest leads to its preservation. However providing a sufficient supply from a domesticated or semi-domesticated source may reduce somewhat the pressure on the remaining wild plants.

There is a clear case of the tragedy of the commons in the use of NTFPs in IR1 sites and elsewhere, with sustainable harvest of wild species not being particularly likely, especially when:

- The value of the product is high, (i.e. certain pharmacuticals);
- When the community does not have control of the resource, (when non-community members can enter the forest and remove any product that has been left to allow regeneration, then the incentive is to harvest all now); or
- When the communities are economically impoverished (making it difficult for them to take a long term rather than a short term view).

One benefit of encouraging a wider, albeit sustainable use of NTFPs in Mt. Cameroon, Djoum and Tikar is that it may raise peoples awareness of the degradation that is occuring. A frequent comment from people only marginally connected to the forest in the IR1 sites was that at one time the forest was plentiful. It is seen as a resource to exploit. There is a widespread sense that the forest is inexhaustible, and that their limited activities do not have an important impact. On the other hand, those people who went to the forest and searched for NTFPs were much more likely to say that species were declining, and that perhaps the resource is being degraded, because the particular NTFPs they are interested in are becoming harder to find.

Furthermore, theoretically, if productivity can be increased or value can be added to the NTFPs in the three sites then the returns per kilo of plant product harvested there will be augmented, and there may be a small incentive to harvest at a slower rate. This increase in unit returns could be done in a variety of ways; through organizing improved collection, storage, and packing; through processing; through collective marketing; through access to more distant and possibly more lucrative markets; through elimination of middlemen or reduction of their margins.

Some Potential Approaches and Possible Opportunities for IR1

- Domestication of some species.
- Introduce and test improving processing and storage techniques
- Organizing marketing systems at the community level
- Rationalize marketing chains
- Improving access to existing higher value markets
- Identifying and developing new markets
- Prepare and circulate for comment simple state of knowledge summaries of the botany, agronomy and markets for promising NTFPs, to encourage sustainable use. Include season of production, occurrence and storage characteristics.

- Come to a concensus on how to prioritize NTFPs for attention using a series of agreed upon criteria, such as widespread occurrence and use, value, potential markets, ease of improving commercialization.
- Work with selected communities to attempt community resource conservation
- Look at the interactions between semi-domesticated NTFPs and other crops grown, particularly in terms of labor requirements and opportunties for intercropping.
- Examine the possibility of cooperating with other interested parties working with forest communities to expand their knowledge and stimulate their interest in encouraging sustainable exploitation of NTFPs.
- NTFPs that have a strong traditional use within a forest community for ritual or social purposes may be more amenable to conservation efforts.

Key Characteristics of the Three Sites visited

Mount Cameroon

A mixture of forest types, lowland to mountain forest. Important for its unique characteristics, range of habitats and altitudes and its biodiversity. Population densities high, and numerous immigrants into the region from Cameroon and from elsewhere. Traditional authority and control perhaps diminishing. Village organizations have been formed. Land pressure high outside of the Cameroon Development Corporation commercial estates, exploitation of the forest for agriculture and NTFP's continuing rapidly, particularly on the south and east. Logged in past, no commercial logging no. Numerous organizations working in the area, DFID, GTZ etc. Limbe Botanic Garden working on NTFPs. Sales of NTFPs in Buea, Limbe, Kumba etc. Easy access to the major market centres of Douala and Nigeria (through Idenao). Plantacam factory is purchasing *Prunus* bark and there are a number of artisanal furniture factories located in the region.

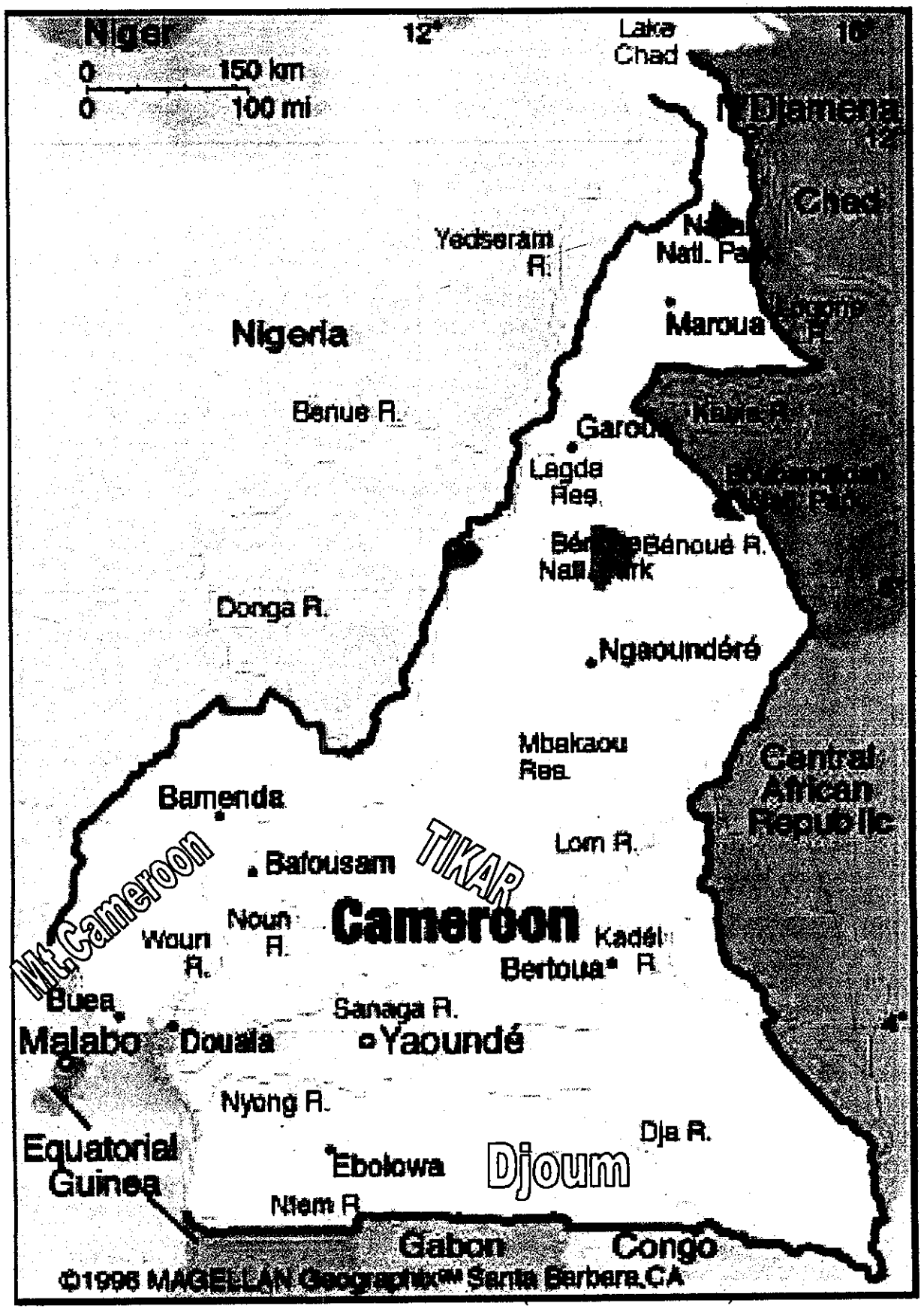
Djoum

Humid semi-deciduous tropical forest. Comparatively close to major forest reserve of Dja. Population density lowest of the three sites. Three main ethnic groups, living separated along roads to the west (Boulou), east (Zamane), and south (Fang). Pygmies (Baka) scattered among other groups. Fang and Boulou earn their living from agriculture, growing subsistence food crops (bananas, manioc etc.) and cocoa as a cash crop, Zamane more involved in hunting wild game, the sedentarized Baka being agricultural and occasional hunter gatherers. Low population density, villages mainly along main roads. Traditional leadership, especially among Fang, appears to still be important, and linked into the political structures. Some areas very recently logged, other being logged now. Few organizations working directly in Djoum, except a local NGO, number working in and around Dja. Limited sale and commercialization of NTFPs due to sparse population, poor access to larger markets, and limited purchasing power of most inhabitants of region outside of the cocoa season. Collection of NTFPs mainly for local, i.e. village use. Sales in Djoum market of herbs imported from

Yaounde for use by local elites. Main market is for wild game (bushmeat). Firewood only collected for sale closer to Yaounde.

Tikar Plain

A transition zone of forest and savannah. Highly agricultural around the periphery of the Plain. Logging continuing in the central region. Mixture of types, small amount of primary, mainly secondary forest, fire degraded, or savannah. Increasingly concentration on agriculture especially outside of the forest, growing coffee, and food crops. Many species semi-domesticated or left when clearing farms. Mixture of inhabitants, with strong chiefs, often muslim or catholic. Very variable population densities, high along periphery and around dam. *Voacanga* has been bought in the past in Bankim.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Mt. Cameroon
Bafousam
TIKAR
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Wouri R.
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Sanaga R.
Malabo
Douala
Yaoundé
Nyong R.
Dja R.
Equatorial Guinea
Ebolowa
Djoum
Ntem R.
Gabon
Congo
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Some Characteristics of the Main Uses of NTFPs

Forest products are used among other things for food, (bushmeat), construction (poles), roofing (palms), furniture (rattan), baskets/containers, firewood, tools, carvings, in rituals, and as medicine.

The following list gives some indication of the range of potential benefits from the Congo Basin forests. This short consultancy concentrated on only a very small portion of this list. Other studies are taking a wider approach.

Environmental benefits
- Catchment protection: controlled runoff, water supplies, irrigation
- Conservation of plant and animal resources: recreation, tourism, national parks, game, gene pool preservation
- Soil erosion control: windbreaks, shelter breaks, reclamation of eroded lands

Indigenous consumption
- Fuelwood and charcoal: cooking, heating
- Agricultural uses: shifting cultivation, forest grazing, medicines, mulches, fruits and nuts, spices
- Building poles: housing, buildings, construction, fencing, furniture
- Pit sawing and sawmilling: joinery, furniture, construction, farm buildings
- Weaving materials: ropes and string, baskets, furniture, furnishings
- Sericulture, apiculture, and ericulture: silk, honey, wax, lac
- Special woods and ashes: carving, incense, chemicals, glassmaking

Industrial uses
- Gums, resins, oils, and latex: rubber, tannin, turpetine, distallates, resin, essential oils
- Charcoal: dry cells, chemicals, polyvinyl chloride PVC, reduction agent for steelmaking
- Poles: transmission poles, pit props
- Sawlogs: lumber, joinery, furniture, packing, ship building, mining, construction, sleepers
- Veneer logs: plywood, veneer furniture, containers, construction
- Pulpwood: newsprint, paperboard, printing and writing paper, containers, packaging, dissolving pulp, distillates, textiles and clothing

Residues: particle board, fiberboard

The Main Categories of the NTFPs on the Limbe List

The three main categories that the species on the Limbe list fall into are: Food and Spices; Medicinals; and Furniture.

They are used within the household, or sold locally, regionally or internationally. . The medicinals in particular can be sub-divided into those used mainly locally and those with an international market.

Food and Spices

Many of the plants on the Limbe list are used for food purposes, often as flavorings. Their markets are local, regional and to a limited extent within the West African ethnic communities overseas.

Dacroydes, bush plum fruits and *Irvingia,* bush mango kernels are widely traded in West and Central Africa for use in local dishes. They are also exported for sale to West Africans living in Europe and the US. *Gnetum* is traded extensively from Cameroon to Gabon and Nigeria. *Ricinondendron*, njangsang, is an important source of flavoring.

Medicinals:

Ethnobotany has a long and interesting history. NTFPs are used both as traditional medicines and on the international markets. They tend to attract a lot of attention because of their high value to volume ratios.

Over the years a wide range of plant products have been used both locally and in the industrialized countries to treat various illnesses. Many of these products had a typical cycle of identification, testing, expanding exploitation, then synthesis of the pure product artificially. The time periods involved are long, and for every successful product identified many are tested and rejected. In recent years there has been something of a resurgence in interest in the identification and exploitation of compounds produced by plants. For example, the National Cancer Research Institute has screened large number of plant products for their effect on tumor growth in vitro. A few years ago a Cameroonian plant *Ancistrocladus korupensis* seemed to show effectiveness against HIV AIDs, and after some problems in relocating the exact species that contained the effective compound, further tests isolated michellamine b from this woody climber. Since that time interest in this particular plant seems to have declined. The costs of this approach to drug development are high, and the returns may be long in arriving. For every successful identification and exploitation there are a long line of failures. Shaman Pharmaceuticals built their reputation on an approach that followed up on traditional uses of plants, starting in Latin America, but they have also been in Cameroon. Recently however they have apparently reorganized due to continuing financial losses.

Common characteristics of medicinals used internationally is that they have a limited period of exploitation, and they frequently lead to a diminuation of the wild populations, as was the case with *Dioscorea* in Central America. The purity required and the variability of the wild product also encourage companies, once they have identified a compound to invest into producing substitutes artificially, often based on modifications of the active ingredient from the plant. The "successful" plant products are those which

are widespread in occurrence, where the effective compounds are a mixture of complicated products, such as *Prunus*; or where domestication is possible, such as *Taxol*.

The distinction between pharmaceuticals and herbals is becoming increasingly blurred. Many of the products being used as herbal products contain quite active compounds. This is a growing market.

Plant products that have been traded internationally from Cameroon include *Prunus africana*, an OTC prostrate treatment, used mainly in Europe. The powdered bark or bark extract is exported, and manufactured into pills in Italy and France. The comparable product in the North America market is saw palmetto, harvested in Florida. *Pausinystalia johimbe* bark has been used traditionally in West Africa for some time as a cure for male impotence. Demand for this in the overseas market has been stimulated by the release of Viagra by Pfizer, which unlike yohimbe is only available via a doctor. *Physostigma veenosum* seeds are exported from West Africa and used in ophthalmology. *Strophanthus gratus* seeds contain oubain, and are used to increase the blood pressure in certain types of heart failure, especially during operations where a fast action is required. There is growing interest within certain communities in *Tabernanthe iboga*, ibogaine, for use in the treatment of heroin addiction. . For many years *Voacanga africfana* seed has been exported from West Africa for use in the treatment of certain types of hypertension, and some mental diseases. Demand has declined recently for Cameroonian product, as it contains lower levels of the desired chemical, tabersonine, than other sources.

A major player in the international trade of NTFP pharmaceuticals in Cameroon is Plantacam, which has tested and traded in most of the plants mentioned above. Part of a large French company, Groupe Fournier, they have invested in a factory near Limbe. Currently they are working with local communities around Mt. Cameroon to exploit *Prunus*. They have a number of other species growing in their test garden and are propagating and distributing some of them. They have recently had their export license quota for *Prunus* lowered, and are perhaps no longer the major exploiter of this tree. Given the investment that Plantacam has made into their factory in Cameroon they have an incentive to stay in Cameroon and encourage the sustainable use of the plants they exploit. Other traders, with less capital investment made, are more likely to move to other parts of the Congo Basin forest, when supplies from Cameroon diminish.

Furniture

Rattan is harvested and used throughout Cameroon to produce furniture. Timber by-products and timber are also used to produce furniture, some of it of high quality.

Some Recommendations

A number of organizations are screening NTFPs from a range of provenances for their qualities. Improved lines have been identified and are being propagated.

- CARPE should be working with community organizations evaluating these lines at the village level. Once appropriate material has been identified, it can be multiplied and disseminated by villagers. Eru and yohimbe are two products that appear to have the medium term markets that would justify encouraging communities to plant them.

It seems likely that despite the volume and importance of the trade in NTFPs they will always be seen by the majority of the community as of secondary importance in terms of income generation, with traditional agriculture taking first place. The costs and benefits of domesticated NTFPs need assessing, as well as ways of further integrating NTFPs into the farming systems.

- It may be useful to review the interactions between agriculture activities and the harvest, processing, sale and use of NTFPs.

There is the potential for a small sector of the forest dwelling community to become specialists in the harvesting, storing, processing, packaging and sale of NTFPs, thus increasing the return to the harvest of these plants that is retained in the community rather than by traders and middlemen. There is also the possibility that groups of women can use processing machinery to more rapidly deal with their individual harvested NTFPs. Examples are njangsang decortication and the preparation of safou paste.

- Review the options for value-added grading, processing and packaging of NTFPs, and experiment with appropriate technologies in the local forest communities.

The forest communities harvesting plant products for export need a stable market. Given the investment that Plantecam has made into their factory in Cameroon they certainly have some incentive to stay in Cameroon and encourage the sustainable use of the plants they exploit. Other traders, with less capital investment made, are more likely to move to other parts of the Congo Basin forest, when supplies from Cameroon diminish.

- CARPE should consider assisting Plantecam to work with local communities in sustainable resource use, as they can provide the necessary outlet for some species. It could even perhaps consider helping them to gain exclusive concessions for harvesting particular species. The rationale being that control over the export of a product and its sustainable harvest is thus made more amenable.

Ethical trade schemes endeavour to take a sustainable approach to the purchase and use of resources. They typically have an oversight body to maintain standards and a label or logo to identify the product, allowing buyers to decide to pay a premium for a particular product,

- CARPE should explore the possibility of taking an ethical trade approach to sustainable use of the forest resources.

Schemes include fair-trade schemes linked to retailing, e.g. Oxfam UK's retail sale of plantation crops such as coffee, cocoa and tea. Crops are produced and marketed under some particular type of smallholder ownership and management, with the goal being primarily to transfer a larger portion of the profits back to the producer, i.e. a social, rather than an environmental goal.

Forest certification schemes have been tried in Latin America, (e.g. Mexico) and Asia, (e.g. Papua New Guinea). In these usually the forest is being managed sustainably, and the main product is timber rather than NTFPs. However, approaches like this which stress environmental goals rather than social goals have generally been less successful. Producers have often failed to receive a premium for the products, outside of certain specialized niche markets, frequently reached via mail-order or catalogues.

Organically produced products have an long established and growing market in both Europe and North America. There is clearly a segment of the market that is prepared to pay a green premium for food produced organically. Perhaps of more particular relevance in terms of expanding the markets of NTFPs is the growing demand for organically produced herbal preparations, and the premium that the afluent consumers of Europe and North America are apparently prepared to pay for these products.

Some characteristics of all of these markets, besides the attempt to ensure a premium by differentiating the commodoties from others on the market include; the organization of alternative marketing chains, outside or parallel to the conventional ones, to both cut out the middleman, and also to improve traceability ; the clear identification of the product, with the oversight and branding of the product usually done by a third party, or agency other than the producers; the need to raise awareness of the significance of the branded product within the consumer community, often via advocacy groups within the purchasing countries who develop the demand and market for these products. The packaging and presentation of these products is often, though not always, able to be less elaborate than conventional marketed goods. Strong links between the producers and the overseas buyers can extend to various forms of contract buying, thus making the market stable and more attractive to producers.

CARPE participants have conducted and are currently conducting a series of market surveys for a number of NTFPs.

- Once any production, processing and packaging bottlenecks have been dealt with, consider a campaign of market promotion of selected NTFPs within the international markets, targeting ethnic and speciality markets.

- Biodiversity and sustainable forest use needs to take into account more than just the economic value of the product. Many NTFPs have a greater importance to forest communities for their ritual and social use than economically. An ongoing collection and dissemination of examples of the non-economic importance of NTFPs could be considered. For example, in Tikar, some medicinals are apparently not sold, as sale reduces their effectiveness in the eyes of the user.

- Currently, artisanal furniture is being produced from both timber and rattan in Cameroon. The markets for these products in Cameroon, especially for timber furniture are quite narrow. The current designs are by and large out of date, and unsuited for the tastes of much of the world market. Overseas markets also require production volumes and quality that artisans have difficulty producing. In the case of rattan, producer groups could be organized to produce to an export standard, and to collectively market the volumes of furniture required for an export shipment, i.e. a minimum of a container load. In the case of furniture produced from timber products, the weight and the moisture content is a real drawback to the export sale of their products. An approach that has been successful elsewhere, is to link the in-country artisans with overseas suppliers of quality furniture. These firms then supply the artisans with their designs for inlays, or ornamentation that they can hand produce on contract and thus sell for a premium. If furniture is to be produced for export, then kiln drying is required and the woods used and the designs need to be chosen carefully. Communities harvesting cut timber left behind after logging was seen in the Djoum region. Links between these suppliers and the producers need to be established.

- Draw up a list of commonly used names of NTFPs, identifying various plant parts and processed products, for use during field surveys by translators and researchers, in English and French versions.

The Limbe Workshop NTFP Species List

Baillonella

Baillonella is a genus in the Sapotaceae consisting of two species. One, *B. obovata,* is found mainly in Gabon. The other, *B. toxisperma*, is an important timber tree in Cameroon.

Baillonella toxisperma Pierre (Syn. *B.djave* Pierre, *Mimusops djave* (Laness.) Engl. , *M.toxisperma*) (Sapotaceae).

NAMES: BSI name: Moabi. Wood also known as Adjap and African Pearwood. Trade name: moabi (France and Gabon) Local names: adjap (Boulou), adjap (Ewondo and Yaounde), adouma (l'Ogooue) adza (Gabon), adzap (Yaounde), bo njabe (Oroko), djabi (Douala), djave (Nigeria), gio (Pygmy bagielli), mabi (Pygmy bibaya), moabi (Congo, nkomi), nfo (Korup), ngiari (Mayouka), njabe (Bakweri), njabi (Douala), njap (Bassa), n'djave (Fang), oku uku (Nigeria), wondololo (Bakweri).

OCCURRENCE: Found throughout Cameroon, in primary forest, although only as scattered trees, and apparently becoming increasingly uncommon. In Djoum, it was said to have become scarce, especially towards the west. Mature trees are apparently now only found at some distance from the villages. It occurs all along the coastal belt, ranging inland up to 150 km, and also along the border with Gabon, with a spur into the south Cameroonian plateau. It is absent from the forest in the Fako area; while fairly common in Mokoko, Southern Bakundu Forest Reserve, and Korup National Park. Hutchinson in the Flora of West Tropical Africa (FWTA), says it is found from South Nigeria via Cameroon, Congo and Gabon to Cabinda. Aubreville in the Flora of Cameroon (FC), says that the *Baillonella* trees in Mayumbe and Cabinda may actually be *B. obovata.*

DESCRIPTION: A species of the moist primary forest, which appears to like sandier soils. A very large forest tree with large prominently nerved leaves. Easily recognizable because of its parasol crown, very wide, flat, consisting of sinuous, ramified and whorled large branches, and of its leaves grouped into characteristic rosettes at the extremities of the very stout twigs, marked with numerous foliar scars. The flowers are rather long-stalked and crowded at the ends of stout branchlets. Aubreville in *Flore du Cameroun*, calls *B. toxisperma* "the largest and prettiest tree in the forest".

HABIT: Very large and very graceful tree, reaching 45-50 m in height and up to 3 m in diameter. Crown parasol, sometimes tabular, very wide, consisting of very large ramified, sinuous and spreading branches closely grouped at the top. Bole very straight, 25-30 m in height, perfectly cylindrical, with thickened base in old trees.

BARK: Dark reddish brown, rough, profoundly cracked longitudinally and very regularly. Blaze 2 to 3 cm thick; slash with outer layer dark brown, inner layer pink-yellow, dotted with red-white, fibrous, hard. Exudation of white latex, sticky, not very abundant. Latex occasionally used to seal wounds.

LEAVES: Simple, entire, grouped into rosettes at the extremities of the twigs. Petiole 3 to 4 cm long, frail, glabrous. Blade oblanceolate, 20 to 30 cm by 6 to 10 cm, apex rounded and brusquely acuminate, cuneiform at the base, pilose on the undersurface then rapidly glabrous. Midrib thick, prominent benaeath, with a few reddish brown hairs; numerous secondary nerves prominent on the undersurface, parallel, brochidrome.

FLOWERS: Fairly large green flowers, occur in dense fascicles at the extremities of the twigs, pubescent, long-pedicillate. Flowering starts at a dbh of 70 cm. Leaves fall at flowering.

FRUITS: Large spherical berries, about 6-7 cm in diameter, grey-green. A soft yellowish pulp with a strong odour, encloses 1 or 2 ellipsoid seeds (5 x 3 cm.) The integuement is hard, thin and shiny brown with a scar occupying most of the ventral surface. The pulp and the oil from the seed is edible. The residue left after grinding and heating the seed to extract the oil is toxic, hence the specific name. Fruiting occurs from June to July in Cameroon.

USES: The oil is highly regarded locally for cosmetic uses, (hair and skin), and sells at double the price of other plant oils, 2,000 CFA. The oil is also used in cooking, and eaten as a butter. Other uses for the oil/butter include admixture with other plant products to produce embrocations, which are heated and rubbed on skin inflammations or joints. The bark is also used to prepare a woman for childbirth and treat infertility in the Mount Cameroon region. In Korup, a decotion of the bark is used as a mouthwash to reduce pain, and as an enema for groin abscesses.

WOOD: Sapwood white. Heartwood red, semi-hard, heavy, silicious, fine grain. . The heartwood varies from light reddish-brown to rich red, sometimes with a greyish tinge. Texture, fine with a silken lustre, straight grained. Weight 800 kg/m^3. SG 0.8 -0.95 @ 12% humidity. Extremely tough and resistant to compression. Dries at moderate rate with some tendency for twisting. Medium hard, works fairly well, but the silica gives it a moderate to severe tendency to blunt tools. Sawdust can irritate eyes and mucous membranes. Nails and glues well, and can be stained and finished. Durable and resistant to fungal and insect attacks. Extremely resistant to preservative. Suitable for exterior joinery and construction, furniture, cabinetmaking, flooring for medium to heavy industrial traffic, and selected logs are sliced for decorative veneers. A typical tree will produce from 10-18 m^3 of useful wood, up to 80 cm wide.

OPPORTUNITIES: This is a highly valued timber tree, a species of the primary forest, which has apparently been heavily logged in Cameroon. Thus the seed oil is becoming increasingly difficult to find. Limited enquiries in some of the market towns did not uncover any samples. A survey conducted in the Bomboko Forest Reserve in late 1998 found only a very small number of mature trees near Munyange. Enquiries during March 1999 in the villages around Djoum suggested it was also becoming increasingly scarce there, particularly towards the south-west. Van Dijk in an assessment of 200,000 logged hectares in the Bipindi-Akom II region of south Cameroon found an average density of 0.2 trees/ha, with a maximum density of 0.3 trees/ha.

RECOMMENDATION: As only the larger moabi trees produce seed, and as currently the value of the seed oil does not justify domestication, conservation of the remaining resource in forest reserves rather than encouraging continued exploitation may be the most useful way to deal with this tree in Cameroon. As the tree may be somewhat more common in Gabon and Congo, samples of the bark, fruit, seed, and seed oil could also be analyzed for their contents and potential use in industry or medicinally.

RELATED SPECIES: *Baillonella obovata* "Karite" (Sapotaceae) Syn. *Mimusops Pierreana.* Orere, ourere, oriri (tree) (Pongoue). Africa, esp. Gabon. Seeds eaten with meat and fish. Source of beurre d´Orere.

Cola

Cola is a genus of about fifty (50) African species. Fruits from several members of this genus are chewed as narcotic stimulants, (e.g. *C.acuminata, C.anomala, C.verticillata*). *C.nitida* has been used as a source of flavor and caffeine in cola drinks.

Cola acuminata (P.Beauv.) Schott and Endl. (Sterculiaceae)

NAMES: "Male cola, beste cola, bester cola, goora nut, abata cola, false cola". Abel, Cola (Fang), luela (Bakweri), monale (Bapounou), oji-awusa (Igbo), obi abata (Yoruba), ombene (around Libreville).

OCCURRENCE: Tropical Africa, found in West and Central Africa, native from Togo and southern Nigeria eastwards and southwards to Gabon, the Congo and Angola. Common in Gabon in secondary evergreen forest, left by farmers clearing, or even planted. Thrives in open sun.

DESCRIPTION: Slender tree, 20-50 cm wide, often branching near base. Grows in flushes, so brqanches are whorled on stem and leaves clustered at end of twigs. Can grow up to 20m, but usually 7-10 metres. Occurs wild in understory of rainforest. Tolerates shade, but thrives in sun. Very similar to *C.nitida*, which tends to be taller. Hybrids between *C.acuminata* and *C.nitida* are known.

BARK: Fibrous, with a reddish or yellow slash, darkening rapidly on exposure.

LEAVES: Dark green, fleshy, evergreen leaves, 10-15 cm long and 3-5 cm broad, (up to 27 cm by 11 cm), sparsely borne on tips of branches. Alternate. Older leaves are 6-8 inches long, oblong-ovate, entire and undivided, but younger leaves often have one or two deep incisions at the base, often curled. Lateral veins not prominent, tip acuminate about 2.5 cm, often twisted downwards, petiole about 4 cm long, with pulvinus just below blade.

FLOWERS: The yellowish white or purplish starry, bisexual or male flowers are borne in compact corymbose panicles, one the old wood. Hermaphrodite flowers about 2.5 cm across, male flowers smaller, at the end of branches or borne on the older stems. The perianth is united for nearly half its length, white with a red splash inside near the base. The calyx is campanulate, green, with dense, short, soft hairs. Petals 0, stamens united in a short column, (androphore) which bears a ring of 10-12 sessile anthers at the top. The ovary is 3-10 celled with as many styles as carpels, the cells many ovuled.

FRUITS: The joined carpels develop into a star shaped compound fruit, 5-6 inches long, made of individual follicles borne at right angles to the peduncle, sessile, brownish

in color, rough but not knobbly. Fruits 2 cm by 6 cm wide, 8 by 20 cm. long. Follicles split longitudinally down one side only when mature. Inside are five to nine seeds (up to 14), 1.5-2 inches long, (up to 4x2.5 cm) surrounded by a fleshy seed coat, the testa is thin and white. The seeds weigh 10-25g or even as much as 50g each. Seeds have three to seven cotyledons, (i.e. more than two) white, or more usually pink or red at first, but on drying change to a reddish brown color. Fruits in June in Nigeria.

USES: These "nuts" are bitter to taste, and are chewed as a stimulant and restorative. They contain 2.4-2.6% caffeine and 0.05% theobromine. Exported and used as caffeine source in cola drinks. Cultivated in Old and New World tropics. The trees start to flower at five to seven years old and bear fruit for up to 100 years. A mature tree will yield a crop of 10-16 kg seed. The nuts are skinned after keeping for a few days and packed in leaves to keep moist. The total world production of cola in the 1970's was about 20,000 tons per year. Seeds are used as a nerve stimulant, cardiac tonic, diuretic. Cultivated in West Indies, Brazil, India and Sudan. Leaves used to treat worms and other stomach problems. Ground and boiled seeds are used as an enema to induce abortion.

OPPORTUNITIES: Less popular than *C. nitida* in Nigeria, but prefered by many forest peoples and favored over *C. nitida* in south-west Cameroon. May be an important cultivated crop and major source of revenue in some areas. In Djoum and Tikar, trees were commonly seen near the house. Van Dijk in an assessment of 200,000 logged hectares in the Bipindi-Akom II region of south Cameroon found wild trees to be comparatively common, with an average density of 2.4 trees/ha, with a maximum density of 4.3 trees/ha in undisturbed forest. *C. nitida* probably has its major importance on the local markets, rather than regionally or internationally.

RECOMMENDATIONS: Cola sp. are very important socially and economically throughout Cameroon, being cultivated for sale, and home use. They are used at all major events, meetings, childbirths etc. They can be a significant source of household revenue. There is widespread differentiation of seeds by size, colour, number of cotyledons, age etc, and the numerous variants are both named differently and regarded differently. During a visit to a Fang village south of Djoum, comparison of a Cola sp. seed I had brought with me and one harvested from the nearby tree occasioned much discussion among the older men in the village, as to the correct name, their taste attributes etc. Domestication of this species is already well under way and selection of favored varieties and their propagation and distribution as grafted seedlings could be considered as a community activity. South West Province appears to be a centre of diversity for Cola spp.

RELATED SPECIES: *Cola cordifolia* "Ogugu" Nigeria. Buff color wood with pinkish tinge. Moderately hard and heavy. A very stable wood, open, straight, fibrous grain. Liable to pickup. Little exported. SG =.65 CW 4. Seeds eaten locally.

Cola lepidota Monkey cola, a wild species commonloy found up to 500 m in the undisturbed forest. Arils eaten, particularly by children. Roots used medicinally.

Cola nitida "Cola" (Sterculiaceae) "White nuts:- abel, mfem-abel (Fang) musali, mvali (Bapounou) obei, obanga (Mitsogha). Red nuts:- eya-abel, mgwangh (Fang) Mumbini (Bapounou). Evergreen tree. Tropical West Africa. Extensively planted in Western Nigeria, where the Yoruba use it ceremonially and socially. Grows 40-60 ft high, bears leathery leaves 10" long. The small, petalless yellow flowers produce long chocolate colored pods, which contain 4 to 15 reddish-brown cola nuts, with 1.1-2.2% caffeine. The seeds smell like roses, are bitter on the first bite, with a sweet aftertaste. Nuts traded widely, used as appetite depressants and reputed to be aphrodisiac. Nuts boiled in water will release caffeine. Used as a cardiac and respiratory stimulant, in non-prescription pain remedies, soft drinks and energizers. Cultivated also in the West Indies, Brazil, India and Sudan.

Dacryodes

Dacryodes edulis (G.Don) H.J.Lam (Bursaraceae) Syn. *Pachylobus edulis,*G.Don *Canarium Saphii*

NAMES: "atanga (mpongwe), bafole, diganga (Bavove), issnaga, safou (Bayaka), la safoutier (French), safou (Gabonais), african plum, african pear, bush plum, igaganga, alom, assa safoutier, odou (Fang), olem, ossegou (Gallois)."

OCCURRENCE: Tree found throughout tropical Africa, esp.Congo, Nigeria, Uganda and Angola. Species of the moist forest and various secondary growths, with shiny dark green foliage, distinquished from *D. klaineana* by its greater number of leaflets (4-8 pairs), plus a terminal leaflet. This tree originated in Southern Nigeria and perhaps Cameroon and has been distributed widely in Africa. Planted in villages for its edible fruits, particularly on the western plateau, and around the Tikar Plain.

DESCRIPTION: *D.edulis* is a hardy species, with medium sized trees around 25 m high, (30-60 ft.) with a low spreading canopy. A very variable species.

HABIT: Medium sized tree reaching 28m in height and 90 cm in diameter. Crown spherical thick and dense. Bole short, sinuous, slightly channelled, enlarged at the base.

BARK: The bark is thin, and on the young branches, rusty-puberulous. Light grey, smooth and rough in old trees, often lenticellate, horizontal annular-rings. Blaze about 1 cm thick; slash: outer layer brown-red to pink, inner layer greyish brown, granular. Exudate resinous, whitish, not very abundant, latex, with turpentine odour, hardening and yellowing in the long run.

LEAVES: The leaves are pinnate with leaflets measuring 3 to 4 cm by 2 to 3 cm. The leaflets are glabrous, narrowly oblong-elliptic, abruptly acuminate. Imparapinnate, alternate. Petiole and rachis 15 to 30 cm long. Petiole pubescent, striated, flattened

and winged at the base. Petiolule 5 to 10 mm long, canaliculate. Leaflets 4 to 8 pairs, opposite, subalternate, plus a terminal. Blade oblong-lanceolate, 12 to 18 cm by 3 to 8 cm, acuminate at the apex, rounded, cuneiform or sometimes assymetrical at the base, coriaceous, glabrous and shiny above, often pubescent on the undersurface. Midrib prominent beneath; 8 to 12 pairs of secondary nerves, camptodrome, prominent below.

FLOWERS: The flowers are fragrant, and borne in dense rusty terminal panicles; the inner flowers are cream colored, the outer ones golden. Sepals and petals are covered with stellate scales. Narrow and lax panicles; small flowers, hermaphrodite, reddish, covered with stellate hairs. Flowering: February to March.

FRUITS: The fruits are orange-red, purple to bright blue black and have a pleasant smell. They consist of a large seed surrounded by a thin mesocarp; the pulp is eaten. Ellipsoid-elongated drupes, 1.5 to 7 cm by 1 to 3.5 cm, pulpy, rose-violet at maturity, pulp having a turpentine odour. Fruiting August in Nigeria, December in Gabon, January to February in Cameroon.

WOOD: Sapwood pink pale grey, heartwood clear pink-yellow, lustred, soft, light, with a fine grain.

USES: The trees are retained when forest or secondary bush is felled. It is also grown as an overstory tree in cocoa plantations, and as a field marker. Fruits, known as safou or bafole, are eaten. The fruits are usually boiled or roasted and eaten with maize. The thin pulp is cooked and/or salted.

OPPORTUNITIES: Van Dijk in an assessment of 200,000 logged hectares in the Bipindi-Akom II region of south Cameroon found the wild *Dacroydes* trees to be scattered, with an average density of 0.4 trees/ha, with a maximum density of 3.8 trees/ha in cocoa plantations. The cultivated trees are a common sight in the Tikar plain region, along the road and in the farms. Safou is one of the NTFP food species being exported to Europe, and unlike many other export species it is consumed by people originating from throughout the West African region, thus making its market somewhat broader than other products which are often speciality foods of just one or two countries.

RECOMMENDATIONS: This species is already semi-domesticated. It is traded and exported regionally from Doula to Gabon. Prices vary according to quality, and Douala is a grading and sorting centre. Safou is also sold during the seasonal production on the European markets and its price varies with supply on those markets. It is possible that lines exist that can extend the season and gain higher prices. Work on its post-harvest storage and handling is also needed.

RELATED SPECIES: One species, from the West Indies, *D.hexandra* produces West Indian elemi, an oleoresin. *Dacryodes buettneri* timber is sold as adjouaba. *Dacryodes excelsa* wood is sold as gommier. *Dacroydes macrophylla* is grown in cocoa plantations for its fresh fruits.

Dioscorea

Dioscorea spp. "African Yams" (Dioscoreaceae): A genus of about six hundred species, tropical and subtropical. A large number of Old and New World species, some harvested from the wild, others cultivated for food.

DESCRIPTION: Twining, annual stems arise from deeply rooted tubers which are either rhizomes or roots, formed either by hypertrophy of the hypocotyl, or the internodes above the cotyledon. In some species small axillary tubers, (bulbils) often form on the main stem. Leaves alternate, usually heart shaped, distinctively veined, flowers small, clustered in spikes or solitary, usually dioecious but sometimes hermaphrodite. Fruits are usually capsules, containing winged seeds.

CULTIVATION: Requires high temperatures, adequate moisture, good drainage and a fertile soil, with a high organic matter. The West African "yam zone" extends from 4° N to 10° N. Well rotted manure or compost is dug in at planting time. Propagated by seed, by divison, or by slicing 2-3 dormant eyes from the upper part of an old tuber. Each plant needs staking. The growth period varies from 7-12 months depending on the species, so the crop is confined to the tropics. Yields can be 10 tons per acre and individual tubers can weigh 100 lbs or more. Tubers left in the soil continue to grow for years. Because they need staking, plus the tubers need deep digging, they are an expensive crop in terms of labor, and cannot compete with cassava in terms of calories per man day. They are well adapted to the tropical rain forest. Some species such as *D. alata* have been vegetatively propagated by replanting the tops from dug roots for so long that now they seldom seed.

USES: Crushed and pounded yams are the source of the important food *fufu* in Cameroon and Nigeria. About ten yam species are regularly cultivated. The main species used for food are *D.rotunda, D.cayenensis* and *D.alata.* The latter, the greater yam or water yam, is probaby the most important, and is grown throughout W.Africa and the W. Indies. In Africa, *D.bulbifera* (Air potato), *D.esculenta* (Chinese Yam), *D.dumetorum* (three-leaved yam), *D. rotunda* and *D.praehensilis* (white yams) and *D.cayenensis,* (yellow or Guinea yam) are all grown as crops. In tropical America, *D. trifida* and *D.cayenensis* are grown, and in Asia, *D.aculeatea, D.divaricata, D.pentaphylla and D.opposita (D.batatas).* Many other species are utilized locally or occasionally, especially as famine foods.

The cultivated species contain about 20% starch. Others are used as fish poisons, insecticides, and arrow poisons, as well as source of fiber and dyes. The roots of many members of this genus contain saponins, tannins and alkaloids. In some cases these compounds are irritants. Previously *D.villosa* was collected in the East coast US (N.Carolina, Virginia, Indiana and Michigan) and the dried rhizome used as an expectorant and diaphoretic. Some of the wild inedible New World species, such as *D. composita D.spiculiflora and D. floribunda* from Mexico and Central America, plus species from China, have been used in the past as the source for the sapogenin

precursor of cortisone, diosgenin; (and sitosterol), used in birth control pills. In Africa and Asia, *D.hispida* and *D.dumetorum* are used to prepare poisoned baits for hunting and fishing. . *D. cirrhosa* is used as a source of tannin. Many species are used in traditional medicine. *D.bulbifera* was reported as being used for "belly bite" in the Bomboko Forest Reserve.

RECOMMENDATIONS: Wild *Dioscorea spp.* were being collected by pygmies in the Djoum region, and seemed to be highly appreciated. Cultivated spp. were being offered for sale throughout the Tikar Plain, and wild species were seen being left to grow in cultivated gardens there. Around Limbe, they are also grown in the gardens. Cultivated yams require hilling up, and thus more labor than other roots crops such as cassava, as well as staking. However, they are a preferred food and thus fetch higher prices on the market. There is an opportunity to link the cultivation of yams with agro-forestry, perhaps of NTFP tree species, such as *Pausinystalia johimbe* to ensure the regular supply of poles needed to achieve optimum yields. Yams are bulky and do not transport particularly well, so most marketing is likely to be in the immediate production area. The wild species in the forest appear to be being collected on somewhat an ad hoc basis, and used as a food mainly when travelling, although wild roasted yams were seen in one pygmy village. The former market for extracting chemicals for use in the pharmacutical industry appears to have collapsed.

Eremosphata

Five species in tropical Africa

Eremospatha marcocarpa "Rattan-palm" (Palmaceae) Known as small cane in Cameroon. Found throughout Tropical Africa. Rattans are used for furniture, mats and baskets. Canes are also used for hammocks, bridges, and binding of house rafters. The split cane is used to make garden furniture and chairs in Cameroon. It is reported to be common around Mt. Cameroon.

RECOMMENDATION: The International Bamboo and Rattan Research Association is starting a program in Cameroon. They will attempt to commercialize rattan in Africa, in the same way it has been commercialized in Asia. The current market is limited and consists of middle class purchasers in the major towns. Artisans in Doula said that occasionally overseas buyers would purchase a container load from them for export. CARPE should coordinate its rattan activities with them.

Garcinia

A genus of some 200 species of slow growing, palaeotropical evergreen shrubs or trees with leathery leaves. Most of the species come from tropical Asia. Some grown for their foliage or their fruits. The fruit is a berry and the seed is arillate. The mangosteen, *Garcinia mangostana* is regarded as one of the world's best fruits. The resin from *G.Morella* obtained by notching the stem is known as "gamboge". Some species yield useful timber.

Garcinia kola Heckel Syn. *G. dinklagei* Engl., *G. conrauana* Engl., Guttiferae. (nom. altern. Clusiaceae)

NAMES: "Male Kola, Bitter Kola, False Kola". Akilu, aki-inu (Igbo), aoulié (Ivory Coast), Ci da Goro (Hausa), ebon gagnange (Douala), efiat (Ibibio), ejari (Ejagham), munjari (Korup), nya (Bomboko, Ejagham), nyai (Bakweri), nye (Oroko), nyi nyi (Upper Balong), onié (Boulou) onié (Ewondo or Yaounde), ngbwel (Pygmy bibaya), orogba, edun (Nigeria), tweapea (Ghana).

DESCRIPTION: Tree, widespread, but uncommon. Found throughout tropical West Africa, from Sierra Leone, to Nigeria, Congo, Cameroon, on to Zaire and Angola. Species of the moist semi-deciduous forest and of the secondary logged over growth. Known as the false kolatier, easily recognizable by its fine hairy flower and its large orangish yellow fruit. The leaves exude a sticky yellow latex. Seeds, bitter, astringent, aromatic. Chewed like Kola nuts.

Found from Sierra Leone to Gabon and Zaire. Its distribution is not particularly well known in Cameroun. It is found in the regions of mamfé, Bertoua, Moloundou and elsewhere. Van Dijk found average densities of 0.4 to 1.1 stems per hectare in his survey of the Bipindi-Akom II region. In the North-West Province it is becoming increasingly rare.

HABIT: Large tree reaching 30 to 40 cm in height and 100 cm in diameter. Crown narrowly triangular with sinuous upright branches. Bole straight, cylindrical, very high, cylindrical or conical, sometimes enlarged at the base.

BARK: Grey-brown, smooth, with horizontal annular rings. Blaze fairly thick, 0.6 to 1 cm: slash light brown, with a brown-red outer layer, granular, hard. Exudate gummy, yellowish, fairly abundant, aqueous. Bark frequently added to palm wine.

LEAVES: Simple, entire, opposite. Petiole 0.5 to 1 cm long, canaliculate, finely pubescent in young leaves. Blade elliptic or obovate-elliptic, 8 to 10 cm by 3 to 6 cm, obtusely acuminate at the apex, rounded or abtuse at the base, coriaceaous, glabrous, 10 to 12 pairs of looped secondary nerves. Dense network of brownish resinous lines, and glandular canals, very visible, parallel to secondary nerves.

FLOWERS: Small terminal umbels; fairly large greenish white, hermaphrodite flowers. Male flowers pubescent. Sepals free, petals greenish-white to yellow, stamens in 4 to 5 clusters, alternating with clusters of sterile staminodes. Ovary 2 to 5 chambered. Flowering December to January.

FRUITS: Globulose-pyriform, reddish yellow, veloute, berry. About 6.5-9 cm in diameter, exuding an abundant sticky yellow latex. Edible, with persistent calyx, containing (1) 2 to 4 brown seeds (2.5-3.5 x 1.5 cm) buried in an yellow-orangish pulp. Fruiting July to October. Seeds chewed. Bitter, adstringent, aromatic.

WOOD: Yellowish, dark brown towards the centre, hard, heavy, susceptible to borers.

USES: Seeds widely used as kola substitute as stimulant, aphrodisiac, purgative, and to promote digestion. Bark almost omnipresent in palm wine. Also used to cure stomach pain and other medicinal uses, such as diarrhoea, as a vermifuge, or against poisons. The pounded fresh bark, and sometimes the seeds, are used to stimulate the fermentation of plam wine made from oil-palm or raphia. The taste is changed and it is said to be tonic and envigorating, as well as to increase the alcoholic effect. Mixed with *Costus afer*, the bark in palm wine is thought to help cure gonorrhea. The latex is also used internally against gonorrhea.

Fresh bark is widely traded throughout the region, Cameroon, Gabon and Equatorial Guinea. Tons of bark apparently leave Cameroon for Gabon every year. The bark is removed from the trunk and the stems, often following an initial beating. It needs to be used within a one to two week period. Roots are used for chewing sticks, and root bark is used against sleeping sickness.

The plant contains biflavonoids with antimicrbial and antihepatotoxic properties. They may also be anti-inflammatory, antiviral and antidiabetic.

A number of other *Garcinia* species contain a yellow latex in their stems, known as gamboge. This resin-gum mixture is used for dying and said to have medicinal properties. It was formerly used as a cathartic. It was most important as a water-paint pigment and in "spirit" i.e. organic solvent based varnishes for metal. Synthetic resins have more or less replaced it. In Asia a light yellow dye is extracted from the gum-resin in the bark of *G.cowa* with water, and used to dye the garments of Buddhist monks. *G.xanthochymus* bark chips were also used to dye cotton bright yellow in Assam. The juice of *Garcinia indica* is used as a mordant with iron in south India. The rind of *G. mangostana* is combined with the fruit of *Terminaia catappa* to produce a black dye.

CULTIVATION: (Based on mangosteen). Plant in part-shade in moist, well drained soil and water regularly. Plants are dioecious, i.e. male and female flowers are on separate trees, but male trees are rare, and most fruit is parthocarpic, and contains no seeds. Propagation by layering or cutting is difficult, and fruit is only borne in an equatorial climate, so *Garcinia sp.* are rarely seen away from their origins.

RECOMMENDATIONS: Harvesting of *Garcinia* bark is widespread, and may be leading to a diminuation in the wild populations. During the brief field survey, often the first thing that drew attention and indicated a bitter cola tree in the wild was the stripped bark, and the attendant bright colored blaze. *G.lucida*, although commoner than *G. nitida* in Cameroon, is also coming under increasing pressure and the current harvest techniques are often killing the wild trees. Broad based germplasm collections should be made, and farmers above 500 metres in the Mount Cameroon region should be encouraged to grow both *G.cola* and *G.lucida* on their farms. Grafting of slow growing species on faster growing stocks could also be an option worth testing.

OTHER SPECIES: The cultivated species *Garcinia mangostana* is highly esteemed in its area of origin and major production, S.East Asia. Its culture has been attempted in many humid tropical lowlands, but no widespread commercial production has been successful. Even in the Far East the fruit is picked from uncultivated, wild trees, or dooryard plants, although occasional plantations are found. It grows in high rainfall areas, over 2,500 mm per annum. The 5 cm fruit contains four to six seeds, and a segmented, white, almost translucent pulp (the aril) protected by a 6 mm purple rind. The pulp is sweet, subacid and pleasant. The tree is slow growing, evergreen with large green leaves, native to Malaysia. It thrives best in warm, humid rainy climates, with little seasonal variation in rainfall or temperature. It can be grown in drier areas, with irrigation. It prefers temperatures between 20 to 30 degrees C, and is extremely susceptible to cold. The tree rarely grows over 10 m. It requires deep, fertile, well-drained, slightly acid soils to yield well. In good years a tree will yield 200-800 fruits, although 2,000 are possible. The tough rind allows transport, and with cooling, the fruits can last several weeks. There are no outstanding improved varieties. The mangosteen seeds are parthenocarpic, and reproduce the mother plant so no variation is produced. The seedlings can take 15 years to come into cropping. Vegetative propagation is difficult, and little selection or varietal improvement has been accomplished. It is hard to establish outside of its natural habitat. It tends to bear alternately. It appears to be graft compatible with other *Garcinia sp.*, but even grafts on hardy stock have little chance of surviving outside the tropics.

Garcinia lucida Vesque, is a small (up to 25m high, maximum 30 cm diameter) diocious understory tree of undisturbed forests, found growing on steep rocky slopes, or in bas fonds above 500 m in Cameroon and Gabon. The tree is commoner than *G.cola* and occurs in high density stands, with up to 58 adult stems per ha., over areas of 2-3 km^2. Van Dijk found 5.4 to 22.7 stems per ha in his survey of Bipindi-Akom II. The bark which is yellow- white, thick and bitter, is used like *G. kola* in Cameroon. The harvesting of the bark from the tree involves beating the stems, and tends to be destructive. Fresh bark from Cameroon is sold in Gabon and Equatorial Guinea, where it is used either medicinally or to stimulate the fermentation of palm wine. Ripe fruits are also used.

Garcinia manni is a shrub/tree, up to 12 m high, found in the dense forest of southeastern Nigeria and South West Cameroon, extending to Gabon and Equatorial Guinea. The stems are used for chewing sticks, the fruit is eaten as a laxative, and ther root as an aphrodisiac. Trade is from the South West of Cameroon to Nigeria. Other species used as chewing sticks include *G.afzelli*, *G.kola*, *G.nobilis* and *G. epunctata.*

G.dulcis, G.livingstonei and *G.xanthochymus* all have edible fruits, but not of the quality of mangosteen. *G. livingstonei*, the African mangosteen occurs in Mozambique, and Northern Botswana and Zimbabye. In November to December it produces a profusion of yellow-orange edible fruits, with a refreshing acid sweet flesh. It is used in Mozambique to make alcohol. Its leaf and flowers extracts have antibiotic properties.

Gnetum

A genus of thirty five tropical species, most are climbing shrubs or lianas, a few are erect shrubs or small trees. They occur throughout the tropics in Asia, South America and Central Africa.

Gnetum spp., Gnetum africanum Welw. and *Gnetum buchholzianum* (Gnetaceae).

NAMES: Longonizia, bawale, fumbua, eru (Anglophone Cameroon), okok (Francophone Cameroon), ukasi (Igbo), afang (Efik/Ibibio), koko (C.A.R. through to Angola).

HABIT: Climbing shrubs or lianas. Distributed throughout the humid tropical forest from Nigeria to Angola as understory lianas. The two species differ in their leaf shape and in their stamens. They thrive in a variety of habitats, including abandoned farmland, secondary forest and primary forest. Becoming increasingly scarce in Nigeria.

LEAVES: Leaves decussate, exstipulate, simple, evergreen, leathery.

FLOWERS: Male and female flowers are borne on separate plants, (dioceous), in spikes, often grouped in compound inflorescences. The spike bears decussate bracts, in the axils of which are condensed partial inflorescences of a large number of flowers, about 3-8 in the male, up to 40 in the female. The flowers form whorls around the stem, intermingled with hair structures. The perianth is tubular, and surrounds a single erect ovule with two integuments.

FRUIT: After fertilization the perianth becomes fleshy and the outer integuments woody, forming a drupe like fruit. *G.gnemon,* in Malaysia, and other species are cultivated for their fruits. The seeds are difficult to germinate, and artificial propagation is usually via leafy vine cuttings.

USES: Leaves traded widely in Cameroon, and also exported from Idenaua to Nigeria and from Campo to Gabon. Also consumed in Congo and the Democratic Republic of Congo. Hundreds of tons leave the forest annually. The main use is that the leaves are shredded for use in stews. The most common dish in Cameroon is a mixture of pounded eru and *Talinum triangulare* called water fufu and eru. Known as fumbua or koko in France, it is consumed by people originating from the CAR, Gabon and the two Congo's so, unlike safou which is consumed by people from throughout the region, it has something of a narrower market. The leaves are sometimes used medicinally, both externally and internally. The twigs are occasionally used to make traps, and the seeds are eaten roasted.

RECOMMENDATIONS: In the Bomboko Forest Reserve eru is harvested for subsistence and for sale and is becoming increasingly rare. Trucks loads of eru are seen every day speeding towards the Nigerian border. However, in Djoum, and parts of the Tikar Plain, only the civil servants appeared to know about eru,so its use appears to

be localized. Currently, because of overharvesting in the Littoral and the South-West it appears to be harvested away from its main area of use, coming daily from the Centre, East and Southern Provinces.

A program of domestication has already been started and a number of lines of eru are being propagated, cultivated and evaluated at Limbe Botanic Garden and elsewhere. Various alternative harvesting techniques are also being looked at, trying to find the methods which allow the most rapid regeneration from the underground tuber. Cutting or pulling the vine at soil level is not a good method, as regrowth is slow and fungal diseases can enter the tuber. The nursery at Limbe was seen and the wide variation there between the various accessions suggests that selection for key characteristics, such as rapid regrowth after harvest should be possible. Palatability also varies widely, probably related to fibre content and this should also be assessed.

As the estate land around Mount Cameroon becomes available, eru cultivation can be encouraged. The main and easiest market to service using cultivated eru is the Nigerian one, which should continue to expand. Apparently there is also a demand for eru in Europe, particularly from people originating from CAR. The seasonal prices remain more or less stable, probably because the plant is an evergreen and thus can be harvested year round.

Irvingia

A genus of eight species from tropical Africa and Asia. Butters with various names are made from the seeds, cay-cay, dika, etc.

Irvingia gabonensis (Aubry-Lecomte ex O'Roke) Baill. (Simarubaceae) (Irvingiaceae).

NAMES: Andok, hanedock, essou (Fang), mouiba (Ioango), muvayu (bapounou), mwiba (mayombe), oba (mpongoue), ogbono, wild or bush Mango.

A tree of the tropical African moist semi-deciduous forest, distinguished from the other Irvingia by its small leaves, with their base cuneate or slightly rounded. Often found near old abandoned village sites. Often seen near villages and towns in the forest region. Grows from Senegal to Angola, and also in Sudan.

HABIT: Large tree with dark green shining evergreen foliage, reaching 35 m in height and 120 cm in diameter. Crown hemispherical, dense, upright, very ramified branches. Bole slightly sinuous, cylindrical, with very high, concave, non-ramified buttresses.

BARK: Brownish grey, smooth, rough and scaly in old trees, flaking off in small elongated, rectangular, thin patches. Blaze fairly thick, 0.6 to 1 cm; yellowish brown, sclerofibrous, fairly hard, brittle, with tubular, rounded concretions, with purple punctuations caused by oxidation. Transversal cut with purple lines.

LEAVES: Simple, entire, alternate. Petiole 1 to 1.5 cm long, frail, canaliculate. Stipules falciform, about 2.5 cm long. Blade elliptic or obovate-elliptic, 5 to 11 cm by 2 to 6 cm, acuminate at the apex, cuneiform or obtuse and slightly asymmetrical at the base, glabrous, coriaceous, and shiny on both faces. Midrib prominent on both faces; 5 to 10 pairs of secondary nerves, prominent on both faces, camptodrome. Reticulation finely prominent on both faces.

FLOWERS: Axillary racemes; small yellowish to greenish white flowers, fragrant, hermaphrodite. Flowering: November to March; June.

FRUITS: Oblong, compressed drupes, resembling a small mango, 5 to 6 cm by 4 to 5 cm, greenish yellow with fleshy pulp, fibrous surrounding a large hard stone. Edible. Fruiting: April to July; September. Selected lines fruit in five years vs 20 to 25 in the wild. Post harvest handling is a problem as the fruit rots quickly.

WOOD: Sapwood yellowish. Heartwood pale yellow, hard, heavy, with fine grain. . Wood is light yellow to reddish yellow, tough heavy, very hard, rather difficult to split; used for street paving.

USES: The fruit of *I. gabonensis* is sweet and is eaten fresh. The kernels are edible, and during the fruiting season they are collected and processed, by women, who do the collecting as a communal activity. The Fang women may leave the village en masse and go together to collect, often from trees growing along the edges of rivers, especially in the Djoum area. The large, flat, oily seed is squashed and grilled to make a paste, called "pain de Dika ou d'Odika" in Gabon. The kernels are used as soup thickeners. Wild trees currently provide the majortiy of the harvest.

Fat from seeds is used in soap, candles etc. Seeds are also a source of Dikka Butter used as food. The seed oil has a saponification value of 241-250, and an iodine number of 1.8-9.8. The seed kernel is used in Dika bread. The tree has a tap root and is comparatively small, so is sometimes used in agroforestry. Essential oil has been extracted from *I. Smithii*.

RECOMMENDATION: It is comparatively common in the Limbe area, and large numbers of trees are said to be growing along the rivers in Djoum. The fruiting season is short and intense, and bearing is markedly biennial. The dried kernels and the processed paste prepared for storage has quite a high value compared to other NTFP's. Different methods of processing are used in the various regions, and perhaps they could be evaluated for their efficiency and popularity.

There is a widespread trade in the kernels, especially to Southern Nigeria and Gabon. Improvements in the processing, grading and transport are likely to be useful. Women can be trained to improve their handling of *Irvingia*, particularly in terms of extraction and storage, which influences the color, whether broken or not, insect damage, etc, all of which have an influence on the price. There is also an important export market which

may pay a premium for quality. In 1975, ICRAF estimated the trade in *Irvingia* to be worth $50 million.

RELATED SPECIES: *Irvingia wombulu* has a sour mesocarp, but an edible kernel. The cake produced is slimier than *I.gabonensis* and thus prefered by some users.

Laccosperma

One species from West Africa.

Laccosperma secundiflorum "Rotin (French), Large cane " (Palmaceae)

Rattans are used for furniture, mats and baskets.

Marantacea

Marantacea are grown or encouraged in bas fonds and low lying areas, and widely collected by women in the Tikar Plain area for sale in the urban centres. They are used in the preparation of fermented cassava, *miondo.*

Pausinystahlia

A genus of three species from tropical West Africa.

Pausinystahlia yohimbe (K.Schum.) Pierre ex Bielle. "Yohimbe" (Rubiaceae) Syn. *Corynanthe yohimbe.*

NAMES: (Douala) djombé, adjeck (Ewondo and Yaounde) adjadjo, toboli (Pygmy bibaya) gabo (Congo) endone (Gabon) idagbon (Nigeria).

In Cameroon, found in Mamfe, Mundemba, Mbanga-Yabassi-Edéa-Eséka-Kribi, also near Kom and in Dja inferieur, west-central and south-central. Found from South Nigeria to mayombe congolais. Grows in the evergreen forest. Sunderland et al (1997) reports an average of only 4 trees >10 cm. dbh/ha. in Cameroon and Equatorial Guinea.

Evergreen tree, tropical West Africa. Base of tree channeled, 20-30 meters high, up to 60 cm thick, bole straight, cylindrical, without buttresses.

BARK: Bark beige green (1-1.5 cm), smooth, with some small cracks; slash ochre red. Aubier, peu differencie, jaune. Bark easy to peel, bitter to taste. Wood, ochre yellow.

LEAVES: Leaves verticilles par 3, simple, grandes (15-38 x 6-13 cm), often ending in a point, more or less sessile, petiole 1mm, base of leaf obtuse or cordate; 12-20 pairs of secondary nerves. Leaves also contain yohimbine.

FRUIT: Fruits: small oblong capsules (10-15 x 5-7 mm) arranged in clusters, opening by 2 valves. Seed, small (8-9 x 2 mm) winged, dispersed by the wind. Light demanding in early stages of regeneration.

WOOD: Wood not used commercially, as trunk tends to be narrow.

USES: Stimulant, antihypnotique and aphrodisiac Bark removed (Yabassi, Kribi, Eseka) and used in Cameroon as aphrodisiac, also in veterinary medicine. The trees are often stripped after commercial logging has allowed access. Bark contains up to 6% of a mixture of alkaloids, including yohimbine (active ingredient) and yohimbinine, (inactive ingredient). The 17 alpha-hydroxyyohimban-16 alpha-carboxylic acid methylester, is also known as aphrodine, quebrachine or corynine. Traded on international markets as Yohimbe bark. The yohimbine levels vary during the year, with the highest levels in the rainy season. Trees usually felled to remove the bark. ICRAF has studied the species, (Sunderland et al., 1997). For further information, see *Science*, Aug. 1984 and *Pharmacological reviews*, vol. 35, plus BBC article in annex.

OTHER SPECIES: *Pausinystahlia spp.* Idagbon, Nikiba. Light orange brown wood with pink stripes, resembles Haldu. Hard and heavy with characteristics of boxwood. Straight grain, with interlocked patches liable to pickup. Used for turning, carving. Specific Gravity = 0.7.

Pausinystalia macroceras "false yohimbe" contains large quantities of the inactive yohimbinine as well as smaller amounts of the active yohimbine.

Physostigma

Two species from tropical Africa.

Physostigma venenosum Balfour (Papilionoidaceae)

Ordeal Bean, Isho, Esere, Djirou, the Calabar vine, Calabar bean" (Leguminosaceae).

Woody climber, shrubby at base, with lofty climbing branches. In the delta of the Niger river, the bean roots in the riverbanks and then climbs 50-60 feet into the trees.

Tropical Africa, Sierra Leone to Cameroon and Congo.

The long clusters of purple to pink flowers curved like a shell (like wisteria) appear in March, and are replaced by 6-inch brownish-yellow seedpods in March to October, which split to reveal 2-3 fat maroon seeds. Introduced to Brazil and India. Traded in past as Calabar or Ordeal Bean. Used as ordeal bean in criminal trials, local name *esere*. The criminal drank a brew made of the seeds, if he vomited and survived he was regarded as innocent.

USES: The dried, ripe, kidney shaped seeds contain several alkaloids including physostigmine salicylate, which is myotic, i.e. contracts the pupil, as well as stimulates glandular secretions, decreases intraocular pressure and stimulates peristalsis. Antiglaucomic, also effective against myasthenia gravis. Physostigmine is a powerful stimulant of muscular contractions, it kills by causing the heart, diaphragm and pulmonary muscles to contract to the point of paralysis. Physostigmine salicylate is sold in the US as Isopto-Eserine, physostigmine sulphate is sold as Eserine sulphate. The isolation of the active ingredients led to the development of the synthetics, neostigmine bromide and neostigmine methylsulfate (Prostigmin) currently being used in the treatment of myasthenia gravis.

Picralima

One species from Gabon

Picralima Klaineana (Apocynaceae) Syn. *P. nitida*. Tree. Tropical Africa. Bark used as febrifuge and vermifuge. Seeds used as local quinine substitute.

Picralima nitida (Stapf) Th. & H. Dur. Apocynaceae. Obero, Edam, eban (Ewando).

Species of the moist semi-deciduous forest, known for its bark, its roots and its seeds used in local medicine (malaria). Occurs from the Ivory Coast to Gabon. Also in Uganda.

HABIT: A glabrous shrub or small tree reaching 15 m in height and 30 to 50 cm in diameter. Crown flabellate, dense, with sinuous and drooping branches. Bole slightly irregular, fairly cylindrical, with enlarged base.

BARK: Greyish with numerous white spots, smooth with horizontal annular rings. Blaze 1 to 1.5 cm thick; slash yellow to yellowish brown, granulo-fibrous, soft. White latex, not very abundant, aqueous.

LEAVES: Simple, entire, opposite. Petiole stout, about 0.7 cm long, canaliculate, glabrous. Blade oblong-elliptic or obovate-elliptic, sometimes oblanceolate, 15 to 25 cm by 5 to 10 cm, acuminate at the apex, cuneiform or rounded at the base, shiny above, fairly thick, coriaceous. Secondary nerves 10 to 20 pairs, alternate to subopposite, parallel, craspedodrome, slightly prominent beneath.

FLOWERS: Fasicles of terminal umbels, with very short peduncle; about 0.5 cm in diameter, white to yellow. Flowering: appears at almost every season.

FRUITS: Solitary, often suspended in pairs, largely obvoid, smooth, yellowish, fleshy, 12 to 15 cm in length, containing many seeds. Fruiting: at almost every season. June in Bamendo.

WOOD: Yellow, hard, with very fine grain.

Piper

A genus of over 1,000 species of shrubs, climbers and trees found throughout the tropics. The source of pepper and kava, often aromatic.

Piper guineensis Schum & Thonn. "Ashanti Pepper, Poivre du Kissi" (Piperaceae)

NAMES: Guinea Pepper, weyowe, veove (Bakweri), yobe, move (Oroko), kowonini (Korup), bi (Upper Balong), esebe (Ejagham), ndonga (Bakundu)

A vine, 30-40 ft long, occuring naturally in high forest and secondary growth throughout West Africa, climbing on trees. Occasionally cultivated in parts of Guinea, and exported. Widespread local use and sale of fruits as spice.

LEAVES: smooth edged, usually deep green, often heart or lance shaped.

FLOWERS: Minute, cream or green, borne on short yellowish spikes formed in the leak axils, sympodial spikes, with bracts closely adpressed to the axis.

FRUITS: The small green fruits are berries, and they ripen to red or red-brown. Black when dry. Fruits from January to March in southern Nigeria.

CULTIVATION: Needs a warm climate with moist, humus rich soil to grow well. Will grow in sun or shade and are vigorous under the right conditions. Propagated by seed, cuttings or division, depending on species. *P.betle* is betel, *P.methysticum*, kava kava and *P.nigrum*, black pepper.

USES: *Piper guineense* , ashanti pepper leaves and fruits are commonly traded throughout Cameroon, and used medicinally as a carminative and also for dysmenorrhea and infertility. It is regarded as a medicine strengthener. Popular spice in pepe soup and with fish.

RELATED SPECIES: *P.clusii* is another African species that produces a similar condiment.

Prunus

The only African species, out of 200 plus in the genus.

Prunus africana (Hook.fil.) Kalkman "Pygeum" (Rosaceae) Syn. *Pygeum africanum* Hook.

NAMES: Pygeum, (Bamenda) alumty, (Oku) vla, (Kenya) mueri, (Bakweri) wotangu, (Bamenda) alumty, (Nso) kirah, (Oku) eblaah.

Tropical Africa, occurs naturally from Ethiopia to South Africa and from Nigeria to Madagascar, especially Natal, Mozambique, Angola, Cameroon. Also in Fernando Po, Sao-Tome, Zaire oriental. Africa oriental and meridional, and Madagascar.

It is found throughout the mountainous parts of tropical Africa, including in the south, Angola and Transkei. As it is only found above 800- 1000 m. it has a wide but disjunct distribution.

Tree to 25 m. or more, 40(-60) cm in diameter, may be 20 meters to first branches. Can be 1 meter wide, 40 meters high in good specimens. Found in forest (1500-3000 m) in the western, northwestern and southeastern provinces of Cameroon. Also towards Ngoro-Linte and Banyo-Tignere in the north. It is an evergreen, mid to late successional species that grows at moderate rate and can grow in open areas. Found in late secondary forest. It can attain a height of 45 m.

Flowers white.

The fleshy, purple-black oval fruit is slightly over 1 cm in diameter, and contains a stone. When grown in pure stands, the tree is often collected as a wildling, although it can be seeded. Seed viability is not known. In Kenya, seeding around Nyahururu is in August.

Bark, very dark brown (1.5 cm), fissured in the young trees, in large plates more or less square in the older trees, slice flexible, firrous, bright rose to brown, with a characteristic odor of bitter almonds. The bark is harvested in Cameroon, Madagascar and Kenya. Found mainly around Babenda/Mt Cameroon in Cameroon

It has been used by the Bakweri people on the slopes of Mt. Cameroon for a long time to treat "old mans disease". Small panels of bark were removed and then the trees left to regenerate. The bark is marketed internationally and used in OTC prostate remedies. Sold as Tadenan in France by Plantecam, and as Pygenil in Italy by Inverni della Beffa.

A French entrepreneur, Dr. Jacques Debat lodged the first patent for pygeum bark. extract in 1966. Laboratoire Debat, which subsequently became PlanteCam-Medicam have worked with bark collectors around Mount Cameroon to train them in sustainable harvesting. They recommended removing bark from opposite quarters at from about 35 cm from the ground to the level of the first branch, and then return after 7-8 years to harvest the alternate quarters. This would allow a sustainable harvest of 38-74 kg of bark per tree, with a mean of 55 kg. However, the demand is such that partially harvested trees are subsequently stripped and thus neither do they regenerate, nor are collectors encouraged to leave part of the bark behind.

The average annual harvest of pygeum bark is about 3,500 tons, mainly from Cameroon (2,000 tons) and Madagascar (600 tons). The amounts fluctuate annually, Cameroon exported 200 tons in 1980, peaked at 3,100 tons in 1991 and in 1996 was

down to 2,000 tons. The increased demand has led to widespread felling to harvest the entire bark. On Mount Oku, 8,000 dead standing trees were seen, and at Mt. Kilim 80% of the mature trees are killed by poor harvesting techniques. Assuming selective harvesting the 2000 tons exported from Cameroon represents the selective harvest of over 36,000 trees. It has been added to Appendix II of CITES- i.e. trade is allowed but subject to a license.

The tree produces strong deep-red wood for heavy purposes like sleepers, bridges, lorry bodies, and even furniture. Known as Red Stinkwood in S. Africa, and used as wagon wood, heavy, hard, close grained timber. Easy to saw and plane, good quality firewood, excellent quality timber and sometimes logged, but in Cameroon the remaining specimens are found on slopes in isolated areas..

RECOMMENDATIONS: Plantacam is no longer the main exporter of Prunus bark from Cameroon, and thus the control previously theoretically possible over the exploitation has disappeared. A stop on the road from Limbe to Douala revealed sheds containing several tons of raw and partially processed (chopped and powdered) Prunus bark. It is ironic that despite a clear demand, together with the juxtaposition of a factory for value added processing close to the resource has not led to a sustainable exploitation, nor a harvesting system acceptable to every one involved.

Cultivation is starting, although site selection is important. A plantation outside Limbe has been planted at too low a altitude, and it, as well as specimens in the Botanic Garden are doing poorly, suffering probably from bacteria disease, (Pseudomonas). Growth is slow.

Ricinodendron

Three species found in tropical West Africa.

Ricinodendron heudelotii "Essang, ndjansan" (Euphorbiaceae) Syn. Jatropha Heudelotii. Large deciduous tree. Coast of West Africa, Nigeria, Congo, Fernando Po. Nuts eaten as food, and used to extract oil used in food. Known as Essang Nuts, Sanga Nuts, Ojok Nuts. Oil resembles Tung Oil and Japan Wood Oil. Minor use in drying oil industries as Essang Oil. Grown as shade tree for cocoa.

Ricinodendron heudelotii (Baill.) Pierre ex Pax, syn. *R. africanum* Muell. Arg.

NAMES: Njanjsang, njanjsanga, esssang (Boulou), nyangsang (Douala), essessang (Ewondo or Yaounde), bisien (Upper Balong) do bao, bo nja sanga (Oroko), gobo (Pygmy bibaya), sanga sanga (Congo), eho (Cote d'Ivoire), essessang (Gabon), erinmado, okhuen (Nigeria), oyok (Ejagham), munkum (Korup), musodo (CAR), wojanga-sanga (tree) njang-sanga (fruit) (Bakweri)

Species of the drier deciduous forest, particularly characteristic of secondary growth. Extremely frequent and locally abundant. From Guinea to Angola. In Cameroun found

almost everywhere, except NE and area around Bamenda and Bafoussam. Identifiable in practice by its compound-digiatate leaf with 3 to 5 leaflets, and its scaly brownish bark with granular reddish slash.

HABIT: Large deciduous tree with caducous leaves, reaching 45 m in height and 150 cm in diameter. Crown spherical, much-branched with verticillate, horizontal branches. Bole often straight, sometimes sinuous or twisted, cylindrical, enlarged and sometimes channeled at the base.

BARK: Brown, first smooth, then becoming rough, with numerous lenticels vertically extended, with horizontal annular rings, very scaly in old trees. Blaze about 1.3 cm thick; slash reddish, very granular and slightly fibrous, with oval, tubular concretions. Twigs densely tomentose yellow.

LEAVES: Compound-digitate, alternate. Petiole 10 to 20 cm long, pulvinate at the base, canaliculate, with 2 glands at the apex. Stipules characteristic, large, foliaceous, suborbicular, about 2.5 cm by 3 cm, deeply dentate, persistent. 3 to 5 (-7) sessile to subsessile leaflets. Blade elliptic to obovate, 6 to 25 cm by 3 to 12 cm, with lateral folioles often smaller, long acuminate at the apex, decurrent at the base, with margins having small galndular teeth, dotted with translucid points and having stellate hairs, especially in young leaves. Midrib prominent beneath; 10 to 16 pairs of secondary nerve prominent on both faces, craspedodrome. Network of veins parallel.

FLOWERS: Terminal panicles, yellow-tomentose. Small greenish white, unisexual flowers. Dioecious tree. Flowering: March to May.

FRUITS: Globose drupes, yellow at maturity, then black, indehiscent, with 2 or 3 cocci, (4-5 x 2.5-3.5 cm) containing (1) 2 to 3 black, hard stones in a greenish pulp.. The naked seeds are cream colored. Fruiting May to October.

WOOD: Yellowish white, fibrous, soft, very light, with coarse grain, shrinkage: low.

USES: Njangsang trees are common in and around farms and fallow as well as secondary regrowth. The yields are stable from year to year and processed seeds can be stored, so they were found in the market throughout the three project areas. The seeds are ground and used to thicken and flavour soups. It was probably one of the most common spices being sold in the markets during my field trip. The roots and bark are used medicinally. The wood is apparently used for mortars.

RECOMMENDATIONS: Separating the seed from the indehiscent fruit is difficult. The trees are common, and demand for the seeds is high. Processing is done in the village, by women, and it involves letting the fruit rot, followed by cleaning, then carefully keeping the fruits in hot water until the indehiscent fruit opens slightly. The seed is then removed by hand. The taste and color of the final product can be spoiled by poor processing. Trials of a simple machine to crack the fruit, without crushing the seed should be carried out. The design should be amenable to be manufactured locally.

There is a demand for njangsang in the northern parts of Cameroon, where the seeds fetch a higher price. Currently, onions are transported into the south from the north, and goods are backloaded on these trucks. The market should be investigated and if appropriate groups of women in the Tikar plain encouraged to produce for and target these northern markets.

OTHER SPECIES: *Ricinodendron Rautanenii* "Manketti Nut" (Euphorbiaceae) Tree. Tropical S.W. Africa.

Drying oil extracted from seeds. Potential uses food, paint, and varnishes. Sp Gr. 0.929-0.931; Sap. Val. 191,5-195, Iodine number 129-137, Unsap 0.85%.

Wood known as M'gongo, Mugongo, Mungongo, Nigerian Corkwood. Yellow, very soft and light. Substitute for balsa. Used for cores for flush doors and plywood, and for insulating purposes. Specific Gravity about 0.2.

Strophanthus

This tropical genus from S.Africa and Asia consists of 38 species of shrubs that are often climbing and have opposite or whorled leaves, with prominent veins. The showy flowers are white, yellow, orange, red or purple, mostly bi-colored, and with the lobes often twisted into a long tail. The follicles are divergent when ripe.

Strophanthus gratus (Hook) Franch (Apocynaceae)

NAMES: . "Smooth Strophanthus, oubain, wabayo, kerim (Korup), ejoku ja mfa (Oroko)."

A glabrous, woody climber or erect shrub, small tree. Commonly found in deciduous forests of tropical West Africa, especially Cameroon, Sierra Leone and Lagos. Climbs to 30 ft (8 m) using its branches as arms.

LEAVES: Has thick, glossy, evergreen, olive green leaves, with prominent veins and a red leaf stalk.

FLOWERS: The terminal flowers are bell shaped, purple and white, like begonias, that smell like roses, 5 cm long with 35mm lobes. In Limbe, it was flowering in March.

CULTIVATION: Prefers a protected, part shaded, warm position, in fertile, humus rich, moist, but well drained soil. Propagated by seed or cuttings.

USES: Traditional healers make a rubbing compound from the leaves to reduce fevers, the leaves are mashed to treat skin ulcers, wounds and parasites, and a decoction is used for gonorrhea. Seeds contain g-strophanthin or oubain. Injected it causes the heart to beat faster and stronger. Unlike digitalis, it has a fast action and doesn't

constrict the peripheral system. It can't be taken orally, or used in the case of heart damage or with digitalis. Also used to deal with low blood pressure during surgery.

RELATED SPECIES: *Strophanthus Kombe* . "Kombe" and *S. hispidus* (Apocynaceae) Perennial woody climbers. Tropical Africa. Trade names Green and Brown Strophanthus. David Livingstone saw them being used as arrow poison. The dried, ripe seed is used as a cardiac stimulant, diuretic. Contains strophanthin, a cardiac glycoside, and kombic acid. *S. sarmentosus* was researched by Upjohn and S.B. Penick as a source of sarmentogenin, a cortisone precursor.

Tabernanthe

Six species, tropical West Africa.

Tabernanthe iboga "Iboga" (Apocynaceae). Woody plant, small to medium sized tree. Trop. Africa, especially Gabon, Congo. A shrub or small tree, found in the humid forest. Occurs in southern parts of Cameroon in the humid forest zone. Limbe Botanic Garden does not have a specimen, although Plantecam has a few young plants. Flowers white, March.

USES: The root is used as a tonic, febrifuge and aphrodisiac. Important ritual plant. Contains a hallucinogen called ibogaine. There are numerous groups, mainly in the United States, advocating the use of iboga, as a substitute for methadone in the treatment of heroin addiction.

Voacanga

Voacanga africana Stapf. (Apocynaceae)

NAMES: Itongongo, intongongo-jaleku (Bakweri), kokiyar (Hausa) pete-pete (Igbo) ako-dodo (Yoruba).

Found throughout tropical West Africa, from Senegal, Gambia, Guinea, Ivory Coast, Ghana, Benin, Dahomey, Nigeria, Cameroon, Equatorial Guinea, Congo, Egypt, Sudan Uganda and Tanzania. In Cameroon, found around Mt. Cameroon in coastal forest, in the gallery forests of the Northwest near Foumban and Meiganga, and in the tropical moist forest of the south and east.

HABIT: A shrub or small tree. 5-30 ft. high, found in the understory of the forest, secondary forest, and in savanna.

LEAVES: Opposite, simple, leaf bases united to form a short rim or sheath. Axillary glands.

FLOWERS: Terminal, bisexual, all floral parts in fives, calyx tubular with glands at the base, corolla tube, white or greenish, stamens attached near mouth of tube. Ovary of two carpels.

FRUIT: Two large, spherical mericarps. Bilobed, green fruits, speckled white, split to reveal bright orange seed. Fruiting from January to April at Buea, in March in Kumba, and April on the Tikar Plain

USES: This small tree is a very common sight in the coffee plantations on the Tikar Plain. The seeds contain voacangine, which has analgesic properties and depresses CNS activity so it has been used for treatment of certain mental disorders. In the past, the price at the farm gate was higher and seeds were collected for sale to a merchant in Bankim. The price has now dropped, and only children bother to collect the fruits/seeds. Plantacam has a number of accessions growing on its grounds near Limbe. In the past it extracted vincamin from the seed oil, buying hundreds of tons of seed. Indole alkaloids occur in the stem bark (4-5%) and the roots (5-10%)

In Bomboko, the stem bark and the leaves are used as a malaria or fever treatment. In the past, the latex, which occurs throughout the plant has been used as bird lime and also to adulterate rubber.

RECOMMENDATION: This is a common species. The main problem seems to be the market, which has collapsed. Also apparently, the content of the desired chemicals (tabersonine) is lower in seed procured from Cameroon than from elsewhere. The market prices and demand should be explored.

Some additional forest/crop species commonly seen in markets

Aframomum

Aframomum spp. (Zingiberaceae) Melegueta, maniguette, malaguette, alligator pepper, sweet alligator pepper, grains of paradise, guinea grains, poivre de guinée, ndong, tondo. An aromatic herb that occurs widely throughout West and Central Africa. It is native to West Africa, but has been carried and is cultivated widely in Cameroon, Gabon and Congo. The genus is complex and species are difficult to differentiate. There are at least 20 species described from Cameroon. It is commonly sold in the markets and *A. hanburyi, A. melegueta* and *A. citratum* are all used.

The number of local names indicates its widespread use. Ndong (Boulou) Enoné, Ntogolo-y-egoro (Mpongwé, Galoa, Orungu), Enuni, Ntogolo-y-egoro (Nkomi), Itugulu-I-giruru (Ngowe), Ukama (Benga), Ndong (Fang), Landonghu (Bakélé), Dindonghu (Beseki), Nungu-tsi-misu (Eshira, Bavarama, Bavingu), Nungu-tsi-tsisa (Loango), Ndungu-a-tsisa (Banzabi), Ndongo-a-miso (Mitsogo, Apindji, Simba) Nongo-a-miso (Ivéa, Boavové), Ndungu-a-mukuti (Bavili, Baduma), Ndungu, Ndu, Ndu-a-nkona (Minduma), Nso bian, mbongo, tongo (Oroko), nso basos (Upper Balong), nso bian

(Ejagham), nso manyan (Korup), indoka eaimokwe, mbongo, tondo, manjuelli (leaves) (Bakweri), kisho (Nso), einchok (Oku) shishur she shiv (Nso), Missisi (Bali) oseoji, ose okwa (Igbo), apokuo (Ashanti).

These rhizomatous perennials are understory plants. They are found in dense clumps in the forest in areas of medium shade or full sun; i.e. clearings and along the edge of paths. It flowers at the base of the stem. The trilocular ovary produces a fruit which is ovoid to elongate, surrounded by the persistent calyx. The numerous seeds are aromatic and enclosed in an acid pulp. It is marketed in large quantities in the region. The seeds (and occasionally the leaves) are used as a condiment in fish stews, achu and pepe soup, as well as nkwi. and medicinally. It is believed to augment the effect of other medicines, so is often mixed with them. The leaves are used in steam baths for malaria. The fruits have anti-fungal and anti-bacterial properties and are used in the treatment of skin diseases. It is thought to be an aphrodisiac.

A. meleguata (Rosc.) K. Schum, "ndong", is a tufted plant with 2-5 leafy stems up to 3 ft high. It is mainly cultivated in the shade, such as under cocoa and occurs only occasionally in the natural forest. The one flowered inflorescences are at the base of the stem, and have a pink or lilac labellum. One stem may have 3-4 fruits at a time. The fruit is about 4 cm long, and red at maturity. The seeds contain gingerol and shogaol, the same active ingredients in ginger. The species was once traded to Europe as a flavouring, but most trade now is apparently regional. The dried fruits can be stored for up to a year. Plants are multiplied via rhizomes. In Ghana it has yielded 4-500 kg of fruits per ha. It appears to self propagate via rhizomes and seeds. Marie and Van Djik found population densities of up to 7,750 plants/ha. in a study site 50 km east of Kribi. In Cameroon it can yield up to 100 fruits per plant per season.

A. citratum (Per. ex Oliv. et Hanb.) K. Schum, "mvolong" forms dense clumps in fallow, on abandoned farms and along old logging trails. It grows with 2-7 stems or more in a clump, to a height of 3m.. It requires the sun, and likes disturbed soils. It grows in places 2-5 years after they have been abandoned. After six years or so, the other successional species shade it out. A stem may have 20-30 fruits, produced during October-December and April to June. They can be stored dry for up to nine months. In Cameroon it can yield up to 200 fruits per plant per season. Harvesting the fruits seems to have a neglible effect on the survival of the wild stand.

Citrullus lanatus

Citrullus lanatus ssp. mucosospermus. "egusi". A sub-species of watermelon, the oil rich seeds are used as a condiment or to thicken soup. They are grown in the southern Sahelian savannah, often as an intercrop with maize. Seen in the Tikar plain markets. Egusi is popular throughout West Africa, and there is a germplasm collection at NIHORT in Ibadan. Although this is a minor cultivated crop, and the use of the seeds is more or less confined to west africa, some work has been done on its agronomy in Nigeria. The seed coats are being removed by hand in Cameroon, a lengthy process. Decorticators are available.

Monodora myristica

Monodora myristica (Gaertn.) Dunal. A tree to 60 ft., with large fragrant flowers. Calyx with red spots, petals yellow and red. The three inner petals spotted red outside and green inside. The fruit is spherical and green. A widely used and traded species.

Tetrapleura tetraptera

Tetrapleura tetraptera (Schum & Thom.) Taub. The Aidan tree. Essekeseke (Bakweri), esaka ce limbi, buja (Oroko), ekok (Korup), rekok (Upper Balong), ekok (Ejagham), four corners (pidgin), edeminang (Efik), oshosho, okpokrikpo (Igbo). Found throughout West Africa on the fringe of the evergreen forest zone. A deciduous forest tree to 80 ft. high, and a trunk up to 4 ft thick, occasionally with buttresses. Dark green, fern like foliage, flowers creamy or pink, turning orange. Fruits dark purplish-brown, 25 cm long, with four wings up to 3 cm wide. Two wings are woody and the other two are filled with an aromatic pulp. The seeds are small, hard and black. The fruit is used as a condiment, medicinally and as a protection from evil spirits. They store well and thus are sold throughout the year.

Xylopia aethiopica

Xylopia aethiopica (Dunal) A. Rich. "Ethiopian Pepper" (Annonaceae). A tall, evergreen, aromatic tree up to 30 m with a many branched crown. Found in evergreen forest at lower altitudes. The bark is grey-brown, smooth or finely vertically fissured. The leaves are oblong, elliptic to ovate, 8 to 16.5 cm by 2.8 to 6.5 cm, leathery, bluish green, hairless above, and with fine brownish hairs below. A narrow drip tip. The base tapers into the short, dark colored petiole. The flowers are creamy green and occur solitary or in sinuous branched spikes, or cymes. The fruit consists of a dense cluster of carpels, each one like a pod, up to 6 cm long, green to red outside. Succulent splitting when ripe, seeds black with yellowish papery aril. The carpels are used as medicine and in cooking. They are said to promote fertility, and encourage lactation. They contain carene, cineole and limonene. The aromatic roots of a related species *Xylopia odoratissima* are used medicinally in South Africa.

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CENTRAL AFRICAN REGIONAL PROGRAMME FOR THE ENVIRONMENT

CARPE/IRI COMPONENT

REPORT ON PARTICIPATORY LANDUSE MAPPING IN DJOUM SUB-DIVISION, SOUTH PROVINCE OF CAMEROON
(March 25th – April 22nd 1999)

Ebong Harrison N
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Mt. Cameroon Project Buea
May 1999

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ABBREVIATIONS

CARPE – Central African Regional Programme for the Environment

CED – Centre for the Environment and Development

GPS – Global Positioning System

INC – Institute National de Cartographie

MCP – Mount Cameroon Project

NGO – Non Governmental Organisation

NTFP – Non Timber Forest Products

TORs – Terms of Reference

USAID – United States Agency for International development

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Introduction

This report explains the Djoum Participatory Land use mapping workshop/Field data collection and transcription between March 25th – April 27th 1999. The workshop was organised by the Central African Regional Programme for the Environment (CARPE) in collaboration with the Centre for Environment and Development (CED) in Djoum South Province of Cameroon.

Workshop implementation and field activities were carried out in three phases as a result of communication difficulties between workshop organisers/sponsorers and Mount Cameroon Project (MCP) consultants.

The first phase of activities was the development of a workshop programme and a detailed budget with the CARPE field Coordinator Zephirin Mogba assisted by Ebong Harrison and Ekwoge Henry in Yaounde. During this same period informal contacts were made with the National Cartographic Institute to prepare for workshop and transcription needs.

The second phase involved workshop implementation and supervision of field data collection in all the villages identified for the mapping exercise within Djoum Sub-division.

The third phase concerned field data verification and subsequent transcription.

Workshop participants came from 15 villages and some Baka (Pygmy) camps within the Djoum Sub-division. Village researchers (Local cartographers), Village Chiefs or their representatives and the Assistant Sub Divisional Officer Chairing the opening day. Also present were Cartographers from National Cartographic Institute and Office National de Developpement des Foret (ONADEF) all from Yaounde. Village Researchers from Mokoko and Tikar regions were present as well.

1.1 MOUNT CAMEROON PROJECT INVOLVEMENT

A draft Memorandum of Understanding was designed to define the objectives and terms of collaboration for specified activities which will be conducted jointly between Mt. Cameroon Project (MCP) and the USAID funded Central African Regional Programme for the Environment (CARPE-IR1)

Activities under this agreement should contribute to MCP and CARPE-IR1 general objectives

CARPE-IR1 GENERAL OBJECTIVES FOR PHASE 1:

« Understand local forest Resources Management Systems (LFRMS): Identify ways to strengthen LFRMS characteristics that are currently or potentially favourable to forest resources conservation ».

OTHER OBJECTIVES :

-Put at the disposal of local population out side protected areas a medium of planning sustainable management of forest resources using participatory mapping.

-Raise individual and collective awareness on the fight against deforestation and the loss of biodiversity out side protected areas.

-Put in place a net work of indigenous management system of natural resources out side protected areas.

-Understanding the dynamic elements associated with local management systems of forest resources

MCP GENERAL OBJECTIVE:

The Project Mission is to maintain the richness and diversity of plants and animals in the Mt. Cameroon region, by helping people and institutions to manage forests wisely, so that they continue to provide benefits forever.

Both partners are committed to:

- Testing feasibility of forging partnerships for conservation in Cameroon with implications for conservation of Congo Basin.

- Equitable cost sharing where appropriate and feasible.

- Mutual promotion of objectives and results obtained through and within th limits of the collaboration venture.

- Adding value by providing a venue for constructive criticism, to enable adaptive management and ultimately to provide a forum for distribution of lessons learned to a wider audience.

- respect and uphold community rights and responsibilities in sustainable Natural Resource Management in so far as it is feasible and to ensure that the products of participatory mapping work belong to the Communities.

1.2 TERMS OF REFERENCE

As stipulated in both contracts, the following terms of reference were strictly adhered to, with some additional activities included for effective implementation of field activities. This include:

- Four days assisting the CARPE field Coordinator to prepare the Djoum mapping workshop in Yaounde, including travel Limbe - Yaounde - Limbe

- Travel by Ebong Harrison of Mount Cameron Project to Djoum to prepare for the Participatory mapping workshop (3 days total).

- Work with CARPE field Coordinator Zephirin Mogba to implement the three day workshop, including 1 day local preparation for the workshop

- Assist the CARPE field Coordinator to supervise the first 2 days of subsequent field work.

- Spend 1 day to assist with the production of a draft workshop report with local NGO Staff. The CARPE field Coordinator will be responsible for finalising the workshop report, which may be in french.

- Participate in village sensitisation meetings prior to mapping exercise (Data collection).

- Assist in facilitating a technical meeting with Cartographers from INC and ONADEF

- Harrison Ebong of Mount Cameroon Project will spend 11 days assisting the CARPE Field Coordinator (Zephirin Mogba) in the transcription of the preliminary data to the Djoum maps, including travel Buea-Djoum-Buea.

-Work with CARPE Field Coordinator Zephirin Mogba to implement data transcription workshop April 19-28.

- Assist in the evaluation of first field work (Gathering data and sketch mapping).

- Assist in field data verification with the use of a hand held Globa Positioning System (GPS) for accurate field data positioning.

-Prepare and produce a base map of forest zonation (plan de zonage) at a scale of 1: 25000 for the Djoum area to used during transcription

- Spend one day to produce a report on the entire contract

A copy of a report of all work carried out by contractor will be made available to the CARPE Field Coordinator, and World Learning on or before May 10, 1999. The report may be written in French or English, and will be e-mailed to those concerned as a Word Document.

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1.3 LOCATION OF DJOUM AND ACTIVITIES OF CED

Djoum is a Sub-Division located in the South Province of Cameroon with three principal ethnic groups which include:
-Fang
-Bulu
-Zamane and a Baka (Pygmy) minority
The area where Participatory Landuse mapping is currently taking place expressed in geographical coordinates reads as follows

Geographic reference

Latitude	Longitude
2° 22'	12° 32'
2° 45'	12° 50'

The Fang clan occupies this zone and is the area least affected by deforestation and logging activities in Djoum Sub-Division over the past years. This area also possess a considerable number of Baka (Pygmy) population who live and interact very closely with the Fang Community.

It is understood that the 15 villages that make up the Fang clan located along a stretch of road some 45 kilometers from Djoum had migrated from an area called Akoafem also located about 25 kilometers from the present site.

According to the villagers their parents were forcefully removed from this zone by the French after the defeat of the Germans in the First World War.

The Center for Environment and Development (CED) is an NGO based in Yaounde. It was created in 1994 and began field activities effectively in Djoum South Province of Cameroon by the end of 1995. In global terms CED has four main objectives which include:

- Improving and encouraging Participatory Natural Resource Management
- Promotion of sustainable agriculture
- Promotion of Indigenous populations Baka (Pygmies)
- Promotion of appropriate local technologies.

Operational activities include:

- Community forest development
- Private forest
- Vulgarisation of Non Timber Forest Products (NTFP)
- Benefit sharing of proceeds from logging activities.

2. PRE WORKSHOP PLANNING

Preliminary contacts were made with the CARPE field Coordinator during the Mokoko Participatory land use mapping exercise on possibilities of involving some MCP staff (Ebong Harrison and Ekwoge Henry) to assist in the same exercise in Djoum South Province of Cameroon. At the same time a tentative workshop adte was agreed upon and later confirmed by the CARPE field Coordinator Zephirin Mogba.

Ebong Harrison and Ekwoge Henry travelled to Yaounde after receiving copies of their contracts for the mapping at Djoum which was to begin on the 7th March 1999 as was agreed with the CARPE field Coordinator. When consultants arrived Yaounde they were informed by Nicodem Tchmou that workshop could only take place 1 week later. Yet no preparations had beingmade by the CED representative. Given these circumstances Ekwoge Henry, Ebong Harrison and Zephirin Mogba worked tirelessly in the CED office and later at Royal Hotel to develop a detailed worhshop programme and budget for the entire mapping exercise at Djoum. These activities were facilitated by the use of CED office logistics for nearly three days.

The National Cartographic Institute was visited as well, to arrange for base maps. Lontchi Paul and Vissi Godlove were contacted. They gave us an estimated cost for base maps and some possibilities of acquiring aerial photograps.

By the time Henry and Harrison left Yaounde a tentative date for the workshop was agreed upon with the CARPE field Coordinator. He promised to have further discussions with the CED representative and inform MCP on subsequent arrangements.

Keeping the agreed date in mind Henry and Harrison were later informed that it will be impossible for the workshop to take place as was arranged, it was later moved to the 25th March 1999.

Given the fact that Consultants had to arrange for a car and travel with two Mokoko village Researchers, it became quite difficult to meet up with time. This situation could not provide appropriate planning for Consultants and timely execution of field activities.

Ekwoge Henry could not join Ebong Harrison after an accident which resulted in a double fracture on his left leg.

In order to meet up with time Harrison travelled for nearly 14hours covering a distance of nearly 700 km for approximately 30% was secondary untarred.
In these circumstances Consultant could only arrive the field two days after workshop has started .

2.2 DAY ONE PROCEEDINGS

Day one of the Workshop was faclitated by Vissi Godlove, Paul Lontchi all from the National Cartographic Institite in Yaounde and Belomnd Tchuomba Coordinator of CED activites in Djoum. In summary the following activities were carried out during this first day of the Workshop :

-Well come speech by a representative of CED

-Opening address by the Assistant Sub-Divisional Officer for Djoum

-Sensitisatgion of Village Chiefs present on participatory land use mapping

-Objectives of participatory land use mapping

-Presentation of maps with diversified themes

-Definition of maps

-Cartographic techniques involved in mapping.

2.3 DAY TWO PROCEEDINGS

Day two of the workshop had the same facilitators as day one with a summary of the following activities :

-Uses of maps

-Participatory Land use methodology
- Sensitisation of population
- Training of village Researchers
- First field work
- Transcription
- Second field work
- Finalisation and presentation of map.

-Participatory land use mapping experinces in other places

-Map elements
- Title
- Legend
- Scale

-Practical exercise (Drawing village maps).

2.4 DAY THREE PROCEEDINGS

Day three proceedings were modified with the arrival of Zephirin Mogba, Ebong Harrison and four Village Researchers from Mokoko and Tikar regions.
Harrison reviewed the methodology for participatory land use mapping and later asked Village Researchers questions to assess their level of understanding on the whole process.
This was closely followed by a presentation of the Mokoko mapping experience by Felix Nekena, Mambo Richard with support from Ebong Harrison.
Djoum village Researchers then continued the drawing of their respective village maps.

Belmond Tchoumba, Ebong Harrison with support from Zephirin Mogba facilitated the objectives for Participatory land use mapping in Djoum both for CED and the local communities.

The objectives for mapping for the Djoum Community was to an extent participatory. Each Village Researcher gave reasons for wanting to undertake this exercise. The reasons differed from one village to another. In the end their points could be summarised as follows :

-A better understanding of their forest for sustainable management

-Put in place a system of control and supervision of forest exploitation

-Evaluate amount of potential farming area available

-Determine forest usage by the Baka (Pygmies)

-Determine areas of common activities between villages and those of neighbouring countries

-Deterime village situation in relation to « Plan de Zonage ».

The objectives for CED listed below were provided by their representative in Djoum.

-Determine potential forest areas that are suitable for community forest development in the region

-Demonstrate forest usage by the Baka (Pygmy) Community

-Show areas of encroachemnt of Local Communities into Permant Forest

-Put in place tools for effective participatory management of forest resources

-Enhance tools for the management of Non Timber Forest Products (NTFP).

Harrison facilitated the development of the questionnaire to facilitate field data collection.With contributions from the entire workshop participants questions were develpoed and phrased to suit the actual situation in the field. Here, more time was spent on phrasing sensitive questions like on hunting and trapping. Most of the agreed questions came from the Village Researchers.After developing the questionnaire, Harrison further explained the use of note books to the Village Researchers. Village Researchers were told, the note book is to keep important information which will help the Cartographers during transcription. This include :
Seasonal Changes of rivers, Number of streams, Distance in time to areas of activities, Village History, Changes in land use over time and information on natural resources.

Presentation of maps drawn by Village Researchers during the workshop was coordinated by Lontchi Paul from (INC). Village Researchers presented their maps followed by criticisms from the entire workshop participants. Questions ranged from map symbols, names of places and their meaning in the local community. Most Village Researchers spent too much time explaining physical features and very little time on human features.

Harrison Ebong highlighted the following as weaknesses of the maps presented as follows :

-Timber exploitation not indicated on their maps which is well developed in the region

-No emphasis was laid on the following (farming, gathering, fishing and hunting).

-Most maps showed individual houses in villages.

Planning for field activities was done in collaboration with Village Researchers. The only potential field problem the Village Researchers highlighted was compensation of key informants. They were advised to give a token out of their perdiem.

Below was the agreed time table for village sensitisation prior to mapping exercise.

VILLAGE	RESPONSIBLE	TIME	DATE
NKAN	ELLA CELESTIN	8 30 am	29/03/99
MINKO	NYANGONO MANASSE	9 30 am	29/03/99
AKONTANGANE	MVONDO OYE PAUL	11 am	29/03/99
DJOB	AFENE JAPHET	12 pm	29/03/99
DOUM	ADJOMO LAURENT	1 pm	29/03/99
AYENE	AKONO SAMUEL	3 pm	29/03/99
MFEM	NYAM ALEXIS	4 pm	29/03/99
ESSONG	ASSAE ALBERT	9 am	30/03/9
BINDOUMBA	MFOULOU BLAISE	10 am	30/03/99
ALAT	ASSAE OKABE	11 am	30/03/99
MEBANE 1	MEBALE FELIX	12 am	30/03/99
MEBANE 11	AVOMO GILBERT	1 pm	30/03/99
YEN	OLEM CLEMENT	3 pm	30/03/99
OKPWENG	MFOLO DANIEL	4 pm	30/03/99
NKOLENYENG	BIFANE EMMANUEL	5 pm	30/03/99

Fisrt evaluation meeting was scheduled on 12/04/99 at Mfem begininmg at 9 am.
Transcription was scheduled on 19/04/99 in Djoum beginning at 9 am.

To facilitate field data collection and subsequent transcription, a common legend was deveoped by the active participation of the Village Researchers with the assistance of the technical team (Cartographers et al).
Care was taken to maintain relevant symbols proposed by Village Researchers, as this made them to feel more involved in the mapping process. Technical team advised Village Researchers on the use of colours and patterns to come up with a readable map.

Harrison concluded by emphasing on the need to remember the following salient poits for field data collection.

-Names of rivers/streams

-Names of hills

-

Names of faring areas

-Names of forest zones and Names of hunting camps/zones etc.

Village Researchers were then provided cartographic materials and returned to their respective Communities

3. VILLAGE SENSITISATION MEETINGS PRIOR TO MAPPING EXERCISE

A total of 15 villages and some Baka (Pygmy) camps were visited in two days to sensitise the entire population before the commencement of the mapping exercise. This was also aimed at improving the working relationship between village Researchers and their respective Communities. Averagely the meetings lasted for less than one hour and representation differed from one village another.
The technical team was responsible for this exercise. Explanations were done in Bulu and French. In all the meetings, it was clarified that Village Researchers are not paid but receive a token for their time spent to produce their Community land use map.
For any village to have a good map there should be active participation of the entire community.
Map will help facilitate the process of community acquisition by villages

3.1 DAY ONE

The village of Nkan was the first to be visited with 15 persons representing the entire Community. No woman was present.
Belmond the CED Coordinator introduced members of the technical team and the objectives of the meeting.
Harrison then explained the experience of Mount Cameroon Project and the expected assistance to be provided for a successfull mapping exercise in Djoum.
The Village Researcher was then asked to explain what he has learnt in the workshop to the population and the need for drawing a participatory land use map. In the end there was no question from the villagers who wellcomed the idea and promised maximun collaboration to the success of the mapping exercise.

The next stop of the team was in a Baka (Pygmy) camp called Ngolintanga near the village of Minko were there was a Village Researcher who represented the Pygmy community in the workshop at Djoum. More than 50 Pygmies were present most of them women , for the men had gone to the forest for hunting. The technical team was introduced and the reasons for their presence to the Baka Community. Harrison explained to them that their camps are not located on maps, and the way they use the forest not known ,therefore their participation is imperative.
The village Researcher was then given time to explain to the Community what he has learnt during the workshop at Djoum with the help of a sketch map.
Minko was visited with the presence of more 60 people including one women. Technical team was introduced and objectives of mapping exercise explained to them. The process appeared quite understood by the Community because Village Researcher was involved in the mapping exercise in Mokoko Mount Cameroon Region. The villagers requseted that they would like to have their old settlement (Called Akoafem) located some 35km away on their maps.
Another stop was at the village of Akotangan and Djob were village representation was not quiet encouraging. Technical team was introduced and objectives of the meeting explained. Village Researchers in both Communities further explained mapping methodology they had acquired in the workshop at Djoum. No questions were raised by the end of the meeting. Community accepted to participate in the mapping exercise.

The last stop of the team for the day was in the following villages : Doum, Ayene and Mfem which are not far from one another. Village representation was encouraging although most of the participants were men. Technical team was introduced and objectives of the meeting explained.
Village Researchers took time to explain to their respective Communities what they have learnt in the workshop at Djoum, focusing on the importance of participatory land use mapping.

3.2 DAY TWO

The first stop for the second day was at Essong were out of 25 participants 15 were women who actively participated in the meeting. Introduction of techniacl team was proceeded by explanations from Village Researcher on what he acquired in the workshop at Djoum. The only question raied here was the location of their old settlement called Akoafem.

Bindoumba was the next stop were out of 9 village participants 3 were women. Introduction of techniacl team was proceeded by explanations from Village Researcher on what he had acquired in the workshop at Djoum. Most of the participants were Bakas (Pygmies). Message of the meeting went through French - Bulu – Baka. Harrison emphasised that Village Researcher should not neglect the participation of Bakas in the mapping exercise as they spend most of their time in the forest.

The villagers asked questions how they could indicate on their map common hunting areas with neighbouring villages and why women are not represented in the technical team nor amongst village Researchers. They were told work with a legend for common hunting areas and that National Cartographic Institute in Yaounde has few women.

The village of Alatemekae with two locations had more than 30 village representatives including women. After the introduction of the technical team Village Rearcher then explained the mapping process as was done in the workshop at Djoum. His explanation was well understood, yet the following questions came up in the end from women.

Our village is found in two locations separated by another village how do we proceed in drawing a map ? Draw two separate maps on one sheet of paper.

Mebane 1and Mebane 11 were our next stop for the day. In both villages technical team was well received and village participation was quite impressive. Village Researchers explained mapping process and the reasons for community participation. The presence of Bakas (Pygmies) and their participation in both villages was quite remarkable.

Apart from locating Akoafem on their maps, the villagers complained that most of the Elders who knew the forest are dead, therefore, they might have difficulties to produce good map.

Some other Villagers were still worried on the importance of having a village map which was again explained to them by the technical team.

Nkoleyen and Opkweng were also visited with village representation not quite encouraging. Yet both village Researchers appeared to have understood the mapping process so well that after their explanations no questions came up. It should be noted that these two villages were not moved by French administration after the Germans left. Although being part of the Fang clan, they are not interested in Akoafem. They were advised to include Bakas (Pygmies) in the elaboration of their village land use maps.

The last stop for these sensitisation meetings was at Yen which had the highest representation and a different interpretation of the mapping exercise. Despite the perfect explanation of the Village Researcher with support from the technical team for community involvement in the mapping process, some villagers thought maps were made to take away their forest and destroy their culture as well.

The chief of the village took time to clear doubts in relation to this misundertansding.

In the end, every body was satisfied and they promised full participation in the drawing of their village map.

3.3 OBSERVATIONS

Participation of women in the first day of the sensitisation meetings was completely absent as compared to the second day.

Most of the villages wanted their old settlement (Akoafem) located some 25 km from their present site to appear on the map.The issue of village boudaries was not quite highlighted during the meetings.

4.TECHNICAL MEETING FOR CARTOGRAPHERS

A technical meeting was held with the aim of delimiting the mapping zone, preparation for transcription and supervision of field activities.The following were present :
Zepherin Mogba CARPE field coordinator
Ebong Harrison Mt. Cameroon Project Cartographer
Vissi Godlove INC Yaounde
Paul Lounchi INC Yaounde
Jean Falloux ONADEF
Belmond Chumba CED coordinator Djoum
Eric Mujih University of Yaounde
Alexis Nyam village representative Mfem
Nyangono Manasse village representative Minko

4.1 OBJECTIVES

A tentative agenda for the meeting was drawn up as follows :

- General situation of the mapping exercise
- The problem of base maps
- Materials for transcription
- Action plan (who should provide what)

Zepherin opened the meeting by presenting a general over view of the mapping exercise this far. He said the mapping exercise has witnessed some bubgetary problems resulting to the delay of work.
He further acknowledge the perfect sensitisation work done by Nyangono Manasse and Nyam Alexis who had earlier participated in the Mokoko Participatory land use maps in Mount Cameroon.

Belmond Tchoumba also added that all the chiefs of the Fang clan were present and Government of Cameroon represented. From their responses the Community seem to have understood the idea and are willing to participate actively in the mapping exercise for the preservation of their forest. High level of literacy of the Village Researchers made the process to be well understood and their eagerness to work.

Harrison explained that with the little time allocated for transcription Village Researchers should be constantly surpervised in the field by the Technical Team (Cartographers) to reduce time spent during the transcription exercise.

The problem of acquiring base maps was discussed at length. According to Zephirin estimates made by INC were received quite late. It was also agreed that the contribution from ONADEF should be encouraged since they are incharge of producing forestry maps of Cameroon.
The Technical team with the assistance of two Village Researchers including a Baka (Pygmy) spent some time to locate areas of their activities in the forest . As professional Hunters they clearly indicated on the base map the furthest distance they expand as far as hunting is concerned.
Arguements on map scale also formed part of the discussion with ONADEF and INC putting forward different ideas. This was based on the number of copies to be produced and the scale as well. At this point it was decide that base maps will be produced at the scale of 1 : 25000.

Aerial photographs were another issue discussed as well during this technical meeting . Harrison proposed that aerial photographs schould be bought only on the area which really concerns the community for it would have been quite expensive to purchase aerial photographs for the whole region.

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4.2 RESULTS

As action plan the following decisions were arrived at :

-A list of transcription materials was produced

-Harrison Should prepare and produce a (Plan de Zonage) map for the Djuom area in Buea at the scale of 1 : 25000.

-Zepherin Mogba, Jean Falloux and Paul Lonchi to travel to Yaounde for aerial photographs and other base maps.

5 FIELD DATA COLLECTION SUPERVISION

As was agreed after the workshop in Djoum, Village Researchers had to be constantly supervised in the field by the technical team to ensure accurate data collection in order to reduce the transcription period.

5.1 DAY ONE AND OBSERVATIONS

All Village Researchers were visited in the first day along the 45 Km road from Djoum with results indicating some degree of laxity on the part of village researchers. At each stop Harrison explained what exactly they were suppose to be doing with their mapping equipments. This could be summarised as follows :

Nkan, Village Researcher had not started work two days after workshop.
Minko, Village Researcher had not started work two days after workshop.
Akotangan, Village Researcher had not started work two days after workshop.
Djob, Village had started work but legend not respected.
Doum, Village Researcher had started work respecting Legend
Ayene, Village Researcher had not started work two days after workshop
Essong, Village Researcher had not started work two days after workshop because he does not know the area well.
Bindoumba, Village Researcher started work with note book.
Alatemekae, Village Researcher started work with note book.
Mebane 1, Village Researcher had not started work two days after workshop.
Mebane 11, Village Researcher had started work but legend not respected.
Yen, Village Researcher had not started work two days after workshop.
Okpweng, Village Researcher had not started work two days after workshop.
Nkoleyen, Village Researcher had not started work two days after workshop.

The results of the fisrt field visit were presented to the technical team by Harrison which necessitated the drawing up of a time table by the CARPE field Coordinator for village stay . Each technician was required to spend at least 4 days in the village to assist Village Researchers. Two village Reseachers of Essong and Yen requested immediate assistance from the technical team.

5.2 DAY TWO AND OBSERVATIONS

Day two of field supervision involved the participation of all the technical team including the CARPE field coordinator. Results obtained showed some amount of improvement from the prevoius visit. This could be summaried as follows :

Nkan, Village Researcher had collected village history with a provisionary map.
Minko, Village Researcher had started work map not encouraging.
Akotangan, Village Researcher had started work but distance not respected
Djob, Village had started work but legend well respected
Doum, Village Researcher had started map encouraging.
Ayene, Village Researcher had started work but map not encouraging.
Essong, Village Researcher had started work but map not encouraging.
Bindoumba, Village Researcher started work with note book and map.
Alatemekae, Village Researcher started work with note book and map.
Mebane 1, Village Researcher had not started work two days after workshop.
Mebane 11, Village Researcher had started work with legend respected.
Yen, Village Researcher had started work with legend not respected.
Okpweng, Village Researcher had started work with legend not respected
Nkoleyen, Village Researcher had not started work two days after workshop.

5.3 DAY THREE AND OBSERVATIONS

Day three witnessed a remarkable change in most villages. From all indications the process at this point was moving in the right direction as nearly all the Village Researchers had good hand drawn maps. Those whoes maps were not good spent time doing other activities they considered important and paid very little attention on the instructions given by the technical Team. They promised to concentrate on their map work in order to improve upon what they have at hand.

6. FIRST EVALUATION WORKSHOP

In the absence of Harrison Ebong, the rest of the technical team facilitated this workshop. Maps were presented by Village Researchers and comments made by those present in the Clan Head of the Fang Community. Note books were also checked to evalaute proper use. This exercise was done village by village. Planning for the next activities concluded the workshop. The following time table was drawn up

- Finalisation of village maps and preparation for transcription 13/04/99 - 14/04/99

-Transcription 15/04/99 - 25/04/99

Assessment of note books 18/04/99

-Presentation of maps to population 26/04/99 - 28/04/99

-Finalisation of map by Cartographers 29/04/99 – 05/05/99

7. PREPARATION FOR TRANSCRIPTION

Results of the technical meeting for Cartographers in principle appeared to have laid a good foundation for the smooth take off of the transcription exercise. Yet, most of the basic materials for transcription were not readily made available as promised. On the one hand ONADEF could not provide aerial photographs and the 1 : 25,000 base map for the Djoum area.

Given these difficulties INC opted to provide aerial photographs produced in the late 1950s at a scale of 1 :50,000 of the Djoum area. They also enlarged the 1 : 200,000 map to 1 : 25,000 therefore leaving out some of most needed physical details. Apart from this, all other Cartographic equipments needed for transcription were provided by INC, ONADEF or bought by the CARPE field Coordinator.

7.1 TRANSCRIPTION PROCESS

Harrison arrived Djoum a day after transcription has started. The technical team organised a meeting to review activities for the first day of transcription. Attendance was as follows :

Belmond Tchoumba, Vissi Godlove, Lontchi Paul, Faleu Jean and Ebong Harrison.

Belmond indicated that the Cartographers don't respect time and many people work on one map at the same time, therefore, causing confusion. This he said will delay work and in the end produce very poor results.

The first transcription day also witnessed some disagreement between INC and ONADEF Cartographers on positioning rivers on maps. As was earlier explained the enlargement of the base map appear to have brought this misunderstanding.

In the end Belmond and Harrison agreed to start field data verification the next day.

Reasons for field data verification

- Aerial photographs available were quite old
- Errors on base maps as result of base map enlargement
- Location of new roads and settlements (camps).
- Location of forest/farm boundaries.

<u>DAY TWO OF TRANSCRIPTION</u>

As early as 7. 00 am, Harrison was accompanied by the CED Coordinator and one Cartogarpher from the National Institute of Cartography in Yaounde for field data verification in four villages located some 20 Km from Djoum.

At the same time the rest of the Technical Team (ONADEF and INC Cartographers) stayed behind with some Village Researchers to continue data transcription for more accurate hand drawn maps.

Our interest here was to locate roads constructed by timber companies which were not found on aerial photographs nor available base maps using a hand held Global Positioning System (GPS).

In each village we contacted a key informant and Village Researcher for the purpose of Community participation. Baka's (Pygmies) were part of our team as they know the forest quite well, and were willing to guide us collect the necessary information. Team made a stop at each village and visited the Roads constructed by Timber companies.

With the aid of a hand held (GPS), waypoints were collected stating Longitude, Latitude and altitude at close range for subsequent plotting and verification on the base maps.

Most timber roads were impracticable at some points as a result of fallen trees. Faced with this difficulty the team had to trek for a good number of kilometers to complete the exercise. By the end of the day, nearly 90% of the roads identified in these villages were surveyed and latter plotted on the base maps with the asssistance of the technical team.

DAY TWO OF FIELD VERIFICATION

Team left Djoum and drove to Nkoleyen some 45 Km to invite some Bakas who had returned from the forest with the selected Village Researchers.
The village of Okpweng locate some 4 Km from Nkoleyen was our first stop. Here data was collected on existing timber roads and abandoned logs of wood by the Malaysian timber Companies. Some new Baka settlements were identified along the timber roads and GPS waypoints collected.
The next stop for the same exercise was at Yen where data was collected from the old German road leading to Akoafem which is nearly 35Km from Yen. Given the difficult nature of the road apprroxiamtely 10 Km were surveyed. The team returned to base at about 6 : 00 pm.

DAY THREE OF FIELD VERIFICATION

Ebong Harrison, Faleu Jean from ONADEF were accompanied by Emane Jean Bernard (Baka) for field verification as early as 7: am. Four timber roads were visited. One of this roads was practically inaccesible while the others were surveyed for a distance of more than 5 km by trekking and car.
This timber roads are found in the villages of Nkan and Doum located some 10 Km from Djoum.
During this same day waypoints were collected for bridges located along the road between Djoum and Nkolenyeng for accurate positioning on the base maps.

DAY FOUR
The fourth day was spent in transcribing most of the field data collected with the use of a hand held GPS. All the members of the Technical Team took part in this exercise. This included information on timber roads, forest / farm boudaries, new location of some Baka (Pygmy) camps and location of streams along the road.

Before Ebong Harrison left Djoum, the maps at this stage appeared to be quite satisfactory with nearly all the relevant data collected from hand drawn map of Village Researchers and transcribed.
As a re of lack time for Harrison, it was agreed that Faleu Jean (Cartographer from ONADEF) should lead the transcription of the « Plan de zonage « as the are soley incharge in the production of forestry maps of Cameroon.

8 RECOMMENDATIONS

The recommendations listed below could serve as guidelines for any successful Participatory Land use Mapping for natural resource management. Neverthe less they might not be applicable to all stuations at a given time. For the purpose of a better understanding they have been divided into technical and management recommendations

8.1 TECHNICAL RECOMMENDATIONS

In respect to technical recommendations the following should be done before the mapping exercise commences:

- Delimit the area to be mapped as this could facilitate budgeting for map preparation and printing

- Check all available base map information which include:
    - Base maps and the scale available
    - Existing aerial photographs and their ages
    - Satellite images if at all they exist
    - Global Positioning System (GPS)
    - Other cartographic equipments

- Harmonise the understanding of participatory land use mapping process for the technical team to avoid misunderstanding (INC and ONADEF)

- Field supervision
Technical team should delegate one cartographer who talks to the Village Researcher at a given time.

- Develop a common legend for the mapping exercise to be used by village Researchers. This will reduce the period of data collection and subsequently facilitate data transcription.

- Each village Researcher should be given some time to particiapate in the data transcription process of his hand drawn map with the technical team within a specified time.

- During the transcription process, it is recommended that the technical team should work first with complete maps drawn by village Researchers then proceed to incomplete ones. At this stage they should take note of information gaps either human or physical features, as this will form the bases for field verification of data in the seccond fieldwwork.

- The participation of women in the whole mapping exercise as well should be greatly encouraged as their impact on the forest and the environment is quite significant. It would be interesting to have a women village Researcher who possess the required qualities

- Village Researchers should be given time after the last workshop to criticize their maps before final production. Experience indicate that they always come up with new information.

- Avoid enlargement of small scale maps from large scale maps. This will reduce the amount of physical details.

Participation of Village Resaerchers from other aresa were maaping has already taken in subsequent workshops should be encouraged. Their contributions to an exetnt facilited the success of the djoum maping.

8.2 MANAGEMENT RECOMMENDATIONS

The organisers of subsequent workshops should kindly consider the following :

- Workshop dates and preparation should be agreed by all parties concerned in time for effective implementation in the field.
-
- Communication between workshop organisers and Consultants should be frequent for information exchange in case of any changes.
-
- Contracts given to Consultants should be concluded and confirmed in time to facilitate proper preparation and travelling to the field.
-
- Consultants should be provided adequate time in the field to implement workshop and supervise field activities.

Annexe 1

Work schedule

DATE	ACTIVITY
04-03-99	Travel Buea – Yaounde
05-03-99	Development of Workshop programme with Zephirin Mogba
06-03-99	Development of Workshop bubget
07-03-99	Arranging and listing Workshop needs
08-03-99	Meeting with INC cartographers and travel to Buea
26-03-99	Travel Buea - Yaounde – Djoum
27-03-99	Implimenting 3 day Workshop
28-03-99	Implimenting 3 day Workshop
29-03-99	Village sensitisation meetings
30-03-99	Village sensitisation meetings
31-03-99	Technical meeting with cartographers
01-04-99	Supervision of field activities
02-04-99	Supervision of field activities
03-04-99	Assist CARPE field Coordinator in Report writing
04-04-99	Travel Djoum – Yaounde - Buea
12-04-99	Negotiations for work to be done in Djoum
13-04-99	Preparation of forest zonation map of Djoum area at the scale of 1 25000
14-04-99	Travel Buea Yaounde
15-04-99	Travel Yaounde – Djoum
16-04-99	Field verification of data and transcription
17-04-99	Field verification of data and transcription
18-04-99	Field verification of data and transcription
19-04-99	Data transcription
20-04-99	Transcription and travel Djoum –Yaounde – Douala
21-04-99	Travel Douala –Buea –Limbe
22-04-99	Report writing

Annexe 3

Workshop on Participatory Landuse mapping
March 25th to 27th 1999 at Djoum Co-sponsored by IR1 CARPE and CED

List of Participants

N°	Name	Village	Profession
1	Nyam Alexis	Mfem	Farmer
2	Akono Samuel	Ayéné	Retired Teacher
3	Avomo Edjée Gilbert	Mebane II	Computer Operator
4	Olem Ndongo Clément	Yen	Farmer
5	Ella Meye Merlin	Alatmekae	Farmer
6	Emane Jean Bernard	Gounitangane	Hunter
7	Essam Aboulou Jean	Okpweng	Farmer
8	Ella Minko Minko Célestin	Nkan	Farmer
9	Adjomo Nno Laurent	Doum	Farmer
10	Mvondo Oyé Paul	Akontangane	Farmer
11	Afene Bitée Japhet	Djop	Farmer
12	Assae Assae Albert	Essong	Farmer
13	Mfoulou Blaise Dieudonné	Bindoumba	Farmer
14	Mambo Richard Akpaya	Diongo	Farmer
15	Ango Mballa Emmanuel	Mebane I	Farmer
16	Nyangono Manassé	Minko'o	Retired
17	Lontchi Paul	INC Yaounde	Cartographer
18	Vissi Godlove	INC Yaounde	Cartographer
19	Mfin Isaac	Ngambé Tikar	Telecom Officer
20	Bifane Elle Emmanuel	Nkolenyeng	Gardener
21	Tchimi Basile	Bankim	Administrator
22	Faleu Jean	ONADEF Yaoundé	Cartographer
23	Zéphirin Mogba	CARPE IR 1	Co-ordinator
24	Belmond Tchoumba	Djoum	Coordinator CED
25	Ebong Harrisson	MCP Buea	Geographer
26	Eric Mujih	Yaoundé	Cartographer
27	Tamo Gérôme	Djoum	CED
28	Ella Ella Pierre	Nkan	Farmer
29	Assa'a Pierre	Minko'o	Farmer
30	Ekomane Joseph	Akontangane	Farmer
31	Bite'e Joseph	Djop	Farmer
32	Evina Ze	Doum	Farmer
33	Etou'ou Cosmas	Ayéné	Farmer
34	Ze René	Mfem	Clan Head
35	Akono Meye	Essong	Farmer
36	Essiane	Bindoumba	Farmer
37	Assae Okabe	Alat	Farmer
38	Mebale Felix	Mebane I	Farmer
39	Nyate Jacques	Mebane II	Farmer
40	Ze Mba	Yen	Farmer
41	Mfolo Daniel	Okpweng	Farmer
42	Elle Moïse	Nkolenyeng	Assistant Mayor of Djoum
43	Ako Paul	Ndong	Farmer
44	Obam	Mfem	Hunter
45	Ze Komba	Elig Melen	Hunter
46	M. BELIBI Jean	Djoum	Assit Sub Divisional Officer
47	Aboubacar	Djoum	Chief of forestry Post
48	Oyono Blaise	Mbouma	ECOFAG representative
49	Mbiame Magloire	Djoum	President OJRDPC
50	Oyomo Jules	Divisional Office Djoum	Protocol Officer D O
51	Zang	Djoum	Sub Divisional Office
52	Kwengueng Emile	Djoum	CED
53	Felix Nekena	Illoani	Farmer

Annexe 3

Discours prononce par M. l'adjoint d'Arrondissement de Djoum A l'occasion de l'ouverture du seminaire sur la cartographie participative co-organise par le Centre pour l'Environnement et le Development et le Programme regional pour l'Environnement en Afrique Central (CARPE)

Monsieur le Maire de la commune rural de Djoum
Excellences,
Mesdames,
Messieurs,

C'est un agréable devoir pour moi de me retrouver parmi vous aujourd'hui pour procéder au nom du Sous Préfet empêché, à l'ouverture des travaux du séminaire sur la méthodologie de cartographie participative à grande échelle organisé à l'intention des populations du Canton Fang Centre par le Centre pour l'Environnement et le Développement (CED) en relation avec le Programme régionale pour l'Environnement en Afrique Centrale (CARPE).

Avant toutes choses, qu'il me soit permis d'associer ma voix à celle des orateurs qui m'ont précédé à cette tribune pour vous souhaiter, en particulier à ceux des conférencier et séminariste venus des localités très éloignées, la bienvenue et un agréable séjour à Djoum pendant les jours que durerons vos travaux.

Mesdames,
Messieurs,
Cher(e)s séminaristes,

La nouvelle politique forestière du Cameroun prévoit que les populations doivent être consultées à chaque fois qu'on procède au classement définitif ou au déclassement d'une forêt. Il s'agit là des moments privilégiés de gestion participative. mais, à l'expérience, combien sont-ils qui maîtrisent cette loi. Pas très nombreux dans nos villages.

Le présent séminaire dont le mérite est de donner des outils nécessaires permettant aux populations de jouer pleinement et efficacement leur rôle dans le domaine de la gestion forestière nous semble par conséquent venir à point nommé.

L'importance de ces assises n'étant plus à démontrer, je vous invite mesdames messieurs les séminaristes à suivre très attentivement les exposés qui vous seront donnés par les conférenciers, à poser des questions et participer dans la discipline à toutes les phases de vos travaux.

En souhaitant plein succès à vos assises, je déclare ouverts les travaux du séminaire sur la méthodologie de cartographie participative à grande échelle organisé à Djoum.

Annexe 4

EVALUATION AND CLOSING

S/N	ATTRIBUTE	VERY POOR	POOR	GOOD	VERY GOOD	EXCELLENT
1	General organisation		1	8	7	6
2	Workshop objectives met		1	11	8	6
3	Presentation of lessons		1	7	9	2
4	Use of time		1	6	11	8
5	Participation		2	8	10	4
6	Duration of workshop		2	9	4	4
7	Preparation of field work		5	13	1	4
8	Field work programme		11	6	1	2
9	Accommodation		1	6	5	10
10	Food			9	15	5

Annexe 5

WORKSHOP PROGRAMME ON PARTICIPATORY LAND USE MAPPING March 25th to 27th 1999 at Djoum Co-sponsored by IR1 CARPE and CED

March 24th 1999
Arrival of participants

March 25th 1999

9 H - 9 H 30
Arrival of the Sub Divisional Officer for DJOUM Sub Division
Wellcome speech by a representative of CED
Opening address by the Sub Divisional Officer for Djoum
Sensitization of Village Chiefs and their opinion on participatory landuse mapping

9 H 30 - 10 H 45 : Coffee break

11 H - 13 H
Presentation of participants and their objectives
A run down of workshop programme and activities

13 H - 14 H : Luanch break

14 H 16 H
Ojectives of participatory mapping
What is map
Cartographic techniques

March 26th 1999

8 H 30 - 10 H
Uses of maps
Participatory land use mapping methodology

10 H - 10 H 30 : Coffe break

10 H 30 - 12 H 30
Participatory land use mapping methodology

12 H 30 - 13 H 45 : Luanch break

14 H - 16 H
Participatory land use mapping experiences from other parts of Cameroon
Practical exercise Drawing village maps

March 27th 1999

8 H 30 - 10 H
Practical exercise Drawing village maps

10 H - 10 H 30 : Coffee break

10 H 30 - 12 H 30
Djoum Objectives of participatory land use mapping in Djoum
Objectives of CED
Objectives of the local Communities

12 H 30 - 14 H 45 : Luanch break
Planning for field activities
Definition and formation of map legend
Salient points for field data collection

14 H - 16 H
Distribution of cartographic materials to Village Researchers
Return of Village Researchers to their respective villages
Annex 6

Annex 6

Questionnaire on Landuse Planning through Participatory Mapping

1. GATHERING

Where do you gather Njansang, Bush-mango, Bush-pepper?

.....

.....

2. TIMBER EXPLOITATION

Where do you exploit timber for sale, building, firewood?

.....

.....

3. MEDICINAL PLANTS: (K. LETTER)

Where do you gather medicinal plants

.....

.....

4. FARMING FOREST

What are the names of your farming/forest area?

.....

.....

5. HUNTING:

Where do you go hunting?

.....

.....

6. FISHING:

<u>Where do you do fishing</u>

.....

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MOUNT CAMEROON PROJECT
MOKOKO AREA

REPORT OF PARTICIPATORY LAND USE MAPPING IN THE BOA PLAIN AREA SOUTH WEST PROVINCE CAMEROON

BY

MOUNT CAMEROON PROJECT AND CARPE

Compiled by:

- *Ekwoge Henry*
- *Ebong Harrison*
- *VissiGodlove*
- *Paul Lontchi*

January 1999

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ACRONYMS AND ABBREVIATONS

CARPE	-	Central African Regional Programme for the Environment
CDC	-	Cameroon Development Corporation
CITERCRAF	-	Centre de Teledetection et Cartographie Forestiere
CNL	-	Centre for the Support for Native Lands
CoP	-	Chief of Post
D.O	-	Divisional Officer
INC	-	Institute Nationale de Cartographie
LBG	-	Limbe Botanic Garden
LFRMS	-	Local Forest Resource Management Systems
MCP	-	Mount Cameroon Project
MINEF	-	Ministry of Environment and Forestry
MRFR	-	Mokoko River Forest Reserve
NTFPs	-	Non-Timber Forest Products
SSI	-	Semi-Structured Interviews

TECHNICAL TEAM:

- Mac Chapin - Centre for the Support for Native Lands (CNL), Washington DC (Consultant)
- Zeperin Mogba - Co-ordinator of Congo Basin – CARPE - IR_1
- Ekwoge Henry - MCP Limbe, Social Development specialist (Supervisor)
- Ebong Harrison - MCP Buea, (Cartographer)
- Belmond Tchoumba - Centre Pour l'environment et le Development (CED) Yaounde
- Paul Lontchi - INC Yaounde (Cartographer)
- Godlove Vissi - INC Yaounde (Cartographer)

Local Cartographers (Village Researchers):

A. MOKOKO AREA:

1. Lucas Dioh - Ekombe Mofako village
2. Joseph Itoh - Ekombe Mofako
3. Ntonga Pius - Barombi Mokoko
4. Chief Elvis Kema - Barombi Mokoko
5. Nekena Felix - Illoani - Balondo
6. John Mbotaka - Illoani - Balondo
7. Onori Felix - CoP MINEF, Illoani
8. William Ngoh - Dikome – Balondo
9. Emmanuel Ngoh - Mbongo - Balondo
10. Asoh Fidelis - Bonjare Balondo
11. Okha Roy - Boa Balondo
12. James Itoh - Boa Balondo
13. Mambo Richard - Diongo Balondo

B. DJOUM / TIKAR

1. Nyangonon Monasse - Djoum, village Mink'oo
2. Ntyam Alexis - Djoum, village Mfem
3. Bifane Emmanuel - Djoum, village Nkolenyeng
4. Tchimi Basile - Plane Tikar, village Bankim

1. INTRODUCTION:

This report is the product of a Participatory Mapping Exercise carried out in the Boa Plains (Mokoko) Area by Mount Cameroon Project in partnership with CARPE – IRI (Central African Regional Programme for the Environment) from December 1998 to February 1999.

The purpose of the Mount Cameroon Project is to increase the capacity of resource users and other stakeholders to implement a participatory strategy for sustainable use and conservation of forest resources in Mount Cameroon Region. A key issue for Local Communities and Project alike is to better understand and define resource use, land and resource tenure, and in particular the geographical extent and legal validity of rights to resource use.

Many of these issues are well understood and documented and negotiations with all the stakeholders are advancing. However, the maps for the area are still restricted to physical features, vegetation cover, political boundaries, gazetted forest Reserves and the leasehold boundaries of the Cameroon Development Corporation (CDC), a large industrial plantation parastatal Company. A clear gap is the mapping of local traditional land ownership and resource use tenure. Such maps would assist the Community to better express their concerns when negotiating land allocation with government, where competing demands for forest conservation, Plantation Development may compromise their own Community development aspirations. This exercise is particularly relevant with the imminent privatization of CDC and the participatory land use planning programme of the Mount Cameroon Project.

CARPE –IRI general objective is to "understand local Forest Resources Management Systems (LFRMS); identify ways to strengthen LFRMS characteristics that are currently or potentially favourable for forest conservation. CARPE intends to achieve its general objective by developing a research action programmes in the three sites in Cameroon representative of diversity of the Congo Basin.

- Arrondisement de Djoum (Lowland Forest)
- Tikar Plain (Forest Savannah Transition Zone)
- Mount Cameroon (Lowland and Montane Forest)

With the abundance of documented information and base maps for the Mount Cameroon region, and good working relations between the Project and stakeholders (communities, CDC, Government services). The Boa Plain area was chosen as an ideal site for testing the Participatory Mapping methodology in Cameroon and at the same time training staff from other regions in the method.

Participatory Mapping through Center for Native Lands (CNL) methodology leads to maps that are of high technical quality (at scale, drawn by professional Cartographers) but represent the local groups' view of the important resources, the conflicts, the denomination of sites, etc.

Beach. The total amount of non-CDC land available for subsistence farming on the Plain is around 830ha including 500ha at the Southern end towards Betika.

Any significant plantation expansion by CDC on the Boa Plain would cause major social problems and would also shift farming pressure onto fragile hills to the South-East with negative repercussions as regards soil erosion and surface water supplies. The Mokoko River Forest Reserve also stands a risk of movements by food crop farmers and Plantation small holders.

1.2.4 Livelihoods:

Some 90% of households on the Boa Plain are actively involved in farming, including both cash (cocoa, coffee, oil palm) and subsistence (cassava, egusi, yams, plantain, fruit trees, etc). Food crop are also sold to urban centers and have been an important commercial activity. Small-scale oil palm became an important source of income in the 70's (and is still on the increase), following the establishment of Community oil palm Plantations and oil mills by a German Clergyman (Father Groot) at Mbongo, Dikome and Iloani.

A major source of income for many natives is renting land to non-natives. Traditionally, land cannot be alienated outside the tribe, and therefore non-natives, especially Nigerians have no right to buy land. However, they can acquire it through co-habitation with or marriage to a native woman. Parts of the Mokoko River Forest Reserve have already been illegally sold at Ekombe Mofako. Renting bush is an easy way to acquire more cash.

The Boa Plain Forests currently supply the bulk of the timber and the NTFPs for the local communities. The forests are also used extensively to supply medicinal plants, wild fruits, vegetables and for hunting and trapping.

The mapping Project was limited to eight villages covering three clans (Balondo, Barombi and Ekombe) in Bamusso Sub-Division that share a boundary with Mokoko River Forest Reserve. The villages in question include: Ekombe Mofako, Barombi Mokoko, Illoani, Dikome, Mbongo, Bonjare, Boa and Diongo.

subject to very steep rainfall gradient, with annual totals ranging from 6.000mm in the South to as little as 2,000mm East of Mbonge. While the Plain is composed of recent sandy and silty alluvium and is subject to seasonal flooding, the hills are a dissected plateau of old volcanic rocks with a few up-faulted sedimentary belts.

Overall, it appears the forests of the Boa Plain are of moderate conservation value. However, local communities value them highly for the supply of NTFPs, especially rattan, bush mango (*gabonensis*) Njansang (*Ricinodendron heudelotii*), Eru (*Gnetum africanum*) etc.

1.2.2 Fauna:

The Boa Plain Forests provide an extensive area of habitat between the hills and the mangrove swamps, suitable for species such as the forest Buffalo. Disturbance, hunting and forest clearance have now greatly reduced the value of the area to larger mamals, but hunters still value the seasonally flooded areas for bush pig, antelopes and crocodiles.

Hunting pressure is high from both local and outside hunters, including the forces of "law and order" who both hunt themselves and provide cartridges to hunters in return for bushmeat. MCP is in the process of assisting the villages around the Mokoko River Forest Reserve to set up a Wildlife Management Committee to begin to re-establish control over hunting and trapping in the area.

1.2.3 Land Use:

Land Use in the Boa Plains is changing rapidly due to both population increase and agricultural development, and land scarcities are increasingly being felt.

Land use is divided between natural, largely undisturbed forest, secondary logged) forest, old fallows, plantations and small-scale shifting agriculture. Primary forest is held in common by the village, individual ownership rights only being conferred on land that is cultivated.

The boundaries of the Mokoko River Forest Reserve are well known and respected in most of the villages. However, the boundary is highly contested at Ekombe Mofako and Barombi Mokoko where the natives claim they were not signatory to the gazettement document. Archives however indicate that these villages were under the Balondo Native Authority that was signatory. Communities enjoy access to the Reserve to exercise customary rights[1].

CDC hold some 16,900 hectares in vicinity of Boa Plain of which only 3,700 ha have been converted to Plantation crops of oil palm and rubber. Some 4.000 hectares of CDC's underdeveloped holdings have been affected by clearance for food crop farming, i.e. the majority of the population of the Boa Plains is actively on CDC land, particularly the old banana plantation between Boa native and Boa

[1] Customary rights: The right to collect all forest products including timber, except the protected species for personal use but not for sale.

1.1 Objectives of Mapping:

From the point of view of the Communities, the resulting maps are potential tools for:

- Increasing sense of ownership and control of land and natural resources, thus improving their ability to participate in the management of such resources.
- Providing legal documentation and giving political weight to Community's perception of ownership and rights;
- Regarding the historical and socio-cultural significance of certain sites.

From, the point of view of MCP, the resulting maps are potential tools for:

- Raising awareness of the state of natural resources by communities/users;
- Natural resource management planning
- Land use Planning
- Finding an entry point for further discussion with Communities concerned
- Increasing security of tenure on land/forest is likely to facilitate subsequent discussions about resource management.

The exercise will contribute to the Land Use Planning and Resource Management Plan to be developed by MCP at the request of the Government of Cameroon. It will determine the land area used by local communities for subsistence activities, agriculture, hunting, gathering (fruits, medicine, rattan, firewood, timber, fuelwood) and areas covered by Commercial Plantations (CDC).

1.2 Background to Boa Plain Area:

1.2.1 Flora:

The Boa Plain area includes nearly 27.000 hectares (270km^2) of lowland forest (Onge / Mokoko forest) and a further 4.000 ha of flooded forest, together with 11.000 hectares of mangroves and other marine vegetation types of the lowland forest. Some 9.000 hectares are within the CDC leasehold, both in the Plain and in the hills to the South.

The Eastern part of the hills was gazetted as the Mokoko River Forest Reserve in 1952 which covers an area of 9.100 hectares. It is a production forest and was last logged 5-10 years ago by Dimitriades, and Akem & Sons. Recently, a logging Company (Société Forestière des la Mvilla) applied for a permit to take timber from some 1.500ha of land on the Southern edge of the Plain to assist farm expansion, but the logging Company lost interest following an Environmental Impact Assessment (EIA) by MCP (MCP 1997b). The area is

1.2.5 SOCIAL ANALYSIS:

S/N	NAME OF VILLAGE SETTLEMENT	ESTIMATED POPULATION FIGURES	HISTORICAL DATA SEASONAL FLUCTUATIONS	ETHNICITY	LAND USE	MAJOR LAND USE PROBLEMS/ CONFLICTS
1.	**Ekombe Mofako**	450 + (45 households)	Increase in population during cocoa season and Nigerian immigrants	Indigenous 85%, Nigerians 10%, other Cameroonians 5%	▪ Subsistence and Cash crop farming – cassava, egusi, plantain, cocoa, oil palm. ▪ Logging in communal forest and Reserve ▪ Logging by Canoe Carvers ▪ Traditional hunting and fishing ▪ NTFPs collection	▪ Encroachment into Forest Reserve ▪ Village Land shortage due to CDC expansion, land sales and soil infertility/flooding ▪ Many outside hunters.
2.	**Barombi Mokoko**	140 + (20 Households)	Increase in population during cocoa period	Indigenous – 20%, Nigerians – 10%, other Cameroonians – 70%	▪ Subsistence/cash crop farming; (cassava, egusi, plantain, cocoa, oil palm ▪ Logging in Communal Forest/Reserve ▪ Traditional hunting	▪ Village land sales ▪ Forest boundary dispute with Illoani. Illoani claim Barombi are settlers ▪ Village land shortage due to CD expansion.
3.	**Illoani**	1,600 + (190 Households)	Increase in population due to CDC expansion (labour force) and Nigerian immigrants	Indigenous – 60% Nigerians – 25%, Other Cameroonians – 15%	▪ Subsistence/cash crop farming; cassava, egusi, yam, plantain, oil palm ▪ Commercial logging by CDC/Community ▪ Logging by Timber Company ▪ Traditional hunting/fishing	▪ CDC encroachment on village land ▪ Forest Boundary dispute with Barombi Mokoko ▪ Many outside hunters

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4.	**Dikome**	350 (42 Households)	Increase in population due to Nigerian immigrants	Indigenous – 70% Nigerians – 25% Other Cameroonians – 5%	▪ Subsistence farming – cassava, egusi, oil palm, etc. (Community oil Palm Plantation) ▪ Logging by CDC/indigenes ▪ Traditional hunting/fishing ▪ NTFPs collection	▪ Long standing forest boundary dispute with Mbongo ▪ CDC encroachment on village land ▪ Proposed Dikome Estate is considered communal forest by villagers
5.	**Mbongo**	1,500 + (188 Households)	Increase in population due to CDC; Secondary school and Nigerian immigrants.	Indigenous – 70% Nigerians – 20% Other Cameroonians – 10%	▪ Subsistence farming; cassava, egusi, yam, plantain, cocoyam ▪ Community Oil Palm Plantation ▪ NTFPs collection ▪ Logging by Timber Company and Local Commercial logging ▪ Hunting/Fishing	▪ Forest boundary dispute with Dikome ▪ CDC Plantation expansion on village land.
6.	**Bonjare**	200 (25 Households)		Indigenous – 90% Nigerians – 10%	▪ Subsistence farming; cassava, egusi, etc ▪ Past logging by Timber Company and CDC ▪ Traditional hunting/fishing ▪ NTFP collection	▪ CDC encroachment on village land

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7.	**Boa Village**	500 (63 Households)	Drastic increase due to Nigerian immigrants and Health Centre.	Indigenous - 65% Nigerians – 30% Other Cameroonians – 5%	▪ Subsistence/Commercial agriculture: cassava, banana, plantain, egusi, oil palm, cocoa ▪ Past logging by Timber Company ▪ Community Timber exploitation ▪ NTFP Collection ▪ Traditional hunting/fishing	▪ Community encroachment on CDC old banana plantations ▪ So many outside hunters

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8.	**Boa Camps**		Drastic increase due to Nigerian immigrants, availability of farmland (CDC abandoned plantations) and easy access through fishing Ports.		▪ Subsistence farming – cassava, egusi, banana, ▪ Fishing/hunting ▪ NTFP Collection ▪ Logging by Canoe Carvers	-
	Kumundu Camp	500 (63 Households)	Drastic increase due to Nigerian immigrants, availability of farmland (CDC abandoned plantations) and easy access through fishing Ports.	Nigerians – 100%	▪ Subsistence farming: cassava, egusi, banana ▪ Fishing/hunting ▪ NTFP Collection ▪ Logging by Canoe Carvers	-
	Bassa Camp	300 (38 Households)	Drastic increase due to Nigerian immigrants, availability of farmland (CDC abandoned plantations) and easy access through fishing Ports.	Nigerians - 100%	▪ Subsistence farming: cassava, egusi, banana ▪ Fishing/hunting ▪ NTFP Collection ▪ Logging by canoe Carvers	-
	Boa Old Camp	500 (63 Households)	Drastic increase due to Nigerian immigrants, availability of farmland (CDC abandoned plantations) and easy access through fishing Ports.	Other Cameroonians – 30% Nigerians – 70%	▪ Subsistence farming: cassava, egusi, banana ▪ Fishing/hunting ▪ NTFP Collection ▪ Logging by canoe Carvers	-
	Market	200 (25 Households)	Drastic increase due to Nigerian immigrants, availability of farmland (CDC abandoned plantations) and easy access through fishing Ports. Plantations and easy access through fishing Ports.	Nigerians – 100%	▪ Subsistence farming: cassava, egusi, banana ▪ Fishing/hunting ▪ NTFP Collection ▪ Logging by canoe Carvers	-

	Motasen Camp	100 (13 Households)	Drastic increase due to Nigerian immigrants, availability of farmland (CDC abandoned	Nigerians – 100%	▪ Subsistence farming: cassava, egusi, banana ▪ Fishing/hunting NTFP Collection ▪ Logging by canoe Carvers	▪ Uncontrolled logging by Nigerians ▪ Local Administration (DO) authorises indiscriminate Timber exploitation.
	Diongo Camps		Drastic increase in population due to Nigerian immigrants, availability of farmland (CDC abandoned plantation) and easy access through fishing Ports.		▪ Subsistence farming: cassava, banana, egusi, plantain, etc. ▪ Hunting/fishing ▪ Logging by Canoe Carvers ▪ NTFP Collection	-
	Baba I	250 (31 Households)	Drastic increase in population due to Nigerian immigrants, availability of farmland (CDC abandoned plantation) and easy access through fishing Ports.	Nigerian – 100%	▪ Subsistence farming: cassava, banana, egusi, plantain, etc ▪ Hunting/Fishing ▪ Logging by Canoe Carvers ▪ NTFP Collection	-
	Baba II	250 (31 Households)	Drastic increase in population due to Nigerian immigrants, availability of farmland (CDC abandoned plantation) and easy access through fishing Ports.	Nigerian – 100%	▪ Subsistence farming: cassava, banana, egusi, plantain, etc ▪ Hunting/Fishing ▪ Logging by Canoe Carvers ▪ NTFP Collection	-
	Diongo Beach	50 (6 Households)	Drastic increase in population due to Nigerian immigrants, availability of farmland (CDC abandoned plantation) and easy access through fishing Ports.	Nigerians – 100%	▪ Subsistence farming: cassava, banana, egusi, plantain, etc ▪ Hunting/Fishing ▪ Logging by Canoe Carvers ▪ NTFP Collection	-

2. CONSTRAINTS

The following difficulties were encountered in the course of the mapping exercise:

- Selection of village researchers was difficult in some villages (e.g. Barombi Mokoko) because the local authorities insisted on using indigenes.

- Some people in Barombi contested the choice of village researcher whom they thought was incompetent and so refused to assist in the Mapping exercise.

- Some village researchers did not understand the process well. This meant the technical team had to make frequent visits to such villages to guide team. Also, village researchers from other villages who have a good knowledge of the forest were deployed.

- Note taking in exercise books was difficult for some village researchers, partly because they are not used to the art of writing.

- Field materials were not given adequate consideration during the planning phase, and some could not be secured. Cartographers hadn't proper materials; e.g. tubes, bags, etc.

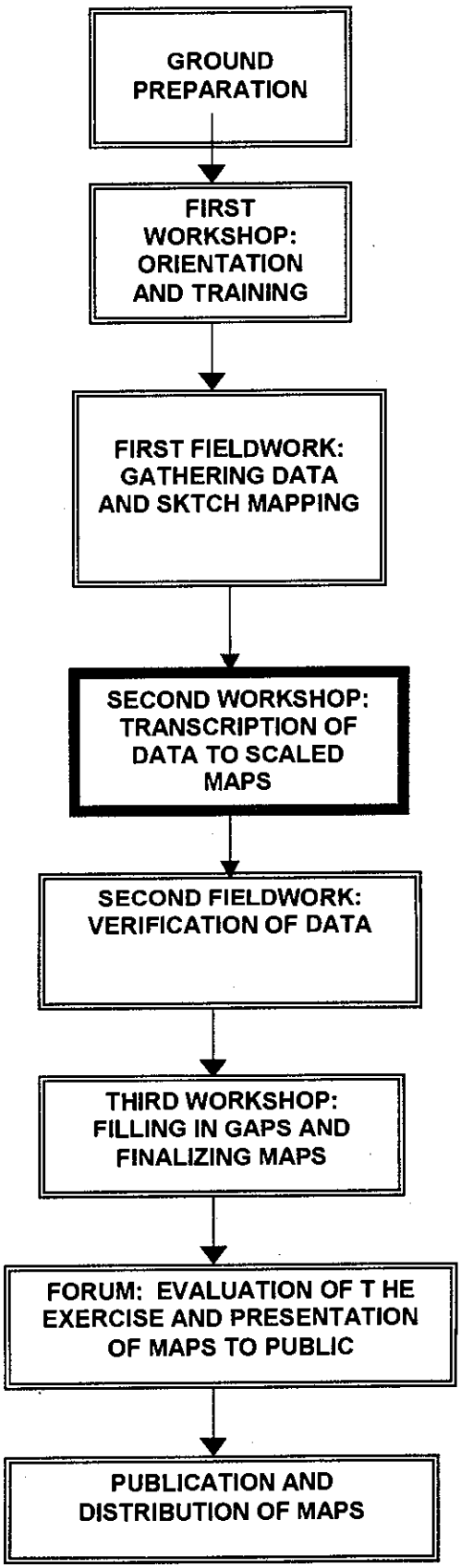
- Fieldwork coincided with the Christmas feasibility period, so some Village researchers were involved in drinking at the expense of data collection. This needs to be considered for subsequent fieldwork in other areas.

- The technical team had to cover long distances on foot from Bonjare to Diongo because of the absence of bridges over some rivers. This made the exercise arduous.

- Work was interrupted on market days. These are very important days in the area and village researchers had to take part.

- Women were not selected as village researchers. This needs to be considered in other areas where this exercise is intended to be done.

CORE STEPS IN PARTICIPATORY MAPPING



3. PARTICIPATORY MAPPING PROCESS:

The mapping involved the following core steps:

3.1 Ground Preparation:

As a first step, MCP Staff working in Mokoko Area held meetings in all the Eight (8) villages in Mokoko Area involving Chiefs, Traditional Councillors, Elders, Women and Youths. The purpose of these meetings was to explain what the Mapping exercise was all about, find out if Communities were interested, select village researchers and finally to arrange field logistics (lodging, feeding, etc). selection of researchers was jointly done by Mokoko Field Staff (based on their understanding of the capabilities of individuals involved in previous activities in the area) and the traditional authorities.

Selection of village researchers was based on the following criteria:

- Should have a good knowledge of the forest
- Should be able to read and write
- Preferably indigenes who command respect in the Community

3.2 First Workshop (3 Days):

This was meant for orientation and training of village researchers (local cartographers). They were equipped with skills and basic principles of mapping. Also, it served as a forum for the Mokoko Researchers and MCP staff to agree on the objectives of mapping and familiarize participants with tools to be used for the mapping exercise.(*See Report on proceedings of the Participatory Mapping Training Workshop of November 23 – 25th, 1998*).

3.3 First Fieldwork:

After the Workshop in Limbe, the Mokoko researchers went back to their respective villages. Before the technical team arrived in the Mokoko area, the Researchers (local cartographers) met the traditional authorities and the entire Community and explained the workshop proceedings and mapping project to them.

3.3.1 Introductory Meetings:

These meetings were meant to test grounds, introduce the technical team to the Traditional Authorities (Chiefs, Traditional Councillors and the Council of Elders), and to finalize agreement on time and venue of the enlarged village meetings. These contacts were made in all the eight villages prior to the sensitization meetings.

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3.3.2 Enlarged Village Sensitization Meetings:

Village sensitization meetings were held in all the villages to further explain the purpose and benefits of mapping to the local Community, the methodology and what was expected of Communities. Meetings were held in School premises, Community Halls, Chiefs' Houses and some in open air under trees. The Supervisor (Mokoko Field Staff) introduced the technical team at each meeting and the researchers (local cartographers) in turn introduced the Traditional Authorities and notables in the community.

The village researchers took a leading role in explaining the mapping project to the Community. A key selling point in their presentations was how the mapping Project would move them towards negotiating with Government for CDC to give back part of their leasehold land to the Community before the imminent privatization of CDC.

It was stressed that although maps of the region already existed, they had not been made by local people, and for that reason they were full of errors. Existing maps don't show how the Communities use land and forest, and really did not carry much information relevant to the Communities. Maps were seen to be more powerful than guns in claiming and defending land.

3.3.3 Data Collection:

i) MATERIALS:

The following materials were used for data collection and drawing of sketch maps:

Questionnaire, Flip Chart Paper, Exercise Books, pens, coloured pencils, pencils, eraser, ruler, GPS, Tubes (made of plastic pipes, with rubber stoppers, as protection against humidity and general wear and tear).

ii) METHODOLOGY:

The Local Cartographers' work in the Community was working with people who know where everything (in terms of land use and physical features) was located. These informants were mostly user groups – hunters, trappers, farmers, timber exploiters, fuelwood collectors, fishermen, gatherers (NTFPs, medicine) and Village Elders with years of experience in historical changes in land and forest use. 4 – 5 persons from each of these groups were brought together to help the Village Researchers. They sat down with the Village Researchers and with the use of Semi-structured Interviews (SSI) provided information, first filling the questionnaire with names of subsistence areas.

In some villages, the subsistence areas listed in the Questionnaire were first of all represented on the ground after locating major roads, rivers, stream and other important physical features and later transferred on flip chart paper. In other Communities the information was put directly on flip chart paper. In the course of putting data on sketch maps there was contradiction on the limits of subsistence areas but these were resolved through discussion.

The Village Researchers used coloured pencils to differentiate the categories of land use and physical features – rivers, lakes, roads, forest Reserve, Communal Forest, Farming areas, CDC leasehold boundaries, CDC Cultivated/uncultivated areas, etc. They indicated areas of conflict with CDC. A sensitive issue here was in the demarcation of village boundaries. As MCP staff in the Mokoko area were already aware of the existing inter-village forest boundary conflicts, it was stressed that the purpose of the mapping project was not to delimit boundaries, but to show land use.

At the initial stage of the Mapping Exercise, symbols for representing land use were developed by individual Village Researchers. This seemed to pose a lot of problems for most of them. So a standard key was prepared for all of them based on their own symbols. The Technical Team made daily visits to all the villages to solve some problems on the spot. Visits to Diongo and Boa were less frequent because the roads were inaccessible during this period. However, Local Cartographers from these two villages had an excellent understanding of the Mapping Exercise to the extent that some of them were deployed to assist their colleagues in other villages.

Village researchers made forest walks to CDC leasehold areas to check the validity of some doubtful information that informants had put on the questionnaire and sketch maps. Historical information about villages – changes in land tenure, land use pattern, changes in river courses and distances to areas of activities (in km or time) was meant to assist cartographers in locating physical features and subsistence areas during transcription of field data to scaled maps.

3.3.4 First Assessment (Evaluation) Workshop:

This was meant for the village researchers and the technical team to assess the problems encountered in the process of data collection and jointly explore ways of addressing them. Also, the forum was used to assess the level of community participation, which in turn served as a barometer for measuring of the community's interest in the mapping project. Maps were displayed on the wall and participants pointed out irrelevant and missing information.

i) PROBLEMS ENCOUNTERED:

S/N	VILLAGE	LOCAL CARTOGRAPHER	WHAT PROBLEM DID YOU ENCOUNTER	HOW DID YOU SOLVE THEM?	HOW CAN THEY BE SOLVED
1.	**Ekombe Mofako**	▪ Lucas Dioh ▪ Joseph Itoh	▪ Elders not available because of many ceremonies ▪ Some hunters refused to give information because they are not paid as Local Cartographers	▪ Further explained importance of Mapping Exercise to the Community	▪ Try to contact Elders in the evening before they take alcohol.
2.	**Barombi Mokoko**	▪ Pius Ntonga ▪ Onori Felix	▪ Villagers want their share of Local Cartographer's Perdiem ▪ Local Cartographer (Ntonga) was considered a stranger and incompetent to represent the village for the Mapping Exercise ▪ 3 Villagers who wanted to represent the village acted as saboteurs. Refused to give information.	▪ Bought Palm wine for informants ▪ Consulted Chief and Traditional Council who called a meeting ▪ Invited MCP/CARPE Team to further explain purpose of exercise and Perdiem.	MCP/CARPE organize an explanatory meeting in the village.
3.	**Illoani**	▪ Felix Nekana ▪ John Mbotaka	▪ Informants asked for drinks. Believed Local Cartographers are paid ▪ Informants occupied with farm work ▪ Elders involved in traditional ceremonies "juju" ▪ Difficult to estimate distances to certain points	▪ Bought drinks with perdiem ▪ Held meetings in the evening	▪ Contact Head of "Juju' group and explain importance of exercise. Asked for 30 minutes/day.
4.	**Dikome**	▪ William Ngoh	▪ Estimating distances from village to certain points was difficult. ▪ Spent all his Perdiem to buy beer for informants because there is no palm wine in the village	▪ Sent people in the field to check these points	▪ Local Cartographer should also check the points ▪ Buy palm wine from neighbouring village.
5.	**Mbongo**	▪ Emmanuel Ngoh	▪ Estimating distances from village to certain points	▪ Together with some villagers, walk to these points	

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6.	**Bonjare**	▪ Asoh Fidelis	▪ So many deaths in the village, so difficult to get informants ▪ Hunters expected him to know everything since he is a hunter himself - not willing to give information ▪ Difficult to group people to give information ▪ People were drinking while giving information (Christmas period) ▪ Not enough time to complete work	▪ Explained that contribution from all was equally important (put heads together) ▪ Bought Palm wine ▪ Met informants in their homes	▪ Avoid working around drinking places ▪ Palm wine should be bought in the evening after work ▪ Researcher should use time efficiently
7.	**Boa**	▪ Okah Roy ▪ James Itoh	▪ Death Celebrations during this period ▪ Informants were busy preparing for Christmas ▪ Difficult to get informants at their convenience (farm work) ▪ Some people felt the exercise was for the benefit of the Local Cartographers	▪ Concentrated on putting already acquired information on map ▪ Organised meetings in the evening and in the night ▪ Bought palm wine to attract informants	▪ Prepare a programme for meeting and give people enough notice ▪ Ask them convenient time to hold meetings ▪ Continue to explain the purpose and importance of Mapping Exercise (Sensitization)
8.	**Diongo**	▪ Mambo Richard	-	-	-

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ii) COMMUNITY PARTICIPATION:

S/N	VILLAGE	PARTICIPATION						
		Excellent	Very Good	Good	Poor	Very Poor	Reasons for Participating	Reasons for not participating
1.	**Ekombe Mofako**		✓				♦ Village Land problem is acute because of CDC expansion and nearness of village to Reserve. Maps will help village to acquire more land	
2.	**Barombi Mokoko**			✓			♦ Map could help present conflict areas with Illoani to authorities concerned.	♦ MCP does not only talk about Reserve, but Communal forest as well; will one day seize Communal forest ♦ Non-native hunters were reluctant to provide information. Thought natives are in the right place to provide information about their forest ♦ Village Cartographer was not some peoples' favourite. Consider him a stranger.
3.	**Illoani**			✓			♦ Map will help in future planning of land and forest use. ♦ Map will help village to present their case on CDC encroachment ♦ Map will help present land conflict with Illoani to Government ♦ Map will enable people gain knowledge of forest and their area as a whole	♦ Some people thought MCP had a hidden agenda ♦ Local Cartographer hadn't enough time to contact everybody because village is big.
4.	**Bonjare**			✓			♦ Map enable people to know boundary between CDC and village ♦ Map will enable peple to know how far they have	♦ People were already feasting (a lot of drinking). Christmas period.

							gone into the Communal Forest. Help in future planning	
5.	**Boa**		✓				◆ Since maps show Reserve boundary and extent of farms into Communal Forest, they will help planning on how to use remaining forest ◆ Maps will enable village to defend land in case of encroachment by CDC ◆ Map will help authorities to solve conflict areas with Barombi Ngatome	◆ Some people were involved in death celebrations for two consecutive days.
6.	**Diongo**	✓					◆ People wanted some of the villages in the area to appear on Map for the first time ◆ Maps will help in planning/management of forest and will check any encroachment on village land by CDC and vice versa	-
7.	**Dikome**		✓				◆ Map will help educate villagers about the area, especially areas timber Companies have logged in the forest ◆ Maps will enable villagers to present their case on CDC encroachment to authorities concerned ◆ Maps will help show remaining forest and subsequent planning on use	-
8.	**Mbongo**	✓					◆ Maps will help villagers defend their land, e.g. stop timber Companies from exploiting in areas not	-

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							acceptable to villagers ◆ Maps will show how farms and other activities have gone into the forest hence planning for future use ◆ Maps enabled villagers to know how much land CDC is occupying ◆ Maps will enable young people to acquire knowledge about their area ◆ Maps will enable forest users to know where resources are found, e.g NTFPs.	

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iii) EVALUATION OF MAPS:

Maps were displayed on wall and participants made their comments about them.

S/N	VILLAGE	GENERAL PRESENTATION OF MAP	PHYSICAL FEATURES	LAND USE	KEY	OTHER COMMENTS
1.	**Ekombe Mofako**	♦ Scanty map (economy of symbols) ♦ Artistic frame not necessary	♦ Rivers not clearly shown	♦ Chop farms not well indicated, savanna area too large, extent of CDC and Forest Reserve not indicated	Key absent	Redraw map
2.	**Barombi Mokoko**	♦ Poor orientation of flip chart paper, no frame, no title	-	-	No key	Redraw map and change orientation
3.	**Dikome**	♦ Symbols not proportionately distributed	♦ Unimportant features included			♦ Map complete, make a few amendments
4.	**Illoani**	♦ No frame, Map not neat			No key	♦ Redraw map
5.	**Mbongo**	♦ No frame, Map over-crowded. Symbols too large, many colours for the same feature	♦ Present rivers and streams in blue. Too many houses	♦ Indicate names of subsistence areas	♦ Congested key with complicated symbols	♦ Redraw map
6.	**Bonjare**	♦ Map congested, very large symbols	♦ Distance from Bonjare to Mbongo exaggerated on Map		♦ Key inappropriate to Map	♦ Redraw Maps and present information better
7.	**Boa**	♦ No title, no date ♦ Poor presentation with overlaps of boundaries	♦ Hills too large			♦ Redraw Maps and respect boundaries with neighbouring villages
8.	**Diongo**	♦ Map too large		♦ Boundaries with forest Reserve, CDC not shown		♦ Map incomplete, redraw.

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3.3.5 SECOND ASSESSMENT (EVALUATION) WORKSHOP:

The second assessment Workshop was limited to the evaluation of maps after villager researchers had done the relevant amendments identified during the first evaluation workshop.

S/N	VILLAGE	GENERAL PRESENTATION OF MAP	PHYSICAL FEATURES	LAND USE	KEY	OTHER COMMENTS
1.	**Dikome**	-	▪ Seasonal rivers not indicated	▪ Symbols for Chop farms, CDC uncultivated area scanty ▪ Timber exploitation in Reserve not indicated.	-	▪ Make amendments on same Map.
2.	**Ekome Mofako**	▪ Researcher's name not written on Map	▪ Seasonal rivers not indicated	▪ Village/CDC conflict area not shown	-	▪ Redraw Map
3.	**Mbongo**	-	-	▪ Area of activities not named	-	▪ Map complete
4.	**Bonjare**	-	-	▪ Areas of activities not named	-	▪ Map complete
5.	**Diongo**	▪ All features outside frame	-	▪ Areas of activities not named	-	▪ Redraw Map
6.	**Illoani**	-	▪ Seasonal rivers not indicated	▪ Fishing areas not indicated	-	▪ Map to be amended
7.	**Barombi Mokoko**	-	-	-	-	▪ Map Complete
8.	**Boa**			▪ Timber exploitation by community and Timber Companies not differentiated on Map	▪ Symbols on key not well represented on Map	▪ Map complete, but make amendments on key

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3.4 SECOND WORKSHOP (16 Days):

3.4.1 Transcription of Data to Scaled Maps:

The transcription exercise took sixteen (16) days with the production of a draft Land Use Maps of the Boa Plain at the scale of 1:25,000. (four sheets in total).

It involved the active participation of two Government Cartographers from the National Institute of Cartography in Yaounde, two Mount Cameroon Project staff and twelve Village Researchers from the Boa Plain.

Transcription was facilitated by the fact that most of the base maps and aerial photographs used had the same scale of 1:25,000.

Despite some difficulties encountered during the first few days of the transcription process, they were easily overcome and the end result was success.

3.4.2 Preparation of Transcription Matrials:

While waiting for the arrival of the village researchers, the following materials and equipment had been assembled in a Hall in preparation for transcription:

- Drafting tables
- Light tables
- Topographical base map of the region at a scale of 1:25,000
- CDC leasehold map at a scale of 1:25,000
- ELF aerial photographs at a scale of 1:25,000
- Four pairs of stereoscopes
- Sheets of tracing paper (vellum)
- Colour pencils, pencils, rulers, erasers, cellotapes, and typing sheet papers

Arrival of Village Researchers:

With the arrival of village researchers with their hand-drawn maps, note books and questionnaires, it became apparent that the transcription exercise had to begin immediately. The first two days of the transcription process did not involve the village researchers much.

The Cartographers used tracing paper (vellum) to trace major river systems, roads spot heights, forest Reserve boundaries and Cameroon Development Corporation (CDC) boundaries. This was produced in four sheets covering the Boa Plain. These were traced from the 1:25,000 Maps which had some irregularities as it was possibly derived from a smaller scale map. Therefore, a lot of basic information (topographic) was absent. Secondly, existing topographic information was unclear as Village Researchers soon discovered that some physical features were not really visual in their actual field positions, e.g. small rivers, field and toponymy etc.

To solve this problem, aerial photographs were of great assistance as they were of the same scale as the base map. Although the photographs did not cover the entire region, they helped to close some necessary information gaps related to topography.

Owing to the fact that the area in question falls within the dense equatorial region, much of the topographic information was hidden under vegetation cover. Smaller streams fell much in this category and were left for the field verification exercise.

3.4.3 Transcription of Topographic Features:

A major problem at the transcription stage was to convince Village Researchers on how scales work, how information reduces on the map with scale reductions and changing symbols to match with scales.

However, all topographic information recognizable to the villagers were kept to give the map some credibility in the eyes and understanding of the villagers.

Working with individual Village Researchers and the use of aerial photographs and sketch maps, it was possible to locate streams, hills, valleys, settlements and attach respective names to the identified features.

3.4.4 Transcription of Land Use:

Like the topographic information, the scale of the map posed some problems to satisfy the expectations of Village Researchers.

The hand-drawn maps contained many symbols. Village Researchers were educated on how to regroup data in order to reduce the number of symbols which were accompanied on the legend by explanatory notes. Pictorial symbols were used to ease interpretation of map by villagers. Farming areas could be clearly demarcated by the use of some prominent land marks like hills and rivers as seen from aerial photographs and Community hand-drawn maps. Areas of intact forest were clearly demarcated and local names attached to farming areas and forest.

Information on fishing, hunting and gathering was equally transcribed taking into consideration the location of streams, forest and farming areas.

Cameroon Development Corporation (CDC) parcel land was also included at this stage (forest, cleared land, fallow land and planted areas).

3.5 Conclusion:

Throughout the transcription exercise, it was realized that some information gaps were lacking as a result of poor obscurity on some aerial photographs or features not well located on hand-drawn maps of Village Researchers.

In a sense, the transcription exercise was quite encouraging as a considerable amount of data was already visualized at this stage. Nevertheless, information gaps included the following:

- Streams under vegetation cover
- Farm/forest boundaries
- Location of new settlements
- Encroachment on Village land by CDC and vice versa
- Encroachment on Forest Reserve by Villagers.

The absence of this data necessitated the second field verification with the use of a Global Positioning System (GPS) and ground truthing.

3.6 Second Field Work – Third Workshop (12 Days):

3.6.1 Verification of Data/Finalization of Maps in Field:

The second field and third Workshop exercise for data verification and finalization of map took 12 days. Six (6) days for field data collection and presentation to the Community; and six (6) days for finalization of maps.

At this stage, the Technical Team was present in the field to ensure accurate data collection in relation to the use of a Global Positioning System (GPS).

Each Village Researcher was given a copy of a draft map produced during the transcription exercise for field verification covering this area. On the maps and in their notebooks were indicated unanswered questions.

The amount of field verification differed from one village to another. In some villages, there was very little to be done while in others the exercise was absolutely necessary.

In the field, it was clearly noticed that the base map had been derived from a small scale topographic map. However, available photographs did not cover the whole map; e.g. the photograph showing Bamusso as an Island was absent, thus this area appears as a continual stretch of land. The area under survey however had necessary photographs.

Geographically, the whole region is an out wash plain and most rivers are seasonal drainage channels. As a result of time constraint only rivers and streams of interest were visited and transcribed. Some water bodies that could not be identified on aerial photographs were visited. In most cases, they appeared as pools of water in deep valleys without outlets.

Global Positioning System points were recorded in areas where this was possible for accurate positioning.

The field visit in the creeks revealed the existence of new settlements not indicated on hand-drawn maps by Village Researchers.

Substantial land use information was collected during this phase of the fieldwork. Many communication lines had altered their use. It was discovered that some motorable roads had degraded into foot paths and vice versa.

CDC cultivated lands had increased and clearing was going on for the opening of new Estates for cash crops.

Limits of farm/forest boundaries were properly verified especially in areas not clear on aerial photographs and hand drawn maps by village researchers. Also included was encroachment on village land by CDC and vice versa and encroachment in the Mokoko River Forest Reserve by villagers. In every area where possible, GPS points were collected for a detailed and accurate transcription.

3.6.2 Presentation of Maps to the Community:

The draft maps were later presented to the entire community (village by village) to ensure that everyone is happy with the information collected. Prior to this exercise, Village Researchers had been busy discussing the draft maps with their communities ad interested parties. Omitted and additional information was immediately transcribed. In the end, villagers were able to appreciate the map with very little assistance from the village researchers. Also, the final product was seen as the effort of the entire community and not just the researchers.

3.6.3 Production of Final Mapas (6 days):

This exercise took 6 days and involved three (3) Cartographers. The village researchers did not participate during this phase.

In the absence of a draftsman, the cartographers carefully drew the final maps on transparent paper (vellum) avoiding any major change as agreed by the village researchers and their communities. However, some symbols and colour patterns were changed to comply with International Convention.

In the end, the final maps produced took into consideration all Cartographic norms.

4. LESSONS LEARNT:

- The choice of Village Researchers is very crucial in Participatory Mapping exercise. The researcher has to command respect in the Community as people are likely to undermine him and therefore take the exercise less seriously as was the case in Barombi Mokoko;

- A lot of time needs to be spent on sensitization of the Community about the exercise. In some large villages like Illoani, information about the exercise did not reach everyone and some only knew about it during Community presentations.

- In most villages informants were aware that village researchers were compensated for their time spent in collecting data. As a result, they constantly demanded drinks from Researchers. Compensation for informants would require some consideration for subsequent Mapping Projects.

- It would be necessary to point out that during the transcription exercise most village researchers were idle, because the technical team could only work with three out of twelve at the same time. In these circumstances, the technical team could not work for long hours.

- Aerial photographs provided had no index. Therefore, the technical team could not work with them until an index was provided. This dampened the working spirit of the technical team to an extent.

APPENDICES

APPENDIX 1 DIARY OF EVENTS

DATE	ACTIVITY
26-11-98	• Departure of Mokoko Village Researchers from Limbe
27-11-98	• Mokoko Village Researchers give feedback of Workshop to Community • Departure of Technical Team and Djoum/Tikar Researchers to Mokoko
28-11-98	• Introduction of Technical Team to Traditional Authorities of Ekombe Mofako and Barombi Mokoko • Village meetings at Ekombe Mofako and Barombi Mokoko
29-11-98	• Introduction of Technical Team to Traditional Authorities of Illoani and Dikome • Village meetings at Illloani and Dikome
30-11-98	• Introduction of Technical Team to Traditional Authorities of Mbongo, Bonjare, Boa and Diongo. • Village meetings at Mbongo and Bonjare
01-12-98	• Village meetings at Diongo and Boa
02 to 07-12-98	• Supervision of local Cartographer/Problem solving
08-12-98	• 1st Assessment (Evaluation) Workshop
09 to 10-12-98	• Supervision of local Cartographer/Problem solving
11-12-98	• 2nd Assessment (Evaluation) Workshop
12 to 13-12-98	• Supervision of Local Cartographers – cross checking notebooks and final drafts of maps
14-12-98	• Submission of final drafts of maps and notebooks
15-12-98	• Departure for Limbe
16-12-98	Field Work Evaluation meeting.
7 to 22-01-99	• Transcription of data to scaled maps
25 to 31-01-99	• Field verification of data (filling information gaps)
1 to 3-02-99	• Presentation of maps to Communities
2 to 10-02-99	Finalization of Maps

APPENDIX 2: AGENDA OF ENLARGED COMMUNITY SENSITIZATION MEETINGS

1. Prayer
2. Introduction of Technical Team (Ekwoge Henry)
3. Introduction of Traditional Authorities (Village Researchers)
4. Explanation of purpose of Meetings (Ekwoge Henry)
5. Presentation of objective of Mapping, Workshop Proceedings and Field work Programme (Village Researcher)
6. Speech by Mac Chapin
7. Fieldwork proceedings and distribution of materials (Ebong Harrison)
8. Closing Remarks (Village Chief).

APPENDIX 3: QUESTION / ANSWER SESSION AT ENLARGE COMMUNITY MEETINGS

Question: (Illoani, Dikome) Will Maps show inter-village boundaries?

Answer: The purpose of the exercise is not to solve boundary disputes between villages, but to map land use. Boundary dispute resolution is the responsibility of the Divisional Officer (Administration) and not MCP or CARPE

Question: (Bonjare) Why are small villages not found on most advanced maps?

Answer: That is why it is necessary for Communities to produce their own maps, locating villages and land use.

Question: (Bonjare) What if villages insist on showing inter-village boundary on maps?

Answer: Conflict areas could be shown on the Map as this could help administration in resolving boundary problems.

Question: (Dikome, Illoani, Mbongo) CDC has occupied most of our land and there are no documents to show that they bought land from our grand parents. How can the map help?

Answer: By producing a Land Use Map showing subsistence areas, CDC cultivated land/uncultivated areas, villages can present their problem to Government. Maps are more powerful than guns.

APPENDIX 4: Attendance at community meetings (sensitization and presentation of maps)

Ekombe Mofako:

S/N	NAME	POSITION IN COMMUNTIY
1.	Thompson Mosua*	Regent Chief
2.	Thomas Nomba*	Traditional Chief
3.	F. M. Betu*	Traditional Councilor
4.	Joseph Misodi*	Secretary, Traditional Council
5.	Peter Mosua*	Hunter/Farmer
6.	Lucas Dioh*	Village Researcher / Councilor
7.	Martin Mbebe*	Councilor
8.	Joseph Ekoko Itoh*	Village Researcher/ Council Messenger
9.	Godfred Minity*	Chainsaw Operator
10.	George Memba*	Farmer
11.	Dominic Naseli*	Farmer
12.	Emmanuel Mbaka*	Farmer
13.	Stephen Nanga*	Farmer
14.	Martin Besong*	Traditional Councilor
15.	Erick Kemenyoh*	Farmer
16.	Thongi Genesis*	Chainsaw Operator
17.	Elias Elengwe*	Traditional Councilor
18.	Richard Besumbu*	Produce Buyer
19.	Peter Namote*	Farmer
20.	Stephen Male*	Councilor
21.	Akama Joseph*	Driver
22.	Julian Okele	Farmer
23.	Donald Angwu	
24.	Abel Same	Hunter
25.	Elisabeth Mbaka	Farmer
26.	Hannah Mokube	Farmer
27.	Christina Itoe*	Farmer
28.	Same John	Farmer

*Those present at sensitization meetings and presentation of maps.

Barombi Mokoko:

S/N	NAME	POSITION IN COMMUNTIY
1.	Elvis Kema Asoh*	Village Chief/Village Researcher
2.	Peter Dibondo*	Traditional Chief
3.	Ajeke Adolf*	Councilor/Timber Exploiter
4.	Tabi George*	Council Secretary
5.	Kudi Daniel*	Council Messenger
6.	Goddy Edet*	Farmer
7.	Augustin Ndecham*	Farmer
8.	Mrs. Sophie*	Farmer
9.	Tamua Ferdinand*	Farmer
10.	Ngolla Denis*	Farmer
11.	Asani Pius*	Councilor
12.	Ngong Rudolf*	Farmer
13.	Sunny Jackson	Council Messenger
14.	Kalu Atare	Farmer
15.	Ndong Gilbert	Farmer
16.	Ngende Emmanuel	Chief Councilor
17.	Jean Paul	Councilor
18.	Mathias Lonje	Farmer
19.	Ntonga Pius*	Village Researcher
20.	Anyenti Albert	
21.	Mbah Oka	
22.	Julius Young	

Illoani:

S/N	NAME	POSITION IN COMMUNTIY
1.	Dominic Etoni*	Village Chief
2.	Ambolo Maroka Samuel*	Councilor
3.	John Mbotoka*	Village Researcher
4.	Kenneth Itoh*	Farming
5.	Nekena Felix*	Village Researcher
6.	Nefenda John	Student
7.	Nekende Augustin	Farmer
8.	Thomas Oasi	Farmer
9.	Ambolo Patricia*	Teacher
10.	Modika Solomon	Farmer
11.	George Itoh*	Farmer
12.	Leo Bau*	Council Chairman
13.	Maadam M. Mbile*	Women's Chief
14.	Embola Ndongo*	Councilor
15.	Okon Etim	Farmer
16.	Martin Molongo	Councilor
17.	Andrew S. Mbotaka	Farmer
18.	William Nekena	Farmer
19.	Alice Nekena*	Farmer
20.	John M. Nanji	Farmer
21.	John Iyassa	Farmer
22.	Patrick Okori	CDC Worker
23.	Etah N.	Farmer

Dikome:

S/N	NAME	POSITION IN COMMUNTIY
1.	James Nhoh*	Village Chief
2.	Sako*	Traditional Chief
3.	William Ateh*	Assistant Chief
4.	Mrs. Ngoh	Farmer
5.	Mara George	Councilor
6.	Nalemu*	Farmer
7.	Mrs Etongo*	Housewife
8.	Egbe Meagot*	Farmer
9.	William Ngoh*	Village Reseacher
10.	Ngassa Peter	PTA Teacher
11.	Manfred Mongot	Farmer
12.	Joseph Owasi*	

Mbongo:

S/N	NAME	POSITION IN COMMUNTIY
1.	Ngoh Emmanuel*	Village Researcher/Councilor
2.	Michael Anje*	Village Chief
3.	Ngoh Thomas*	Council President
4.	Disuku Isaac	Village Adviser
5.	Moto Vincent*	President, Mokoko Wildlife Management Association
6.	Alabi Moses*	Councilor
7.	Molua Francis*	Farmer
8.	Disuku Michael	Farmer
9.	Pius Nakinya	Farmer
10.	Lucy Nowango*	Farmer
11.	Mary Itekeh	Farmer
12.	Grace Etani	Farmer
13.	John Iyassa*	Elder
14.	Nofanjo Stephen	Farmer
15.	Andumu Stephen*	Farmer
16.	Richard Ngoh*	Farmer
17.	Raymond Abilabi	Farmer
18.	Nikoh Orinji	Farmer
19.	Pauline Efio	Farmer
20.	Elisabeth Naende*	Farmer
21.	Alabi Alfred*	Farmer
22.	Alphonsus Etongo	Farmer
23.	Julie Alabi*	Women's Leader
24.	Edward Nofanjo*	Farme
25.	Stephen Efi*	Councilor
26.	Okori	Chief of Nigeria Union
27.	Simon Netomba	Farmer
28.	Etoi Jospeh	Farmer
29.	Tom Andumu	Farmer

30.	Olomo M.	Farmer
31.	Ude Enjinna	Farmer
32.	Oko Lanky	Farmer
33.	Obasi Oko*	Farmer
34.	Igwoh Edet	Farmer
35.	Mbula Blessing	Farmer

Bonjare:

S/N	NAME	POSITION IN COMMUNTIY
1.	Chief Lucas Sako*	Village Chief
2.	Joseph Anda	Chief Councilor
3.	William Etongo*	Hunter
4.	Emmanuel Enoh*	Farmer
5.	Nelson Arrey*	Farmer
6.	Asoh Fidelis*	Village Researcher
7.	Ekomo Innocent	Trapper
8.	Lucy Mbango	Farming
9.	Mary Saka	Farming
10.	Sunday Alego*	Farmer
11.	Udo	Nigerian Chief
12.	Aanastasia	Women's Chief
13.	Joseph Anda Itogo*	Chief Councilor
14.	Mathias	Council Messenger

Boa:

S/N	NAME	POSITION IN COMMUNTIY
1.	Martin Fete*	Village Chief
2.	Malle Esaw*	Traditional Council Chairman
3.	Okha Roy*	Village Researcher
4.	Enongene Victor	Headmaster, Government School, Boa
5.	Esther Kongo*	Farmer
6.	Andrew Otto	Farmer
7.	Stephen Bau*	Farmer
8.	Hans Bau*	Traditional Chief
9.	Ikome Ikome	Farmer
10.	Nangia Francis*	Farmer
11.	Bekondo David	Farmer
12.	Etongo Martin	Farmer
13.	Naliembe Pauline	Publicity Secretary, MWMA
14.	Alex Niasa	Farmer
15.	Peter Bau	Farmer
16.	James Itoh*	Village Researcher/Hunter
17.	Peter Itoh	Farmer
18.	Jacob Nangia*	Farmer
19.	Divine Okho*	CPDM Sub-Section President
20.	Agrikola Ajebu	Farmer
21.	George Mukete*	Farmer

Diongo:

S/N	NAME	POSITION IN COMMUNTIY
1.	Emmanuel Ilambo	Village Chief
2.	Paul Eyoh Kossah*	Regent Chief
3.	Henry Baua*	Council Chairman
4.	Effiong Okon*	Farmer
5.	Daniel Bau*	Treasurer, MWMA
6.	Muku Bau*	Farmer
7.	Effiong Udo*	Farmer
8.	Mambo Richard*	Village Researcher
9.	Agnes Kossah*	Women's Chief
10.	Emilia Wassa	Farmer
11.	Comfort Mambo*	Farmer
12.	Grace Chiche*	Farmer
13.	Magdalene Bau*	Farmer
14.	Anna Moliki*	Farmer

*Those present at sensitization meeting and presentation of maps.

MOUNT CAMEROON PROJECT

MOKOKO AREA

PROCEEDINGS OF A PARTICIPATORY LAND USE MAPPING TRAINING WORKSHOP

HELD AT

THE LIMBE BOTANIC GARDEN
(NOVEMBER 23RD - 25TH 1998)

Compiled by:
EKWOGE HENRY
EBONG HARRISON
MBONG GLORY

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GLOSSARY AND ABBREVIATIONS

CARPE	-	Central African Regional Program for the Environment
CDC	-	Cameroon Development Corporation
CETELCAF	-	Centre de Teledetection et Cartographie Forestière
CNL	-	Centre for the Support of Native Lands
INC	-	Institute Nationale de Cartographie
LBG	-	Limbe Botanic Garden
MCP	-	Mount Cameroon Project
MINEF	-	Ministry of Environment and Forestry
MRFR	-	Mokoko River Forest Reserve
ONADEF	-	Office Nationale de Développement des Forêts

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1. INTRODUCTION:

This report documents the proceedings of a 3-day Participatory Mapping Training Workshop jointly organized by CARPE (Central African Regional Programme for the Environment) and the Mount Cameroon Project, (MCP) at the VISACOM of the Limbe Botanic Garden from November 23rd – 25th , 1998.

Workshop participants were drawn from the eight villages in the Mokoko Area - (Ekombe Mofako, Barombi Mokoko, Diongo, Boa, Bonjare, Mbongo, Illoani and Dikome), Djoum in the South Province, and Tikar (Bankim) in the Adamawa Province, Centre for the Support of Native Lands (CNL), CARPE and Mount Cameroon Project. The Target groups were Village Researchers from Mokoko Area, Djoum and Tikar which are the three sites selected by CARPE for the Participatory Mapping exercise in Cameroon.

Selection of workshop participants from Mokoko area was jointly done by MCP (Mokoko Area Team) and the village community and was based on the following criteria:

- Have a good knowledge of the forest
- Be able to read and write
- Must command respect in the community

In villages where an individual selected could not meet the first two criteria, two candidates were chosen. One of them literate and the other conversant with forest related issues.

During the workshop, translation was done from English to French for the benefit of French speaking Cameroonians from Djoum and Tikar.

1.1 WORKSHOP OBJECTIVES:

- To familiarize participants with Maps and their uses;
- To train village researchers on participatory mapping and later transcription on scaled maps;
- To prepare participants towards the community mapping exercise in the field;
- To deepen participants' understanding of how village Researchers and Cartographers work in the field.

1.2 RESOURCE PERSONS:

➢ Mac Chapin	-	Centre for the Support of Native Lands (CNL) Consultant/Facilitator
➢ Zephirin Mogba	-	CARPE – IR1
➢ Mbani Jean-Marie	-	MCP Limbe, Mokoko Area (Translator)
➢ Henry Ekwoge	-	MCP Limbe, Mokoko Area (Assistant Facilitator)
➢ Ebong Harrison	-	MCP Buea (Cartographer)
➢ Ntube Grace	-	MCP Limbe, Mokoko Area
➢ Mbong Glory	-	MCP Limbe (Secretary)
➢ James Acworth	-	MCP Limbe, Coordinator

DAY ONE: MONDAY NOVEMBER 23RD, 1998

2. WORKSHOP PROCEEDINGS:

The Workshop was declared open by Ekwoge Henry who apologized for the late start. He solicited the cooperation of the participants for the success of the Workshop. This was followed by a rapid individual introduction, and then a welcome speech by Mr. Joseph Besong, Director of Mount Cameroon Project.

In his welcome address, the Director re-iterated the objective of MCP, which ties with that of the Central African Regional Programme for the Environment (CARPE), - that of identifying ways to strengthen local forest resources management systems. He reminded participants on the expected output of the Workshop which are maps which will show how the community uses the forest and land so that they can negotiate their current and future needs.

He concluded by wishing participants a happy stay in Limbe and hoped that at the end of the workshop, they will be well equipped with the necessary skills needed for the execution of the fieldwork.

The workshop facilitator - Mac Chapin, gave a brief introduction of himself and made a recap of the Workshop objectives as follows:

- Introducing participants to participatory mapping techniques developed by the Centre for support of Native Lands (CNL);
- Training participants on how to understand maps and their uses;
- Preparing participants towards community mapping project and make them conversant with mapping in the field;
- Deepening participants' understanding on how cartographers and Researchers work together to produce community maps.

3. INTRODUCTION TO PARTICIPATORY MAPPING (MAC CHAPIN):

3.1 Definition of Map:

A map is a representation of an image which can either be good, fairly good or bad. Also, a map is a representation on paper of the earth surface or a part of it; showing geophysical features such as rivers, mountains, etc.

3.2 Uses of Maps:

- Maps could be used by individuals or government to claim or control land. (E.g., Nigeria/Cameroon border conflict).
- Maps are used for the purposes of defense.
- Maps are used for political organization; to coordinate politically all the States/Provinces in a country.
- Maps are used for educational purposes. They are used in schools and colleges in teaching students about other places in the world – ATLAS.
- Maps are used by Conservation Project, (e.g. MCP, GTZ, KORUP, etc) in resource location.

3.3 Purposes of Mapping:

- Political Organization: Some countries map out their territory for boundary demarcation. Moreover, when a country is mapped out, it eases control and administration.

- Physical Features: The map is an essential guide for travelling in the country. E.g., tourism, commerce, etc.

- Natural Resources: In this light, maps are drawn either to protect or destroy the natural resources in a given area or territory. Some organizations need mapping to know natural resource deposits and manage them for future use, while others need to know the location of natural resources for exploitation.
- To lie: Since all maps are not precise but approximations, some people take advantage of this flaw and do mapping for the purpose of lying. A good example is in timber exploitation. The exploiters often show their area of exploitation as being limited to the licensed area while working in another or larger area.

3.4 Who Does Participatory Mapping?

- Forest Users
- Informants
- Field Guides
- Village Council
- Elders
- Women
- Government Authorities
- Village Researchers
- Cartographers, etc.

3.5 Participatory Mapping (Examples Elsewhere in the World):

Mac Chapin cited an example of Latin America where he and two other Cartographers were commissioned for a Community mapping Project. The entire Project took about six months to accomplish. That is, three months of effective fieldwork and the other three months to complete the maps.

In order to facilitate the exercise, three teams selection was done:

- Administrative Team: This team was in charge of logistics
- Community Team: This was the most complex team in the Project. They were made up of villagers, village leaders, political leaders, etc. The political leaders selected the village researchers.
- Cartographers Team: They were made up of technical support team. They were charged with assisting the local community to have accurate scale maps.

Furthermore, the village Researchers were of the following standards:

1. Came from the village community in question;
2. Were people with very high reputation;
3. Literate and conversant with the forest and the geography of the area to be mapped.

With the above put in place, they accomplished their mission and came out with a detailed and acceptable map of the village (in Latin America).

4. METHODOLOGY OF PARTICIPATORY MAPPING:

Mac Chapin highlighted the following as core steps to be followed in the course of participatory mapping:

4.1 Ground Preparation:

This involves the sensitization of the local community about the Mapping Project and the selection of village researchers.

The selected researchers must come from the village community to be mapped. The researchers are selected based on their roles and capacities in the village; and they must be able to read and write.

4.2 First Workshop (1 Week)

This is meant for orientation and training of village researchers. Here, the objectives of the mapping exercise are agreed by the village researchers. Also, they are equipped with the skills and basic principles of mapping.

This also gives the researchers an opportunity to state the objectives of mapping. During this workshop, the following issues are developed and discussed:

a) Land Use Questionnaire:

The village researchers and the Project will develop a questionnaire specifying their interests, e.g. hunting areas, fishing, farming, etc. The information on the questionnaire is based on the objectives of mapping.

b) Community Map:

The village researchers will practice drawing a map of their village showing all the physical features (rivers, roads, hills, forest, etc) and land use.

c) Notebooks:

One of the rules in mapping is that the map in question should not be overloaded with information. In order to assist the cartographer in presenting a detailed but less complicated map, a notebook is needed for the recording of information, which will guide the cartographer during transcription. Examples of such information include: points of intersection of rivers, distances of travel of forest based activities and areas of other land use activities, history of settlement, etc.

4.3 First Fieldwork Period (3 Weeks):

This involves the movement of Researchers to the village to collect basic information, which will guide them in producing their community map. It is during the fieldwork period that the land use questionnaire will be put to use. Before data collection begins, village based sensitization meetings are held to further explain the purpose of mapping.

4.4 Second Workshop (2 Weeks):

Local researchers meet the technical team of cartographers who have assembled all available maps and aerial photographs. Information from the questionnaires and hand-drawn community maps is put onto new base maps developed by the cartographers. The result of this work is a set of cartographically precise maps. The maps are in draft form, with numerous questions outstanding.

4.5 Second Fieldwork (2 Weeks):

- Verification of Data:

This period requires a lot of patience. The second fieldwork is undertaken to get precise information on areas not well presented by the village researchers.

Cartographers and researchers return to the communities with the draft maps, answer questions and fill in gaps.

4.6 Third Workshop:

Village researchers reunite with the cartographers to incorporate the draft and put the maps in final form. In this workshop, the researchers and cartographers together refine the maps by putting all final details and necessary connections. A meeting is then held with community members to confirm the map.

4.7 Production of Maps:

Based on the final information from the village researchers, the cartographer produces a detailed map of the village community showing all the physical features and other areas of interest.

DAY TWO: TUESDAY NOVEMBER 24TH, 1998

The second day of the workshop began with Ekwoge Henry welcoming participants back to the workshop. He then called on participants to feel free to express their views

Harrison Ebong facilitated the morning session of the workshop. He made a review of the previous day's programme and presented mapping from a wider point of view as follows:

5. TYPES OF MAPS:

1. General Maps:

These are maps showing general themes, and used in physical, rural, human and economic geography.

2. Maps showing particular themes:

Examples include: maps showing vegetation, migration, urbanization, industries, transport systems, etc.

5.1 Map Elements:

- Title: This implies that every map must have a heading.

- Frame: Maps must all be framed. The reason being that when a map is being framed, it can be scaled. This frame enables coordinates to be fixed in the map.

- Legend (key): This is an explanatory key to the map. It enables the map to be interpreted and can be used in explaining several activities taking place in an area. A legend is made up of the following:

- Cartographic symbol
- Colours (primary – green, red, blue:
  secondary colours – yellow, white, purple black)
- Shading (patterns)
- Nomenclature: This was described as how a character is being represented in a map. The biggest size font should be used for the title. Also, capital of countries, must be well represented (big and distinctive).

- Source of Map: Any reference used in the course of drawing of a particular map must reflect on the map.

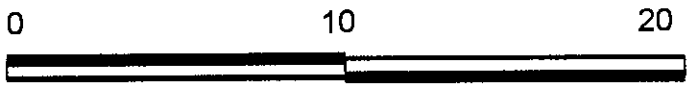
- Date: It is of great importance to date a map. This will determine how long ago a map was drawn. The date determines the validity of a map.

- Name and Address of Author: The name of the author must appear on the map. This is then followed by his address and any other secondary partner.

5.2. Map Scale:

This was defined as the relationship between the dimensions of a map and the dimensions of the earth. It is usually expressed as a ratio between a distance on the map and a distance on the earth.

The scale ratio 1:24.000 means one unit of distance on the map represents 24.000 of the same units of distance on the earth.
Below is an example of a map scale 1.100.000



Kilometres Scale: 1:100.000

➢ Small Scale Maps:

A Small-scale map is one in which a given part of the earth is represented by small area on the map. Small-scale maps generally show fewer details than large-scale maps, but cover large part of the earth.

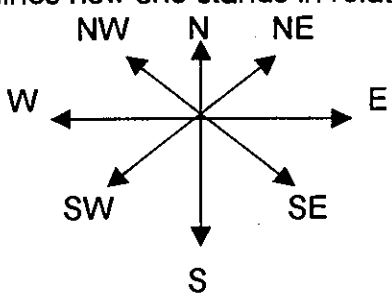
Maps with regional, national and international extension typically have small scale such as 1:1.000.000.

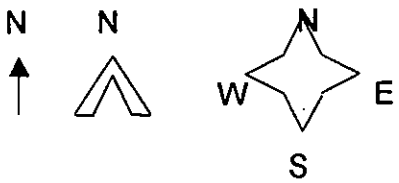
➢ Large Scale Maps:

A Large-scale map is defined as one in which a given part of the Earth is represented by a large area on the map. Large-scale maps generally show more details than small scale maps because on a large scale there is more space on the map in which to show features. 1:2.500 is an example of a large scale. In this exercise it was decided to use a scale of 1:25:000 where 1km on the ground is represented by 4cm on the map.

5.3 Orientation:

Orientation was described as the direction or position.
- It determines the position of something with regards to the points of compass.
- Determines how one stands in relation to ones surrounding.





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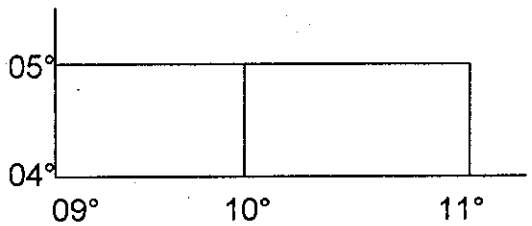
5.4 Coordinate System:

This was defined as a reference system used to measure horizontal and vertical distances on a planimetric map.

- Latitude: The North/South measurement of a position perpendicular to the earth's polar axis.
- Longitude: The East/West measurement of a position in relation to the prime meridian.



5.5 Producing Maps:

The most important thing to guide against when producing maps is that it should not be overloaded with details, which might obscure the main theme. For this reason, the theme must be precise by:

- Elements appearing orderly
- Selecting vital information and leaving out what is not certain
- Eliminating information which have no relationship with the theme, and classify the chosen elements.

Mac Chapin briefly summarized Harrison's presentation and added that in producing maps the following should not be left out:

Physical features:
Rivers
Roads
Swamps
Lakes
Hills
Forests
Village.

Subsistences:
Fishing areas
Farming areas
Hunting areas,
Weaving materials
Medicinal Plants

6. PRACTICING MAP DRAWING:

Participants were given flip charts, pencils and coloured pencils to practice drawing maps of their various areas. Staff at the Limbe Botanic Garden also drew the map of the Garden showing areas of interest. All the maps were later pasted on the wall and participants had the opportunity to examine each and make criticisms. Mac Chapin at this point summarized lacking but pertinent points in the various maps. All the comments were put together and clarifications made.

Fominyan Christopher then presented a sketched map of the Limbe Botanic Garden. In order to test the degree of participants' comprehension of mapping elements, copies of the sketch map were distributed to participants for criticisms. The following elements were lacking in the map:

- Title
- No Hills
- Key
- Name of Author
- Date
- Frame
- No orientation (North Direction)
- No Coordinate
- No Scale

At the end of the exercise, Mac Chapin explained the logic behind map drawing and expressed gratitude for the wonderful jobs done by the participants. He asserted that map drawing is not meant for a certain class of people and that with constant practice, participants can become experts in producing maps of their areas.
Some of the maps produced are shown in appendix 6.

DAY THREE: WEDNESDAY NOVEMBER 25TH, 1998

The third day of the workshop started at 9:00 a.m. Ekwoge Henry welcomed participants to the last day of the workshop and emphasized that for the workshop to end successfully, participants are expected to participate fully. He added that the day's activities will start with a review of map drawing and end with an action plan for the fieldwork in Mokoko Area.

After the recap of the previous day's activities, participants were of the opinion that after spending two days learning about mapping coupled with the map drawing exercise of the previous day, they were fully equipped to produce maps of their areas.

The morning session was facilitated by Ebong Harrison. He began by encouraging participants to ask questions on what has been done so far with regards to participatory mapping. (*See appendix for questions and proposed answers).* The following were highlighted as being of great importance in map drawing:

- Time in relation to distances
- Compass for orientation

7. OBJECTIVES OF MAPPING IN MOKOKO AREA:

This topic was facilitated by Mac Chapin. He gave a detailed explanation of how the mapping exercise could be useful to Mokoko Community as follows:

- <u>To Educate the People</u>:

  The mapping of Mokoko area will help educate the present and future generations about their region. Moreover, when the population are versed with information concerning the natural resources in their area, they can better plan on how to use and manage what they have. Furthermore, the village community will be more educated on their territorial boundaries, and this will act as a tool for villagers to know where other villages are located.

- <u>To map existing farmland and Natural Resource Use Areas</u>:

  The mapping exercise in Mokoko area will enable the village community to know the existing farmlands and where natural resources are found in the region.

- <u>To Plan Resource Use and Economic Alternatives</u>:

  The mapping of this area will enable the village community to know what is left in the forest and then plan on how to manage their forest resources for present and future use.

- To Unite the Region:

  When the area is mapped, the villagers will get to know those villages that make up Mokoko area, and there will exist a strong bond between them. They will think together, plan together and work together for the proper management of their forest.

- To better manage wildlife:

  When the Mokoko region is mapped, the villagers will know where animals are found in the forest and how much is left and this will create an avenue for them to better manage their wildlife.

7.1 LAND USE PROBLEMS IN MOKOKO AREA

The Mokoko village rResearchers outlined problems faced by their Community as follows:

- Non-indigenes claiming portions of their lands;
- Some villages encroaching into the Reserve, e.g. Ekombe Mofako;
- CDC encroaching into village lands;
- Outsiders trespassing right into the Reserve to hunt and extract natural resources.

7.2. AGREEING OBJECTIVES OF MAPPING IN MOKOKO AREA

This was a brain-storming exercise to find out from Mokoko Researchers and MCP (Mokoko Area) staff possible things to map and expected results of the mapping exercise.

7.2.1 Mokoko Community Objectives:

To facilitate the presentation, Diongo village was chosen for the analogy; and participants gave the following features as what they would like to appear in their Community map:

Physical Features:

- Rivers
- Villages (Settlement)
- Petroleum deposit (prospection)
- Beaches
- Shrines
- Springs
- Lakes

- Mangroves
- Swamps
- Roads
- Markets
- Savanna
- Forests
- Catchment area
- Footpaths
- Hunting routes
- Fishing areas
- Old Timber Roads

Land Use:

- CDC/village boundaries (old and new)
- Gathering zones (eru, bush mango, bush pepper, medicinal plants, etc)
- Fishing areas
- Hunting / Trapping areas
- Timber exploitation areas
- Mokoko River Forest Reserve
- Potential Community Forest
- CDC activities on Community land (camps, etc.)
- Farming areas

Mokoko River Forest Reserve:

- Farms in the Reserve
- Villagers' proposed Reserve boundary

The maps produced will show how the Community and other institutions use land and forest and would enable the Community to negotiate their current and future needs with the authorities concerned.

7.2.2 MCP Objectives:

The MCP (Mokoko Team) staff outlined the following as being the objectives for the mapping exercise:

- The mapping exercise will contribute to the Participatory Resource Management Plan and Land Use Plan to be developed by MCP at the request of the Government of Cameroon.

Land Use Plan:

Land in Mokoko Area faces pressure from subsistence farming, large scale commercial agriculture by CDC, timber exploitation, hunting, etc. A participatory Land Use Plan would help sort out some of the existing land problems. The logical first step to prepare a Land Use Plan is therefore to have a map showing land and forest use.

Management Plan for the Mokoko Forest Reserve and Surrounding Forest:

The Management Plan will stipulate a system with regards to methods of exploitation, regeneration and tending. The objectives of the Management Plan are: biodiversity conservation, participatory management by the State and local community, sustainable production of forest products and benefits to local community within the limits of biodiversity conservation.

8. INFORMATION GATHERING TOOLS FOR MAPPING (MAC CHAPIN/EKWOGE HENRY)

8.1 Questionnaire:

Participatory method was used in the designing of the questionnaire below. Participants were asked to construct interrogatory statements to reflect the activity in question. Many options were stated from which the best way of presenting the question was chosen. (see ✓)

Farming:s

What is the name of your farm?

Hunting:

a) Where do you go hunting? (✓)
b) Where do you get animals?

Fishing:

a) Where do you do fishing? (✓)
b) Where do you get your fish?

Gathering:

a) Where do you gather bushmango, cane, bitter leaf,etc (✓)
b) Where do you get your bushmango, etc

Timber Exploitation:

a) Where do you get Timber?
b) Where do you find timber in your forest?
c) Where do you cut trees for timber?
d) How do we find timber?
e) Where do you go to cut timber?
f) Where do you exploit timber for sales, building firewood, etc? (✓)

(See appendix 2 for complete Questionnaire).

8.2 Notebook:

This book is used for recording vital information, which will help the cartographer (during transcription) in producing a detailed and comprehensive map. The following were enumerated as information likely to be recorded in the notebook:

a) Distance (in time) to areas of activities
b) Shape of rivers, roads
c) Number of creeks, streams
d) Seasonal changes
e) History of the village
f) Changes in land ownership (tenure)
g) Changes in land use over time

Cultural changes:

- Linguistic information
- Historical information
- Natural resource information.

9. INTRODUCTION TO MOKOKO AREA (Mbani, Ekwoge, Ntube)

The Mokoko Area Team presented activities of the Area to give participants (especially those from Djoum, Tikar and CARPE) an overview of the area as a whole and MCP's activities there.

The Mokoko Area falls under one of the four geographical areas of the Mount Cameroon Project and covers eight villages in Bamusso mainland (Balondo, Ekombe and Barombi clans) and ten villages in Bomboko clan. The main output of the Mokoko area team is the preparation of a Participatory Management Plan for the Reserve and the surrounding forest. The Mokoko River Forest Reserve covers an area of 9.100 hectares, and was gazetted as a Production Reserve in 1952.

MCP activities in the Area can be summarized as follows:

The Mokoko area team has identified the various stakeholders (people interested in the management of the reserve). Moreover, all existing and potential conflicts were mapped and common grounds identified. The common grounds serve as a basis for the development of an Action Plan by all stakeholders.

The main resources identified are:

- Land:

The prevailing land problem in the area is the encroachment into the Reserve at Ekombe Mofako by the villagers. Several meetings have been held with stakeholders in this regard. The reasons advanced by the villagers for the encroachment was lack of enough farmland due to CDC encroachment into the village land and unlawful land sales by the villagers. In order to ameliorate the situation, some major action points were agreed upon. The first was a letter to be written to government to lease out some reserve land to the village and secondly, injunctions on CDC to stop further expansion and give out uncultivated land to the village. The issue at stake is how to get the villagers to accept the gazettement document, since two villages are of the opinion that they were not signatories to the gazettement document though records indicate that the these two villages were then under the Balondo native authority, which of course was a signatory to this document.

- Wildlife (bushmeat)

A Wildlife Committee comprising all the Stakeholders has been put in place by the Mount Cameroon Project. The Committee is governed by rules and regulations drafted by the Committee members and agreed by all concerned including MINEF. Membership now stands at 50 and the area team is presently working on how to get the indigenous hunters and outside hunters together for a better wildlife management.

- Timber

A logging Company was invited by nine villages from the Mokoko Area in 1997 for exploitation of 1.500 ha non-permanent forest in the Northern fringes of Onge and Mokoko Region. The villages concerned expected that the logging Company would bring benefits and infrastructural development to the area.

It was against this background that the Mount Cameroon Project organized a visit with some Community representatives from Mokoko area to some Community Forestry Projects in Nigeria in January 1998. These Communities have successfully resisted large scale logging by outside Companies and are carrying out small scale, more profitable exploitation of forest resources. The visit was to serve as confirmation that rural communities can better manage their forest for present and future use.

With the effort of the Mount Cameroon Project, people are now requesting joint management of timber resources by the local community, timber exploiters and the forestry Department. There is already growing interest for community forestry, and it is hoped that this will lead to the formation of village based institutions for the management of timber resources and Non Timber Forest Products (NTFPs).

Project workers have realized the integral importance of identifying conflicts in the process of community based management of resources. In fact it is the actual process of finding solutions that moves communities closer to taking responsible decisions and action plans for managing their forest.

10. PLANNING FOR FIELDWORK

10.1 Potential Field Problems (FEARS)

This was facilitated by Ekwoge Henry. In order to prepare for the field trip, Workshop participants were given an opportunity to enumerate problems, which are likely to be encountered in the course of fieldwork. The following were listed as potential field problems and the *italics* represent proposed possible solutions to the problems.

- Compensation for Community informants:
  ⇒ *Compensation with palm wine using part of perdiem.*

- Researchers might fall sick
  ⇒ *Pass on knowledge acquired to others*
  ⇒ *Exchange visits between Researchers*

- Movement between villages might be difficult
  ⇒ *Stand-by vehicle*
  ⇒ *Enlarged meeting in central place*
  ⇒ *People will walk*

10.2. FIELD MATERIALS/EQUIPMENT:

10.2.1 MCP/CARPE

- Money
- Paper Flip Charts (1 roll)
- Coloured Pencils (8 Packets)
- Vehicles (2)
- Rulers (8)
- Pencil Sharpener (8)
- Erasers (8)
- Notebooks (12 - 80 leaves)
- Tubes
- Compass
- Cellotape

10.2.2 VILLAGE RESEARCHERS:

- Cutlasses
- Arrange Meeting Halls

10.3 ACTION PLANNING

ACTIVITY	RESPONSIBLE	TIMMING
1. Type out Questionnaire & produce copies	MCP	26th/27th November
2. Departure of Mokoko Village Researchers	Driver (MCP)	26th November
3. Village Sensitization	Mokoko Researchers	From 26th November
4. Prepare field logistics – Materials, etc.)	MCP/CARPE	From 26th November
5. Follow-up Arrangements (accommodation) in Mokoko Area.	Ekombe - Lucas Dioh & Joseph; Illoani - Nekena Felix Boa - Roy & James Itoh Gen. Supervisor – Chief of Post, Illoani)	From November 26th
6. Departure of CARPE/MCP/DJOUM, Tikar, etc	Driver, all	27th November (10:00a.m.)
7. Introductory meeting at Ekombe Mofako and Barombi Mokoko	• MCP • Village Researchers • Chief of Post Illoani • Ekombe Mofako • Community/Barombi Mokoko	28th November 2:30 p.m. 4:00 p.m.
8. Meeting at Illoani and Dikome	• Illoani Reseachers • Chief of Post MINEF • Dikome Researchers	29th November 2:30 p.m. 4:00 p.m.
9. Meeting at Mbongo and Bonjare	• Mbongo Researcher • Bonjare Researcher	30th November 2:30 p.m. 4:00 p.m.
10. Diongo and Boa	• Diongo Researchers • Boa Researchers	1st December 12:00 noon 2:00 p.m.

10.4 EVALUATION AND CLOSING:

The evaluation of the Workshop according to participants' responses was as follows:

S/N	ATTRIBUTE	VERY POOR	POOR	GOOD	VERY GOOD	EXCELLENT
1.	GENERAL ORGANISATION	1	2	6	10	6
2.	WORKSHOP OBJECTIVES MET?	-	-	2	8	15
3.	PRESENTATION OF LESSONS	-	1	3	6	15
4.	USE OF TIME	-	3	4	13	5
5.	PARTICIPATION	-	-	2	8	15
6.	DURATION OF WORKSHOP	-	2	6	9	8
7.	PREPARATION FOR FIELDWORK	-	2	4	9	10
8.	FIELDWORK PROGRAMME	-	3	5	8	9
9.	ACCOMMODATION	2	1	9	8	5
10.	FOOD	-	-	3	4	18

The Workshop ended with closing remarks from the Facilitator – Mac Chapin. He congratulated participants for the hard work they had put in the workshop; and added that he was particularly impressed by the efforts of the village researchers throughout the duration of the workshop. He concluded by saying that participants should make good use of the knowledge and understanding they had acquired in the workshop.

Participants were then led to refreshment and the Facilitator entertained participants with a video tape. The video illustrated a village in India in which the village community attached very much importance to their forest. They believed that their forest was their source of life because without it, most of the medicinal plants which they use in treating illnesses would not have been found. They conserve and use their forest wisely. The facilitator then gave a brief summary of the video tape and the workshop rose with participants fully satisfied with the 3-day's programme.

CARPE

CENTRAL AFRICAN
REGIONAL PROGRAM FOR THE ENVIRONMENT

LESSONS LEARNED SYNTHESIS

THEME FOUR

COMMUNITIES AND FOREST RESOURCE MANAGEMENT

By Michael Brown, Diane Russell,
Laurie Clark and Jonathon Landeck

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I. DESCRIPTION OF THEME FOUR

A. Introduction

Theme Four of CARPE – Communities and Forest Resource Management—comprises three Intermediate Results (IR) teams: IR1 – Local Forest Resource Management Systems; IR3 - Agricultural Systems; IR5 - Non-Wood Forest Products. This Theme Four grouping was arrived at arbitrarily within CARPE for IRs 1,3,5 by CARPE management in mid-1998.

One of the challenges to CARPE in general, and Theme Four members in particular, is to develop applicable strategies and tools for community-level forest conservation across a highly diverse and dynamic Congo Basin social and cultural landscape. Each IR team member in Theme Four had slightly different original hypotheses and/or assumptions as to how this could best be achieved. These hypotheses oriented the respective IR partners work plans ***prior*** to the creation of Theme Four as a distinct entity.

We have come a long way in harmonizing approaches so that Theme 4 can become functional on an operational level, and not just in theory.

1. Assumptions and Units of Analysis

The IR1 team decided to use ***local forest resource management systems*** (LFRMS) as a unit of analysis. By LFRMS, we mean management of specific forest resources within the context of specific institutions and incentives. This unit of analysis was assumed at the outset to offer strategic advantages as it is based on previous research in the region. An example of a well-defined LFRMS is the cocoa system, where the institutions include farmers groups and markets, the resources are cocoa trees, inputs and land, and the incentives include prices and the desire to attain the status of "cocoa planter."

The IR5 Team was building on USDA's interest and capacity to undertake a series of studies on a thematic area hypothesized to be of key importance to the long-term viability of Congo Basin forests – non-wood or non-timber forest products (NWFPs). The IR5 Team planned for a series of studies to uncover market, ecological and social factors that shape NTFP's role in forest conservation in the Congo basin. For IR5, then, the unit of analysis has been the specific resource (NWFP) under research. After the International Expert Workshop on NTFPs in Limbe (May 1998), however, IR5 commissioned studies on the legal and institutional aspects of NTFPs, as well as continuing research on NTFP markets. The commissioning of these studies emerged from an understanding that NTFPs have to be seen within the context of economic, institutional, livelihood and ecological systems.

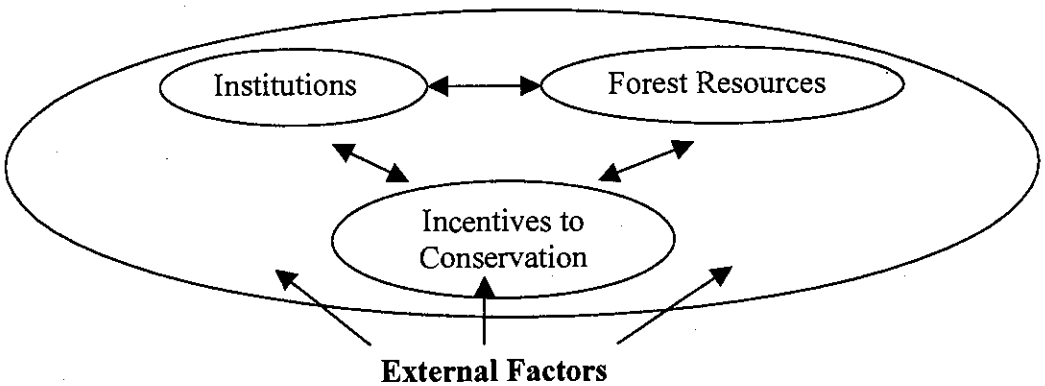
Peace Corps, IR3, use the farming system as its unit of analysis. The IR3 Team was building on Peace Corps lengthy field presence in Gabon and Cameroon primarily over the past six years working with farmers and forest-based agricultural systems at the household level and higher. Peace Corps assumed that based on available macro-level

data and trends, deforestation due to agricultural clearing represented the single greatest threat to Congo Basin forest conservation, reinforcing the logic of PC's work with farmers and sustainable agricultural practices.

Theme Four has decided to adopt LFRMS as its unit of analysis, thereby merging NTFP resources and farming systems into a larger unit that looks at the totality of forest resources and ways that they are managed.

Research into LFRMS can focus on both resources and institutions—such as households, village councils, government agencies and markets—that govern the management of a range of resources. Incentives to sustainable management such as economic benefit, food security, cultural integrity and empowerment also cut across both institutions and resources. The advantage of focusing on LFRMS is that each of these components are seen in interaction with each other.

2. *Local Forest Resource Management System Conceptual Model*



The reasons for using LFRMS as a unit of analysis include:

- Identification of appropriate actions to enable CARPE to ***scale up*** from specific sites to a range of comparable institutions, resources and incentives.
- Avoiding a focus on any specific institution, such as the household, with the assumption that it would be significant with respect to managing specific resources.
- The focus on systems enables the identification of key variables affecting sustainable or unsustainable resource use of specific resources.

There are risks associated with using LFRMS as a unit of analysis. First, the concept can be seen as too vague unless Theme Four is able to provide concrete and replicable examples across the CARPE region. Second, it may be too diffuse. One strength of IR5, for example, was the concreteness of focusing on NTFP resources. Finally, it may be too ambitious. Unraveling the strands of any system, reweaving these strands into useful models, and then comparing these models across a vast region, is an effort worthy of a major research initiative.

What unifies Theme Four's IR teams is the quest to identify general conditions, and specific incentives, for enabling community level institutions and individuals within communities to adopt practices that will promote forest conservation in the Congo Basin. As a newly formed thematic team, the interface between institutions, incentives and forest resource management practices to maximize learning is still at an early stage.

B. Overview of IR1 component – Local Forest Resource Management Systems (LFRMS)

1. IR1 Objectives

IR1 seeks to gather information, leading to knowledge, about the conditions under which LFRMSs[1] contribute to forest resources conservation outside of protected areas. [Note: LFRMS are not the same as indigenous resource management systems and they don't automatically lead to sustainable management.] The kinds of information IR1 has acquired include:

- Expert analyses of institutional components of LFRMSs, and the relevance of LFRMS as a conceptual framework for forest conservation
- Targeted assessment of NGO capacities in the Congo Basin relevant to forest conservation
- A comparative assessment of approaches similar to IR1, which can be defined as encompassing or promoting community based forest conservation
- Baseline forest resource inventories in the IR1 target zones
- Information on natural product development opportunities in the target zones
- Mapping of communities' visions of resource availability mapped to serve as a basis for management planning in the IR1 target zones
- Methodological information on Participatory Mapping
- Methodological information on Participatory Forest Resource Inventory

Three action research sites—Mt. Cameroon, Djoum, Tikar Plain—were chosen to study LFRMS in different ecological and social contexts. These sites are seen to be more than representative of physical locations—they encompass common situations across the Congo Basin.

A Matrix for Original Selection of LFRMS Sites to Work in IR1

Site	Ecology	Key social institutions	Infrastructure /Market	Population Density	Internal LFRMS Situation
MC	Montane Forest	Mix of local and immigrant	Ready access	High	Relatively Dynamic Complex multi-stakeholder

[1] For over two years, IR1 referred to Indigenous Forest Resource Management Systems (IFRMSs). In fact the term "local" now appears to be preferable to indigenous, hence use of LFRMS.

Djoum	Deep forest	Village and lineage based	Difficult access	Low	Stagnant internally; external logging threats
Tikar	Forest-savannah Transition Zone	Chieftancies with strong in-migration	Moderate access	Moderate	Complex—multi-stakeholder

IR1 seeks to identify conditions and practices that promote forest and/or biodiversity conservation outside of protected areas in the Congo Basin. In so doing, IR1 has targeted the role that communities can play in promoting the CARPE objective. In certain instances these conditions and practices may be vestiges of "traditional" forest management systems. In other instances, they may encompass a hybrid of what for lack of a better term include "traditional" and "modern" elements. One anticipated result of this action-research approach is identification of specific elements that appear to promote conservation and that could serve cornerstones CARPE's activities in Phase 2.

IR1 has chosen sites that are felt to be "representative," and which can affect long-term forest and biodiversity conservation in the region. Its initial stratification strategy for selecting target zones to work in was premised on working only in areas that were representative of social, cultural and ecological variables that are found in large areas of the Congo Basin, so that results generated would be of immediate relevance to CARPE and its partners. The results of IR1 activities are meant to enable external partners to help local communities identify appropriate incentives, processes, and mechanisms can be structured to promote the CARPE SO.

One element of IR1's (and Theme 4's) integrated approach is the study of trade based incentives. IR1 seeks to clarify the role and, to a limited extent, the feasibility of ***trade-based incentives*** to mobilize community-based institutions. The IR1 focus on trade based incentives to mobilize communities was encouraged by the CARPE SOT.

Through its strategic approach, IR1 hoped originally to model components and processes of a "sustainable forest resource utilization ethic" for the Congo Basin, identifying factors under which communities contribute to grassroots environmental advocacy consistent with CARPE objectives in the region. This interest was premised on the belief that there could under the right conditions and incentives, be considerable interests on the part of communities to promote conservation of forest resources in a manner consistent with CARPE objectives.

IR1 together with other theme 4 partners will identify specific management systems, communities and wider regions from which conservation lessons could be drawn as well as tested. These lessons will form the basis of a model that displays the socio-cultural conditions or scenarios under which forest conservation is most likely to occur. This

model could then be extrapolated to the Congo Basin to create wider predictive models and plan activities in Phase 2 of CARPE.[2]

2. *IR1 Assumptions*

The IR1 component of CARPE was developed around a series of assumptions:

Overarching

a) There has been little consensus among external agents to conservation in the Congo Basin on whether, *in fact*, communities are capable of being ***lead*** players in Congo Basin forest conservation and, if so, under what conditions.
b) Communities can be more active players in Congo Basin forest conservation than has occurred to date, given the right context and incentives.
c) For conservation to occur, communities must become engaged in both hands-on sustainable use/conservation activities ***at the local level***, as well as advocacy for forest resource conservation ***across the Basin***.
d) Proportionately fewer resources are devoted to forest conservation activities in forest zones outside protected areas (inclusive of buffer zones) than in vast Congo Basin forest zones.
e) Certain community-based institutional structures, if networked and with the proper incentives and enabling conditions, offer potential to promote the CARPE SO across the Congo Basin.

Technical

f) Efforts to promote community-based forest management must balance institutional and technical factors to achieve success.
g) At the technical and institutional interface, participatory forest resource inventories (PFRI) play an important role in identifying resources within the context of community institutions—thus they are an essential component of market-based incentives.
h) The lack of tested and appropriate mapping technologies, which can be used by communities to portray their resource rights and management perspectives constrains conservation action in the Congo Basin.
i) Participatory mapping (PM) as developed and tested in Latin America through Center for Native Lands offers a model not tested previously in Africa..
j) Once PM skills are acquired by communities, the rationale for training community level PFRI monitors will become clearer, as will other potential technical aspects of forest resource conservation.

[2] During the lessons learned phase of CARPE, from April – October 1999, IR1 will begin developing the ***social institutional basis*** for identification of geographic areas potentially amenable to CARPE Phase 2 activities. To the extent that information on the other two pillars of the IR1 agenda – incentives and forest resources - can be factored into the predictive model, they will be.

k) PM maps IR1 develops in Mokoko, Djoum and Tikar will enable communities in these areas to better negotiate for stewardship/co-management responsibilities under the new Cameroonian forestry legislation.

3. *IR1 Approach*

IR1's approach has been to program activities that further both the knowledge base and the theoretical understanding of community level contributions to forest conservation in the Congo Basin. This approach involves building on lessons learned on the one hand, and testing methods that bring potentially new perspectives on the other. The overall approach is thus one of **Action Research**.

> **Action Research and Science**
> Action research means simply research that involves action on the part of its "subjects," and leads to actions that improve their lives. Action research does not necessarily mean participatory research or PRA although varying levels of participation and consultation are always part of action research. Examples include on-farm trials, resource inventories, development of management plans, and institutional assessments.
>
> Action research complements in-depth and long-term scientific research and monitoring by providing critically important local viewpoints, helping to translate scientific findings to local actors, and being flexible enough to capture quickly changing situations.

Numerous organizations have worked on community-based conservation programming in the Congo Basin for a decade or longer. Many lessons have been learned, though not necessarily shared systematically, among the community of interested colleagues and partners. While conservation organizations such as WWF and WCS—to name but two—have been involved in integrated conservation and development project (ICDP) programming in Cameroon, Congo, and Central African Republic (CAR), ICDPs have always been undertaken in conjunction with protected area conservation programming. 95% of the Congo Basin forest area meanwhile remains in unprotected management classification.

On the other hand, Université Libre de Bruxelles (ULB) and Avenir des Peuples des Forêts Tropicales (APFT) in particular, as well as CIRAD-Forêt, have greatly contributed to the anthropological basis of understanding of Congo Basin conservation. That said, a cursory literature review at the outset of CARPE indicated that the anthropological or sociological literature available for Congo Basin forest peoples was not readily translatable into operational programming for an activity such as CARPE.[3] Through the course of implementation of Phase 1 of CARPE we have learned that numerous groups have worked on issues that can feed into the IR1/Theme 4 framework as it is evolving. These include work undertaken at IITA on agro-ecological systems, the excellent historical studies of University of Wisconsin Professor Jan Vansina, and many others.

[3] Through the remainder of this phase of CARPE, and moving into CARPE Phase 2, the opportunity to capitalize on the existing anthropological literature addressing forest peoples and their management systems will be increasingly exploited.

Generally, the data are either too specific to enable extrapolation beyond the level of broad generality, or too broad at the level of generalization to enable application beyond the level of "principles"[4] [5].

In summary, IR1's approach gives priority to Congo Basin forest conservation outside of protected areas. IR1 targets communities and the resource management system of which they are a part. The approach is characterized by:

- analysis of systems from an institutional standpoint
- rapid analysis of the resource base relevant to the institutional components of forest management systems
- analysis of potential market/trade based incentives shaping resource use
- analysis of incentives and conditions required for communities to contribute to the CARPE SO.

B. Overview of IR3 Component – Farming Systems

1. IR3 Objectives

Small-scale agricultural activities are by far the predominant method of forest-based natural resource use in the Congo River Basin. This use may be responsible for up to 70% of all deforestation in Central Africa, making unsustainable agriculture systems the single major cause of deforestation in the region. Slash and burn agriculture, in addition to commercial collection of forest products, cultivation of forest products as cash crops and hunting-gathering, are the primary subsistence activities that contribute to deforestation and biodiversity loss. Most small-scale farmers remain locked in a cash poor economy. This leaves few options and little incentive to manage forest-based ecosystem sustainably. Consequently, the two objectives of Peace Corps as CARPE's IR3 implementing partner are:

- Identify tools available to farmers to enable them to change from extensive to intensive agricultural practices.
- Assess how farming system productivity and marketing changes among smallholder forest-based farm families in Cameroon and Gabon impact forest resource use.

[4] For example, Serge Bahuchet of APFT has offered excellent detailed analysis of hunter gatherer/agricultural interface issues over the years [citation]. The perspective taken has often prioritized the position of Pygmy (Baka) interests to that of the agricultural peoples. Moving into a balanced operational program from there that does not target reinforcement of the Pygmy culture, both broadly and in particular instances, is problematic. While laudable, this type of programming option for Phase 1 CARPE was impossible, in the same way that broad based NGO capacity strengthening in natural resource management was impossible.

[5] The Biodiversity Conservation Network's Nick Salafsky has discussed this dilemma of "non-trivial principles" that are in-between very specific data sets such as "Chief John can solve disputes" and overly broad information such as "Clans often dispute territory" [citation].

2. *IR3 Assumptions*

The primary working assumptions underlying the achievement of these objectives are:

- A shift from extensive to intensive, sustainable (more efficient internal nutrient recycling) farming practices may, under certain conditions, decrease forest loss, reduce pressure to convert wildlands to agriculture, and reduce the intensity of harvesting of wild resources.

- Enhancing smallholders' capacity to market their agricultural and forest products will reduce pressure to convert forest lands to agriculture, reduce the reliance of smallholders on overexploiting forest resources, and enhance the value of forest resources to smallholders.

- More efficient resource recycling within individual farm units will enhance local forest-based resource biodiversity.

To test these assumptions and address the two IR3 partner objectives, during the period October 1998 to September 2000, a total of 35 Peace Corps Volunteers in Gabon and 50 Volunteers in Cameroon will have gathered and analyzed quantitative and qualitative data on the production and marketing components of rural farming systems in Gabon. These Volunteers are posted to sites which, in the aggregate, are representative of the range of farming system environments across the Congo River Basin. These data will enable the IR3 partners to begin to identify the socioeconomic conditions under which traditional as well as innovative farming practices would conserve forest resources and nurture biodiversity habitat rather than decrease these forest ecosystem attributes. Data from 16-20 community-based field sites in Gabon and a similar number of field sites in Cameroon will establish a baseline of reference points to monitor through September 2008 and enable the IR3 partners to extrapolate their findings to similar community farming system environments in the wider Congo River Basin ecosystem.

At present, after one year of fieldwork, available data neither verify nor refute the assumptions noted above. The approach taken by the IR3 partner to obtain data is not a classic Farming Systems Research and Extension methodology based on systematic surveys of randomly selected farm households. Rather, the data gathered are closely associated with the applied agroforestry demonstration and marketing activities undertaken by Peace Corps Volunteers determined to be appropriate by host country counterparts and the Associate Peace Corps Directors who supervise the Volunteers. The work and data collection is "farming systems" in nature because the activities that the Volunteers undertake are closely linked to household livelihood concerns, i.e., subsistence production of food grown in the context of a forest environment and the generation of household income through the marketing of agricultural and natural resource based products.

In other words, while the IR3 program focus in Gabon and Cameroon is farming systems, Peace Corps Volunteers' community-based work activities to improve food production is designed with the local, forest ecosystem as the contextual framework.. For example, Peace Corps CARPE-related activities in Gabon are managed and administered within the rubric of a project called FARM, which means "Forest and Agricultural Resource Management." Community-based PCV extension workers work in teams composed of forestry, agricultural, and marketing specialists. June 1999 will mark the first full year of this structure. The FARM Project is expected to continue through September, 2008. During the past year, with partial support from CARPE, Peace Corps/Gabon FARM Volunteers have received in-service training in conducting NWFP surveys; in establishing a baseline of information related to biodiversity conservation that is primarily related to the diversity of tree species that survive or are lost during the process of slash-and-burn land clearing and subsequent grain and cassava production; and in establishing a baseline of information related to the analysis of forest and agricultural product marketing. The latter training was also given to Peace Corps/Cameroon Volunteers.

3. IR3 Approach

The Theme 4 IR3 partner employs the following methods in its efforts to achieve its objectives:

- A farming systems description study to be conducted during July, 1999, focusing on institutional characteristics, forest resources, farmer behavior, policies, and market forces.

- A baseline survey conducted by Volunteers to establish reference points for assessing the impact of agroforestry activities. The survey was designed and pilot tested in February, 1999, in the forest zones of southern and eastern Cameroon, and in the savanna areas. The survey is now being implemented. The pilot test suggested that agroforestry activities may not be appropriate in the southern forested zone of Cameroon. Farmers tend to question the logic of planting trees in an area that is relatively heavily forested and which enjoys a low population density. The method is more applicable to savanna zones within which CARPE operates.

- A baseline survey conducted by Volunteers to establish reference points for analyzing agricultural and forest-based products was designed and pilot tested in March, 1999, in Gabon and is now being implemented.

- A baseline survey conducted by Volunteers to establish community-based, agricultural field sites for monitoring the conservation of biologically diverse tree species designed and pilot tested in March, 1999, in Gabon and is now being implemented.

- A survey method for analyzing NWFPs was introduced to Volunteers in Gabon in January, 1999, by representatives of the U.S. Forest Service, a CARPE Theme 4

partner, and is now being implemented. The results of this survey will be combined with the results of the survey for analyzing the potential marketing of agricultural and forest-based products. Although the implementation of the surveys are restricted to areas and communities in or near where Volunteers are posted, a minimum of three "generations" of Volunteers are expected to be placed in a single community, resulting in six years of monitoring data by Volunteers for a one reference point. This is sufficient time to build local capability to monitor deforestation when Volunteers will no longer be posted to one particular site. Moreover, these surveys are replicable and their aggregated results are relevant to the broader Congo River Basin. While stratified survey implementation is not the primary mandate of Peace Volunteers, agents of capable non-government organizations could be trained by Volunteers to administer the survey, supported by CARPE. An initial survey report is expected in mid-FY00.

- The primary source of findings from the various surveys noted is individual farmers and farm household members in rural communities of Gabon and Cameroon. The selection of data sources is not and will not be random because this is a function of where Volunteers are posted. Secondary (literature) sources will be used in the farming systems description study.

- The ability to extrapolate survey findings across the Congo Basin and/or converge survey results with findings from other studies and surveys implemented across the Congo River Basin will largely be inferential. Given the general paucity of information across the Basin, however, this reality should not be considered in a negative sense. Over the long-term, minimally ten years, these replicable survey and monitoring methodologies have very good potential to add additional data reference points across the Basin.

D. Overview of IR5 Component – Non-Timber Forest Products (NTFPs)

1. IR5 Objectives

The sustainable exploitation of Non-Timber Forest Products (NTFP) has been identified as having some potential to meet CARPE goals as part of wider management and enterprise development strategies now being developed under Theme Four. In particular, IR5 identified NTFPs that either had high potential for development, were severely threatened, or both. Those with greatest commercial value are being investigated (market chains, domestication, value addition) for their contribution to livelihoods of forest dwellers. In addition, IR5 is contributing to the economic valuation of NTFPs vis a vis logging in order to help FAO and national governments to make decisions on forest exploitation.

Programmatically, IR5 had the following objectives:

1. Make a comprehensive review of activities and issues within the NTFP sector in the CARPE countries

2. Come up with options for development of the sector in consultation with experts who are involved in ongoing work
3. Prioritize next steps in research and development for specific NTFP resources
4. Contribute to an understanding of NTFPs in wider systems (market, institutional, legal)

All of these objectives have been attained, although number 4 is still in process because studies have not yet been completed.

2. IR5 Assumptions

IR5 proceeded on the assumption that NTFPs contribute to the goals of CARPE. This assumption was based largely on the work of people within the sector—both researchers and local resource users. As part of the second phase of CARPE, IR5 will take both a step back and a step forward to assess the relative merits of NTFPs as part of a "bundle" of incentives, and continue with the development of NTFPs already identified by researchers and local resource users as having high potential.

As part of Theme Four in Phase 2 of CARPE, IR5 would like to include sustainable timber into the equation because in fact people are already managing timber resources but have few guidelines to do so. In other parts of the world, sustainable timber had moderate success in providing large enough benefits to communities to help them fight against large-scale timber (Salafsky and Cordes 199x).

How are NTFPs seen to contribute to CARPE's goals?

- They are a valuable resource for local communities both economically and for subsistence.
- They can form the basis of non-extractive industries, if significant care is taken to management and monitoring.
- Domestication and commercialization of NTFPs can increase the diversity of the rural economy, thus providing benefits to a wider range of stakeholders.
- NTFPs can be key ecological and economic indicators for scientists and communities (example: mushroom species, valuable tree products)
- Management of NTFPs can form the basis of community management plans

For more information, refer to IR5 Lessons Learned Synthesis.

3. IR5 Approach

The approach taken by IR5 has been to build on previous research in the region and sector. IR5 initially contracted with Canadian forester Jean Aube to come up with a plan for the program. This plan, which involved setting up several networks within the region for research and action on NTFPs, proved to be too ambitious for the initial phase of CARPE. Indeed, IR5 concluded that this kind of role for CARPE in the sector was likely to be impractical at any stage. There were several important activities that were directly

or indirectly working in the sector, including Tropenbos Cameroon, CIFOR and Limbe Botanical Gardens (LBG).

In order to gather information on what was going on in the sector, Nicodeme Tchamou did an initial survey of the activities and actors in NWFPs in the CARPE region (late 1996). These findings were augmented by field visits by Laurie Clark, Tchamou and Sunderland in 1997-98. Diane Russell was to go to the Democratic Republic of the Congo to do the same in the summer of 1998 but the war there intervened.

The International Experts' Workshop on NWFPS, held at Limbe Botanical Gardens, was the keystone activity of IR5. This workshop brought together the major actors in the region to present their findings, discuss relations among different aspects of the NWFPs (biological, social, market), and prioritize work for the future. The proceedings from this

A Brief History of IR5

1994	CARPE is born
1995	Conception of IR5 within CARPE?
Sep 1996	Auke Report
	Laurie's chat show
Nov 1996	Tchamou and Sunderland paper supporting international workshop
	Market Research in IR1
1998	State of the Sector
1998	Market Survey training
	Organizing the Limbe Workshop (Clark and Sunderland)
May 1998	International Experts Workshop on NWFPs-Limbe Botanical Gardens
1998	Priorities and plans from workshop; (to small grants; See LLS, Annex A)
Jan 1999	IR5 "lumped" together with IR1 and IR3 into CARPE Theme 4
Feb-May 99	Conceptualization of CARPE Theme 4
April-May 99	Lessons Learned Synthesis
May 1999	Presentation of Lessons Learned and Theme Four at CARPE SOT meeting
	Publications of Limbe Proceedings

workshop are being published by FAO, and David Wilkie summarized the results of the workshop that lead to next steps in the program. See Annex B of Lessons Learned Synthesis (LLS) for details on the status of projects stemming from the workshops. That annex also looks at these projects in light of emerging priorities of Theme Four.

II. THEME FOUR PRELIMINARY FINDINGS

A. IR1 Findings

1) Forest conservation and deforestation are topics of interest to Congo Basin communities, not only external conservation agents.

2) The IR1 component has investigated local forest resource management systems (LFRMS) and their interface with forest conservation in the Basin.

3) IR1 originally conceived LFRMSs to include local institutional, natural resource, and external policy and marketing components. The conceptual model used to date has helped generate findings pertaining to institutional factors and incentives impacting on forest management.

4) IR1 has been able to identify local institutions that theoretically and empirically are responsible for different aspects of forest resource management in the three sites. This identification has been accomplished through a combination of methods including rapid institutional assessments and participatory mapping. The institutions involve traditional village level institutions, together with institutions linked to the former through local government.

5) IR1 is now testing the credibility and relevance of rapid forest resource inventories to establish baseline community forest monitoring systems. The data and analysis generated from this type of monitoring system will reflect on the credibility of local institutions to manage forest resources. These findings are at present incomplete.

6) IR1 is keenly interested in how policy and external market factors can create pressures and threats on community level institutions and forest resources. That said, IR1 findings have been limited primarily to institutions and incentives within the LFRMS internal core (see Diagram 1).

7) IR1 activities have succeeding in mobilizing communities to participate in mapping exercises, resource inventory exercises, and exploration of natural product development opportunity exercises. Participatory Mapping appears to be serving as an incentive for community level institutional engagement in activities that are necessary for decentralized forest resource management.

8) Communities in Mt. Cameroon, Djoum and Tikar seem to engage in participatory mapping because they believe that participatory mapping may lead to greater tenure security. Some of these communities understand that the new forestry legislation in Cameroon offers them the opportunity to participate in joint management activities. IR1 is finding that communities perceive that the product of participatory mapping – e.g. the maps – will enable them to negotiate with government and private sector entities to capitalize on the new legislation. They have not, in the areas where IR1 is

working, previously perceived this negotiation as feasible as indicated by inactivity in responding to opportunities availed through the new legislation.

9) IR1 is finding the maps, and the entire exercise accompanying it, are empowering as indicated by participation levels of communities, NGOs and Government officials. We have yet to find whether ***in fact*** maps will enable effective to negotiation to occur. Data to evaluate effectiveness will be collected over the next 6-12 months.

10) We also do not have a finding as to whether the maps, together with current community capacities, will be sufficient to enable successful negotiation of community stewarded forests to occur. Consultants Alain Karsenty and Daou Joiris feel that in order for capitalization on the existing community forest legislation to occur, considerable NGO capacity building and community based capacity building will be needed. In particular, skills in negotiation, mediation, and facilitation will be required of partner NGOs to facilitate communities capitalizing on opportunities that both the revised forest Legislation and participatory mapping offer identification of conditions necessary to capitalize on both the new legislation and the apparent early success of the e Participatory Mapping methodology will continue over the coming 6 months.

11) IR1 has also found that the Institut National de Cartographie (INC) and the Organization National des Eaux et Forêts (ONADEF) is also willingly participating in the mapping exercise. How much this is dependent on small financial incentives provided to government mappers, versus genuine institutional buy-in, will be monitored over the coming months.

12) While prioritizing the institutional components of LFRMSs, IR1 has found that it is fruitless to overemphasize any single component of the system. While IR1 has stronger findings, for example, on the level of community based institutions, IR1 has found that it is essential to link understanding of the forest resource base to the functioning of these community level institutions. So too, incentives and conditions that enable local institutions to function cannot be overlooked either.

    For example, IR1 has just completed a test of a forest inventory methodology[6] that has already been tested with partners in the Mount Cameroon Project zone. The objective is to establish a baseline of forest resources in Mokoko that can be continually updated by community members to monitor forest trends. This activity makes sense now that community resources have been mapped in a participatory and collaborative manner at Mokoko. This will further enable IR1/Theme 4 in Phase 2 of CARPE to identify potential forest and NWFPs that offer development potential for sustainable management through community level institutions.

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[6] See *A Participatory Survey and Inventory of timber and Non-Timber forest Products of the Mokoko River Forest Reserve, SW Province, Cameroon, A Report for IR1/CARPE* by Terry Sunderland and Peguy Tchoutou, May 1999 (to be posted to the CARPE SOT). Also see *A Protocol for Participatory Inventories of Timber and Non-timber Forest Products in Cameroon (for IR1/CARPE)*, by Dr. Charles M. Peters (posted to the CARPE SOT).

13) IR1 has found that Congo Basin Social Scientists believe that a systems approach to understanding the role of communities in forest conservation is desirable, but that it **must incorporate** the dynamic and strategic nature of individual and/or small interest group decision making at the "micro-strategy" level.

14) IR1 has found that some social scientists believe that **ethnic differentiation** is not the key variable in the Congo Basin for social institutions but rather, professional categories are more pertinent. Professional categories (versus ethnicity) are seen as a more critical determining element in the character of LFRMSs.

15) IR1 has found that few Congo Basin forest conservation activities occur outside protected areas per se, save for several. While we do not currently have either a dollar figure amount for these activities, nor a surface area figure, it is possible to anecdotally estimate these amounts. This figure would provide an interesting contrast to the funding for protected areas programming, inclusive of the immediate peripheral zones.

16) While there have been changes to existing forest legislation in Cameroon offering opportunities for co-management between communities and other institutional entities, IR1 has found that few programs are involved in targeting activities to achieve this goal. Activities involved in promoting co-management and negotiated multistakeholder forest resource use agreements are found to be lacking. Correlation of this finding with the Environmental Governance Theme of CARPE is needed.

17) Corollary to finding 16, IR1 has found multistakeholder, multidisciplinary approaches to forest conservation are lacking. Where PA approaches to forest conservation **are** clearly multidisciplinary, they cannot always be said to be multistakeholder in terms of the development of the concept together with its implementation.

18) Social Scientists working in the CB find that modern logic and customary logic occur simultaneously with respect to Local Forest Resource Management Systems (LFRMSs). [For example, within one household, some land could be allocated to plantation crops using "modern" methods, while other land could be allocated to subsistence food production. People can simultaneously believe that soil fertility declines are a technical problem (lack of biomass) and a social problem (sorcery, lack of community good will) Russell and Tchamou 1999.] A conclusion as to whether this mixture of management regimes and beliefs is constraining or conducive to forest conservation requires more reflection.

19) LFRMSs are found to be comprised of socially prescribed rules that create authorizations or use rights over forest resources. Within two of the action-research areas where IR1 is operative—Djoum and Tikar—the social institutional basis of LFRMSs is **in some places**, still very strong. In other places within the same general areas, it is found to be weak. The context within which LFRMSs and individuals

operate is found to be characterized by a proliferation of institutions with "modern", "traditional" and "neo-traditional" elements.[7]

20) Emphasis over the coming six months will be placed by IR1 on determining conditions under which modern, traditional and hybrid institutional arrangements can promote the CAPRE objective.

21) It has been found by Social Scientists that pressures on non-wood forest resources (particularly bushmeat) increase in parallel with income generating opportunities from cacao and coffee at the community level. This finding brings into question by some Social Scientists the credibility of the integrated conservation and development hypothesis for widespread application in the Congo Basin[8].

22) Social Scientists have found that stakeholder groups within LFRMSs are best identified by their **crosscutting aspects.** For example, a crosscut of kinship based groups, civil society organizations, local government and private sector groups may have more coherence as stakeholder groups around specific issues than each respective group vis à vis the issue per se. In other words, the issue is what mobilizes people, rather than the particular stakeholder group per se. This finding is very relevant to LFRMSs and CARPE Phase 2 design.

23) In addition, Social Scientists have found that all LFRMSs in Basin are characterized by existence of regional economic symbiotic alliances, which makes economic characteristics more relevant than either ethnic or linguistic distinguishing factors.[9]

24) It has been Karsenty and Joiris (op cit.) find that land tenure in the Congo Basin is generally characterized by inalienable collective property rights of villages, which extend **use rights** to individuals, versus property rights per se. That said, there is significant registration of land around the major towns and cities, and minor trends in that direction in other areas. Villages in Mbalmayo in Cameroon showed 3% of lands being registered (Diane Russell, personal communication). In addition, cocoa plantations are not collective property, but are often the property of specific individuals and their close relations. These plantations are inherited directly. A finding from Russell's and Tchamou's work with IITA in Mbalmayo showed that land pressure forces families and chiefs to demand more compensation for access to land, even from close relatives, than was the case even a few years ago. There is thus

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[7] See Zepherin Mogba's *Etude des Systemes Locaux de Gestion des Ressources Forestieres à Djoum,* for an in depth presentation of local institutions in Djoum. This has been posted to the CARPE SOT.

[8] Further research into this point is required. For example, it could be that it depends upon **who** is exploiting these resources—external or internal elites, younger men or women. There is a difference between the artisanal trapping that cocoa farmers do, and the more determined activities of young men with guns who go into the forest for several days to get larger game.

[9] More work on this topic will be required in Phase 2. For example, There are very deep patterns of resource management including labor recruitment or agroecological variables that condition crop choice that could be as significant as market variables.

an increasing "closing of the commons". This does not take place in a logical, transparent, or systematic way (Diane Russell, Personal Communication).

25) Karsenty and Joiris find that Congo Basin villages tend to be demarcated by topographical attributes (Mboko of Odzala, riparian CAR populations, *the fincas rusticas forestales and reservas de poblado* in Guinée Equitoriale being exceptions), so that Participatory Mapping which is largely based on topographical referencing is likely appropriate "technologically. " Participation in Participatory Mapping exercises to date further support this finding.

26) Information on demographic variables at the household and village level, morbidity and mortality rates, household consumption patterns is very imprecise in the Basin. The degree of dependence of people living in communities on the forest is poorly understood. Conversely, it is found that both economic systems and land tenure systems are well understood generally.

27) Regarding **exogenous factors** relevant to LFRMSs, the degree of persistence of pre-existing regional symbiotic relations such as that well described for Pygmy and Bantu populations (see Turnbull 1968, Bahuchet, ____) has been found by Karsenty and Joiris to be poorly understood. The economic and ecological impact of outsiders on LFRMSs is poorly understood. The relationship between small urban centers and their impact on villages within LFRMSs is poorly understood. The impact of international economic structures on villages embedded in LFRMSs is also poorly understood

28) IR1 is currently undertaking inventories in the Mokoko area of Mt Cameroon, Djoum and Tikar. As of 4/99 IR1 is not in the position to objectively comment on the forest resources base as a system component of LFRMS (See Peters *op cit. and Sunderland and Tchoutou).* IR1 is hypothesizing that these inventories will serve as a potential first step, together with the participatory maps completed as well as the institutional desk study nearing completion, for establishment of management plans at Mokoko, Djoum and eventually Tikar.

- A partial list of the natural products to date that IR1 and IR5 has explored in Cameroon, and internationally, to determine theoretical development potential in IR1 sites include the following list based on results of the CARPE May 1998 Limbe workshop:

Baillonella toxisperma: Moabi
Cola acuminata: Kola
Dacroydes edulis: prunier
Dioscorea spp.: yams
Fungi: Mainly *Chanterelle* and *Amanita spp.*
Garcinia cola: Bitter kola
Gnetum africanum: eru
Honey
Irvingia gabonensis: wild mango

Marantaceae: wrapping leaves
Pausinystalia johimbe: yohimbe
Physostigma venenosum: Calabar bean
Picralina nitada: Obero or Eban
Piper guineense: Wild pepper
Prunus africana: Prunus
Rattans: Mainly Eremospatha hookeri and Laccosperma secundiflorum
Ricinodendron heudelotti: Njangsang
Strophantha gratus:
Tabernaemontana crassa: Iboga
Voacanga africana
Aframomium spp.: Melengueta
Ancistrocladus korepsinensis
Cola nitida: Cola
Monodora myristica: African Nutmeg
Tetrapleura tetraptera: Aidan
Xylopia aethopicae

1. External agents

a) Policies

It is found that conservation programs in the Congo Basin do not address issues affecting forest resource management outside of PAs on a comprehensive basis, save as part of buffer zone strategies. [citation to follow].

As noted above, changes in legislation for community managed forests have yet to have major beneficial impact on communities, forest conservation or LFRMSs for a variety of reasons.

There are a gamut of factors relevant to systems analysis external to the institutional core of LFRMSs that enable or disable effective community level action to occur at the local level. These factors include population densities, infrastructure/road networks, access to markets, the nature of the state and local government. The extent to which these factors shape LFRMSs has not been satisfactorily determined in this Phase of CARPE. These influences could be more accurately identified in Phase 2 of CARPE.

b) Market forces

It is found by IR1 that communities do not yet develop balanced portfolios that incorporate cash and subsistence revenues from forest use, at the community level, or at the household level. This is true for both wood and non-wood forest products that could be feasibly marketed. Lack of coherent marketing opportunities is found to be constraining.

Different households can have and or use a very different resource base even within the same village or clan. The household "portfolio" depends on many different factors, including access to resources, labor, market prices, social institutions that promote or constrain use of particular resources or technologies.

Sustainable use in response to market based incentives is found to not yet be a driving criterion as a value-adder at either the household level, or community level decision making structures within LFRMSs.

At the IR1 sites, sustainable management has not been instituted in response to increased market demand for a given product. This lack may be due to lag time in perceiving scarcity, powerlessness of harvesters/resource owners vis à vis traders, or a general lack of management institutions and capacity at the household or wider level. These issues will be explored more fully in Phase 2 of CARPE.

In other parts of the world, it has been found that resource users typically move toward sustainable management only when there is no substitute for the resource in part because the transaction and social costs of management are high. Value-addition does not in itself address the issue of high transaction costs—it might even add to these costs. Participatory mapping and resource management plans may temporarily increase transaction costs and conflicts, but over the long term will help to decrease these costs. This fact points to the necessity of using the Theme 4 conceptual model, and of working toward BOTH technical and institutional solutions to resource management dilemmas.

c) Other institutions

In this phase of CARPE, IR5 has not been able to determine the extent to which a broad gamut of system components external to the community level core of LFRMSs—for example, population densities, infrastructure/road networks, access to markets, etc. – enable or disable effective community level action to occur. The interest to study this topic is high. In a second phase of CARPE, Theme 4 will integrate existing knowledge of these factors into its framework and develop a collaborative research agenda to fill the gaps.

d) Conservation Programs

In undertaking a comparative analysis of community based conservation approaches for IR1, Karsenty and Joiris (1999) found that most community-oriented projects are designed on a modified ICDP model based on the assumption of external population invading the territories of conservation-minded local peoples. They found that conservation programs also founded on assumption of centralized state management inefficiencies. Programs neglect looking at contradictions/overlapping use rights issues across stakeholders – traditional resource use claims in areas gazetted for restricted use or no-use; classified forests overlapping in areas of permanent agriculture.

IR1 has found that LFRMSs offer an alternative framework for addressing social, institutional, cultural and economic aspects of resources management in the Congo Basin. Based on available findings, we can tentatively say that LFRMSs offer a framework through which promotion of Congo Basin forest resource conservation can be achieved.

IR1 has found that its hypothesis that participatory mapping and use of natural products as incentives to promote community conservation in LFRMS institutions is ***potentially accurate*** based on community interest and participation in both these IR1 components. No other other incentives beyond the mapping exercise itself were provided to communities to participate in mapping, so that these results are important.[10] Whether these prove feasible in generating conservation through LFRMS institutions will require more field data unavailable to IR1 at this time (4/99).

IR1 has found that communities do not yet think in terms of developing balanced portfolios at the community level, or at the household level, between wood and non-wood forest products that could be feasibly marketed. Without external support, the current marketing of NTFPs and/or FPs as practiced is not found to lead to either strengthened LFRMSs or improved conservation, as the linkage between the two is non-existent in the communities IR1 is working in.

IR1 has found that the concept of sustainable use in response to market based incentives is not yet a driving criterion as a value-adder at either the household level, or community level decision making structures within the LFRMSs IR1 has been working with. At the same time, preliminary data indicates that the potential for market/trade based incentives to become linked to sustainable forest resource use is appealing to many in the IR1 zones. [This is repetitive. See above.]

2. Validity of original assumptions

IR1 linkages to other CARPE components involving environmental governance, advocacy, logging sector policy have been found to be weak. The current CARPE Thematic teaming is not structured in a way to favor these kind of collaborative partnerships within CARPE. IR1 finds the institutional setup of CARPE to be constraining, as certain kinds of conceptual planning at early stages, and information exchange at later stages could be helpful in rounding out IR1. This problem may be assumed to hold for other CARPE components as well. Therefore, relying on the *ad hoc* good will and special efforts of individuals with full schedules and other priorities cannot be assumed to lead to systematic working relationships that will favor forest conservation.

IR1 and all Theme 4 members believe that in order for teamwork to work, collaboration has to be ***built in*** to peoples' schedules. It can't be an add-on that is expected to happen if people are not "too" busy with their "regular" work—as they always are. If this collaboration is not in-built, then teamwork should not be expected of people and there should not be a premise within the institution that it will happen.

[10] A report on the IR1 mapping exercise in Djoum will be forthcoming.

B. IR3 Findings

1. Small-scale agricultural activities are the dominant method of forest-based natural resource use in Gabon and Cameroon where Peace Corps Volunteers work under the FARM/CARPE project framework.

2. Logging is currently the major forest-destroying activity in Gabon while slash-and-burn agriculture is responsible for the vast majority of deforestation in Cameroon.

3. Slash and burn agriculture, collection and cultivation of forest products, cultivation of forest as cash crops, and hunting-gathering are the primary livelihood (largely subsistence) activities in forest-based communities of Cameroon and Gabon.

4. Most small-scale farmers in the Congo Basin zones of Cameroon and Gabon are in cash poor economic situations with few options and incentives to manage their forest-based ecosystem in ways that Western-based observers consider sustainable.

5. Agroforestry activities may not be appropriate in the southern forested zone of Cameroon. Farmers tend to question the logic of planting trees in an area that is relatively heavily forested and which enjoys a low population density. The method is more applicable to savanna zones within which CARPE operates, or in the Sahelian zone of Cameroon where agroforestry project activities expect to expand.

6. The selection of data sources for farming systems surveys conducted by Peace Corps Volunteers is not random but rather a function of where Volunteers are posted.

7. The ability to extrapolate survey findings across the Congo Basin and/or converge survey results with findings from other studies and surveys implemented across the Congo River Basin will largely be inferential. Over the long-term, these replicable survey and monitoring methodologies have good potential to add additional data reference points across the Basin.

8. During the past year, Peace Corps/Gabon Volunteers have learned that there is good potential and considerable interest by women farmers to produce horticultural products (fruits and vegetables), particularly in the area of home gardening for household income generation.

9. In Cameroon, where Volunteers largely work in forest-transitional zones, agroforestry has become a popular activity among local farmers. More than 2,500 farmers in these zones have requested information from Volunteers regarding agroforestry techniques. Nearly 400 agroforestry field demonstration sites are now functioning. At 41 of these sites, farmers are producing their own tree seeds, and 15 farmers have commercialized this seed. More than 37,000 agroforestry tree species have been planted as a result of Volunteer activities in Cameroon, produced at 125 tree nurseries. The IR3 team expects the popularity of agroforestry to grow among the

farmers of Cameroon and expects to find that it will have a significant long-term effect on the use of slash-and-burn techniques.

10. In Gabon, the future of agroforestry is more dubious in the short-term due to very low population pressures on the forest system and the widespread availability of forested land for clearing. It is more likely that the low availability of labor will become the limiting factor in forest clearing, largely due to migration of young men to urban areas, potentially making income-generation activities increasingly attractive to women farmers who may wish to purchase rather than grow their food. Nevertheless, reduced labor requirements in the long-term from implementation of agroforestry is a perceived benefit from adoption of this technique among farmers in Gabon. These farmers cite additional tree clearing to be a major labor-related impediment to agricultural development in Gabon, a constraint that more intensive (rather that shifting) farming techniques would mitigate.

11. The role of Volunteers as field representatives/agents of CARPE's IR3 institutional partner, in addition to gathering data via the surveys noted above, is to disseminate the information drawn from the survey data to communities, government and non-government participants and stakeholders, and policy-makers. The strengths of the IR3 partner, Peace Corps, are its field presence across two CARPE countries; its ability to diffuse information across large areas of the Congo River Basin; its ability to collaborate on applied research programs in large areas of the Congo River Basin; and its ability to train national professional collaborators and counterparts in survey methods and extension techniques. Correct identification of local counterparts is important to building capacity, whether these are government, non-government, private, or commercial sector participants.

12. Community-based sources of information and knowledge about farming systems and biodiversity are the foundation for introducing new information via Volunteer extension activities that illustrate to farmers other options available to them related to sustainable forms of land use. Extension education related to demonstrations or informational workshops need at least 3-4 years (two Volunteer cycles) before farmers begin to accept the results seriously enough to adopt these practices.

13. More definitive information regarding local organizations in Cameroon and Gabon could be helpful to Volunteers, as would specific studies of forest products that show potential for exploitation in a sustainable manner. Support for training Cameroon and Gabon national counterparts in monitoring methodologies, whether professional, non-government, or community-based is therefore needed.

C. IR5 Findings

See IR5 Lessons Learned Synthesis.

III. IMPLICATIONS OF THEME FOUR FINDINGS FOR CARPE PHASE 2

A. Validity of Original Assumptions

1. Markets as Incentives

It is found by IR1 that communities do not yet develop balanced portfolios at the community level, or at the household level, between wood and non-wood forest products that could be feasibly marketed. Lack of coherent marketing opportunities is found to be constraining. [What is meant here by "balanced portfolios"? Cash and subsistence? Domesticated, managed and wild? Communities (villages, clans...?) have different resource bases for historical and agroecological reasons. Different households can have and or use a very different resource base even within the same village or clan. Their "portfolio" depends on many different factors, including access to resources, labor, market prices, social institutions that promote or constrain use of particular resources or technologies.]

Sustainable use in response to market based incentives is found to not yet be a driving criterion as a value-adder at either the household level, or community level decision making structures within LFRMSs. [Suggest: At the IR1 sites, sustainable management has not been instituted in response to increased market demand for a given product. This lack may be due to lag time in perceiving scarcity, powerlessness of harvesters/resource owners vis a vis traders, or a general lack of management institutions and capacity at the household or wider level. In other parts of the world, it has been found that resource users typically move toward sustainable management only when there is no substitute for the resource in part because the transaction and social costs of management are high. Value-addition does not in itself address the issue of high transaction costs—it might even add to these costs. Participatory mapping and resource management plans may temporarily increase transaction costs and conflicts but over the long term help to decrease these costs. This fact points to the necessity of using the Theme Four conceptual model, and of working toward BOTH technical and institutional solutions to resource management dilemmas.]

2. The Importance of NTFPs to CARPE's Goals

There has been significant criticism of focus on the NTFP sector as both a conservation and a development strategy. We present some of the major points below, and show how, in Phase 2 of CARPE, Theme Four will address these issues.

- Attention to "minor forest products" shifts the focus away from the major issues such as logging and large-scale extraction.

Theme Four Strategy: Look at sustainable community-based logging, and continue to assess benefits of different activities to local stakeholders. Link with CARPE Theme...that is focusing on logging. Papers from Limbe workshop show that the relationship of logging and NTFPs is complex. Increased attention to the value of

NTFPs may lead to restrictions on logging species that are of great value to local people. Some logging companies are interested in trade in NTFPs. Many NTFPs grow in secondary forest and logging may even enhance them.

- When NTFPs become commercialized, local people lose control of them and they can be rapidly depleted.

Theme Four Strategy: Development of NTFPs is incorporated into wider strategies for community-based management, such as resource inventories, mapping and development of management plans.

- The long-term ecological impact of harvesting can be hard to assess without substantial investments in monitoring.

Theme Four Strategy: Community-based monitoring of NTFPs developed in other parts of the world will be tested at the Theme Four sites. Ideally, Theme Four sites will be the focus of attention of larger institutions with a stake in monitoring (Peace Corps, Universities, conservation organizations). More research needs to be done on the ecology of NTFPs and their roles in specific habitats.

B. Methodological Findings

1. Multidisciplinarity

In the LLS Email Survey, many people pointed to the need for multidisciplinarity when looking at NWFP sector (not only in technical disciplines, but also socially, economically and environmentally). Most projects, however, concentrate on one aspect of NTFPs and look superficially at other aspects that bear on their major concern. For example, in the domestication projects, attention is focused mainly on the technical challenges of domestication. Extension efforts are being made but there has been no real economic analysis of potential for wide adoption of domesticates. If technologies turn out to require inputs or are labor-intensive, care must be taken to show that they are adoptable under ***existing*** economic and social circumstances. (The lessons from alley cropping and "multipurpose" trees come to mind here.)

Cunningham believes that "Conservation programs need cross-disciplinary inputs—particularly in the social/anthropology side, but this must not obscure the conservation objectives or else they become very complex social/rural development programs where the objectives of maintaining habitat and species diversity are lost/obscured."

Most of the work in NWFPs has proceeded from priorities of biological scientists and to some extent economists (market surveys). One highly respected anthropologist (Serge Bahuchet) who has worked for decades in the region has different priorities for NWFP research:

- Ethnoscientific research on traditional knowledge; inventories of resources used by indigenous populations (contractual basis)—Theme Four will take this up.
- Systematic studies of traditional techniques for arboriculture, agroforestry and enriching fallow land—Peace Corps?
- Ecological research on the dynamics of forest regeneration after cultivation and on the dynamics of populations of wild plants and animal species used by human populations—This is a key lacuna in IR5
- Research on the economy of local networks of trade and exchange—Market studies are bringing some of these to light but we need to look at barter systems as well
- -within the community
- -outward towards urban areas
- "South-South" exchanges (e.g., Malaysia→ Central Africa already planned by IR5)

Units of analysis, scale, precision, audience for research results and approach to field research vary according to discipline. These issues must be addressed for any multidisciplinary approach to be successful.

Theme Four will identify key multidisciplinary research questions that require data from different sources. For example:

- Returns to labor for harvesting, processing and selling specific NTFPs compared to other activities.
- "Collateral benefits" of NTFP harvesting such as tenure over specific forest plots, access to bushmeat, etc.
- NTFPs in farming and agroforestry systems. Farming systems and ecology of NTFPs: how do changes in farming/agroforestry technology affect the ecology of NTFPs (e.g., mushrooms, caterpillars)
- Links between NTFP benefit streams (who gets use-value and cash-value from NTFPs) and management of (who owns and/or controls) NTFPs

2. Participatory Methods

Cunningham also notes that "The issues are complex and cannot be answered through 'quick and dirty' methods. This includes PRA methods-very much in vogue—which ARE useful as tools in preliminary studies, but have to be linked to longer-term and for key species (or key communities) quantitative studies (1-3 years).

Participatory workshops have been shown to be effective for dissemination of research results that motivate local people to take action (Shanley). In addition, User Group Analysis has also been employed in the study of NWFP use. This methodology builds on studies of common property institutions and advances in community forestry.

Dissemination of on-station research has to take into account weak national forestry and agricultural research systems in the CARPE countries and devise innovative ways to work with the private sector, NGOs and community groups (e.g., LBG Conservation through Cultivation program).

The ways of supporting and training local managers, researchers, etc. through continued international funding and the right (pragmatic) training are essential.

3. Monitoring of NTFPs

Chuck Peters asks "Why has so little attention been focused on monitoring the sustainability of NWFPs?" In part because monitoring is hard work and the institutional capacity for monitoring is very limited in the CARPE region. There are significant choices to be made when designing monitoring for scientific accuracy or monitoring for community management (Mahanty 1998).

Periodic monitoring activities are essential for defining and maintaining the sustainability of NWFP exploitation. Several NWFP monitoring methods have been devised and some are being used by IR5 partners. Some methods incorporate management into monitoring by focusing on user group schedules and harvesting techniques as well as volume of harvest, recruitment, etc. Market surveys are a form of monitoring as they give an indication of the level of commercialization of the species and hence the total offtake. But they can be quite inaccurate when substantial product is bartered, sold through "illegal" networks or used for subsistence purposes.

Cunningham notes the importance of permanent plots for long-term monitoring once key species have been selected—but there must be institutional capacity to set up and maintain these plots.

Can CARPE make use of new community-based monitoring methods (e.g., Parks 1997)? How to integrate monitoring into management plans and institutional programs?

C. Ability to Extrapolate from Findings across Congo Basin

The IR1 site selection provides the first effort to test specific actions in different settings. While Peace Corps is limited in site selection by host country priorities, efforts can be made to understand how Peace Corps sites fit into wider classifications in the region. In Cameroon, there are a large number of PCVs placed at many sites, so some could become benchmark sites within CARPE.

Theme Four will build capacity to generalize from specific sites by:

- Mapping key demographic, cultural, socioeconomic and agroecosystem variations
- Mapping other Theme Four and CARPE activities
- Classifying areas in the CARPE region according to specific research criteria (e.g., Olson and Underwood's biodiversity map.)
- Adding sites in other countries based upon this classification in partnership with local organizations

D. Theme Four Links

1. With other CARPE Components

Protected Areas—any research on NWFPs, community resource management and enterprise development will be relevant to protected areas. Note for example the paper by Cunningham on lessons from Bwindi Impenetrable Forest for the Limbe Workshop. Also, there is a proposal by John and Therese Hart (WCS) for work in DRC Parks with communities that will fit nicely with what Theme Four is proposing.

Logging—research on NWFPs in logging as additional products, to help promote more sustainable logging, conflicts between local use and logging.

Mapping—"ground-truth" satellite maps with community mapping (see E. Moran, etc.) Looking at different scales (ecological vs. human ecology scales vs. political boundaries).

2. With other Congo Basin Programs

IR5 has a track record of working closely with Congo Basin partners. The Limbe Workshop exemplifies these partnerships. Key partners:

Limbe Botanical Gardens
CIFOR
Tropenbos
IITA
APFT
WB-CAMBIO?
NGOs-CERUT, AidEnvironment
DRC—ICCN, GTZ,

E. Theme Four in CARPE 2

1. Phase 2 Recommendations based on Theme Four Findings

The issue of scale
Building a multi-layered map of processes
Multidisciplinary focus on key questions/hypothesis testing
Building CARPE into local institutions—communications products that will reach resource managers
Need to understand implications of instability in the region—scenarios

2. Relevance of Theme Four to CARPE Phase 2

See presentation for CARPE SOT.

F. Proposed Theme Four Activities in CARPE2

1. Integrate or Complement?

"Integration" of IRs is too strong a term to use for the efforts of IRs 1, 3, and 5 within Theme Four of CARPE during Phase 1. While planned for in the next phase of CARPE, given existing agreements and the independent manner with which work programs were implemented, IRs 1,3, and 5 could be deemed "complementary" rather than "integrated" at this point in time.

Complementarity involves: (1) keeping partner IRs aware of the respective activities of each other (2) with the formation of Theme Four, striving for areas where the IRs can work together more closely in the last months of CARPE1.

2. Specific Activities

Community Inventories and Management Plans
Community Mapping
Ongoing IR5 Research into NWFPs
Market surveys→ Subsector analyses
NWFPs in farming systems (livelihood and ecological aspects)
Economics of NWFP domestication and enterprise development
Communication products to help resource managers
Monitoring and long-term research on NWFPs and forest management

3. Proposed Budgets

IR5: Refer to LLS page 23.

ANNEX: SOURCES OF INFORMATION

A. IR1

Sources regarding findings can be broken down into the three categories of IR1 activities – (1) LFRMS related (2) market/trade based incentive related (3) participatory mapping related.

Both written and verbal information is presented. The following are the ***primary*** sources that have been used to date to support IR1 activities per category. Each written source noted in turn provides significant bibliographic resource material to support the positions developed. Between May and November IR1/Theme Four will be systematically updating other relevant supporting documentation which could be both supportive, and critical of LFRMSs as a conceptual framework

1. LFRMS

Written Reports
Zepherin Mogba
Luc Mendouga
Jean Martial Bonis Charancle
Michael Brown
Alain Karsenty/Daou Joiris
Chimère Diaw
Jean Claude Nguingiri
Mt Cameroon project desk study for IR1
IR1 electronic conference contributors – to be listed
Michael Vabi and Nicodeme Tchamou

Oral
IR1 working group participants – IITA meetings
Meeting and discussion notes from Alain Karsenty's presentation at IRM

2. Market/trade based incentives

USDA/IR5 Limbe workshop results
Jonathan Greenham reports
Charlie Stathacos reports

3. Participatory Mapping/resource inventorying

Mokoko community maps, Mt Cameroon (in collaboration with INC, ONADEF, MCP, CARPE/IR1)
Terry Sunderland/Peguy Tchoutou report for Mokoko-Mt Cameroon
Djoum participatory maps (in collaboration with INC, ONADEF, CED, CARPE/IR1)

THEME 4: COMMUNITIES AND FOREST RESOURCE MANAGEMENT
A VISION FOR CARPE 2000-2003

"Never doubt the power of a small group of committed individuals to change the world. Indeed nothing else ever has." —Margaret Mead

The Vision

CARPE models for effective governance arrangements for sustainable forest resource management are tested, adapted and replicated across the Congo Basin countries. The benefits from forest exploitation flow to transparent and representative forest management bodies, which in turn purchase the services of professional foresters, bookkeepers, managers, and ecologists.

Forest managers develop habitat and species management plans that carefully balance shorter-term economic gain with long-term maintenance of the resource. They use creative links to outside stakeholders to maintain the long-term value of the resource. These links could include long-term scientific research or monitoring contracts, "leasing" of trees and gathering or hunting areas (with strict rules), value-added provisions to contracts, or trust funds. Forest management bodies make decisions to set aside forest for conservation and, with the help of foresters and conservation biologists, link these conservation areas together for greatest conservation impact.

Representatives of forest management councils form part of the national-level body that decides how national-level funds are used. A fair proportion of the national-level funds is re-invested back into the welfare of the forest dwellers. Forest management councils are allied in wide-ranging networks that share "best practices," market information, and ecological knowledge.

The empowerment of forest dwellers and links between forest dwellers and urban activists leads to pressure for an end to militarization in the region. Gun control is strictly enforced and it becomes a high crime to shoot or destroy certain valued species. Ancient ties of kinship, blood brotherhood and trade flourish once more. Forest skills are reanimated. The integrity of the Congo Basin forest and its cultures attracts visitors from all over the world. They travel in safety and return to their own countries with a vision for how people can live in harmony with nature and themselves. Is this a fairy tale? Why not reach for our highest vision?

How to Get There

The Theme 4 vision for CARPE is premised on the belief that conservation activities cannot be sustained in the Congo Basin without the mobilization of Congo Basin peoples. This mobilization needs to occur on many levels. Theme 4 is particularly focused on the community level, and forging links between forest communities and urban populations. Collaboration and partnership between Congo Basin communities and external partners, achieved through negotiation over rights and responsibilities in forest management supported by state agencies and donor partners, will increasingly be a prerequisite for successful forest and biodiversity conservation, as it is in other parts of the world.

Community-level strategies need to be complemented by better understanding of the larger-scale economic and ecological forces shaping forest resource use, and pressure for governmental transparency and accountability. Sound forest resource management requires a dynamic interplay of "bottom-up" and "top-down" strategies.[1] With its mix of partners and approaches, CARPE is

[1] When asked about the disastrous USG/IMF "policy failure" in Russia, one USAID professional noted that all efforts were directed toward governmental and financial reform and "technical solutions," while little was done at the community level. The weakness of local-level institutions undermined reform efforts.

in a good position to craft such an integrated strategy. Our attempt at an integrated vision is a good first step. This vision must be followed by design of integrated research and action.

Theme 4 will be the action-research component of CARPE 2, identifying and testing tools and mechanisms for forest management partnerships. By working at specific sites, Theme 4 will be able to move from theory to reality, from concept to action. Through partnerships and alliances—both within and outside of CARPE—Theme 4 will show how change in individuals and small groups leads to wider institutional change.

It is only through teamwork—working with Africans and within their institutions—as much as generation of substantive knowledge, that forest conservation will be achieved in the Congo Basin. More emphasis needs to placed on African voices and realities.

CARPE Investment Priorities

During 2000-2003, CARPE should

- Provide information to Congo Basin communities, governments, and other interest groups on forest trends, opportunities and constraints.
- Develop a process for participatory assessments of conservation and development options.
- Develop models of facilitation and negotiation of management decisions vis à vis forest resources. In particular, test strategies for positively involving local and national elites.
- Test a number of action-research activities that may be incentives to conservation at the local level such as market surveys/valuation of forest resources, resource inventories, community mapping, forest product development and value-added options.
- Provide a forum for direct and indirect stakeholders to Congo Basin forest conservation to convene more frequently to discuss the future of the forest. The CARPE newsletter and other CARPE communications pieces could take on this role. Bring in lessons from other parts of the world and adapt these to particular country circumstances.
- Help clarify the respective roles and responsibilities for other forest stakeholders such as logging companies and state agencies, ideally through a negotiation process.

To achieve the above, the CARPE internal team, together with a secondary tier of external partners and a tertiary network of partners, needs to operate in as ***integrated*** a manner as possible:

- Design of activities is coordinated to optimize the strategic impact of CARPE activities among ***all*** CARPE components.
- Research funded by CARPE is interdisciplinary and shows links between different levels and units of analysis.
- Field-level research is coordinated among the partners and used as a forum for dissemination and discussion of CARPE information with local partners.
- Rigorous monitoring and evaluation standards are established such that CARPE programming is increasingly based on results versus beliefs, assumptions, or polemic.

To achieve the above, a high degree of transparency and consensus over objectives is required. This presupposes that criteria and mechanisms for reaching decisions, which the core CARPE team can accept, are enacted.

If this integration occurs, CARPE can continue evolving into one of the most innovative and important projects in USAID, if not entire donor community, portfolio. If it does not occur, CARPE will just be another run of the mill project in which the sum of the parts is less than the whole.