DOMESTIC MARKET POTENTIAL FOR TREE PRODUCTS FROM FARMS AND RURAL COMMUNITIES: EXPERIENCE FROM CAMEROON

NRI Socio-economic Series 13

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Foreword

This series is based upon work carried out under the socio-economics and related research programmes at NRI. Its purpose is to provide an easily accessible medium for current research findings. Whilst it is hoped that the series will be of interest to those concerned with development issues worldwide, it may be of particular relevance to people working in the developing countries.

The topics covered by the series are quite diverse, but principally relate to applied and adaptive research activity and findings. Some papers are largely descriptive, others concentrate on analytical issues, or relate to research methodologies.

The aim is to present material in as straightforward a fashion as possible so that it can reach a wide audience. We are interested in the views and opinions of readers and welcome any feedback to this series.

Alan Marter
Social Sciences Research Manager

Acknowledgements

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Abbreviations

IFPRI	International Food Policy Research Institute
MCP	Mount Cameroon Project
NRI	Natural Resources Institute
NTTP	Non-Timber Tree Product
ODA	Overseas Development Administration
RMA	Rapid Market Appraisal
RRA	Rapid Rural Appraisal
SWP	South West Province

£1 = CFA 700

Summary

This publication summarizes the results of research carried out by NRI in Cameroon during 1995–96 on the domestic market potential for tree products from farms and rural communities. The study arose from concern that agroforestry projects, which generally aim to reduce the pressure on natural forests by planting trees on farmland, were inadequately addressing the associated marketing needs. As a consequence, many of the projects were failing. The research reported here sought to characterize the markets for non-timber tree products (NTTPs) and highlight constraints to the development of markets for traditional and emerging NTTPs. The research in Cameroon was paralleled by a study in the Brazilian Amazon carried out by IFPRI; ODA provided funding for both studies.

The work began with an inventory of products and subsequent identification of marketing chains. Four products were selected as case studies and were used to explore issues relating to valued added, domestication and the role of NTTPs as sources of income. The marketing of the four products was well-established and appeared to be relatively competitive, in spite of some concerns over lack of information at farmer level. There was growing demand for the products, apparently matched by increasing supply. The wholesalers, who source the products in the forest fringe communities and sell them on to retailers, were the most dynamic links in the marketing chains.

The impetus to domesticate NTTPs seemed always to be farmer-driven, and occurred when a product important for subsistence and income needs was not readily available from the forest. However, the role of NTTPs within the farming system is important; they must fit into a complex strategy which includes seasonal smoothing of income, production and labour needs. Also, tree-planting is a long-term investment which is unlikely to be undertaken if land tenure is insecure.

In conclusion, areas are highlighted for future research. These include: technical aspects of cultivation, processing and storage; identification of products which will be in greater demand as a result of urbanization; the role of NTTPs in the livelihood strategies of particularly vulnerable groups (including the landless) in the forest fringe communities.

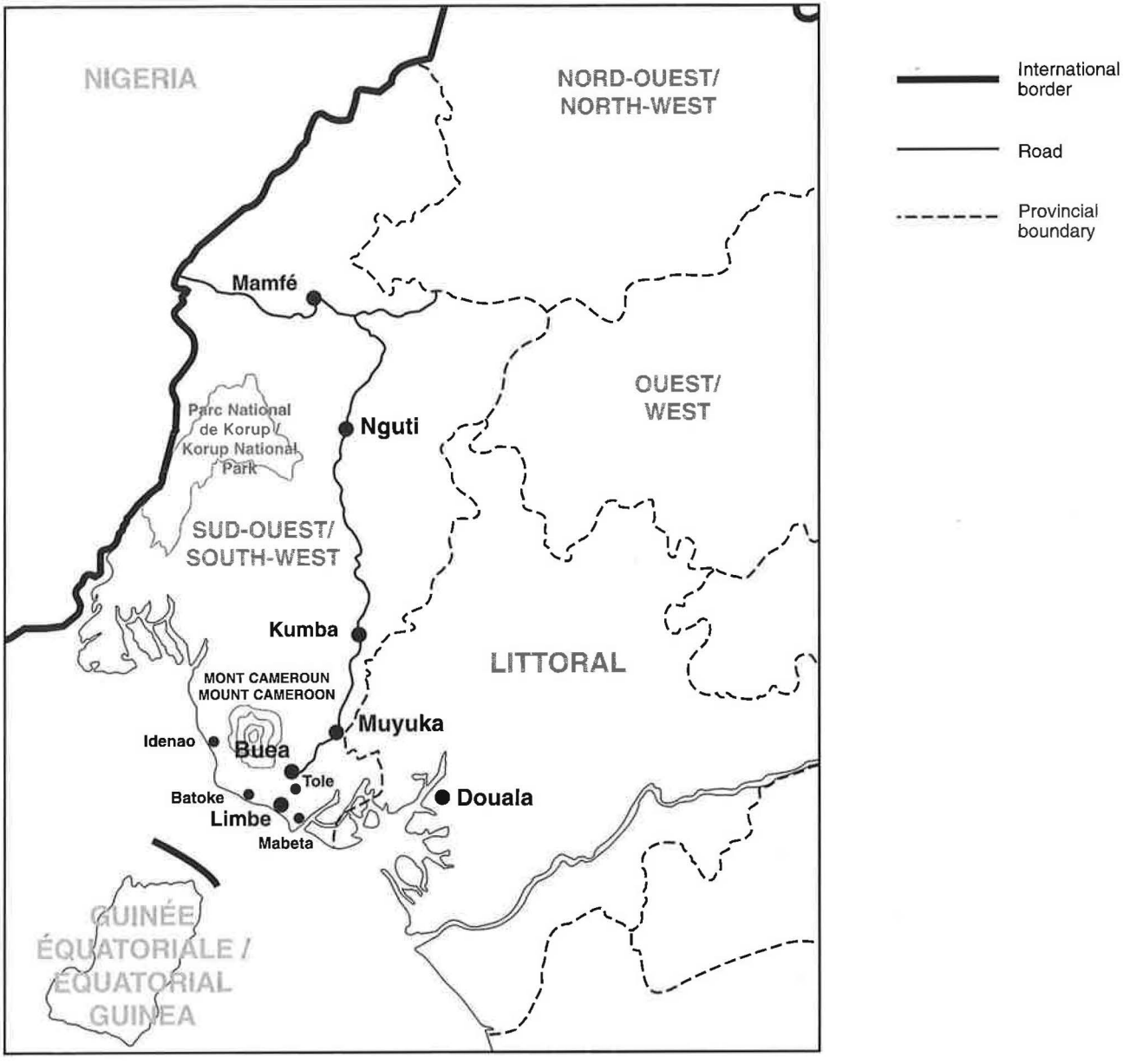


Figure 1 Map of study area

Introduction

This project arose from concern over the neglect of market considerations when developing agroforestry and forestry projects. Such projects aim to encourage the growing of trees on tropical farms for the following reasons:

(a) tree canopy cover, mulch and rooting systems can contribute to the sustainability of farming systems in fragile lands such as hillsides, humid lowlands and drylands;
(b) trees help to protect important watersheds which are intensively farmed;
(c) with declining access to natural forests and rising rural populations, on-farm production can help meet consumption needs for subsistence or trade;
(d) greater on-farm tree growing can reduce deforestation pressures on nearby forests.

Many of the benefits of planting trees on farmland may not be perceived by the farmers themselves, as they are often only realized in the longer term and may benefit the wider community rather than the individual. For many farmers, the perceived benefits do not justify the investment. This had led to an interest, among foresters and development practitioners, in tree products and multipurpose trees which might bring more tangible and immediate benefits to the farmers. However, many sustainable agriculture, agroforestry and community forestry programmes have failed because there has been insufficient associated research into the market potential of the trees and tree products prior to their establishment. Researchers are now beginning to assess market potential before investing scarce research funds in the improvement of specific tree species and associated systems.

The International Food Policy Research Institute (IFPRI) and the Natural Resources Institute (NRI) have been collaborating on a three-year joint project (1994–97), funded by the Overseas Development Administration (ODA), entitled Domestic Market Potential for Tree Products from Farms and Rural Communities. The project had three main objectives:

(1) to highlight constraints to the development of markets for traditional and emerging agroforestry and forestry products, with special emphasis on the characteristics of these markets and common types of market failures;

(2) to test this model in two case study areas in order to assess the market importance and potential of different tree products, to characterize supply, demand and market channels for selected products, and to identify key constraints and opportunities for future market development;

(3) to develop practical methodologies for assessing markets for farm tree products which are traded, gathered or produced informally, at least in part, over a dispersed area on a seasonal or irregular basis, and whose production and consumption are largely unrecorded.

Methodology

PLANNED METHODOLOGY

It was agreed that NRI would conduct field work in Cameroon and IFPRI, in Brazil, because in these countries, the topic is of current interest and the research may complement the activities of other organizations. The results of the NRI study in Cameroon are presented here.

The project was implemented in 1995 in association with the Mount Cameroon Project (MCP); Figure 1 shows the area covered by the research. MCP had just embarked on a research programme aimed at identifying, analysing and enhancing income-generating activities within the project area. For the purpose of this research, markets in Nigeria were treated as 'domestic' markets; any attempt

to exclude them would have amounted to a false dichotomy with truly domestic markets, given their proximity, importance, and well-established (if largely informal) marketing links with the study area. Their inclusion would also render the results more comparable with those generated by IFPRI in Brazil, where the domestic market obviously extends over a much larger geographical area.

During the planning stage of the project, NRI and IFPRI agreed to a three-stage approach to the field work:

(1) compilation of an annotated tree product inventory in each of the case study areas;

(2) rapid collection of data on market systems for 30–40 products to identify key issues for follow-up through more detailed case studies;

(3) identification of selected products as case studies.

The methods used for data collection, and the ways in which the research plan was adapted during the course of the field work, are outlined below; a more detailed account of methodological issues is provided in Gordon (1997).

EVOLUTION OF METHODOLOGY

Initially, the field work focused on the product inventory and market chains.

Compilation of an annotated tree product inventory

Secondary data sources were used to compile an inventory of almost 300 NTTPs, with additional information provided by market traders, key informants amongst the local population, MCP staff, and other forestry experts. In addition to local names and Latin names (where known), the inventory contained the following information:

- source of product (cultivated, forest, or both)
- final market destination (subsistence, traded within South West Province (SWP), or beyond)
- seasonality
- availability in markets (rarely, sometimes, or often).

Although information gaps remain, the inventory has been published by NRI (Papadopulos and Gordon, 1997); subsequent editions will be revised to take account of any additional information which might be obtained from further field work and from readers' comments.

Rapid collection of data on market systems for 30–40 products

About 30 products were selected from the inventory and their marketing chains analysed through rapid market appraisals (RMAs), which draw heavily on the techniques used in rapid rural appraisals (RRAs), of 11 markets in the Mount Cameroon area. The original intention had been to draw a stratified sample of 30–40 products from the inventory. However, random selection within each sub-group was impracticable because of the varying incidence and seasonality of many of the products. A more pragmatic approach was adopted which enabled coverage of all sub-groups identified.

Producers and market traders were interviewed about the source of their products and the common types of marketing functions in which they were involved such as transporting, storing and processing. The marketing chains of these 30 products could be broadly categorized into five groups:

- those where transport was the only marketing function, e.g. fresh bush pepe and palm nut
- those where processing and transport were the main marketing functions provided, with processing carried out by the initial producer/gatherer, e.g. bush mango, njangsang, and country onion
- those where the gatherer/producer processes, and also markets, the product, e.g. wrapping leaves and raffia palm baskets
- those involving trade with Nigeria, e.g. eru and cola
- those which do not fit into any of the above categories.

Once these two stages had been completed, key issues were identified based on the observed variation between products and an understanding of the common approaches, or vision, of agroforestry or forestry projects. The following three topics were chosen for further investigation.

The influence of market factors on prospects for domestication of NTTPs

This topic was to be investigated by comparing:

- a new product promoted by a project which was experiencing difficulty in persuading people to grow it
- a product for which there was pressure to domesticate from traders/collectors
- a product which had switched from forest to cultivation.

Factors affecting the extent and location of value added

The objective of this component was to investigate the conditions which determine, or permit, value adding activity, and those which determine where the activities occur, the nature of the activity, and who is involved.

Importance of production and trade of a 'basket' of products rather than of higher volume, single product specialization

The field work had shown that many of the NTTPs were traded in low volumes with short marketing chains, and represented just one component of a basket of goods which varied in size and composition (according to season and possibly other factors). These products are often traded by women (and children). Taken together, they may represent an important and flexible source of income which is accessible to relatively disadvantaged groups. If this is one of the most important ways in which NTTPs contribute to the local economy, it has major implications for the agroforestry initiatives which tend to focus on one product (or just a few products). It was intended to research this issue through case studies in selected forest villages, comparing a specialized, high-volume traded product with a basket of goods, to identify those involved in production, trade and related activities, and to determine how they benefitted.

These issues became the focus of the third stage of the field work. Based on preceding field work and discussions with MCP staff, four NTTPs were selected as case studies: eru, bush mango, njangsang and cola.

These NTTPs were chosen mainly because they are the most commonly traded and consumed within the region, attempts have been made to domesticate them, and they all require some form of processing before consumption. Cola was chosen because having already made the transition from forest to farm, it has been extensively domesticated.

The initial stage in the case studies involved interviewing the market traders who sell the products at the main markets, and tracing out the marketing chains. NTTPs are sold openly in the regular markets rather than in specialized markets. The interviews were loosely structured around two check-lists, one for farmer/gatherers and one for market traders (see Appendices 1 and 2).

The market trader check-list was piloted at Muea market. It was subsequently revised because it was found to be too long and too intrusive. As a gesture of courtesy, permission to interview the market traders was first obtained from the market master/mistress, the local government official responsible for the market who was often helpful in introducing the researchers to the NTTP traders. All the markets are under the jurisdiction of the local urban council and are managed by a master or mistress and assistants. Each local council has a set entrance fee, charged either daily for those who wish to sell off the ground, or monthly if a stall needs to be hired. At Limbe, the fee was CFA 100/seller/day for ground space or CFA 1500 for the monthly hire of a wooden stall.

Market traders were usually interviewed in pairs,

BOX 1 DESCRIPTION OF CASE STUDY PRODUCTS

Eru (*Gnetum* spp.)

Eru refers to the leaves of the climbing plants *Gnetum* spp. and *G. africanum* and is widely eaten as a vegetable in Cameroon and throughout West and Central Africa. It grows in abundance throughout Cameroon's forests, especially in secondary forest and abandoned farmland. Eru leaves can be harvested throughout the year, though growth is allegedly greatest during the wet season. It is collected into hand-sized bundles and secured with eru vine. Some villagers claimed to harvest, on average, about 10–20 bundles/day but Acworth (1993) estimated that about five bundles could be harvested in a day. Eru is perishable and only lasts a week after harvesting. Despite the volume traded and consumed, there were very few reports of domestication, even around Mamfe where over-exploitation for local consumption and trade with Nigeria has led to its demise.

Bush mango (*Irvingia gabonensis*)

The kernel of the bitter variety of the bush mango tree is used for flavour and to thicken soups. The 'sliminess' it imparts to soup or sauce makes gari (cassava) and other staples easier to swallow. It also reduces the need for more expensive condiments such as stock cubes. The bush mango tree is an evergreen tropical with a conical crown. Although there are two types (the sweet type which fruits during the rainy season and the bitter type which fruits during the dry season and whose flesh is inedible), only the kernel (the cotyledons) of the bitter variety is traded. Bush mango is unrelated to the more commonly known sweet commercial mango, *Mangifera indica*. During the harvesting season, the fallen fruits are collected into piles under the trees and cracked open with a knife to reveal the kernel which is then gouged out. As the fresh kernel weighs only about a tenth of the total weight, there are obvious advantages in processing the fruit where they fall. The kernels are then carried back to the village for sun-drying which reduces them to about half their fresh weight. Once processed, bush mango can be stored for up to two years if kept dry.

with one researcher asking questions and the other taking notes. Table 1 shows that there were generally only a few retailers and wholesalers selling NTTPs in any given market in the same locality, so it was therefore possible to interview most of them. A wholesaler is defined here as anyone who buys and sells in large quantities and a retailer, as anyone who sells in small quantities. The market days are staggered, enabling itinerant buyers and sellers to move from one market to another, so it was quite common to meet traders who had been interviewed on a previous occasion. Most of the main markets in the Mount Cameroon area, including a number of the village 'bush' markets where there was more interaction with farmers, were surveyed.

Table 2 lists the villages that were visited during the research. These visits were intended to provide an opportunity for focusing more on farmer/harvester perceptions of the marketing of NTTPs through group and individual interviews.

During the course of the field work, two main revisions were made to the proposed research plan. First, because of the lack of evidence for domestication of the products chosen (or any other NTTPs) within the Mount Cameroon area, it was decided to extend the survey to

BOX 1 (*Continued*)

Njangsang (*Ricinodendron heudelotti*)

Njangsang is a large forest tree which often grows in secondary forest. It is valued for its yellow seeds which, once processed, are used as a condiment for soups and fresh fish. Crushed njangsang has a spicy/peppery taste and also acts as a thickening agent for soups. The green, kidney-shaped fruits drop towards the end of the wet season and are collected into piles under the trees, usually by women and children, to signify ownership and to encourage the pulp to rot. It takes about 3–4 weeks for the fruit to decompose. On average, the nut weighs about a third of the fresh fruit's weight. Processing is labour-intensive and tedious and is generally carried out by women and children over the next couple of months. If properly stored, the processed pale yellow seeds can be kept for several years.

Cola (*Cola nitidia*)

Atara, or real cola, is a good example of a former forest product now widely domesticated and traded throughout SWP. It contains caffeine and is used as a stimulant throughout West Africa; it is of great cultural importance to the Muslim communities. Cola is also used to dye clothes. It varies in colour from white to a deep red; white is the preferred colour. A single tree can bear different coloured colas, probably because of cross-pollination. Cola is usually planted from germinated seeds and takes about 5–7 years to mature. It is harvested twice a year, either by collecting fallen fruit, or with hooks attached to long poles. The main harvest occurs in October and November. The large green pods are cracked open under the trees and the nuts carried back to the village for removal of the thin outer skin; sometimes the nuts are sold with the skin on and are subsequently peeled by the market retailers. If kept dry, cola can be stored for up to two years, usually in baskets or old fertilizer bags.

include the northern region of SWP where these products were allegedly being cultivated. Secondly, it was decided for the village studies that given the lack of 'high volume specialization' in production or collection of any one NTTP, it would be more appropriate to compare the importance of NTTPs with other income-generating activities through ranking exercises. In previous studies, the importance of NTTPs had been ranked separately from other income sources.

As well as questioning those actively involved in the marketing and collection of these products, other key informants were interviewed, including MCP and Ministry of Agriculture staff, and researchers at the Institute of Agronomic Research, Ekona, and the Pan-African Institute for Development, Buea.

Characteristics of NTTP markets

This characterization is based principally on findings from the four case studies; however, it also draws on the market chains and inventory compiled in the earlier field work, and on other published work where available.

POOR VISIBILITY

In contrast to the four case study products, many NTTPs have a relatively low profile. The reasons for this include: seasonal or sporadic production; demand associated with

Table 1 Numbers of retailers and wholesalers observed in markets

	Bush mango		Cola		Eru		Njangsang	
Market	Wholesalers	Retailers	Wholesalers	Retailers	Wholesalers	Retailers	Wholesalers	Retailers
Batoke	0	1	0	1	0	2	0	2
Douala	0	3	0	4	2	6	0	7
Limbe	1	6	0	4	5	8	2	10
Mabeta	0	2	0	3	0	3	0	4
Mile16	0	2	0	2	0	2	0	2
Muea	1	5	2	5	5	13	0	12
Mutengene	2	4	2	7	3	19	2	8
Tole	0	1	0	2	0	4	0	3

Note: Other markets surveyed included Buea 'Great Soppo', Mile 4, Kumba, Muyuka and Yoke.

Table 2 Villages in SWP visited during the survey

Village	Traded NTTPs
Limbe area:	
Ombe Native	Cola, eru, bush mango
Batoke	Cola
Bonjongo	Eru
Wutuku	Eru
Etome	Cola
Scipio Club	Cola
Idenau	Eru
Nguti area:	
Bayip Asibong	Bush mango, eru, njangsang
Okoroba	Bush mango, eru, njangsang
Bakogo	Bush mango
Mamfe area:	
Kembong	Bush mango
Bioffiong	Bush mango, njangsang
Ossing	Bush mango, njangsang
Talangaye	Bush mango, njangsang

certain festivals only; extremely localized production or consumption; dispersed production sources; production/extraction in remote or inaccessible areas; low traded volumes mixed with other products; the limited visibility of groups collecting NTTPs (e.g. the landless, the poor, women and children); multiple names, or only a local name if the Latin name is unknown; environmental concerns which may contribute to secrecy; and trading systems which are mostly informal with no dedicated infrastructure. There are rarely secondary data on NTTPs.

WELL-ESTABLISHED MARKETING CHAINS

The marketing chains for the four case study products are well established and operate within the existing market infrastructure. Figure 2 shows the varying degrees of sophistication of the marketing chains for eru, including the principal functions of the market actors.

The lower half of the diagram shows a less sophisticated marketing chain linking harvester, retailer and consumer. This type of chain is representative of the eru harvesters, for example, who live in villages close to Limbe

market. On market days, they walk to Limbe market carrying the harvested eru and sell it to the market retailers who in turn, process it and sell it to consumers. In marketing chains such as these, which are characterized by low trading volumes, there is no role for the wholesaler, but as the distance between the production source and the end user increases, as shown in the top half of the diagram, the additional marketing roles of bulking and distributing are performed by wholesalers.

Any overlap in the marketing chains between different NTTPs, in the sense that they share marketing channels, is generally a function of the volumes (and hence, profitability) of the products traded. For example, eru wholesalers and retailers do not generally trade in other NTTPs, but market retailers of the NTTPs traded in smaller quantities often sell them as part of several product lines which include other NTTPs.

COMPETITIVE MARKETS

Competitive markets are characterized by large numbers of participants at the various stages in the marketing chain, few barriers to entry (which might limit participation and hence, competition), and open access to information about the market. Competition between traders should keep profits to a 'normal' level (i.e., below which a trader would switch to other activities) and encourage efficient use and pricing of traded products. Although generalizing about the economic efficiency of markets without providing supporting quantitative data is potentially problematic, several factors suggest that NTTP markets, at least for the case study products, can be broadly classified as competitive.

First, large numbers of actors are present at all the stages of the marketing chain, implying that no one actor can exercise excessive market influence and dictate prices. In the case of eru, although there are relatively few wholesalers compared to the numbers of harvesters and retailers (as would be expected, given their role of accumulation and distribution), harvesters and retailers both reported that they had the option of trading with a number of wholesalers.

Secondly, with open access to most forest resources, virtually no product differentiation, and only minimal capital investment required for harvesting and processing, there are no major barriers which might discourage new

BOX 2 OVERVIEW OF NON-TIMBER TREE PRODUCTS

NTTPs are defined here as all plant products (other than timber) and fungi which can be found in the forest, such as trees, shrubs and vines, and their roots, tubers, seeds, fruits and flowers. Common NTTPs in SWP and their uses include:

Use	Commonly traded NTTPs
Food and spices	Bitter leaf, bush mango, bush onion, bush pepper, bush plum, colas, eru leaves, mushrooms, njabe oil, njangsang, palm nut
Medicinal	Chewing sticks, lemon grass, *Prunus africana*, seruk
Building and manufacturing	Bamboo and cane products, palm brooms, raffia palm baskets and mats, rattan, wrapping leaves

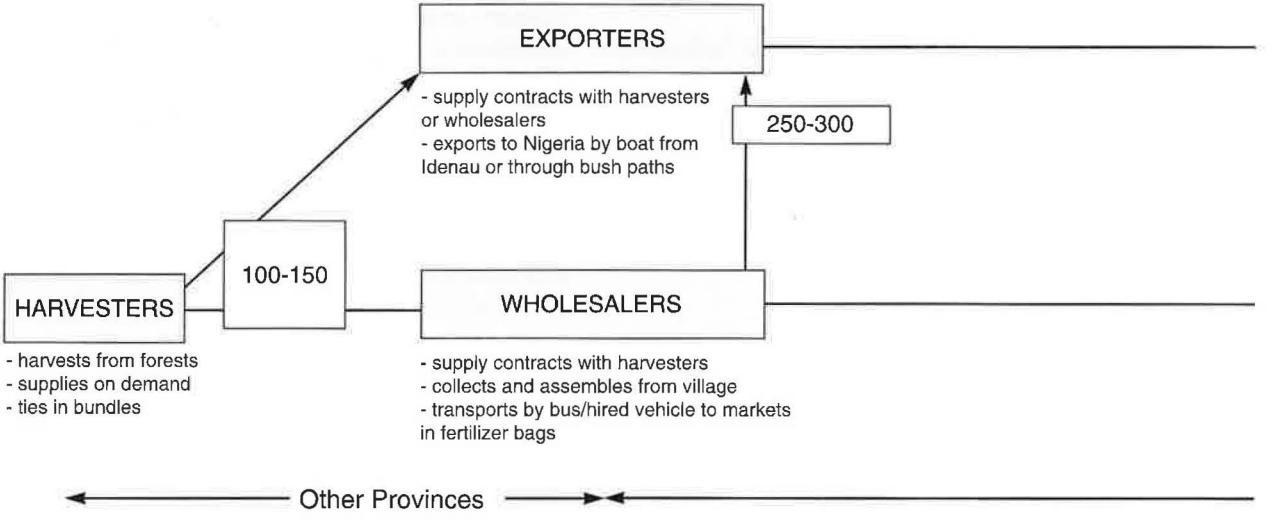
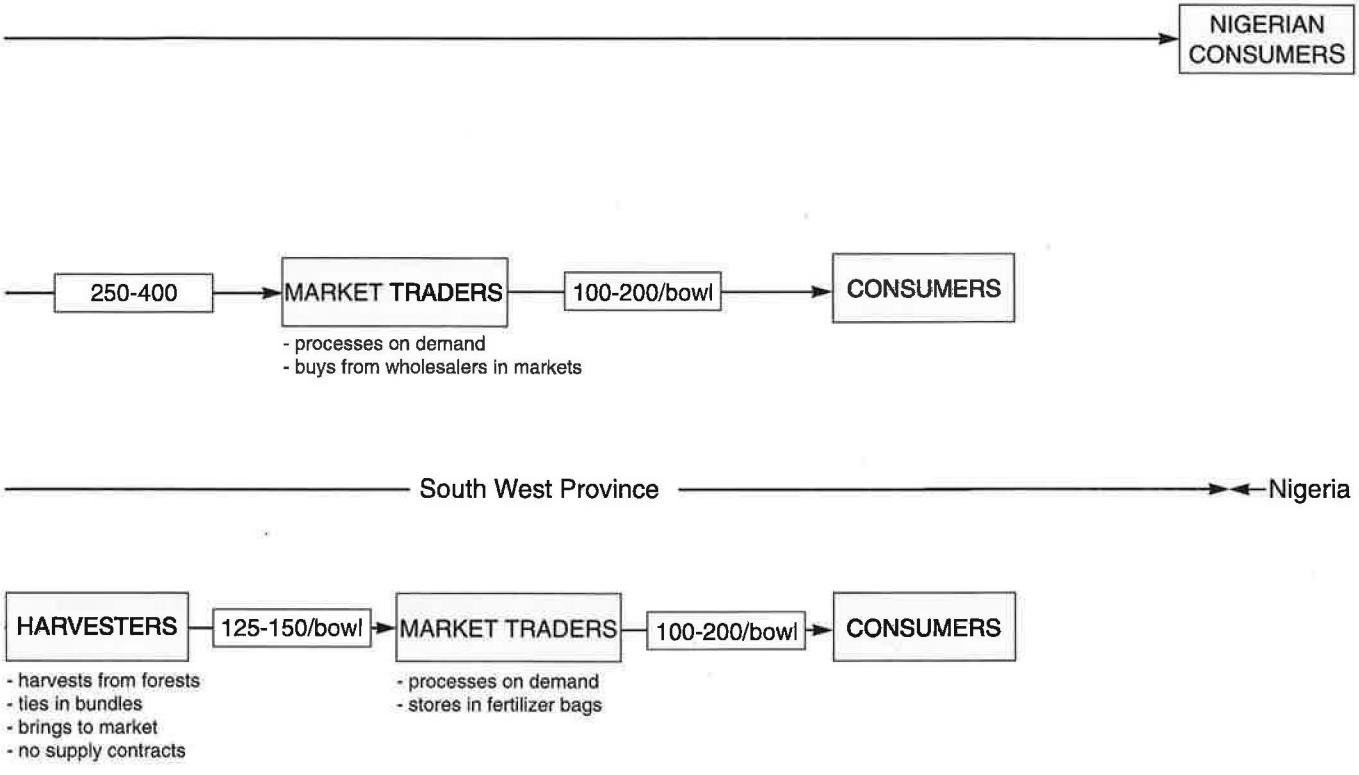


Figure 2 The marketing chain for eru leaves


NIGERIAN CONSUMERS
250-400
MARKET TRADERS
100-200/bowl
CONSUMERS
- processes on demand
- buys from wholesalers in markets
South West Province
Nigeria
HARVESTERS
125-150/bowl
MARKET TRADERS
100-200/bowl
CONSUMERS
- harvests from forests
- ties in bundles
- brings to market
- no supply contracts
- processes on demand
- stores in fertilizer bags

entrants to the NTTP markets or place them at a disadvantage.

However, there appear to be impediments to the flow of market information along the chains, possibly caused by wholesalers for strategic reasons. For example, market traders generally had little knowledge about the production sources of the NTTPs (location, and whether the produce was harvested from the forest or grown on farmland). Similarly, farmers were not very well informed about the prices for NTTPs in urban markets, nor were there any official statistics on harvesting, production and marketing. (It is noted that lack of quantification of the NTTP trade may lead to an under-estimation of its economic importance.)

GROWING DEMAND

Although there are few recorded data on quantities marketed, the survey found that demand for the four case study products is growing. Market officials reported that there were more NTTP traders in the markets than in previous years, with no noticeable reduction in the volumes being traded by individuals. Market traders and wholesalers were optimistic about their future prospects; all those interviewed claimed that they intended to continue selling in the future, and most farmers/harvesters said that there was the opportunity to sell more than in previous years.

Further evidence for growing demand was provided by reports that wholesalers were often visiting the villagers during the harvesting season rather than meeting them in local bush markets (as was the traditional arrangement). Cola wholesalers interviewed in villages around Limbe explained that they had been forced to target producers directly because the market was increasing and there was pressure to find new sources of supply.

Increasing population size is widely believed to be driving demand. The growing demand for bush mango, cola and eru may also be attributed to the development of export markets with Nigeria and in the case of cola, with Gabon and the Central African Republic. (Njangsang is not exported to Nigeria which may account for its production in smaller quantities.) Villagers around Nguti who trade in eru recounted tales of Nigerian wholesalers offering higher prices and visiting more frequently than local wholesalers.

Malleson (1994) attributes the increase in domestic demand for NTTPs to increasing urbanization, and to the recent down-turn in the domestic economy which resulted in devaluation and a reduction in the size of the civil service. The subsequent fall in income levels may have resulted in the substitution of more expensive food crops and condiments with cheaper NTTP alternatives.

SUPPLY AND SEASONALITY

Figure 3 illustrates the seasonality of the four case study products and some of the major cash crops in the region. There is a marked seasonality in production of three of the four products, with harvesting usually coinciding with the end of the wet season. In general, seasonality is only an issue for those NTTPs produced from fruits. Products such as leaves and bark can be harvested throughout the year, although villagers reported that during the wet season, farm activities and heavy rainfall prevented them from harvesting as much eru as in the dry season.

Seasonality is not such an important issue for less perishable NTTPs as they can often be stored by wholesalers and released into the markets during the year (see section below on factors affecting the extent and location of value added).

During the interviews, farmers and traders were asked if they had perceived any changes in volume traded over the past 12 months. Market traders generally reported that supply had not changed much over the year, but wholesalers thought that supply had improved in response to demand pressures.

PRICE VARIATION

Trade between farmers and wholesalers is often based on a reserve price from which both sides are reluctant to deviate. By contrast, price determination at the

trader / wholesaler level, which is based on supply and demand, appears to be fairly competitive.

Other important factors involved in price determination include:

- **seasonality:** the price of NTTPs with a marked seasonality increases during the off-season
- **availability of substitutes:** traders claim that the price of bush mango, for example, falls when okra, its main substitute, is in season
- **quality.**

It was sometimes suggested that if a product was sourced in the forest, it might be considered to be of a better quality and hence, command a higher price, even if it was actually no different from its cultivated counterpart.

Although there is some seasonal variation, most traders reported that there had been no upward trend in prices over the last year; this is further evidence that supply is keeping pace with demand.

DYNAMIC WHOLESALERS

Evidence from the case studies suggests that the wholesalers perform most of the activities in the marketing chains and consequently, incur many of the costs, risks and problems involved. Reported wholesaler activities include obtaining supplies, and providing informal credit, storage, transportation and technical advice.

Obtaining supplies

Wholesalers generally tour the production areas towards the end of the harvesting season, either buying from door to door in villages, or meeting the producers at local bush markets. Some even employ a local villager to act as an agent and buy on their behalf. In this way, wholesalers can develop a larger supply network.

Other wholesalers establish contracts with villagers. For example, most eru traded in the markets around Mount Cameroon comes from the Yaounde area and is sourced directly from the villages, usually through verbal contracts. The wholesaler orders a number of bundles of eru from individual villagers and returns on an agreed date to collect them. These contracts become more important during the wet season when the supply is more limited and competition amongst wholesalers is fiercer.

Informal credit

Some wholesalers provide cash advances as part of the contract with farmers; the money is deducted from the agreed purchase price when the product is supplied. However, as yields of NTTPs can often be highly variable, many farmers prefer not to accept the advances in case the yield is lower than expected and the loan cannot be repaid. Some farmers also expressed a reluctance to take the cash advances in case it committed them to too low a price.

Storage

Although seasonal, the more durable products such as cola, bush mango and njangsang can be stored for a number of years once they have been processed. Wholesalers take advantage of this and buy the products in bulk during the harvest season for release on to the market either during the off-season, or after a bad harvest when prices are higher. This strategy can be very lucrative, provided that the prices are high enough to compensate for the storage costs and storage losses (through heat and insect damage). In addition, storage helps to stabilize market prices by ensuring a regular supply throughout the year.

Transportation

Wholesalers are generally responsible for bulking and transporting the products by public transport or hired vehicle from their production sources to the main markets, hence incurring all the costs and inconveniences of travel (which may include informal and formal road tolls and local taxes).

Technical advice

Although there were no reports that the wholesalers had actually encouraged farmers to plant NTTPs, many cola

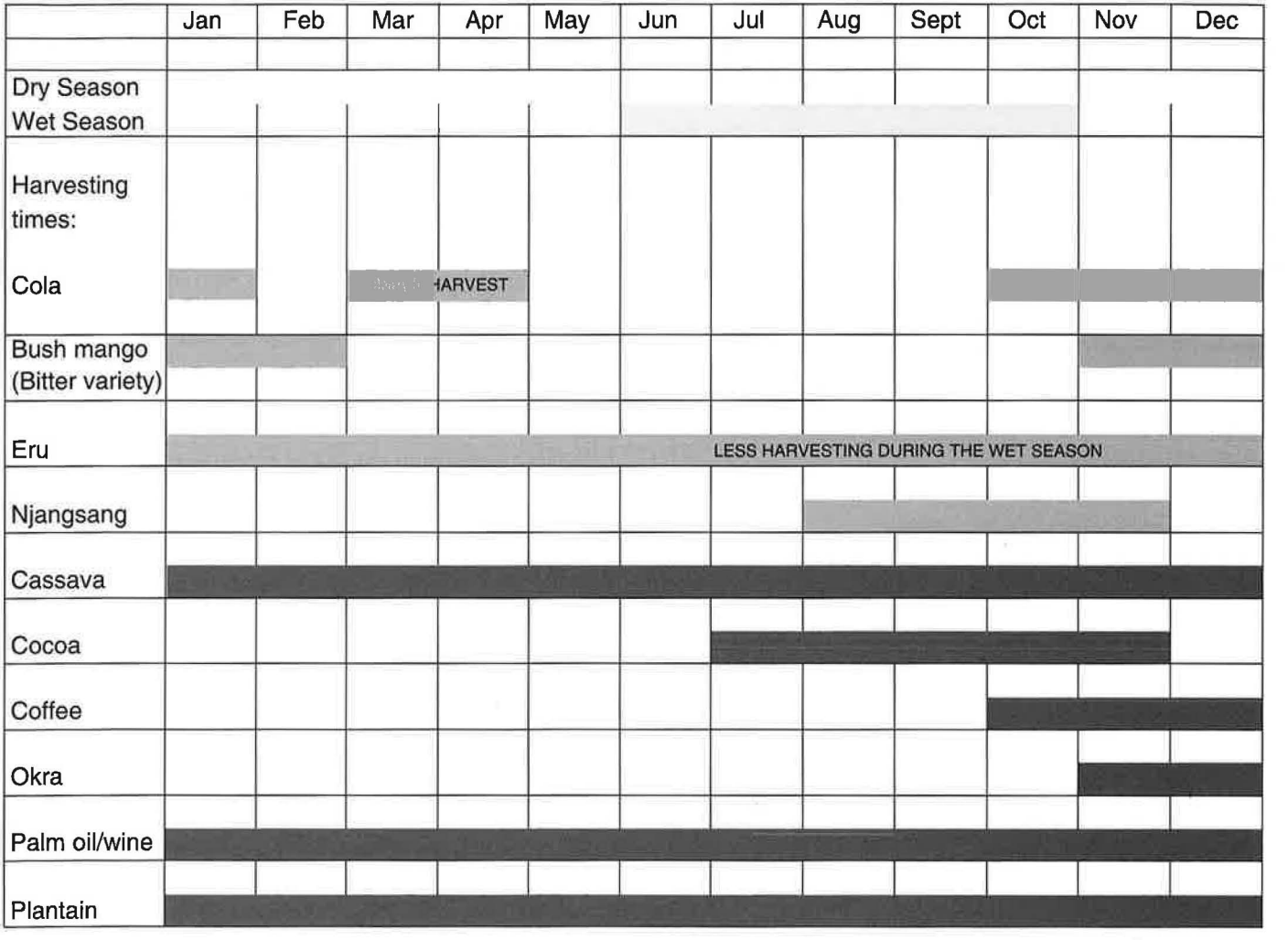


Figure 3 Harvesting calendar for selected products

farmers around Limbe reported that wholesalers had advised them on the use of insecticides to help preserve the processed nuts and protect the trees from ants.

LEGAL ISSUES

Although many NTTPs are openly traded in the main markets and bush markets within the Mount Cameroon area, the source of the NTTP can influence the legal status of these transactions. Under the new forestry act, different definitions of forest resources determine the access rights of local communities. There are two main classifications of forests:

(1) in permanent forest estates (forest lands used solely for forestry or as a wildlife habitat), local populations are usually granted customary rights, which are defined as the right to harvest all forest, wildlife and fisheries products (except for protected species) freely for personal use;

(2) in non-permanent forest estates, the land may be used for purposes other than forestry, and provided that a management contract has been agreed between the government and the local community, the forest resources belong to the community.

Therefore, it is often illegal to trade in any products gathered from these forests, and given the unregulated nature of NTTP markets, it is impossible to determine whether the products on sale have been harvested legally. Uncertainty over the legal status of NTTPs from forest resources helps explain why traders in eru complained more about being stopped by the police than those trading in cola for example; it is widely known that eru can only be obtained from the forest, whereas cola is grown predominantly on farmland. (It should be noted, however, that all traders are subject to fairly frequent police checks for valid business permits and, in the case of Nigerians, residency permits.)

GENDER

The roles of men, women and children varied greatly according to product and region but generally, both men and women appeared to be involved in harvesting while women and children were more likely to be involved in the tedious processing. Of the four case study products, only the eru marketing chain is dominated by women who sell the finely shredded leaves in the markets by the bowl. Anecdotal evidence suggests that as soon as a product begins to assume greater importance as an income source, the men will take it over from the women (as has happened in some areas with bush mango, for example).

BOX 3 A COLA WHOLESALER FROM NORTHERN CAMEROON

This wholesaler is from northern Cameroon and tours a number of villages in the Mount Cameroon area during the main cola harvest season. He has hired a store room in which to store the cola as he purchases it. He also has a stall selling leather goods, spices, garlic, ginger, etc. It is not uncommon for these products to be bartered for cola. He sells the cola in Kassa Marire market in Kano, northern Nigeria, to retailers with whom he has verbal agreements. He says the market is increasing and there is pressure to find new sources, hence his presence in the Mount Cameroon area. He exports to Kano via Idenau/Calabar. His main marketing problems are high transport costs, which consume about half of the value of the produce, and storage losses (about 10%). He says the 1996 cola harvest is poor because of the lack of rains, so there are fewer wholesalers than in previous years.

WEIGHTS AND MEASURES

NTTPs are usually traded in rather arbitrary units of measurement. For example, eru is sold in bundles but these have no fixed size or weight. Bush mango and njangsang are traded in 15 litre buckets and 300 ml cups, but the number of cups per bucket is 60–65 for bush mango, and 100–110 for njangsang; as they are bought by the bucket and not by weight, a wholesaler's idea of a full bucket will often differ from that of a farmer/producer. Although there is no defined grading system, NTTPs are still inspected and this increases the costs of the transaction. It was also noted that with medicines, the buyer pays for the advice rather than the products *per se*, so even if five products are prescribed, the unit of purchase is essentially 'one prescription'.

Influence of markets factors on domestication

Figure 4 shows the extent of domestication of the four products studied. Cola made the transition from forest to farm some years ago. The bitter variety of bush mango is now widely cultivated in the northern parts of SWP and in other places to which people from this area have migrated. Domestication of njangsang is less common; most market retailers and wholesalers reported that it is sourced only from the forests. Eru has not been domesticated at all, despite the large volume of trade.

There are several reasons why some products have been domesticated and others have not.

FARMER-DRIVEN

It appeared from the case studies that the impetus for domestication is farmer-driven. Throughout all the field work, only MEDINO (a French acronym for the North West Development Authority), which existed prior to the establishment of the Ministry of Agriculture in the late 1970s, was reported to have exerted any external pressure on the farmers to domesticate.

SUBSISTENCE VALUE

NTTPs are often domesticated in the first place for subsistence. For example, some villagers planted cola initially for their own consumption and only became aware of its market value later. Even where NTTPs are now cultivated mainly for commercial reasons, a proportion is always retained for home consumption.

Wood from bush mango and njangsang can also be used for firewood and construction. The importance of subsistence value may help to explain why the indigenous population of Limbe (Bakweris) do not plant bush mango, i.e., they actually prefer okra for thickening their soups.

There is also a cultural dimension to domestication. It is not unusual for migrants, who are attracted in large numbers to areas such as Mount Cameroon by work in the plantations, to introduce tree species native to their original homelands. For example, in Ombe native village, a farmer from the Mamfe area (northern SWP) brought with him what he referred to as the 'common Mamfe variety' (the bitter one) of bush mango and planted it for his own supply because he could only find the sweet variety in the local forests.

MARKET OPPORTUNITY/SUPPLY AVAILABILITY IN THE FOREST

Many NTTPs have traditionally been valued as subsistence commodities, and it is only relatively recently that the economic potential of some of them has been realized. In the past, many bush mango and njangsang trees were destroyed when clearing land for farms because they were creating shade. However, most farmers are now aware of the economic importance of these trees and will refrain from destroying them in the future.

BOX 4 ERU CULTIVATOR

This farmer from a village near Limbe began to cultivate eru in the early 1990s. He collected the bright red eru seeds from the forest and planted them in a small nursery. Once germinated, he transplanted the seedlings on to abandoned farmland. He now has over 100 eru plants. Now that the eru has taken hold, he intends to cut down the trees which have been providing shade and replace them with shrubs. He does not want the eru vines to climb the trees because harvesting would be difficult. Growing them on shrubs will make harvesting much easier. He claims to have started planting eru because he believes it has good market potential, but he wanted to reduce the labour spent on harvesting. He is not aware of anyone else who has planted eru and has not received any assistance from anyone.

Increased demand puts pressure on the forest supply of NTTPs. For example, during the fruiting season of the bush mango, the hunt for the fruits around Nguti was described as a 'scramble'; as forest resources are common property for the local community in the Mount Cameroon area, most NTTPs are exploited on a 'first come first served' basis. Therefore, growing them on farms is viewed by farmers as a means of ensuring access to a regular supply. Similarly, there has been little attempt to cultivate eru because it is perceived by the villagers to be abundant in the local forest. Many farmers were bemused by enquiries about domestication and asked "why plant something that grows wild in the forest and in such abundance?".

FAVOURABLE RETURNS TO LABOUR

As well as securing a supply, domestication of NTTPs on farmland reduces the inconvenience and time spent in searching and gathering. Villagers often complained that harvesting eru, for example, involved time spent travelling to the eru-growing areas and the problem of biting ants, mosquitoes and snakes.

Traditional cash crops, such as coffee and cocoa, require labour inputs for fertilizer application, spraying, pruning and harvesting, whereas domesticated NTTPs like cola and njangsang, only involve labour inputs for collecting the fallen fruits; they therefore arguably offer a higher return to labour. (Presumably, they could benefit

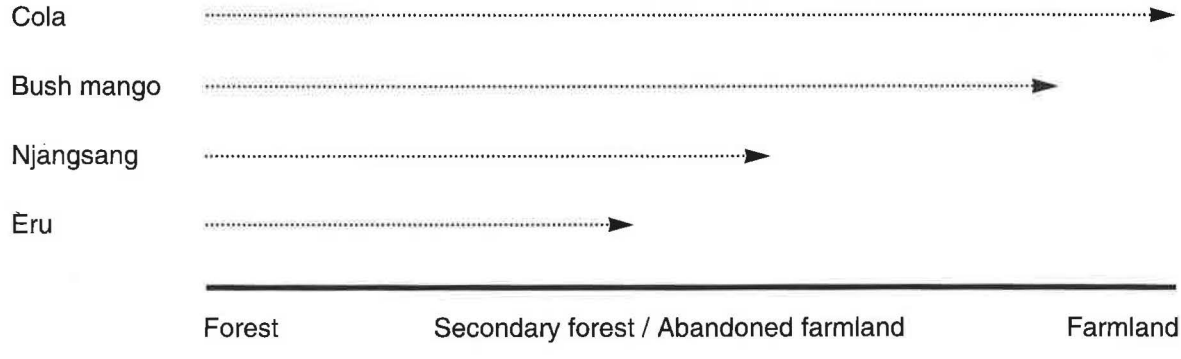


Figure 4 Forest-farm interface

BOX 5 BUSH MANGO CULTIVATION IN BAKOGO VILLAGE, SWP

Villagers started growing the bitter variety of bush mango in the early 1980s, initially for their own consumption because of the lack of trees in the forest but later, for trade. Trade in bush mango is increasing, with most of the demand coming from Nigeria. The bush mango fruits are gathered by both men and women from November to February. Wholesalers, often from Nigeria, come to the village at the end of the harvesting season. Producers prefer to sell their product in the village because it is more convenient than taking it to Nguti and Kumba. Although yields are variable, more households in the village are becoming interested in planting bush mango because it is perceived as having economic potential.

from pruning, fertilizer application, etc., but no one has yet produced a suitable technical package.) However, domestication will reinforce income disparity because those without access to land will have little option but to continue with the forest-based activity, offering lower returns to labour.

LAND TENURE AND SIZE OF HOLDINGS

Planting trees on farms can only ever be a medium- to long-term investment. Njangsang trees bear fruit after three or four years but with bush mango, it can take from four to twenty years (Acworth, 1993). This raises the issue of land tenure arrangements. Farmers can only invest in tree-planting if their land tenure is secure. Although land rights are very complex in this region, it appears that many farmers are renting their land; only traditional landowners can have permanent farms. It is illogical to plant trees on rented land, unless it can be leased for long periods, because the trees would become the property of the landowner as soon as the tenancy expired. Insecurity over land tenure naturally reduces a tenant's planning horizons and results in products being planted that will generate a quick return. Even if farmers have secure access to land, few may be prepared to take a sufficiently long-term view. (Although the authors found the situation reported here to be the more typical, the alternative view was occasionally put forward that the planting of trees helped confirm ownership in cases where it might otherwise be ambiguous.)

Njangsang and bush mango create too much shade for intercropping so they are usually grown on a separate area of land; size of land holding may thus become an issue as well.

EASE OF DOMESTICATION

Little is known about the biology of NTTPs. Some, such as bush mango and cola, are more biologically robust; they can easily be grown from seeds with little management, and they do not appear to suffer from any diseases. By contrast, the growing conditions for eru vines, for example, are more specific; they require shade and therefore cannot be grown on open farmland. Eru seeds are also reported to be more difficult to obtain.

Factors affecting the extent and location of value added

PROCESSING

All the case study products require some form of processing prior to consumption. Most of the processing of bush mango, cola and njangsang is done where the fruit drops

BOX 6 A NJANGSANG PROCESSOR, BATOKE VILLAGE

This farmer harvests njangsang from the forests around Batoke in August and September during the wet season. She rots the fruit by soaking it in water and then squeezes out the nut. She finds processing the nuts very laborious as they often have to be boiled twice before they crack. Once cracked, the seeds are removed and sun-dried. She prefers not to store the njangsang so she sells it to traders at Batoke and Limbe markets. She sometimes has verbal agreements with family and friends to supply njangsang, but never with traders. She knows of only a few other people in the village who gather njangsang from the forest; most comes from Mamfe and Bamenda. She does not consider it to be as important a source of income as the food crops she grows on her farm, such as coco yam and plantain.

to reduce the labour cost of carrying it back to the village whole. As the seeds represent only a small proportion of the fresh weight, processing increases the value for weight of the fruit. It is often carried out by women.

The other main benefit of processing bush mango and njangsang is that it increases durability. Provided that they are thoroughly dried and subsequently stored in a dry place, they can last for up to two years.

As might be expected, consumers prefer to buy these products processed, mainly for convenience but also because some do not know how to process them. Nobody expressed a preference for buying ground bush mango or njangsang because grinding reduces the storage life. For eru, value is added primarily by retailers who slice the leaves.

To a certain extent, the level of processing is also influenced by the purchasing power of the consumers. For example, in the more remote bush markets, eru is sold in

Table 3 Ranking exercises of most important annual sources of income

Village	Ombe Native	Scipio Club	Bayip Asibong	Okoroba	Bakogo
Rank 1	Okra	Corn	Coffee	Coffee	Palm oil/wine
2	Cocoa	Plantain	Palm oil/wine	Cocoa	Coffee
3	Corn	Cassava	Cassava	Cassava	Bush mango
4	Cola	Palm oil/wine		Palm oil/wine	Cocoa
5				Bush mango	
Others:	Rabbit	Bush plum	Bush mango	Cola	Cassava
	Cassava	Cocoa	Eru	Eru	Cola
	Honey	Cola	Njangsang	Njangsang	Eru
		Guava		Orange	Njangsang
		Okra			Orange
		Groundnut			Pawpaw
					Plantain

bundles rather than sliced because it is cheaper unprocessed.

STORAGE

As noted above, wholesalers may store the products bought in bulk during the harvesting season for sale in the off-season when prices are higher.

Farmers generally sell immediately after processing, and market traders buy only in small quantities throughout the year. Although farmers often know that they could make more money if they stored the product, they are unable to wait because they need the cash immediately. They would also have to bear the additional burden of transporting the products to the markets themselves (unless the practice of storing became so widespread that the wholesalers could visit the production areas throughout the year).

ARBITRAGE

Arbitrage, which means moving a product from areas where it is present in abundance and prices are low to areas where there is a demand but no supply, is a form of value adding carried out by wholesalers and applies to all four case study products. For example, bush mango is bought from villages in the Mamfe area where it is produced in abundance and resold in the markets around Mount Cameroon where it is scarce.

Relative importance of NTTPs as an income source

FARMERS

The results of some of the village ranking exercises in which villagers were asked to rank their most important annual sources of income are shown in Table 3. They highlight two important issues: the income earned from any single NTTP is not considered to be of primary importance; and villagers have a diverse range of income-generating activities.

Farmers did not generally rank NTTPs as primary sources of income because of their seasonality and consequently, irregularity compared, for example, to food crops and palm oil. The only noticeable exception was eru which can be harvested throughout the year, albeit in smaller quantities during the wet season. Also, as the yield of some of the major NTTPs is unpredictable, villagers were unwilling to expose themselves to such relatively high risk products.

However, the income generated from NTTPs appears

Table 4 Selling prices

	Bush mango CFA/bucket	**Cola** CFA/basket	**Eru** CFA/bundle	**Njangsang** CFA/bucket
Farmer	10000–13500	2000– 5000	100–150	10000–13000
Wholesaler	13000–15000	6000–10000	250–400	13000–18000
Retailer	16250–19500	10000–16700	400–600	17500–25000

to have an important smoothing effect, especially at times when on-farm work is limited and more labour is available. Acworth (1993) claimed that although NTTPs cannot generate enough income to support a household by themselves, they can represent a valuable cash windfall.

No wealth rankings were undertaken to determine which groups were involved in NTTP harvesting, but anecdotal evidence suggests that although harvesting NTTPs from the forest is an option open to all villagers, it is more likely to be exploited by the poorer groups with limited land resources.

TRADERS

Tables 4 and 5, although not based on random samples, provide some insight into the relative profitability of the four case study products.

Table 4 shows the range of selling prices reported over the last 12 months. Although retailers sell these products in smaller units such as cups and bowls, prices are given in the unit used by wholesalers and farmers for ease of comparison.

Table 5 provides examples of the gross margins and volumes traded in the four weeks prior to the survey. In gross margin accounting, only the variable costs are shared out to individual enterprises. The gross margins for market retailers of bush mango and njangsang suggest that they are not a major source of revenue because they are not retailed in large volumes. This explains why they are usually sold as just one of a range of product lines together with other NTTPs, pulses, dried chillies, onions, ginger, garlic, etc. In fact, many retailers viewed marketing in general as a secondary activity for supplementing the income earned from farming. However, as retailers of the more highly traded products such as eru and cola have higher gross margins, they are more likely to depend on these products for their livelihoods.

By contrast, most of the wholesalers, even those trading in bush mango and njangsang, considered marketing to be their main source of income. Although they are often perceived as being exploitative, buying cheaply from producers and selling at much higher prices to retailers, this should be weighed against the fact that the wholesalers perform most of the activities in the marketing chain and consequently, incur most of the costs and problems. Cola wholesalers, for example, source the products directly from the villages, organize and pay for transport from the production centres to the main markets, and absorb any losses during storage. By comparison, market retailers and farmers often reported that they had no basic marketing problems; farmers can sell their produce without leaving the village, and market traders can buy in small quantities from wholesalers in the main markets throughout the year.

Table 5 Monthly gross margins

	Qty	CFA		Qty	CFA
Bush mango			**Eru**		
Wholesaler (Muea)	24 buckets	40100	Wholesaler (Mutengene)	1000 bundles	83200
Retailer (Limbe)	4 buckets	23200	Retailer (Limbe)	210 bundles	38500
Cola			**Njangsang**		
Wholesaler (Limbe)	50 baskets	109500	Wholesaler (Muea)	24 buckets	67300
Retailer (Limbe)	8 baskets	55200	Retailer (Muea)	3 buckets	18700

Conclusions

THE ROLE OF NTTPs IN AGROFORESTRY AND FORESTRY PROJECTS

The importance of considering market factors to achieve successful agroforestry and forestry projects was used as the starting point for this research. Forestry projects are generally aiming at conservation and the encouragement of farmers to plant trees in order to:

- reduce pressure on natural forests
- stabilize the buffer zone around forests
- promote conservation and 'care'of tree resources
- promote soil conservation/stabilization.

As these benefits are often not enough to attract farmers because they are long term, or benefit the wider community, population, or both, rather than the individual, forestry experts have turned to trees which provide short-term, multi-purpose benefits, i.e., tree products. However, many of these projects have still had disappointing results because inadequate attention has been paid to the market for these products.

An attempt was therefore made to identify constraints to the development of tree product markets. Several conditions which affect NTTP market potential are outlined below. The risks which often constrain the market development of these products are discussed, and lessons for agroforestry or forestry projects are noted. Areas of potential conflict with broader forestry or environmental policies are also indicated and further areas for research are highlighted.

CONDITIONS AFFECTING NTTP MARKET POTENTIAL

The characterization of NTTP markets highlights a number of factors which influence market potential. These include production or supply considerations because of the way they affect reliability and hence, demand. Important determinants of market potential can be summarized as follows (although few products will satisfy all the conditions):

(a) returns to labour are high for producers, relative to alternative activities;
(b) markets already exist, or farmers perceive a growing demand;
(c) access to the product is secure and reliable;
(d) the product is not highly perishable, or there is scope for value addition through processing and storage;
(e) there are few competitive substitutes;
(f) specialization is not required for production/collection because the producer can trade in a changing 'basket'of relatively minor products to help smooth income and reduce risk through diversification;
(g) only minimal capital investment is required for production/collection and village- level processing/storage;
(h) integration into the existing farming system is relatively easy, offering scope for increasing returns to labour, and ensuring access through domestication.

With reference to these determinants, it is possible to eliminate certain products because their market potential would be poor. For instance, a highly perishable fruit with little scope for drying or low-cost processing is unlikely to find a market outside the immediate area.

RISK FACTORS AFFECTING NTTP MARKET DEVELOPMENT

Demand

Several aspects of demand should be considered when assessing the risks associated with marketing a product. For instance, some NTTPs may be inferior goods, i.e., people may turn away from them as their incomes increase (e.g. tooth sticks may be replaced by toothbrushes, and natural basketware may be replaced by synthetic basket-

ware). It was interesting to note that young people in Cameroon were less attracted by red cola because it stained their teeth, but the demand for white cola was still strong. According to Malleson (1994), the resurgence in NTTPs in Cameroon resulted from the recent economic down-turn (which has affected Cameroon and neighbouring Nigeria), but the demand may not be sustainable in the medium to long term.

Lack of substitutes may only persist in the short term. In the Brazilian Amazon (from where there have been considerable data and documentation for many years), natural forest products such as balata, macaranduba and rotenoid insecticides, which were important exports in the 1920s and 1930s, have been replaced by synthetic rubber, synthetic chewing gum base, and synthetic insecticides, respectively (Gordon and Coppen, 1993). There may be similar pressure to develop a synthetic substitute for *Prunus africana*. Cameroon is the most important source of this product (which is used in the pharmaceutical industry), but the resource is now under threat from over-exploitation.

Over-dependence on a single unstable market may also undermine longer-run potential if producers or traders experience unexpected difficulties in market access. This might be true of the Nigerian market which, although long established as a trading area for this part of Cameroon, depends on formal or informal sanction by the authorities which is likely to change according to economic (particularly currency) conditions in both countries.

Supply

If there is unambiguous scope for domestication, a possible (and even, likely) outcome might be that production on the forest fringe (i.e., production consistent with the objectives of agroforestry projects outlined above) would be displaced by more efficient cultivation, possibly on plantations, closer to the markets. These producers would be able to undercut the higher-cost, forest fringe producers; market prices would fall in line with the higher level of supply, and forest edge cultivation would be rendered non-viable. This highlights the importance of considering production factors in detail. For example, the greatest potential for tree domestication at the forest fringe might be associated with **diseconomies of scale**, or with the generation of a 'package'of benefits suited to a particular farming system but not apparent or useful to the large-scale producer. This could apply in cases where intensive cultivation is associated with an unacceptably high risk of disease, or where multi-purpose trees generate benefits appropriate for a mixed smallholder system on unstable soils in which the sale of the tree product is only one component.

There is a risk of over-exploiting forest products in a rapidly expanding market but this will vary according to the product. However, given the general lack of data on both the production and marketing of forest products, and the often conflicting opinions among experts concerning the resource base and its sustainability, a number of products which have not yet been domesticated may also be at risk of over-exploitation. It is ironic that such an evident threat to the resource base (which many foresters are seeking to avert before it becomes apparent to all and hence, very serious) is providing the incentive to domesticate. Similarly, there may be both sustainable and destructive techniques for harvesting many NTTPs, but as the pressure on a resource increases, there may be a greater incentive to adopt a higher yielding, destructive technique (a 'tragedy of the commons') as has happened with certain gums and exudants; eru harvesting should only involve the removal of leaves, but it may be quicker to cut the main stem and pull the vines down. Trees which are apparently abundant and accessible in the forest are unlikely to be domesticated by local farmers.

Inadequate extension, which might include the provision of information on market trends and prices and technical advice, increases the perceived risk and contributes to a farmer's decision not to domesticate a product. In many cases, the biology of the trees is poorly understood, but even when more information exists, it may be difficult for over-stretched extension services to reach relatively

remote forest edge communities. Production of many trees may pose unacceptable risks for the small producer (in view of irregular fruiting and yield variation, for example) even with improved information, although a farmer may be able to off-set the risk by planting a variety of multi-purpose trees. Similarly, current market information may not be enough to attract farmer interest, even if the activity appears remunerative, if other product markets are subject to considerable fluctuation. Farmer decisions will be based on a number of factors. For example, the performance of the market over several years may be important, particularly as trees are a long-term investment. It would be difficult to eliminate all the risks involved in tree-planting, so risk takers will probably lead any trend towards domestication (as is the case with the adoption of any new technology); a role for an initial subsidy or extra incentive may also be implicated (although this may create more problems than it solves).

Farmers will want to be convinced of the benefits (income or otherwise) associated with tree production and will only consider cultivation if it clearly fits into their existing farming system, preferably out-performing or complementing other activities (through interactions, or by spreading income or demand for labour). When considering the availability of labour, the labour associated with subsistence activities, which may be given high priority by the farmers, should always be investigated. Division of tasks according to gender should also be considered; farm activities may not be shared equally and although there may be surplus labour, NTTP activities may not be acceptable to everyone in the household. Timing and seasonality are extremely important. Domestication may reduce the time input associated with searching and harvesting, but NTTPs such as bitter bush mango are more likely to be grown if they can be harvested during slow periods on the farm.

Good roads reduce transportation costs and often have a dramatic effect on market access and hence, supply. In the study area for instance, a number of villages were suddenly made accessible after a timber company built a new road near Nguti. As one villager put it, "once they built the road, all our marketing problems disappeared". In sparsely populated areas, roads may exist but they may be poorly served by transport.

POTENTIAL CONFLICT WITH FORESTRY OR ENVIRONMENTAL POLICY

A number of areas of potential conflict can be identified between NTTP market development and the broader environmental or forestry context. These include the following examples.

(a) In Cameroon, the existing forest resource classification means that the harvesting of NTTPs for commercial purposes could be interpreted as illegal. If similar products can be extracted from the forest, either sustainably or destructively, or produced on the farm, enforcement of the legislation (which is in any case difficult) would become very problematic.

(b) Improved market access may increase deforestation.

(c) Domestication of a tree and increased supply of a product may lead to lower prices and reduce the standing value of the wild trees (hence reducing the incentive to conserve them).

(d) Conservation and livelihood objectives may conflict with one another. In this research, the problem was partly resolved by integrating the two within a clear hierachy, i.e., investigating NTTP markets in order to identify a means of increasing the standing value of the natural forest. If the livelihood objective is more important than conservation, different approaches and activities may be appropriate, and additional measures may be needed to conserve the natural forest.

LONGER-TERM CONSIDERATIONS

Certain trends have become apparent which have implications for conservation and forest product markets. In many parts of Africa, population growth is likely to

continue and lead to on-going pressure on forest resources, resulting in the disappearance, or near-disappearance, of many of the products available today. Price rises associated with diminishing supply may increase the pressure still more, although in some areas where access to the forest is considerably improved (due to expansion of road networks), the supply may increase in the short term. If domestication of forest products occurs, it will adversely affect the livelihoods of the gatherers who, in the extreme case, will no longer have any incentive to preserve the forest through the use of sustainable harvesting techniques and selective extraction.

The effect of urbanization and medium-term increases in real incomes will vary according to the product. Cameroon has experienced considerable economic instability during the last 10 years and this, combined with the importance of the Nigerian market to the producers in the Mount Cameroon area, makes it very difficult to ascertain the medium-term importance of forest products in the consumption patterns of urban consumers. Some products, such as eru and possibly white cola, may have a relatively robust demand whereas others may eventually have only a limited market among the rural poor in areas close to the forest source.

Processing of forest products requiring substantial capital investment for a high value market is only likely to occur where there is a large domestic market or an export market. In Cameroon, *Prunus africana* fits into the latter category and in Brazil, certain medicinals, fragrances, and essential oils are produced for the domestic market. Occasionally, there may be a niche market for a natural forest product. Generally, however, the markets for such products, even internationally, are relatively insignificant; they command only a minor share of developed country markets, with the natural component normally forming only a small proportion of the finished product.

Although the outcome will vary according to product and location, the development of markets for NTTPs appears to hold little promise for forest conservation in the medium to long term.

POSSIBLE AREAS FOR FUTURE RESEARCH

More information on the technical aspects of cultivation would reduce the risk that farmers associate with NTTPs. In many cases, this would require additional research, much of which would be long term because of the length of the life cycles of the trees concerned. Clearly, given the vast range of NTTPs, there is a need to be selective, and it is suggested that priority should be given to the multiple-use products identified and characterized above.

In view of the long-term nature of research on trees, it is important to collate all previous data so that they are more widely available, and so that work will not be replicated; although some research has been published, many of the results have never been disseminated to audiences outside the country concerned.

Research into harvesting, processing and storage would be useful so that techniques requiring a lower input of labour could be developed for areas where labour is in short supply (and possibly seasonal), and so that producers could increase their incomes by processing and storing their products.

Urbanization is associated with important changes in consumption patterns. Urban consumers may switch from some NTTPs, particularly if these are considered to be 'inferior goods'. However, urbanization may increase the demand for some products (as seems to be the case with eru in Cameroon, and possibly white cola) and offer scope for domestication. It would be useful if these products could be identified in a number of countries so that comparisons could be drawn and the information made available.

The importance to producers and traders of a large and variable 'basket'of products has been emphasized. NTTP researchers should avoid concentrating their efforts on a search for a single product to meet all needs. If farmers are to domesticate NTTPs, they are likely to look for a number of products which more closely reflect existing marketing conditions, and which fit into their complex

farming systems and strategies. These complexities and the need for product choice should be addressed in research and development projects concerned with NTTPs.

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Appendix 1

FARMER CHECK-LIST

DATE
LOCATION
TIME

COMPILED BY:
CHECKED BY:

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1. Gender/age (approx.)/ethnic background.
2. Note products harvested.
3. Source of products: the farm or the forest? Are many people harvesting? Who is involved? Gender?
4. How long have you been harvesting/growing these products?
5. Do you know of anyone who is growing, or has tried to grow, these products on their farm? Do you know of anyone who has tried to persuade farmers to grow these products?
6. Has anyone cultivated other types of forestry products such as bush plum?
7. Where do you sell these products? Who does this? How often? Who do you sell to? Contracts? Which markets? Do prices differ in the markets? How is the produce transported to market?
8. Seasonality? At what times of the year are they most/least available? Has supply changed over the years?
9. What price do you sell at? What is the unit of measurement (buying and selling)? Has the price changed over the years?
10. How do you harvest these products? Can anyone harvest these products?
11. How do you process? Who does this? Where? What are the problems?
12. How long can you store the product? Where do you store it? How? Is it farmers or traders who store the product?
13. How is the road to the market?
14. What are the main problems in marketing this product? Could you sell more?
15. Sources of income. Rank in order of importance sources of income (e.g. forestry products, food crops, bushmeat, coffee, cocoa, off-farm work, etc.). Who is involved in these activities? 1= most important, 10= least important.
16. Seasonality of income from NTTPs? How does this compare with income from other sources (e.g. food crops, cocoa etc.). Draw up a seasonal calendar.
17. Other notes (land tenure, access to forest resources, estimates of losses, perceptions of the future).

Appendix 2

TRADER CHECK-LIST

DATE
LOCATION
TIME

COMPILED BY:
CHECKED BY:

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1. Gender / age (approx.) / ethnic background.
2. Note products sold.
3. Source of product: trader / farmer (gender)? If from farmer, is it coming from the farm or the forest? Number of suppliers?
4. How long have you been selling this product?
5. Do you know of anyone who is growing, or has tried to grow, this product on their farm? Where? Do you know of anyone who has tried to persuade farmers to cultivate this product? Where? Why don't people cultivate it?
6. Do you go to the traders / farmers or do they come to you? Where do you meet? How often? Time and location? Do you have contracts with your suppliers? How much do you buy? How long does it take to sell?
7. Seasonality? At what times of the year is it most / least available? Has supply changed over the years?
8. What price do you sell at? Buy at? What is the unit of measurement (buying and selling)? Has the price changed over the years?
9. Do you sell in other markets? Which ones? Why don't you sell in other markets? Are the prices different in other markets?
10. Is this your main source of income? Which is the most important? Which products are the most important?
11. In what form do you buy your product? Processed / unprocessed?
12. How long can you store the product? Where do you store it? How? Is it farmers or traders who store the product?
13. How is the road to the market? How is the road to the suppliers?
14. What are the main problems in marketing this product?
15. What are the consumer preferences?
16. Will you continue to sell this product in the future? Are there more or less sellers of this product than in previous years?
17. Do wholesalers provide any services to farmers or market traders such as loans, insecticides, etc?
18. For each market, count how many sellers (wholesalers and market retailers) there are of cola, eru, njangsang and bush mango.
19. Try and talk to the market master or mistress. How much does it cost to sell in the market? How easy is it to hire a stall? Are there more or less sellers of these products than in previous years?