Forest Products, Livelihoods and Conservation

Case Studies of Non-Timber Forest Product Systems

VOLUME 2 - AFRICA

Editors
Terry Sunderland and Ousseynou Ndoye

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Foreword

His Excellency, Henri Djombo
Minister of Forest Economy
and the Environment of the Republic of Congo

President of the Conference of Ministers in Charge of Forests of
Central Africa (COMIFAC)

Several authors have highlighted the importance of Non-Timber Forest Products (NTFPs) in the livelihoods of forest dwellers in Africa. These products, namely fruits, nuts, leaves, barks, cane and bushmeat in particular, have been used for centuries as food and medication by African forest dwellers.

The collection and sale of NTFPs is mainly the activity of poor populations and small traders. As a result, any action aimed at developing the NTFP sector will contribute to poverty alleviation in the same way as it does to the development of the agricultural sector.

The economic crisis of the 1980s in Africa, which resulted in the decline in the profitability of cocoa and coffee production on the international market, prompted the majority of farmers to diversify their sources of income by collecting and selling NTFPs in order to minimize the risks related to agriculture. The economic potential of NTFPs for poverty alleviation is very high compared to traditional cash crops such as coffee and cocoa. Research by the Center for International Forestry Research (CIFOR) has shown that the prices of certain NTFPs could compete with those of cocoa and coffee.

The lack of harmonization of the methodological approaches used in the past did not allow for a comparison of the case studies carried out on NTFPs in various parts of the continent and between Africa and other continents. CIFOR took an unprecedented step by initiating the project on World Comparison of NTFPs, financed by DFID. This project is based on 61 case studies, including 17 in Africa. The lessons learnt from the project were very beneficial to the researchers involved, and put their case studies in a global perspective. It is certain that in Africa, researchers who work on NTFPs do so in isolation. This does not enable them to exchange or learn from other researchers in the same field. The CIFOR project allowed various researchers

involved to interact for the first time, especially during workshops organized on each continent, and through the web sites created for this purpose.

There is no doubt that this volume, which is devoted to Africa, will help in guiding investments and decision making on NTFPs in the continent for years to come. This volume highlights the important role of NTFPs in the well being of millions of Africans, and it is also the basis of a plea to African governments to work together towards securing the access and property rights of populations. It also indicates the need to improve the performance of markets with a view to intensifying and diversifying viable local economies that have strong bases in national and regional networks. This will contribute to the emergence of a situation where forest resources will be preserved and the livelihoods of populations will be improved (a win-win situation). In my opinion, this intensification and diversification would be attainable in a sustainable way if the domestication of NTFPs were carried out at the same time and on a large scale, thus allowing rural communities to integrate trees into their farming systems.

The publication of this volume is very timely as COMIFAC, CEFDHAC and other sub-regional organizations plan to organize important meetings in 2004.

Foreword

J.E. Michael Arnold

Products other than timber and other industrial roundwood have always constituted a large part of the forest economy in developing countries. Individual products provide inputs and income directly to huge numbers of rural and urban households. In many countries the aggregate of non-timber forest products (NTFPs) contributes as much, if not more, to national product as industrial roundwood. However, their designation as 'minor' forest products reflects their relative neglect until quite recently. Produced and consumed largely outside the monetary economy, they attracted only limited attention and even less in the way of measurement and research.

The recent increase in interest in NTFPs has been a consequence of a number of shifts in developmental focus. With the evolution in thinking about the importance of rural development and poverty alleviation has come growing interest in how forests and forest products contribute to households' food and livelihood security. Within this framework forest product activities have begun to attract particular attention as being often one of the larger income-generating components of the non-farm part of the rural economy. In recent years this interest has been reinforced by shifts in development policy and strategy towards more market driven activity within this part of the economy.

At the same time, concerns that development activities be consistent with environmental integrity, and not prejudice the future potential of forest and land resources, have highlighted arguments that managing them for NTFPs might be less environmentally damaging than alternative uses of forests. In addition, the policy shifts that encourage devolution of control and management away from central governments to local institutions have drawn more attention to NTFPs as a potentially important incentive to local forest management.

However, the state of knowledge about these aspects of NTFP activities has not kept pace with this emerging and evolving perception of their

increased importance. Though quite a lot is known about the characteristics of many individual products, much less is known about their commercial performance and developmental linkages. Consequently, we are still at a quite early stage in the process of establishing general patterns of NTFP activity that could help us understand the factors that determine the circumstances in which they are or are not likely to be commercially successful and appropriate.

This knowledge is so rudimentary not only because of the low priority attached to NTFPs in the past, but also because of the complexities of researching and understanding such a highly diverse group of products, produced in such a wide range of different ecological and socioeconomic situations. Some are generated within predominantly subsistence livelihood systems, in order to generate the limited amounts of cash income needed to fill seasonal gaps or tide households over hard times. Others form part of livelihoods that are integrated into the market economy, and can form important and growing sources of household income and improvement. Many NTFPs are goods that fall out of use as incomes rise, or that can no longer compete when more efficiently produced alternatives become available in their markets. Others, in contrast, face expanding markets and generate attractive returns. Consequently greater exposure to market forces may disrupt or even overwhelm some NTFP trades, while offering new or expanded opportunities for others. It is therefore important to understand more precisely the factors that shape such possibilities and threats, in order to be able to identify what types of intervention might encourage the one, or help avert or alleviate the other.

There are also different scenarios to be considered on the supply side. Some NTFPs are extracted from existing 'wild' resources, others are produced from forest resources under some form of management, while still others are outputs of cultivated tree resources within a predominantly agricultural environment. Issues that we may need to know more about include how different forms of management relate to the different roles particular NTFPs play in the associated livelihood and socioeconomic system; the extent to which different NTFP production systems conform to conservation objectives and concerns; and the capacity of existing governance mechanisms to effect desired outcomes.

These three volumes represent one output from a substantial pioneering exercise designed to help fill some of these gaps in our present knowledge base. The study set out to determine what patterns of interaction between factors such as those mentioned above can be discerned from existing information, based on comparative analysis across a substantial number of different products in different situations in Africa, Asia and Latin America. This is not a random, or necessarily representative, sample of case studies. Their choice reflects the availability of the needed information, but the selection covers a wide range of product, circumstance and situation.

The analysis of information provided by this body of work has shown that important patterns can be identified. These are summarised in the introduction chapter of Volume 1. Each volume complements this comparative

analysis by providing a descriptive account of each case study that was contributed from a particular geographical region, prepared by the researchers involved. Together they provide a wealth of information about individual NTFPs and the situations in which they are being produced and traded, and indicate the extent of the research base drawn upon in the course of this important exercise. It is to be hoped that it will provide a starting point for further research and analysis to continue the process of improving understanding of the potentials for NTFP activities to contribute successfully to livelihood enhancement and sustainable forest use.

Chapter 1

Commercialisation of non-timber forest products in Africa: history, context and prospects

Terry C.H. Sunderland, Susan T. Harrison and Ousseynou Ndoye

INTRODUCTION

Since the 1970s, non-timber forest products (NTFPs) have emerged to take their place among the many aspects of forest use that guide natural resource decision-makers. In the early 1990s, NTFPs were mooted as a potential alternative to deforestation and land conversion activities (Falconer 1990; Plotkin and Famolare 1992). Some NTFPs have strong market value and it was postulated that the long-term value accruing from the harvest of these products could override the short-term gain of converting that forest or individual trees to other uses such as timber, agriculture, or plantations (Peters *et al*. 1989; Godoy and Bawa 1993). The attention of both the conservation and the social development communities was captured, and it was put forward that through the harvest of NTFPs, the often marginalised forest peoples of the world might capture valuable income and social benefits, whilst the aim of conserving of natural forests was achieved. If this were indeed the case, then the development and formalisation of the NTFP sector could at once meet the often-contradictory goals of development and conservation.

This optimism, however, was based on exaggerated claims of economic potential which were often over-simplistic assessments of 'value' (Southgate *et al*. 1996) and a limited evaluation of the complexity of economic, social and market oriented issues surrounding the NTFP category (Lawrence 2003). The advocating of increased commercialisation of forest products for rural livelihoods has also been questioned, and it is argued that many households barely cover the opportunity costs of collection, even for high-value forest products (Southgate *et al*. 1996) with the majority of the income accruing to those who transform the product or local élites who control the market (Dove 1993).

Despite these concerns NTFPs can form an integral part in conservation and development strategies (Ogle 1996), but this can only be undertaken with the full knowledge of a range of interlinked issues and requiring a multidisciplinary approach which incorporates social, economic, cultural, ecological and policy

contexts, so often missing in integrated conservation and development projects (Lawrence 2003). To date, and despite massive investment in the NTFP sector, a number of basic conceptual issues remain unresolved in order to better position NTFPs within conservation and development strategies (Ruiz-Pérez and Arnold 1996; Arnold and Ruiz-Pérez 1998).

To that end the Centre for International Forestry Research (CIFOR) developed the project 'Assessment of the potential for non-timber forest products–based development', which is an attempt to address this problem and to improve our understanding of NTFP systems through a comparative and formal analysis of a wide range of case studies of forest product development (Ruiz-Pérez and Byron 1999; Belcher and Ruiz-Pérez 2001). A standardised set of descriptors was developed to capture the key ecological, technological, socio-economic and institutional aspects of forest resource production, processing and trade.

The goal of this NTFP Case Comparison project is to:

- Create typologies of cases
- Identify conditions associated with particular kinds of development and conservation
- Develop and test hypotheses about forest product development

Collaborators from 27 countries, representing 47 institutions in Africa, Asia and Latin America were identified and recruited, contributing a total of 62 case studies to the analysis. The criteria for selecting individual cases included:

- That the forest product has demonstrably significant commercial and trade value (i.e. it is traded in the cash economy)
- That the production, processing and marketing system has been subject to prior research, with data available on at least 70% of the variables
- The presence of an individual or team of researchers willing to collect additional data to complete the case study documentation and to participate in the comparative analysis
- The need to include an adequate representation of a wide range of cases

This chapter discusses the multidimensional issues surrounding NTFPs in Africa through a summary of the 17 cases undertaken by researchers across the continent as part of the Case Comparison project, which are presented in this book. The subsequent chapters are grouped according to the end use of the particular NTFP: (i) medicinal, hygiene and cosmetic plants; (ii) fruits and oils; (iii) woodcarving and wood products; (iv) fibres and weaving products; and (v) animal products. The location of each case is presented in Figure 1. The most important characteristics of each case are presented in Table 1.

Background to the Case Comparison project in Africa

Seventeen case studies were performed in 10 different African countries on NTFPs with a range of production, processing and marketing characteristics. Each of the 17 NTFPs chosen has been commercially traded for at least half a century or, in the case of chewsticks (*Garcinia* spp.) and shea butter (*Vittelaria paradoxa*), for hundreds of years, and each product reveals strong annual sales figures, often in the US$ millions.

The life forms represented by the case studies are as follows. Twelve are trees (including one arboreal palm), three are climbing palms (rattans), one is a perennial herb and the last is an animal (elephant) product. With only one exception (*Dacryodes edulis*) the majority of the cases originate in the wild or are managed in a wild situation (*Vitellaria paradoxa* and, in certain instances, *Garcinia kola*).

However, as in Latin America (Alexiades and Shanley 2004) and Asia (Belcher and Kusters 2004), the availability of comprehensive information on high-value NTFPs in Africa is somewhat scanty and selection of the cases was undoubtedly subject to bias, particularly product-oriented and geographical. It is clear that often more information is available for widely commercialised species and this disparity may have led to bias on the selection of the product type. For example, six of the case studies presented are of wood products—four of woodcarving and one each of chewing sticks and fuelwood—meaning that over one third of the NTFPs cases presented rely on the felling and removal of the entire individual as in timber exploitation. In this instance, this selection may imply that the perceived NTFP paradigm of 'sustainable harvest' is not necessarily represented by these cases and the destructive harvesting techniques employed are probably not wholly representative of the African NTFP sector, which focuses on a much wider range of products than those that are wood-based.

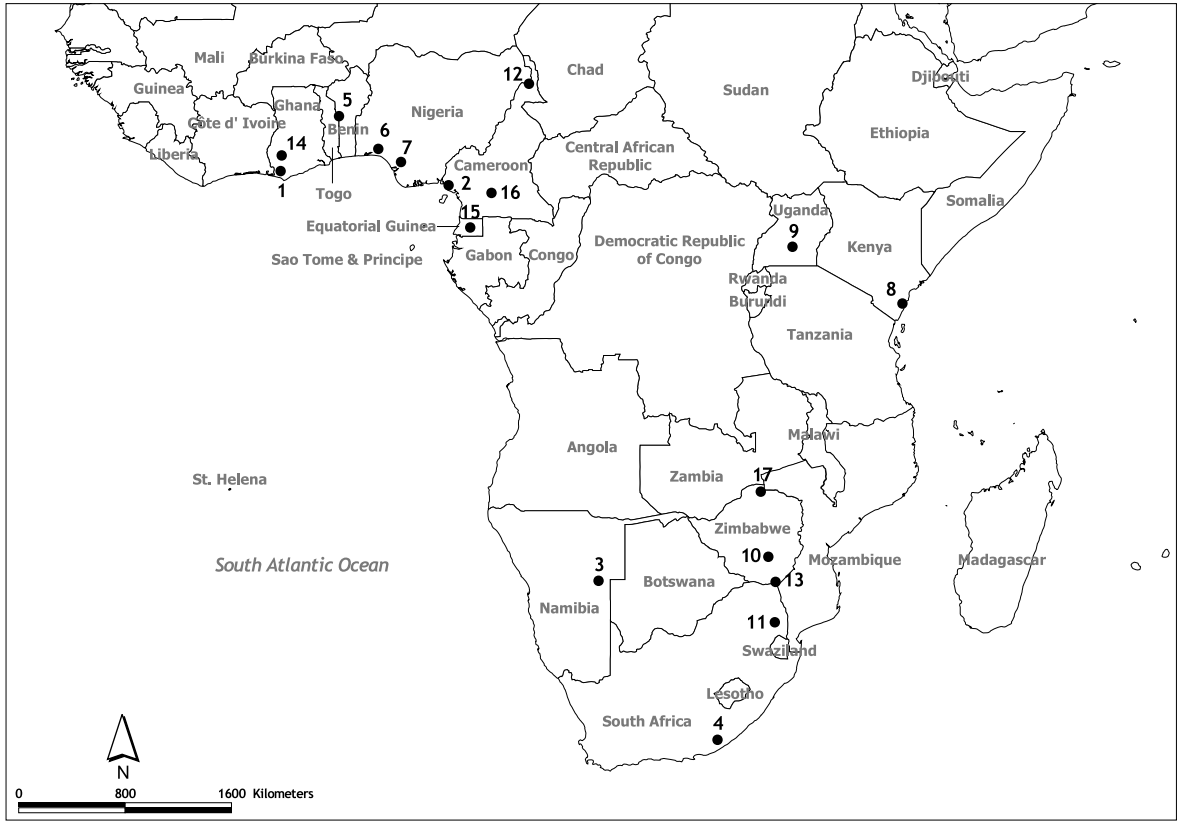
In addition, geographical bias is evident in the selection of the cases presented in this volume, since over 80% of the studies originated from central, southern and eastern Africa. Undoubtedly this reflects the long history of forest and woodland resource research and the advanced nature of our knowledge of the forestry sector within each region. Despite this bias, with the inclusion of a number of varied products from a wider geographic range, the 17 cases present a diversity of products, management practices and trade regimes that are relatively representative of the African NTFP sector.

Devil's claw (*Harpagophytum* sp.) highlights quality control and cultivation in relation to NTFPs, particularly for medicinal use where strict regulatory measures are increasingly imposed for exported devil's claw roots. The Sengwe palm (*Hyphaene petersiana)* was chosen because of its long history of use and coordination of studies completed on the palm use in the basket trade since 1993. While scarcity of NTFPs is not prevalent in all our case studies, it is of major concern for resources such as chewsticks in Ghana (*Garcinia spp.)* and *Pterocarpus angolensis,* which are facing scarcity issues. *Prunus africana,* which is internationally recognised by the Convention on the International Trade in Endangered Species of Flora and Fauna as an endangered species because of overexploitation, is probably the most endangered species in this study.

THE HISTORICAL TRADE OF NTFPS IN AFRICA

Trade patterns are historically deep rooted in Africa and have heavily influenced the economic development of the continent. The conquest of North Africa by Arab peoples in the seventh century led to the development of many trade links (Townson 1992). These included the extensive trade routes across the Sahara and those along the East African coast, where the seasonal shifts in monsoon winds determined the movement of small sailing vessels that carried people

Figure 1. Location of the case study areas



Source: ESRI Data and Maps 2002.

Table 1. Important characteristics of the cases

no.	country	species	common names	part of the resource used	dominant form of management	transformation*	scale of trade	national trade and export**	geogr. range***	authors
1	Ghana	*Garcinia kola; Garcinia epunctata*	Tweapeah, nsorkor	stem	wild	low	international	medium	medium	Blay, D.
2	Cameroon	*Prunus africana*	Pygeum, Red stinkwood, Wotango	bark	wild	high	international	medium	small	Ndam, N. and Tonye, M.
3	Namibia	*Harpagophytum procumbens*	Devil's claw, Arthritis root	root	managed	high	international	medium	medium	Wynberg, R.
4	South Africa	*Cassipourea flanaganii*	Umemezi	bark	wild	low	national	low	small	Cocks, M.L. and Dold, A.P.
5	Benin	*Vitellaria paradoxa*	Shea, Karité	kernels	wild/ managed	high	international	medium	large	Schreckenberg, K.
6	Nigeria	*Garcinia kola*	Bitter cola, Orogbo	seeds	wild/ managed	low	national	low	medium	Adebisi, A.A.
7	Nigeria	*Dacryodes edulis*	Safou, Bush pear, Orumu	fruit	managed/ cultivated	low	national	low	medium	Adewusi, H.G.
8	Kenya	*Brachylaena huillensis*	Mahogany, Muhu	wood	wild	medium	international	high	medium	Choge, S.K.
9	Uganda	*Polyscias fulva*	Mutati, Parasol tree, Setaala	wood	wild	medium	international	low	medium	Omeja, P. *et al.*
10	Zimbabwe	*Afzelia quanzensis*	Afzelia, Pod mahogany, Mukamba	wood	wild	medium	international	low	large	Standa-Gunda, W. and Braedt, O.
11	South Africa	*Pterocarpus angolensis*	Kiaat, African teak, Murotso	wood	wild	medium	national	medium	large	Shackleton, S.E. and Shackleton, C.M.
12	Cameroon	*Acacia seyal*	Seyal, White-galled acacia, Ulbe	wood	wild	low	national	low	large	Ijang, T.P.
13	Zimbabwe	*Hyphaene petersiana*	Ilala palm, Ilala	leaves	wild	medium	international	low	medium	Sola, P.
14	Ghana	*Eremospatha macrocarpa; Laccosperma secundiflorum; Calamus deerratus*	Rattan, Mfia, Ayie	stem	wild	medium	international	medium	large	Adu-Anning, C.
15	Equatorial Guinea	*Laccosperma secundiflorum; Laccosperma robustum; Eremospatha macrocarpa*	Aka, Rattan	stem	wild	medium	national	low	large	Sunderland, T.C.H. *et al.*
16	Cameroon	*Laccosperma secundiflorum; Eremospatha macrocarpa; Laccosperma robustum*	Maraca, Rattan, Ékè	stem	wild	medium	international	low	large	Defo, L.
17	Zimbabwe	*Loxodonta africana*	African Elephant, Nzou	elephant	wild	high	international	medium	large	Doré, D. and Bond, I.

* The degree of processing that is required: Low (e.g. fruit, bush meat or other products that can be used directly by the consumer), medium (e.g. fibre from grass used for weaving or handicrafts; wood for carvings); or high (e.g. essential oil extracted from plant and used in incense or as a chemical component in medicine).
** Value of national trade and export in 1998: Low (< 1,000,000 US$/year); medium (1,000,000 - 10,000,000 US$/year); high (10,000,000 US$/year).
*** Geographic range: Total area (global) over which the target species lives: Large (>1,000,000 km^2); Medium (<1,000,000>75,000 km^2); Small (<75,000 km^2).

and trade goods to and from the Persian Gulf, the Indian subcontinent and South East Asia (Iliffe, 1995).

During this period, a number of high-value products were transported from the forested regions of sub-Saharan Africa for consumption and sale in North Africa, Europe and the Persian Gulf region. For example, aside from palm oil and ivory, pepper (*Piper guineense*) and kola nuts (*Cola acuminata* and *C. nitida*) in particular were traded extensively from the Guinea and Akan (Ghana) forests to the sub-Saharan Sudanic belt (Oliver 1999). Shea butter (*Vitellaria paradoxa*) was also an important commodity traded from the region since the fourteenth century (Chapter 6). In the early mediaeval period, another forest product, melegueta pepper or 'grains of paradise' (*Aframomum* sp.) began to be transported to Europe for use as a spice and condiment (van Harten 1967). Its recorded use in Europe as early as 1214, long before direct European trade, is testament to the influence and extent of these trans-Saharan and Arabian trade routes (*ibid.*).

During the sixteenth and seventeenth centuries, Europeans began to explore the African coastlines, both east and west and, aside from their involvement in the lucrative slave trade, realised there was also considerable potential for further 'legitimate' trade (Isichei 1997). An extensive network of trading stations was established at strategic points along the coast, and iron goods, cloth and weapons were transported from Europe and exchanged for spices and condiments, palm oil and ivory (Oliver 1999).

The established trading stations provided steppingstones to colonial expansion and many European powers used their trading influence to annex considerable areas of land during the 'scramble for Africa' from 1870 to 1910 (Packenham 1991; Iliffe 1995). The colonial period was characterised by the trade of non-timber plant resources such as tea, coffee, cocoa and rubber between the continents (Hobhouse 1999), the commercialisation of which led to the conversion of large tracts of forest lands to plantation agriculture, particularly in the humid tropics, where they have become important contributors to many countries' GDP today.

A number of indigenous forest products became increasingly important during the colonial period and these included rattan cane from West and Central Africa being exported to Europe and other colonies for furniture manufacture (Hédin 1929) along with large quantities of shea butter (*Vitellaria paradoxa*) for the production of margarine and candles (Chapter 6). This latter product became so valuable, that it became a principal component in the agroforestry parklands of Benin described in Chapter 6. In addition, prior to the supply of Brazil rubber (*Hevea brasiliensis*) from plantations, wild sources of rubber for tyre manufacture were highly valued and the exploitation of native African rubber (*Funtumia elastica*) from the Congo Free State led to a brutal and exploitative policy of enforced collection for the brief period the activity was economically viable (Hochschild 1998).

More recently, high-value international markets for a number of NTFPs have developed from migrations of people from Africa, such as in areas of Western Europe and North America which have dense, often prosperous, African populations. These people are prepared to pay a premium for genuine African products, often paying up to 500% more than the local sales price (Clark and

Sunderland in press). Such high-value resources include chewsticks (*Garcinia* spp.) (Chapter 2) and a wide range of other products, particularly spices, condiments and foodstuffs (Tabuna 1999), including bush plum (*Dacryodes edulis*) (Chapter 8). In addition to the supply of NTFPs to the African diaspora in the West, a corresponding increase in tourism to the African continent over the past 20 years has led to increased demand for art and craft items, particularly baskets and woodcarvings—hence the relative importance of the woodcarving and weaving industries as presented in this volume (Chapters 9, 10, 11, 12, 13, 14, 15, 16 and 17). At the upper end of this tourist market, safari hunting based on the premise that local communities share the proceeds of the industry has led to the conservation of the wild elephant resource in Zimbabwe (Chapter 18). In addition, the formalisation of the herbal and cosmetic markets has led to a massive increase in the trade volumes of products such as pygeum (*Prunus africana*) (Chapter 3) and devil's claw (*Harpagophytum* app.) (Chapter 4), together worth some US$320 million annually.

ECOLOGICAL ISSUES

Is NTFP harvest sustainable?

In many respects, and depending on the plant part harvested, the exploitation of wild-sourced NTFPs can be sustainable. However, this requires an understanding of the plant's growth and reproductive characteristics and the application of harvesting practices that permit adequate reproduction or regeneration of the individual organism. Unfortunately even this basic information is woefully incomplete for most taxa. As is evident in nearly all of the case studies presented in this book, growing demand will ultimately intensify the pressure on wild populations. As with any wild plant or animal, if harvesting and mortality exceed annual production, the resource will progressively be depleted and become locally extinct (Cunningham 2000). When the value of an NTFP and the intensity of exploitation are low, human impacts on that species are likely to be minimal. When the value of an NTFP and the intensity of its use are extremely high, however, it is likely that the resource is being overexploited and supplies may become exhausted. For endemic taxa, or those with a limited geographical range, this has serious consequences for the species itself (Cunningham 1999). This is particularly the case with pygeum (*Prunus africana*), which is restricted to montane forest 'islands' across Africa and Madagascar (Chapter 3) and umemezi (*Cassipourea flanaganii*) which is endemic to the Eastern Cape (Chapter 5). In addition, species that are slow-growing, such as the ilala palm (*Hyphaene petersiana*) in southern Africa (Chapter 14) or take many years to become reproductively mature, such as the elephant (Chapter 18) and shea (*Vitellaria paradoxa*) (Chapter 6), are also more susceptible to population decline when overharvested.

In the majority of cases presented in this book it is important to recognise that threats to wild populations of NTFP species predominantly stem from overharvesting pressures and the lack of effective management of the individual NTFP populations, rather than the loss of habitat through logging or conversion to agriculture or accompanying burning[1]. In fact, logging and other forest

disturbances (for example, shifting and mixed agriculture) are not necessarily inimical to NTFP production (Laird 1999). Some NTFPs are found in primary forests, but many, particularly rattan canes, respond extremely well to disturbance and are a common component of secondary forest regrowth (Chapters 15, 16 and 17).

Peters (1994) asserts that harvesting seeds and fruits only adds to what is normally high seed mortality and may not adversely impact plant regeneration[2]. The 'fruits and oils' case studies presented in this book support this theory (Chapters 6, 7 and 8). NTFPs prized for their wood, roots or bark, however, are particularly prone to unsustainable use as harvesting either seriously damages or kills the parent plant. For example, the harvesting practices that partially or wholly strip bark from live trees such as pygeum (*Prunus africana*) and umemezi (*Cassipourea flanaganii*) expose them to ring-barking and exposure to stem-boring insects that can result in considerable postharvest tree mortality (Chapters 3 and 5). Likewise the use of wood products for carving, chewsticks or fuelwood also results in the immediate death of the individual organism (Chapters 2, 9, 10, 11, 12 and 13), as does the sport hunting of elephant (Chapter 18).

Responses to scarcity

As discussed above, higher demand increases pressure on the resource and as resources become depleted three main strategies are employed to militate against shortfalls in supply: (i) to travel further to find supplies, (ii) simply to substitute the particular forest product with a similar product or (iii) to develop more intensive or cultivated sources of supply (Cunningham 2000).

Increased harvesting range. A typical first response to resource scarcity is to increase the harvest range (Cunningham 2000). For example, in all of the rattan case studies presented in this book, it is reported that the first response to scarcity is to travel further into the forest to find adequate supplies of cane to feed the rural and urban markets (Chapters 15, 16 and 17). However, it is commonly found that local harvesters do not factor in the increased opportunity costs of the additional labour needed to collect these resources from a greater distance and that the 'payment received by households [for NTFPs] barely covers the opportunity cost of labour employed in harvesting' (Southgate *et al.* 1996: 1). As the demand for rattan products continues to grow in West and Central Africa, this response will undoubtedly lead to further scarcity and local extirpation[3].

Substitution. In a number of instances, when a preferred species becomes scarce, a similar product is utilised in its place. For example, in the case of chewsticks in Ghana, the preferred *Garcinia* species, *G. kola* and *G. epunctata*, are often replaced with other, less desirable chewstick species (Chapter 2). The same occurs in the case of woodcarving, where indigenous species that have become overexploited are being replaced with fast-growing indigenous or, latterly, exotic species, particularly to supply the thriving Kenyan and Zimbabwean woodcarving industries (Chapters 9 and 10). Indeed, substitution of *Pterocarpus angolensis* with appropriate exotic species is being advocated to militate against the increasing overexploitation of this resource (Chapter 12).

Intensification: is cultivation the answer? Unlike the NTFP resource base in Latin America (Alexiades and Shanley 2004) or Asia (Belcher and Kusters 2004),

the majority of NTFPs in Africa are predominantly wild-sourced. This is further illustrated by the case studies presented in this book, in that only one species, *Dacryodes edulis*, is actually 'domesticated'[4] in the true sense and is widely cultivated in compound gardens throughout Central Africa (Chapter 8). Although shea (*Vitellaria paradoxa*) occurs on agroforestry parklands in Benin, where it is retained within agricultural systems along with other utilitarian species, it is not intensively planted (Chapter 6). Despite the current lack of intensification in the African NTFP sector, many of the case studies presented in this book advocate the encouraging of cultivation to militate against the increasing overharvesting of these products (Chapters 2, 3, 4, 5, 7, 9, 15 and 17). This is often a secondary response to overharvesting (Cunningham 2000). Indeed Homma (1992) suggests that increased demand of a product leads to increased harvest from the wild resulting in the loss of economic viability of the wild resource and encouraging the process of domestication. It appears, however, that the socio-economic and marketing conditions prevalent in the African natural resource sector discourage the transition from wild harvesting to the provision of cultivated sources of supply for a number of reasons elaborated on later in this chapter.

Better management of the wild resource? Without doubt the best prospects for the sustainability of many wild resources are to develop sustainable harvesting regimes grounded in good ecological science coupled with holistic forest management systems compatible with the notion of 'extractivism' (Boot and Gullison 1995). For example, Peters (1994) outlines the necessary six components for the 'sustainable exploitation' of commercially traded NTFPs:

- Species selection
- Forest inventory
- Yield studies
- Regeneration surveys
- Harvest regime assessments
- Harvest adjustments

This model stresses the importance of a constant flow of information about the ecological response of a species to varying degrees of exploitation and that without continuous adjustment sustainable harvesting fluctuates (Peters 1994). The investment in basic research needed to implement such a regime, however, is often too great to be economically rewarding and, as can be seen from the cases presented in this book, such basic knowledge is often missing or incomplete. This is the case not just in the African context but is also prevalent for species that have been harvested and traded commercially for hundreds of years such as Brazil nut (Boot and Gullison 1995). In short, huge investment in long-term ecological research is required to develop sustainable harvesting models of high-value NTFPs from wild populations; research that is notoriously 'unsexy' to donors. This situation, coupled with the need for integrated community-based monitoring systems (Cunningham 2000), examples of which are few and far between, suggests that such a model is almost impossible to implement.

SOCIO-ECONOMIC ISSUES

Household strategies

During the wider analysis of the Case Comparison project, Belcher *et al*. (2003) identified a typology of livelihood strategies for NTFPs and noted clear differences among the three continents in the reliance on forest products by rural and urban households and the importance of such products to them. In our case studies from Africa, the majority of the products (14 out of 17) contribute less than 50% to household incomes and in nine cases, less than 25%. In only three cases did the particular NTFP contribute significantly (more than 70%) to the household incomes. Nevertheless, in many cases this contribution to household income is particularly important at times of economic need, such as the payment of school fees (Chapters 16 and 17), or provides seasonal income when agricultural labour needs are low, particularly in the rainy season (Chapters 7 and 8). There are then stark contrasts in the case studies outlined in this book in that some NTFPs are used predominantly at the subsistence level while others are highly integrated into the cash economy. For example, cases characterised by a 'coping strategy' (that is, integration into the cash economy of less than 50%) are predominantly preoccupied with other agricultural or other natural resource-based activities. Forest products are extracted predominantly from the wild, often in unmanaged, open-access situations; together with agricultural products they provide the main access to the cash economy. These products also provide an important economic safety net through product diversification, and in the context of Homma's model (Homma 1992) these products represent the 'expansion phase' of NTFP economic development.

The three 'specialised' cases are characterised by the respective products providing the greatest contribution to the household economy in the context of a relatively high integration to the cash economy. It is unsurprising that these cases focus on the predominantly urban production of craft materials such as wood carvings (Chapter 12) and rattan baskets and furniture (Chapter 16) and also on the fabrication of specialized hygiene products with a large, well-organised market, such as chewsticks (Chapter 2). However, in light of our case studies, these specialised cases seem to be more of an exception to the rule, and the NTFP sector in Africa is characterised by the prevalence of 'coping strategies'.

Interestingly examples of the 'diversified strategies' identified by Belcher *et al*. (2003) are rare in the African context, as evidenced by the case studies presented here. This may be due to the predominant lack of product intensification of NTFPs on the continent through cultivation or domestication or the relatively low value of wild harvested NTFPs in comparison to other income generating activities such as agriculture.

Tenure issues and product intensification

Sustainable NTFP management or forest conservation plans will need to begin with a clear understanding of local land and resource tenure and access rights. For example, research conducted in Cameroon concludes that even for

economically valuable NTFPs few management techniques are applied under traditional harvest practices (Malleson 1999; van den Berg *et al*. 2001). The case studies in this book serve to emphasize this situation. Overlapping layers of class, education, elite and statutory 'rights' overlying basic traditional tenure systems will affect how innovations and management options are implemented, and together these relationships will play a direct role in management successes or failures.

In many of the case studies described in this book the lack of management regimes is precipitated by the fact that the resources are considered 'open-access', for which there is no customary control on harvesting. Destructive harvesting techniques that increase as market pressure begins to build are often a direct result of situations where property rights are poorly defined or not at all (Dove 1993). Similarly, such insecure tenure discourages the investment in intensification through cultivation and this is particularly characteristic of the African NTFP sector, which is heavily reliant on wild-sourced forest products. It has been argued that even if the open-access problems that lead to destructive harvesting were resolved, increases in the value of NTFPs might not benefit the conservation of tropical forests or the livelihoods of their inhabitants (Southgate *et al*. 1996). The reason given for this partly historical observation is that as an extractive commodity becomes scarce, cultivation outside the natural ecosystem has been a characteristic response. However, often such intensification efforts exclude the original resource users with the majority of resultant profits accruing to local élites or commercial concerns (Dove 1993). In addition, removal of an economically valuable product from the forest economy reduces the value of the standing forest leading to more lucrative, often destructive land-use alternatives (Homma 1992). This situation is particularly highlighted by the devil's claw (*Harpagophytum* spp.) case study where Rachel Wynberg articulately describes the inequity caused by intensification:

> '[With the issue of cultivation] two trends are worth noting. First, there is a high level of competition among projects, evidenced by a complete shroud of secrecy (often formalised through confidentiality provisions in contracts), an astonishing absence of collaboration and a distinct lack of published information about the technical aspects of the disparate projects. A second and related trend concerns the increasing involvement of the pharmaceutical industry and private sector in sponsoring and initiating cultivation projects, a development that reflects the vested interests of the industry to secure long-term supplies of the drug and to ensure a high quality product. With a few notable exceptions this is associated with the virtual exclusion of local research institutions from participation in the technical work required and negligible involvement of rural communities in the establishment and ongoing maintenance of projects. Instead, most cultivation initiatives to date draw upon foreign scientists and are located on the lands of commercial white

> farmers in South Africa or Namibia. In all likelihood these patterns do not reflect any technical constraints associated with the difficulties of cultivation, but rather a preference on the part of industry to follow paths of greatest ease.' (Chapter 4)

The HIV/AIDS pandemic has had an enormous impact on the workforce. This is particularly the case in southern Africa where the highest global instance of infection exists; one in five adults is HIV positive and 4.2 million new cases are reported per year. While the instance of infection is decreasing in some countries, such as Uganda, there is a notable increase in others, such as Kenya (Kiai *et al.* 2002). While health issues were not discussed in great detail in our Case Comparison studies, the great loss of life in Africa has had a strong effect on land tenure and reform issues. This is particularly relevant to land transfer problems facing survivors, especially orphans and single mothers struggling for supplemental income generation for survival.

Gender issues

The gender differentiation surrounding NTFPs in Africa is particularly interesting and the case studies presented in this book highlight the increasingly important role of forest products in rural livelihoods, particularly for women. Although some industries are entirely male dominated, for example woodcarving (Chapters 9, 10, 11 and 12), rattan furniture production (Chapters 15, 16 and 17), bark harvesting of *Prunus africana* (Chapter 3) and sport hunting of elephant (Chapter 18), women play a dominant role in the marketing and final sale of many products. For example, 85% of the chewstick trade in Ghana is coordinated by women who organise themselves in a hierarchical trading system (Chapter 2). This level of organisation among female traders of forest products and foodstuffs, often led by market 'Queens', is a common occurrence in the large urban markets of Ghana (Clark 1994). The harvest and sale of fruits and nuts also seems to be a predominantly female economic activity as indicated by the studies of *Garcinia kola* (Chapter 7), *Dacryodes edulis* (Chapter 8) and shea (*Vitellaria paradoxa*), with the trade of this latter product being controlled exclusively by women (Chapter 6). The elderly population is also very much involved with shea, which is seen as a relatively 'simple' activity for them to manage.

Likewise, the local collection and sale of fuelwood in Cameroon is also dominated by women, often assisted by adolescent children (Chapter 13). Interestingly in the last case presented, the involvement of men in fuelwood collection has been to the detriment of the resource; women are more involved with collecting fallen branches and otherwise naturally dry material, whereas the involvement of male harvesters has precipitated significant felling of individual trees which are left to dry before being split and traded. Another male–female dichotomy is also described in the case of umemezi (*Cassipourea flanaganii*) where, although over 80% of the harvest and trade is undertaken by women, the few male traders are those that are willing to travel further to sell the bark and hence accrue the greatest revenues from the trade (Chapter 5).

Equity issues

Issues of NTFP commercialisation undoubtedly underpin issues of equitable distribution of benefits (Neumann and Hirsch 2000). Browder (1992) draws on available research from the Amazon and suggests that collecting NTFPs does not necessarily greatly benefit rural livelihoods and that the living standards of households that rely on forest products compare poorly with even the meager socio-economic norms of the rural Amazon. Southgate *et al*. (1996) suggest that, even for highly commercialized products, the greatest share of the profits is normally realised at the processing level, that is, at the top of the domestic marketing trade. This is a view also shared by Dove (1993: 18), who suggests that 'The more successful the [resource] development, the more likely it is that external political and economic forces will become involved, and the less likely it is that local people will be able to retain control.'

In this same vein, a number of the case studies presented in this book exhibit clear and characteristic issues of inequity in the distribution of benefits, particularly for rural harvesters. Most notably, these instances often occur with high-value products that undergo moderate to high levels of transformation and are sold in international markets. The tangible lack of benefits for most NTFP producers seems particularly to affect those involved in the sector as a coping strategy, as discussed above. In contrast, households involved in NTFPs as a specialized strategy attain the greatest level of benefits as they are often involved in both the production and transformation aspects of the system.

Another issue regarding equity is benefit sharing, which is specified in the Convention on Biological Diversity (CBD Article 1) as 'the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding' (Glowka *et al*. 1994: 15).

This is particularly relevant to medicinal plants for pharmaceutical research and drug discovery and incorporates technology transfer as a component to supply benefits back to local people who supply extractable resources. This issue is particularly relevant for devil's claw (*Harpagophytum* spp.), a traditional medicinal plant that now forms the basis of a US$100 million per year industry in which the benefits accrue almost entirely to the processing and transformation actors along the marketing chain while a very low proportion of the international trade value benefits the domestic producers. Since the commercialisation of the product resulted from ethnobotanical studies, it represents a classic example of 'biopiracy'.

Cultural issues

NTFPs are valued not only for their market value; cultural, social and spiritual attributes also add to the value of the products. Though not easily quantified, these characteristics may in some cases be as important to people as the economic value (Davidson-Hunt *et al*. 2001), an issue that is often overlooked. This is particularly germane to the case comparison studies where the products have been traded for decades. For example, one researcher noted under 'study limitations' the way to 'meet a chief is to introduce yourself with a gift of at

least 10 cola nuts. These procedures were followed so as to gain the villager's cooperation and to be seen as showing respect'. This ended up facilitating discussions with the villagers as to the kind of research being conducted (Gakou and Force no date).

The case study of devil's claw (*Harpagophytum* spp.) in Namibia (Chapter 4) describes how the harvesting methodology of these medicinal roots has contributed to Africa's long 'story' of persecution of ethnic groups, particularly the Omakeke San, the primary harvesters. Even though it is pointed out that there are no anthropological studies in relation to the trade of devil's claw, groups such as the Omakeke San have a complex history tied closely to the sociopolitical structure in Namibia. Postindependence resettlement placed them on government-owned farms with other ethnic groups in an area that is one of the most arid and marginal for agricultural production. Facing limited options for work, the Omakeke San are not unlike the people of neighbouring countries where extreme poverty and lack of education define the harvesting of devil's claw as a 'low status' activity. A similar situation exists for chewing sticks in Ghana, where harvesting is labeled a 'menial' activity (Chapter 2).

Further discussed in Chapter 14 is the link between cultural practice and commercialisation: cultural tradition controls the Sengwe (*Hyphaene petersiana*) harvesting in Zimbabwe, which begins with a 'kraal head has its own designated tapping fields and so the leaf harvesting areas. The chiefs, working through headmen, have overall control of palm utilisation. To date they have managed to stop the transportation and sale of unprocessed palm leaves. So far, the impact of traditional rules has been generally positive as it has resulted in the palm being conserved whilst everyone in the designated area has access to the palm for leaf harvesting'.

MARKET AND TRADE ISSUES

Trade perspective and history

The chapters of this volume show the importance of NTFP markets and their role in improving the livelihoods of farmers and traders involved in commercialisation of these products. Like other agricultural commodities, NTFP markets follow the law of supply and demand. The supply of NTFPs is a function of the amount of product harvested as well as the quantity stored. because of the seasonal nature of NTFP production, storage becomes important to insure availability throughout the year. The demand for NTFPs is a function of the quantities buyers are willing and able to purchase, which depends on the amount of capital they have at their disposal and the signal of scarcity in local, national, regional and international markets (Ndoye *et al*. 1997).

One feature that NTFP markets in Africa have is that they are thin, meaning that a small change in production (supply) has a large effect on the quantity marketed (Ndoye *et al*. 1999). This changes the role of the markets in assembling and distributing forest products from year to year. For example, the past five years have statistically shown a three- to sixfold increase in the amount of devil's claw (*Harpagophytum* sp.*)* traded (Chapter 4). While local trade of this product is centuries old, the international trade history dates

back just 50 years when Western pharmaceutical companies took interest in the product for medicinal research and pharmaceutical profit.

Local markets for NTFPs. Local markets contribute to the well-being of rural households by enabling farmers to sell their forest products. In these markets, the process of price setting between harvester (farmer or seller) and trader (buyer) involves bargaining (haggling) to reach an equilibrium price somewhere between the lowest price the seller is willing to accept and the highest price the buyer is willing to pay (Ndoye *et al*. 1997). Haggling is common in African markets and is highlighted in Chapters 9, 12 and 15. Accessibility of and proximity to the markets are important variables that affect farmers' willingness to market their forest products (Chapters 8 and 12). Local markets are affected by many inefficiencies caused by regulatory enforcement officials (police, gendarmerie, forestry officials, municipal authorities), which increase transaction costs. This is particularly the case for rattan (Chapters 14, 15, 16 and 17). One immediate consequence of such practices is the increase of the level of extraction or harvest to meet these costs. Woodcarvers in South Africa face particular difficulties when dealing with regional trade for crafts as opposed to more locally consumed furniture (Chapters 9, 10, 11 and 12).

Adding value. Because there are many players involved in adding value from harvest to market, trade data is often fragmented and unavailable for the entire process as monitoring and seasonality are inconsistent. In the case study of woodcarvings from *Pterocarpus angolensis*, Shackleton and Shackleton conclude that specialized market studies are needed to further the understanding of this century-old trade (Chapter 12). Urban markets involve migration and people who bring their rural cultural preferences and uses of NTFPs with them.

What is often overlooked in the value chain is the role of intermediaries: (1) intermediary traders who buy from primary producers and sell to larger volume traders, processors, exporters or retailers; (2) export processing services, which facilitate links between producers and commercial buyers and (3) intermediary marketing organisations, which identify market linkages between producers and appropriate buyers and are paid a commission for each deal facilitated (Belcher and Schreckenberg unpublished draft).

Postharvesting handling of NTFPs is vital to product marketability. Consistent storage and transportation, however, are unpredictable in Africa where infrastructure continues to be weak in most areas. This issue could be particularly detrimental in relation to medical plants, which on the open market demand a high level of quality control. Another related issue is scale-up. With demand fluctuating and issues such as fad or niche markets in the U.S. and elsewhere, technical issues such as product scale-up are difficult to judge. This is significant for large internationally marketed products such as shea which is processed in a variety of ways (Chapter 6).

Regional and international markets. Many authors have highlighted the importance of international trade in NTFPs in West and Central Africa, both between neighbouring countries and with countries outside Africa (Falconer 1990; Tabuna 1999). Several reasons explain this importance.

(a) Eco-physiological: The production of some NTFPs is highly seasonal. For example, *Dacryodes edulis* production is from June to November in countries like Cameroon and Nigeria and from November to April in Angola, Congo, Democratic Republic of Congo and Gabon. This seasonal variation through the region stimulates trade among countries.
(b) Linguistic and cultural: It is common to find close ethnic groups living on both sides of a given frontier, consuming similar products and with significant trade among them (Ruiz-Pérez *et al*. 2000).
(c) Migration patterns: Many countries in Europe and North America have important communities of migrants from Africa. For example, NTFPs such as *Dacryodes edulis*, *Gnetum* spp., *Ricinodendron heudelotii* and *Irvingia* spp. are found in shops specializing in tropical products in Brussels, Lisbon, London and Paris (Tabuna 1999).
(d) Trade value and volume: The majority of NTFPs treated in this volume (65%) are traded in international markets. The value of trade is medium (US$1 million to US$10 million per year) for 41% of the cases. Only one NTFP, *Bachylaena huillensis,* used in woodcarving in Kenya, has a high value of trade (more than US$10 million per year). Shea butter is intricately linked to other large-scale NTFP exports such as cocoa and cashews. As pricing fluctuates for one market, the other follows suit or acts as a substitute. However, export figures vary from company, government and agency (FAO) statistics—for shea from 7,870 tonnes to 13,000 tonnes of kernels in just one year (Chapter 6).

Trade Organisation and Development

Fair trade. 'Fair Trade' organisations promote 'eco-harvested' products with an emphasis on rainforest products (Shanley *et al*. 2002). Fair trade organisations work with producer co-operatives that use democratic principles to ensure that working conditions are safe and dignified and that producers have a say in how their products are created and sold. Co-operatives are encouraged to provide benefits such as health care, child care and access to loans. They encourage producers to reinvest their profits into their communities (www.fairtrade.org).

Fair trade initiatives are hindered, however, by a number of social and institutional constraints. At the local level, these include a lack of tenure security, insufficient monitoring capacity, poor business and management skills and low levels of organisation. Inadequate quality and resource management also present major hurdles. At the international level, monopoly control severely compromises the ability of local producers and range states to receive optimum benefits and prevents range states from adding full value to their resources. Cultivation efforts represent a further threat to ensuring a reliable stream of benefits for harvesting communities.

Some fair trade organisations work to shift processing and packaging activities to the developing world, so that as much work as possible will remain in the producer country. Often, such activities are performed abroad, depriving

the neediest countries of the opportunity to boost their incomes. With concepts such as these being adopted into practice in an equitable manner, solutions are possible (www.fairtrade.org). Again, Dove (1993) points out the need to recognise that this is not often the case where plantation and NTFP enterprise 'owners' are the most likely to gain. Likewise on the consumer side: 'The responsible consumer is only slightly more enlightened; they are willing to make their contribution, but they are naive about the many complex issues' (Wilkins 1999).

The Fair Trade Federation 2003 report (www.fairtrade.org) details a 37% increase in North America and the Pacific Rim for fair trade products. Sales reached US$250 million. However, most trade continues to be skewed to international trade agreements, such as the North American Free Trade Agreement and the General Agreement on Tariffs and Trade, which reduce barriers to trade and investment for firms. As a result, the gap between producers (the poor) and investors (the rich in the 'north') continues to widen. In addition, it must be remembered that consumers are often more interested in protecting ecosystems, not necessarily the people who live in them (Clay 1993). Therefore, it is up to in-country managers to promote fair trade issues and justify the reason behind the subsequent increase in price.

Impact of commercialisation. The income obtained from the sale of NTFPs enables farmers to meet their basic needs and those of their families (purchase of medicinal products, kerosene, soap and clothes; construction of houses; payment of dowry and school fees) (Chapters 3, 12, 13 and 17). The income farmers get from selling NTFPs enables them to finance other lucrative activities such as purchase of pesticide for cocoa plantation (Chapter 17). Income received from the sale of NTFPs can also help rural communities invest in water and electrification projects. This is particularly so in the case of *Prunus africana* in Cameroon (Chapter 3).

Training producers to commercialise their products, as in the case of the Sengwe palm in South Africa, is assisting them by researching the sales opportunities in distant markets. In addition, training is provided to analyse and capitalise on market trends. Yet again, without a sustainable supply and equitable benefit sharing of Sengwe or the many other NTFPs analysed here and elsewhere, the marketability declines (Chapter 14). In order to improve the market position of NTFPs, one must analyse the commodity 'value chain' in much greater detail. Several strategies can be used to increase returns, such as vertical integration (e.g. packaging), improved quality and efficiency, horizontal integration (e.g. co-operation with other small enterprises) and targeted marketing (Belcher 1998).

POLICY AND DEVELOPMENT

The global Case Comparison project provides useful examples of success stories, and failures, in relation to NTFPs. There are many government agencies working closely with non-governmental agencies such as CIFOR in organising a vision for NTFPs. Because of variability in NTFPs from wild harvested species such as devil's claw (Chapter 4) to field and fallow parkland harvested species such as shea butter (Chapter 6), it is difficult to assess where government policies can

assist local producers in the form of organisation, sustainable harvesting strategies and forestry reserves support. Clearly, a synergy must exist for a product to move from harvesting into the commercial sector and continue to provide a sustainable yield, economic benefits, and a low ecological impact. But is lumping NTFPs into the forestry sector, in itself, adequate protection?

An example of a foreign ministry working well with other governmental agencies is an extensive study underway in Zimbabwe for which CIFOR has teamed up with the U.S. Agency for International Development's CAMPFIRE programme to study the impacts of the wood carving industry. A potential answer to its success is likely the incorporation of local people in the decision process recognising the potential negative impact on the forest as a resource for production of wood carvings (www.cifor.cigiar.org). The Shackleton and Shackleton study on woodcarving observed that organisation of local producers was a key constraint in the analysis (Chapter 12). Poor business and organisational skills could be issues taken up by government agencies such as the trade ministry. However, with expertise drawn from other institutions, such as CAMPFIRE, alternative strategies can prove useful to both industry and local people.

THE WAY FORWARD

NTFP case analyses such as those presented here continue to facilitate a sound understanding of NTFP markets and their potential to further enhance livelihood strategies of people in Africa. At the same time, scientists, politicians, non-governmental organisations and research institutions race to study the various components of domestication of wild species of NTFPs as a possible solution to sustainability. The third, and perhaps most critical, component is the fact that ease of penetrating distant markets with NTFPs while still sustaining local use markets is a delicate balance. The international marketing of biodiversity products brings together at least two starkly different cultures and economies. To succeed, projects must be carefully designed to accommodate the distinct needs of these disparate worlds, and good communication among all parties is a must.

In the case of devil's claw, recent regulations such as permitting created strict harvesting periods for an NTFP traditionally being harvested year-round in an arid region where livelihood options are limited. Because it is now endangered, international support for harvesting monitoring is enforced by the Convention on the International Trade in Endangered Species of Flora and Fauna on an international level. But does this adequately assess the local consumption of devil's claw? The financial benefits to the harvesters rarely exceed 0.85% of the retail price. Surely a more equitable policy structure is the key to long-term sustainability, on both an economic and an ecological level for this high-in-demand medicinal plant. How can we continue to develop a link between foresters, scientists and government agencies and economists, social workers, village leaders and the artisans and producers of NTFPs?

According to Dove (1993) the 'widely accepted explanation of tropical deforestation attributes it to the poverty of its native inhabitants'. His contrary view is that the poverty of forest dwellers is an outcome of the exploitation of

forest resources by powerful outsiders. One aspect of this argument is the suggestion that NTFPs are unlikely to be a solution to poverty, as any product that is valuable and for which commercial exploitation is viable, will be taken over by such outsiders. While this theory has been disputed in terms of having universal or even wide applicability, it does have plausibility and, if true, really calls into question the whole notion of conscious attempts to alleviate poverty through forest enterprises (Southgate *et al*. 1996).

The lessons learned from the case studies are as variable as the products themselves, but there is a resounding complaint of lack of organisation among workers and lack of access to administrative assistance such as credit organisations. In addition, a main conclusion was the need for further studies, whether to assess the urban markets in more detail or to look deeper in the pricing of NTFPs at a subsistence level.

What we can learn from case comparison studies such as these is a cohesive strategy which (1) includes structured policy to promote NTFPs, (2) promotes knowledge of and safe and sustainable access to resources, (3) responds to needs for legislation and regulations and assesses and improves technologies, (4) organises producers, (5) builds capacity and promotes human resources, (6) continues research into domestication, (7) supports technical and marketing strategies and (8) looks to trade history of existing NTFPs and assess market potential prior to introduction of new NTFPs.

Monitoring international trade of NTFPs can be impeded by lack of demand, inconsistency of data from local processing facilities through the market chain and sustainable supply. In turn, these factors are linked to lack of investment. Private capital lacks the will and interest, while state capital lacks the focus, planning and knowledge. A potential role for researchers to help maintain interest in NTFPs by investors and consumers will depend on modernisation of NTFP production. For woodcarvers in Africa, this is a particularly crucial step as they face moving from local sales to tourists into the wholesale market (Chapters 9, 10, 11 and 12).

NTFP commercialisation should start with products already on the market. Introducing new products can take up to five years for foods, 10 for personal-care products and 20 for pharmaceuticals (Clay 1992). All case studies included here are already considered to be infiltrated into trade. The key now is to learn from case comparisons, such as those presented here, as to how NTFPs in Africa can remain a sustainable industry and actually increase the economic position of the local people while also tackling modernisation.

CONCLUSION

For products such as shea, a commodity heavily within the local and international trade, the options for market sustainability and growth are interdependent on other traded commodities such as cocoa and cashews (Chapter 6). On the other hand, to achieve a fair and sustainable trade base for medicinal plants, such as for devil's claw (Chapter 4), there is a strong need to recognise market constraints of this single product, such as lack of tenure security, poor monitoring, a dwindling resource base and lack of business skills. The differences between these two studies and the remaining 15 are

inherent to NTFPs—they vary widely in material composition (from wood to elephants), use (medicinals to drumming) and market potential.

The following case studies, spanning 17 NTFPs, reveal an ancient system of resources moving through space and time, resources which further enable African people to benefit from their marketing capacity locally. As our case studies show, establishing or strengthening markets for NTFPs can help to encourage renewable resource conservation and can contribute significantly to rural livelihoods. However, for NTFP extraction to 'save' large tracts of forests and woodlands, the problem of attenuated land and property rights will have to be resolved, just as it must be resolved if eco-tourism, selective logging or any other economic activity is to be conducted in an environmentally sound manner. In addition, attempts to raise the market value of NTFPs, and therefore rural incomes, could be self-defeating if agricultural production of these products originally harvested from the wild is the result. In addition, understanding the political economy is crucial in addressing the economic, social and institutional contexts in which NTFPs are harvested and traded.

ENDNOTES

1. However, land conversion to agriculture in Benin is affecting the regeneration of *Vitellaria paradoxa* (Chapter 6).

2. But Philips (1993) suggests that fruit production from tropical forest is far less than most conservationists assume.

3. Fortunately, the commercial species of rattan favoured by artisans are geographically widespread throughout the lowland forest regions of Africa (Sunderland 2001).

4. Domesticated in the sense that the desirable traits of the species have been selected over generations so that the cultivated resource is genetically different from its wild relative. Often such species are only able to be reproduced clonally, of through the use of first generation (or F1) seeds.

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Chapter 2

Dental hygiene and livelihoods: a case of chewing sticks in Ghana

Dominic Blay[1]

Common names	Part of the resource used	Management	Degree of transformation	Scale of trade	Geographic range
Tweapeah, Nsorkor	Stem	Wild	Low	International	Medium

ABSTRACT

This chapter provides an overview of the chewing stick trade in Ghana. Chewing sticks are one of the most important non-timber forest products of the Western Region (Falconer 1990; Falconer 1992) and have provided the primary form of dental care for millennia. The production, trading and marketing of chewing sticks also provides the main source of income for many men and women in rural communities, many of whom are economically marginal. The trade in chewing sticks also contributes significantly to the local, regional and national economies (Tabi-Gyansah 2001). However, as with other resources, the *Garcinia* spp. exploited for chewing sticks are becoming increasingly scarce, particularly outside of forest reserves (Wong 1997).

INTRODUCTION

The excellent condition of people's teeth in West Africa is common knowledge (Isawumi 1978). Many authors claim that chewing sticks, which many West Africans (Isawumi 1978) and as many as 90% of the people of southern Ghana utilise, are the major contributory factor for the good condition of people's teeth (Adu-Tutu *et al*. 1979; Abbiw 1990). Because of the long and widespread use of chewing sticks in the region, there is a wide trade network, which involves a large number of people, both from rural and urban settings. It is estimated there is an average of 250 women in the two main markets in Kumasi alone involved in processing of chewing sticks (Falconer 1992).

The contribution made by chewing sticks to the economy of the Ashanti region of Ghana is estimated at around US$203,000 (Blay unpublished notes). Thus, in addition to the provision of dental care, chewing sticks contribute to

the income of many Ghanaians and at the same time contribute to local, regional and national economies. Notwithstanding the medical and economic importance to the nation, the resource base is gradually dwindling because of overexploitation. Yet there are no policies or management strategies in place either to ensure sustainable production of the species concerned or to improve trade and marketing.

METHODOLOGY

The study on the production-to-consumption system for chewing sticks, the findings of which are presented in this chapter, was undertaken in three villages in the Western Region of Ghana—Banso, Betinasi and Nkwanta—where the majority of chewing stick logs are harvested (Figure 1). Regional markets in Accra and Kumasi and some additional weekly markets in the Western Region of Ghana were also studied. The study used direct observations as well as participatory rural appraisal and 'focus group' survey methodologies (Malleson 2001).

THE RESOURCE BASE

Introduction

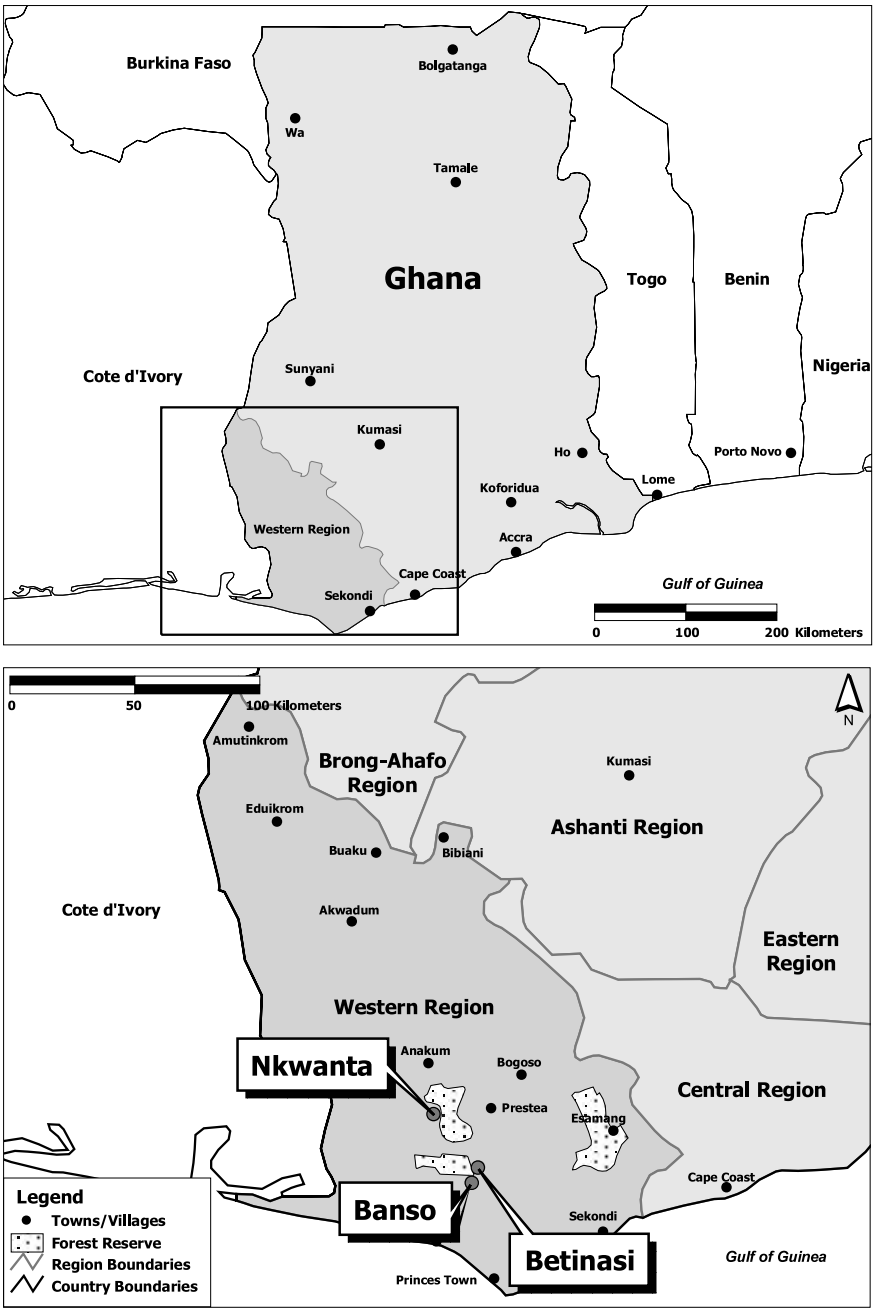
Chewing sticks are made from the split stems of a number of tree species. Although Isawumi (1978) and Abbiw (1990) mention that over 70 species of woody plants are used in West Africa as chewing sticks, only three species account for the commercial trade—*Garcinia epunctata*, *G. afzelii* (both referred to as *nsorkor*) and *G. kola* (or *tweapeh*) (Adu-Tutu *et al.* 1979; Falconer 1992; Tabi-Gyansah 2001). These species comprise over 90% of the chewing sticks sold in Ghana (Falconer 1992). The three species of *Garcinia* are mostly found in the south-western area of Ghana, particularly in the moist evergreen and moist semideciduous forests of the Western Region (Foggie 1941; Hall and Swaine 1976).

Harvesting

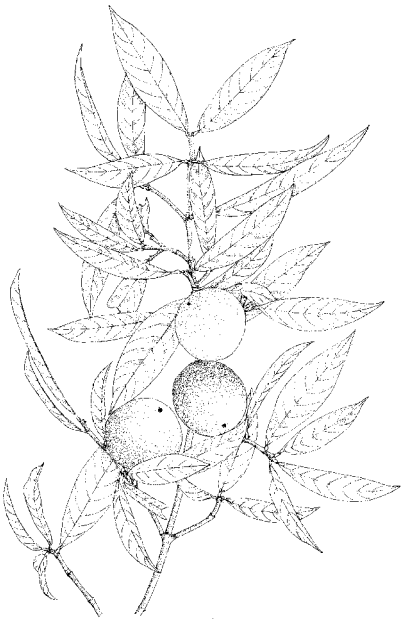
Although historically harvested in the Western Region from both primary and secondary forests, because of overexploitation the harvesting of the species of *Garcinia* concerned has extended as far as Côte d'Ivoire and Liberia (Holbech 2000). The species are harvested exclusively from the wild. However, recent efforts aimed at production intensification have focussed on planting of *Garcinia* spp. in agroforestry systems. The nongovernmental organisation Cooperative for American Relief Everywhere International and the local logging company Samartex have undertaken this effort in collaboration with local communities.

Harvesting occurs during six to nine months of the year. It rests in the rainy period because of the poor quality of the roads in the area and because the chewing stick gatherers prefer to work in the dry season (October to March). The majority of harvesting is undertaken in forest reserves owned by the government or, less commonly, in 'off-reserves' owned by families or clans

Figure 1. Location of the study area



Source: ESRI Data and Maps 2002.



(Garcinia kola)

(Holbech 2000). Since almost all the individuals of the desired species have been destroyed either as a result of persistent farming or from direct exploitation, the remaining harvestable stems are small to medium sized, 12 cm to 25 cm diameter at breast height (Wong 1997). Therefore the cutlass (or machete) is the main harvesting tool. However, some more organised individuals, especially urban gatherers, occasionally use chainsaws to fell the trees. The harvesting is extremely destructive as the entire bole is removed for processing. The gatherers operate in teams, usually numbering between three and five men, and at times are hired by a single trader. Harvested logs are carried to a point that is accessible to vehicles. This operation is normally undertaken by men, but women occasionally take part in carrying logs, particularly when in need of immediate additional income. The logs are then loaded and transported to urban centres, where they are taken over by middlemen for distribution. Studies in Ghana have shown that a full truckload contains about 200 logs (Amponsah 1978). The cost of a log depends on its length and size as well as the relative costs of transportation.

RAW MATERIAL PRODUCERS AND SOCIO-ECONOMIC CONTEXT

Raw material production area

The logs of *Garcinia* spp. harvested for the production of chewing sticks are mostly obtained from the villages of Banso, Betinasi and Nkwanta in the south-western part of Ghana. The geographical and socio-economic characteristics of each settlement are briefly described below.

Photo 1. Raw logs of *Garcinia* spp. prior to cutting into billets (Photo by D. Blay)

Banso

Banso is a large village with a population of about 2,000 far up the Ankobra River about 10 miles from Draw River Forest Reserve. Access to Banso is poor, as the only road is impassable for large parts of the year. The river is the only other means of transport. A motorised boat plies it at least once a week and many villagers have their own canoes. The main economic activities are subsistence farming, coconut and palm fruit production and the distilling of *akpeteshie* (local gin), which occupies many men full time. Farming is primarily a woman's task, men being responsible only for land clearing.

Betinasi

Betinasi, also with a population of around 2,000 people, is located further up the Ankobra River north of Banso and borders the Draw River Forest Reserve. The village is extremely isolated. It is two hours from Banso by river with canoe as the main means of transport. There are no basic services in the village such as a school or health post. Most people are subsistence farmers and rely heavily on the forest for subsistence goods.

Nkwanta

Nkwanta is a growing village located to the west of Prestea, a thriving mining town and the nearest urban market, and a few miles from the Fure River Forest Reserve. The settlement has a population of around 3,000 people. Access to market is fairly good and the road is passable during all but the worst of the rainy season. Although the natives of Nkwanta are Wassas, in the last 10 years the population has become more cosmopolitan so that outsiders now outnumber natives. The main economic activities are food crop and cocoa farming, cane

basket weaving, cane and chewing stick log collection and hunting. Traders come from Accra and Kumasi as well as nearby markets for food and non-timber forest products.

Harvesting and trade

The average household size in the raw material production area is five to six people. Around 90% of the households of the region are involved in the harvesting of logs and within these households, almost all the able bodied young men take part in the harvesting of chewing sticks. Thus while the age group involved in harvesting ranges from 10 to 50 years, the active group is between 20 and 40 years. The collection process does not require any particular skill or high level of education and most of the collectors have attained only a basic school education. The average daily wage for harvesting is US$0.90 and the average annual income from harvesting ranges from US$300 to US$400, with 80% earning between US$300 and US$390. Thus the income level of the majority of harvesters is around the average national annual income of US$390.

Households engaged in harvesting do not earn any other income from forest products. Hence the degree to which the product contributes to household forest product income is 100 percent. However, all of the harvesters engage in subsistence farming and this provides around 20% of total household income. The income of many harvesters has been steadily declining because of overexploitation, which has resulted in decreased density of the species as well as a reduction in large individuals. Many people in the local and urban communities regard the harvesting of chewing sticks as a 'menial activity', in common with most forest-related activities, and therefore generally hold the workers in low esteem.

Processing

The processing of raw logs into chewing sticks basically consists of peeling the bark off the logs and cutting them into billets of about 30 cm. Each billet is then split into pieces of about 2 cm to 5 cm and put into small bundles of about 20 to 30 pieces, the number depending on the amount the bundle will be sold for. Hence, the processing of the logs into the final product requires very little transformation and the value of the forest product in the finished product is around 95%.

There are two categories of chewing stick processors. First order processors process the cut stems and branches into round logs while second order processors split the round logs into small shards for consumption. The first order processors are male and they comprise around 15% of the total number of processors. The second order processors make up the remaining 85% of the total number of processors and these are mostly females. First order processors can earn between US$300 and US$800 annually, second order processors, between US$200 and US$500.

In Kumasi, *nsokor* logs are purchased daily at wholesale stations located near production sites in markets and certain designated areas. First order processors, normally working in two-man teams, cut the logs into billets that

are, on average, 30 cm long. Second order processors then split these billets with knife and mallet into chewing sticks. Most women process the equivalent of one or two logs a day. Larger chewing sticks prepared for the wholesale market are stored for several weeks and are then split into smaller sizes for sale. These are later split into yet smaller dimensions for the retail market and immediate consumption. The number of chewing sticks produced per log varies considerably depending on the diameter at breast height of the individual tree. On average, between 230 and 1,665 bundles of chewing-sticks are produced per log; thus an approximate mean of 750 chewing sticks bundles are produced per log. Branches are never used in the trade because the cost of transportation is too high to warrant their exploitation and they are considered too small in size to facilitate splitting.

Labour is paid on commission basis, i.e., by the number of logs cut into pieces or number of pieces split. In this regard, processors prefer working alone. Other processors are also involved in the collection and trade of logs from Western Region. These processors have established relationships with village gatherers and visit the village to collect harvested logs. In some cases they pay for the logs in advance and return the following month to collect them. Their profits are higher than those of processors who purchase logs at Kumasi's Central Market because the outside processors are involved in the entire chain of the chewing stick trade from paying forest gatherers in the village for whole raw logs to peddling bundles of chewing sticks in the streets of Kumasi.

Photo 2. Splitting and shaping of chew sticks prior to sale (Photo by T.C.H. Sunderland)

About six years prior to this writing processors established an organisation which regulates their activities, particularly the rates at which they purchase raw materials. This organisation also serves as sociocultural association since members are required to help fellow members during funerals, births and other social functions. Hence there is a relatively high degree of organisation among processors and all members participate highly in the organisation. Nevertheless the organisation is ineffective as far as production is concerned because many members disregard the regulations of the organisation. In spite of the high level of organisation, there is no barrier to entry into the organisation. All one needs is to get a space in the market where the processors are located and the initial capital to purchase logs and processing materials and pay for the processing. Thus, although there is an investment in the processing, this investment is minimal. All these activities are in the private sector with no state intervention except ensuring that all the processors pay their taxes.

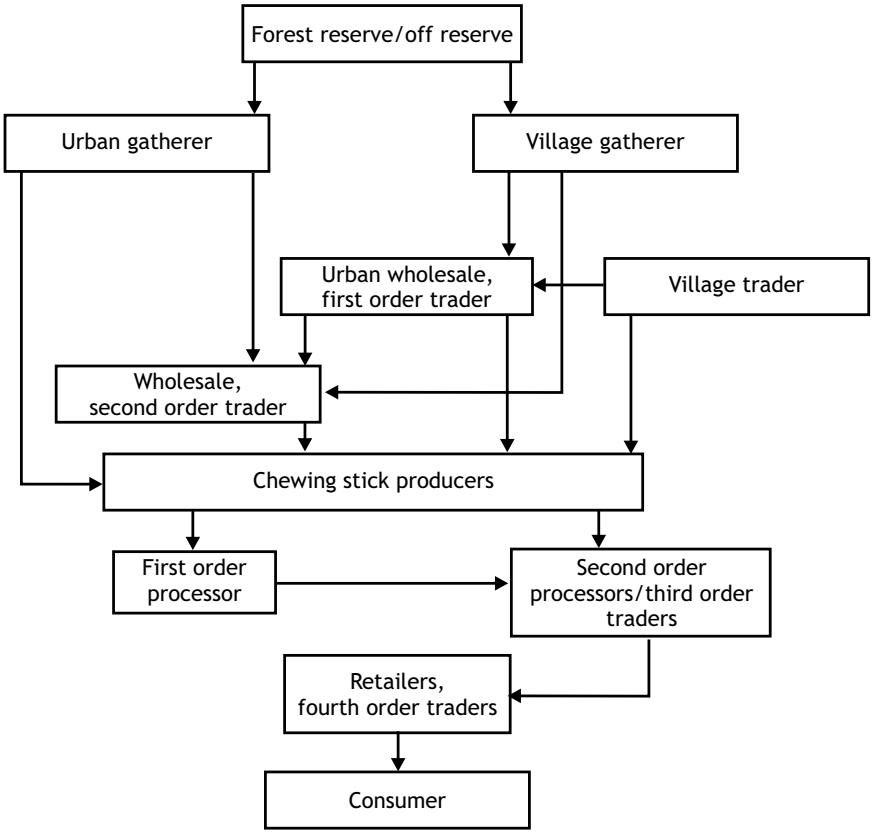
CHARACTERISTICS OF TRADE AND MARKETING

There are two main categories of chewing stick traders—those that trade in chewing stick logs and those that deal in processed logs. Those trading in logs are subdivided into first and second order traders. First order traders sponsor the harvesters directly to bring the logs from the production site to the urban markets. These traders have total control over the truckload (they own it) and then sell the logs to other interested traders. This category of traders constitutes around 30% of all traders. Second order traders make up 25% of traders. They buy logs directly from first order traders and sell them to processors. Some of these traders sometimes also act like processors when they process some of the chewing sticks for sale.

The remaining 45% are the processors and retailers who sell the finished product to the general public. Chewing sticks are sold in all the markets studied in Ashanti, both rural and 'regional' ones, but are absent from smaller markets in Western Region, where an alternative product, the chewing sponge (*Acacia kamerunensis*), is available. There is a great spectrum in the retail trade ranging from those who sell a few chewing sticks along with household goods to those who specialise in the sale of chewing sticks exclusively. Chewing sticks are commonly sold by those selling plant medicines as well as by traders who sell a multitude of small household wares (e.g., batteries, catapults and soaps). The majority of retail traders, however, do not rely solely on chewing sticks because profits are usually small. A diagram of the trade network appears in Figure 2.

The processors in Kumasi supply chewing sticks to traders throughout the entire region. Even chewing sticks sold in the larger Western Region markets were generally purchased in Kumasi or Accra. For retail traders, returns range from several hundred to 76,000 cedis (up to US$12) a week. The size of business varies greatly from those who sell a few bundles to those who sell more than 100 bundles a day. Because they are so widely sold, the price of chewing stick bundles is basically uniform across the entire region. Traders may alter the size of the bundle somewhat, but to do so radically would be risky because of competition. Based on our field surveys we estimated the total contribution of chewing sticks production to the regional economy to be about US$203,000.

Figure 2. Chewing sticks trade network in Ghana



This figure assumes a monthly production of over 14 million chewing stick bundles.

Most traders are aged between 30 and 39 years, only a small minority being 60 years or older. About 15% are male. Chewing stick trading is the major occupation of 85% of the traders interviewed while only 15% consider it as a minor, or secondary, occupation. Chewing stick logs are transported over 300 km on mostly lateritic roads to Kumasi and Accra, hence the traders incur heavy transportation costs. In addition to the direct costs of transportation, the traders also pay for the cost of loading and off loading.

Traders that double as processors generally employ people to work with them. The income obtained from chewing sticks was said to be decreasing because of the shortage of logs. Almost all traders market their wares at the Kokomba and Aghophloshie markets in Accra and at the Central Market in Kumasi. These markets are well noted in the country for the trade of chewing sticks, both processed and raw. In addition to these main markets, bundles of chewing sticks are retailed in all markets and garages. Processed chewing sticks are also transported to Togo for sale. From our surveys we estimate that about 15% of the total product is exported to Togo.

Because of the low level of transformation the product goes through from raw material to finished product, the product cannot be adulterated and it is always in prime condition, except of course when the desired species are not used. Also because of the little transformation, there is no vertical integration. Most of the traders belong to associations that were established in the early 1990s. The main objective of these associations is to regulate the activities of the business and to help one another in times of crises or need. As in the case of the processors, the traders' association is an economic and a sociocultural one. While there are no social, technical or regulatory barriers to second level traders joining any of the associations, there are economic barriers, because one needs some capital before becoming a second order trader.

While there are no corrupt practices financially, there is currently a trend of some traders using alternative species for the genuine *Garcinia* spp., which are becoming increasingly scarce. Nevertheless there are no national or local government regulations that directly relate to the chewing stick trade apart from the payment of taxes on the produce. There is also no incentive or direct investment from the government. In the absence of government support, the nongovernmental organisation Sinapi Aba has recently stepped in to offer support in the form of soft loans to traders and processors to enable them to increase their working capital. This sponsorship is expected to continue if traders continue to repay their loans.

POLICY ENVIRONMENT

Legislative framework

The Forest Services Division of the Forestry Commission, which is the governmental agency responsible for the management of forest resources, has regulations on harvesting of chewing sticks. These regulations however apply only to harvesting in designated Forest Reserves. Here the gatherer must first obtain a permit to enter the reserve. Gatherers who enter Forest Reserves without permit are arrested and at times prosecuted; their logs are seized. The permit system is meant to check excessive exploitation and illegal harvesting, but it has failed to achieve these objectives because the Forest Service does not ensure strict monitoring of harvesting operations. This laxness has led to abuses by both gatherers and Forest Commission staff, which has culminated in depletion of the resource.

After gathering, a specific levy is put on each tree or log before the logs are trucked to the urban market. These taxes or levies are only meant to generate revenue to the national and local governments (the latter called District Assemblies) and are not meant in any way to influence the raw material production.

Traditional Laws

Traditional laws governing chewing sticks gathering and trade are informal and differ from place to place. Usually these customary regulations cover trees found in off-forest reserves. Here the gatherer pays a token fee together with drinks before he enters the land. Sanctions are instituted against people who

trespass and the network is such that it is difficult for people to evade payment. However, trees gathered from private lands also require permits before they can be transported to marketing centres.

TRENDS AND ISSUES

The resource base for chewing sticks in Ghana has seriously declined as a result of considerable overexploitation. As a direct result, currently a lot of harvesting of *Garcinia* spp. for chewing stick production takes place in Liberia and Côte d'Ivoire (Holbech 2000). This harvesting outside Ghana is affecting the livelihoods of harvesters that cannot afford to go to neighbouring countries to harvest the logs. The decrease in the availability of the *Garcinia* spp. locally has also led to the hike in price of chewing sticks and to a situation where some traders sell any species that can be used as a chewing stick as *Garcinia* spp.

Key issues/problems

The fast depletion of the resource base as result of overexploitation came about because of the lack of appropriate policies and management strategies including adequate monitoring to regulate the remaining resource and to put in place strategies to regenerate the species concerned—the highly organised network of collectors, processors and traders notwithstanding. This network, which spans from the rural communities to the urban areas, provides income to many marginal men and women and therefore contributes significantly to the local and regional economies. The product also has considerable potential for export not only to neighbouring countries but also to Ghanaians in Europe and America who still cherish the use of chewing sticks. Despite the decreased local availability of the desired species there are still considerable levels of processing and trade in chewing sticks as imported logs from Côte d'Ivoire and Liberia supplement domestic stocks. In spite of the importance of the species economically and for health care, the Forest Services Division has paid little attention to the species concerned. There has thus far been no government intervention so as to promote either the regeneration of the species or the development of the market.

Conversation and development lessons

It is estimated that about 4,700 trees are harvested a month to meet the demands of Kumasi and the Ashanti region alone. Thus about 12,000 to 19,000 logs are processed into chewing sticks monthly for the region. Meanwhile there are equally important processing centres in Accra and Takoradi. Given this market pressure, *Garcinia* spp. is now seriously threatened in Ghana (Wong 1997).

There is virtually no management system for chewing sticks because there is no information on the current level of stocking or the current rate of exploitation. Although there are regular inventories of timber trees, chewing sticks trees are not inventoried because they are understorey trees. In addition, there is also no information on the regenerative capacity of the species or its rate of growth. Currently the only levels of control of chewing stick exploitation are the high transportation costs and the gatherers' dislike for small logs. However,

more recently even small logs are harvested since most gatherers are not from the areas they operate within and therefore rarely return to the same forest. In contrast with non-indigenous gatherers, locals allow time for smaller diameter trees to develop since most of these local communities are dependent on the gathering of chewing sticks. Thus the value of the trade in itself does not provide incentives for degradation of the resource base. The resource base has been degraded because of the lack of appropriate policies and management. There is an urgent need to develop a sustainable resource base through the adoption of sound management practices based on scientific data. To achieve that goal, the following information is needed: current level of *Garcinia* spp. stocking and rate of exploitation. This knowledge should lead to a standardisation of amounts extracted. Current efforts to establish plantations of *Garcinia* spp. need to be increased.

ENDNOTES

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Chapter 3

'Chop, but no broke pot': the case of *Prunus africana* on Mount Cameroon[1]

***Nouhou Ndam*[2] *and Mahop Tonye Marcelin*[3]**

Common names	Part of the resource used	Management	Degree of transformation	Scale of trade	Geographic range
Pygeum, Red stinkwood, Wotango	Bark	Wild	High	International	Medium

ABSTRACT

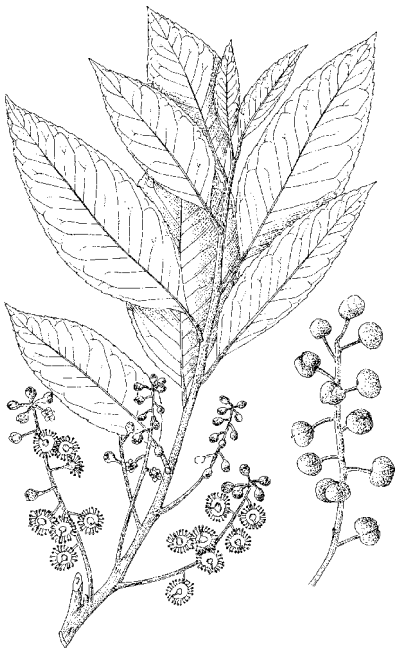
P. africana is a tree occurring in some montane regions of Africa. The bark is used by local peoples to treat many diseases and is known internationally as a remedy to prostate disorder. It is exported to developed countries from a number of African countries where it contributes to the economic and social well-being of peoples of this continent. In the Mount Cameroon area where this case study is based, initiatives have been made to sustain its use while increasing its benefit to local communities. This paper outlines the ecological and socio-economic context of the species focusing on its distribution, harvesting, processing, marketing, and policy environment for sustainable use and equity in benefit sharing. Lessons learnt from conservation and development efforts are drawn from the case study.

INTRODUCTION

Prunus africana (Hook.f.) Kalkman, formerly known as *Pygeum africana* (Hook.f), is a tree belonging to the Rosaceae family distributed in montane forest regions across Africa. Traditionally, it is used to treat malaria, stomach ache, fever, urinary problems, sexually transmitted diseases, wounds, chest pain and heartburn (Carter 1992; Tonye *et al.*1999). It is a purgative for cattle and its fruits are consumed and disbursed by many birds and insects (Sunderland and Nkefor 1997). Its bark is used in modern medicine to treat prostate disorder that leads to uncontrolled urine release in elderly men (Bombardelli and Morazzoni 1997). It is exported to developed countries from a number of countries where it contributes to the economic and social wellbeing of African peoples. Aside from medicinal use, it is also a source of timber for export or

building materials, of firewood and of wood for making tools and carvings (Hall *et al*. 2000).

In the Mount Cameroon region, the species is not only exported to Europe as a medicinal plant product, but the bark is also widely used traditionally as local medicine and the wood for hoe handles and timber. The species is distributed on the main forest massif in patches ranging from 700 m to 3,000 m altitude (Achoundong 1995; ONADEF unpublished report). The area has 300,000 inhabitants distributed in 51 villages with an annual population growth rate of 3% to 6%. These communities have been aware of the commercial value of *P. africana* since the early 1970s. Since then, the benefit from the species has gradually become the driving force for rural development of the region and livelihoods improvement (Ndam and Ewusi 2000).



(Prunus africana)

According to an unpublished report to the World Wildlife Fund–Cameroon, the benefit sharing system put in place after the formation of the Mapanja *Prunus* Harvesters Union has been a good promoter for the sustainable community based organisation. For example, income following nine months of the union's functioning in 1998 amounted to US$35,700 (25 million CFA), of which US$2,260 (1.58 million CFA) went to the village development fund, US$1,530 (1.07 million CFA) covered the group's running costs and the balance of US$32,925 (22.35 million CFA) was shared among the 60 harvesters according to their output (Ndam and Ewusi 2000). The impact of the income improvement through *Prunus* activities can easily be noted by the contribution of the village to certain pending development projects like water and electrification projects. In addition, there have been significant individual livelihood improvements, notably in increased house construction in the village, a surge in formal marriages and a greater

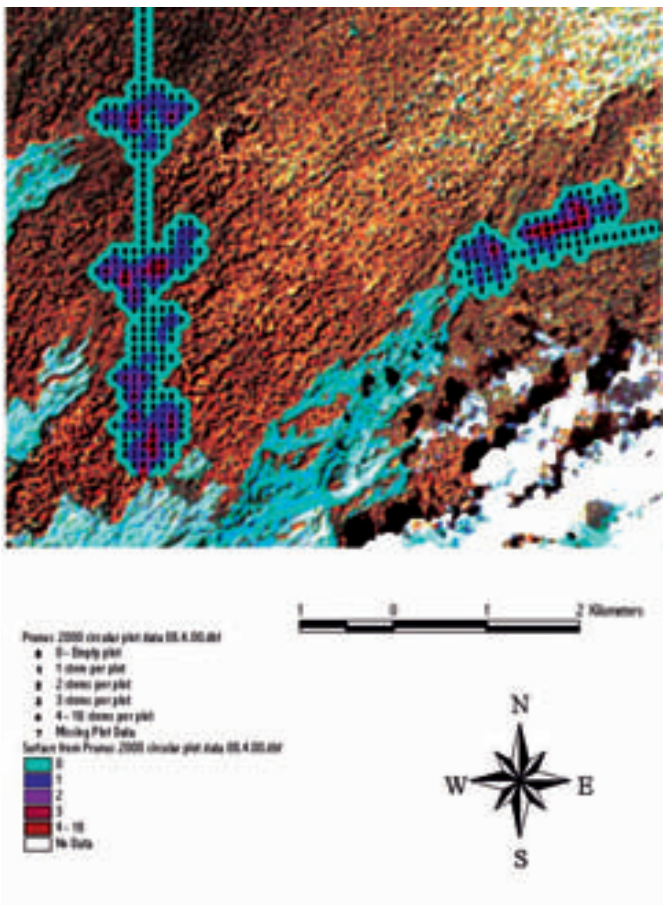
proportion of children being sent to school. As the commercial value of *P. africana* in the international trade continues to increase—it currently stands at US$220 million annually, representing roughly 3,600 tonnes of raw material (Cunningham *et al*. 1997)—owing to the gradual inclusion of the plant's products in the U.S. health care system as a dietary supplement, the population of the Mount Cameroon area community based organisations are becoming more organised to secure more benefit for themselves and future generations.

THE PRODUCTION-TO-CONSUMPTION SYSTEM

The resource base

Three major forest types are reported to occur in the Mount Cameroon area, namely agricultural fallow (15%), secondary forest (35%) and closed-canopy primary forest (50%) (Ndam 1998). *P. africana* is an evergreen species occurring in montane areas at a minimum elevation of approximately 900 m (Hutchinson and Dalziel 1958). In the Mount Cameroon region, the raw material production area represents 2,000 km^2 with mixed distribution patterns of isolated and clustered individuals (ONADEF unpublished report). The distribution of the species

Figure 1. Concentration of *Prunus africana* on lava flows



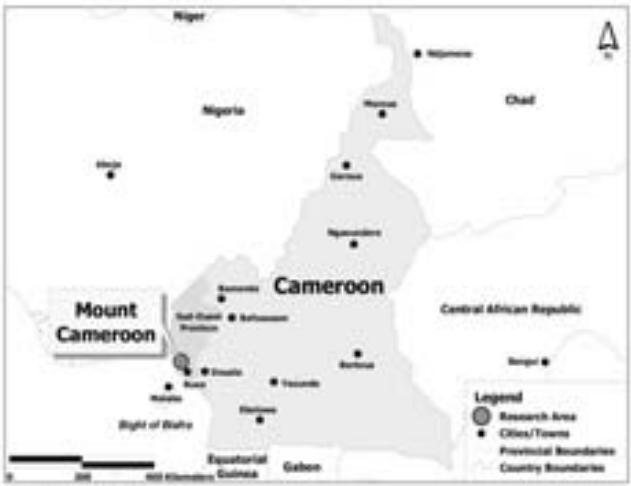
is also closely associated with mean annual temperatures of 11°C to 19°C in the coolest months and 17°C to 23°C in the warmest (Fraser *et al*. unpublished report). It is also evident on Mount Cameroon that *P. africana* thrives in dense stands in areas recently disturbed by volcanic activity, being one of the first species to colonise and form a forest canopy on recent lava flows. Figure 1 illustrates how *Prunus africana* is heavily concentrated (density represented by colours and numbers) on recent incursions of lava into montane forest areas and disappears completely from the climax (undisturbed) montane forest, as on the north-western flank, which has for the most part not been affected by lava flows for some centuries. Figure 2 shows the main area of *P. africana* occurrence in the study area. The mean density of *P. africana* individuals on Mount Cameroon with a diameter at breast height (DBH) of greater than 20 cm is estimated at 5.5 trees/ha (ONADEF unpublished report).

The soil in the Mount Cameroon area is volcanic based and such recent laval soils with their associated pyroclastic ash are highly useful for commercial agricultural purposes (FAO-UNESCO 1977). The land use system in the raw material producing area is not in particular conflict with the sustainability of the resource in the wild because much of this intensive agriculture occurs at altitudes below the altitudinal range of *P. africana*.

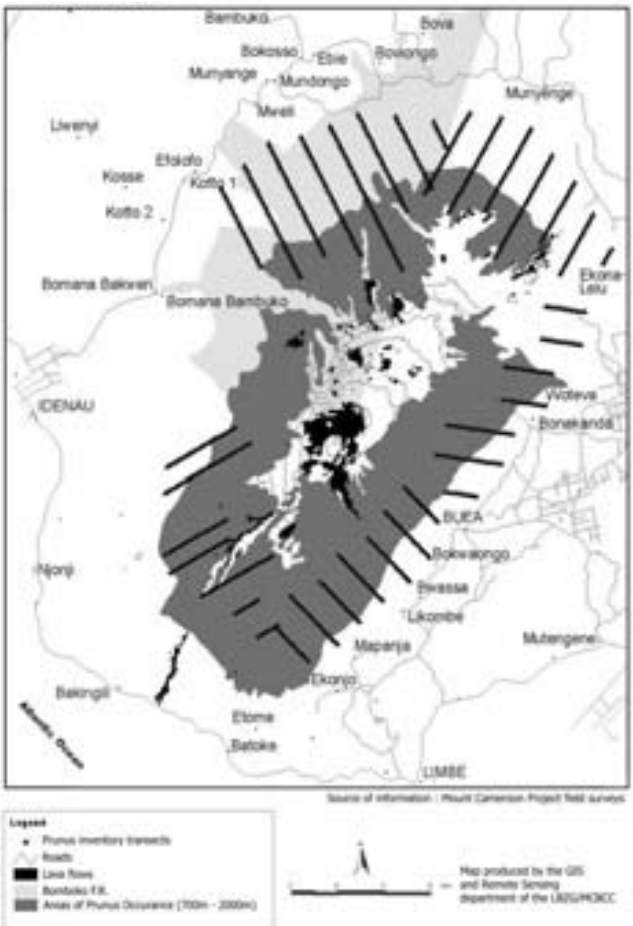
There is growing interest on the part of the communities, as well as research and environmental institutions, in the domestication of *P. africana*. Basic requirements of *P. africana* seed production and nursery have been studied by Sunderland and Nkefor (1997) and, more recently, by the International Centre for Research in Agroforestry (ICRAF) for vegetative multiplication (Tchoundjeu *et al*. 2002). Sunderland and Nkefor (1997) reported that, if basic cleaning and storage requirements of *Prunus* seeds are satisfied, *Prunus* seeds maintain

Photo 1. Measuring dbh of large individual of *P. africana* (Photo by T.C.H. Sunderland)

Figure 2. Main area of *P. africana* occurrence on Mount Cameroon



Source: ESRI Data and Maps 2002.

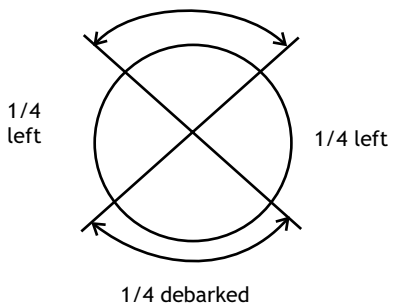


viability and high germination rates. Preliminary results of the study of vegetative propagation of *P. africana* by cuttings showed that the rooting percentage was greatly influenced by rooting medium, auxin content and the cutting leaf area (Tchoundjeu *et al*. 2002).

In terms of industrial cultivation, to date only 9 ha of pure plantation have been established at Moliwe, just outside Limbe, by the Cameroon Development Corporation. A further 3 ha of enrichment planting (more than 3,000 seedlings) was established by Plantecam in 1998–99 at 1000 m altitude on the Mount Cameroon in the Bambuko forest reserve area.

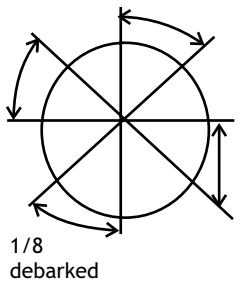
Following the prescribed methods (Nkuinkeu and Remi 1998) for sustainable harvesting of *P. africana*, trees are peeled starting at 1.0 m to 1.5 m above the ground level removing opposite quarters two or four depending on the diameter of the tree (Figure 3). If the DBH is greater than 50 cm, four sections representing 50% of the tree circumference will be debarked from opposite sides representing four eighths of the tree circumference from four opposite sections instead of two (Figure 4). Even when harvesters adhere to these guidelines, however, poor techniques expose the trees to pests, diseases and other die-back, much of it stemming from physiological stress. In addition to direct tree felling, die-back following harvest is leading to a significant decrease of the wild population.

Figure 3. Two opposite sections of *Prunus* tree debarked when 30 cm < DBH < 50cm



Source: Nkuinkeu and Remi 1998.

Figure 4. Four opposite sections of *Prunus* tree debarked when DBH > 50cm



Source: Nkuinkeu and Remi 1998.

Photo 2. Stripped stem of *P. africana*. (Photo by T.C.H. Sunderland)

The mean duration of flowering of *P. africana* reported to date is 10 days (Pouakouyou personal communication). *P. africana* is an outbreeding species, and insects and the wind reportedly are the main pollinators (Hamilton 1972). In the Mount Cameroon area, birds and mammals feeding on the fruits are reported as major dispersers of *Prunus* seeds (Cunningham and Mbenkum 1993). Light is seemingly required for the regeneration of *P. africana* (Sunderland and Nkefor 1997), and Ndam (1998) found that regeneration of *Prunus* seedlings is greater in secondary forest.

Raw material producers and the socio-economic context

The Bakweri people are the major ethnic group on Mount Cameroon, the Bambuko and Balundu also being indigenous to the region. However, there are significant numbers of migrant labourers also involved in non-timber forest products (NTFP) exploitation, and particularly in *P. africana* harvesting. At the outset when Plantecam was launching *Prunus* activities in the area, skilled workers were brought from the north-west and western provinces of Cameroon, where exploitation had first started. Gradually, the communities around Mount Cameroon began to realise the economic importance of the species and became increasingly involved in its exploitation. Today, the sale of *Prunus* bark is one of their major sources of periodic income. The communities in this area are mostly living from farming activities, growing food crops such as coco-yam, pepper, plantains etc., which are sold in the nearby periodic markets. Farming

is the major activity in the area, and *Prunus africana* harvesting supplements household income.

Prunus exploitation and harvesting is a strenuous activity mostly involving young men in the village. Female participation is limited to feeding their husband to get them ready for their strenuous daily duties. Women are also responsible for planting *Prunus* seedlings (often wildlings collected by their husband) on their farms. During the production season from May to September 60% of the households in the raw material production area are involved in the production-to-consumption system. *P. africana* is the major source of their income and accounts for 70% of the US$71 average annual income from their various activities. This income is very low, compared to the US$600 national average recorded in 2003 or the US$500 for the data year of 2000. On average, rural producers spend about US$2.15 for daily labour expenses, mainly to purchase drugs and the inconsistent daily meal. Married rural workers may spend less than this amount considering they get their breakfast at home and carry up to the mountain the meal required for the day.

The processing industry

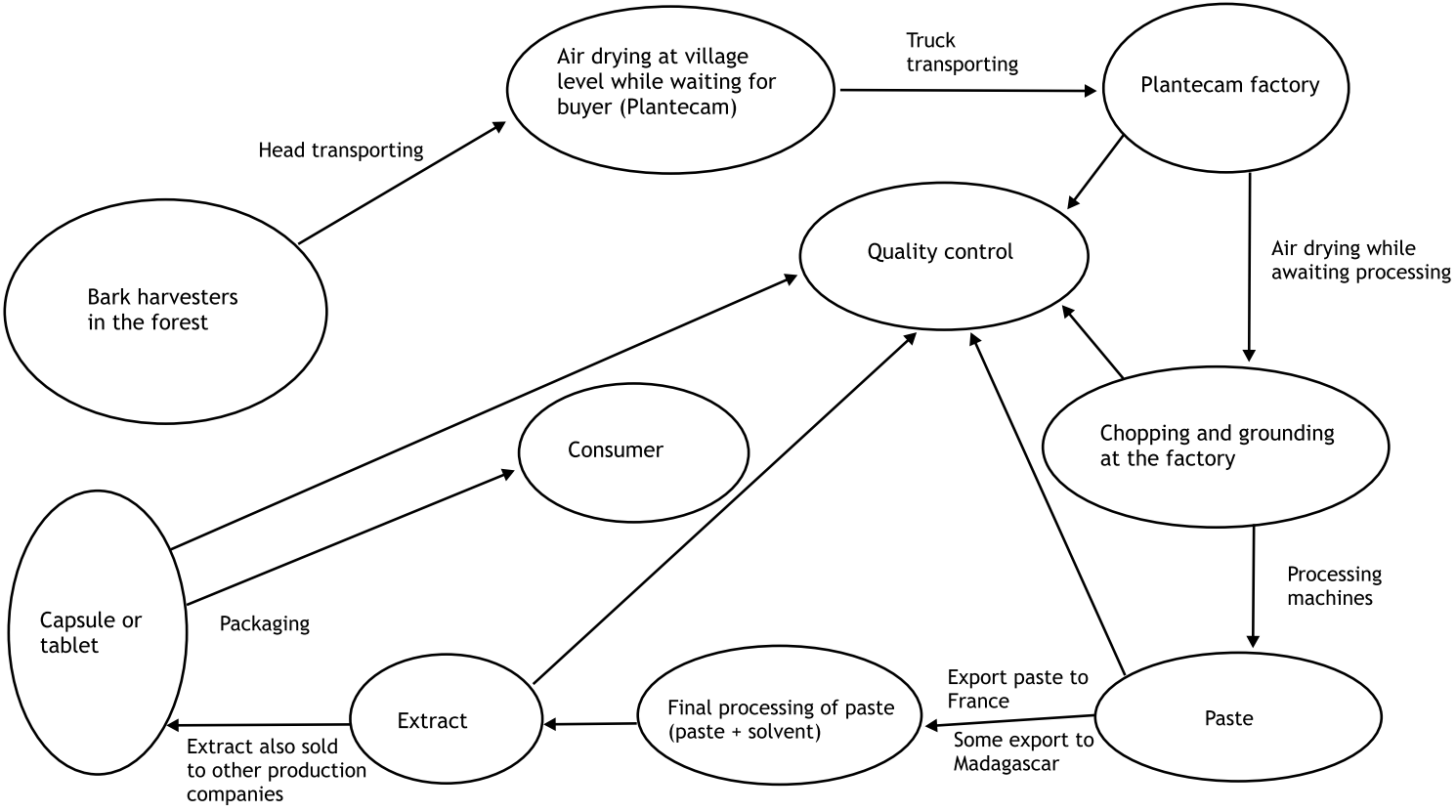
Tonye *et al.* (1999) reported on the various steps involved in the processing of *P. africana* bark. In this chain, the input of local workers is limited to the drying stage at the outset of the process, where bundles of 20 to 30 pieces of fresh bark are sun-dried to less than 38.5% moisture content. The dried bark is then supplied to Plantecam which, until recently, was the sole processing industry in the Mount Cameroon area[4]. Plantecam used to pulverise or 'chip' the bark before the extraction process. Further processing leads to a noncrystalline extract in a red transparent paste with as much as 20% pure extract depending on the solvent used. These can include methanol, distilled water, chloroform, methylene chloride, benzene, cyclohexane, petroleum ether, acetone and methylethylketone. From recent data, it is estimated that 200 kg of fresh bark yields 1 kg of extract (Pomatto unpublished report).

Trade and marketing

At the time of data collection Plantecam was the only company in the study area processing *P. africana* bark supplied or acquired directly from the harvesters without intermediaries or middlemen. The market line therefore starts from the products extracted from the wild, continues to the village storing place, where the sun-drying takes place and from where Plantecam collects the products that will be weighed at the entrance of the factory (Figure 5). The raw material price depends on the product's moisture content and degree of adulteration with non-*Prunus* bark. With these criteria the price range is estimated at US$0.3 to US$0.41 per kilogram of bark at the factory gate (Tonye *et al.* 1999).

The extract processed here was subsequently exported to Groupe Fournier. It is not the only destination. Plantecam also sold raw extract to other processors and pharmaceutical companies, where it is refined and capsules or tablets (final products) are filled with 25 mg to 50 mg of *Prunus* extract ready for

Figure 5. Trade and marketing route of *P. africana*



consumption (Nkuinkeu and Ndam unpublished report). In the year of data collection, the international trade volume of *P. africana* bark extract was 10,000 kg to 15,000 kg. Groupe Fournier accounted for approximately 5,000 kg to 7,000 kg of the overall quantity (Acworth unpublished report), which is the equivalent of between 1,000 tonnes and 1,400 tonnes of fresh bark. These figures correspond well with those reported for annual exports of *P. africana* bark in the late 1990s (Cunningham *et al*. 1997). During the period 1994–96 this amount was harvested annually by Plantecam and illegal operators from Mount Cameroon alone, resulting in a severe overexploitation of the natural population.

Policy environment

The policy and regulations affecting the exploitation of NTFPs and special products in Cameroon, and *P. africana* in particular, are primarily influenced by the National Forestry Law. Law No. 94/01 of 20 January 1994 specifies forestry, wildlife and fisheries regulations and covers *P. africana*. In addition, the National Forestry Action Plan developed in 1996 and the Emergency Action Plan put in place in 1999 as an implementation mechanism of the outcomes of the Central African heads of state summit all have provisions for the sustainable management of forest resources and recognise *P. africana* as a resource of important contribution to Cameroon's national economy. The creation by presidential decree No. 98/345 on 21 December 1998 of the Directorate of Promotion and Transformation in the Ministry of Environment and Forestry, including the subdirectorate in charge of NTFPs, emphasised the consideration authorities gave the NTFP sector (Ndibi and Kay 1997).

The financial laws also have significant impact on this sector as far as regulating taxes is concerned. Specifically, Article 5 of the 1998/99 and Article 11 of the 1999/2000 finance law fix a tax of CFA10/kg of any resources harvested and a duty of 5% on any resources exported. The impact is minimal in terms of the overall value of the product as the tax represents less than 5% of the value of the raw material. Moreover, this money has not been reinvested in regeneration of *P. africana*. However, in the field of NTFP exploitation policy tools often suffer from either lack of adequate implementation or considerable weaknesses in monitoring.

TRENDS AND ISSUES

Dynamic changes

Bush fire and volcanic eruptions constitute the major natural disturbances of the case study area. In the Mount Cameroon area, no products are competing with *P. africana* in the commercial treatment of prostate disorders. Additionally, the plant's products such as leaves and bark are used in the treatment of other sicknesses including stomach ache and malaria. Hence the plant is an important component in the traditional health care of the communities around Mount Cameroon (Cunningham and Mbenkum 1993).

The majority of the exploitation is carried out in state forests; 90% of the production takes place on state land, the rest on communal land, allowing for less conflict among the population for access to this species. So far most of the production is undertaken from wild populations and managed populations in the natural environment of the production area. The drastic decrease of the wild population because of overharvesting should be an incentive for more emphasis on cultivation in order to meet the future demand for raw material. Although *Prunus* planting is gaining ground in people's habits around the mountain, only about 20,000 seedlings have so far been planted in individual farms within the framework of agroforestry practices. In addition to higher levels of planting in the North West Province of Cameroon (Cunningham *et al*. 1997), some notable efforts have been undertaken by the industry (Plantecam) in the field of artificial regeneration around the Mount Cameroon area. With *P. africana* cultivated stands by the village surroundings, the balance sheet of gender representation in the raw material production system could change in the future, allowing more women to be involved in the production. Indeed, so far 75% of men are reported to be involved in production in the raw material production area, with around 25% of women participating mainly in the cultivation aspect, when men have already carried the wildlings from the forest to the farms.

In the year of data collection, although state intervention was increasing, trade and marketing of *P. africana* products was also increasing because of the nearby demand for raw materials by Plantecam trying to supply the powerful production machines of its factory at Mutengene. The communities organised in Harvesters Unions developed internal rules of sharing the outcomes from *Prunus* activities. But it should be understood that it is the processing industries and factories which benefit much from *Prunus* trade and marketing, considering the price variation of 26% to 28% between raw material and end product at the consumption stage. The laws in place unfortunately do not allow the communities to fully participate and earn consistent benefits from the exploitation and trade of *P. africana* products. Even the communities around Mount Cameroon, which show their commitment to the sustainability of this species, have serious constraints on their participation in *Prunus* trade and marketing. But with even the little the communities can earn from their involvement in these activities, it is clear that their means to satisfy their needs have improved. The youths have learned enough about sustainable exploitation and cultivation techniques. With these results from *P. africana* alone, local communities have realised the high importance of forests resources in poverty alleviation, and now the tendency is to get more involved in forest production activities in general and the production-to-consumption system in particular. Thus, the NTFP portfolio of communities around Mount Cameroon is obviously not limited to *P. africana*, but integrates other forest resources such as bush meat, *eru* (*Gnetum* spp.), bush onion (*Afrostyrax* spp.) and bush mango (*Irvingia* spp.).

As far back as at the outset of the exploitation and trade of *P. africana* products in Cameroon, international donors and processing industries have been the main counterpart in conservation as well as exploitation activities. Concerning exploitation, with the 1994 Forestry Law, more Cameroonians were

provided with the opportunity to get more involved in this activity. As for conservation, numerous international organisations such as Britain's Department for International Development, Germany's Gesellschaft für Technische Zusammenarbeit, the World Wildlife Fund, ICRAF, the Center for International Forestry Research, etc. have had considerable impact in the enhancement of research in various angles on *P. africana*. This has helped in the organisation of communities for wise management.

Key issues and problems

With the series of measures taken for the sustainable management of *P. africana* within its range of distribution, Cameroon has emerged as an example in the good management of this useful species. To date, within the raw material production sector in Cameroon, there already exists at the national level an organisation of *P. africana* exploiters, which brings together all exploiters and exporters of *Prunus* products in annual meetings to discuss issues of common concerns. The organisation is more than five years old and consists of around 60 members. While there are no social or economic barriers, both technological and regulatory barriers seriously impede the functioning of this organisation. The exploiters in this organisation are not trained foresters and therefore the majority of them are unaware of good forest management practices. Furthermore, they do not have any permanent field qualified forest technician in the teams operating in their forest concessions, as required by the forestry law. In the raw material production area, there are in general customary laws in relation to access and use of natural resources as a whole, but during our research, we did not come across rules with specific references for *P. africana*. At the government level, there exist regulations that influence raw material production, but their impact on the promotion of equitable sharing of outcomes deriving from *P. africana* or really influencing the production of raw material have been mitigated. A key problem the policy and regulatory should solve is setting measures that facilitate better access to exploitation permits and other licensing procedures for the local communities that have already proven their commitment to sustainable management of the species. The government also should give regulatory incentives to professional private operators (with an agreed limit) who need to transform *Prunus* bark collection locally. By so doing we shall move gradually to equitable sharing of outcomes deriving from *P. africana*.

Apart from this regulatory aspect, further research is urgently needed that will provide a scientific base for the development of better harvesting methods of *Prunus* bark. The harvesting methods being applied are suggested from observations made during field surveys and have no scientific base, though they have so far proven their efficiency so far as bark recovery has already been observed. The study currently being undertaken by the National Museum of Paris in conjunction with Université de Jussieu Paris 6 of Paris, France, on the physiology of *P. africana* bark recovery will throw more light on this issue. Other gaps and studies underway include research into the understanding of the reproductive biology of *P. africana* and the mechanisms involved in the flowering and fruiting of the species (Pouakouyou personal communication).

Further studies on the natural regeneration of *Prunus* in the wild with the establishment of permanent plots for regular monitoring will solve several problems and therefore improve the state of research on *P. africana* (Ndam 1998). Another interesting development being implemented by ICRAF is the 'effective selection of *P. africana* using active ingredient content' (Nkuinkeu 2001), a study which intends to supply farmers around Mount Cameroon with superior planting materials (clones).

In addition, the study underway aiming at developing a legislative framework for the setting of exploitation and exportation quota, in compliance with the Convention on the International Trade in Endangered Species of Flora and Fauna (CITES) requirements for developing Non-Detriment findings for species in the international trade will be a serious step forward towards getting laws and regulations developed that will have positive impacts on raw material production and consequently promote the sustainability of the species (Cunningham *et al.* 1997).

Other issues of relevance in the *Prunus* sector relate to the integration of household income into the cash economy within the production-to-consumption system. The provision of this particular information, which might come from in-depth socio-economical investigations in the area, will guide conservationists and development agencies in their approach particularly to the management of wild populations. The link between the communities around Mount Cameroon and this particular resource could then be fully evaluated.

Still in connection to this relationship between resource and community, while checking how the rural population in the Mount Cameroon area depends economically on the income generated from *P. africana* activities, traditional matters that have so far been overshadowed by the various stakeholders (communities, researchers, conservationist, policy makers) should henceforth be considered as issues of high concern. Like any other community, the people around Mount Cameroon area have inherited customary rules from their ancestors, rules which have from time immemorial been applied in their traditional system of natural resources management. However, the populations in this area have not yet affirmed themselves regarding traditional rules governing specifically the exploitation of *P. africana*. Along this line, more emphasis should be put on the enhancement of local communities' awareness of their traditional rights to resources.

In the trade and marketing components, two main operators can be mentioned without going into first, second or third order trader. There was the main buyer, Plantecam, and the local communities, i.e., the harvesters, as the supplier of raw material. Other actors are the Mount Cameroon Project/Limbe Botanic Garden and the Ministry of Environment and Forestry, playing the roles of facilitator and controller and helping the principal actors in the set-up of and compliance with equitable benefit sharing schemes. Occasionally, illegal exploitation and trade are reported in the area adding difficulties to the provision of absolute numbers of operators involved in these activities around the mountain. It is consequently understandable that the assessment of the size of trade in the raw material production area and the related issues of the size of national trade and of the raw and semiprocessed products export trade are unclear and need further attention.

Apart from Plantecam, which was the sole processing industry established in the raw material production area and known as being an extension of Groupe Fournier, no other clear relationship between the communities and any other

processing firm with a contact in the raw material production area was mentioned to us, unless it falls within illegal practices. Even as far as international surveys are concerned (undertaken by ICRAF), the pharmaceutical industries in the West are tight-lipped about their sources of raw materials acquisition.

CONSERVATION AND DEVELOPMENT LESSONS OF CASE STUDY

As earlier mentioned, the communities involved in *P. africana* activities are earning much needed income from their participation in the trade. This income could be increased if communities reviewed their partnerships with exporters or processing industries and the legislative and regulatory framework provided them with more tenure security over the resource.

The international trade in *P. africana* bark has long been recognised and the species was included in Appendix II of CITES during the ninth meeting held in 1994 in Harare, Zimbabwe. So far, however, information for the determination of sustainable yields, needed for the adequate implementation of legislation, is limited. Hence the study underway on the physiology of bark recovery of this tree under various harvesting regimes is crucially relevant. With the significant increase in the world's ageing male population and the increasing interest in natural products, demand in *P. africana* is likely to increase in coming years. The rate at which this species is exploited—and therefore declining in the wild—raises doubts on whether the wild populations will be able to satisfy demand in the future. Therefore, emphasis should be laid now on conservation through cultivation. That would likely satisfy future demand for *P. africana* products. Strategies that are being developed in Cameroon and other countries for the sustainable management of remnant wild populations with the participation of interested communities need to be continued. The benefits to local communities from involvement in *P. africana* activities are a significant incentive for their commitment to the conservation of this species. Decision makers should put in place a transparent mechanism that will enable farmers and community based organisations to use forest regeneration taxes (paid by *Prunus* exploiters) directly in order to finance a planting programme. But as far as considering industrial exploiters and exporters of *Prunus* products, the desire to always increase their benefit margin by exploiting as much as possible often leads to overexploitation—and even illegal activities. However, although such excessive exploitation was common in the past, with the participation of the communities today, these problems are being solved with the setting of exploitation quotas for individual harvesters and the reorganisation of harvesters into monitoring and control groups. Occasionally these groups seize the products of those who dare to undertake illegal practices.

ACKNOWLEDGMENTS

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highly relevant to the NTFP sector in the Mount Cameroon region, particularly in highlighting gaps in our knowledge base. Hopefully, these identified gaps will be filled by future studies.

ENDNOTES

1. "Chop, but no broke pot" is an African statement that calls for sustainablity when using resources, it means use the resources now and save some for the future.

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4. Plantecam ceased operations in Cameroon in 2000.

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Chapter 4

Achieving a fair and sustainable trade in devil's claw (*Harpagophytum* spp.)

Rachel Wynberg[1]

Common names	Part of the resource used	Management	Degree of transformation	Scale of trade	Geographic range
Devil's claw, Arthritis root	Root	Managed	High	International	Medium

ABSTRACT

There is growing international trade in *Harpagophytum* spp. (devil's claw), a Kalahari plant used to treat rheumatism and arthritis. At least 9,000 rural people in Namibia, Botswana and South Africa rely on wild harvesting the plant, often as their only source of income. Increased commercialisation, combined with harmful harvesting techniques, has led to concerns about overexploitation and the status of *Harpagophytum* populations, and a proposed CITES listing. This paper investigates the harvesting and use of devil's claw, analyses the potential impacts of its domestication, and provides an overview of its production and trade. Three models of commercialisation are described for the species, each yielding different sets of benefits and constraints. The paper concludes that the plant holds considerable potential as a non-timber forest product that can both be harvested sustainably and deliver significant development benefits to marginalized rural communities. Several barriers, however, impede this potential from being realised, including a lack of tenure security, insufficient monitoring capacity, poor business and organisational skills, and inadequate quality and resource management. Monopoly control at the international level severely compromises the ability of communities and range states to receive optimum benefits. Constructive interventions to address these constraints are urgently needed and are receiving increased attention from decision-makers and industry.

INTRODUCTION AND OVERVIEW

One of the most thought-provoking and complex cases of commercialisation in southern Africa is that of devil's claw (*Harpagophytum* spp.). Roots of the plant are commonly used to treat rheumatism and arthritis and this has led to a growing international trade over the past 50 years. Increased commercialisation has also resulted in an escalation of local harvesting of the plant, and concerns about the sustainability of wild extraction. This, together with a desire to improve pharmaceutical quality, has led to investigations in the feasibility of cultivation, often without consideration of the broader social, economic and environmental impacts. The imperative for sustainable use is not only ecological. At least 9,000 rural people in Botswana, Namibia and, to a lesser extent, South Africa rely on the wild-crafting of devil's claw, often as their only source of cash income. They include some of the most marginalized communities in the region.

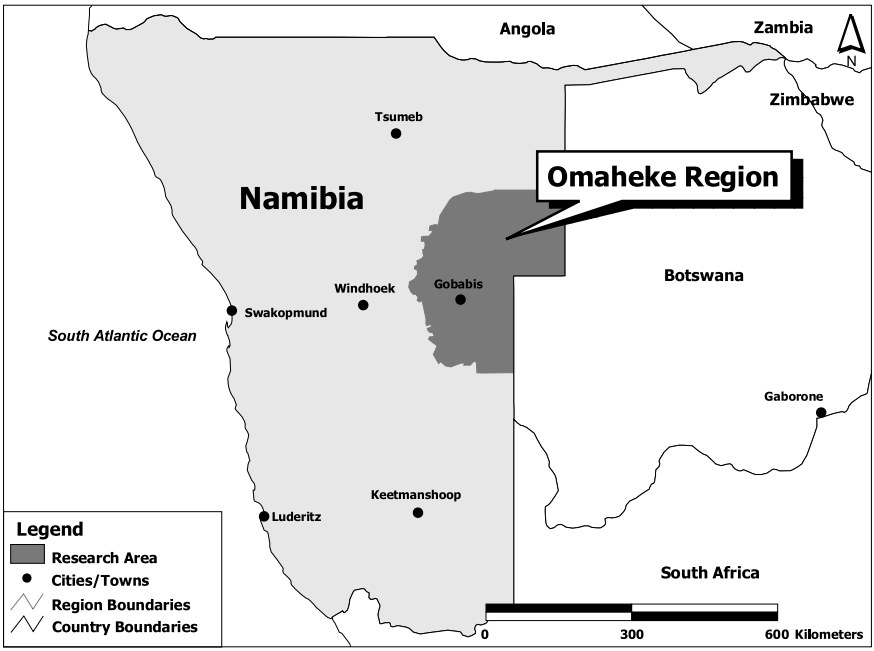
In all, some 600 tons to 700 tons of dried material is traded each year, worth an estimated US$100 million in the international trade. A complex set of relationships characterises trade in devil's claw, determined to a large extent by the role of the state, and that of industry, the non-governmental sector and community-based organisations. These scenarios in turn provide different sets of national and local benefits. Overall, however, devil's claw commercialisation results in local harvesters and national economies receiving a minute proportion of benefits from the trade, and virtually no value adding occurs within the region. Although government policies are in place to protect the species and monitor its trade, their implementation is weak and thwarted by a lack of human and financial capacity. The difficulties of competing against highly sophisticated industries, combined with poor collaboration between producers and local traders, further weakens the bargaining power of developing countries in the region.

This paper explores these issues in more detail, providing an overview of the ecology of the plant, its use and sustainability, and the questions raised by efforts to domesticate the species. Insights are provided in the social and cultural aspects of devil's claw production and its trade, with emphasis on the raw material production area in Omaheke Region, Namibia. The paper concludes with a short analysis of key trends and issues, lessons learned from the case and suggested strategies to address current pitfalls.

STUDY AREA AND CONTEXT

This chapter provides an overview of trade in devil's claw in southern Africa. However, to allow for comparisons across case studies and to facilitate statistical analysis, the focus is Omaheke Region of Namibia (Figure 1). Omaheke represents one of 13 regions in Namibia, and one of the poorest in the country. It is located within the Central Kalahari Savannah, an area that receives highly variable rainfall, averaging 250 mm to 450 mm per year. In parts of this area, 328 harvesters are engaged in the "Sustainably Harvested Devil's Claw Project" (SHDC), a project facilitated by non-governmental organisations (NGO), which focuses on 12 pre-independence resettlement farms including Vergenoeg, Gemboksfontein, Blouberg, Kalahari Prag and eight farms linked

Figure 1. Omaheke Region, Namibia



Sources: ESRI data and Maps 2002; Barnard, P. 1998; Wynberg, R. forthcoming.

to the Tjaka Ben Hur complex. These cover an area of 307,415 ha, much of which is degraded through overgrazing. Some 10 tons of raw material are traded from this area, representing 1.7% of the total devil's claw trade. The objectives of the SHDC project are:

- to enable marginalized rural communities to improve their household food security through earning a reasonable income from sustainably harvested devil's claw;
- to equip harvester groups to manage and utilise their resource independently on a sustainable basis and to facilitate their direct involvement in the trade; and
- to further demonstrate, on a scale large enough to be significant in the overall market, the viability of a fair trade in sustainably harvested devil's claw (CRIAA SA-DC 2002).

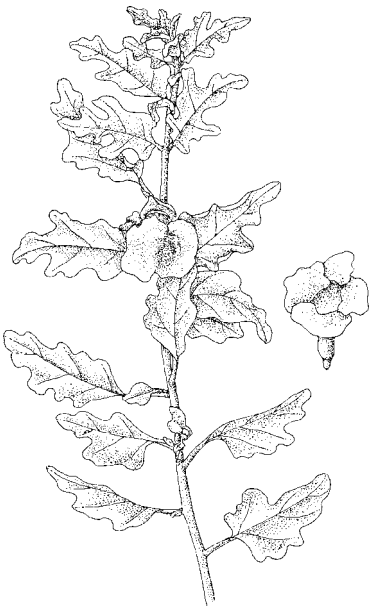
The SHDC project is atypical and illustrates the situation in a minority of communities in Namibia. Its origins lie in the initiation of a project by the Namibian NGO Centre for Research and Information Action in Africa – Southern African Development and Consulting (CRIAA SA-DC), which has enabled communities to link directly with a local exporting firm and to put in place measures to achieve sustainable harvesting. Elsewhere in Namibia, an unfacilitated 'free market' approach to the trade is in place, and harvesters are more vulnerable to exploitation.

THE RESOURCE BASE

The ecology of devil's claw

Devil's claw, of the genus *Harpagophytum* DC. ex Meissn., in the family Pedaliaceae, is endemic to the Kalahari region. The plant is perennial and has a tuberous rootstock, from which prostrate annual stems spread bearing greyish-green leaves. Its tubular flowers have a maroon to pink colour and develop into the characteristic fruits that give the genus *Harpagophytum* ('hook plant', when translated from the Greek) its colloquial name, devil's claw. The fruits have numerous long arms with sharp, hooked thorns, as well as two straight thorns on the upper surface (Photo 1). Dispersal of the seed occurs through entanglement of the fruit in the wool, tails or feet of animals and its subsequent implant in sandy soils (Phillips 1938), leading some to state that the name devil's claw originates from the bedevilled dance that animals do to get rid of the fruit that has run into their hooves (Moatti *et al*. 1983). While devil's claw is the name most widely associated with the plant, at least 20 other names are used to refer to it.

Harpagophytum occurs between 15° and 30° latitude in Namibia, Botswana, South Africa, Angola and, to a lesser extent, Zambia, Zimbabwe and Mozambique (Ihlenfeldt and Hartmann 1970). Two species occur in southern Africa, *Harpagophytum procumbens* and *Harpagophytum zeyheri*, which can be subdivided into five subspecies differentiated by their fruit and leaf characteristics and geographical distribution. While both species are accepted for medicinal use, it is *H. procumbens* that is mostly traded and recognised by the international pharmacopoeia (Blumenthal 1998). However, *H. zeyheri* is very similar in appearance to *H. procumbens* and the two species may be easily confused.



(Harpagophytum procumbens)

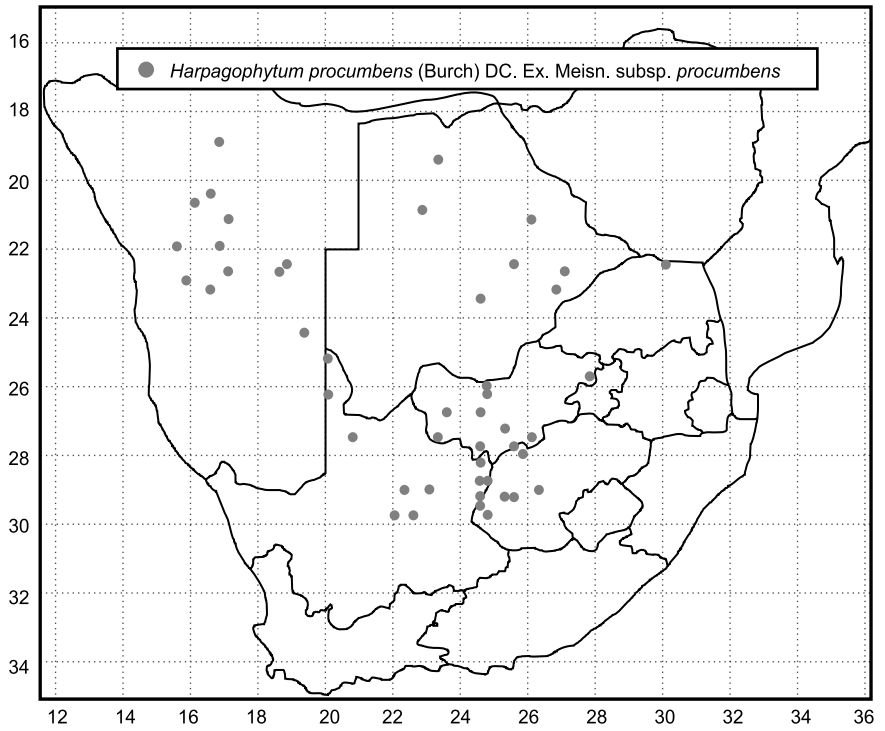
Photo 1. Devil's claw flower with leaves (Photo by R. Wynberg)

Both species are considered in this paper because of the difficulties of distinguishing between them, and because of an increasing trade in *H. zeyheri,* but for the most part discussion is focused on *H. procumbens,* the species found in the study area.

H. procumbens typically occurs in the red sandy soils of the Kalahari desert, in areas coinciding with some of the driest parts of the region (Figure 2). To survive the dry period the plant forms water-storing secondary root tubers which branch off horizontally from the primary taproot, and it is these roots that are used in phytotherapy to treat a wide variety of ailments. Varying assessments suggest the secondary tubers can attain depths of 2 m, lengths from 4 cm to 25 cm, and a diameter up to 6 cm (Taylor and Moss 1982; Hachfeld 1999). The growing season of the plant typically commences in December, following sufficient rains, and ends in April-June after the plant has produced seeds and accumulated adequate phytosynthates to facilitate growth in the following season (Strobach 1999). Flowers and leaves of the plant are visible only during the active growing season, when suitable climatic conditions prevail. After rains these parts of the plant dry out rapidly and soon disappear, making location of the tubers extremely difficult. Both the abundance and visibility of the plant are strongly correlated to rainfall.

H. procumbens is considered a 'common weed' (Phillips 1938; Henderson and Anderson 1966) and is frequently reported to be more abundant in disturbed, trampled or overgrazed areas including road verges, firebreaks and dune slopes (Ihlendfeldt and Hartmann 1970; Nott 1986; Hachfeld 1999). Nott (1986) attributes this to the deep root systems of *H. procumbens* and the inability of the plant to compete with the shallow root systems of grasses. Because grasses use topsoil water, moisture penetration to the subsoil is reduced, as is the ability to sustain the deeper root systems of *H. procumbens*. Indeed, several authors note that the plant occurs in greater numbers where

Figure 2. Distribution of *H. procumbens*. Data provided by National Herbarium, Pretoria Computerised Information System (PRECIS)



there is little perennial grass cover and sparse distribution of shrubs and trees, an observation confirmed by a recent survey among farmers in Namibia (Hachfeld 1999). Based on an average yield of 600 g per plant and densities of 2 to 2,000 plants/ha, biomass production of *H. procumbens* can vary from 120 g to 120 kg/ha air dry weight (Wynberg forthcoming).

Harvesting and processing

Methods for harvesting *Harpagophytum* vary considerably from location to location and depend to a large extent on the intensity of the operation, the level of awareness among harvesters and the implements at hand. These factors in turn are greatly influenced by the levels of organisation among harvesters and by the presence of extension and support services. Although *Harpagophytum* can be harvested at any time of the year, digging tends to be easier and yields greater during the rainy season, when the sand is moist (Nott 1986). This advantage is offset to some extent by the difficulties experienced in drying material during the rainy season. Permit conditions introduced by both Namibia and Botswana confine harvesting to the dry period between March/April and September/October, a restriction imposed largely to curtail overharvesting.

Two main methods of harvesting can be distinguished: complete removal of the plant and the environmentally superior 'superficial' method, which entails harvesting of the secondary tubers whilst leaving the parent tuber intact (Ntseane 1993) (Photo 2). Harmful harvesting practices are widely practised but the advantages of superficial harvesting are increasingly being recognised, and a number of government departments, NGOs and some exporters have introduced programmes to raise awareness about appropriate harvesting techniques. This includes interventions by CRIAA SA-DC described in the raw material production area of this study.

Photo 2. Secondary tuber of H. procumbens (Photo by R. Wynberg)

Processing of the root is relatively simple and entails washing, peeling and slicing the tuber into approximately 0.5 mm thick pieces, generally on the same day as harvest. Slices are then typically sun dried in a well-ventilated area, sometimes on nets suspended off the ground. The drying procedure takes two to five days but is dependent on the time of year and weather conditions. Dried and sliced devil's claw is subsequently packed into bags and stored, awaiting sale.

Resource use and sustainability

Harmful harvesting techniques, combined with the escalation of international trade in the plant, have led to growing concerns about overexploitation and the status of *Harpagophytum* populations. Although localised declines in *H. procumbens* populations have been recorded by several studies, little information exists on its overall population status in the region. Nonetheless, based on World Conservation Union (IUCN) criteria for overall population size, extent of occurrence or area of occupancy its status is not considered threatened (Raimondo and Donaldson 2002). Assessment is complicated by the close interrelationship between production, overgrazing and rainfall

(Taylor and Moss 1982) and by substantial oscillations in the natural densities of *Harpagophytum*—both from area to area and from year to year. However, given the right conditions, including rotational harvesting, sustainable harvesting is possible, as has been successfully demonstrated by a number of important examples (Taylor and Moss 1982; Nott 1986; Schneider 1997; Lombard 2000). As a case in point, the SHDC Project conducts pre- and postharvest ecological surveys to set harvesting quotas and equips harvesters with the tools and knowledge to control quality, to monitor harvesting and to record supplies (Lombard 2000).

Cultivation

Virtually all current trade *in Harpagophtyum* draws on harvests from wild populations, but commercial interest in the plant, combined with concern about the overexploitation of natural populations and a desire to improve pharmaceutical quality, have led to a range of studies to investigate the plant's potential for cultivation (e.g., Blank 1973; Thusano Lefatsheng, 1995; Schmidt *et al*. 1998; Levieille *et al*. 2000). Two trends are worth noting. First, there is a high level of competition among projects, evidenced by a complete shroud of secrecy (often formalised through confidentiality provisions in contracts), an astonishing absence of collaboration and a distinct lack of published information about the technical aspects of the disparate projects. A second and related trend concerns the increasing involvement of the pharmaceutical industry and private sector in sponsoring and initiating cultivation projects, a development that reflects the vested interests of the industry to secure long-term supplies of the drug and to ensure a high quality product. With a few notable exceptions this is associated with the virtual exclusion of local research institutions from participation in the technical work required and negligible involvement of rural communities in the establishment and ongoing maintenance of projects. Instead, most cultivation initiatives to date draw upon foreign scientists and are located on the lands of commercial white farmers in South Africa or Namibia. In all likelihood these patterns do not reflect any technical constraints associated with the difficulties of cultivation, but rather a preference on the part of industry to follow paths of greatest ease.

In light of these developments it is not surprising that a vigorous and highly polarised debate has evolved as to the advantages and disadvantages of cultivating *Harpagophytum*, catalysed to a large extent by a proposal from Germany in 2000 to list the plant on Appendix II of the Convention on the International Trade in Endangered Species of Flora and Fauna (CITES). The proposal was later withdrawn, partly as a result of protests from range states and NGOs, leading to a CITES decision for range states and importing states to submit information on trade, management and the biological status of *Harpagophytum* species to the secretariat. At the recent 12th meeting of the Conference of the Parties to CITES, the decision was taken for range states to provide an update to the next meeting on implementation of policies and management programmes and to negotiate with the industry to obtain support for management programmes that support sustainable use and community development.

One of the main effects of CITES has been a decline in market demand, but it has also given renewed impetus to domestication and cultivation efforts, stemming from the perceptions created of an endangered resource. Although Appendix II allows for 'controlled trade' in a species rather than imposing an outright ban, successful listing will undoubtedly affect trade from the wild—and thus the livelihoods of thousands of harvesters dependent on the resource for income. Including *Harpagophytum* on Appendix II, it is argued, will shift the market towards preferring a cultivated product over one that is wild harvested, and thus an environment that favours agribusiness and commercial farmers over and above marginalised small farmers and local livelihoods (CRIAA SA-DC 2000a). A major concern in this regard is the role played by South Africa in successfully cultivating *Harpagophytum* and its potential, as a highly developed agricultural economy, to completely usurp production of devil's claw in the region and make wild harvesting redundant (Cole and du Plessis 2001). Planned cultivation projects outside of range states present a similar threat for harvesting communities and national economies in southern Africa.

What are the inputs required for cultivation and how might these restrict the involvement of small farmers and marginalized people in these activities? Although specific information is difficult to come by, irrigation is an essential requirement for devil's claw cultivation, estimated by some to be 6 liters of water per plant per week (Powell and Moolman 1999). Such requirements are clearly an impediment for marginalized communities in remote settlements, few of which have access to potable water let alone sufficient quantities for irrigation. Also pertinent is the question of the willingness and ability of communities to engage in devil's claw cultivation and the importance of (often nonexistent) extension services to support such activities (Matlhare 1994). The reality of the situation, borne out by the majority of experiences and by the stated interest of commercial farmers, is that cultivation of devil's claw is most likely to be pursued by economically privileged farmers with ready access to water, land, transport and knowledge.

This notwithstanding, many of those engaged in the devil's claw trade in southern Africa see cultivation as an inevitability that should be controlled and turned to their best advantage, rather than an activity that should be prohibited on the basis of its social impacts. The issue is obviously not cut and dry, nor the potential impacts. Although often touted as a solution to unsustainable use, *Harpagophytum* cultivation brings with it its own set of environmental problems, notably those associated with soil erosion, land clearing, increased salinity and genetic uniformity. Strict controls on cultivation, such as those introduced recently by the Namibian government, clearly require widespread monitoring, adherence and application throughout the region.

SOCIAL AND CULTURAL ASPECTS OF DEVIL'S CLAW PRODUCTION

Devil's claw production in southern Africa takes place in some of the most inhospitable and arid parts of the region, considered marginal for conventional agricultural production and suitable mostly for grazing. Livelihood options are thus extremely limited, and devil's claw extraction is a highly important survival strategy for the poor. Indeed, the 9,000 or so devil's claw harvesters represent

some of the most marginalized communities in southern Africa, characterised by extremely low levels of education, acute poverty and limited access to income-earning opportunities. This, combined with the arduous nature of the work and its low income-earning potential, has led many to comment that the harvesting of devil's claw is a 'low status' activity reserved for the poorest of the poor (see, for example, Ntseane 1993). In Namibia, CRIAA SA-DC (2000b) reports an average annual income of N$264 (US$26) per harvester, although this applies specifically to resettlement farms involved in the SHDC Project. Elsewhere in the country incomes of harvesters are highly erratic, varying from N$100 to N$500 (US$10–50), depending on the volumes harvested. While these earnings may seem low, and certainly fall well below the poverty line, they nonetheless represent an extremely important source of income in communities in which only a minority of people have formal jobs.

A diverse range of ethnic groups are engaged in harvesting and trading devil's claw, including the San, Herero, Damara, Ovambo and Bakgalagadi. Virtually no anthropological accounts exist of the trade, although it is fair to say that the most marginalized groups, and most notably the San, are those most active in harvesting the plant (Ntseane 1993). A long history of dispossession and relocation has accompanied the San, described comprehensively in Suzman (2001) and illustrated well by the situation of the Omaheke San in Namibia, who represent the majority of participants in the SHDC Project. Cole and du Plessis (2001) chart the complex history of this group who, prior to conquest by the Herero and later colonisation by Germany and South Africa, were organised into relatively stable social units attached to particular areas known as *n!ores*. After colonisation, groups of San were retained on commercial farms as a source of cheap labour, but over time became redundant as farm labour was reduced, and were forced to squat in road reserves or informal settlements. Following independence the Omaheke San were 'resettled' on government-owned farms in the region, together with displaced farm workers of other ethnic origins. This story of resettlement and persecution is one that has played itself out in many other parts of the region as well. It is also a narrative that forms only part of a much wider political texture for the case of devil's claw.

TRADE AND MARKETS

Use and pharmacological effects

The root of devil's claw is used widely as a medicine, both traditionally and in Western preparations. Traditional use of the tuber for fever relief, blood diseases, muscular aches and pains, digestive disorders, syphilis and as an analgesic during pregnancy is widely recorded, as is the use of pulverised root material as an ointment for sores, ulcers and boils and for difficult births (Watt and Breyer-Brandwijk 1962; Giess and Snyman 1995). Indeed, traditional knowledge was the basis for initiating Western interest in the plant at the turn of the twentieth century, thus marking one of the first and certainly one of the most significant 'biopiracy' incidents in Namibia.

Today the plant has a reputation for efficacy in the treatment of arthritis and rheumatism in Western medicine. Extracts of the tubers are used widely as ingredients in pharmaceutical preparations, herbal remedies and cosmetics

either in preparations in the form of raw or powdered material or as standardised extracts in the form of capsules, tablets, tinctures and ointments. The main active molecules are the iridoid glycosides: harpagoside (the main compound in the fresh and dried root), harpagide, procumbide and procumboside, all of which show analgesic and anti-inflammatory properties (Czygan *et al*. 1977). Other potentially active chemical constituents include phenols, phytosterols and flavonoids (Ziller and Franz 1979; Burger 1987). A number of studies have demonstrated the efficacy of devil's claw as an anti-inflammatory (e.g., Lanhers *et al*. 1992; Chrubasik *et al*. 1996), and its properties are considered comparable to cortisone and phenylbutazone but without the accompanying side effects (Moussard *et al*. 1992). This, combined with the proven safety and efficacy of the plant and its recognition by the international pharmacopoeia (Blumenthal 1998), has led to a rapid escalation in demand in devil's claw, far surpassing historical levels of use.

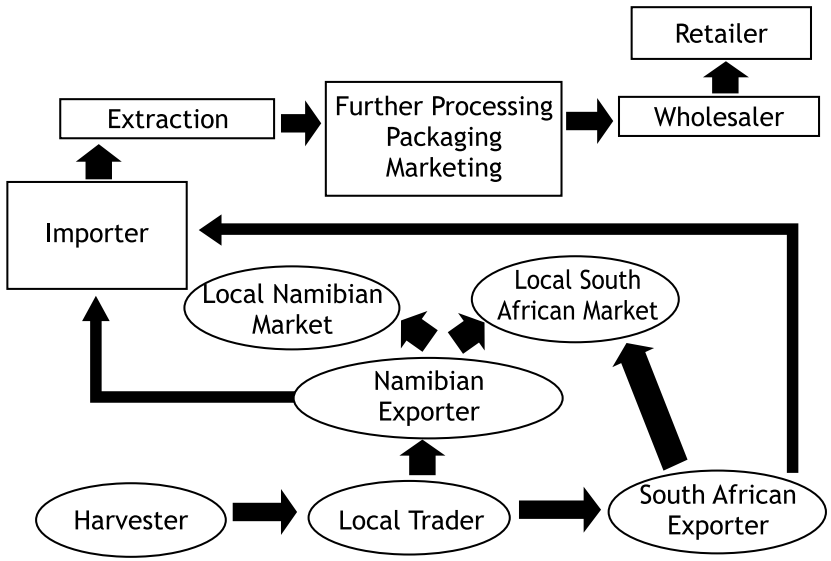
Trade history

Devil's Claw has been traded internationally for some 50 years, most exports going from Namibia to Germany. Although the trade has been erratic, there has over the years been a steady increase in export volume, which in turn has led to an expansion of the area from which material is sourced to include Botswana and South Africa as well as the more remote parts of Namibia. The past five years in particular have been distinguished by a three- to six-fold increase in the amount of *Harpagophytum* traded, reaching a level of over 600 tons exported from Namibia alone in 1998 and 1999, and nearly 700 tons in 2001 (Wynberg forthcoming). In 2001, 92% of the trade originated from Namibia, 5% from Botswana, and 3% from South Africa. Importing countries include Germany (predominantly), France, Switzerland, Spain, Portugal, Italy, the United Kingdom, the United States, South Korea, Japan, Belgium and Brazil (Wynberg forthcoming). On average, the raw material is exported for US$1.40/kg to US$1.80/kg, while the finished product retails for approximately US$140/kg. Harvesters typically receive US$0.50/kg to US$1.20/kg (Wynberg forthcoming).

The production-to-consumption system: models of commercialisation

A complex set of relationships characterises trade in *Harpagophytum*, and trade chains vary considerably from country to country and region to region. Three general models of trade can, however, be discerned at the local level (Wynberg forthcoming). The first and most prevalent pattern, which I call the 'Free Enterprise' model, typifies the situation in Namibia and involves up to 6,000 harvesters of *Harpagophytum* supplying local traders, who in turn supply four or five main exporting companies (Figure 3). Material may be purchased and resold several times by local traders before being sold to one of the exporters. Local traders are typically urban-based, employed entrepreneurs who have the benefit both of owning transport and of established relationships with *Harpagophytum* exporters. Although this model has the greatest outreach, harvesters receive the lowest proportion of financial benefits—0.36% of the retail price.

Figure 3. 'Free Enterprise' model of Namibia and South Africa



Exporters within this model are represented by about four to five established companies within Namibia, one large French exporter which works independently of either Namibian or South African firms, and an increasing number of smaller enterprises. Raw material may be (a) packaged and sold within Namibia for limited local trade, (b) exported directly from Namibia to Europe or the U.S., (c) exported to Europe or the U.S. via South African firms, or (d) exported to South Africa for local trade. Typically, it will then be passed onto an extractor who, depending on circumstances, will likely pass on the extracts to a company for manufacturing, packaging and marketing of the drug.

The second model of trade, the 'Honest Broker' model, illustrates the situation in a minority of communities in Namibia, where support from CRIAA SA-DC has enabled communities to link directly with a local exporting firm (Figure 4). This is also the model described by the accompanying data to this study. The exporter collects material directly from involved communities and pays a premium price on the basis of the material being certified organic and of a high quality. In total, some 10 tons are traded. Although this model has limited outreach, the 328 participating harvesters receive a greater proportion of the retail price (0.85%) than harvesters of the other two models. After export, the product follows the same route as that described above.

The third model of trade, which I have dubbed the 'State-NGO' model, typifies the situation in Botswana, where a single NGO has dominated trade in *Harpagophytum* over the past 10 years. Here, a strategy of targeted intervention has lead to *Harpagophytum* being purchased directly from marginalized rural communities in the country by a rural development NGO, Thusano Lefatsheng, which also markets the product (Figure 5). A significant variation from the Namibian models is that only a small proportion of material from Botswana is exported directly to target markets; most material leaving

Figure 4. 'Honest Broker' model of the Sustainably Harvested Devil's Claw Project, Namibia

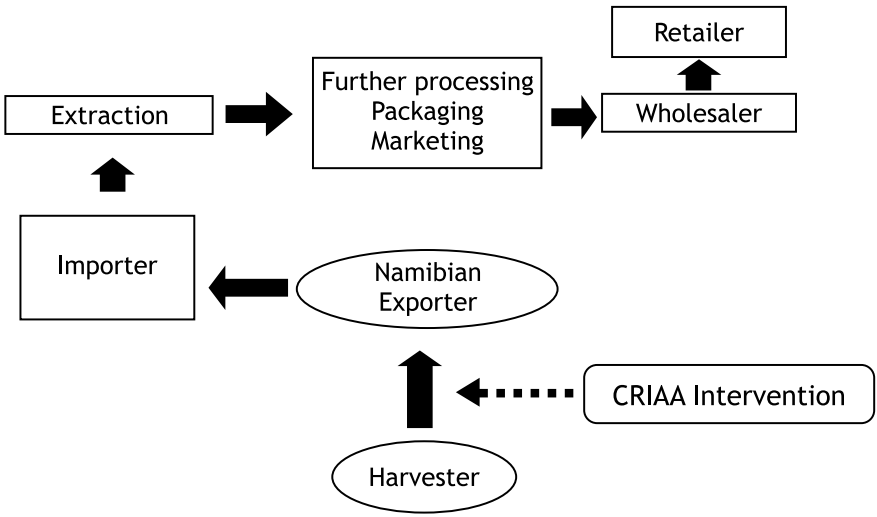
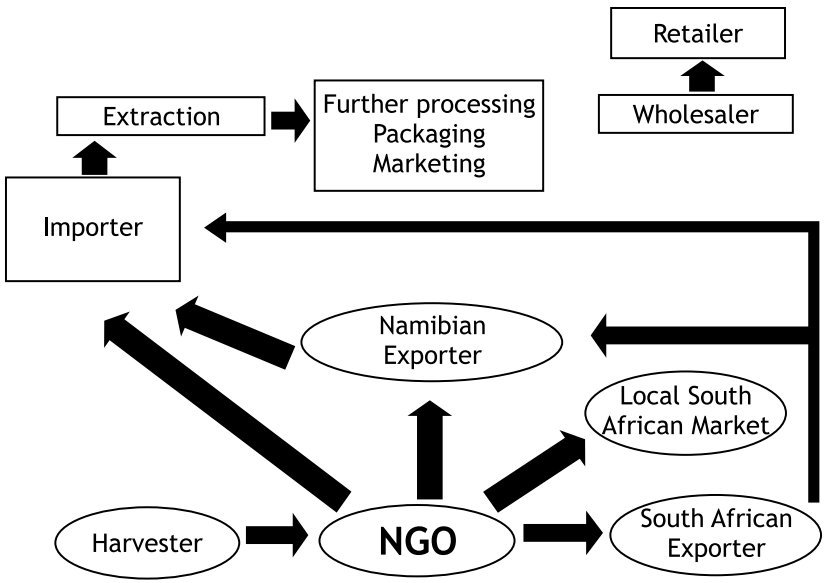


Figure 5. 'State-NGO' model of Botswana



Botswana is exported to Europe and the U.S. via Namibia and South Africa, and thereafter follows the same route as that described for the other two models. This model has significant outreach, benefiting some 2,500 harvesters who receive 0.64% of the retail price.

Global patterns of trade in *Harpagophytum* are far more uniform, albeit more complex, than those described at the local level. An intricate web of importers, traders, wholesalers, processors, and retailers are engaged in marketing, branding and adding value to devil's claw, with the largest and most established markets by far being those in Germany. Five to 10 companies dominate the European trade, the most predominant being the German Martin Bauer Group, estimated to control 75% of world trade in devil's claw. Important subsidiaries recently established under the Martin Bauer umbrella include Paul Muggenburg, responsible for supplying and sourcing raw material; Plant Extract, which produces extracts; and Finzelberg GmbH and Co., which manufactures herbal extracts for the pharmaceutical industry.

POLICY ENVIRONMENT

For the most part, devil's claw is extracted in the communal areas of Namibia, Botswana, and South Africa. Most of these areas have suffered a long and chequered history under years of colonial and apartheid administration and, more recently, through a suite of problematic government policies that discriminate against the use of non-timber forest products such as devil's claw. In Botswana, for example, the 1975 Tribal Grazing Land Policy and 1991 National Agricultural Development Policy have been central in diminishing access of rural people to natural resources, instead reserving communal areas for grazing to accommodate increased beef production (Molebatsi and Atlhopheng 1998). This has been accompanied by the privatisation and fencing of communal grazing areas. The increasing enclosure of communal lands through private fencing is also a trend in Namibia, stemming partly from a legal vacuum in regard to ownership and management of these areas. The lack of tenure security is a major constraint precluding more effective management of devil's claw in Namibia, where communities face difficulties in excluding others from extracting the resource on their lands. The problem is particularly acute in the study area, where customary controls have been steadily eroded through resettlement and social dislocation. As in Botswana, Namibian policies such as the 1995 Agricultural (Commercial) Land Reform Act and the 2000 Communal Land Bill have set forth new agendas on fencing and individual leasehold tenure (Alden Wily 2000). Concern has been expressed about the inappropriate adoption of the titling model by these new laws, based on Western notions of ownership rather than African systems of tenure (Cousins 2002).

A more conducive policy environment exists for the management of devil's claw, and a variety of laws and policies aim to control its exploitation and trade in the region. These date back to the 1970s and the onset of growth in international trade of the species. In Namibia, the first efforts to control exploitation of devil's claw were introduced in June 1975 with the declaration of *H. procumbens* as a protected plant under Schedule 9 of the Nature Conservation Ordinance (4 of 1975) and the introduction of a permit system to control the gathering, purchase and export of plant material. While the permit system for exporting material worked relatively well, that for controlling harvesting proved extremely problematic. This resulted in permit requirements for harvesting, possession and transportation being suspended in 1986, and maintained for export and phytosanitary purposes only.

In 1999 renewed concerns about overharvesting and unsustainable methods of harvesting, as well as the unauthorised harvesting on communal and private lands, led to a reassessment of the situation and the issuance of the overarching Policy on the Harvesting and Export of *Harpagophytum* by the Ministry of Environment and Tourism. The policy stipulates a harvesting season from March to October for both species of *Harpagophytum*, no permits being issued outside of this period. Harvesting will be subject to a nontransferable permit valid for the duration of the harvesting season and applicable for a particular locality only. Permit holders, which may be individuals or a group, are required to obtain the permission of the landowner prior to harvesting and are also required to report the number of bags harvested, to whom such bags were sold and on which dates. New permits will be issued only on receipt of such a report and confirmation of compliance with sustainable harvesting techniques. Furthermore, persons dealing (purchasing, transporting, selling, exporting, importing) in *Harpagophytum* are required to register annually with the ministry, to keep a register of all transactions, in collaboration with harvesters, and to clearly distinguish between the two species of *Harpagophytum* in reporting. Export permits are still required for the export of *Harpagophytum*, to be accompanied by information on the origin of all material, as are phytosanitary certificates. Permits are also required for any cultivation of *Harpagophytum,* for research on the plant and for any feasibility studies into cultivation. The policy also supports projects that add value to *Harpagophytum* in the interest of national development. Decision-making is effected through the Devil's Claw Working Group, a stakeholder group set up in 1999, and the government gives increasing recognition to the importance of maintaining a sustainable trade in the plant.

TRENDS AND ISSUES

The Resource Base

Although the commercial harvesting of *Harpagophytum* can have negative ecological impacts, evidence points towards the excellent potential of the plant as a resource that can be harvested sustainably. However, this requires the implementation of appropriate management practices and plans at local, regional and national levels. These are to varying degrees already in place but, because of the patchiness of the resource, are locally specific and often project specific, hinging on the involvement of NGOs. A major constraint is the ability to monitor and enforce harvesting and trade policies, particularly in remoter harvesting areas. Little capacity exists within government, requiring adoption of innovative approaches, including self-policing and monitoring by communities (van der Vleuten 1998). This in turn requires capacity-building programmes at the local level and an enhancement of existing extension services. A further constraint is the lack of reliable information on the population status of *Harpagophytum* species, which precludes effective resource management and points to the need for systematic and comprehensive research.

Despite these constraints, there is increasing political will and growing awareness of the importance of conserving devil's claw and ensuring its sustainable use. One of the beneficial effects of CITES proposals to list devil's

claw has been enhanced regional collaboration between range states, and increased efforts are being made to harmonise policies, standardise the monitoring of trade and harvesting and improve enforcement of regulations. This will not only lead to improved conservation of the resource, but will also enhance the bargaining power of producers and exporters.

Livelihoods and benefit-sharing

The importance of sustainable use is not only ecological given that the harvesting of devil's claw represents an extremely important survival strategy for some of the most marginalized communities in southern Africa. Both mismanagement of the resource and domestication will have negative ramifications for those harvesting from the wild. While trends towards enhanced management of the resource will support sustained trade in wild-crafted material, range states have an important role to play in ensuring that domestication strategies are locally appropriate, do not jeopardise local livelihoods and spread the benefits as widely as possible. Steps are needed to pool and share existing knowledge on cultivation, for the benefit of the industry as a whole. One of the most startling aspects of the study is the wholesale lack of involvement of nationals from range states in research and development activities, and in cultivation projects in particular.

A key issue raised by this case concerns the negligible benefits procured by range states through trade in devil's claw. At the community level, direct financial benefits rarely exceed 0.85% of the retail price, and typically comprise only 0.4%. Local exporters usually obtain only 0.2% to 0.4% of the retail price. Although there are obvious costs involved in the processing and marketing of the imported product, in reality the trade is monopolised by a small cohort of international companies and increased profits (or favourable changes in exchange rates) are seldom passed down the chain to producers. In a similar vein, processing activities take place almost exclusively in Europe, and the bulk of material is exported in a raw and largely unprocessed form. Although some companies are now seeking to redress this and to build value-adding facilities in the region to undertake additional processing steps such as milling, grinding, crushing and extraction, there is as yet no demonstrable evidence of real commitment. Of significance is that foreigners hold virtually all the existing patents for the processing of devil's claw.

Finally, the lack of tenure security for communities harvesting devil's claw remains an unresolved issue requiring attention by range states. This is an essential component of any strategy aimed at ensuring a more sustainable and equitable trade in devil's claw.

Trade

Continued growth in demand for *Harpagophytum*-based products is likely, in keeping with the past five to six years which have seen a three- to six-fold increase in amounts traded. These trends parallel those of the phytotherapeutics market in general over the past decade and can be attributed to a growing interest in 'natural' biological alternatives to chemical-based

drugs and increased coverage by health insurance companies of herbal remedies (Grünwald and Büttel 1996). Increased demand for devil's claw in particular can be attributed to the proven safety and efficacy of the plant, well-founded clinical data, an increase in patients suffering from arthritis and substantial marketing. Continued efforts on the part of the industry to cultivate the plant are likely, stemming from the desire to improve and standardise pharmaceutical quality and concerns about the overexploitation of wild populations. A key concern is that misperceptions on the part of industry and consumers regarding wild-crafted populations will lead to increased demand for cultivated material and a shift in production systems from poor communities to rich farmers or multinational companies.

Direct sourcing partnerships could be a valuable strategy to develop sustainable and fair trade sources of raw materials, including the negotiation of long-term contracts at fixed (US$) prices. That such a strategy can work is well demonstrated by the efforts of the SHDC Project, which has linked communities directly to a local export firm that markets the product and sells it at a premium price. A noteworthy feature of the project is the personal commitment of both the exporter and importers to a fair and sustainable trade. However, experiences from both Namibia and Botswana point to the financial difficulties of sustaining NGOs as long-term intermediaries, the importance of private-sector partners and the critical need for external marketing support. Tools that warrant further investigation include the development of certification standards and a set of specific guidelines for industries involved in trading devil's claw that describe specific criteria for fair trade, environmental sustainability and quality standards. This could stimulate positive changes in current practice and provide an important monitoring tool. Improved branding and consumer awareness is also important to market the beneficial socio-economic impacts of the product and its links to a specific geographical area.

CONCLUSIONS

Devil's claw holds considerable potential as a non-timber forest product that can both be harvested sustainably and deliver significant development benefits to marginalized rural communities. Its occurrence on degraded lands and opportunistic nature suggests negligible harvesting impacts on ecosystems; its ability to regenerate after harvesting indicates opportunities for sustainable use; and its distribution in the communal lands of the Kalahari enables households with few other livelihood options to earn an income, albeit small, for part of the year. National benefits are also significant, both in terms of taxes generated, employment generation and export revenue. Furthermore, the long history of trade in devil's claw, its continued growth and the established safety and efficacy of the plant suggest a reliable market upon which long-term strategies can be developed. Increased interest in fair and sustainable trade products provides further potential for developing niche markets and improving local prices.

Several barriers, however, impede the full realisation of the plant's conservation and development potential. At the local level, these include a lack of tenure security, insufficient monitoring capacity, poor business and management skills and low levels of organisation. Inadequate quality and resource

management also present major hurdles. At the international level, monopoly control severely compromises the ability of local producers and range states to receive optimum benefits and prevents range states from adding full value to their resources. Cultivation efforts represent a further threat to ensuring a reliable stream of benefits for harvesting communities.

Despite these constraints, constructive interventions are both possible and probable as support is growing from both decision-makers and industry for a sustainable trade in the species. Certainly they point towards devil's claw being one example that can attempt to marry the sometimes conflicting objectives of conservation and development.

ACKNOWLEDGEMENTS

This paper draws from a series of rich discussions held with role players in the devil's claw trade and forms part of doctoral research being undertaken on the commercialisation of southern African biodiversity. All those who have participated in this research are gratefully acknowledged for giving so generously of their time and information. Particular thanks are due to Dave Cole (CRIAA-SA DC), Marianne Strobach and Mike Krafft for assisting with information for the database. Scholarships awarded for this study by the National Research Foundation, Annell Trust and Smartt Memorial Trust are thankfully acknowledged. The National Botanical Institute is thanked for permission to use data from the National Herbarium, Pretoria Computerised Information System (PRECIS). Tony Cunningham and Terry Sunderland provided useful comments on earlier drafts of this paper.

ENDNOTES

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Chapter 5

The informal trade of *Cassipourea flanaganii* as a cosmetic in South Africa

Michelle Cocks[1] ***and Tony Dold***[2]

Common name	Part of the resource used	Management	Degree of transformation	Scale of trade	Geographic range
Umemezi	Bark	Wild	Low	National	Small

ABSTRACT

A rare forest tree, *Cassipourea flanaganii* (Schinz) Alston (Rhizophoraceae), has, in the last 25 years, been harvested indiscriminately for sale in informal herbal markets and *amayeza* (*Muthi*) stores in South Africa. The bark is removed, often resulting in the death of the tree, and sold locally and nationally as a skin lightening cosmetic known as *umemezi* in both Zulu and Xhosa languages. The effect of uncontrolled harvesting has had negative consequences on the ecology of the species and its habitat. It is, however, an important means of income to poverty stricken peri-urban women who are reliant on the sale of wild harvested plant material to support their families. The findings of an ecological survey of *C. flanaganii* and a survey of the socio-economic conditions of the trade of its bark is presented.

INTRODUCTION

As early as 1936, Hunter reported that a light skin complexion was favoured by Nguni women (amaXhosa) and was considered attractive. Furthermore, she noted that women made use of 'Tambookie grass' (*Cymbopogon, Hyparrhenia* or *Miscanthidium* (Smith 1966)) as a strong bleaching agent by means of chewing the roots and applying the saliva to the face at least twice a day (Hunter 1936). This desire for a lighter complexion has not diminished in recent times and various cosmetics, both natural and synthetic, are still used today.

The cosmetic use of *Cassipourea flanaganii* (Schinz) Alston as a skin lightener appears to be relatively recent, as the first mention of it in the literature surveyed was in 1976 (Earle 1976). Surprisingly, the use of the species was not recorded in the extensive work undertaken by Watt and Breyer-Brandwyk (1962) or De Lange's (1963) investigation into Xhosa cosmetic practices. This is confirmed by a review of the literature (Gerstner 1942; De Lange 1963; Earle 1976; Coates Palgrave 1977; Broster 1981; De Villiers 1984; Cunningham 1988, 1993; Hutchings *et al.* 1996; Khan 1996a, b, c; Cocks 1997; Dold and Cocks 1997, 1999). The absence of recorded use of *C. flanaganii* suggests that the use and trade of the species was uncommon before the early 1970s. It was not until the mid 1970s that Earle (1976) reported that the chemical skin lightening industry in South Africa was worth US$12.8 million (converted at a rate of approximately ZAR1.00 to US$1 as in 1976) for that year and noted that vegetable preparations of the bark of several species, including *C. flanaganii*, represented a lucrative informal trade. Earle (1976) called for strictly controlled harvesting and predicted inevitable overutilisation of some species. From 1976 to 1990 the trade in manufactured skin lightening products increased considerably (Khan 1996c). However, many of these products were mercury based and caused serious damage to the skin. These products saw widespread use from about 1956 to the early 1970s, when they were finally banned. The sale of skin lightening products containing hydroquinone, another mercury-based lightener (Butler's Pharmacy personal communication), dates back only to 1961 (Khan 1996c). As a result, lobby groups protested against over-the-counter skin lightening products. In August 1990 the National Minister of Health finally proclaimed hydroquinone a substance controlled by law, to be sold only by pharmacists (Khan 1996c).

Khan's survey, undertaken in 1996 in the townships of Cape Town, revealed that skin lightening products were still available and continued to be sold from pharmacies although not as commonly, nor in as great a quantity as previously. It is believed that this lack of availability in chemical products is fuelling the growing trade in traditional skin lightening preparations based on plants such as *C. flanaganii* (Khan 1996c). This study revealed that the majority of users equated a lighter skin colour with beauty, most likely enforced by feelings of racial inferiority as a result of the psychological legacy of apartheid. Khan (1996c) concluded by highlighting the fact that this social factor, the desire to be light-skinned, is responsible for posing a threat to these species as a result of overharvesting to supply the markets in urban centres.

Another species of *Cassipourea*, *C. gerrardii* (Schinz) Alston, has also been recorded as *umemezi* and is used and traded in the same way as *C. flanaganii* in KwaZulu-Natal and Gauteng (Cunningham 1988; Hutchings *et al.* 1996; Van Wyk and Gericke 2000). The bark of these two species are undifferentiated in the trade (A.B. Cunningham personal communication). The name *umemezi* has been referred to by some authors for several unrelated taxa including *Calodendrum capense* (L.f.) Thunb. and *Rapanea melanophloeos* (L.) Mez. In this regard it is important to differentiate between two important subclassifications of *umemezi*, that of *umemezi-omhlope* (*Calodendrum capense*) and *umemezi-obomvu* (*C. flanaganii* and *C. gerrardii*). The suffixes refer to the colour of the cosmetic paste, *omhlope* being white and *obomvu* reddish-brown. These are clearly differentiated in the trade, but as *Calodendrum capense* is seldom sold in

the Eastern Cape (Cocks and Dold 2000), the suffix is not used by traders. Therefore all *umemezi* in the study site refers to *C. flanaganii*.

The bark of *C. flanaganii* is sold in an unprocessed state in the study site. Consumers simply purchase a piece of dry bark, which is then ground on a granite stone and mixed with water to form a paste that is applied daily to the face as a skin lightener. The vernacular name *umemezi* is derived from the Xhosa verb *ukumemeza*, meaning to 'call aloud' or to 'attract attention' (Nomtunzi Sizane personal communication).

Hilton-Taylor (1996) lists *Cassipourea flanaganii* as 'rare' in the Cape region and globally, and as endemic to the Southern Africa floristic region. The current plant Red Data list (Victor 2002) does not treat this species. The species has a scattered distribution and is present in highly localised forest patches in the Eastern Cape Province from King William's Town in the west to southern KwaZulu-Natal in the east. *C. gerrardii* occurs primarily further to the north-east of the Eastern Cape in KwaZulu-Natal and in tropical east Africa (Pooley 1993).

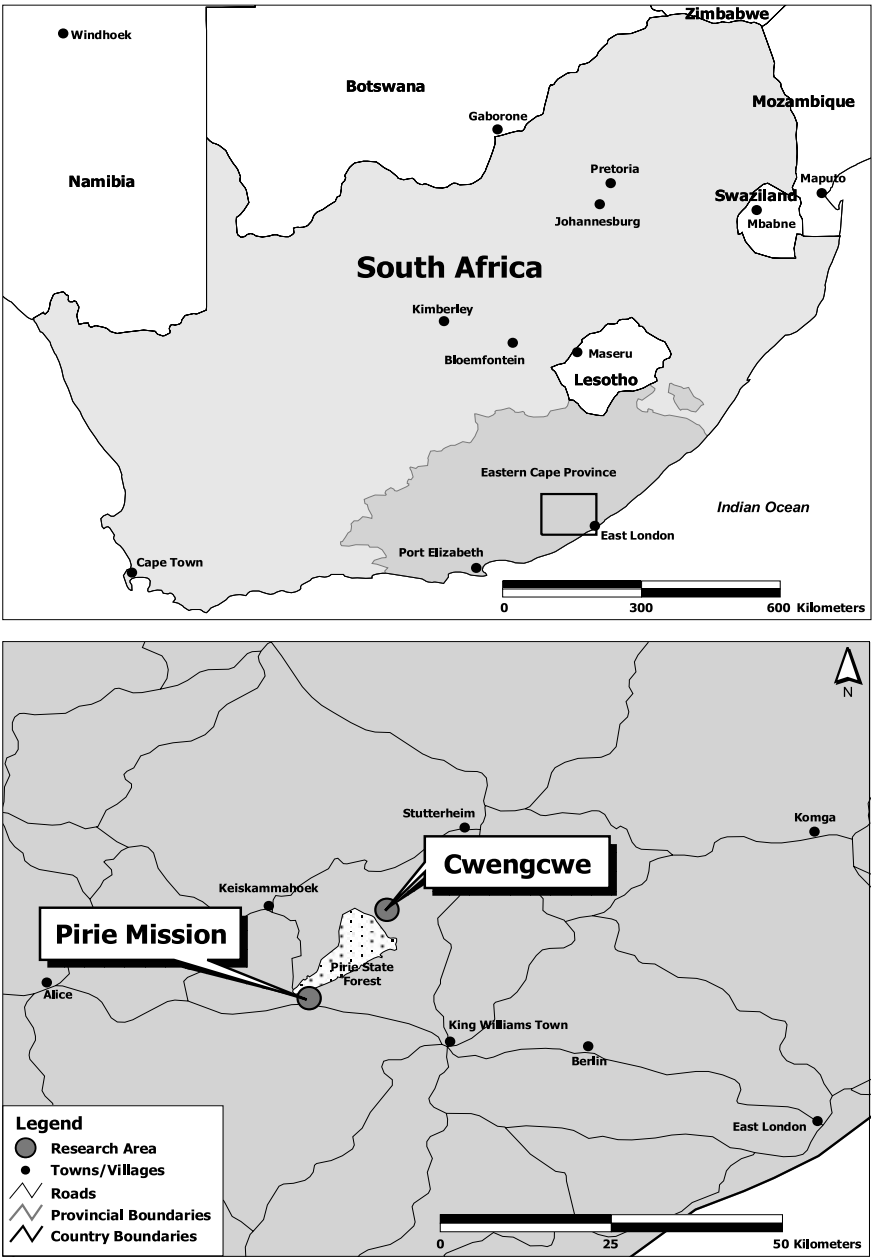
The bark is currently harvested from wild populations only. Cocks (1997) reports an extensive informal trade in the bark, both in street markets and in *amayeza* stores (African chemists), in King William's Town with demand from as far as Cape Town. Khan's (1996c) survey revealed that the 97.9% majority of traders obtained *C. flanaganii* from the Eastern Cape. Cunningham (1993) confirms this finding and includes *C. flanaganii* in a list of traditional medicines commercially traded nationally in South Africa (1988), particularly KwaZulu-Natal. In response to demand for *umemezi*, local manufacturing companies have begun to purchase bark material in bulk, which is ground into a powder and packaged in small plastic containers. These products are sold in stores in the larger urban centres across the country, such as Cape Town, Gauteng and Durban (A.B. Cunningham personal communication). This indicates an increased demand for the product resulting in further commercialisation by means of preprocessing and packaging.

A market survey of medicinal plants traded in the Eastern Cape (Cocks and Dold 2000) revealed that Pirie State Forest near King William's Town is the primary source of traded *C. flanaganii* bark, a smaller quantity coming from Gatyana Forest in the Willowvale District, approximately 150 km to the east. Pirie Forest is state owned and managed by the Department of Water Affairs and Forestry (DWAF). It is surrounded by several villages typical of rural communities in the province that are equivalent to peri-urban settlements (Figure 1). Families are more or less integrated into the wider economy as they depend on cash or food from family members in urban centres and commuters with jobs in the nearby towns. Crop production is virtually nonexistent but families invest in small and large stock, resulting in large numbers of livestock in the area. The villages are situated approximately 8 km from a main access route to King William's Town.

CHARACTERISTICS OF THE PRODUCTION SYSTEM

Pirie State Forest (32°44'S 27°17'E), classified by Low and Rebelo (1996) as Afromontane forest, is situated between 580 m and 1200 m above sea level with an average annual rainfall of 890 mm. The geological formations are mudstone, shale, and sandstone with dolerite intrusions. The forest comprises

Figure 1. Study site: Pirie State Forest, Hobo and Cwengcwe



Source: ESRI Data and Maps 2002.

43 tree species dominated by *Olea capensis* L. ssp. *macrocarpa* (C.H. Wr.) Verdoorn, *Podocarpus falcatus* (Thunb.) R.Br. ex Mirb., *Mimusops obovata* Sond. and *Nuxia floribunda* Benth. in the canopy, and *Trichocladus ellipticus* Eckl. and Zeyh. and *Canthium ciliatum* (Klotzsch) Kuntze in the subcanopy (Bailey *et al*. 1999).

(Cassipourea flanaganii)

C. flanaganii is located in primary and secondary forest areas as it is a mid-canopy species reaching a height of 8 m (Coates Palgrave 1997). The bark is harvested throughout the year. Smaller diameter individuals (<41 mm) are not harvested because of the difficulty experienced in removing the thin bark. Hence, the main limiting factor for harvesting is size, and therefore the age of the tree. Within the study site the tree is common in tall (15 m+) forest on the south-facing slope and considerably less common on drier east facing aspects. *C. flanaganii* individuals in the forest show no immediate associations or distinct areas in which they are more common. The species appears to have a loose clumping habit, as in some areas there were many seedlings present, whilst in other areas there were none. The clumping is attributed to restricted seed dispersal. Occasional mature trees were found that could be identified as possible progenitors of clumps of seedlings. Little is known about biology and reproduction of *C. flanaganii* as no detailed studies have been conducted on the species. Spatially, trees in the Hobo forest showed similar densities throughout, and only a few sections were devoid of *C. flanaganii*. It is suggested

that *C. flanaganii* is a generalist in where it grows within the south-facing Afromontane forests, being present in a variety of canopy heights and forest types. The coppicing potential of *C. flanaganii* appears to be limited as all ring-barked trees were dead.

It has been reported that between 1986 and 1989, at the peak of the trade in *C. flanaganii*, uncontrolled harvesting was undertaken on a large scale in Pirie State Forest resulting in an almost total loss of adult trees (C. Kameni personal communication). Within the study site all *C. flanaganii* material is harvested from Pirie Forest. There are no managed or cultivated populations and there are no recognisable trends towards domesticating or cultivating the species. In addition to *C. flanaganii*, 11 other species are regularly harvested for their bark for the medicinal plant trade. These are *Cassine papillosa* (Hochst.) Kuntze, *Curtisia dentata* (Burm.f.) C.A.Sm., *Harpephyllum caffrum* Bernh. ex Krauss, *Hippobromus pauciflorus* (L.f.) Radlk., *Pleurostylia capensis* (Turcz.) Loes., *Protorhus longifolia* (Bernh.) Engl., *Ptaeroxylon obliquum* (Thunb.) Radlk., *Rapanea melanophloeos* L. Mez, *Schotia latifolia* Jacq., *Scolopia zeyheri* (Nees) Harv. and *Strychnos henningsii* Gilg. It has been established that approximately 4 tons of forest-harvested plant material, with a value of approximately US$9,000 is harvested annually from the Pirie State Forest. Just over 50% of this is derived from the bark of these 11 tree species with a street market value of approximately US$4,000 (Cocks and Dold 2000).

An ecological survey was undertaken to determine the density of, and assess harvesting damage to, the populations of *C. flanaganii* in Hobo and Cwengcwe forests. These two forests form part of the larger Pirie State Forest (Figure 1). The survey sampled two representative areas of Hobo and Cwengcwe. Two 1,000 m transects were plotted and random 100 m^2 quadrates sampled along the transects; in this way reliable density estimates where made. In total, 156 quadrates comprising 249 *C. flanaganii* trees were sampled. The parameters recorded for each tree were the diameter at breast height (DBH) where applicable, total height and level of bark damage to the tree following Cunningham's (1988) seven-point scale.

Hobo forest has a density of approximately 125 *C. flanaganii* trees per hectare; 76% of these are seedlings (0 mm–10 mm in diameter); 19.7% are saplings (10 mm–46 mm in diameter) and only 4.3% are above 46 mm DBH, the minimum reproductive diameter encountered in the study. Cwengcwe forest has a density of approximately 210 trees per hectare, 94.4% of which are seedlings and 5.6% saplings. No reproductive or potentially reproductive trees were found.

Plots of comparable sizes in inaccessible areas of Pirie forest, with consequently low intensity harvesting, revealed tree density to be approximately 588 individuals per hectare with 35.5 trees per hectare above the minimum harvesting size, whereas in Hobo only 5.2 harvestable trees per hectare were recorded while in Cwengcwe none were found. In the survey of Hobo and Cwengcwe all sampled trees were undamaged as only 2.1% of the trees had a diameter greater than 41 mm. Furthermore only a single reproductive tree was found with a DBH of 46 mm.

No data were found in the literature reviewed on the reproduction of the species, and therefore the reproductive size is unknown. One individual of

46 mm DBH was found with severe harvesting damage but with many flowers. This represents the smallest flowering *C. flanaganii* found and sets the minimum reproductive size for harvested *C. flanaganii*. However, this size may not represent the minimum reproductive size for a nonharvested tree as the profuse flowering may have been a result of harvesting stress. Should stress play a role in early flowering of this specimen, the size estimate would be a conservative underestimation, meaning that there are even less potentially reproductive trees in the forest.

The survey clearly reveals a lack of large individuals. Palmer and Pitman (1972) and Pooley (1993) state that the tree attains a diameter of up to 230 mm, whereas the largest individual recorded in the study site was only 120 mm DBH. There is no doubt that this discrepancy is due to excessive bark harvesting (complete ring-barking) resulting in fatality of the larger trees. This has important ecological implications as the species is being harvested unsustainably and there are virtually no mature individuals in the populations to ensure its continued reproduction. *C. flanaganii* has a relatively thin bole and bark that tends to peel off easily in sheets. Sustainable harvesting based upon harvesting one side of the trunk is therefore not considered a viable strategy. It is suggested that *C. flanaganii* has a low potential for sustainable harvesting. Currently there are no studies investigating the impact of different harvesting regimes on the long-term survival of this species.

Photo 1. Evidence of bark harvesting within Cwengcwe Forest (Photo by T. Dold)

SOCIO-ECONOMIC CHARACTERISTICS OF THE RAW MATERIAL PRODUCTION AREA

Four distinct questionnaires were administered to the stakeholder groups involved in the trade of medicinal plants (herbal gatherers/hawkers, *amayeza* storeowners, traditional healers and customers). Within King William's Town 46 questionnaires were administered, 8 of these to traditional healers, 14 to street traders, 7 to *amayeza* storeowners, and 20 to consumers. Figures given for street traders and *amayeza* storeowners represent a 100% sample. However, only a small proportion of traditional healers were interviewed, and it is unknown how many are currently operating in the town. The authors established that *C. flanaganii* is more frequently sold by street traders than traditional healers and *amayeza* storeowners as it is a cosmetic rather than a medicine (Cocks and Dold 2000). In-depth interviews were conducted with raw material producers (RMPs) from two study sites to address issues regarding the harvesting and marketing of *C. flanaganii*.

A structured interview survey was conducted with household members (33.3%) from the raw material production area of Pirie Mission and Cwengcwe villages. The survey aimed to determine household wealth, reliance on arable land and home garden production, investment in livestock production and reliance on cash obtained through fixed and informal employment, pensions and remittances.

The RMPs reside in the villages of Pirie Mission and Cwengcwe adjacent to Pirie State Forest (Figure 1). Both villages are relatively small, with populations of between 460 and 600 people. The majority of the population is relatively stable as over 86% and 97% of the individuals of Pirie Mission and Cwengcwe, respectively, were born in and still reside in the villages. The two settlements are characterised by environmental degradation, very low or nonexistent levels of economic activity, a heavy dependence on urban earnings and welfare payments, high unemployment and poor infrastructure. The majority of households lack access to running water and the villages were electrified only in 1999. Access to poorly serviced schools and clinics is available in both villages.

The two villages are typical of communities in the surrounding district being classified as peri-urban settlements. Peri-urban settlements came about under the former apartheid government and its policies, which have left a distinct pattern in terms of location of the country's rural population and on the existing economies in these areas (Viljoen 1994). These policies, for example, have led to high density population figures in rural areas with little infrastructure. This has resulted in the land becoming overcropped, overgrazed and subject to soil erosion. The peri-urban communities in these areas are largely dependent on money from formal employment, the informal sector, government pensions and remittances rather than having a subsistence based economy (Palmer 1996).

Differences between the two communities reflect poorer conditions within Cwengcwe. For example, 46% of the houses in Pirie Mission make use of modern building materials, including bricks for the structure and zinc sheets for the roof, whereas in Cwengcwe only 25% were built solely of manufactured materials. The remaining households were built from natural indigenous materials. The Cwengcwe community is considerably more reliant on an agriculture-based

production system and this is reflected in the higher number of households owning arable lands (47%), whereas in Pirie Mission only 20% acknowledged ownership of arable fields land. No families in Pirie Mission currently utilise their fields for cultivation, whereas 26% of the households in Cwengcwe make regular use of their fields. However, in both villages there is some reliance on cultivation of home gardens. For example, 80% of the households in Pirie Mission still have access to home gardens and 72% cultivate them. Similarly, 89% of the households in Cwengcwe have access to home gardens and 84% make use of them on a regular basis. The majority of products from home gardens are consumed by the household rather than sold. In Pirie Mission the gardens contribute approximately 2.1% towards the total household income. Similarly, in Cwengcwe the vegetables cultivated contribute approximately 2.4% of the household total income despite the higher number of households cultivating their fields. None of the families of RMPs own their own fields but they do cultivate home gardens.

Households in both villages have invested in livestock. In Pirie Mission 25% of the households have cattle, while in Cwengcwe 33% do. Livestock and poultry products such as milk, eggs, and meat consumed within households in Pirie Mission contribute approximately 2% of their total income. In Cwengcwe livestock-based products contribute 5% of the average household total income. None of the RMPs own large livestock, but the majority own some pigs and chickens.

Cash contributes significantly higher amounts to total household income than subsistence-based products in both villages. (Cash in this instance refers to cash earned and obtained through fixed and informal employment, pensions and remittances.) For example, 78% of total household income in Pirie Mission is cash, whereas in Cwengcwe cash contributes approximately 66% of households' total income. A significant portion of the total amount of cash generated and obtained stems from state pensions and grants.[3] For example, in Pirie Mission 35% of households' cash income is obtained via state pensions, and in Cwengcwe 29%. These figures clearly reveal the extent to which households within these communities rely on the state for their survival. These findings reflect the communities' movement away from a subsistence-based economy and towards a cash-based economy.

Within the two villages 3.2% (n = 10) of households are involved in the harvesting of *Cassipourea* bark. It appears likely that access to pensions as well as the strong social stigma against the collection of medicinal products prohibits more households from engaging in the activity. Gatherers frequent the forest so regularly that they are often viewed as sorcerers. Similarly, at national level, gatherers of medicinal plants do not have a high social status.

Of the 10 gatherers in the two communities, eight are women and two are men. Women gatherers trade only in the informal market in King William's Town, whereas male gatherers commute to markets further afield and sell their material to traders in informal markets and *amayeza* stores as far away as Cape Town. Harvesting of *C. flanaganii* is undertaken weekly throughout most of the year except during the rainy season. It occupies between five and seven hours a week, including time spent harvesting other medicinal plant materials. The only initial cost in the harvesting process is the purchase of an axe, which costs approximately US$3.5. On average each female gatherer/

trader earns US$271 annually from *C. flanaganii* sales (converted at a rate of R6.41 to US$1 as reported on 10 March 2000), ranging from US$124 to US$748, annually. It is estimated that each female gatherer/trader earns an annual average of US$2,004 (ranging from US$1,121 to US$3,790) in total sales of plant material traded. The sale of *C. flanaganii* contributes approximately 14% of their total income. The gatherers/traders have no other means of income other than the sale of medicinal plants.

INSTITUTIONAL CHARACTERISTICS OF PRODUCERS

Although the trade in medicinal plants is well established countrywide, it operates entirely informally at the production/harvest end of the marketing chain (Cunningham 1988). There is no formal organisation amongst gatherers in the study site and they operate as independent agents when it comes to the harvesting of material. The main barriers to additional households becoming gatherers are the skills needed to identify plant species and the negative social stigma attached to the activity. In the study site no customary rules apply to the management of the forest, as it is state owned and access was previously strictly controlled. It is clear that gatherers harbour feelings of resentment and animosity towards government authorities and regard access to these resources as their right because they live adjacent to the forest. Although they readily acknowledge that greater distances need to be covered to obtain material, the gatherers perceive all forest resources, including *C. flanaganii*, to be inexhaustible.

CHARACTERISTICS OF THE PRODUCT

Hardly any transformation takes place from raw material to end product within the study area. The bark is removed from trees, brought home, scraped to remove debris such as lichen and left to dry for two days. It is then cut into pieces approximately 120 mm long. The pieces are transported to the neighbouring and larger urban markets across the country. However, with the increased commercialisation of the product, a factory-processed and packaged product has recently become available in the central business districts of some provinces. The authors have not yet recorded these products in the Eastern Cape.

CHARACTERISTICS OF TRADE AND MARKETING

The female gatherers/traders from Pirie Mission and Cwengcwe sell their material in King William's Town. The material is harvested on weekends or in the early morning hours during the week. The work is strenuous, and women take their older children to assist with the harvesting, but no additional labour is employed. The majority of gatherers/traders is between 45 and 65 years old. They represent the poorest sector of their communities and have little or no formal education.

The medicinal plant market in King William's Town has been in existence for 12 years, during which time its size has both fluctuated and increased.

It peaked in the 1980s in Cape Town and dropped in the early and mid 1990s. In 1997 the trade started to increase as wholesalers began purchasing material from the informal market in King William's Town for resale in other city centres. A distinct chain of role players are involved in the trade of *C. flanaganii*. For many of the female traders, plant material sales are their sole source of income besides the pensions for those over the age of 60. The women commute the approximately 20 km to King William's Town six days a week to sell the harvested material, each incurring transport costs of approximately US$40 per month (converted at a rate of R6.41 to US$1 as reported on 10 March 2000). King William's Town (Figure 1) is a large town with a population of approximately 28,000 people (Statistics South Africa 1996). It has a dynamic business centre that supplies a growing urban population as well as a large rural population of the former homeland of Ciskei surrounding it. It is located on a national road linking rural areas to urban centres as well as the major developing centres of East London and Port Elizabeth and therefore is an important commuter point. The total number of RMPs and herbal street traders (first order traders) is eight and they sell their product at an informal herbal market situated at the taxi rank, where herbal material is simply displayed openly on the sidewalk. Street traders are predominately women who make their living from selling herbal material in urban centres. In some instances they collect their own material or they rely on gatherers to supply them with material (Cocks and Dold 2000). The RMPs and herbal street traders in this instance are the same people.

Photo 2. Street traders selling medicinal plants within the informal market in King William's Town (Photo by T. Dold)

Surplus material is sold to the third link in the chain, *amayeza* stores. These stores are owned by either traditional healers or entrepreneurs of various ethnic groups who employ traditional healers. The *amayeza* stores form part of the formal commercial sector as these stores are run as businesses and the owners have rent and business expenses to pay (Cocks 1997). The stores are generally situated in the formal central business district and operate as dispensaries of both herbal and patent products. *Amayeza* stores sell *C. flanaganii* for US$15.60 per kilogram. The mark-up is as high as 150% compared to the street market price, which is US$6.24 per kilogram.

RMPs have various options to sell their products. The price per kilogram is up to six times greater, however, when they sell the material from their street stalls rather than to storeowners or middlemen. RMPs ranked *C. flanaganii* as the fifth most common species sold, whereas traditional healers and *amayeza* storeowners did not include it amongst the top 10. This is so because *C. flanaganii* is a cosmetic generally sold by itself rather than being used as an ingredient for herbal medicinal mixtures prepared by traditional healers. A large percentage of the population is aware of *C. flanaganii* use and consumers purchase it without consulting a traditional healer. Consequently the majority of material sold is from street markets.

Because the gatherers are also the first level traders, they are aware of the use and value of the product and are therefore in a position to adjust the price of wholesale material depending on the buyer. For example, white entrepreneurs pay significantly higher prices for the material than black entrepreneurs. No grading system is currently utilised and there is no significant alteration to the product as only the bark is sold.

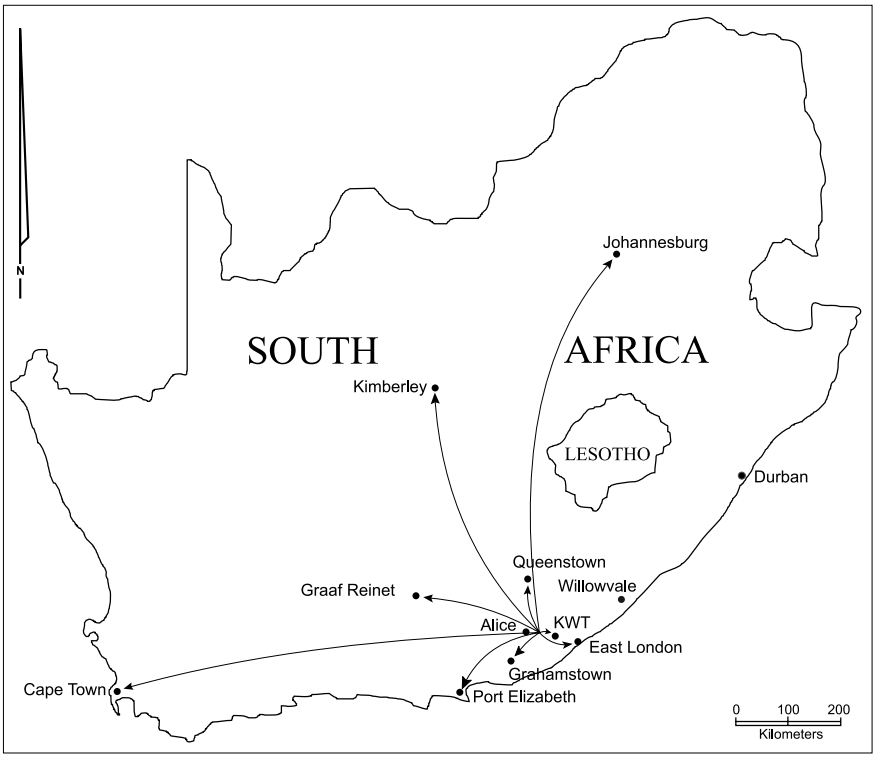
Neither the gatherers nor the street traders belong to any formal trade organisation. There do appear to be basic conventions, however, that street traders have formalised amongst themselves. In King William's Town there are two groups of street traders. The older of the two groups has monopolised the opportunity to supply *amayeza* stores on a weekly basis and wholesalers from neighbouring towns such as Grahamstown and Port Elizabeth on a monthly basis.

TRADE TO LARGER CENTRES

Within the study site, only two male gatherers commute regularly to the large urban centres of Cape Town, Johannesburg and Kimberley as well as Alice, Port Elizabeth and Graaf Reinet (Figure 2) to sell *C. flanaganii* bark. It is likely that this product also reaches Durban through resale, although gatherers/traders in this study did not report commuting there. The demand for *C. flanaganii* in KwaZulu-Natal is in competition with *C. gerrardii* and therefore probably not as lucrative.

These traders considered their activities to be far more profitable than selling in the herbal market in King William's Town. Male gatherers are willing to travel alone to as far as Cape Town whereas the women prefer to operate closer to home. The former have been harvesting for 12 years in the study site. *C. flanaganii* is one of 12 medicinal plant species harvested for external sale. The male gatherers showed similar social characteristics to herbal hawkers, i.e., low levels of education and the same age group categories.

Figure 2. Documented trade routes of *C. flanaganii* bark from Pirie Forest



Map by Rhodes University Graphics Services Unit
Source: Cocks and Dold 2002

The difference in price for *C. flanaganii* is substantial in the various urban centres. For example, between King William's Town and Grahamstown (110 km) the mark-up is approximately 213%. Recordings were made of the price of *C. flanaganii* at secondary markets in the neighbouring districts and the increase in price per kilogram was significant.

POLICIES AFFECTING RAW MATERIAL PRODUCTION

Pirie State Forest has been heavily exploited both by herbal gatherers and historically by woodcutters (Board 1962). Furthermore, past and recent political changes in South Africa have seriously impacted upon the management of Pirie Forest. For example, under the previous administration forest management was under the jurisdiction of the former homeland. During that era, communities were strictly prohibited from accessing forest resources. Forest guards patrolled the area to ensure that no one accessed resources. This changed, however, in 1994 after the first South African democratic election when the Chief Directorate of Forestry inherited *de jure* responsibility for all forests previously under the jurisdiction of the former provinces, homelands and self-governing territories. This constituted a substantial

increase in the number of forests under the department's control. Since this change, however, the Department of Water Affairs and Forestry has struggled unsuccessfully to manage these areas because of increasing financial and staffing constraints. Decision-making bodies have subsequently realised that the department would never be in position to manage the indigenous forest effectively without the co-operation and assistance of local communities and other stakeholders. This thinking was reinforced by growing international trends and pressures for increased community involvement and participation in the management of indigenous forests. Since 1998 the department has subsequently adopted an institutional and legislative context that supports the implementation of participatory forest management, which aims to include all stakeholders in collaborative forest management—be it in the form of agreements, shared regulatory roles or community monitoring systems (N. Michell personal communication). In 1998 the department also passed the National Forest Act, which makes provision for the special protection of forests and trees as well as the setting aside of protected areas. Sustainable utilisation is, however, an important component of indigenous forest management. Consequently the department has adopted a mission statement emphasising the conservation (preservation and utilisation) of natural forests and wood lots on a sustainable and scientific basis for the benefit of all (RSA Government Gazette 1998). Inhabitants of communities in proximity to state forests are thus permitted to harvest an armload of dry material per person per day for household use. No tools to chop or containers to transport material are permitted. Only subsistence use of forest products is permitted and commercial harvesting is illegal (Anonymous 1997).

This stance has also resulted in the department's policy no longer being one of patrolling and imposing law enforcement to keep people out of the forests. In 1996 the department removed weapons from the forest guards. In Pirie State Forest, the forest guards retaliated and refused to patrol the area after a forest guard was killed by illegal timber harvesters in the area (C. Kameni personal communication).

Despite adoption of the Participatory Forest Management Policy program by the Department of Water Affairs and Forestry in 1998 no concrete steps have been undertaken towards its implementation in Pirie State Forest. The government has, however, indirectly increased its involvement in raw material production through the new legislation by permitting access to harvest for subsistence purposes. Currently no effective management structures are in place and neither the community structures nor the department is effectively managing the indigenous forest (C. Kameni personal communication). As a result gatherers in the surrounding communities have relatively free access to indigenous resources. The gatherers are aware, however, that their commercial activities are considered illegal and harvesting is undertaken apprehensively. Nevertheless, harvesting is undertaken on an unsustainable basis and is having a detrimental impact on the survival of *C. flanaganii* and other species.

CONCLUSION

The study has revealed that large quantities of wild plant material are being harvested from Pirie State Forest—as much as 1,592 kg of bark annually. The sale of *C. flanaganii* contributes substantially to medicinal plant traders' annual income as 14% of their total earnings are derived from this species. The high economic value of *C. flanaganii*, as much as US$46.80 per kilogram, in neighbouring cities has resulted in it being an extremely valuable product, but the current harvesting levels are not sustainable in the long term.

Without appropriate steps being taken to increase user groups' ownership and responsibility of the resource the likelihood of sustainability is extremely low. Despite the Department of Forestry's policy to increase access to resources and the implementation of joint management programs in the area, no effective structures are in place as yet. It is therefore strongly recommended that cultivation programs and alternative harvesting methods be initiated at the grassroots level to ensure that the species is not harvested to extinction. Preliminary work on other rare species in South Africa has shown that active ingredients can be found in parts other than the bark—such as the leaves—and that these alternatives to the highly destructive harvesting of bark should be explored (M. Mander personal communication).

The advantages of cultivation are not only confined to the individual taxa but also to the maintenance of ecological integrity. For example, the continual felling of *Prunus africana* (Hook.f.) Kalkm. (Nkefor *et al.* 1999) and *Pausinystalia johimbe* (K. Schum.) Pierre ex Bielle (Sunderland *et al.* 1999) in Cameroon to exploit the maximum bark yield causes large and discontinuous gaps in the forest, affecting dynamic processes. In both cases successful domestication and cultivation of the species are being undertaken by means of a well-documented process (Nkefor *et al.* 1999; Sunderland *et al.* 1999) that could be applied in South Africa. Furthermore, income generated from the sale of *C. flanaganii* bark from sustainable sources would help alleviate the abject poverty of the communities of Pirie Mission and Cwengcwe who would be guaranteed an income from already well-established markets. The gatherers, predominantly women, are also traditionally subsistence farmers and have both farming skills and ecological knowledge of the forest as well as of the species itself, which would be essential to the successful domestication of *C. flanaganii*.

It is clear that, in accordance with the proposed implementation of a participatory forest management programme by the Department of Water Affairs and Forestry, the communities of Pirie Mission and Cwengcwe would benefit from a collaborative, interdisciplinary effort to make optimum use of a forest product and ensure its sustainability through domestication. The benefits would be participatory and therefore afford truly sustainable management as well as economic empowerment to local communities.

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ENDNOTES

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3. Government pensions for the superannuated—men over 65, women over 60—and the permanently disabled were introduced for rural populations, including those in the former homelands in the late 1960s (Palmer 1996) and constituted US$86 per month in 2001.

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Chapter 6

The contribution of shea butter (*Vitellaria paradoxa* C.F. Gaertner) to local livelihoods in Benin

Kathrin Schreckenberg[1]

Common names	Part of the resource used	Management	Degree of transformation	Scale of trade	Geographic range
Shea, Karité	Kernels	Wild/Managed	High	International	Large

ABSTRACT

The data for this paper were collected in 1992/3 as part of a larger Ph.D. study investigating the supply and demand of non-timber forest products in the Bassila region of Benin. Shea (*Vitellaria paradoxa* C.F. Gaertner) is the principal tree component of the agroforestry parklands in the region and, in spite of changes in agricultural practices, will continue to be so for the near future. Shea butter is a staple component of the local diet and the kernels are a significant source of income for women. They have been traded internationally for over a century for use in the food (margarine and chocolate) industry. Changes in consumption patterns and the availability of alternative, more reliable and less arduous, income-earning activities suggest that local interest in shea may decline in the long-term. This may be counteracted, however, by increased interest internationally as shea butter gains a growing foothold in the cosmetics market, leading to greater demand for kernels and, particularly, locally produced butter. No specific policy interventions are required to ensure that shea remains an important livelihood option for local women in the case study area.

INTRODUCTION

Why the interest in shea?

Known as *karité* in French, the shea tree (*Vitellaria paradoxa* C.F. Gaertner) is the most common species in the parklands of semi-arid West Africa (Breman and Kessler 1995). The edible butter made from its kernels was reported to be

traded in the fourteenth century (Busson 1965, cited in Hall *et al.* 1996) and was mentioned frequently in the writings of early European travellers in West Africa (Park 1799; Clapperton 1829; Caillié 1830). Export of what was then known as *Butyrospermum parkii*, to supply European production of margarine and candles, began well before World War I. Figures for the current European import market are highly unreliable but a conservative estimate suggests it is worth US$13 million per year (Fintrac 1999). The main producers are the Sahelian countries, shea being the third most important export crop in Burkina Faso, for instance. Most of the trade (and all the data presented in this chapter) concerns the more common subspecies *paradoxa*, which occurs in a wide belt from Senegal to the Central African Republic (Hall *et al.* 1996). The liquid fat produced from the second subspecies *nilotica* hardly features on the export market, possibly because of the tree's location in the relatively unstable areas of southern Sudan and Ethiopia, Uganda and north-east Zaire (Hall *et al.* 1996).

Processing into butter is predominantly carried out in the importing country. Much of it is used as a cocoa butter equivalent (CBE) in the chocolate industry, often being mixed in various proportions with fats derived from other non-timber forest products (NTFPs) such as palm oil (*Elaeis guineensis* Jacq.) and illipe (*Shorea macrophylla* (Vriese) Ashton). Shea is considered to be the best of the CBEs and is particularly useful in chocolate manufacture as it raises the melting point, giving increased shine and hardness at room temperature (Boffa 1999). While the chocolate and confectionery industry uses the butter (stearin) fraction of shea butter, its oil (olein) fraction is also used in margarines and baking.

In recent years, the food industry market has been supplemented by a small but dynamic market emerging for use of shea butter in 'natural' cosmetic products. Its high triglyceride content gives it a rich consistency which is valuable for skin creams, shampoos and other cosmetic products because of its hydrating, protecting and softening properties.

At the same time as being an important traded crop, shea plays an integral role in rural people's subsistence. In most of the southern Sahel and Sudan zones in Africa, shea butter is the most affordable and extensively used edible fat (Boffa 1999). In non-pastoral areas it is sometimes the only source of fat for rural populations (Hyman 1991). The fruit flesh (a thin but delicious layer around the nut) provides an important snack during the early agricultural or 'lean' period, when stocks from the previous harvest are low but energy needs are high (Boffa 1999). Shea butter has numerous traditional medicinal applications. Rancid butter is traditionally used to make soap, the by-product of butter-making is used to waterproof earthen hut walls (Schreckenberg 1996), and the wood burns well and makes good charcoal. As a source of income, all shea-related activities are entirely in the women's domain.

Context of the study

The data were collected as part of a Ph.D. study (Schreckenberg 1996) to investigate supply and demand of NTFPs in the Bassila region of Benin. Continuous fieldwork was carried out from September 1992 to September 1993, focusing on three case study villages. The supply of NTFPs was investigated through fortnightly phenological observations on 193 trees representing 11 species,

including yield estimates for shea and African locust-bean (*Parkia biglobosa* (Jacq.) Benth). This was combined with an inventory of land-use types and tree densities in a circle (with 3.3 km radius) around each village, this being the approximate area from which NTFPs were collected and in which the majority of fields lay. On the demand side, community-level meetings were followed by regular group discussions with women in all three villages to discuss the role of NTFP incomes in their livelihoods as well as weekly observations at two weekly markets for a whole calendar year. This was supplemented by a complete household survey to determine the amounts of NTFPs used (for subsistence and sale) in the previous year.

Much NTFP research focuses on products that have suddenly caught the public eye because of the rapid decline in resources (e.g., woodcarving and trophy hunting in southern Africa), the boom-and-bust nature of markets (e.g., rubber and brazil nut in Bolivia), the impact of high-profile outside interventions ('rainforest crunch' literature) and concern for the empowerment of local people (e.g., Brazilian chicleros and rubber tappers). This shea case study is perhaps unusual in that it is a by-product of a larger study on NTFPs in an area that was chosen primarily for logistical reasons[2] rather than because NTFPs were considered to be an issue of any particular importance, and where processing and trade have not been supported by any external interventions. While the chapter refers to the shea trade more generally, the specific case study is not representative of the key shea-producing areas in the drier Sahelian region.

Regional setting

The research was carried out in three villages (Kodowari, Djantala and Diepani PK8) in the Bassila subprefecture, Atacora Department, Benin. The three villages were selected as being average-sized (50–500 inhabitants) communities representing a cross-section of ethnic groups. Bassila, a small town of 5,500 inhabitants, lies about 350 km inland, close to the Togo border (Figure 1). Together with most of the local villages it is sited along the main road leading from the coast to Burkina Faso in the north. Although unpaved, this road is a major trade route and two of the study villages (Djantala and Diepani PK8) were established here by immigrants in the late 1960s and early '70s to take advantage of relatively empty land along a good road. The indigenous village, Kodowari, moved from its original forest location to its present roadside location at the same time.

Vegetation in the Bassila region is a typical 'savanna landscape' (Bourlière and Hadley 1983), in which savanna vegetation dominates but is interrupted by a series of distinctive gallery forests along mostly seasonal watercourses. With its unimodal rainfall (May–October) of around 1,300 mm, the Bassila region falls into the Northern Guinea savanna category in the Keay (1953) classification or the broader category of 'Sudanian woodland' according to White (1983). This is the southern and wettest end of the shea distribution.

This area of Benin was once the 'wood-basket' of the country. By the time this study was carried out in 1992/3, however, the area around the villages was dominated by field, fallow, bush savanna (*savane arbustive*) and tree savanna (*savane arborée*) in almost equal proportions (around 20% each), the remainder

Figure 1. Map of Benin and study site

Source: ESRI Data and Maps 2002.

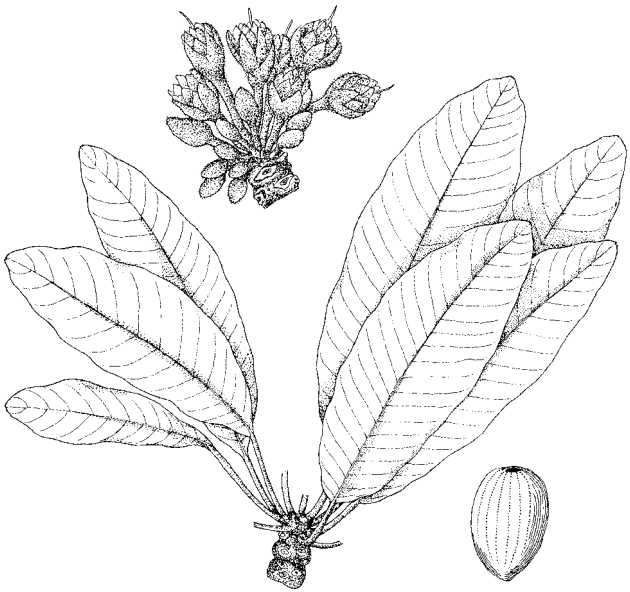
consisting of dense dry forest and gallery forests. During clearing, farmers retain mature individuals of a number of useful tree species in their fields (Photo 1), thus converting the landscape into a characteristic parkland. These are land use systems in which trees are deliberately preserved in association with crops and/or animals in a spatially dispersed arrangement and constitute the predominant agroforestry system in semi-arid West Africa (Nair 1993; Bonkoungou *et al*. 1994). Parklands are usually dominated by one or two tree species, which may vary with climatic zone and agricultural practices (Boffa 1999). In the case of shea, the typical companion tree is the African locust-bean, the seeds of which are fermented to make a protein-rich seasoning used in most sauces in the Bassila area.

Photo 1. Farmers retain mature individuals of useful tree species in fields (Photo by K. Schreckenberg)

THE PRODUCTION-TO-CONSUMPTION SYSTEM

The resource base

Shea is one of several species (others are the African locust-bean and the timber tree *Khaya senegalensis* (Desr.) A. Juss.) in Benin for which farmers must obtain a permit before clearing. As the underfunded forestry department is not in a position to enforce these regulations (Schreckenberg 1999), it is just as well that the law mirrors local practice. As also reported from Mali (Bagnoud *et al*. 1995), men in the study area stated that they often maintained more shea trees than they consider optimal from a crop point of view because they were a key source of income for their wives.



(Vitellaria paradoxa)

Selective retention of shea has increased its relative density in the fields to three times that in the savanna (Schreckenberg 1996). Of 63 trees (of all species) per hectare in the fields, 25 are shea. This compares well with the figure of 30 to 60 shea trees per hectare recorded slightly to the north-east by Agbahungba and Depommier (1989) and is double that typically found in Burkina Faso and Mali (Kater *et al.* 1992; Gijsbers *et al.* 1994; Boffa 1995). Well over half the trees in the fields and fallows are productive as farmers tend to clear younger trees. As a result, regeneration—which is entirely natural—occurs primarily in the fallows. The only management intervention is the removal of unwanted individuals (excess regeneration and trees with consistently poor yields). As has been described for northern Ghana (Lovett and Haq 2000), selection by farmers of healthy, productive individuals well suited to the managed field environment is an indication that the species is in the early stages of domestication.

Like many indigenous species, shea is renowned for its variable yields from year to year (Schmidt-Leplaideur 1987; Agbahungba and Depommier 1989). Women said that out of every three years, they expected one good, one bad and one average year. No clear relationship between annual yield variation and environmental factors was recognised by farmers; nor has it been identified in the literature (Boffa 1999). In addition to variability from year to year, there is also variability between trees (Ruyssen 1957), which farmers explain by saying, 'Trees are like people, some are bad, some are middling, and some are very good' (Schreckenberg 1996). Farmers considered 1993 a 'good' year, the average yield being 19.6 kg of fruit per tree, which corresponds to 5 kg of dried kernels.

Raw material producers and socio-economic context

The population

The Bassila region is a veritable ethnic melting pot. The indigenous Anii are restricted to this area and a few villages in neighbouring Togo. They are Muslims and make up the entire population (585 people) of one of the case study communities, Kodowari. The two main immigrant groups are the Logba (from Ouaké, 80 km to the north-west) and the Otamari (from Natitingou, 170 km to the north-west). The community of Diepani PK8 (108 people) consists almost entirely of the Protestant Otamari, while the Logba in Djantala (147 people) are a mixture of Muslims and Catholics and are joined by several Peulh families. These semisedentarised cattle herders originate from areas to the north and north-east of Bassila as well as from Togo, and live in isolated family camps in the bush around the villages. They practise agriculture and hold small herds of cattle and livestock on behalf of settled villagers.

Population density in the Bassila subprefecture remains relatively low at 9.5 people per square kilometre (1992 census) and there is no shortage of land. Tenure, however, is a complicated matter. Although all land formally belongs to the state, customary tenure still applies around Bassila and in much of the north of Benin. Local authorities recognise the rights of the 13 Anii customary landowners in the study area, who hold the land in trust for their lineage in a quasi-'private' way. Farmers must request their permission to clear land, but can then farm without paying rent (though occasional gifts to the landlord are advised). As the landowners have large holdings (in several cases many thousands of hectares), they are often unable to control them and land becomes a *de facto* open access resource.

All three communities live along the main road linking the coast with the north. Each has access to a local school and a less than functional health post. Kodowari has a lively market attracting around 100 traders after Friday mosque, whereas the more recent shared market of Diepani PK8 and Djantala draws in 30 to 40 traders on Tuesday afternoons. Neither market is large enough for the prefecture to collect taxes. Most traders are simultaneously sellers and buyers, mainly of agricultural produce. In addition, each market has a number of 'petty' traders selling batteries, soap, sugar, matches and medicines, and an important drinking area where traditional sorghum beer, palm wine and food are served.

Agriculture and other income-earning activities

In the study area fields are cleared and farmed for around four to six years before being left fallow, sometimes for only two to four years. The main cash crops are maize, groundnuts, cotton and cashew nuts. Sorghum, yam and cassava are also important for subsistence. Traditional tools are the short-handled hoe and the machete, animal traction being a recent (but popular) introduction to the area. Artificial fertilisers and pesticides application is limited to cotton and (rarely) maize. In general, the division of labour by gender is still fairly traditional. Men clear and prepare land, weed, and harvest rootcrops, while women sow and harvest all other crops. Women rarely have fields of their own and generally work on their husbands' or fathers' fields. The heaviest labour period is May to July when some crops are being planted, some already

harvested and others requiring weeding. Livestock are restricted to a few goats or sheep per household and some cattle, kept by the Peulh.

Agriculture is the main income-earning activity for men of all ethnic groups. Only a few men still hunt regularly, following a decline in game stocks. A growing number of men supplement their farm income by collecting palm nuts or honey. This is true particularly for young men and recent immigrants who do not yet have land of their own to farm. They may also earn small amounts by transporting goods on their bicycles, and the few who own bullock pairs rent out their animals or use them to transport goods and people. A few immigrants from the south earn money from tapping oil palms and distilling palm wine.

Women earn very little for the time spent working in their husbands' fields. An exception are the Otamari women, who control most of the vegetable harvest. In other ethnic groups, unless women own their own fields (relatively uncommon except for widows), agriculture is their least important income-earning activity. Most important are various forms of food processing, petty trade, collection and sale of fuelwood, and the gathering and processing of a range of NTFPs.

Income from shea

The importance of shea income for women is recognised by all. It is often considered a 'gift from god' enabling them to survive. Well over 90% of women were involved in collecting nuts. Those that failed to collect were either too ill or absent (travelling to visit family) during the harvest season. Some of the latter immediately bought stocks of kernels on their return. Yet when averaged over all households, the income from shea (including sale of kernels, sale of butter and own consumption of butter) makes up only about 2.8% of total household income. To understand the significance of even this income, for women in particular, a brief description of household budgeting is required.

In the study area, as in much of West Africa, men and women have very separate budgets. Men primarily earn money from the sale of their agricultural produce and are responsible for providing the staple food (maize, cassava, yam) and covering school fees and children's medical costs. Women have two types of income:

- 'Weekly' income is derived from daily or weekly activities such as cleaning rice, preparing food for sale, processing shea butter or African locust-bean *moutarde,* collecting fuelwood for sale. The income is used to cover daily expenditure on sauce ingredients, school lunch money, soap, kerosene and grain milling, and ranges from about CFA450 to CFA2,600 (US$1.6–9.4) per week depending on the woman's ethnic group and the size of her family.
- Annual lump sums income is derived from activities such as the sale of stocked produce (including shea kernels), seasonal sale of palm oil and honey. This kind of income is essential for women to fund investments both in consumptive activities (such as new clothes, school uniforms, gifts at Christmas, pots and pans) and in productive activities (building a storage hut, purchasing a goat, purchasing agricultural stocks for later resale, etc.). Annual expenditure of this kind costs a minimum of CFA10,000 (US$36) per year.

It is particularly as a source of lump sum income, obtainable with no investment other than labour, that shea kernels are important to women. In 1993, income from kernel sales varied from CFA2,000 to CFA10,000 (US$7–36) and, for many women, was sufficient to cover a substantial part of their 'annual expenditure'. Similar figures were recorded in south-western Burkina Faso (US$15–35) by Crélerot (1995, cited in Boffa 1999). Incomes depend on the amount of kernels a woman can collect and the time at which they are sold. Poorer women cannot wait for prices to rise and are obliged to sell all their kernels as soon as they are sufficiently dry, whilst others can hold on to their stocks to benefit from seasonal price rises. In 1992/3, the price for kernels rose from CFA17 per kilogram at harvest time to CFA52 per kilogram just before the harvest. In spite of variable yields, it seems that annual incomes may not be so different from year to year—in a good harvest year women can collect more but have to sell at a lower price, while in a poor harvest year the little they can collect fetches a higher price. Certainly at a national level, Hyman (1991) has argued that annual variations in yield are partly offset by changes in the proportions of nuts collected.

Income from the sale of shea kernels was one of a number of NTFP-based incomes found to be particularly important in bridging the financial shortfall at the start of the agricultural season (May/June) (Schreckenberg 2000). Many women even suspended their usual income-generating activities so that they could invest time in collecting shea nuts. The average amounts collected by women in the different ethnic groups are shown in Table 1.

Table 1. Kernel collection, shea butter consumption and NTFP consumption

	Anii (in Kodowari)	Logba (in Djantala)	Otamari (in Diepani PK8)
Average amount (kg) of kernels collected per woman in 1993	159	202	288
Average annual value (CFA) of shea butter consumed per household	516	1261	9193
Average annual value (CFA) of all main NTFPs consumed per household	18,427	23,493	25,834

Source: Schreckenberg 1996.

Shea is less important as a source of 'weekly' income as only 6 out of the 201 women in the study villages processed kernels into butter for sale. These were mostly Peulh women, who are known locally as the 'butter-making specialists'. Making shea butter is a laborious (see below) and not very profitable business. On average, women transform about 12 kg of kernels, giving them a total profit (not taking into account the opportunity cost of their labour) of about CFA200 (US$0.7) per week. Although at the low end of the range, this is similar to profits made from other 'weekly' activities. Women maintain their profits at this level regardless of the price of kernels by altering the unit price

of butter. Butter 'pats' are always sold for CFA25, but their weight varies from 110 g just before the harvest to 266 g a few months later. Profits are low because the women's own stocks of kernels rarely last more than a few months and none have sufficient capital to lay aside a large stock when the price is low at harvest time. Instead they buy the kernels they need each week and are often obliged to buy them on credit, repaying with the proceeds of the butter sale. However, because they often sell their products on credit, they can easily fall into a credit trap and lose their capital. Any factor that disrupts this earning and spending cycle, such as illness, pregnancy or unexpected expenditure, can lead to impoverishment.

Direct consumption of shea butter

In addition to income from the sale of shea kernels and/or butter, many families also benefit from the consumption of shea butter. Farther north in Benin, beyond the natural range of oil palms, shea butter is the most important source of edible oil (Agbahungba and Depommier 1989). It plays a particularly important nutritional role as a source of fat in children's diets (Crélerot 1995, cited in Boffa 1999). In the Bassila area, where both shea trees and oil palms grow, the various ethnic groups are divided in their use of these two vegetable fats. Though generally cheaper, shea butter is the main cooking fat only for the Otamari and the Peulh. The Logba and the Anii prefer to use palm oil or, if available, groundnut oil. The Otamari women in Diepani PK8 process around 3 kg of kernels per week, producing about 1 kg of butter, which would cost them CFA100 to CFA225 (US$0.36–0.8) on the market, depending on the season. This is very close to the 150 g of butter used each day by a Malian family of seven (Fleury 1981) and converts into an annual per capita consumption of about 10.3 kg. The average value of annual household consumption of shea butter for the three settled ethnic groups in the study area is shown in Table 1.

Processing industry

Harvesting and drying the kernels

As in the rest of West Africa (Boffa 1999), in the case study area it is women and children who collect shea nuts. As nuts in fields are reserved for the female relatives of the farmer, women start collecting in bush areas where competition from other women is greater. Fruit ripen and fall from April until August and women begin to collect almost immediately, investing as much time as possible in the early part of the agricultural season (April–June), when they are not yet preoccupied with weeding and harvesting. Most women collect nuts on their way to and from the fields and, if time allows, will also undertake special half-day collecting expeditions to remoter areas with a friend or co-wife. Headloads of up to 47 kg were recorded.

Once collected, fruits are prepared for sale or storage. This requires inactivation of the lipase enzymes, which increase the concentration of free fatty acids and thereby reduce the butter quality. Two methods are used. The Otamari roast the nuts in a tall oven for 12 hours to 24 hours, and then store

them in their shells. The Anii, Logba and Peulh first boil the fruit for an hour before sun-drying them on the ground. This takes one to two weeks depending on the weather, during which time the nuts have to be turned occasionally. Once dry, the nuts are pounded gently to remove the shells. The kernels are then sun-dried for a few more days before being stored in sacks. Once dry, the kernels can be stored for up to two years.

Local butter-making

Kernels are first coarsely pounded in a wooden mortar and then roasted in a large iron pot. A temperature of about 120°C is key to achieving maximum butter extraction without burning the kernels. These are then pounded again and ground into a smooth brown paste, either by hand on a flat stone or, if funds are available, at a local cereal mill. The paste is then beaten with water. Knowing how much warm or cold water to add is a skilful task and, after about 30 minutes, the mixture separates. The solid fat is scooped out and washed until it is almost white. It is then boiled and decanted to remove any remaining impurities, leaving a clear yellow oil that solidifies to a pale yellow butter. The butter can now be stored in a cool place (often covered with a wet cloth) for several months. If it is to be sold, it is formed into small pats by gently warming the butter, scooping it into small calabashes and dipping these into a bowl of cold water. This makes the pats solidify and float to the surface. The pats are then placed on a large plate covered in wet leaves to keep them cool for sale (Photo 2).

Photo 2. Pats of shea butter ready for sale (Photo by K. Schreckenberg)

Industrial processing

In the Sahelian countries, where shea is one of the few income-earning activities available to rural women, development projects have invested much effort in finding ways to mechanise butter-making. None of the resulting manual and mechanised presses were known in the Bassila area at the time of this study. All industrial processing in Benin was carried out at the government Société Nationale pour l'Industrie des Corps Gras (SONICOG) factory in the capital, Cotonou. This facility was dedicated mostly to the manufacture of palm oil and palm kernel oil and only made shea butter when contracted by a number of local exporters. Processing involved grinding the kernels and then heating and pressing them to extract the oil. In European factories, shea butter is produced using hydraulic presses on the kernels and then placing them in hot air ovens. The product is then bleached with a hexane solvent and must be stored and transported in cool, airtight containers to prevent it from becoming rancid (Fintrac 1999).

Trade and marketing

The trade diagram (Figure 2) provides an overview of the main movements of the principal shea products—kernels, butter and soap. The information relates primarily to trade within Benin as information beyond the borders is difficult to obtain.

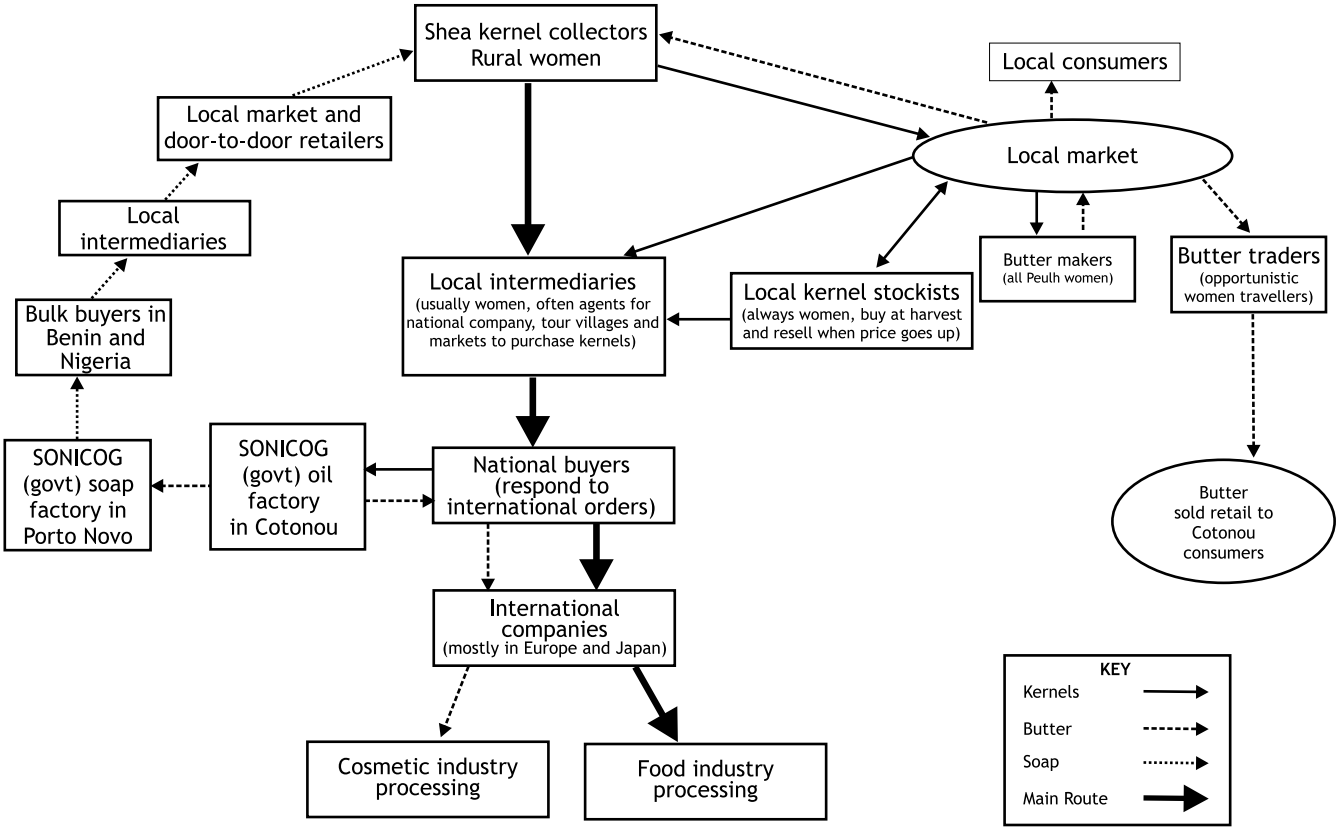
Kernel trade

While the Otamari, Peulh and Logba all retain some of their kernels for processing into butter, most kernels in the Bassila area are collected and dried for sale. The first kernels come to market in May and the volume sold peaks in September. At this time, the main buyers are bulk buyers who purchase several sacks (of 115 kg). These are women, often from the nearby town of Bassila, who are either agents for national companies or suppliers for such agents. Agents are usually provided with sacks and an advance by the company. In addition to purchasing kernels at local markets, they also go directly to villages, particularly those situated conveniently along the road, to buy from the women.

Discussions with companies based in Cotonou suggest that they require orders of at least 500 tonnes before initiating a purchasing campaign. Only a handful of companies export shea kernels and they are often also involved in exporting other products such as palm oil and palm kernels. Cashew nuts are a particularly good complement to shea as they require the same transport infrastructure and are available in the alternate season.

The first year in which the government itself, as required by structural adjustment, did not purchase any kernels was 1992. The department responsible for quality control of exported products, Direction du Contrôle du Conditionnement des Produits (DCCP), did, however, continue to set the minimum purchase price in consultation with the main export companies. The price is set in July and takes into account prices in neighbouring countries, the cost of transport and international market prices. In 1993 it was set at CFA40 per kilogram but traders in the Bassila area ignored it as good yields

Figure 2. Trade diagram for shea butter



had caused the price to fall to CFA17 per kilogram. By contrast, poor yields in 1992 resulted in a higher local market price (CFA50/kg) than the official minimum (CFA40/kg). The international price for shea is closely linked to that of cocoa, and the highest official minimum price in Benin (CFA100/kg) was set in 1985/6 when there was a shortage of cocoa butter on the international market (Kagnassy personal communication).

Official export figures from Benin are highly variable and unreliable. One large export company claimed to have exported 13,000 t of kernels in 1992, though the DCCP estimated total exports at only 9,100 t. FAO statistics suggest that exports in 1993 were only about 7,870 t and then nearly doubled in 1994 (FAO 2001).

Several sources suggest that both potential and actual supplies of shea kernels in West Africa exceed local and international demand (Boffa 1999). Certainly this was true in the study area, where less than 5% of total production was collected in 1993. On the international demand side, European food industries are not concerned about a shortage in supply (Boffa 1999) given that demand has never exceeded supply in the history of the crop.

The international shea market is a narrow and confidential one, for which it is rather difficult to obtain prices, quantities purchased, demand or other data (Boffa 1999). FAO (2001) estimated total exports from West Africa in 1994 to be around 58,700 t of dried kernels. Savadogo *et al.* (1998) estimated that 40 t to 75,000 t were destined for Europe with a further 10 t to 15,000 t being exported to Japan. More recent estimates, however, suggest that the real volume leaving West Africa each year may be closer to 500,000 t (P. Lovett personal communication).

Butter trade

Locally processed butter is essentially for the local market. A few women also made opportunistic use of trips to Cotonou to take baskets of butter pats with them for door-to-door sales. At national level, butter is exported by just a handful of companies. All of these contract the SONICOG factory in Cotonou to do the processing. According to the government, 1,879 t of butter were exported in 1992 but the figures are unreliable.

Soap trade

In the Bassila area, the women who make butter for sale may also make traditional soap from left-over and rancid butter. This black and crumbly soap is made from shea butter (or palm kernel oil), which is saponified using potash derived from the ash of trees such as *Piliostigma thonningii* (Schum.) Milne-Redhead or sorghum stalks. Some people prefer this soap to manufactured soap because of its reputed skin-healing properties. At national level, the SONICOG soap factory in Porto Novo uses small proportions (less than 5%) of shea (together with palm oil and palm kernel oil) in some of the soap it makes. This Palmida brand soap eventually ends up back in the village via a series of intermediary traders.

Policy environment

At the time the research was carried out in 1992/3 there was no direct government intervention in the shea trade in Benin (Table 2). Until the year before the study, shea kernels had been purchased by a government parastatal, along with other cash crops such as cotton and cashew nuts, but the practice was suspended as part of the structural adjustment process. Unlike in many Sahelian countries, where there has been much external project investment to promote shea butter as an income source for women, there was no external support to any shea activities in the study area. The existing international policies (Table 2) also appear to have little impact on the ground.

Table 2. Impact of national and international policy interventions

Policy		Impact
National	The Forest Department encourages farmers to leave 25 to 40 trees standing per hectare when clearing new fields (Fagbémy and Sodeik 1993). Permits are required to fell shea trees.	The regulation mirrors traditional practice so has no particular impact. Should traditional practice change, the Forest Department would not have the resources to enforce the regulation.
	Government sets minimum price for shea kernels each year in an attempt to ensure a fair deal for sellers and traders alike.	The set price is irrelevant at local level as it is based on international prices and does not reflect production levels. Local market prices may be higher or lower than the set price depending on local yields.
International	Production of CBEs is prohibited in many European countries and the United States, although the sale of CBE products is permitted. In the interests of product purity the European Union has restricted the proportion of CBEs in chocolate to 5% (Boffa 1999).	There has been much debate within the European Union about this issue, with cocoa-producers concerned that greater acceptance of CBEs will damage their interests and the chocolate industry arguing that the impact on the cocoa trade would be negligible. The fact that many of the coastal West African countries export both cocoa and shea complicates the story but, largely speaking, they are still more pro cocoa due to the unreliable and unmanaged nature of shea yields from year to year. The practical impact in the field appears to be minor. Shea prices continue to shadow those of cocoa but at a substantially lower level (Fintrac 1999).

TRENDS AND ISSUES

The contribution of NTFPs to local livelihoods is variable both within communities and over time. The short duration of this study means that it was impossible to provide any long-term observations of trends relating to local shea consumption and trade. But trends may be observed across space as well as time, and the different behaviours of the four ethnic groups included in the study do appear to indicate the direction of change. This change is evident in three closely related areas—the resource base, direct consumption and shea as an income-earning activity. Trends at local level are complicated by change in a fourth area, namely the international trade in shea. Each of these is dealt with separately below.

Changes in the resource base

As a typical parkland species, the future of shea is closely linked to the future of the parklands system itself. In the Bassila area, three changes in agricultural practices may threaten the survival of parklands in their present form:

- A growing number of young men have been trained as 'modern' bullock plough farmers and have removed all the trees from their fields. While they are encouraged to replant trees around field boundaries or in small woodlots, most prefer to plant pole or timber-producing species or sometimes exotic fruit trees (particularly mango and/or cashew) rather than indigenous NTFP species, which are slow to mature and the benefits of which are traditionally associated with women (Schreckenberg 1999).
- The introduction of cotton—now the major cash-crop in the area—has, for the first time, taught farmers to monocrop. Cotton is often cultivated by groups of men and complete removal of trees is recommended.
- Shea regeneration occurs predominantly in the fallows. The current trend of shortened fallows, combined with the fact that shea can only reproduce from about 20 years (Ruyssen 1957), means that the population in the fields is an ageing one (Schreckenberg 1999). Given the longevity of shea (easily up to 200 years), this trend is unlikely to become a problem in the immediate future but may be cause for longer-term concern.

Similar changes have been reported from Senegal (Bergeret and Ribot 1990), Côte d'Ivoire (Bernard *et al.* 1996) and Burkina Faso (Kessler 1992; Gijsbers *et al.* 1994; Boffa 1995). Yet evidence suggests that parklands are unlikely to disappear overnight. They are, on the whole, highly dynamic systems that may develop over many generations, reflecting changes in the physical and socio-economic environment (Boffa 1999). Despite the long time before shea reaches maturity, the key factor determining its future is clearly the market. Thus Louppe and Outtara (1996) report from northern Côte d'Ivoire that management of shea trees responds rapidly to changes in prices of its products with regeneration being promoted when the kernels or butter sell for high prices. Conversely if the fuelwood prices outstrip those of other shea products, trees tend to be felled and sold as fuelwood.

Substitution in direct consumption

Shea fruit remain important as a nutritional snack during the early agricultural season. Yet the use of shea butter may be changing. Today its main local use is in cooking and it is currently the cheapest cooking oil available year-round. However, both the indigenous Anii and the immigrant Logba prefer to use palm oil if they can afford it, and all the ethnic groups like the even more expensive groundnut oil. Apart from taste, the latter has several other advantages. Groundnuts are one of the few crops increasingly cultivated by women, who are therefore less dependent on the vagaries of natural production (as in the case of shea) and male collectors (as in the case of palm oil), and processing the oil is much less labour intensive and time consuming (Schreckenberg 2000). Across the border in Togo the preference for groundnut oil has apparently already led to a reduction in the number of shea trees retained in fields (Sauvaget 1981).

A minor but still common local use of shea butter is in the manufacture of traditional soap (also made with palm kernel oil). This soap has been widely replaced by manufactured soap for both laundry and personal hygiene and is now primarily used for medicinal purposes.

Substitution in income-generation

NTFPs are often considered to be particularly important as a source of income for poorer groups within society (Neumann and Hirsch 2000). Although no data on relative well-being were collected in this study, there was a consensus among women that shea nuts were particularly important for those with few other income-generating options. These include the elderly (often widows, and without the physical strength necessary to engage in other activities) and young women newly married into the villages who had not yet had the time or capital to get started in other activities. Like most NTFP-based activities in the study area, trading in shea kernels has the advantage of requiring no capital investment but collection is time consuming and uncertain (owing both to variable natural yields and fluctuating prices). Most women therefore aspire to more consistently lucrative activities such as petty trade, storage and resale of agricultural crops or investing in smallstock (Schreckenberg 2000).

The trend away from NTFP-based incomes in general is demonstrated by the fact that the Peulh women, who live further from the main road and access to markets, rely to a much greater extent on NTFP-based incomes than the women of the three ethnic groups settled along the major road. Even among these there are significant differences in the volume of shea kernels collected, with the highest level of collection among the Otamari (Table 1). The indigenous Anii, who consider themselves to be the most ‘modern’ of the ethnic groups, collect the lowest amounts of kernels, no longer know how to make shea butter and generally rely little on NTFP-based incomes.

The trend away from shea amongst the indigenous Anii, both in consumption and as a source of income, appears to be confirmed by another indigenous group, the Nagot, in the nearby small town of Manigri. The Nagot women have a number of other income-earning opportunities based principally on cassava cultivation and processing. Combined with the existence of a more active fuelwood market, this has led to shea being one of the main fuelwood species sold (Grund 1993).

The impact of the international trade on the local future of shea

The international and, to some extent, the domestic trade of shea is likely to be the determining factor in the future of shea in the study area. Local consumption of shea butter will probably continue to decline gradually and decisions about whether or not to retain shea trees in the fields will depend primarily on their value as a source of income. This value, in turn, depends on the demand generated by the international trade. The scanty information available about this topic has been reviewed by Boffa (1999) and is summarised in Box 1. If demand for kernels rises, the high density of shea trees and excellent transport links of the study area would put local women in a good position to benefit from increased sales, providing they received reliable and timely market information. Currently, women get a feel for prices only once the purchasing campaign starts in mid August, at which point it is already too late in the season to adjust collection strategies. If demand is high, their best option is to sell a greater proportion of the stock of kernels they would normally have reserved for their own consumption. Given the oversupply on the international market, this is not considered a problem for the industry.

Box 1. What future for the global trade in shea?

The evidence suggests that there is potential for increase in the domestic markets of shea in producer countries, both for use as a food item and in the cosmetics industry. The 1994 devaluation of the CFA franc increased the price of imported oils thus favouring internally produced palm oil and shea butter. In Burkina Faso, for example, the two main oil-producing companies appear to have devoted all their stocks to domestic soap production rather than to export, and a number of new small-scale processing enterprises have appeared. The potential probably exists for developing cheap, stable and odourless packaged industrial products for local markets.
At the international level, it appears that demand for shea for food purposes has declined in recent years. In part this drop is caused by a fall in demand for chocolate products in Eastern Europe (where they may contain up to 15% shea butter) as a result of economic difficulties, and in part because of competition with cocoa butter and other CBEs.
The area with the most immediate potential for expansion is the cosmetics sector, although its maximum potential has been estimated by Brun (1996) at just 1,500 t/year. Half of the demand of the cosmetics industry is supplied by the food processing industry at a price twice that for food applications. While the refining process used by the food industries has the advantage of stabilising the butter, it also reduces the unsaponifiable fraction desired for cosmetics use. A number of cosmetics companies are therefore trying to obtain their butter directly from African processors in spite of the difficulties in working with this pure and often less stable product. Production in partnership with African suppliers and processors could meet the current demand among consumers for natural products produced in environment-friendly ways.

Source: adapted from Boffa 1999.

Whether local women would benefit if the international cosmetics sector demand for artisan produced butter increased is debatable. It is more likely that such demand would be met by producers in countries with a high prior investment (by government, projects and private sector) in the technology and organisation of butter making, such as Burkina Faso (Diallo n.d.), Mali (Hyman 1991) and Ghana (Pugansoa and Amuah 1991; Wallace-Bruce 1995).

CONSERVATION AND DEVELOPMENT LESSONS OF CASE

Conservation lessons

There tend to be two areas of concern linking conservation and NTFPs, neither of which is especially relevant to the shea case. The first derives from the early hope, particularly in Latin America, that incomes from NTFPs would provide sufficient incentive to local people to ensure the conservation of rainforest resources. This case study, however, joins a growing body of literature from Africa (Lindström and Kingamkono 1991; Falconer 1992; Scoones *et al.* 1992) indicating the importance of fields and fallows for NTFP collection. Shea will therefore never contribute to the conservation of rainforests, nor even to the conservation of its natural savanna vegetation, as it thrives particularly well in a cultivated parkland environment. The second area of concern relates to the future of the NTFP itself and the fear that successful commercialisation may lead to overexploitation of the resource. In the case of shea the high level of potential supply (in terms of the existing resource base) relative to demand, combined with a nondestructive method of harvesting, means that there is no danger of overexploitation.

Development lessons

The interest in shea is related almost exclusively to its potential to contribute to livelihoods, which it does both as a staple ingredient in the local diet and as an important source of income for women. De Jong *et al.* (2000) argue that the literature rarely deals with the extent to which NTFPs can drive socio-economic development on a sustainable basis. They identify five threats to sustained income from NTFPs:

1. destruction of resource base through overharvesting;
2. appropriation of benefits by more powerful stakeholders as commercialisation becomes successful;
3. domestication and production in intensive plantations far away from original collectors;
4. reduced demand because of products going out of fashion; and
5. substitution of product by manufactured goods.

None of these threats applies to the shea case. The first and third are only relevant if demand outstrips supply, and the reverse is true for shea (Fintrac 1999). The second does not appear to be a problem, perhaps because profits have always been modest and have therefore not attracted the attention of the powerful. The fourth threat (reduced demand) could have been a longer-

term concern if local consumption of the butter were the only outlet for shea. However, the international market provides a second outlet, moderating the impact of any changes in local demand. Finally, in the fifth case, shea butter already has a number of substitutes (though all derived from cultivated crops rather than manufactured products) but because it also has multiple uses at both local and particularly international level—and new uses continue to be identified—this potential threat has been counteracted.

It seems then that the long and relatively stable history of moderate income generation from shea is likely to continue for years to come. Most women in the study area, unlike those in less accessible communities or in the drier Sahelian countries, have a choice of income-generating activities. It is unlikely that they would seek a greater involvement in shea kernels and/or butter trade unless it became much more advantageous (in terms of financial returns and the amount of labour invested) than the available alternatives. At present, therefore, there is no need for any development interventions directed specifically at the local shea sector. Any scaling up of activities is likely to be achieved through individual initiatives. This state of affairs is illustrated by a group of women in the town of Bassila, who have obtained a small business development grant to produce butter for sale to a hairdressing salon in Cotonou. To facilitate this kind of initiative, the usual development recommendations apply: better market information, easier access to formal credit for women and capacity building in organisational, administrative and financial management.

Given the current abundance of the resource internationally there is little justification to invest in increased production of shea. In the longer term, should demand increase beyond supply, there would be an interest in more research into how best to integrate shea with other crops, reducing the age to maturity and improving the year-to-year consistency of yields. Initially, however, international efforts should focus on improving the economic contribution of shea by promoting quality at all production and processing stages, improving market information systems, developing appropriate and cost-effective extraction technologies and diversifying the product (and packaging) range at the national and international levels (FAO 1998; Savadogo *et al.* 1998).

CONCLUSION

Shea is a widely available resource in the West African savanna zone. No inputs other than labour are needed to harvest and process it and it fits in well with the local agricultural landscape and range of income-earning activities. While official figures can be extremely misleading, it appears that the market has been relatively stable over many generations, largely because the product can be either consumed locally or traded into the international market, where its multiple uses have protected it from the threat of substitution. Moreover, shea is an extremely egalitarian product collected by nearly all women in the area and with little evidence of particularly uneven appropriation of benefits along the marketing chain. No particular policy interventions are needed to ensure that the trade continues its history of providing a vital livelihood option for local women, the importance of which fluctuates from year to year but remains relatively stable over the longer term. Development interventions

need to be concentrated on those regions where women have fewer alternative income-generating opportunities (e.g., the Sahel) and should focus on identifying and alleviating constraints to marketing.

ENDNOTES

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2. The research was mainly funded by the German agency for technical co-operation, Gesellschaft für technische Zusammenarbeit (GTZ), and originally planned for a GTZ forestry project in Togo. Because of political unrest, the study was relocated to a GTZ forestry project in Benin which, at the time, had no interest in NTFPs.

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