# Riches of the forest: For health, life and spirit in Africa

Editors
Citlalli López
Patricia Shanley

# Riches of the forest:
# For health, life and spirit in Africa

# Riches of the forest:
# For health, life and spirit in Africa

Editors
Citlalli López
Patricia Shanley



Scientific reviewer: Anthony Cunningham

Reviewer and copy editor: Tess Holderness

Assistant copy editor: Claire Miller

Case study illustrations: Dadi Sungkowo

Botanical illustrations: Ishak Syamsudin
(except *Laccosperma secundiflorum,* by Lucy Smith)

Cover illustration (of an African woman): April Mansyah

Lay-out design: Yani Saloh

Lay-out: Eko Prianto


Printed in SMK Desa Putera, Indonesia

ISBN 979-3361-36-0

*Mailing address:*
P.O. Box. 6596 JKPWB, Jakarta 10065, Indonesia

*Office address:*
Jalan CIFOR, Situ Gede
Sindang Barang, Bogor Barat 16680, Indonesia
Tel: +62(251) 622 622
Fax: +62(251) 622 100
E-mail: cifor@cgiar.org
Website: www.cifor.cgiar.org

# Acknowledgements

We would like to thank the restitution thematic working group, especially Alfredo Fantini, Rocío Alarcón Gallegos, Paul Hersch-Martínez and Mariana Ciavatta-Pantoja, for their catalysing role and dedication to this project. Marina Goloubinoff, Anthony Cunnigham, Ousseynou Ndoye, Koen Kusters, Sheona E. Shackleton, Terry Sunderland, Nicolas Césard, Takeshi Toma, Titin Suhartini, Florence Munoh, Ramadhani Achdiawan and Andy Darmawan offered valuable assistance during the compilation of this volume. The CIFOR-Communications Unit, Information Services Group, especially Michael Hailu, Yani Saloh, Eko Prianto and Gideon Suharyanto, also offered technical assistance and support. This book was developed as part of CIFOR's broader NTFP Case Comparison Project, led by Manuel Ruiz-Pérez and Brian Belcher, who supported this publication throughout its development. This book would not have been possible without the generous support from the UK Department for International Development (DFID) and the European Commission (EC).

# Foreword

Africa is a diverse continent, rich in human and natural resources. It is also a continent facing major development challenges: with the highest proportion of poor people compared to any other continent, civil conflict, poor governance, slow economic growth and the spread of HIV/AIDS.

Throughout Africa, non-timber forest products (NTFPs) including plants and bush meat, are in daily use, commonly providing crucial resources for local livelihoods where no other social security is provided by the state. In a typical African country, where only one person in ten has a formal job, economically important forest species provide a significant source of informal income.

Rather than electricity, wood gathered from forests and fields represents the major source of household energy. Nine out of ten people live in informally built houses, often made from local plants, and eight out of ten people consult traditional healers. Traditional toothbrushes, called "chewing sticks" make a major contribution to dental care and edible wild foods and fungi commonly provide dietary supplements. Forest animals and fish constitute a major source of protein, and in Central Africa alone, an estimated 2 million kilogrammes of bush meat are consumed each year.

Harvesting and selling wild fungi, plant and animal resources is one of the few ways in which poor rural people can shift from a subsistence way of life into the cash economy. Generally, it is the most popular species that enter commercial trade, and the highest prices are paid for those species that are the most scarce and difficult to obtain. With an increase in trade, it is the species that produce

the most delicious fruits, the strongest fibres, the most effective medicinal plants or the tastiest bush meat that can become at risk of over-exploitation. Yet, it is precisely these species which have the greatest value to local livelihoods. The shift from subsistence use to commercial sale can have important implications for resource management, with larger volumes being harvested, and at a higher frequency and intensity.

Given the great reliance of many people on locally harvested plant and animal resources, in a region where millions of poor people live, how can "boom and bust" situations and the unsustainable use of this "green social security" be avoided? What are the causes of actual or potential failure in the commercialisation of non-timber forest products? Despite the research that has focused on NTFPs, there is still a lack of knowledge, on the part of both the general public and policy makers, regarding the importance of these forest products for both subsistence livelihoods and trade. For sustainable harvesting and use to become a reality, harvesters, industries and consumers need to be aware of the ecological and socioeconomic factors linked to the products that they work with and consume.

To date, the NTFP research that has been conducted and communicated has been targeted towards a very narrow audience. This book, as part of a three volume set, is a rare and valuable exception. It brings to life the people and products behind the research results, communicating in a very readable format. The individual cases are drawn from a series of studies carried out by the Center for International Forestry Research (CIFOR) and other partner organisations, as part of a comparison project focusing on Asia, Latin America and Africa. Within this volume, a variety of different forest products are included, from various parts of Africa. It is our hope that you enjoy reading these case studies, and that through the sharing of this information, awareness will increase about the diversity of people and landscapes that are closely connected to the forest products we use.

Anthony Cunningham
WWF/UNESCO/Kew Botanical Gardens
People and Plants Initiative

# Preface

Do you know how many of the products that you buy in shops contain ingredients, components or materials extracted from African forests? Many forest products for example, are used in the food, cosmetic and pharmaceutical industries. The raw materials often travel a long way from their original source and some of the end products have even become part of modern city life. Such forest resources are not only important for city dwellers, they are essential for the lives of people based in local communities throughout Africa - and have been for centuries.

Among the many resources obtained from the forest, such as bush meat, rattan and caterpillars, trees have been important for people living in rural Africa for hundreds of years. A single tree can be the source of various products, sometimes with dozens of different uses. Some trees grow on sacred sites or they and their products are used in ceremonies, or in innumerable other ways, are essential to the spiritual life of African people. The bounty obtained from trees has endless uses - wild fruits, nuts and bush meats are eaten, leaves are used for animal food, bark for medicine, and wood for manufacturing domestic and farm utensils. Another of the great gifts of trees is the shade under which people can meet and rest.

Over time, fruits, nuts, leaves and bark have traveled far from their places of origin, making their way to cities and even distant lands outside of Africa. In recent times, some products with traditional uses have become more mainstream and new uses have also been discovered. For example, the

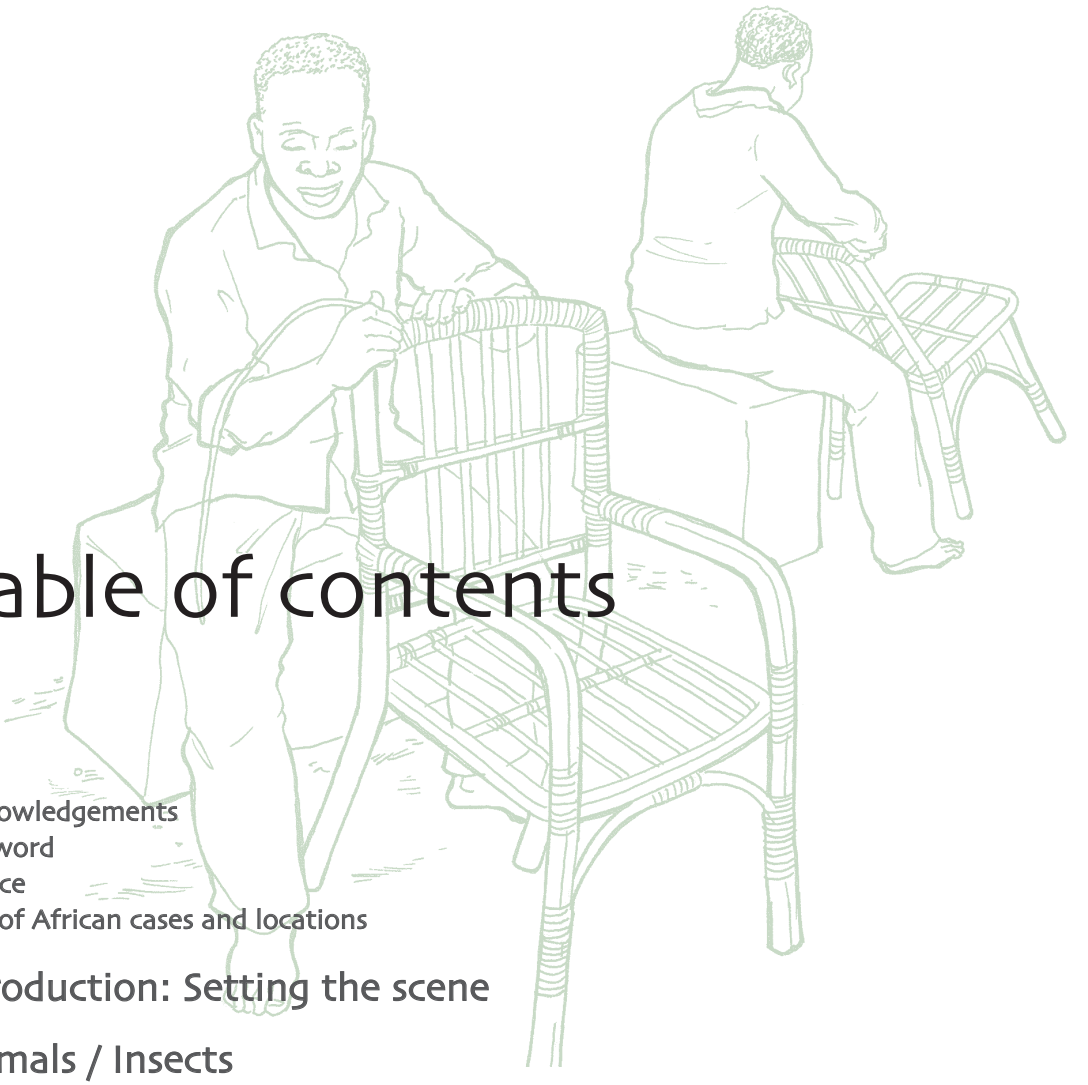
seeds, pulp and skin of some fruits are being processed into oils and essences. Reaching international markets, marula fruits are now being used in the production of certain lipsticks and shea butter is enriching moisturising body creams.

Today, people around the world can appreciate the flavours and exotic far-away tastes of wild fruits and condiments. Ghanaians, Cameroonians, Kenyans and other Africans living overseas can delight in finding local stores that stock the favoured fruits and spices they used to eat in their home villages. From the shelves of food shops and drugstores we can buy dried mango, njansang kernels, and pills for arthritis and rheumatism which contain extracts from devil's claw plants. Away from the places where these plants grow however, little is known about their local uses or whether they are being wisely harvested.

Unfortunately, high demand from consumers and widespread industry marketing of products, such as medicinal bark from *Prunus* and *Warburgia*, has fueled rampant over-harvesting. This has led to the disappearance of trees - in the case of *Prunus*, from certain areas of Cameroon and with regard to *Warburgia*, from throughout Zimbabwe. In the process, villagers who rely on such trees for curing different illnesses are losing access to an important source of medicine. In addition to over-harvesting, changes in land use are also threatening some forest products. Predatory logging, the clearance of forests for farm expansion, and modern agricultural practices that favour the use of pesticides and herbicides, are eroding away the rich tapestry of native plant diversity.

Another change that has had an impact on the use and sale of forest resources is road building. Not so long ago, few villages had road access. But in recent times, the sale of goods along African roadsides has become a custom, and a familiar part of the landscape. Men, women and children travel along dusty and mud-caked roads between villages and cities buying things like bush meat, bitter cola nuts, weevil larvae brochettes and marula beer. Through the placement of their wares in roadside stalls, woodcarving artisans have created a thriving tourist market. Some of the most famous African handicrafts only became well known after roads were opened up - like the beautiful hand crafted kiaat wooden bowls in South Africa, and the carved black ebony elephants and rhinos, and spotted giraffes in Zimbabwe and Kenya. All over Africa, local traders offer the likes of fruits, spices, carvings, potions and amulets, laid out on colourful cloths.

The next time you go to a handicraft shop or local market, if you look carefully you may come across beautiful African woodcarvings, exotic fruits or medicinal products derived from African resources. The stories within this book allow you to learn about the places that these forest goods come from and the hard-working people along the way who make it possible for us to have them in our homes.



# Table of contents

## Bark / Roots



## Wood

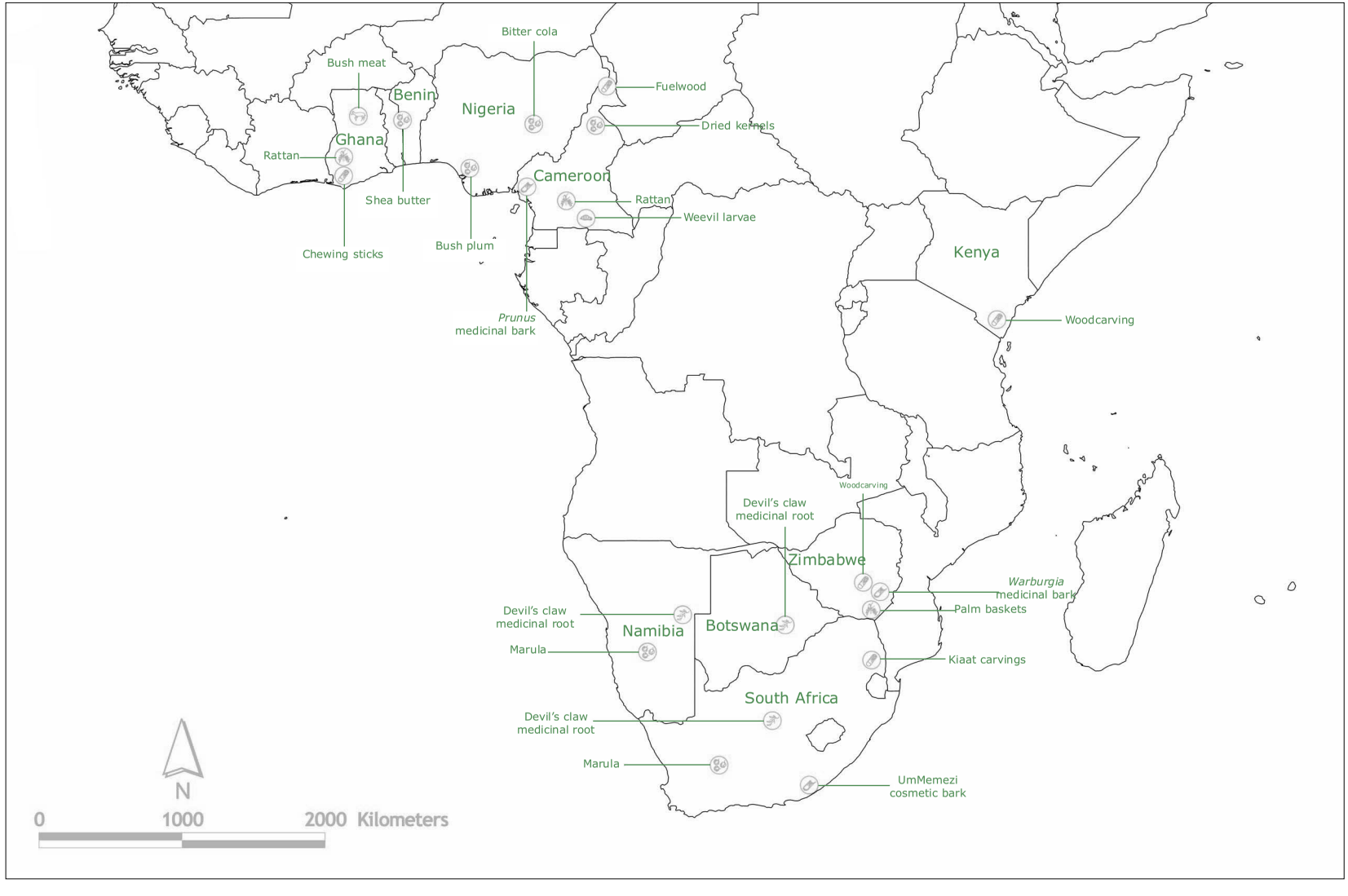


## Rattan / Palm



## Conclusions: The lessons learned

# Map of African cases and locations



# Introduction: Setting the scene

The pages of this volume contain real life stories about a wide range of forest products and the people who use and manage them. The individual chapters illustrate how different forest foods, fibres and medicines are grown, harvested, processed and traded. Through these stories, we learn about the history of such products - some of which have been used and traded for centuries and some of which are relatively new. We also find out about the various opportunities and problems that collectors and traders face, and the way they respond to change.

The group of goods called non-timber forest products (NTFPs) includes a great variety of forest resources, used for both domestic and commercial purposes. Centuries ago, Chinese and middle-eastern traders would cross seas, mountains and deserts in search of forest spices and resins. Later, during the colonial period, there was great interest in Europe in the many valuable foods and spices that can be sourced from forests. Voyages of exploration, sometimes lasting a year or more, were launched to seek new flavourings and preservatives for European markets. After the Second World War however, a shift occurred and forests began to be valued principally for their timber resources and for wood fibre for paper-making. At the same time, commercial and scientific interest in other forest products waned.

Beginning in the 1980s, recognition of the rapid rates of deforestation, and a newfound appreciation of the difficulties facing people living in rural areas, led to a renewed focus on forest products other than timber. Researchers began assessing both the commercial and subsistence roles of these products. Studies carried out in Latin America compared potential income from a variety of forest products (like fruits, medicinal plants and fibres) with the possible income from logging and other land uses, concluding that over the long term, NTFPs could potentially provide more value. Some aspects of the early studies have since been criticised on economic grounds, however the research has served to create a wave of interest in NTFPs, and this has led to an increased appreciation of their overall importance for people in both forest communities and cities.

During the last 15 years, governmental and non-governmental organisations (NGOs) have given their attention and support to various NTFP-related activities, with the aim of improving the livelihoods of families living in and near forests. Some of these initiatives have been effective in achieving social, economic or conservation goals. However, overall results have been mixed, partly due to the great diversity of conditions and the different circumstances in which forest resources are harvested, processed and traded.

## Sharing knowledge about forest products

Many researchers have studied forest products in different parts of the world using methods from various disciplines, including biology, economics and anthropology. While these studies have increased our knowledge about forest resources, they have also raised important new questions. Due to the widely differing methods used however, it has been difficult to compare the studies and draw general lessons. To overcome this problem, a group of researchers from around the world recently combined efforts to compare and contrast individual case studies. This collaborative research project, coordinated by the Center for International Forestry Research (CIFOR), with major funding from the UK Department for International Development (DFID), included 61 different cases of forest product commercialisation from Asia, Africa and Latin America. CIFOR worked with small teams and individual researchers, representing 47 NGOs, universities and government research agencies, from 27 different countries. The researchers - which included ecologists, foresters, agronomists and anthropologists - wanted to gain a better understanding about the wide range of conditions that influence whether NTFP trade benefits rural people and helps to conserve forests and if so, how. With improved knowledge about the impacts of commercial trade on forest products and people, the researchers now hope to share this information about rural development and natural resource conservation with decision makers in government and development agencies.

An in-depth, three volume set of scientific reports has been published, focusing on the three regions of Asia, Africa and Latin America - *Forest products, livelihoods and conservation: Case-studies of NTFP systems*. The researchers were also keen to share their knowledge about forest resources with a more general audience, beyond scientists and donors, using simpler language and an illustrated, briefer format. To achieve this goal, three supplementary volumes have been produced: *Riches of the forest - Food, spices, crafts and resins of Asia; Riches of the forest - For health, life and spirit in Africa;* and *Riches of the forest - Fruits, oils, remedies and handicrafts in Latin America*.

The volume in your hands is one of the products of the researchers' collaborative efforts. The 23 researchers involved in the African case studies explain how a selection of forest resources are harvested, processed and traded. Consumers generally go to markets, stores and bazaars, choosing and buying food and goods like decorative or beauty products without knowing much, if anything, about the history of these products or the people involved in their collection and sale. This comes at a time when forest cover worldwide is decreasing rapidly, and forest-reliant communities are having to respond to enormous changes. What can we learn from people who carve out a living harvesting forest products? And how can our buying patterns affect or assist them?

While reading this volume, it is useful to keep in mind the main characteristics of Africa's physical and social landscape. About 22 percent of Africa is covered with forests - ranging from dry vegetation types, like open savanna*, to rainforests and mangroves. Within the rainforests the diversity of plant and animal life is rich but generally to a lesser degree than for rainforests in other parts of the world. For centuries, forest products from Africa have been traded to other countries. During the sixteenth century, cloves, cattle, sugar and bananas, among other products, were shipped to countries on the other side of the Atlantic and Indian Oceans. Such trade intensified when European countries started to colonise and control natural resources across the continent.

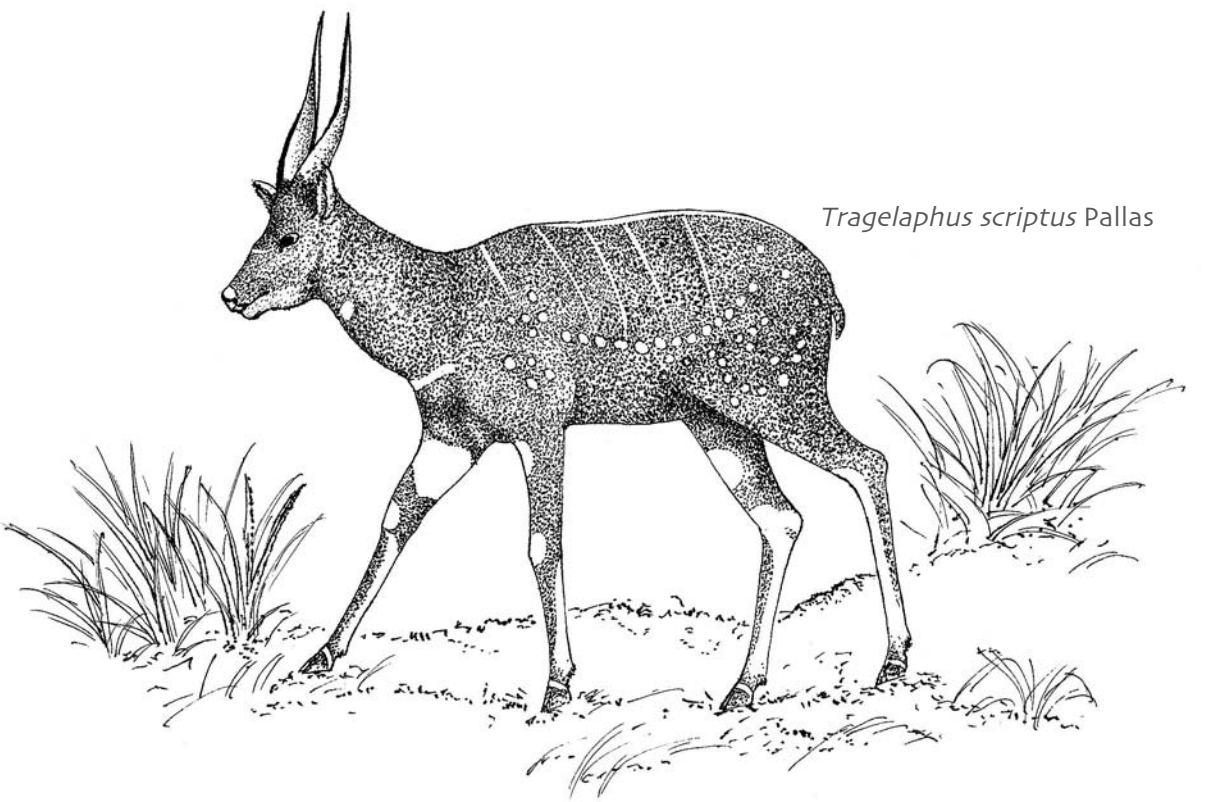
In recent decades, the decolonisation of Africa has shaped a new context for the African people and their environment, as have more recent events, such as civil wars, environmental disasters and waves of migration. As the cases in this book illustrate, this broader context, along with the individual circumstances surrounding each forest product, can present challenges for the harvesters, processors and traders of forest goods. As you will discover, the products described within are as dynamic and diverse as the African landscape and the people who inhabit it.

## The case studies

This volume brings to life 19 case studies featuring forest plants and animals. The botanical cases are presented according to the main part of the plant being used - the fruit, bark, roots or wood. Sometimes the plants have multiple uses, or different cultures may use the same part of a particular plant in different ways. Animals and animal products that require forest habitat are also critical for rural livelihoods, and are represented in this volume by bush meat and weevil larvae. In each case, the contributors describe the main characteristics of the forest product, its historical usage, harvesting and management, and how it is processed and traded. In closing, each author comments briefly on trends and current issues regarding the resource. The final chapter reviews common themes and lessons that can be drawn from these cases.

** Throughout the following cases, the symbol * denotes words for which definitions can be found in the glossary, at the end of the book.*

** At the start of each case, you will notice the scientific names of the different forest plants (and animals) that are profiled. A full explanation about the use of botanical and scientific names can also be found in the glossary.*



*Tragelaphus scriptus* Pallas

# Bush meat

Ghanaian case by Anthony Cunningham

# 'Chop bars' and the bush meat trade

According to an African saying: *Meat is a visitor, but morogo* (edible leafy vegetables) *are a daily food*. Throughout the tropics, starchy staple foods like cassava, rice and maize are made more interesting and appetising with the addition of sauces and side-dishes prepared from wild or cultivated plant products. For most people, meat remains a luxury reserved for special occasions. When meat is eaten in many parts of Africa, it is meat from wild animals ('bush meat' or 'bush beef') that is the preference - although it is more expensive than meat from domesticated animals such as goats, sheep, cows or chickens. In Central Africa alone, the bush meat harvest is believed to total more than two million tonnes annually.

Men dominate two aspects of the bush meat trade in Ghana - hunting and the preparation of carcasses for wholesalers. They prepare these goods by either skinning them or singeing the hair off over a fire. Their payment increases according to the size of the animal.

Incomes are higher for urban 'white collar' workers than for people in rural communities and this means that city people can afford to buy bush meat more regularly. Urban markets in Ghana provide a good example of this trade, and some markets, such as the Atwemonom market in Kumassi, are even named after bush meat. In Akan, *atwe* = duikers* and *mono* = fresh, referring to a market for fresh duiker meat. Such markets are like 'barometers', reflecting what is happening to wildlife populations in forests, woodlands and savannas*. Bush meat markets in Ghana have been studied since the 1970s and nationally the trade is estimated to be worth around US$ 350 million per year. Worldwide, the trade is as much of a concern to conservation agencies as it is to those looking at local livelihoods and development.

## From forests to markets and 'chop bars'

During the week, throughout Ghanaian cities, office workers crowd their favourite 'chop bars' ('chop' is a widespread pidgin word for food) to enjoy bush meat. Talk to any of them and they will tell you that bush meat has a special flavour, which is not found in the likes of beef or mutton, and which goes well with delicious local soups or with starchy 'fu-fu' (a popular paste made from cassava, corn or sorghum).

Bush meat is sourced from rural bushlands and forests. After harvesting, this wild product changes hands down marketing chains, from hunters to wholesalers, then on to retailers, most of whom are women - with the exception of a few men, who run chop bars. In general, men dominate two main activities. Firstly, hunting and secondly, providing the market service of burning the hair off carcasses before sale.

Both the wholesaling and retailing of bush meat are dominated by women - and what incredible businesswomen they are too! Female wholesalers generally control the price paid to hunters for bush meat, as well as the retail price. Individual wholesalers are often supplied by particular hunters, with whom they build a business relationship. In these cases, women regularly pre-finance the hunters, who then have to repay them with bush meat. These canny wholesalers also provide credit facilities to retailers. Such social and economic links provide a good return for wholesalers. But these links also address a key problem of the NTFP trade - the uncertainty of supply and the high demand - by ensuring regular supplies and a more stable market for bush meat.

A hunter sets up a trap on a log used by small animals for crossing a stream.

## Wild forest animals under pressure

The actual trade in bush meat is huge. Studies of a single market (Kantamanto) in Kumassi for example, show that between 1971 and 1986, an annual average of

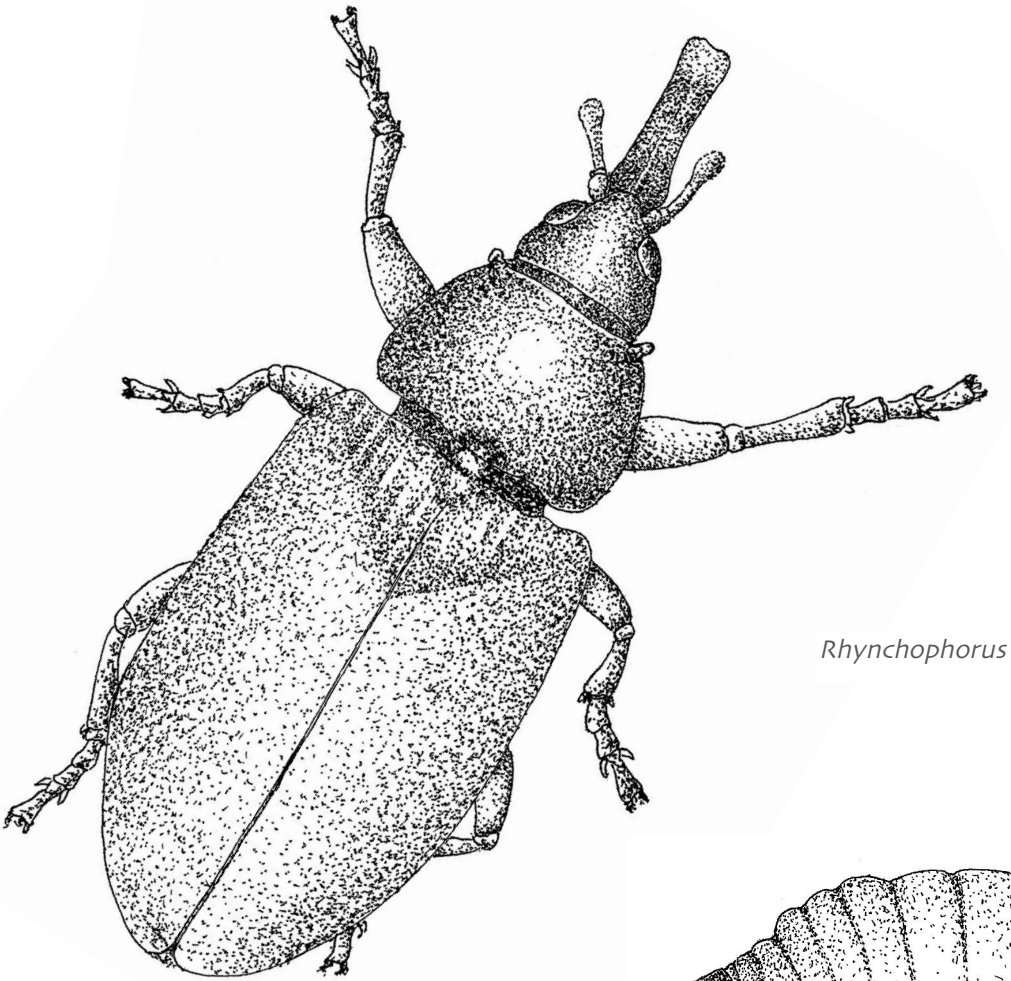
nearly 70 tonnes of fresh bush meat carcasses were sold (ranging from 20-105 tonnes per year). Some markets specialise in smoked bush meat, but the markets selling fresh bush meat often carry a small stock of smoked carcasses as well - including the popular giant African land snails, which come served on a stick.

The most common bush meat species sold in Ghana include grass-cutters* (*Thrynomys swinderianus*), Maxwell's duikers (*Cephalophus maxwellii*) and bushbuck* (*Tragelaphus scriptus*). In Ghana's markets 10-25 different bush meat species are known to be sold, including pangolins*, porcupines and monkeys. These animals are caught in different types of traps and snares or are shot with guns. In more recent times, animals are also being caught using poisoned baits. This is an issue which has raised considerable concern, with recent estimates that around one third of Ghana's bush meat is contaminated by chemical poisons.

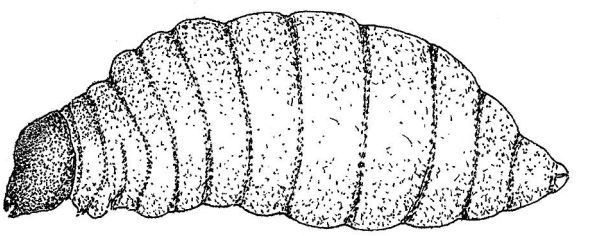
In an attempt to lessen the impact of the bush meat trade on wild animal populations, Ghana's Department of Game and Wildlife has nominated a period during which the hunting of some species is outlawed. This is intended to protect the animals from being hunted at a time when they are pregnant or have recently borne young. Although this seasonal ban is advertised in the national newspaper, this measure is considered to be ineffective in the face of the high demand and prices for bush meat - and prices are continuing to increase rapidly. This situation encourages many rural households to sell bush meat from the animals they catch, rather than consuming it themselves for its nutritional value.

The porcupine is the symbol or totem of the Ashanti nation.

For certain faster growing herbivores, such as grass-cutters and giant snails, high prices can provide an incentive for production through ranching. But for the large bodied, habitat-specific* species, and particularly those with slow reproductive rates, the future may be bleak. This is a cultural issue as much as it is a conservation one. As Ghanaian traditional leader, Okatakyle Agyeman Kudom, pointed out at a recent meeting: "*The proverbial porcupine is the symbol or totem of the Ashanti nation and we used to find them here, but now they have completely disappeared … If we are not careful, all our wildlife will disappear and we will have nothing to show future generations*".



*Rhynchophorus phoenicis* Ol.



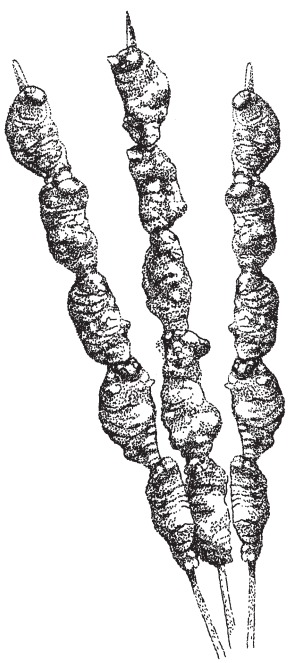
# Weevil larvae

Cameroonian case by Edmond Dounias

# Edible weevil larvae: A pest for palm trees but a delicacy for city-dwellers

*The finger that extracts a weevil larva should not be stiff.*
*Cleverness is sometimes more suitable than force.*
Mvae Proverb, southern Cameroon

Insects have played an important role in the history of human nutrition, and in Africa, Asia and Latin America, hundreds of species are still eaten. Some of the more important groups include grasshoppers, caterpillars, beetles, termites, bees, ant larvae and pupae, cicadas, and a variety of aquatic insects. Generally having a high cultural and symbolic value, insects are also rich in nutrients and are available in large quantities, without the risk of resource extinction. Some insects, like the larvae of the African palm weevil (*Rhynchophorus phoenicis*), are even sources of substantial and sustainable profits.



Roasted palm weevil larvae are sold at toll roads or city bars as a nutritious snack.

The edible larvae of *Rhynchophorus* weevils are found throughout tropical areas. With a flavour resembling hazelnuts, they are a true delicacy for forest inhabitants of the Amazon, Borneo, Papua and Central Africa. However, it is Cameroon where these edible insects have the highest economic value. City-dwellers in Yaoundé and Douala crave these fatty larvae, which are sometimes as big as a thumb, and do not hesitate to pay for them.

## The palm-insect marriage: A long evolutionary story

Palm weevil larvae are mainly harvested in *Raphia* palms, and secondarily, in oil-palms. Palms belong to the Palmaceae family, which is distributed throughout the tropics and contains more than 1400 wild and domesticated* species. Palms are visited by countless insect species. Some, like mosquitoes, find optimal conditions for their reproduction. Others, like bees, occasionally visit the palm flowers, and insects like spiders may take up residence in search of prey. Other insects, like certain weevil species, have developed relationships with palms that provide mutual benefits to both partners. In exchange for 'bed and breakfast', the insect actively contributes to the reproduction of its host-plant*, for example, by fertilising flowers. However, this is not the case for the African palm weevil, which is a true pest.

Nicknamed the 'stipe driller', the adults perforate the palm trunks and exploit injuries to the plant caused by human activities, fungal disease or the attack of other insects. When they invade agro-industrial* oil-palm plantations they can cause severe economic damage.

## Finding Larvae: Look, smell, listen and feel

Most ethnic groups of the humid forest zone of Cameroon harvest and consume weevil larvae from oil-palms. The larvae are systematically extracted from trunks that have been cut down for palm-wine production. Adult females lay eggs in the decaying trunks that are left after the extraction of sap. Mature larvae may then be harvested a few weeks later. But their unpleasant fermented wine taste confines their consumption to a domestic level.

Extracting sap from oil-palms. The consumption of weevil larvae associated with palm-wine is an unforgettable gastronomic experience!

In Cameroon, larvae are mainly extracted from the trunk of *Raphia* palms, growing densely in swampy lowlands. Harvesters spend hours in the dark, muddy waters, often up to their waists, suffering insect bites and encounters with snakes. Only half a dozen villages in southern Cameroon specialise in the harvesting of larvae for trade. A few ethnic groups, such as the Maka, Bulu, Eton and Mangisa, have developed some expertise, each with specific harvesting tools and techniques.

Larvae may be collected from juvenile trees, although identifying infested ones does require some expertise. Slightly yellow leaves can be a good indication. A skilled harvester may detect the particular smell that larvae emit or if they listen carefully, they might recognise the characteristic sound of larvae crawling within the palm frond stalks (rachis). This insect movement also causes a small vibration, which harvesters may be able to feel. Sometimes, the palms are also host to large *Oryctes* caterpillar larvae. Although edible, these are less favoured than the weevil larvae and are seldom traded. *Oryctes* adults leave recognisable holes when they pierce the rachis, providing an access point for the weevils.

Weevil larvae are mainly sought in adult *Raphia* palms. Identifying infested plants is much easier, as the weevils colonise only sick palms, causing them to lose their leaves and turn a greyish colour. The *Oryctes* holes are also more visible on the adult trunks, and both caterpillar and weevil larvae are frequently harvested simultaneously.

A single adult *Raphia* palm may yield up to 500 weevil larvae.

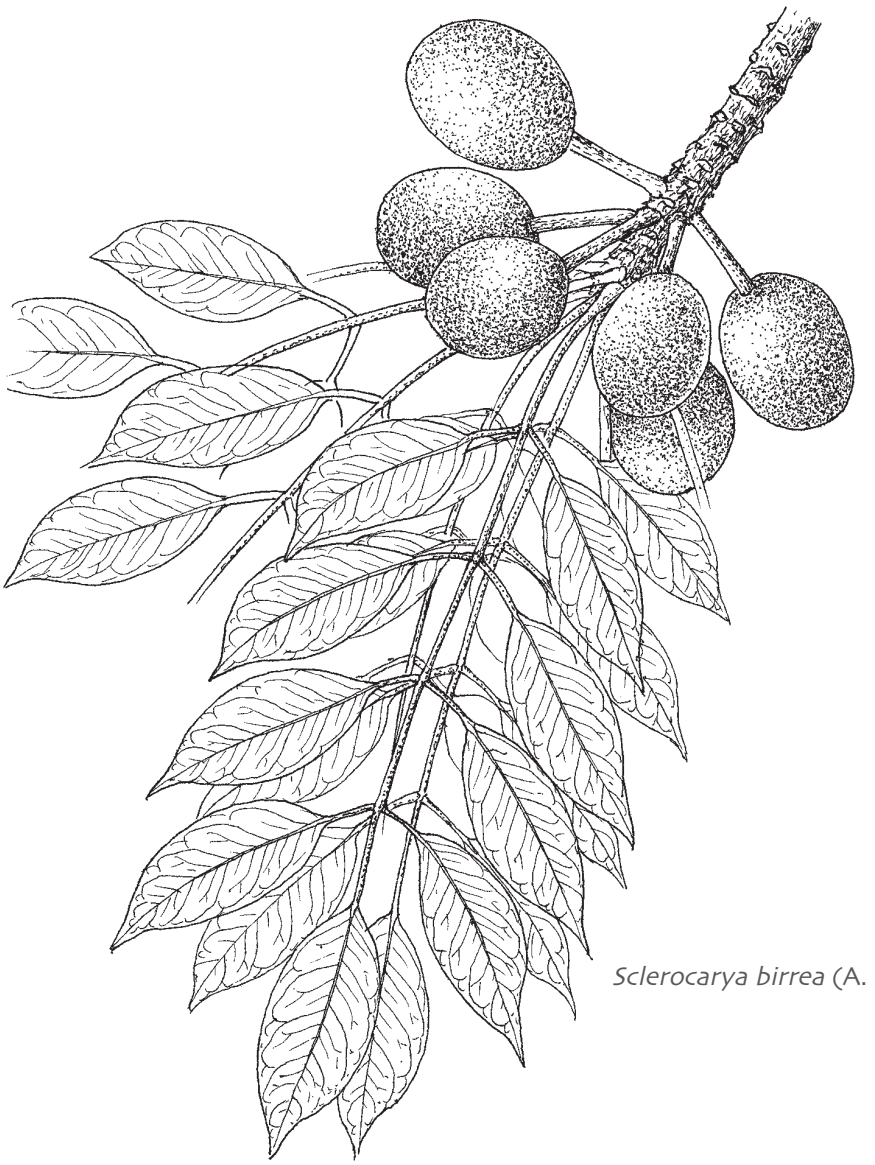
## A small maggot that makes big money

The average monthly income for larvae harvesters is about US$ 71 for live larvae, sold to retailers supplying city markets, and US$ 50 for roasted larvae, sold as snacks along roadsides or in bars. Such income is significantly higher than that obtained by unskilled workers in town, or by the producers of coffee (US$ 50 in good years) or cocoa (US$ 28). Compared with other notable Cameroonian forest products, weevil larvae generate better income than bushmeat (US$ 58), *Gnetum* leaves (US$ 31), or rattan (US$ 26). Margins for retailers are also good: larvae bought from harvesters for US$ 0.14-0.19 apiece fetch around US$ 0.53 apiece in the Douala markets. Uncooked larvae are always traded alive and can be maintained for around 10 days. For consumers, this guarantees the product is 'fresh'.

## Is the resource sustainable?

*Raphia* palms are among the most utilised plants on the African continent. Numerous plant parts are used - for construction, furniture-making, fuelwood, basketry, weaving, cosmetics, textiles, and even for making fish poison, lubricants, medicinal soap and cough mixture. Fruits, as well as the sap, stolons* and young shoots are also consumed, and even the ash obtained after burning the leaves is used as a salt. Yet despite these age old, multiple uses, scientists know relatively little about the ecology* of this tree, and in turn, this lack of knowledge about the weevils' host plant, hinders a better understanding of the larvae.

Larvae harvesting does not endanger the weevil populations, as larvae production continues all year round, and a female adult may lay up to 800 eggs at a time. The factor limiting the long-term exploitation of weevil larvae is the host-tree: *Raphia* swamps are generally perceived as low value and inhospitable ecosystems*. The biodiversity* of swamps that shelter indigenous* plant and animal species is neglected by forest management plans, which often call for a drastic conversion of these landscapes. The economic value of weevil larvae could provide a strong argument for the preservation of *Raphia* swamplands. What a nice ending to the story if the *Raphia* palms could finally be saved by their insect parasites!



*Sclerocarya birrea* (A. Rich) Hochst.

# Marula

Namibian - South African case by Caroline Sullivan

# Marula: A tree for everyone!

Fruit, juice, beer, jam, flavourings, medicinals, shade, caterpillars, handicrafts, fuelwood and more … all from the marula tree! This versatile member of the mango family grows on open savanna grasslands* across southern Africa, in Namibia and South Africa (and also, Botswana, Swaziland, Mozambique and Zimbabwe). The marula tree (*Sclerocarya birrea*) often towers some 15 m above the surrounding landscape, a beacon of shade in a hot, dry land. It bears huge amounts of juicy fruits, providing a vital source of nutrients for many species, from people right down to the insects and fungi that consume whatever remains uncollected on the ground.

## A multi-purpose tree

Throughout the year the leafy branches of marula trees offer respite from the relentless sun. When the tree is fruiting, a special type of fermented beer is produced, signalling a period of community celebration. These festivities provide an opportunity to build friendships or form important social networks, and even draw home distant family members, cementing crucial urban-rural bonds. Bags of marula kernels are exchanged as gifts of friendship, a single nut may be tied around the waist of a young child to ward off disease and misfortune, and a rare, misshapen nut may be used as one of a number of diviners' dice.

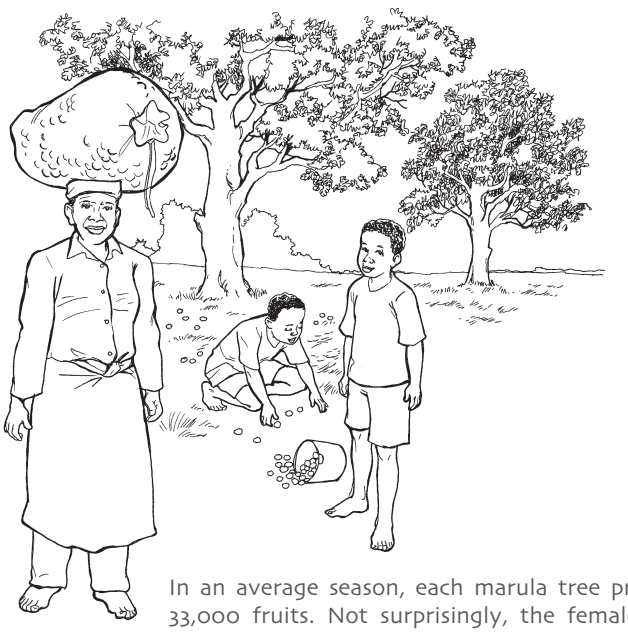
Coinciding with the start of the school year, the trade of marula beer provides important family income (US$ 30-80 per season). This is a significant sum in a region where the minimum wage is US$ 1 per day. In some areas however, the selling of beer is considered taboo.

While the marula tree has multiple uses, the main ones relate to its fruit. These round yellow, plum-like fruits hang in abundance from every branch. As they mature the fruits fall to the ground, where they are eaten by wildlife and livestock or are collected by people. Mainly women and children gather the harvest, for eating or brewing into beer - a product greatly appreciated by the men and shared between households.

Although less common, the production of marula jams and juices is on the rise, generating useful cash income. Compared to orange juice, marula juice contains around four times the amount of vitamin C!

The use of marula for flavouring yoghurts, chocolates, biscuits and alcoholic liqueurs is also becoming more widespread. Inside each fruit is a nut containing 2-4 small, nutritious kernels - and even these are useful! They are eaten as a snack or mixed with wild greens, or alternatively, are crushed to produce a cooking oil. Due to its special moisturising properties, this oil is also used to create marula skin care products, which are sold in local markets. On a larger scale, an international natural skin care and cosmetics company called The Body Shop is purchasing co-operative production of the oil in Namibia, for use in a new line of lipsticks. It is hoped that such new developments will foster an international market for the oil, with increased benefits for all.

The bark and wood from the marula tree also have a number of uses. For example, traditional healers use the bark for medicinal purposes. Sometimes on old tree branches, parasitic mistletoe* causes special outgrowths to sprout and these 'woodroses' are used as decorative ornaments or are sold to tourists. The wood itself provides a major source of raw material for woodcarving, for domestic implements and the tourism trade, while the deadwood and fallen branches are used for fuelwood. If you look closely at the marula leaves, you are likely to find caterpillars from several emperor moth species. These provide an important source of protein for local people, who regard them as a delicacy.



In an average season, each marula tree produces 3,000-33,000 fruits. Not surprisingly, the female trees, which bear the fruit, have become symbols of fertility and plenty.

## Harvesting and processing the fruits and seeds

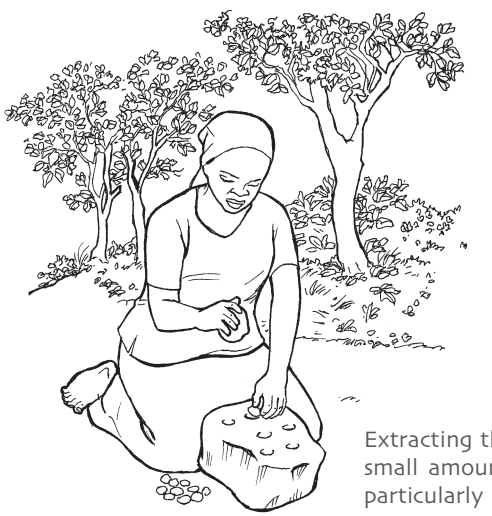
As the marula fruits fall when they are ready for consumption, harvesting is easy and accessible - although customary restrictions on certain trees can place some limits on harvesting. The fruit's accessibility means children can eat it on their way to school, and older women can earn a little money through its collection and sale. Fortunately, with this ease of harvesting, there is no desire to cut the tree down - saving them from the sad fate that faces other fruiting trees in many parts of the world.

Women remove the leathery marula skin with a fork (formerly a cow horn) and squeeze the juice into a basin, putting the nuts aside for later extraction of the kernels. To make beer, the juice is then fermented.

## Marketing issues

As globalisation takes hold, marula users become subject to the same pressures of market forces that influence us all. Unfortunately, this means that pressure on the use of the 'wild' resource may become too great or entrepreneurs may take advantage of trusting communities by not giving them a fair price. If marula products become more popular, the demand for raw supplies will increase, providing potential income for people in communities with access to these trees.

However, it is important that those involved in the collection and trade are informed about how this tree can be used in an ecologically sustainable* way. The economic and social aspects regarding its various other uses also need to be considered. To maintain all these local values, respect for traditional uses is vital, as is the strengthening of land tenure rights and systems for managing the marula resource. In the past, the traditional values and uses have too often been forgotten in resource commercialisation decisions. Perhaps this trend can be reversed through highlighting all of the values of the marula tree, not just the monetary ones. Only by developing effective policies for equitable and sustainable use, will we continue to see the great marula tree as a familiar feature in the landscape of southern Africa, providing food security, income streams and other benefits to local communities and future generations.



Extracting the oil is difficult as the shells are hard and each kernel only produces a small amount of oil. Traditionally, nuts were opened by cracking them against a particularly hard stone. In areas where such objects are not easily found, 'marula cutting stones' have been passed on from one generation to another, like heirlooms.

*Garcinia kola* Heckel

# Bitter cola

Nigerian case by Atilade Akanmu Adebisi

# Bitter cola: The African wonder nut

Bitter cola nuts come from *Garcinia kola* trees, which grow in coastal rainforests in the south, west and eastern parts of Nigeria. Traditionally, these nuts were chewed as a masticatory substance (to stimulate the flow of saliva) but today they are widely consumed as a snack. They contain large amounts of caffeine and other stimulants (like theobromine, kolatin and glucose) and are also believed to be an aphrodisiac. Unlike other cola nuts (*Cola nitida, C. acuminata*), bitter cola is thought to clean the digestive system, without side effects such as abdominal problems, even when a lot of nuts are eaten.

When a Yoruba baby is old enough to be carried on its mother's back, the parents arrange the naming ceremony. Ceremonial foods, such as bitter cola nuts, are introduced to the baby with prayers that the child will not use them against anyone or have them used against him.

Bitter cola is culturally very important for the Yoruba and Igbo tribes and for many other people living in the sub-Saharan region. For centuries, the nuts have been an important part of their lives - from birth to death. They are used in traditional ceremonies, marking special events like births, marriages and the conferring of chieftaincy. A cola nut tree may be planted when a baby is born, with the child becoming its lifelong owner. In proposals of marriage, young men offer cola nuts to the father of the bride, and an exchange of cola nuts is essential in many business dealings as well.

## Multiple uses

Bitter cola nuts are extracted from the fruit of *Garcinia kola* trees. In herbal medicine, the fruit pulp is used for the treatment of jaundice, or high fever, while the bark of the tree is used in medicinal preparations to help heal various ailments. The nuts are also dried, ground and mixed with honey to make a traditional cough mixture. In the last 3-4 years, ground nuts have also been used as an industrial bittering agent in some Nigerian breweries. The hard wood of bitter cola trees is not often used for timber or firewood, but the stems, branches and roots are commonly used in the production of chew sticks*.

*Garcinia kola* grows in humid rainforests near the coast, as a medium sized tree that can tolerate shade. Until the early 1960s, these trees were found in dense populations in most of the forest reserves set aside by the then regional governments in south-eastern and south-western Nigeria. However, deforestation in recent decades has dramatically reduced the number of these trees growing wild. Over the last decade however, *Garcinia kola* trees have been increasingly cultivated in secondary forests*, as a component tree in plantations, or in agroforestry* systems. The trees can be planted from seed and bear fruit after 10-12 years. At its peak, a mature tree yields on average, almost 500 fruits and 1700 nuts each year.

In Nigeria, almost 70 per cent of bitter cola is produced from natural or secondary forests in government reserves. The rest comes from trees growing in cocoa/cola combined farming plots in south-western Nigeria, and from oil-palm/cassava farms and home gardens in south-eastern Nigeria.

## Extracting and marketing the nuts

The fruit of *Garcinia kola* is collected after falling to the ground and is kept until its orange-coloured, velvety skin softens. This may take 5-7 days. Extracting the nuts is a simple household affair that is not very labour intensive. The harvest is threshed to release each fruit's 3-4 kernels. These are referred to as bitter cola nuts as soon as the fruit pulp is thoroughly washed off. At this point, the nuts are ready for eating fresh or can be air-dried and stored in a cool, dry place. Both the fresh and dried nuts are appreciated by rural and urban populations and demand for them cuts across the three major ethnic tribes in Nigeria (Yoruba, Hausa and Igbo).

As well as being sold in local and nearby city markets, the nuts are also transported in large quantities to the far north of the country where *Garcinia kola* trees do not grow. They also find their way into roadside kiosks in major cities and towns in the northern part of the West African sub-region, including Cameroon. The trade in bitter cola is worth an estimated US$ 50,000 a year.

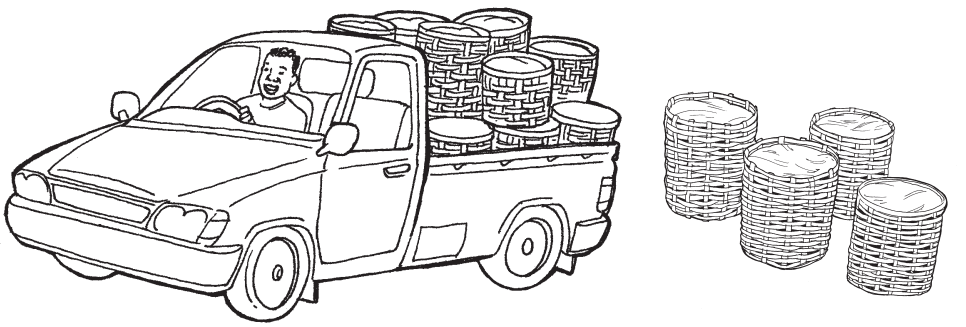
Whenever bulk buyers do not purchase the bitter cola nuts directly from collectors, an appointed village trader takes the harvest to the closest market. At the farm gate, 1 kg of bitter cola fetches around US$ 0.80, while in the local market, it sells for US$ 1.20, in a marketing scene dominated by women.

Processing bitter cola nuts takes time, but entails little or no economic cost to the farmers involved in this activity. The resulting income helps poor rural families pay for school fees and materials or household goods. Bitter cola's increasing commercial value means it is important for farmers to cultivate *Garcinia kola* trees rather than rely on the dwindling wild supplies.

The nuts are more profitable than any other forest resource in Nigeria. In one season, a family can collect an average of three baskets of bitter cola, weighing 25 kg. This generates about US$ 24 in household income. The ability to store the nuts and use them fresh or dried makes this a wonderfully versatile and useful product.

## Trends

Bitter cola has become an increasingly important and valuable commercial commodity for the rural poor of Nigeria, but deforestation and the conversion of forests for development and plantations has reduced the number of wild bitter cola trees. In the last decade, attempts to grow more trees have proven fruitful. People have learned how to raise and manage the trees, and due to the diversity of uses for this tree and the cultural affinity that people have with bitter cola nuts, individuals and organisations alike are now actively planting *Garcinia kola*. The trees are being grown from seed or wild seedlings are being transplanted from the forest, but there are also trials of alternative methods underway, aimed at reducing the time it takes for the trees to mature and bear fruit.



Bulk buyers wrap 25 kg of bitter cola nuts in leaves and store them in baskets lined with jute cloth. These are taken to the larger city markets where 1 kg sells for around US$ 2. Retailers purchase the nuts in bulk and sort them into 1 kg packages - selling them from roadsides or kiosks for US$ 3.40 per kg.

*Ricinodendron heudelotii* (Baill.) Pierre ex Heckel

# Dried kernels

Cameroonian case by Danielle Lema Ngono and Ousseynou Ndoye#

# Njansang and bush mango: Cameroonian seeds in national and international markets

For centuries, Cameroonian families living in both villages and cities have enjoyed dried kernels from 'njansang' and 'bush mango' fruits - particularly for flavouring and thickening soups, stews and sauces. Today, these kernels are imported into Europe as well, largely for the benefit of the African expatriate populations that now live there. These popular 'oilseeds' as they are known, represent an important source of income for the rural families who collect and process them, especially in the wet forest belt of Cameroon.

Women sell the bush mango kernels in heaps or in the form of a solidified paste.

## Njansang

Kernels from the dried seeds of *Ricinodendron heudelotii*, locally known as njansang, are amongst the most favoured forest products consumed and sold in local markets. These energy-rich kernels, which contain high levels of fat, protein and calcium, can be substituted for groundnuts or used in cooking, either ground or in a paste. The fruits are generally harvested (mainly from central Cameroon) from July to September, appearing earlier or later in different regions. The fleshy fruits, which change from yellowy-green to black on ripening, are not eaten by people although they are enjoyed by some animals. Each fruit contains 2-3 reddy-brown or black seeds, with small white kernels within.

## Bush mango

Bush mango kernels, from a wild species of mango, are another popular forest product in Cameroon. The fruits, which turn from green to yellow on ripening, are harvested from two related tree species. *Irvingia gabonensis* bears fruit from June to August, while *I. wombulu* fruits from January to March. The local name for these trees is 'andok', and the fruits and kernels, both of which are edible, are known as 'ndok'. The seeds contain single kernels, which change from white to yellow when dried. Their colour and odour are the most appealing characteristics. In the

south-west, the fresh kernels still covered with their stones are preferred because of the flavour they impart when cooking sauces. But in the rest of the country, people prefer the odour of the dried kernels.

## Harvesting the bounty

Both njansang and bush mango trees sometimes reach 40 m in height and 1 m in diameter. They grow in the humid forest zone of Cameroon but are increasingly being cultivated as well, in cocoa plantations, home gardens and on farms. When grown from seed, they take around 10 years to start producing fruit. The wood of these trees can be used as a building material, while the roots, leaves and bark are sometimes gathered for medicinal purposes.

Harvesting the fruits for their kernels however, represents the trees' main usage. Fortunately, this harvesting is non-destructive. Women and children collect large quantities of the fruits and prepare the seeds for processing. With access to the necessary capital and transport however, it is the men who control the wholesale marketing of the njansang kernels. For bush mango, it is largely the women who market and sell the kernels in urban and rural markets, although men carry out much of the production.

## Harvesting and processing njansang seeds

The labour intensive production of njansang kernels occurs particularly around the main growing area - Cameroon's Central province. First, the fruit is collected and then covered with foliage to accelerate the fermentation of the pulp. After approximately one week, the stones are washed and separated from the softened fruit by hand. The stones are then boiled over a low fire for at least 24 hours to crack the seed coats.

The kernels are extracted using simple tools like knives or flattened nails, before being dried in the sun or on a tray over a fire - a process which turns them a yellowy-brown colour and ensures that they develop the flavour and scent buyers favour. The highest quantities of njansang kernels are traded in Yaoundé's Mfoundi market, and Douala's New-Bell market - and from these locations, the product finds its way to many other urban and rural markets.

Boiling the njansang seeds softens and cracks open the seed coats, making it easier to extract the kernels.


Bush mango and njansang kernels are sold in specialty shops and grocers in Europe.

## Extracting bush mango kernels

Bush mango processing, like that of njansang, is a labour intensive, local activity that only requires the use of basic tools. The fruits are crushed and the stones are extracted with the assistance of a machete or knife. The stones are then soaked in water to facilitate the removal of their tough fibrous coating. Alternatively, the ripe fruits may be juiced, sometimes commercially, producing a drink that children in particular enjoy. When all the pulp has been removed, the remaining stones are dried - another technique that assists with the removal of the fibrous coating.

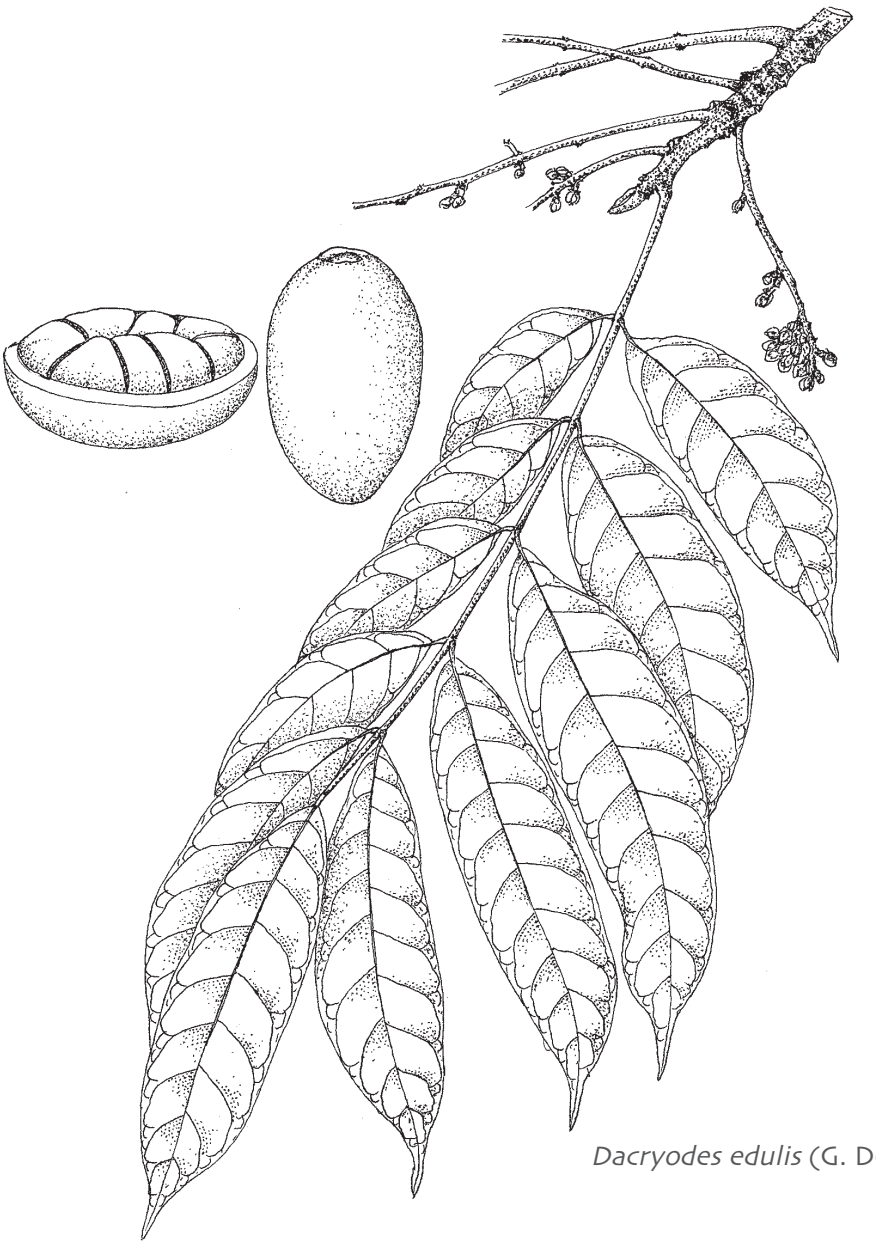
The dried seeds are much easier to handle than the sticky fresh ones and can be preserved for quite a long time or kept in the form of a seed cake or paste. Bush mango production varies between cultural areas and is most intensive in the South, South-West and Central provinces. The main trading centres and distribution points are the Ebolowa and Mfoundi markets.

## Pricing

The harvester/processors generally receive almost two thirds of the final consumer price. However, local market prices fluctuate, depending upon factors like kernel quality, the season (and level of scarcity or abundance), and the transport distance from the main production areas. For example, the price per kg of bush mango kernels was US$ 1.40 in 1997 but in 1998 and 1999, during a period of increased scarcity, the price rose to US$ 2.20. The commercial value of njansang kernels has also fluctuated. At the Mfoundi market it altered a little, from US$ 31,720 in 1997 to US$ 31,180 in 1998. During the same timespan at the New-Bell market, the main market in Cameroon's administrative province, where most of the marketing and also, reselling (to domestic and export traders) takes place, the total value increased from US$ 248,700 to US$ 464,235.

In addition to the domestic trade, the kernels are sold to a number of neighbouring countries. For example, the trade of bush mango kernels to Gabon, Equatorial Guinea, Nigeria and the Central African Republic was valued at US$ 260,000 per annum in 1997. Both bush mango and njansang kernels are also exported to Europe, where they are sold in specialty shops and grocers, largely to immigrants from West and Central Africa. Around US$ 1 buys 50 gm of bush mango kernels or 100 gm of njansang kernels - with much of the proceeds going towards sustaining the Cameroonian families who harvest, process and trade these popular products.

*# The authors would like to acknowledge the assistance of Abdon Awono (CIFOR research assistant) in the compilation of this case.*



*Dacryodes edulis* (G. Don) H.J. Lam

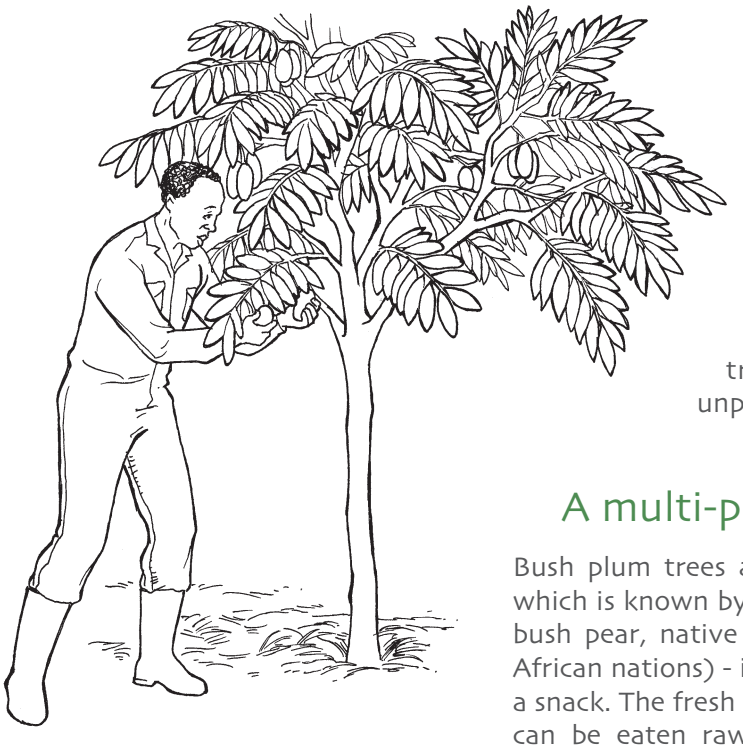
# Bush plum

Nigerian case by Hassan G. Adewusi

# Bush plum: The all-purpose family tree

The bush plum of West Africa (*Dacryodes edulis*) has almost as many uses as it has shapes, sizes and names. This indigenous* rainforest tree supplies villagers with food for their tables, wood for making tools, cooking oil, livestock feed, resin to seal gourds and mend earthenware, and traditional medicines. The species' multiple and varied uses make it one of the most highly valued wild plants in West Africa.

Bush plum trees grow wild in humid, lowland tropical rainforests. These forests spread from south-western Nigeria down through Cameroon, Gabon, the Congo Basin and as far south as Angola and Zambia. The species has been gradually cultivated and commercialised over the past 60 years, and bush plum trees are now found in garden plots and farms far beyond their natural habitat.

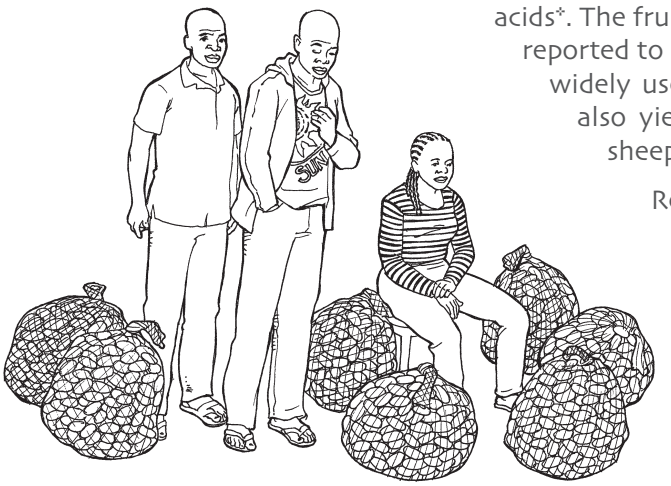


Fruits are gradually harvested as they ripen. None are left by the end of the season.

Farmers commonly have three to four semi-domesticated* trees growing on their average-sized, one-hectare farms. Their patient selection and cultivation of desirable traits has created seven variations of this fruit, differing in shape, colour, size, taste, and in the thickness of the 'mesocarp' or fleshy pulp. Farmers have also succeeded in 'forcing' their trees to produce much earlier. In the wild, bush plums begin to fruit after 10-15 years. On farms, pruned and cultivated trees bear fruit within three years, while unpruned trees start reproducing after five years.

## A multi-purpose tree

Bush plum trees are a nutritious source of food. Their fruit - which is known by various other names, including African plum, bush pear, native pear, safou or safoutier (in French-speaking African nations) - is eaten as a supplement to the main diet or as a snack. The fresh pulp is quite oily and has a pear-like flavour. It can be eaten raw (once thoroughly washed), or after being steamed, or roasted and softened in hot ash. It is often eaten between meals, particularly with boiled or roasted maize during the 'hungry season', when most staples such as yam, cocoyam, and rice are not yet mature.



The fruit is generally available in markets between May and November.

The fruit pulp is rich in protein and has a good balance of amino acids*. The fruit itself yields about 48 per cent edible oil, which is reported to be relatively stable, and compares favourably with widely used vegetable oils. The 'cotyledon' or seed sprout, also yields oil, as do the kernels - which can be fed to sheep and goats after the oil has been extracted.

Resin from the bark of the tree is used to seal vessels like bowls made from 'calabashes' or gourds, and to repair earthenware. The timber is good for tool handles, axe shafts, mortars and carpentry, while the leaves, bark, roots and other parts of the tree are used to treat a variety of ailments. Cultural uses are also widespread. In certain parts of south-eastern Nigeria, for example, bush plum trees are a sign of either hospitality or hostility to visitors, while the kernels are used to foretell the future.

## A family affair

In the typical rural household of seven people, about half the family members are involved in harvesting bush plums and making various products from the tree. About a third of the family, mainly the women and children, are involved in marketing the goods.

The bush plum tree's primary economic value lies in the sale of its fruit. Mature trees yield between 1500 and 10 000 fruits a year, generating US$ 75-150 in cash income. In Nigeria, the trade extends through the major cities, and into distant semi-arid and arid areas thousands of kilometres away from where the trees are grown.

The fruit is packed into 25 kg baskets and transported through the cool of the night for early morning delivery in cities. During the peak production period, baskets sell for between US$ 0.95-1.50 at the farm gate, and are resold in cities for US$ 1.00-1.70.

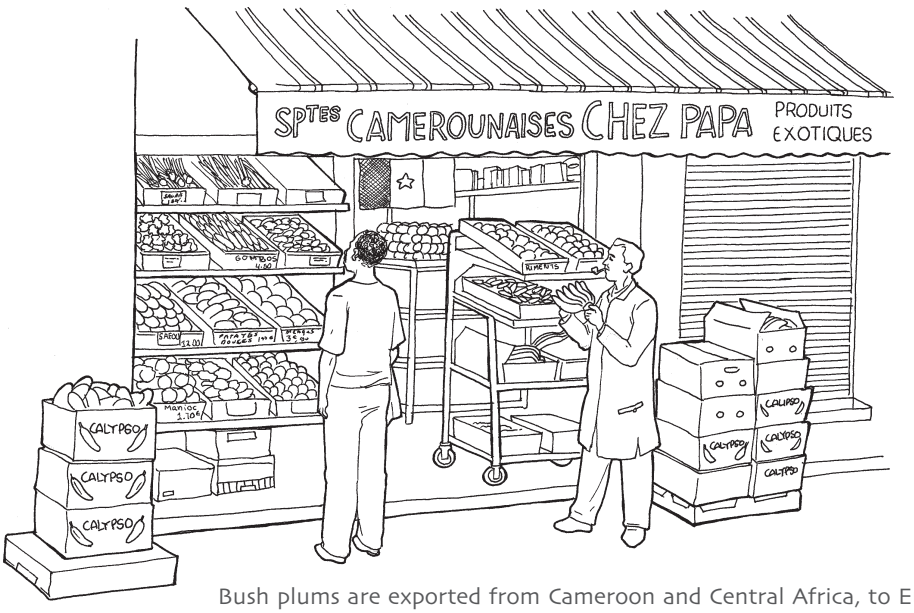
## The future

Bush plum trees have been commercially important locally and nationally for many years, and international markets are currently expanding. The trade appears sustainable because harvesting methods do not harm the tree itself, and few trees in the wild are exploited. More than 90 per cent of bush plum products are made from trees in home gardens and agroforestry* systems. Bush plums provide a long-term source of income as fruit production levels only begin to decline after 60 years.

But there is still plenty of room for improvement. Some researchers have noted a need to study the biology and the commercial potential of *Dacryodes edulis*. Despite being grown on farms for many years, the species remains largely unimproved and semi-domesticated, which means there is scope to greatly boost production and quality.

Potential improvements include bigger, small-seeded, creamier fruits; thicker flesh; and shorter, faster maturing trees. Encouraging the cultivation and commercialisation of *D. edulis* will enhance the selection of elite specimens from the highly variable wild stocks. This will in turn, promote the adoption and practice of conservation strategies for bush plum trees in the wild. Conservation of the species and improvement of its fruit will help boost international trade. Additional export products from these trees could include cooking oil, margarine, soap, cosmetics and animal feed.

What is mostly needed, however, are better organised production and marketing systems. The road network within the production area is in a serious state of disrepair. Easy passage is only partially possible during the short dry period of the year, and this is affecting the producers' capacity to get bush plums to market. This valuable fruit will continue to benefit all of the people involved nationally in its production, transportation and trade. With further improvements in production and marketing future social and economic gains may be possible for rural communities.




Bush plums are exported from Cameroon and Central Africa, to Europe. In Paris, France, where Cameroonians can buy products from their home country and other African nations, 1 kg of fresh *Dacroydes edulis* fruit costs 10-13 Euro (about US$ 14-15).

*Vitellaria paradoxa* C.F. Gaertner

# Shea butter

Benin case by Kathrin Schreckenberg

# Shea butter: From cooking fat to cosmetics and chocolates

When there is no bottled sunflower or maize oil for cooking, what do people do?

In northern Benin, as in most of the southern Sahel and Sudan zones of Africa, shea butter is the most common and affordable type of cooking fat. In non-pastoral areas* it is sometimes the only type available, with a typical family consuming around 150 gm per day. Made from dried shea fruit kernels, shea butter is also used in traditional medicine and soap making, while the fruit itself makes a tasty and nutritous snack.

Internationally, shea butter is used as a cocoa butter equivalent. For example, in chocolate making its high melting point results in increased shine and hardness at room temperature. In addition to food applications, a new market has also recently opened up - the production of 'natural' cosmetics. Shea butter's hydrating, protecting and softening properties are making it a valuable ingredient in skin care creams and shampoos.

Family holdings throughout the Sahel and Sudan region are often surrounded by agricultural fields, containing about 25 shea trees per hectare - far more than you would find growing in natural vegetation.

Shea butter has been traded in Africa since the fourteenth century. In the early twentieth century, it was exported to Europe for margarine and candle production and today, the European export market is worth around US$ 13 million per year. The collection and trade of shea products is largely the domain of women, with local people describing shea as a 'gift from God to help women survive'. Its French name, 'karité', comes from the Dioula language, meaning 'tree of life'.

## Shea trees on agricultural land

When farmers clear new fields, they generally retain their mature shea trees. These medium sized trees grow best in open sunlight and have a thick bark protecting them against the frequent savanna grassland* fires. Regenerating easily from seed, shea trees bear fruit after about 15 years and can continue fruiting for around 200

years. Yields are generally good once every 3 years but this does vary between trees. A single tree may produce around 20 kg of fruit (or 5 kg of dried kernels).

## Harvesting and processing shea butter

Women and children collect fruits off the ground from April to August, usually when going to and from the fields. The rotting fruit flesh is discarded or fed to livestock and the nuts are dried in the sun or in tall ovens before being gently pounded to remove their shells. After being sun dried for a few days, the kernels can then be stored for up to 2 years.

Making the butter requires large amounts of fuelwood and water. The kernels are coarsely pounded and roasted before being ground into a smooth brown paste and mixed with water to separate out the fat. Washing, boiling and decanting removes impurities and the resultant butter can then be stored in a cool place for several months. The transformation rate of local processing is very efficient and produces 1 kg of butter from 3 kg of dried kernels.

Most processing for the international food industry occurs in European factories, using modern technology to obtain the butter. This refining process stabilises the butter but also reduces some of the qualities valued for cosmetics. So, some cosmetics companies source their butter directly from African processors.

If time allows, women undertake special half day trips to gather shea fruits, returning with headloads of over 40 kg.

To produce butter pats for sale, warm creamy butter is scooped into a small calabash* and then allowed to harden in cold water.

## To market

A few women are considered 'specialists' in making shea butter, producing large quantities for sale, but most retain only enough kernels to make butter for home consumption, selling the remainder. In an average year, women may collect 160-300 kg of dried kernels and depending on their financial needs, may sell the entire collection or small amounts at the market to cover weekly food costs. Prices vary from US$ 0.06-0.20 per kg but can reach US$ 0.36 per kg if the cocoa harvest is poor.

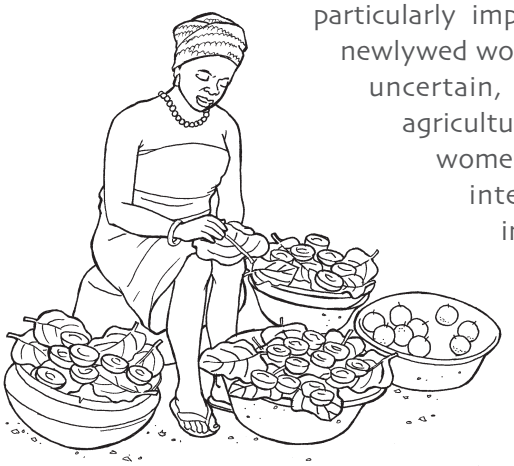
Depending on the price and the amounts collected and also, retained for home use, women can earn US$ 7-36 from the sale of kernels. This can provide an important source of 'lump-sum' income, for example, for buying agricultural stocks or clothes.

Between August and November, agents visit local markets or villages to purchase kernels. Some are processed into butter in West African factories but most are exported to Europe and Japan for processing, later reappearing as cosmetic ingredients or as 'vegetable fats' in a variety of food products.

## Trends

Women buy shea kernels for processing into butter.

Shea has provided local people in the Sahel region with a long and relatively stable history of moderate income generation. Market stability has been assured largely because the product can either be consumed and traded locally or internationally and its multiple uses have protected it from the threat of substitution. Involvement in shea collection is open to all women and the benefits are fairly evenly distributed along the marketing chain. Nevertheless, certain trends are placing longer term pressure on the resource. Changes in agricultural practices (e.g. the introduction of cotton monocultures*) are promoting the removal of shea and other native trees. Local butter consumption is also changing. Shea butter is still the cheapest cooking fat but some ethnic groups are moving to palm or groundnut oils.



Since harvesting and processing don't require capital investment, shea kernels are particularly important for those with few other options, including elderly or newlywed women. But as collection is time consuming and yields and prices are uncertain, more lucrative activities are sought. The combination of agricultural pressures, declining butter consumption and the preference of women for alternative activities, means the future of shea will depend on international (and to some extent domestic) demand. This is influenced in part, by cocoa butter prices, the proportion of shea butter allowed in chocolates (currently only 5 per cent) and increasingly, the cosmetic industry's requirements for kernels or locally produced butter.

Butter sellers typically transform 12 kg of dried kernels per week, into 4 kg of butter. Kernel prices vary three-fold over the season but profits remain steady at around US$ 0.70 per week, through retaining a standard butter pat price but varying the size.

*Prunus africana* (Hook. f.) Kalkman

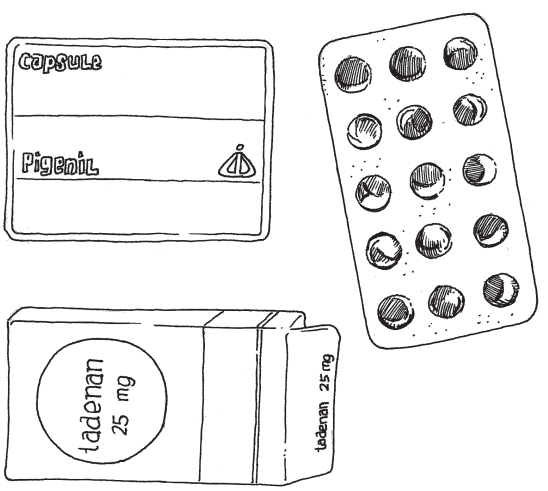
# *Prunus* medicinal bark

Cameroonian case by Nouhou Ndam

# *Prunus africana*: A traditional medicine finds international fame

*Prunus africana*, locally known and traded as 'pygeum', is a medium sized evergreen* tree with multiple uses, ranging from local to global. *Prunus* leaves and bark have been used in traditional remedies for centuries and they continue to play an important medicinal role today. Rural people in Cameroon and other African countries where these trees grow, also use the strong, hard wood to make items like axe handles and poles for building construction, or as a source of firewood. The pygeum fruits are eaten by birds and insects, and sometimes humans as well, although they are believed to contain some toxic compounds.

In traditional medicine leaf infusions are consumed to improve appetite or are used as an inhalant to remedy fever, while the fresh leaves can be used to dress wounds. Various bark preparations treat a range of ailments - including malaria, stomach-aches, urinary problems, sexually transmitted diseases, chest pains and heartburn. Bark concoctions are also used as a purgative for cattle.




*Prunus africana* bark is processed into non-crystalline and purified crystalline extracts, the active ingredients in the medical treatment of prostate disorders. An estimated 200 kg of fresh bark yields around 1 kg of extract.

In the late 1960s, it was discovered that *Prunus africana* also had potential in modern medicine. In recent decades, active ingredients from the bark have been utilised around the world to treat millions of older men suffering from inflammation of the prostate, a disorder that leads to urination difficulties.

## *Prunus* trees in danger

*Prunus africana* grows to 25 m in height in mountainous forest regions in 22 countries, mostly on the eastern side of the African continent. Its range extends from eastern Africa westward towards central Africa, with a number of separate populations also appearing in West African countries like Cameroon and Nigeria, and in Madagascar as well.

A number of factors have adversely affected *Prunus africana* stocks. In Cameroon, entire trees are sometimes cut down before the bark is removed, or the bark may be

In Cameroon, a harvester collecting 30 kg of bark per day can earn an average of US$ 0.40–1.00 per kg. This price can increase to around $US 1-2 per kg if the middleman is cut out. For harvesters living in Mount Cameroon, bark collection accounts for about 70 per cent of their total annual income.

completely peeled off standing trees. Either way, trees harvested in such a manner tend to die. Another major threat is the widespread clearance of montane forest* for farming, in malaria-free highlands. With the decline of world market prices for cocoa and coffee, large areas of forest are being cut down to create more crop farms to compensate for lost revenues.

Amidst concerns for the future of this species, the international community included *Prunus africana* in the Convention on International Trade in Endangered Species (CITES*). This means exports now need to be monitored. Cameroon was the major exporter of *Prunus* bark throughout the 1980s and 90s, accounting for an average 1800 tonnes per year. However, this has taken place without any assessment of standing stock or sustainable harvesting* practices, and the effect on *Prunus africana* populations has been devastating, particularly in north-west Cameroon.

## Salvaging the situation

Given the unrestrained depletion of natural stocks, the Cameroonian government is currently reviewing harvesting practices and the need for conservation measures. It is also supporting initiatives to determine exploitation quotas, explore the prospect of planting to boost supplies, and undertake an education campaign. However, the rate of progress has been criticised and it appears too late for exploitation quotas in some areas, given the already high levels of over-exploitation. Although in a few places, like Mount Cameroon, international development or commercial projects are focusing on assessing sustainable harvest levels and methods.

A number of techniques have been identified, including taking bark only from mature trees, removing the bark in patches, and not re-harvesting for a period of 4-5 years to allow for regrowth. The bark is harvested with cutlasses* and stakes and then tied into bundles for carrying home. Dirt and debris are removed and the bark is dried in the sun before being sold to traders or directly to factories for processing. Sustainable practices will have the best outcomes in areas where there are adequate supplies, harvesting and access are secure, and incentives exist to encourage harvesters to better manage *Prunus* stocks.

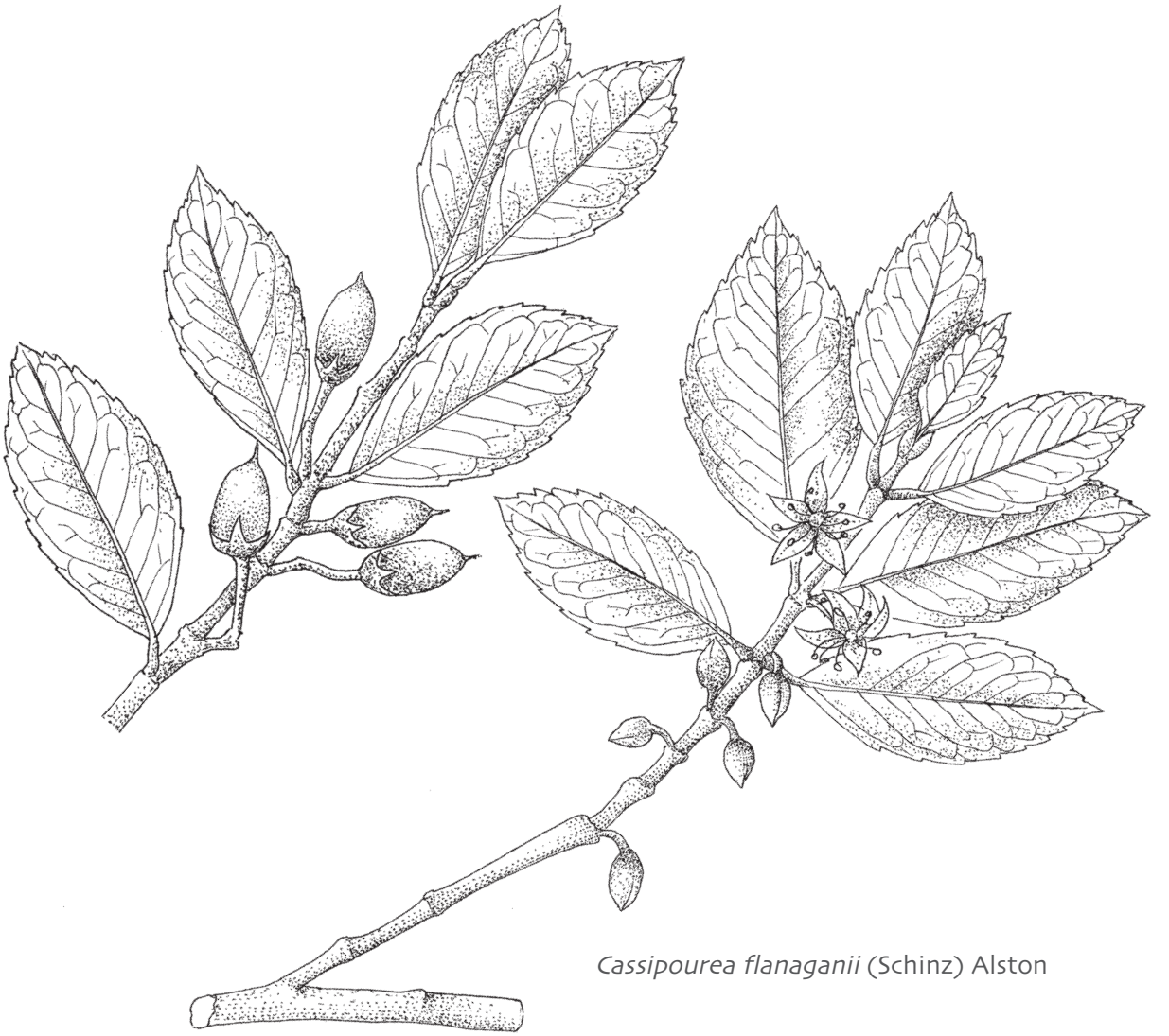
Bark harvesting is hard work, requiring collectors to climb *Prunus* trees and carry 30-70 kg loads of bark through mountainous forest. Hence, this activity is most suitable for strong, young men.

## The future of the *Prunus* trade and trees

In addition to its traditional local uses, *Prunus africana* generates a lot of money. Worldwide, its retail value is in the order of US$ 220 million per year, although only about 1 per cent of profits reach the rural communities where it is harvested. Nevertheless, sufficient income is generated to make bark harvesting a worthwhile activity for local people. Looking to the future, thousands of small scale farmers have also commenced growing this tree on their land.

To date, factors such as the State's failure to set sustainable quota levels and control exploitation have exacerbated the over-harvesting of this species, particularly in places where corruption levels are high, or where there is a "free for all" harvest. If the management of *Prunus africana* is to become more sustainable, the efforts of many people will be required - including authorities, local communities, traders, processors and consumers. Constructive actions on the part of the government could include simplifying the acquisition of special permits by groups committed to sustainable management; clarifying the ownership of planted stands and the harvesting rights of owners; and determining quota allocations and other management guidelines for both wild and cultivated *Prunus* stocks.

Rural communities could demonstrate their commitment to improving local management by controlling illegal exploitation within the framework of local unions, avoiding deals with middlemen, and enhancing *Prunus* cultivation in agroforestry* systems. Harvesters and traders should comply with the provisions of their exploitation permits and licenses. For instance, ensuring that extracted wild stocks are compensated for through regeneration measures, according to government requirements. Also, pharmaceutical companies should provide source countries with a fairer share of benefits from the *Prunus* bark trade. With market demand likely to increase, such collaborative efforts by all stakeholders will be required to ensure the continuous availability of *Prunus* bark - not only to meet cash needs, but also longer term family and health care needs.



*Cassipourea flanaganii* (Schinz) Alston

# UmMemezi cosmetic bark

South African case by Michelle Cocks and Tony Dold

# UmMemezi bark: Cosmetic use threatens native tree

*"Ukumemeza!"* In the Xhosa language of South Africa, it means "to call aloud" or "to attract attention". This expression also lends its meaning to a small forest tree and the popular skin cosmetic made from its powdered bark. The endangered UmMemezi tree grows wild in a small area of South Africa's Eastern Cape Province, where poor village women in particular, harvest its bark to supply a growing national market. Young Xhosa women mix the powdered bark with a little water to make a pale, reddish brown paste, which they apply to their faces to conceal blemishes, improve their complexion and lighten their skin.

Women use the powdered UmMemezi bark as a skin cosmetic to improve their complexion and lighten their skin.

## The quest for beauty

Xhosa people consider a lighter skin tone to be more attractive and have used various products as lightening agents. The desirability of lighter skin was reinforced during the years of apartheid* in South Africa, when dark skin was linked to racial inferiority and lighter skin tones often made it easier to find favour. This desire for lighter skin has not diminished in recent times and various cosmetics, both natural and synthetic, are still used today.

Although Xhosa women have made cosmetics from grass roots, fungi and even clay for centuries, the use of UmMemezi was only documented for the first time in the mid-1970s. Its popularity increased dramatically after 1990, when new laws restricted mercury-based, commercial lightening products, which could cause serious damage to the skin. The growing trade in traditional preparations based on plants such as UmMemezi *(Cassipourea flanaganii)* and a closely related species *(C. gerrardii)*, has seen the bark become available in herbal street markets and 'amayeza' stores (chemists) throughout South Africa. However, this desire to be light-skinned is posing a threat to these species, as over-harvesting is occurring to supply the urban demand.

## Collectors and traders

In the Eastern Cape, bark harvesters, mainly women, regularly collect UmMemezi bark and other plant materials to sell in the herbal markets of nearby towns and cities. Harvesting takes place mainly on the weekends or early on weekday mornings. The work is quite strenuous and older children often assist their mothers. Together they remove the bark from the trees with an axe, taking it home to scrape and remove debris such as lichen. The bark is then left to dry in the sun for two days before being cut into small pieces of about 15 x 5 cm. Hardly any transformation takes place from raw material to end product and no further processing or packaging is required.

UmMemezi is bought directly from the collector-street traders and is resold at much higher prices at similar markets in the larger cities. Some urban entrepreneurs package UmMemezi powder in small bottles and sell it in herbal medicine shops. With the increased commercialisation of the product, recently a factory-processed and packaged product has also become available in the central business districts of some provinces. Consumers simply buy the dried bark and grind it with a granite stone, or they purchase the bark in a powdered form. This powder is then mixed with water to make a paste, which can be applied daily to the face as a skin lightener.

The sale of dried UmMemezi bark has created a lucrative informal trade. It sells for about US$ 6.24 per kg. It is estimated that nearly 1600 kg is harvested every year from the Pirie State Forest alone - the main source of supplies. UmMemezi accounts for 14 per cent of the collector-traders' total income from the sale of various wild plants. In large neighbouring cities, this high value product sells for as much as US$ 19.48 per kg, representing a mark up by street traders, of some 200 per cent.

Most collector-traders are women aged 45 to 65. Understanding the use and value of the bark, they adjust the price depending on the buyer - with white entrepreneurs paying significantly more than black entrepreneurs.

## The future for this embattled tree?

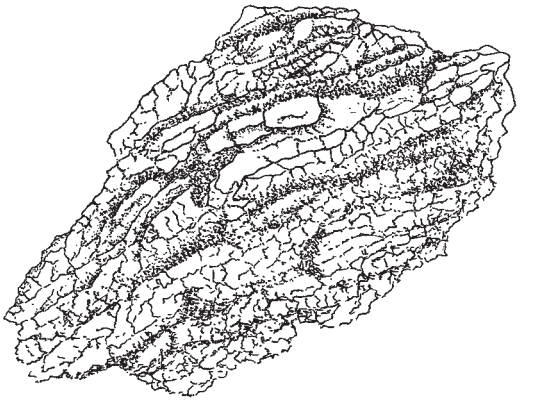
The desire for lighter skin has not diminished in recent years despite the end of apartheid. The banning of harmful commercial skin products has only increased demand for the UmMemezi cosmetic and large quantities of bark are being harvested to supply urban markets. However, the number of trees growing wild is very limited and stripping too much bark from them can lead to their death. Couple all of these factors together and the end result is over-exploitation of natural stocks.

UmMemezi is an understorey* plant that grows wild in certain forests. Despite the rarity and high value of these small trees, there are no managed or cultivated plantations. Most forests containing UmMemezi are State-owned and managed, but the State lacks the capacity to manage the forests effectively and there is very little control over harvesting. Furthermore, there are no customary rules or community forest management programmes, and current harvesting rates are simply unsustainable. Indiscriminate removal of the bark is killing these trees. Few large UmMemezi trees remain after being ringbarked* in the past, raising concern that there are now virtually no mature trees left to reproduce and keep the species alive. This species, the biology of which is poorly understood scientifically, has been listed as critically endangered.

UmMemezi harvesters are often poor, illiterate women who rely on selling wild plant material to support their families. In 1998, the State adopted a Participatory Forest Management Policy that involves local communities more and endeavours to foster sustainable forest use. Commercial harvesting of UmMemezi bark remains illegal, yet its collection continues to occur, largely due to the strong demand for supplies, and the opportunity it provides for poor people to earn income from a free resource. But without appropriate steps being taken to increase user groups' ownership of and responsibility for the resource, the likelihood of sustainable extraction* is extremely low.

There is an urgent need for studies into this tree's biology, alternative harvesting methods and the potential for domestic cultivation at a grassroots level to ensure that this species is not harvested to extinction. The bark gatherers are traditionally subsistence farmers and possess farming skills as well as ecological knowledge of both the forest and the species itself, which would be essential for successful domestication*. Further research is also recommended to determine whether parts of the tree other than the bark can be used, to possibly reduce the destructive bark harvesting.

*Warburgia salutaris* (Bertol. f.) Chiov.



# *Warburgia* medicinal bark

Zimbabwean case by Anthony Cunningham

# Muranga returns! Zimbabwean medicinal bark

This is the story of the reintroduction of Zimbabwe's most important medicinal plant species. In the 1970s, the 'pepper-bark tree' (*Warburgia salutaris*) was over-exploited, becoming locally extinct* within its natural habitat* - the margins of high altitude, evergreen* forests. But in recent years, farmers have been replanting *Warburgia* in agroforestry* systems – heralding the return of this economically and culturally important tree.

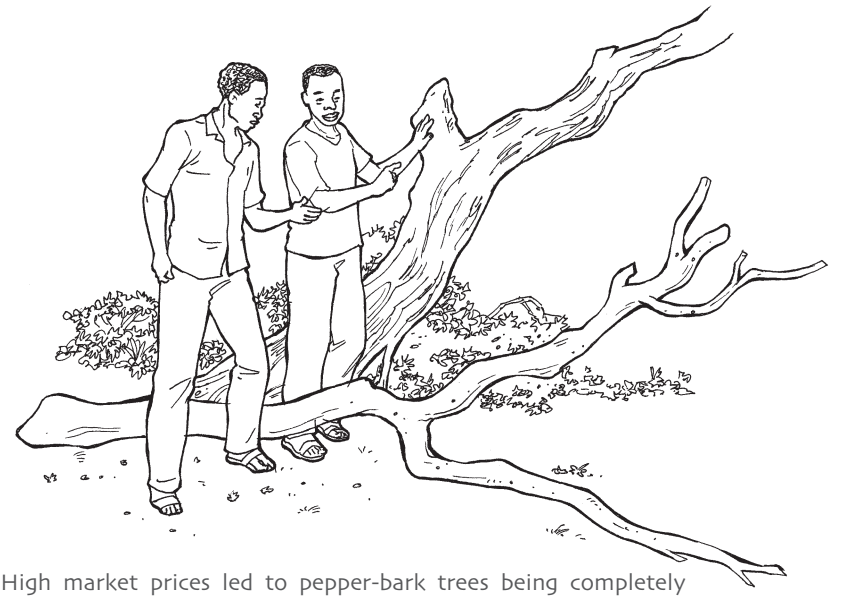
The pepper-bark tree produces an effective medicinal bark which has been traditionally used in southern Africa. A natural anti-microbial* remedy, both the bark and leaves are used to treat yeast, fungal, bacterial and protozoal* infections. They are also used as a diuretic and in the treatment of dyspepsia. The bark and leaves have a hot peppery taste and are commonly chewed in an unprocessed form, or the bark is ground into a powder. Locally known as 'muranga' (Shona), 'isibaha' (Zulu, siNdebele, siSwati) or 'chibaha' (Tsonga), *Warburgia* bark can be found for sale in the urban markets of Mozambique, Swaziland, South Africa, Lesotho and Zimbabwe.

*Warburgia salutaris* trees have simple, glossy leaves and generally grow 5-10 m high, although they can reach up to 20 m. In southern Africa, this species has a limited distribution and was recently listed as a vulnerable regional species by the World Conservation Union (IUCN). The situation in Zimbabwe however, is particularly acute. Wild growing *Warburgia* trees were formerly restricted to forest ecotones* on a few moist, high altitude sites in south-eastern Zimbabwe. But the high commercial demand for their bark has led to the depletion of these stocks.

## Over-harvesting of muranga trees

The combination of weak land tenure, destructive bark harvesting and the high value of this product has had a negative impact on muranga stocks throughout southern Africa. In the early 1930s, the German botanist Jacob Gerstner, who spent many years living in northern KwaZulu, South Africa, recorded that bags of muranga bark were being transported from Hluhluwe to Durban for sale. For more than a decade he attempted to collect the flowers or fruits of this species for scientific identification but all he found were sterile coppice* shoots sprouting from already exploited trees. In 1972, three Zimbabwean botanists had a similar experience, finding only a few dead or dying trees and collecting the last root coppices to plant six trees in the Harare Botanical Garden. Today, these have grown tall - but they too are being debarked!

By the late 1990s, muranga had become locally extinct due to over-harvesting for medicinal purposes. Bark supplies then had to be brought into Zimbabwe from the Mozambican side of the Chimanimani mountains. The destruction of muranga populations in Zimbabwe was seen as a conservation problem as well as an issue of concern to local people and traditional healers, who lost access to this important herbal medicine.



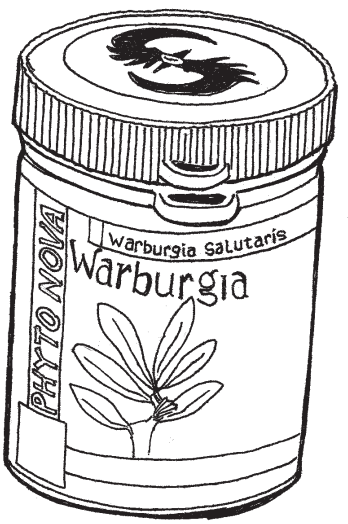
High market prices led to pepper-bark trees being completely girdled and large branches being chopped down to obtain the bark. When all the above-ground bark has been removed in this way, roots are then dug up and the root bark is taken as well - signaling the death knell for the tree!

## Reintroducing muranga

In 1996, the World Wide Fund for Nature (WWF), United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Kew Botanical Gardens People and Plants Initiative carried out a "local needs" survey. The results showed that the reintroduction of muranga through the transplanting of rooted cuttings* was a viable option for four reasons. Firstly, this tree species has a high cultural value associated with its medicinal role. Secondly, the reintroduction of muranga is useful from a conservation perspective. Thirdly, the high value of the bark (around US$ 33 per kg in Zimbabwe), coupled with its vigorous resprouting ability and reasonably rapid growth rate, suggest that it is an economically viable agroforestry tree species. Finally, several thousand rooted cuttings were available from a South African forestry company which had mass produced *Warburgia* plants from cuttings in the mid-1990s when the pepper-bark tree was nominated as South Africa's 'Tree of the Year'.

In late 1997 and early 1998, a pilot project was set up to reintroduce *Warburgia* seedlings back into Zimbabwe. This was coordinated by WWF-Zimbabwe and the local non-government organisation, SAFIRE (the Southern Alliance for Indigenous Resources). However, despite meticulous documentation (phytosanitary* certificates, export and import permits), careful packing in cooler boxes and the expense of air-freighting 1200 cuttings (temporarily removed from the soil for phytosanitary reasons), the young trees had a rude awakening. They were delayed by Zimbabwean Customs for several hot summer

days before SAFIRE was able to rescue them. Several hundred seedlings died but enough survived for planting out in the south-east of the country - the species' former Zimbabwean heartland. Importantly, this reintroduction did not take place in the forests, as the lack of individual rights would have been likely to lead to over-harvesting again. Instead, the seedlings were planted into the home gardens of local farmers.




*Warburgia* and other traditional African medicines, like *Sutherlandia* and African Ginger, can be bought via the internet. *Warburgia* is described as the most valuable of the natural African anti-microbials and the bark and leaves have been used to treat infections for centuries.

In 1999, a group of botanists, economists and rural development field workers assessed the muranga reintroduction as part of a University of Zimbabwe training course. Their economic analysis of this pilot project, along with market price data from a survey of local herbal medicine markets, strongly suggest that the reintroduction of *Warburgia salutaris* in south-eastern Zimbabwe is a viable practice. The replanting also has great potential to enhance the conservation of an endangered species while simultaneously improving the livelihoods of local rural people. The muranga cultivation is profitable and beneficial for both social and economic reasons, particularly for traditional healers (with a benefit to cost ratio of 42:1) and also for small-holder farmers (with a benefit to cost ratio of 24:1).

The social values of this species are important to consider at a time when HIV is widespread in southern Africa, and most Zimbabweans are facing economic chaos, hyper-inflation and declining access to pharmaceutical medicines. *Warburgia* bark from cultivated trees represents a source of income and also contributes to local self-sufficiency in health care. In South Africa, pills containing freeze-dried *Warburgia* leaves are being used to treat secondary infections in patients with HIV. Fresh leaves can also be used – and these are now being harvested by the farmers who planted muranga and who have assisted its return to Zimbabwe.

*Harpagophytum procumbens* subsp. *procumbens* (Burch.) DC. ex Meisn

# Devil's claw medicinal root

Namibian - Botswanian - South African case by Rachel Wynberg

# Devil's Claw: The root of traditional and modern medicines

'Devil's claw' is said to stir wild animals into a crazy dance to rid their feet of its thorny seeds, but the root of this weed, which grows in the red, sandy soils of the Kalahari Desert in southern Africa, brings welcome relief to humans the world over. The plant's roots are highly valued both locally and in the West for treating a wide variety of human and livestock ailments.

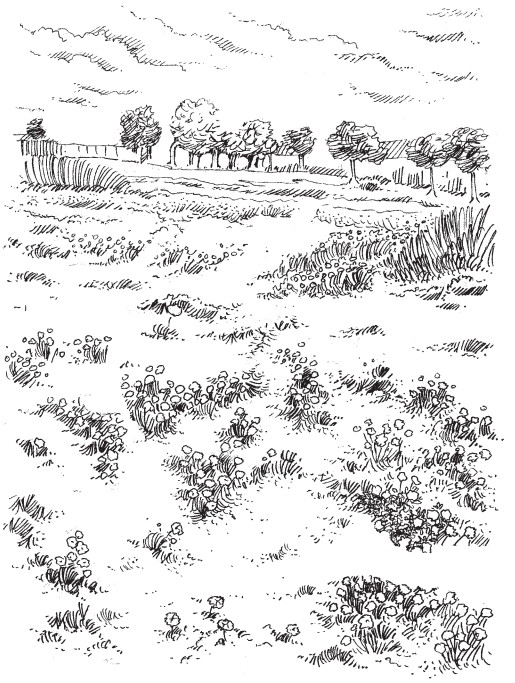
Traditionally, the root is used to relieve fever and labour pain, cure blood diseases, ease muscular aches, pains and stomach problems, and treat sores. This traditional knowledge led a German researcher to realise the plant's commercial potential and commence its exportation in the 1950s. In the West, extracts are widely used in pharmaceutical products, herbal remedies and cosmetics. The plant is best known for its role in the treatment of arthritis and rheumatism, and studies have confirmed its anti-inflammatory properties. Extracts are considered comparable with cortisone and the drug phenylbutazone, but without the side effects.


A wealth of traditional knowledge underpins the Western use of devil's claw.

## A gift from the desert

Two related species are used: *Harpagophytum procumbens* and *Harpagophytum zeyheri.* They are easily confused, but *H. procumbens* is the most commonly traded and internationally recognised. Devil's claw is a sprawling, low-lying plant with grey-green leaves and pink flowers, which develop into fruits with several long arms and sharp, hooked thorns. These catch on the wool, tails or feet of passing animals, serving to disperse* the seeds within. The most common name, 'devil's claw', is thought to originate from the bedevilled dance of animals desperate to dislodge the prickly seeds, but the plant also goes by around 20 other local names.

Devil's claw grows in sandy, arid regions, surviving dry periods by forming water-storing secondary roots* that sprout from the main tubers*. Medical treatments are made from these secondary roots, which sprout as far down as 2 m, vary in length from 4-25 cm and are up to 6 cm in diameter.



Devil's claw is most abundant in arid regions, where there is little grass cover and shrubs and trees are sparse.

Devil's claw is considered a weed and is often more abundant in disturbed, trampled or overgrazed areas. Thirty years ago, villagers reported devil's claw was common around their homes. Nowadays, collection requires "camping out" because the plant is no longer found within an easy distance for daily harvesting. Drought and goats are partly to blame for the scarcity but commercial harvesting is also taking its toll. On the other hand, the remoteness and inaccessibility of these plants in many areas affords them some measure of protection.

Nonetheless, harmful harvesting techniques, combined with an escalation of international trade, have raised concerns about this plant's future. There is discussion about listing devil's claw under the Convention on International Trade in Endangered Species (CITES)*, which monitors trade in species considered at risk in the wild. Companies are also increasingly looking at the plant's potential for cultivation, but often without considering the broader social, economic and environmental impacts. Successful cultivation could reduce pressure on wild stocks but also, disadvantage impoverished rural people who rely on collecting devil's claw as their only source of cash income. Listing the species under CITES would further affect trade from the wild.

## Harvesting and processing

Devil's claw is harvested in some of the most inhospitable and arid parts of southern Africa. People in these areas, like the San, are among the most marginalised groups - often extremely poor and with few ways to make a living. Devil's claw is a very important source of income for about 9 000 such people.

Permit conditions introduced in both Namibia and Botswana confine harvesting to the dry period between March and October, a restriction imposed largely to curtail over-harvesting. Methods of harvesting differ between areas and can be destructive if the whole plant is removed. If the secondary roots are removed carefully however, leaving the main tuber, harvesting need not kill the plant - and there is growing awareness about this method. After collection, the roots are washed, peeled and sliced into pieces, then sun-dried on suspended nets. The dried root is then packed into bags and stored, ready for sale. Further processing is mostly done in Europe.

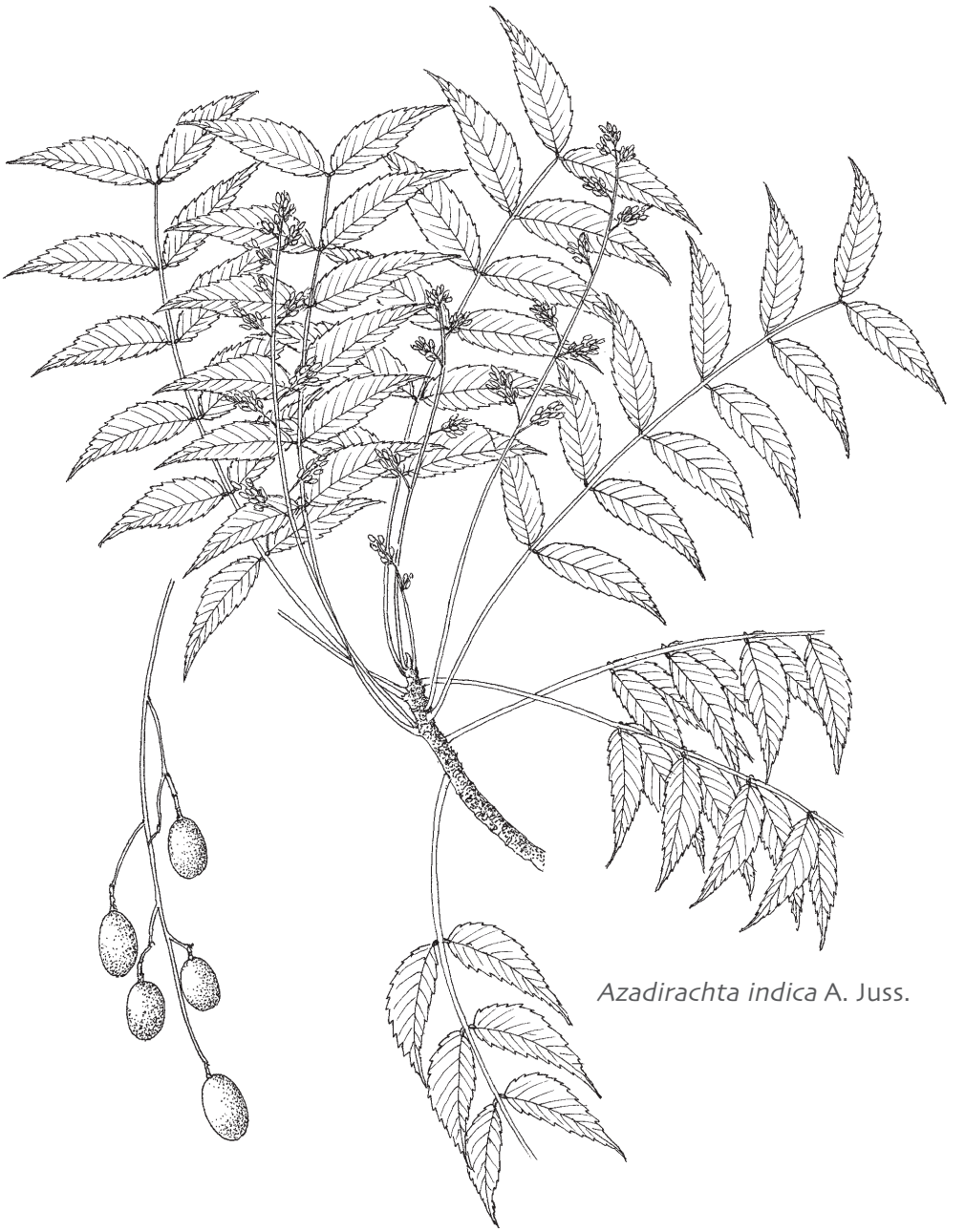
## A valuable commodity

Devil's claw has been traded internationally for more than 50 years, with most exports going from Namibia to Germany. There has been a substantial increase in export volumes and about 600-700 tonnes, worth US$ 100 million, are traded each year. Trade chains are complex and vary between countries. In most cases, harvesters supply local traders, who then sell the dried roots to local exporting companies. In some cases, non-government organisations (NGOs) help harvesters trade directly with exporters, or purchase material themselves for export. Five to ten companies - one of which controls 75 per cent of world trade in devil's claw - dominate the European market. Most profits are realised at this level: harvesters receive US$ 1.20 per kg, and local exporters US$ 1.40-1.80 per kg, while the retail price in the West is US$ 140 per kg.

## Trends

If managed well, devil's claw could: be harvested sustainably*, contribute to rural livelihoods and bring economic benefits to southern African nations. Some governments have good policies in place, but monitoring and enforcement is extremely difficult, especially in the remote areas where devil's claw grows. Harvesters lack good business and management skills, and there is insufficient cooperation among traders and the governments of exporting nations. There is virtually no value-adding within the region, and government policies to protect the species and monitor trade are confined to nature conservation departments rather than the more strategic departments of trade and industry. At the international level, insensitive cultivation efforts and monopoly control of the trade prevent producers getting their fair share of the plant's commercial potential and profitability. All this, combined with the difficulty of competing against sophisticated Western companies, weakens the bargaining power of local traders and harvesters. Such issues could be addressed in part, through harvesters' associations.

Sometimes deep, wide holes are dug with a spade to extract the entire root. However, this harvesting technique is destructive for both the plant and its broader environment. A preferable method is to harvest only the secondary tubers whilst leaving the main tap root intact.



*Azadirachta indica* A. Juss.

# Woodcarving

Kenyan case by Simon K. Choge

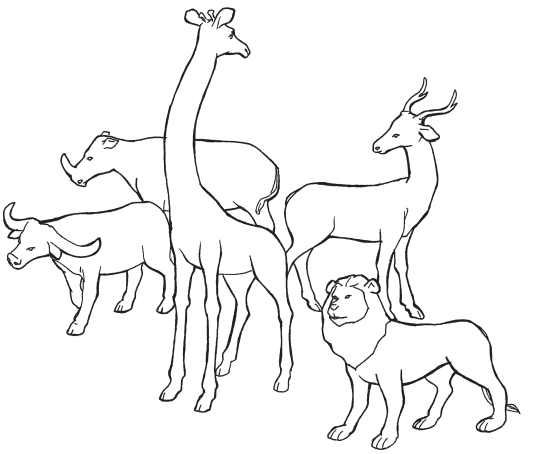
# Wooden animals from Kenya: Leaving tracks around the world

Kenya is world famous for its wooden carvings. Mutisya Munge, a muKamba man from Wamunyu, in the Machakos district, pioneered the production and trade of woodcarvings, as far back as 1919. Today, the waKamba people (muKamba=singular, waKamba=plural), who live in the drought prone, eastern parts of Kenya, create most of the country's carvings. They largely contribute to making Kenya the biggest producer of African woodcarvings for international trade.

Kenyan carvings are exported to countries like the United States of America, Canada, Japan, Spain, South Africa, Germany and the United Kingdom. Popular figures of wild game such as lions, giraffes, rhinos and elephants, along with many other types of wooden sculptures, are the end result of an often lengthy production and marketing chain, which all begins with the acquisition of wood.

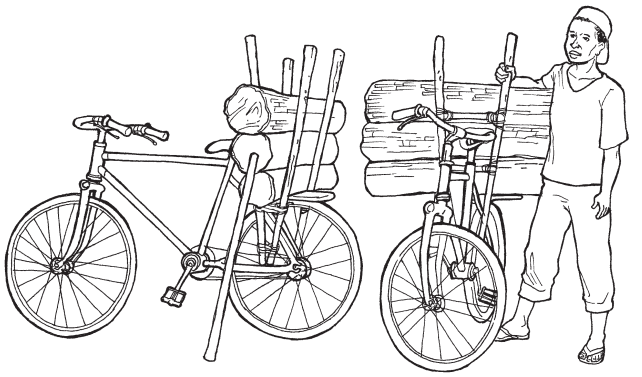
## Carving out a living

Kenya is home to 60,000-80,000 carvers who in turn, generate the main source of income to support around 400,000 dependants. These carvers depend upon wood from forests, farms and bushlands and each year, about 50,000 trees are felled to supply the commercial carving trade. Unfortunately, only a relatively small number of tree species are suitable for quality carvings. Most of the preferred wood comes from very slow growing species found in forests and woodlands. However, due to intense harvesting their natural populations have been severely reduced. Many carvers living in depleted areas have since moved to other provinces (such as Central Kenya and the coast) in search of new raw materials and markets.



Carvings are created from the wood of various tree species.

Over 60 per cent of woodcarvings are currently made from *Brachylaena huillensis*, known locally as 'muhugu'. However, it can take 100 years for these dry forest trees to attain a girth of around 40 cm and a height of 25 m. Supplies from these trees have been dwindling in recent years due to the high demand and long time span required for regeneration. As a



Bicycles, handcarts and vehicles are used to transport the wood to carving centres.

result, alternative woods have been sought from species like *Azadirachta indica*, locally known as 'neem'. This introduced species* is widely distributed along the Kenyan coast and is increasingly being used for woodcarving. It is sometimes viewed as a weed due to its abundance and profuse natural regeneration but this abundance and its fast growth rate and good carving qualities make it an excellent substitute for the favoured but depleted indigenous* hardwoods*.

Wood for carving is usually harvested from forests, woodlands and farms, and is generally obtained with the aid of a power saw operated by a single person. Wood dealers, who are the main collectors, scout for supplies from both distant and nearby sources, buying from land owners and harvesting and delivering the wood to carving centres.

## The commercial chain

Woodcarvers acquire their skills and training through working closely with experienced carvers for several years, learning how to specialise in certain types of products. The production of carvings is very labour intensive and involves several processing steps, including filing, sanding, painting and polishing. Products made from fresh or juvenile wood are dried in the shade for several days before the final touches are applied. The finished products are then sold to dealers or tourists. It is exclusively men who carve although women sometimes help with polishing and painting, particularly at a household level. With a trend towards the specialisation of activities, some carvers also contract out time demanding stages like sanding to skilled operators, whose work creates a nice smooth finish and results in the products fetching a higher price.

Generally, woodcarvers work in groups or co-operatives for the convenience of obtaining wood supplies and marketing finished products. Established groups sell their products through show rooms located at strategic places in towns and cities. Carvings are also sold in shops, at the entrances to game parks and along beaches and roadsides. Large quantities are exported to overseas markets as well. An increasing number of middlemen are getting involved in the carving marketing chain, buying products from carvers in a semi-finished state, for a cheaper price, and then adding value using skilled workers to sand, polish and paint these products. With a high quality finish, such carvings are destined for exclusive shops in major centres or for the export market.

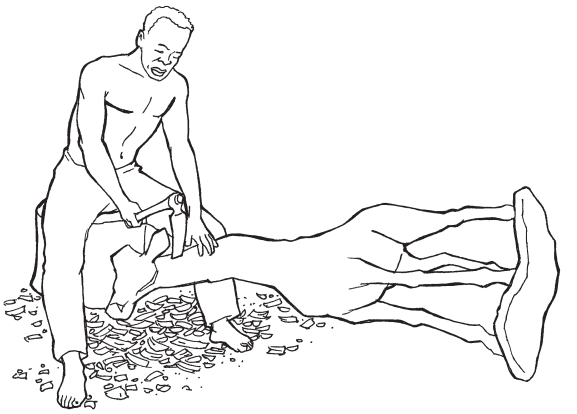
## Links in the chain

Many steps can be involved in the production of woodcarvings, with profits differing along the various stages of the production chain.

1) Wood is harvested and bought for US$ 12-15 per $m^3$.
2) Loading and transport charges are US$ 2 per $m^3$ and US$ 0.1 per $m^3$/km, depending on the species.
3) Semi-finished products are bought for US$ 30-66 per $m^3$ (about US$ 1-2 per carving). Approximately 600 pieces are produced from 1 $m^3$ of wood.
4) Skilled workers are hired to sand and polish the carvings, which are sold to middlemen or tourists at carving centres for US$ 3-4.
5) Specialised middlemen and dealers arrange for further finishing and their high quality carvings are then sold in exclusive shops for US$ 5-10.
6) Dealers fill export orders, pricing the carvings at over US$ 20 each.

## Trends

Increased demand for raw material is leading to widespread depletion of the more popular carving species in the forests and woodlands where these trees naturally grow. Alternative species with similar carving qualities but which are more abundant and faster growing are gradually bridging the gap between supply and demand. Carvers, woodcarving co-operatives and private investors are considering programmes to encourage on-farm production of fast growing trees to make woodcarving a more sustainable industry in Kenya. This is linked with the 'good wood' campaign aimed at developing sustainable supplies* of wood from sources outside natural forests - using species such as *A. indica*, which can be planted in between crops and in plantations. This campaign also encourages buyers to choose 'good wood' carvings. However, it is currently difficult to distinguish between these products and those made from the scarcer woods.



Carvers develop their skills through many years of experience and are able to quickly transform pieces of wood into sculptures, using simple hand tools.

There is a clear need to assist both traders and buyers with the identification of carvings made from 'good wood'. This could be achieved through attaching labels from an independent certifier to carvings which are made exclusively from 'good woods' and/or are tied to a strategy aimed at supplying wood (both 'good woods' and indigenous species) from plantations and farms.

*Afzelia quanzensis* Welw.

# Woodcarving

Zimbabwean case by Wavell Standa-Gunda

# MuKamba: Woodcarving from a rain-making tree in Zimbabwe

This is the story of the *Afzelia quanzensis* tree, which the Shona people of Zimbabwe call 'muKamba' and the Ndebele people know as 'umkamba'. In English, it is referred to as 'pod mahogany'. Throughout Africa, the roots, seeds, leaves and wood from these dry forest trees have a long and varied history of use, in both urban and rural households. Culturally, because of their large size, muKamba sites have often been used for rituals, rain-making and spirit appeasement ceremonies. The root is traditionally used in herbal medicine as a treatment for chest pains, kidney problems and snakebites. At times, spiritual healers have used the striking red and black seeds to exorcise bad omens, while women have found an alternative use for the seed pods - as decorative necklaces.

Poles fashioned from the wood of muKamba are used for grinding maize.

During droughts and food shortages, muKamba leaves are eaten as a vegetable and the wood has long been used as a raw material for the household manufacture of domestic equipment like yokes, stools, spoons and plates. Such items are sometimes bartered in exchange for food or even social capital. In recent times, the wood has attracted a more commercial focus as well, in the production of woodcarvings and modern office and home furniture.

## The woodcarving boom

In Zimbabwe, the escalation of trade in woodcarvings is linked to various national and regional events. Firstly, the collapse of apartheid* in South Africa and several years of domestic political stability in Zimbabwe led to increased tourism between the two countries. The devaluation of the Zimbabwean dollar contributed to the woodcarving boom as well - making the country more attractive to tourists. Another factor was the serious droughts of the late 1980s and early 1990s, which forced many people to find alternative sources of income to supplement their agro-pastoral activities*.

Growth in the number of craft producers and markets has been phenomenal. The number of roadside markets selling woodcarvings and other handicrafts along the 300 km stretch

of road linking Masvingo to Beitbridge, on the route connecting South Africa with Central Zimbabwe, has grown from just a few in the late 1980s, to more than 25 in the late 1990s, directly involving approximately 4,000 people. Recently however, the country's political instability has resulted in a general decline in the industry, the Zimbabwean dollar has been over-valued and fewer tourists are entering the country.

Small branches are taken for firewood, while the larger ones for carving are removed with an adze (chisel-like tool) or axe. This reduces the weight of the log for transporting to the homestead or roadside market, where the final carving takes place.

## Harvesting the trees

MuKamba trees are naturally found in eastern and southern Africa, in woodlands and dry forests. These drought resistant* trees grow to 12-15 m but sometimes reach up to 35 m. As it is illegal to cut these trees, secret harvesting occurs at night. Alternatively, Zimbabwean laws allowing villagers to collect dead trees are exploited, with harvesters ring barking* the trees and leaving them to die. They later cut them with an axe or hand saw (as none of the wood harvesters own a motorised power saw). If it is a large tree, the harvesters may dig around the edges to a depth of around 1 m, setting fire to the root system and pulling the tree down with ropes and oxen if it doesn't fall. Such harvesting techniques are destructive and leave nothing for regeneration.

## Processing the wood

Rough carvings are shaped with chisels into African animals like hippos, giraffes or warthogs. Next, sandpaper is used to smooth the carvings before they are polished with floor or shoe wax. This whole process can take up to 15 days, earning the carver an average US$9 per product. Financial returns for carvers vary between markets and over time. Woodcarvers generally earn between US$ 100-500 per person, per month, depending on market conditions and the level of tourism, with the peak months being in August and January.

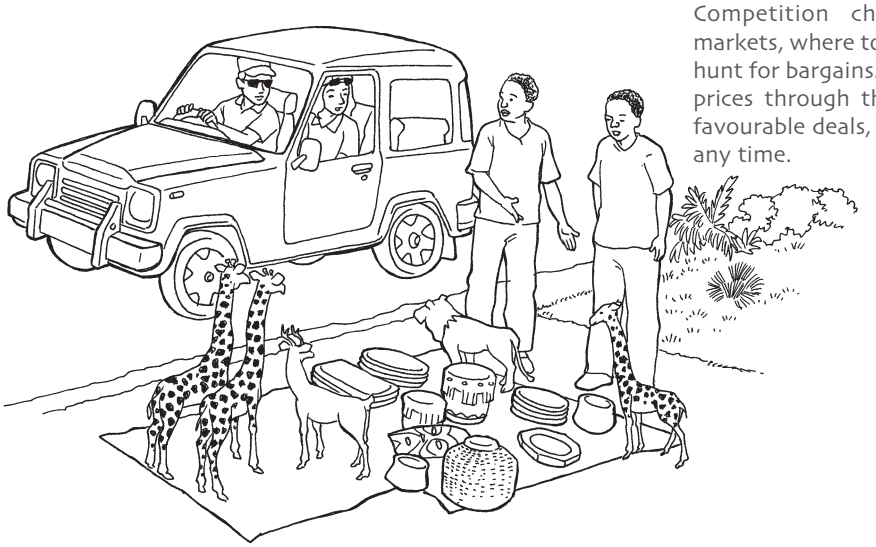
In Zimbabwe, unlike woodcarving industries in other parts of Africa, and especially Kenya, there is no specialisation. The same person carries out all of the activities involved in woodcarving in Zimbabwe, from harvesting through to selling. In Kenya, where there is a greater degree of specialisation, the product quality is high and the prices fetched per cubic metre of wood are also higher than in Zimbabwe and Malawi.

## Avoiding the bust - fostering more sustainable trade

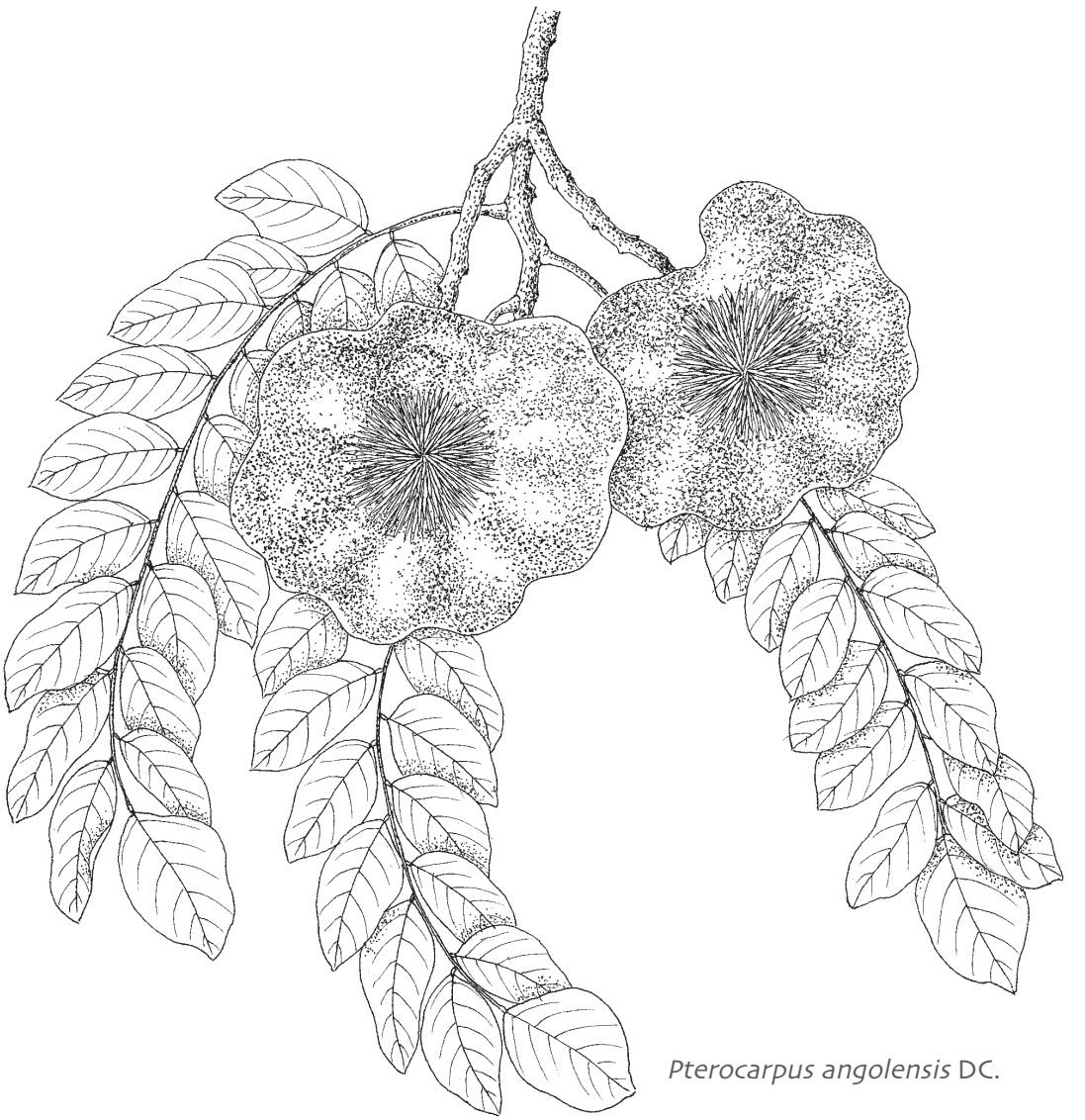
The sustainability of the woodcarving industry depends entirely on the future supply of raw material. The region's forests are unlikely to be able to sustain the current rate of harvesting, signaling future scarcity for woodcarvers and a loss of muKamba's multiple uses and benefits for rural populations. To avoid shortages and conflicts, and to foster sustainable management*, changes are required locally and nationally.

Legislative reform is needed to make woodcarving legal and to shift the control of trees and harvestable timber to a sub-district level. The greatest successes have been where control has been transferred to community organisations such as villages or wards with low populations. To support community management and control, a permit system could be introduced to limit the harvest of timber for carving and the amount of wood that can be purchased by carvers. Such a permit system could also result in the community receiving the payments for harvested supplies.

Valuable lessons can be learnt from the Kenyan experience. In response to the scarcity of indigenous* hardwoods*, timber from alternative species, like jacaranda and mango, is now being used in the Kenyan carving industry. These trees can be found throughout Zimbabwe as well - where their wood could also be substituted for carving. Campaigns promoting the use and advantages of such 'good woods' should focus on providing information to carvers and the tourists buying their products. Both groups stand to benefit from these measures and education campaigns.



Competition characterises the roadside craft markets, where tourists and local buyers browse and hunt for bargains. If they remain in their cars, asking prices through the window, traders need to offer favourable deals, as the buyers are likely to leave at any time.



*Pterocarpus angolensis* DC.

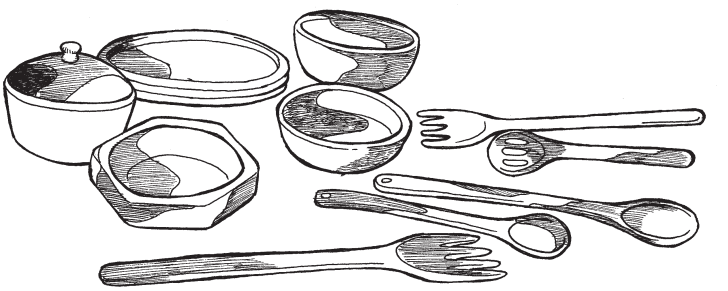
# Kiaat carvings

South African case by Sheona E. Shackleton and Charlie M. Shackleton

# The kiaat tree: Timber for appetising tableware

Food seems all the more delicious when it is served with beautiful wooden spoons, and green salads are freshly mixed in wooden bowls. There are few more beautiful timbers to whet the appetite than that of southern Africa's kiaat tree. A simple approach brings out the best in this warm brown, medium-grained wood. Leaving their woodcrafts unadorned, carvers merely polish their bowls, spoons, platters, walking sticks and the like, before taking them to catch a tourist's eye at craft and curio markets.

The kiaat tree (*Pterocarpus angolensis*) was greatly sought after during the colonial era, particularly for making furniture. About 50 years ago, a few unemployed men in the region bordering the Kruger National Park decided to try their luck at carving this attractive, hard wood and selling their products to tourists. Many of these original craftsmen are still plying their trade. They have been joined by numerous others, who all work individually from their homes, with the help of their families. Kiaat tableware and utensils are now common items in markets and other outlets in this region.



Carvers produce bowls, spoons and many other woodcrafts, from kiaat's beautiful timber.

## Hanging in the balance

Kiaat is an extremely slow growing tree, taking more than 80 years to reach a minimum harvestable size. Its distribution in the woodlands of South Africa is relatively restricted, and years of exploitation are taking their toll. Carvers are finding it increasingly difficult to find suitable trees within the communal lands surrounding their villages, and taking trees from land around other villages is causing social tension. Although the species is state property and legally protected, there has been uncontrolled pillaging in some nature conservation reserves.

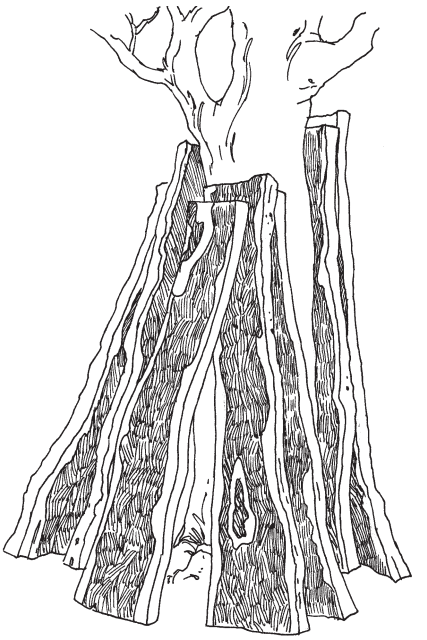
Scarcity has led to some substitution with other species but, on the whole, there are few alternatives available. Unfortunately, attempts to propagate* the plant have been largely unsuccessful. The kiaat craft industry thus hangs in the balance as the resource dwindles.

## A job between jobs

High levels of unemployment, combined with a shrinking job market, a lack of land for farming and an increased need for cash, have driven many rural households to seek alternative sources of income. Woodcarving and furniture-making represent one widely adopted strategy in parts of South Africa where suitable wood species occur.

Craftsmen tend to enter the industry following retrenchment, with some moving continuously back and forth between carving and formal jobs. Thus, the ability to access wood and fashion it into saleable products is an important safety net for the unemployed.

Carvers harvest their own wood, usually felling whole trees, which they cut into smaller logs and transport home. By law a permit is required to cut the trees and the timber is paid for, albeit at a very subsidised price compared with the open market, where it sells for more than US$ 700 per cubic metre. In their makeshift workshops, carvers meticulously fashion the wood by hand into a range of products using homemade axes, adzes and other tools. Women and children do the sanding and polishing.



Kiaat logs are highly valued due to their beautiful, rich wood, with its contrasting streaked colouration.

Once a carver has adequate stock, he boards a minibus taxi and visits the various informal markets, which are often located at key tourist destinations such as waterfalls, game reserves and viewing points. A selling trip usually takes the whole day, with the craftsman covering 200 km or more. Female traders buy the goods at these informal markets and then sell them to tourists. Sometimes the carvers sell their handiwork to formal retailers, although in recent years the curio shops have begun stocking imported goods from Kenya and West Africa rather than locally made items. The best times for sales are the peak holiday periods of Easter and Christmas.

However, the trade is not a profitable one for carvers, with most simply subsisting from one day to the next. Sales fluctuate from month to month and costs are high, especially the costs of extracting timber and visiting the markets. The considerable labour involved in harvesting and carving is rarely recognised in the prices received, and carvers are often forced to accept exploitative prices in order to pay their taxi fare home and put food on the table.

Competition from other African countries has made South African kiaat craftsmen even more vulnerable. Imported carvings began flooding in after trade embargoes were lifted in 1994. In real terms, carvers are less well off now than 10 years ago, as prices have not kept

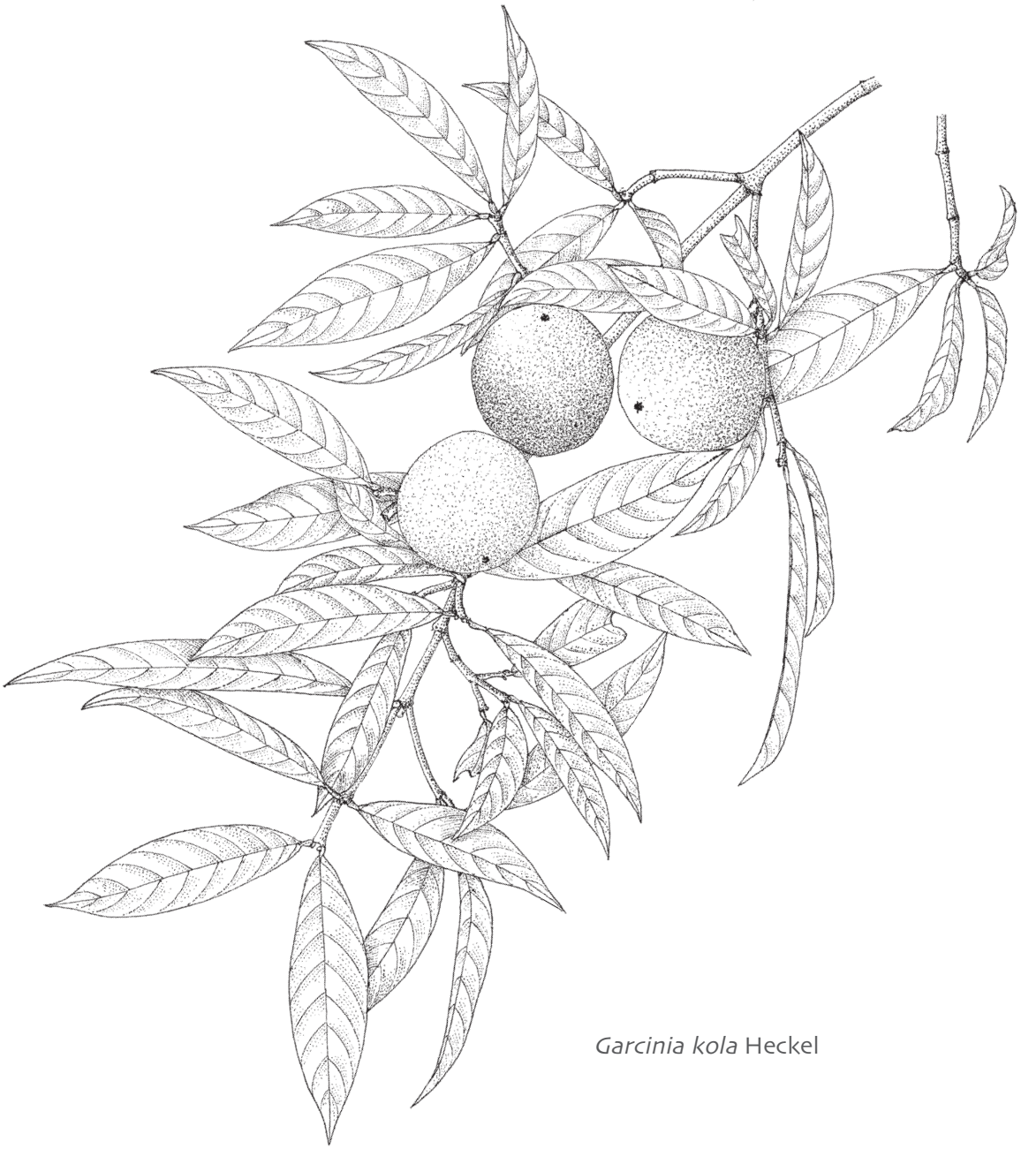
pace with inflation. However, dependency on woodcarving remains high, and it is estimated that the carvers obtain around 75 per cent of their annual household income from this activity. Given this, and the dwindling natural resource base, the outlook is not good for these craftsmen - unless the Government and development agencies intervene to help secure their future.

## Trends

For kiaat carvers making plain but useful utensils, market opportunities are not as great as for craftspeople producing a wide array of fancier carvings for tourists and export. Only a small number of South Africans are involved in kiaat woodwork, but it represents their principal source of income in rural areas with few jobs and unemployment rates of over 75 per cent. For carvers to continue earning a living and practicing the specialist skills that they have developed, access to alternative sources of wood is essential, and efforts must be made to involve kiaat producers in managing the resource if the trees are not to become locally extinct.

In the last five years, there has been an increase in external support to producers and traders but this needs to be better coordinated, and a more focused long-term effort by all key stakeholders will be required to foster a more sustainable industry. Lessons from other African countries and elsewhere could also assist this process. New skills, products, organisational structures and perspectives are needed to diversify production and trade in the local industry and bring carvers more into the mainstream - particularly given the competition from neighbouring country imports. Consumers also need to be made more aware of the value of kiaat wood, and the time and effort required to produce carvings and handmade furniture. Local products should be promoted and appreciated, rather than being regarded as inferior to imports and the fancier factory produced items. If such issues can be addressed then there can be hope for the future for the local woodcraft industry.

Market traders sell many different woodcrafts, including kiaat carvings.



*Garcinia kola* Heckel

# Chewing sticks

Ghanaian case by Dominic Blay, Jr.

# Traditional tooth care: Chewing sticks in Ghana

Beautiful smiles come naturally to the people of West Africa, where traditional toothbrushes literally grow on trees. Long before the advent of plastic brushes and toothpaste, West Africans, especially in Ghana, were chewing on green, split stems to keep their teeth healthy and white. Even today, there is hardly a Ghanaian household of any class without chewing sticks.

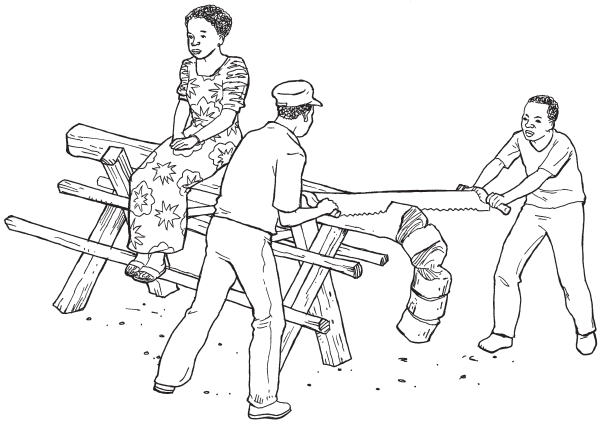
The practice is one of the main reasons West Africans have such good dental health. Medical studies have shown that the sticks are as efficient as synthetic toothbrushes in removing plaque from teeth. This is due to the combined effects of mechanical cleaning, enhanced salivation and the sticks' natural anti-microbial* properties, along with regular use every morning and after meals.

About 70 species of woody plants are used in Ghana as chewing sticks, but the best quality sticks come from 'tweapea' (*Garcinia kola*) and 'nsokar' (*Garcinia epunctata*) trees. These two species grow wild in south-west Ghana, particularly in wet evergreen* and semi-deciduous* forests.

Chewing *Garcinia* sticks help to maintain good dental health.

*Garcinia epunctata* is a medium-sized, evergreen tree, with a tall but fairly regular and dense crown*. It flowers profusely during the dry season and produces fleshy, edible fruits the size of oranges in the wet season. These fruits are eaten by animals, which then disperse the seeds.

*Garcinia kola* is a medium-sized, shade-tolerant* tree, with a cylindrical trunk that is slightly buttressed* to the ground. These trees have a dense crown, which is compact but not spreading. Their fleshy, red-orange coloured fruits usually fall to the ground, where both small and large animals (like elephants) feed on them and disperse the seeds. The *Garcinia kola* seeds are also extracted from the fruit and eaten by people in Nigeria and Cameroon as 'bitter cola' nuts. These nuts are eaten fresh or dried as a popular snack, or are ground up and used in traditional medicines.



Cutting the stems down to size in the production of chewing sticks.

## Trees on the edge

Wood for chewing sticks is harvested from tweapea and nsokor trees in government-owned forest reserves or in forests over which families and/or clans have tenure. Despite their economic importance, there have been few studies about how to encourage the regeneration of these species, and there are few controls over harvesting in the wild. Harvesters say the trees coppice (or shoot new stems from their base) but these shoots die after a few years.

The Forestry Commission requires all harvesters to buy permits but it does not set quotas nor monitor the amount of wood being taken. There is virtually no management of the resource and little information is available about the rate of harvesting. The length of time it takes *Garcinia* spp. to mature is also unknown. The only deterrents to harvesting are high transport costs and a dislike of small logs among local harvesters. Most harvesters come from outside the areas they operate in. As they rarely return to the same forest, they have little incentive to let trees mature so that harvesting can be more sustainable.

*Garcinia* spp. are now seriously threatened with extinction in Ghana due to over-exploitation. To meet the demand in the Ashanti and Kumasi region, each month an estimated 4 700 trees are harvested and 12 000-19 000 stems per month are turned into chewing sticks for the Ashanti region alone, in three processing centres. Similar quantities are being processed in other Ghanaian regions like Accra and Takoradi.

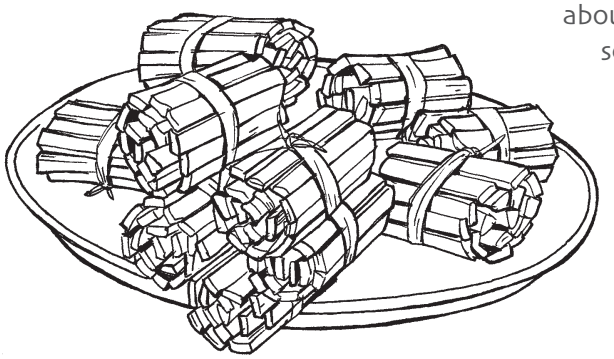
## Harvesting and processing

Harvesters cut the stems or 'logs' with machetes or cutlasses*. Some use chainsaws for thicker stems, which can be more than 20 cm in diameter at breast height. Branches are never used because they cost too much to transport and are usually too small for splitting. Harvesting generally takes place between October and March to avoid the wet season, when most forest roads are impassable.

Men and women work in small groups but they are paid individually, according to the number of logs cut or chewing sticks split.

Harvesters make use of other forest products in their daily lives but only earn money from *Garcinia* spp. In some regions, about 80 per cent of household income comes from harvesting wood for chewing sticks. The harvesters usually work in small groups of 3-5 men and carry their logs to nearby roads. These are picked up and transported to towns and cities in trucks loaded with about 200 logs each.

The stems are taken to processing centres and turned into chewing sticks by hand - from start to finish. This is a two-step process taking 1-4 hours. In the first stage, men working in teams of two remove the bark and cut the logs into small sections about 13 cm long. In the second phase, women split the sections into 2-5 cm chewing sticks using knives and mallets. The sticks are then tied into bundles containing 20-30 pieces. Each log yields an average of 750 bundles.



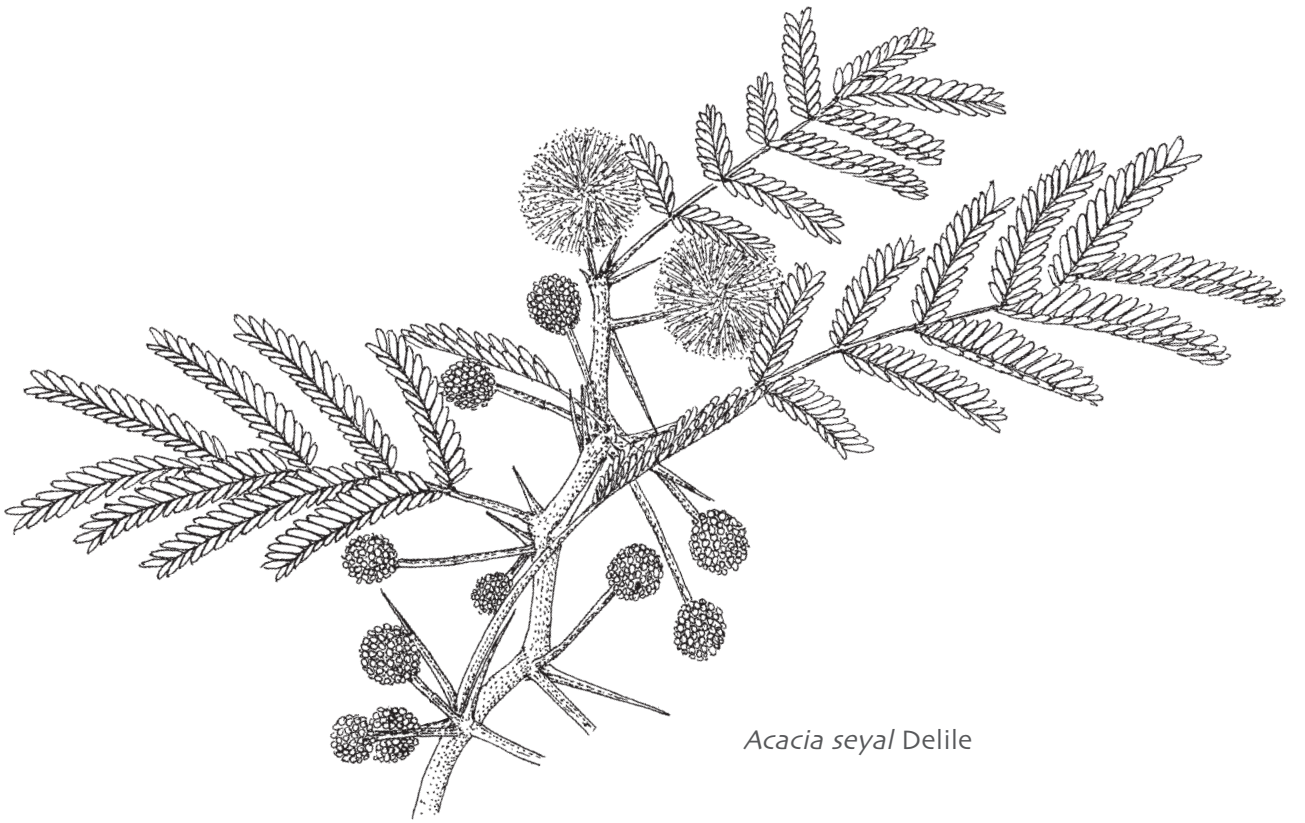
Bundles of 20-30 chewing sticks are sold in local markets and urban centres.

Women earn much less than men for their processing role. Annually men earn about US$ 300-800 for cutting the stems into sections, while women earn US$ 200-500 for splitting the wood into chewing sticks. Workers are paid according to the number of logs they cut or chewing sticks that they split, so they prefer not to share the labour.

## Trends

Over-exploitation has seriously depleted the number of *Garcinia* trees growing in Ghana. It now takes more than a week to find enough trees in the forest to harvest one truckload of about 200 stems. This local scarcity is increasing harvesting rates in nearby Liberia and Côte d'Ivoire, and is affecting the livelihoods of harvesters who cannot afford to travel outside Ghana. Scarcity is also driving up the market price of chewing sticks, and some traders are selling poorer quality alternative species. About 70 other species are now being used as substitutes for *G. kola* and *G. epunctata*.

There is an urgent need for appropriate policies, including the monitoring of harvesting rates and the management of *Garcinia* spp. With a sustainable supply, the product has potential to be exported to neighbouring countries, as well as to Ghanaians in Europe and the United States. In spite of the scarcity issues relating to the two preferred tree species, income from producing chewing sticks continues to support many families and to contribute to local and regional economies.



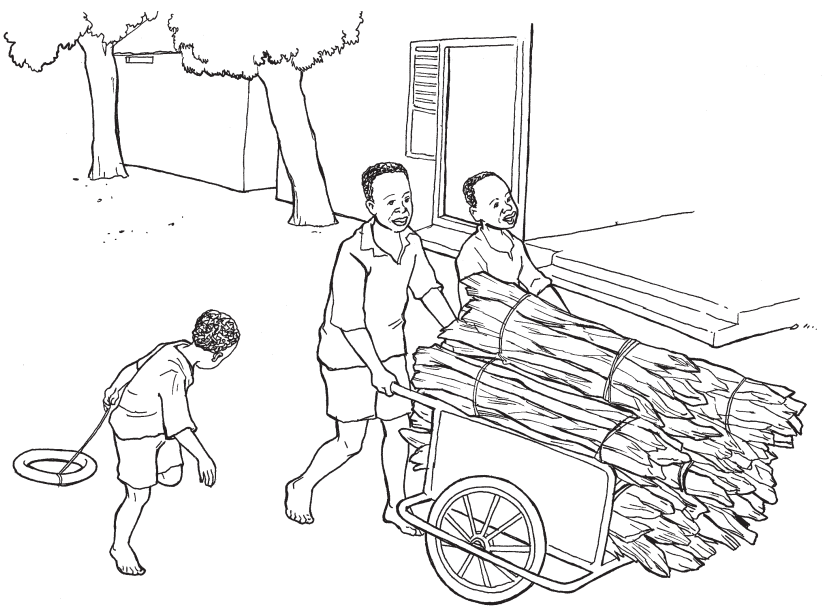
*Acacia seyal* Delile

# Fuelwood

Cameroonian case by Tata Precillia Ijang

# Fuelwood in Cameroon: An energy source from the forest

In the Maroua area of the Far North Province of Cameroon, many forest products are gathered from both plant and animal sources. The range of products includes fruits, nuts, oils, medicinal plants, Arabic gum*, bush meat, bark and wood. Fuelwood is one of the key harvested products - an essential source of energy, gathered for both subsistence needs and commercial trade. In many rural areas, like Maroua, particularly where gas and electricity are uncommon and household incomes are low, wood represents the main source of fuel. This is the case not only in Cameroon but also in many other neighboring countries in the region. For centuries fuelwood has remained an affordable and reliable source of domestic energy for the rural populations of developing countries around the world.



Fuelwood is transported as individual headloads*, or by animal, bicycle or push cart. The mobile urban retailers use push carts and cars, while the urban transporters use six or ten tonne pick-up trucks.

In Maroua, where there are few wage labour oppotunities, the extraction of wood for fuel has contributed to income generation, in addition to meeting household energy needs - but it has also contributed to environmental degradation. In this part of the world, wood harvesting is the third most important economic activity after agriculture and the rearing of animals. It is an area characterised by a high population density and harsh, dry climatic conditions. It experiences high temperatures, sometimes reaching 40° C, a long dry season, short rainy season and annual rainfall rates between 760-1000 mm. The plant cover of mixed trees, shrubs and savanna* is quite sparse and many of the plant species have developed specialised structures to enable them to survive in these harsh conditions - including deep root systems, few and small leaves, thorns and thick bark.

## Fuelwood harvesting and consumption

In Cameroon, fuelwood constitutes around 60 per cent of the total energy consumed in all sectors and 85 per cent of the energy consumed in households. Maroua reflects this high consumption rate, with two thirds of the total energy consumed by urban households and 100 per cent of village household energy being derived from fuelwood. Village usage averages 586 kg per person each year, at a cost of around US$ 0.03 per kg. Formerly, wood harvesting in this region was mainly undertaken by women, who gathered only dry branches and small trunks for home consumption. Today however, following the increase in demand and the expansion of the commercial trade, a massive amount of felling is taking place, drawing on both dry and fresh branches and trunks. The result has been a drastic reduction in tree cover.

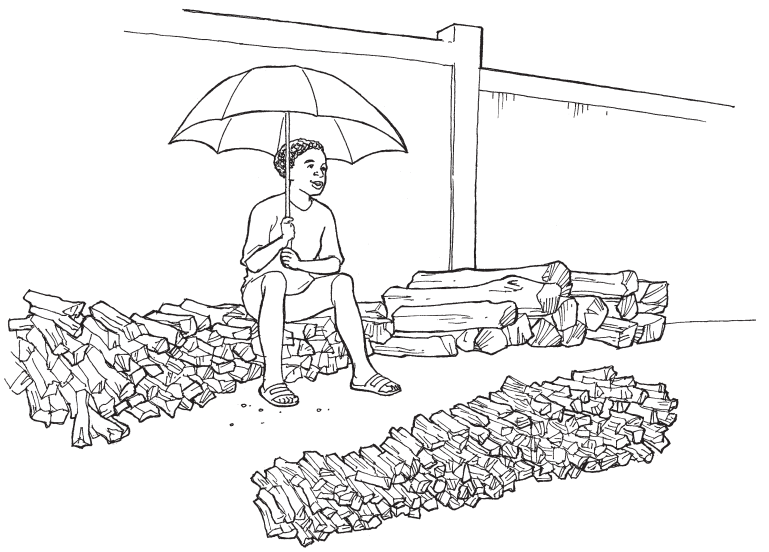
To increase value and maximise profits, successive traders split the wood into smaller and smaller pieces along the trade chain. Logs and big branches are split into large halves, medium halves and small halves (which consumers prefer the most). During processing, the quantity of wood sold per US dollar is reduced, enabling traders to make a small profit.

Now men do the main woodcutting, early in the morning before it gets too hot, with fuelwood sales taking place in the afternoons. The harvesters keep some wood for home use and sell the rest, mainly to wholesalers, although some retailers and consumers buy directly from the village harvesters as well. It is the wholesalers however, who are the main link between the villagers and the urban population. These wholesalers resell to retailers in towns, who employ workers to split, tie and sell the wood to urban consumers. Basically, the marketing chain for fuelwood stretches from the forests to the villagers' local roadside markets and finally, to the town markets, where the main consumers are the urban poor - for whom fuelwood is their only source of domestic energy. Some of the larger stems are also sold in urban centres as poles for the construction and repair of houses.

## *Acacia seyal* - The main source of wood

Most of the fuelwood is harvested from *Acacia seyal,* which grows to a height of around 17 m and fortunately, has a fairly rapid rate of regeneration. The seeds germinate and with little or no assistance, grow quite easily unless they are disturbed by browsing cattle or

bushfires. Full growth is attained after about 10 years, and in areas that have not been completely depleted of stocks, it is quite common to find around 20 trees per square kilometre. Fuelwood from *Acacia* has a high quality, relating to its good capacity to burn and produce charcoal, and the fact that it creates less wood ash and smoke than many other species. These trees can also be used for timber, forage, food, medicine and improving soil quality. However *Acacia* and other tree species are being cut down indiscriminately without much consideration for the age or size of the trees.

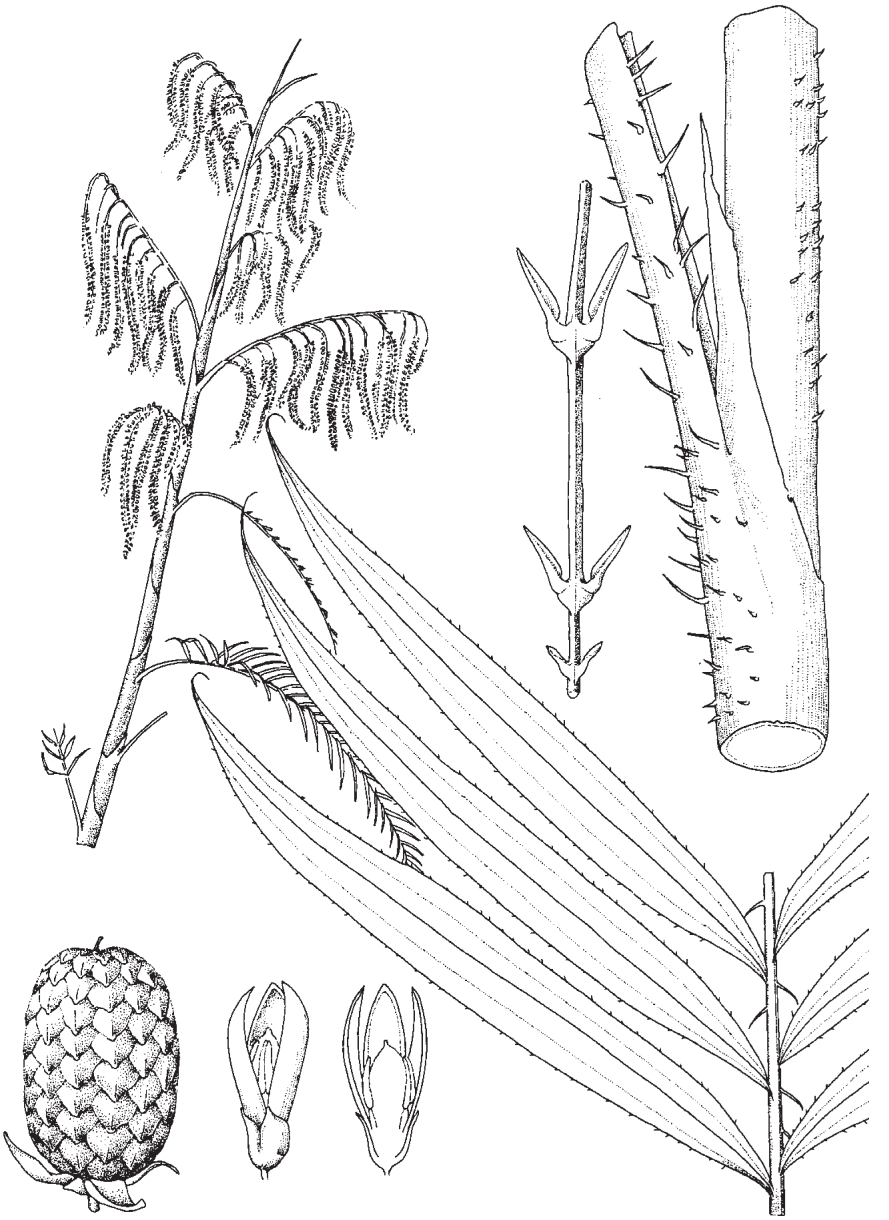


The commercial sale of fuelwood generates valuable cash income for poor rural harvesters and urban traders.

## Addressing the issue of declining supplies

The most noticeable change attributed to the intense harvesting of wood is the disappearance of the indigenous* tree cover, leaving behind a wide, empty landscape covered with tree stumps and a few scattered young trees, which often do not reach maturity due to heavy browsing. The trade and demand for fuelwood is increasing, although supplies remain inconsistent, especially during the rainy season. The main reasons for this include the increasing scarcity of local supplies and the need for longer distances to be traveled to reach new collection sites, bad roads and the high cost of hiring vehicles.

Since the collection of fuelwood represents a major source of income for many households, it has been difficult to achieve a reduction in this activity, despite the negative environmental impacts. However, the current level of over-harvesting is not sustainable*. Improvements in management and harvesting techniques are required, along with the more effective use of this product. In a bid to address these issues, there has been an increase in State attention and in the number of non-government organisations and environmental protection programmes operating in the area in recent years. Harvesters have benefited from these developments through education and training, and the resulting improvements to their living conditions, income generation and employment prospects. Some local people have even become motivated to maintain trees on their own plots or plant exotic*, fast growing fuelwood species in the area to help compensate for the disappearance of the natural savanna.



*Laccosperma secundiflorum* (P. Beauv.) Kuntze

# Rattan

Central African case by Terry Sunderland

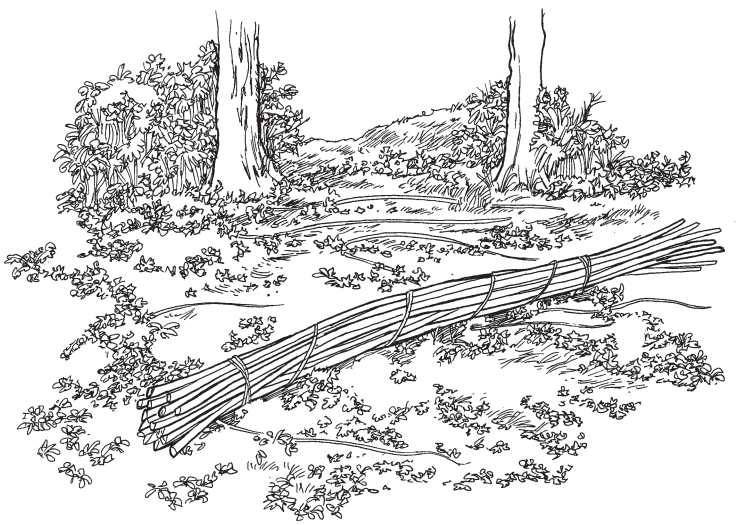
Cameroonian case by Louis Defo and Ghanaian case by Charles Adu-Anning

# Rattan: Poor man's furniture turned fashionable

Rattan was once regarded as 'poor man's furniture', made by villagers who could not afford anything else, but the rustic charm of rattan chairs and tables now has a much broader appeal in many different parts of the world.

The word 'rattan' comes from the Malay 'rotang', literally meaning 'climbing palm'. The inner part of the flexible stem is used as 'cane' for making furniture and weaving baskets. The larger diameter canes, from *Laccosperma secundiflorum* and *L. robustum*, are used to form frames, while the smaller diameter ones, from *Eremospatha macrocarpa*, are often split and used for weaving around the framework. Rattan canes are flexible, long lasting and suitable for making many items: like furniture, fish traps, crossbow strings and hammock bridges.

Rattan products are common in rural Africa, but cane furniture has recently become fashionable in towns and cities, and in Europe as well. A thriving harvesting and manufacturing base has developed over the last 5-10 years to supply the growing local and international trade.



Historically, short lengths of cane have been used to discipline school children and in many African schools they are still in use today. Poor children!

## A big family

Rattans grow in lowland tropical forests and are widespread in forests throughout central Africa. There are about 600 different species growing in Asia, but only 22 in Africa. Some species grow well in dense forest, while others prefer more open areas, for example, where trees fall and light breaks through the canopy.

The rattans that provide good quality cane in Africa produce many stems from a single individual. As the rattan clump gets older it produces more and more climbing stems and becomes wider in diameter. A really old individual can be up to 5 m across, with up to 50-100 stems in one clump!

As climbing plants, rattans rely on trees for support. Their fast growing stems wind their way upwards towards the light, pulling themselves up into the canopy using 'whips' that extend from the ends of their leaves. These are armed with big hooks, which anchor the palm to the surrounding trees.

Most rattans are also very spiny, discouraging wildlife from eating their growing tips or fruits. However, many animals (including elephants, chimpanzees and gorillas) and birds (such as hornbills) love the juicy, sweet fruits and seek them out, spreading the seeds far from the mother plant as they travel through the forest. Even though the seeds are deposited in their own little pile of compost, they can take up to a year to germinate. Wildlife is very important in rattan regeneration and seedlings are hard to find in forests where hunting has made animals scarce.

Rattan stems are cut from the base of the plant using cutlasses*. The spiny skin is then pulled away, and the stems are cleaned and tied into bundles or rolls. It is a tough job and while some harvesters use thick gloves for protection, others just use their bare hands.

## A tough customer

Both the harvesting and processing of rattan is almost exclusively a job for young men aged under 35. This work is usually secondary to farming activities. Men work in the fields all morning, perhaps harvesting a little cane or sending their sons into the forest. They then gather in village squares for the afternoon, working on rattan and discussing community issues.

Whenever you ask a rattan harvester about his job, he will always complain about the many ant bites he gets every time he is in the forest! The raw canes are peeled and dried in the sun before being turned into furniture, baskets, fishtraps and other items. Some items may be sold for cash at the roadsides to passing trade, or exchanged for bushmeat or traditional medicines.

Most of the cane however, is sold to middlemen, who take it to specialised rattan markets in towns and cities, where it is sold to urban artisans. The canes are fashioned into various products and are sometimes varnished prior to sale to give them an attractive, shiny appearance and to ward off termites and other insects.

## Management

Rattan is not well managed throughout Africa. Anybody can harvest the cane if they pay the nearest village a small fee or give a gift to the chief and his council. The development of a wide network of logging roads has also opened up previously inaccessible forest areas.

This open access has led to unsustainable practices. Harvesters indiscriminately cut everything from the rattan's base clump, even the young stems, just to get at the mature cane. But this doesn't allow the clump to regrow and produce new stems for future harvests. Collectors then take their destructive practices to new sites and as they move through the forest, the rattans are either killed or take a very long time to recover. Some harvesters now complain they have to travel further into the forest each time they want to gather cane. The added transport and labour costs are slowly pushing up the price of raw cane in the urban markets.

Because of the long time it takes for rattan seeds to germinate and the fact that rattan is still found in the forest, farmers do not cultivate the palms on their land. However, once rattan is established, it can grow up to 7 m in length per year, which means there is potential to grow it on farms using fruit trees for example, for support.

## Trends

Cane products have become fashionable in Europe and among urban dwellers in many African cities. As the quality of the finished products has increased, the perception that they are traditionally 'poor man's furniture' has faded. The rising cost of timber has also boosted demand for cane as a less expensive alternative.

However, this growing market is promoting uncontrolled harvesting. Although rattan palms are generally common, harvesters are being forced to travel further and further into the forest. The introduction of small-scale cultivation coupled with a more regulated wild harvest regime could significantly help to foster the long-term sustainability of the rattan resource in Africa.

In rural communities, local people are often harvesters as well as artisans, making products for sale. However, most of the harvest is bought by traders and is destined for cane markets and finally, the hands of urban artisans.

# Rattan in Cameroon

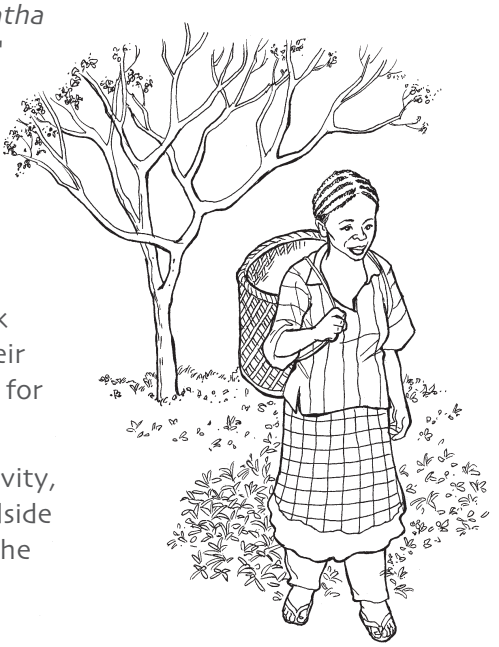
As in other African countries, local populations in Cameroon have used rattan canes* for centuries, mainly for fine weaving, basketry, housing construction and making furniture. During the period of European colonisation, traditional production started to change and a new style of rattan processing was introduced. The 'modern' rattan cottage industry, which produces new designs of baskets, shelves, beds, tables, chairs and many other items, has witnessed the progressive development of a commercial dimension in both rural and urban areas.

## Harvesting and Processing

Rattans are widespread throughout the humid forest zone of Cameroon. In the Yaoundé region for example, this forest product is of economic, social and cultural importance, ranking second only after agriculture in village production systems. The two main commercial species are *Laccosperma secundiflorum* and *Eremospatha macrocarpa*, locally known as 'ékè' (maraca rattan) and 'nlong' (fillet rattan) respectively. These rattans are gathered completely from wild stocks, mainly by men, who alternate rattan harvesting with other income-producing activities.

After being harvested with cutlasses*, the rattan canes are bundled together and carried back to local villages, where they are later processed or made into items for sale. Alternatively, they may be carried directly to roadsides and transported by car or truck to the urban rattan market in Yaoundé. Here, the harvesters sell their cane directly to processors, receiving around US$ 0.22 per metre for nlong and US$ 0.03 for ékè.

Villagers and farmers manufacture rattan products as a sideline activity, but in the urban areas rattan artisans work full time, in small roadside workshops. The individual craftsmen undertake almost all the manufacturing stages themselves - including scraping, drying, splitting and bending the canes, constructing the framework for various items, weaving and varnishing. They use simple, manual tools like knives, hammers and hand saws, along with gas blowtorches to assist with bending the material into the desired shape.



Rattan baskets are important items in the daily lives of rural people.

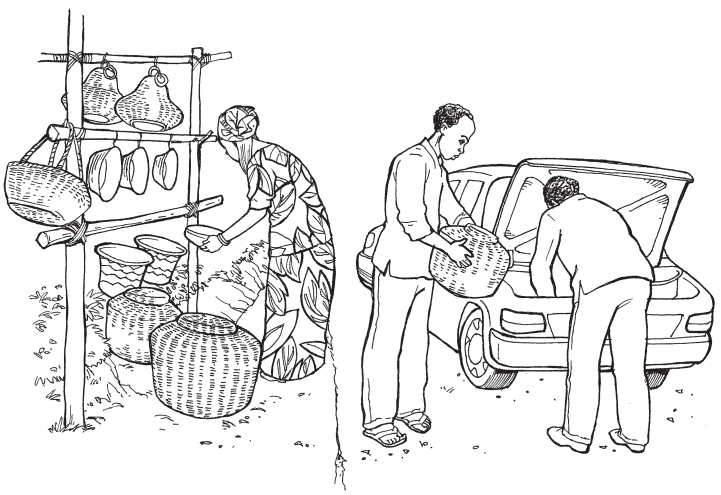
Rattan processing is done mainly by young men, many of whom became rattan basket makers after the country went into recession and unemployment levels rose.

## Marketing the finished products

The rattan craftsmen generally sell their products directly to consumers - to other villagers or passers by in rural areas, or to city dwellers in the urban markets. As a result, middlemen are quite scarce. The market prices range from around US$ 0.36 (for a small basket) to US$ 380 (for a higher end dining setting). Nearly all of the products are sold on the domestic market, with only a very small quantity going for export. The export market remains largely unexplored but has a lot of potential given the international demand for rattan products. One of the issues to be addressed though is that the quality of the African end products is not as good as those produced in South-East Asia.

## Trends

In the Yaoundé region of Cameroon, many families depend on rattan as a source of money, and in producers' households it represents about 42 per cent of overall cash income. Harvesters can earn around US$ 288 per year, while rural craftsmen can earn around US$ 376. The rattan sector has potential to grow and continue providing a valuable source of revenue, however it is facing a number of difficulties - including unsustainable harvesting, a resource shortage around some villages due to over-harvesting and agricultural expansion, a lack of appropriate policy and regulatory frameworks, a lack of appropriate equipment, and poor processing techniques. These factors are all exerting pressure on the rattan resource. Such issues will need to be addressed if rattan production is to be put on a more sustainable* footing and its true development potential in Cameroon realised.



Some craftsmen showcase their rattan products near busy, major roads, making the most of the exposure this offers.

# Rattan in Ghana

In Ghana, as in Cameroon, the two most important rattan species are *Laccosperma secundiflorum* and *Eremospatha macrocarpa*, but in this part of the world they are known as 'eyee' and 'mfia' respectively. Rattan canes* are collected predominantly from the south western part of the country, with the processing industries mostly located in and around Kumasi in the Ashanti region. About 60 per cent of the villages have road access between the rattan harvesting sites and the marketing centres. However, the remaining 40 per cent do not, and the harvesters have to carry their heavy rattan bundles to the nearest roads, which can be 8-10 km from the production sites.

Rattans were once found throughout the high forest zones of Ghana but forest degradation and over-exploitation of the species have since limited commercial quantities to the wet and moist evergreen* forests of the south west. Originally, rattans were only used on a subsistence level to produce the likes of rattan mats and ropes, but around 50 years ago, commercial rattan products like furniture began to be manufactured. The collection, processing and trading of rattan and rattan products now involves many thousands of rural and urban people throughout southern Ghana. Today, rural processors tend to produce mainly storage and carrying baskets, and fish traps for the local markets, while the urban processors produce items like furniture, book shelves, baskets, trays and various artefacts.

## From raw material to finished products

After cutting the rattan canes, the harvesters generally clean away the sheaths and spines before arranging the stems into bundles of about 50-80 pieces (depending on the species). Given the strenuous nature of the work, and the weight of the 2-3 m long bundles, at around 30-35 kg each, it is hardly surprising that the harvesters are predominantly young males. Many of the rural harvesters return to their villages with their supplies, later making rattan products for sale. Other harvesters sell their cane to middlemen at the "forest gate", or pool their collection with several other harvesters, and sell to marketing centres. Sometimes urban processors directly hire harvesters to bypass the middlemen, reducing their costs and guaranteeing their supplies in the process. Before the processors can utilise the cane though, it needs to be dried in the sun or in kilns to reduce the moisture content (and to ward off insect attack and fungal disease).

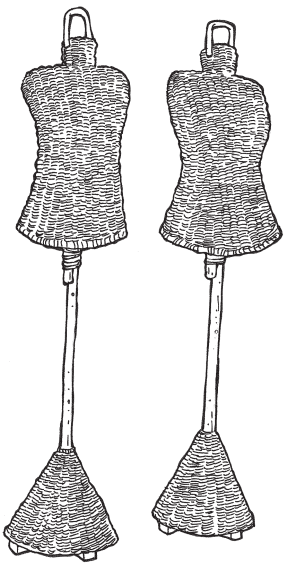
Thousands of minor and major players earn valuable income from harvesting, processing or trading rattan. The major rural rattan collectors generally carry out their harvesting around

other farming activities, earning up to US$ 350 per year. The major urban rattan processors tend to be involved on more of a full time basis, and good operators can potentially earn more than US$ 800 per year. The quantity of rattan products sold in markets and roadside stalls largely depends on the time of the year, with the busiest periods being Christmas, Easter and during the dry season.

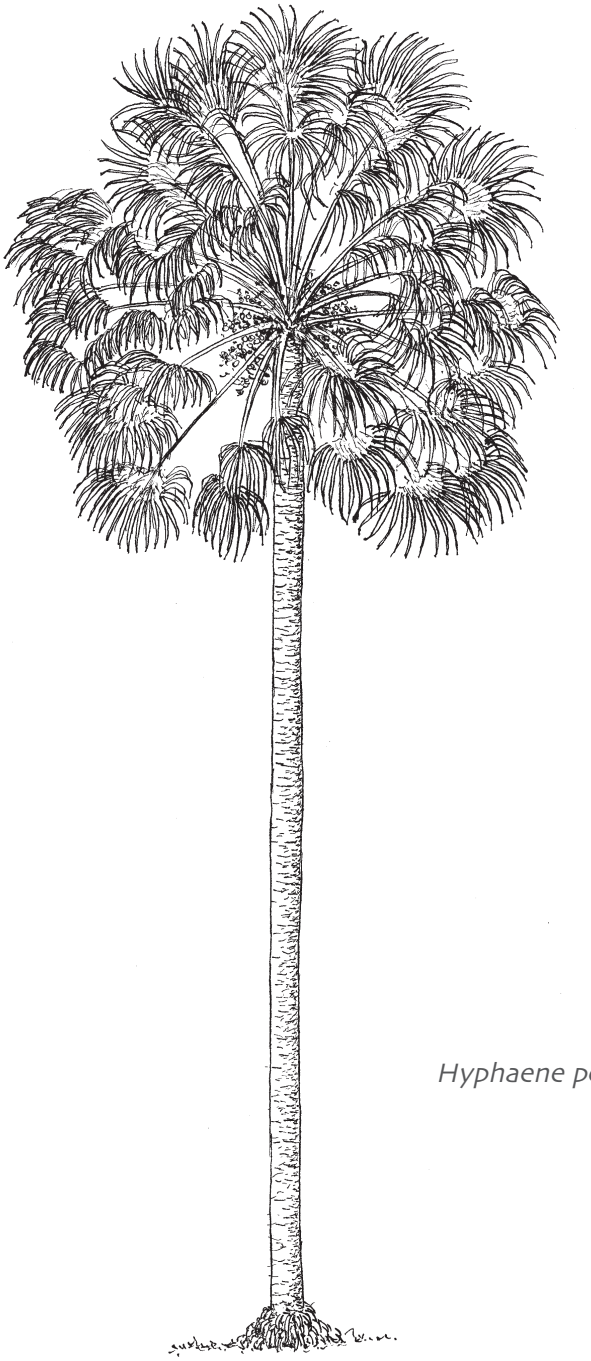
## Trends

A combination of deforestation, excessive timber logging, and over-exploitation has greatly reduced rattan populations. As a result, many small scale rattan industries have been forced to close. Other consequences include considerable increases in the travel time for collection and the cost of raw material. Rattans are even being imported now from Liberia and Côte d'Ivoire. The survival of the industry in Ghana will depend on strict adherence to reduced impact logging* (RIL) techniques in areas where the concentration of rattan species is greatest, and also, the establishment of rattan plantations in old *Hevea brasilensis* and *Theobroma cacao* (rubber tree and cocoa) plantations.

Currently less than 50 per cent of rattan producers belong to rattan associations. The strengthening of these associations could assist with fostering unity and good relations among members, controlling raw material prices, regulating and encouraging sustainable harvesting* practices to protect existing wild stocks, and promoting rattan cultivation and plantations. If the necessary attention is given to the industry, it has the potential to continue contributing economically both regionally and nationally, and also, improving the livelihoods of those involved in collecting, processing and trading rattan.



Rural and urban buyers purchase different types of products, with the city markets tending to stock fancier items.



*Hyphaene petersiana* Mart.

# Palm baskets

Zimbabwean case by Phosiso Sola

# Weaving ilala: Palm leaves in communal areas of Zimbabwe

Have you ever noticed how many baskets of different shapes and sizes there are in most handicraft shops? In many African countries, the basketry industry has been experiencing growth, and in places like Botswana, Namibia and South Africa, basketry has become very important for people's livelihoods - providing both household items and a means of making a living. In the Sengwe communal area of South Zimbabwe, shangaan people have been utilising the palm *Hyphaene petersiana* for craft work and sap tapping for centuries. The young leaves are used for basket making, the dry petioles (palm frond stalks) for doors and chairs, and the fresh rachis (the frond stalk extensions, from which the leaflets arise) for mats. Women also use the fan leaves as thatching material and for weaving tablemats.

Craft production depends on leaf supplies, which in turn, depend upon palm densities and leaf production rates. In one of the Sengwe communal areas, an estimated 3300 leaves are harvested per hectare each year. Such a figure may sound high but fortunately under the local circumstances, this rate is sustainable* without leading to over-harvesting. *Hyphaene petersiana*, locally known as 'ilala', is a communally owned resource that grows naturally in large clusters, scattered across woodland* areas. In Zimbabwe, land in the communal areas is State-owned, with traditional leadership and local government as resource custodians. In Sengwe, the local shangaan people have access rights to tapping their local palm stands for sap, with these rights being passed down from father to son. Anyone in the community however, is able to harvest the palm leaves for craftwork.

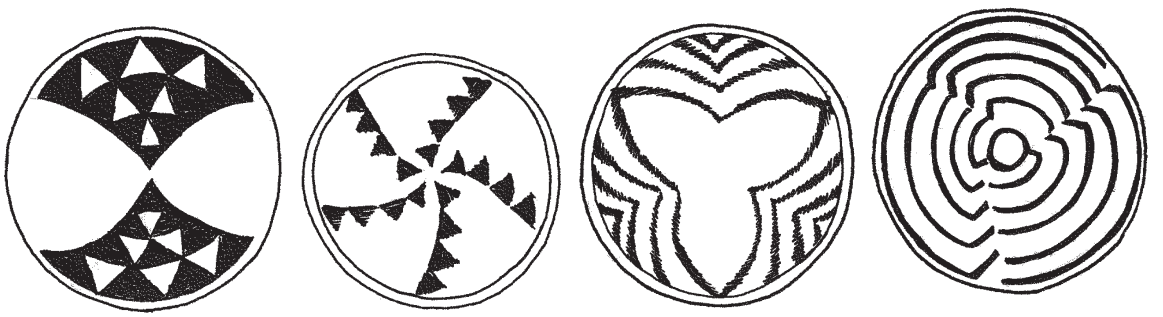


Plate-shaped baskets are coloured with natural dye. The bark of *Bechermia* trees is collected and ground (and sometimes mixed with charcoal to deepen the colour), before being added to palm leaves in boiling water.

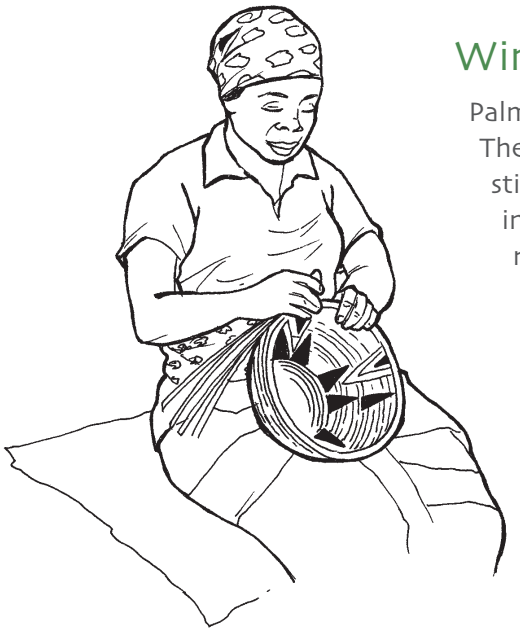
Each village has its own designated areas where tapping fields and also leaf harvesting areas are located. The village chief has overall control of palm utilisation, working through a head man, and to date, they have managed to stop the transportation and sale of unprocessed palm leaves. Traditional rules have helped to conserve the palms, even with everyone in the designated area having access to palm leaf harvesting.

## Leaf processing and weaving

Family members carry out both leaf processing and weaving. Unopened leaves, consisting of many leaflets, are cut and opened for drying. The leaflets are split using a big needle, the midrib* is removed and the outer edges are discarded. Midribs are used as weft threads and weaving material for winnowing baskets, and as filling for shopping and fruit baskets. The big craft pieces (winnowing, harvest and washing baskets) are made from palm leaves of about 100 cm in length, while the smaller weavings, such as wall hangings, fruit baskets and sugar basins, are made from shorter leaves.

Harvesters collect material from female plants, which have dark green, pliable leaves that are well suited for craft making. Male plants on the other hand, have whitish-green leaves that are more brittle and therefore less suited to craft production.

Nearly two thirds of the items produced are sold for cash - either traded locally or collected by producer groups, graded and sold to the Sengwe Vanani Craft Association (SEVACA). This craft-trading organisation was established in 1997 with financial assistance from a German NGO called Terre des Hommes (TDH). About 60 per cent of commercial basket producers belong to this association. Before its establishment, basket quality was poor, the range was small, and production and income levels were low. Basketry was an activity that took place outside the main agricultural season, with most of the products being piled up in houses in case potential buyers passed by. Building the capacity of local people and linking the Sengwe community to outside markets has led to an increase in craft production and income levels. In 1998, craft producers earned an average US$ 14.80 per year, and the basketry industry accounted for about 20.5 per cent of the annual income of Sengwe households. A 2001 survey revealed that the average basketry earnings had increased to US$ 21.07. However, it is likely to have since declined again due to the country's current economic problems.



In Sengwe, most community members have participated at one time or another in palm related activities. The overall proportion of cash income generated from sales is around 8 per cent for men and 20 per cent for women.

## Wine tapping

Palm sap tapping is the main competitive use of *H. petersiana* palms. The optimal season for tapping is between August and March, as stipulated by local rules and traditional technical knowledge (which indicates tapping in the cold season results in reduced output and retarded regeneration). It can take around three months for experienced tappers, mainly elderly men, to tap a ramet (palm stem). Each day, only a small amount of tissue is scraped off from the top (a maximum of 1 cm, with an average thickness of 0.5 cm). This is why tapping takes so long. A recovery period of three years is then required before the ramet can be tapped again. This period is shorter than for palms in other regions, as the Sengwe flood plains facilitate a faster recovery.

Tapping the sap prevents palm stems reaching flowering maturity. Apart from leaf material which is cut when the palm stems are prepared for tapping, leaf production ceases while the stems are being tapped. This reduces the availability of material to the basketry industry in the short term, but the repeated tapping actually maintains suitable small palms for basketry, and also increases the number of resprouting stems per clump.

## Trends and issues

*H. petersiana* palms are not being over-harvested but there are other possible threats to the basketry industry, including population growth and land conversion. The Sengwe area used to have more palm veld* but much of it has been lost to agricultural fields. Human population growth also remains a key factor influencing the availability of palm resources, as it contributes directly to the rate of land use conversion, settlement and crop production.

The basketry industry that began as chance-sales by a few households has grown to encompass about 60 per cent of the Sengwe community. SEVACA, the locally based trading association, has facilitated the expansion of markets, which in turn, has increased community and household income levels. This demonstrates that with well directed support, community based industries can be viable.

# Conclusions: The lessons learned

By Brian Belcher and Citlalli López

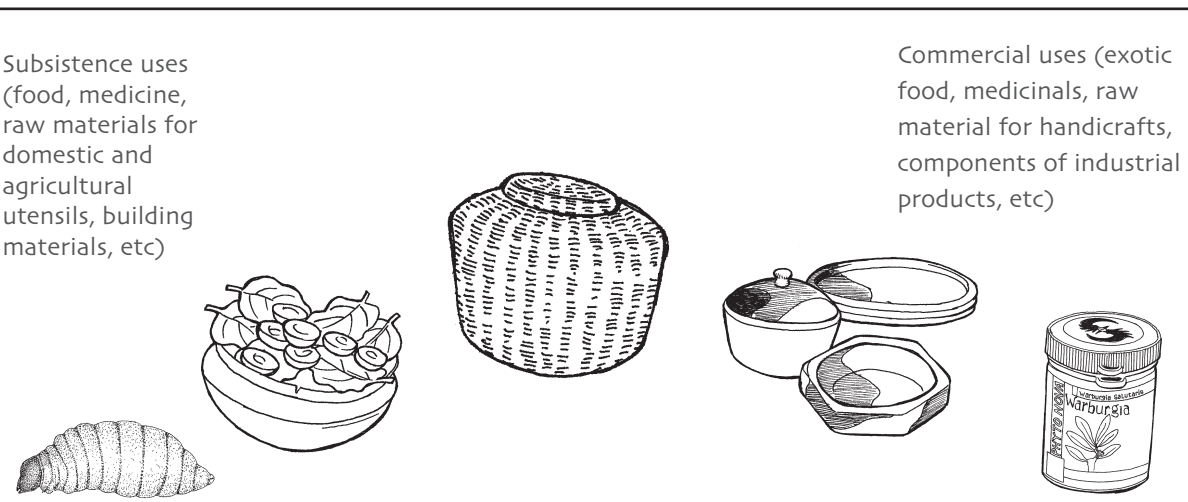
The cases within this volume demonstrate a great deal of variability, as well as some striking similarities. As such, they are valuable for what they teach us both individually and collectively. By comparing and contrasting different cases we can gain a greater understanding about the characteristics of small scale natural resource management, the broader socio-economic context and also, policies and interventions that may lead to successful outcomes or failures. This final chapter discusses some of the key issues and lessons learned about the value of forest resources, their sourcing and management, demand and supply, and fair and sustainable trade.

## The value of forest resources for rural families

Rural livelihoods, especially in developing countries, are characterised by diversity. Households rely on the direct use of agricultural and forest goods as well as many different sources of cash income, generated from the sale of produce or wage labour. Three categories of households involved with non-timber forest products (NTFPs) can be identified according to the degree of household income earned in cash and the proportion generated by the trade of NTFPs.

- Households primarily relying on subsistence sources (direct use) of forest goods
- Households in which the commercial NTFP provides a supplementary source of income
- Households that earn most of their income in cash, from the sale of a forest product

The latter group tends to deal with products that have large and often international markets. Commercial value however, is not the only reason families conserve and manage forest resources. Many trees in Africa are rich sources of food, building materials and medicines. Particular trees may also give rise to different end products, which are used both commercially and in many other ways by local people, for instance in rituals or in terms of medicinal or domestic applications. Long-lived trees such as marula, which grows in southern Africa, can be a source of food, fuelwood, medicine, and income - in this case, when the fruits are processed into beer. Shea trees, the source of shea butter, have multiple uses too, as do bush plum trees, and *Afzelia quanzensis*, which is used in Kenya and Zimbabwe for woodcarving. Sometimes commercially important trees, like bitter cola, retain significant cultural values as well. When a baby is born a bitter cola tree is often planted and lifelong ownership is bestowed upon the infant. Bush plum trees can be a sign of either hospitality or hostility to visitors, while trees used for woodcarving in Zimbabwe (including *Afzelia quanzensis*) can indicate important ritual sites.




Forest products are used both to meet subsistence needs and to generate income

## From where do our forest products come?

Forest resources not only come from forested lands, as we observe in a number of the cases, they are also found in home gardens, on agricultural lands and even in plantations. Around the world researchers have identified different approaches to forest resource management, ranging along a continuum from low to high intensity. At the high intensity end of the scale, there is a greater level of investment in terms of time and money, human labour, the use of agrochemicals* and special tools, etc. Along the management spectrum valuable species may be:

- Collected from wild populations, with no management
- Encouraged, protected and otherwise managed in natural forests
- Managed along with other useful forest species
- Tolerated (allowed to grow naturally and not weeded out) on agricultural lands
- Cultivated on agricultural lands in combination with other cultivars*
- Managed in small plantations
- Grown in large monoculture plantations

As the various cases illustrate, many African forest products are collected from the wild, and in contrast to Asia, there are far fewer examples of intensively managed forest species. Wood for chewing sticks in Ghana, UmMemezi cosmetic bark in South Africa, and food products like edible weevil larvae in Cameroon and bush meat in Ghana, are all hunted or collected directly from forests and traded in local markets. Products destined for the international marketplace, such as devil's claw root, and bark from *Warburgia* and *Prunus africana* trees (which are all used for pharmaceutical purposes), are also collected from the wild.

In a few of the cases in this volume, we observe that resources that were originally found in the forest are now being cultivated. In such cases farmers have patiently experimented, planting valuable species close to their settlements, on farms, in agroforestry* systems or in their home gardens. Shea trees are retained where they are found naturally growing in agricultural fields and near houses and regeneration is encouraged to boost natural stocks. Recently, due to market pressures and resource scarcity, farmers and researchers have begun experimenting with the planting of *Prunus africana* and

From low to high intensity resource management

*Warburgia* seedlings within agroforestry systems. Some other species, such as bush plum (*Dacryodes edulis*), have already been domesticated* and can be found growing in garden plots and on farms. To satisfy consumer tastes and supply larger quantities of products for burgeoning markets, farmers have, over time, modified the characteristics of certain species, like those of the bush plum. For example, by selecting or breeding to change the size, flavour or colour of the product, improve consistency or shift the fruiting period.

## Harvesting, transporting and trading forest resources

Several cases in this volume show that harvesters may receive low levels of revenue, yet collecting forest goods can represent their most important source of cash income. For example, the harvesting of wood for chewing sticks in Ghana, palm leaves for basket weaving in Zimbabwe, and *Prunus africana* bark for medicinal purposes in Cameroon, provides the main form of income for many rural families. A number of the cases indicate that harvesting forest resources is often a seasonal activity which fits in around other work demands and largely depends upon the seasonal harvesting period, especially in relation to fruits.

In most cases it is the men who carry out the harvesting, although women and children are responsible for the collection of some forest products, such as marula, njansang and wild mango fruits. In South Africa, it is the women who collect UmMemezi bark to make cosmetic powder, an activity which often constitutes their main source of income. For rural families, the income generated from the sale of raw or manufactured forest products is used to meet daily subsistence needs or to cover important expenditures such as school fees or medical treatment. Some forest products provide valuable supplementary income in addition to agricultural or other income sources.

After harvesting, the resources need to be transported to their point of sale or processing. As with the old real estate motto, location is everything! The distance to markets, the availability of roads and the means of transport all influence whether and how producers market their produce. The harvesters' families or other local processors immediately process some forest products - especially those that are prone to spoiling and bulky or heavy products with a low value. Processing increases their durability and concentrates value. In several African cases, the harvesters undertake the processing themselves, especially when the requirements are quite simple and only call for the use of basic technology or tools. Products like UmMemezi bark, bush plums, njansang and wild mango fruits are processed into different products and sold directly to consumers in markets. A great number of women are involved in these processing phases, obtaining important income for their families.

When products require a higher level of transformation, the raw material is delivered to artisans or other workers, most of whom live in cities or near roadsides. The production of chewing sticks in Ghana provides a good example of this type of setup, as do woodcarving in Kenya and Zimbabwe, and the manufacture of rattan products in Ghana and Cameroon.

When it comes to selling forest goods, the products are moved to market individually on producers' backs, atop bicycles or motorcycles, or using available public transport. Sometimes forest products go directly from harvester to consumer, which can work well if the buyers want small volumes. For example, large amounts of bush meat and weevil larvae brochettes are sold in this way along busy roadsides. However, for many products this approach can disadvantage the sellers, who may be forced to accept low prices on a "take it or leave it" basis, particularly if they are far from home.

Instead, marketing is often organised by intermediaries, who purchase the products from harvesters and transport them to markets, larger traders or processing centres. Although such 'middlemen' are often seen as rural robbers, these traders frequently provide important services that are otherwise unavailable - like transport and marketing, loans against future production, and the provision of essential goods and information to remote villagers. Traders can also be important repositories of detailed knowledge regarding specific forest products. They often work hard to earn a modest profit while carrying a considerable share of the risk - prices may fall by the time the product reaches market, a proportion of the shipment may spoil or the whole lot may be confiscated by forest guards.

## What happens when demand and supply change?

Over time, the demand for forest products has expanded within Africa and also in other parts of the world, especially in Europe, North America and Japan - largely due to companies tapping into the organic goods market in search of ingredients for the likes of beauty and pharmaceutical products. A number of the cases document an increased demand for products, particularly where an international market has developed or expanded. Some products, such as *Prunus africana*, *Warburgia* and devil's claw, are largely traded outside their production areas. The trade in bush plum, shea butter and bitter cola has also extended beyond local and country borders. The individual cases show that when demand increases, changes take place in terms of harvesting, processing and marketing practices.

A rise in demand stimulates producers to pursue various strategies to increase production. With wild resources, harvesters first intensify their collection practices. Especially when there is "open access" to forest (i.e. the unrestricted use of resources, with no effective property rights) and different harvesters compete to obtain the same forest products, there is a tendency for harvesting methods to become ever more destructive. This has been observed in relation to the felling of trees in places like Zimbabwe, where wood is collected for carving, in Ghana where chewing sticks are produced, and in South Africa, where kiaat wood is obtained for making handicrafts. In the cases of *Prunus africana* and *Warburgia* trees, their respective barks, which are valued as pharmaceutical ingredients, are being over-harvested, and in the case of devil's claw root, another source of medicinal components, entire plants are being uprooted. However, in all such cases, these practices limit the species' ability to regenerate and reproduce, leading to a reduction of future supplies. Similarly, due to competition or scarcity, immature specimens may be gathered, even when they do not attain the best market prices. When resources become extremely depleted in a given area, harvesters may then begin traveling long distances to more remote locations in search of new supplies.

Pressure over resources
Harvesting techniques
Resource management

Changes in processing technology
Division of work
Quality and quantity of production
Transporting and marketing

When demand for a forest product increases, many changes can occur in relation to harvesting, processing and marketing

Traditional rules have often provided guidance over access rights and have helped to protect resources. However, in situations of conflicting claims (e.g. between the State and communities) or as demand and prices for forest products increase, traditional rules can break down. To address the issue of over-exploitation and ensure a continued supply, farmers may intensify the management of valuable species. Together, a number of factors favour the process of domestication: significant demand, high market prices, secure tenure and appropriate ecological conditions.

Increased demand often leads to the specialisation of tasks. Sometimes this involves the abandonment of traditional manufacturing methods in order to produce larger quantities - and this can result in lower quality end products and lower market prices (as in the case of woodcarving in Kenya and Zimbabwe). In some cases, the processing takes place outside the original country where the forest product is collected. This is the case for forest goods that are processed into pharmaceuticals in Europe and the United States of America, and for commodities like shea butter, which is manufactured from shea kernels and used in skin care products.

Contrary to what most consumers would imagine, growing demand for forest goods does not always result in improved incomes for rural collectors, processors or traders. In fact, sometimes conditions for the rural poor may even worsen. Increasing demand and more profitable commercialisation can:

- Diminish the supply of and access to forest products for families who depend on forest goods for their own use or for sale
- Result in diminished resource access for small farmers who lack control or ownership over land and/or resources, shifting access to more powerful individuals or groups who have land rights and capital to invest
- Favour domestication efforts which involve not the original forest-based producers but a new set of producers with greater access to agricultural land and planting technologies

## Fair and sustainable trade of forest goods

Due to the complexity and potentially negative impacts for small producers, plans to enhance commercialisation or intensify the production of forest goods need to bear in mind the wide range of potential impacts. Forest products are often sourced unsustainably, or their value is inequitably shared among the many people involved in their collection, processing and trade. Working to promote ecological sustainability and fair trade, international and national organisations have established several initiatives over the last two decades - including certification and the formulation of forest conservation policies.

Certification is a procedure whereby a written assurance is given that a product, process or service conforms to certain standards. For instance, several non-timber forest products, such as Brazil nuts and palm hearts, have been certified in Brazil and Mexico. However, very few harvesters overall have access to the financial resources or organisational framework necessary to pursue certification. Programmes for certification have mainly been developed for timber and agricultural products but four main categories are relevant to forest products as well, and consumers may encounter these kinds of labels when making purchases:

- Environmental - e.g. the Forest Stewardship Council (FSC) promotes ecological sustainability as well as socially responsible forestry
- Health - e.g. the International Federation of Organic Agriculture (IFOAM) focuses on the avoidance of exposure to, and contamination by, chemical pesticides and fertilisers
- Social - e.g. the Fairtrade Labelling Organisations International (FLO) aims to ensure that there is a fair and equitable distribution of benefits to producers
- Quality - e.g. the International Organization for Standarization (ISO) and Good Manufacturing Practices (GMP) formulate international product standards and encourage quality assurance

In addition to efforts by non-governmental organisations such as those outlined above, many countries have formulated national policies for the conservation of biological diversity, including forest resources. The United Nations Convention on Biological Diversity (CBD), adopted in 1992,

affirms that States have sovereign rights over their own biological resources, and provides a broad legal framework to structure access and benefit-sharing agreements. Since the management and use of many commercial forest products is based on indigenous knowledge, such agreements have been particularly relevant for the conservation of genetic forest resources and the protection of intellectual property rights.

## Building the knowledge base

As the various case studies illustrate, it is critical that forest goods are recognised and valued not only for their short term economic benefits, but also for their cultural richness and the sustenance that they offer to tens of millions of rural and urban families worldwide. For centuries, non-timber forest products have played vital subsistence roles and this continues to be the case in developing countries. A range of products with commercial potential, as we have seen, also provide important sources of family income - for those with few other choices, as well as for those with access to capital or land and the initiative to further market or commercialise a particular product. The ability of a given resource to continue meeting both subsistence and commercial needs however, largely depends upon sustainable* harvesting and management practices. Access to information to assist with things like resource management, equitable access, income sharing, product development and marketing can be an important part of this process - and can help to ensure a longer term future for both the forest products and the people who depend upon income generated from their collection, processing and trade.

Research, such as that carried out in the course of compiling this volume, helps us to better understand and appreciate the importance and roles of forest products, and some of the factors that lead to positive or negative outcomes for resources and forest people. It is hoped that the lessons learned will add to the growing knowledge base about forest products and that this information can contribute to government and development policies, a general raising of awareness amongst consumers and also importantly, that it can filter back to the communities involved in the commercialisation of forest products, enhancing the traditional knowledge and skill base. Such information can better equip communities to improve their livelihoods in an environmentally sustainable manner - tapping into the riches of the forest in ways that can meet both short term and longer term subsistence, commercial, cultural and conservation needs.

# References

## General


Bakarr, M.I., Ampadu-Agyei, O., Adomako, E. and Ham, R. 2002 Bushmeat utilization, human livelihoods and conservation of large mammals in west Africa. *In:* Mainka, S. and Trivedi, M. (eds.) Links between biodiversity conservation, livelihoods and food security: The sustainable use of wild species for meat. 24th edition. World Conservation Union (IUCN) Species Survival Commission - Occasional Paper. Gland, Switzerland and Cambridge, United Kingdom.

Belcher, B.M. and Schreckenberg, K. 2003 NTFP Commercialization: A reality check. Paper presented to the World Forestry Congress Side Event "Strengthening Global Partnerships to Advance Sustainable Development of Non-Wood Forest Products". Quebec City, Canada, 20 September 2003.

Dounias, E. (ed.) 2000 Review of ethnobotanical literature for Central and West Africa. Association for the Taxonomic Study of the Flora of Tropical Africa (AETFAT), People and Plants initiative-UNESCO-WWF-Royal Botanical Gardens Kew, Bulletin of the African Ethnobotany Network 2. 117p.

Centre for Ecology and Hydrology Winners and losers website: Investigating the human and ecological impacts of the commercialisation of non-timber forest products.
(www.ceh-wallingford.ac.uk/research/winners)

Ruiz-Pérez, M. and Byron, N. (eds.) 1999 A methodology to analyze divergent case studies of non-timber forest products and their development potential. Forest Science 45(1): 1-14.

Sunderland, T.C.H., Clark, L.E. and Vantomme, P. (eds.) 1999 The non-wood forest products of Central Africa: Current research issues and prospects for conservation and development. Food and Agriculture Organization of the United Nations (FAO), Rome.
(Online: http://www.fao.org/docrep/X2161E/x2161e00.htm)

World Wide Fund for Nature (WWF-UK) and United Nations Educational, Scientific and Cultural Organization (UNESCO). People and Plants Newsletter (issued quarterly, this publication reflects the latest developments in the People and Plants programme).
(Online: http://www.rbgkew.org.uk/peopleplants/newsletter/oct2003.htm)

## Animals/Insects

Asibey, E.O.A. 1974 Some ecological and economic aspects of the Grasscutter *Thryonomys swinderianus* (Temminck) (Mammalia, Rodentia, Hystricimorpha) in Ghana. Ph.D. Thesis, University of Aberdeen, United Kingdom.

Bodenheimer, F.S. 1951 Insects as human food. A chapter of the ecology of Man. W. Junk, The Hague.

Brown, D. and Williams, A. 2003 The case for bushmeat as a component of development policy: Issues and challenges. International Forestry Review 5(2): 148-155.

Conservation International 2003 Ghana's old hunting trade generates new problems: Findings link bushmeat to chemical toxins.
(http://www.conservation.org/xp/news/press_releases/2002/090502.xml)

De Foliart, G. 1990 Hypothesizing about palm weevil and palm rhinoceros beetle larvae as traditional cuisine, tropical waste recycling, and pest and disease control on coconut and other palms. Can they be integrated? The Food Insects Newsletter 3(2): 1-7.

Dounias, E. 2003 L'exploitation méconnue d'une ressource connue: La collecte des larves comestibles de charançons dans les palmiers raphias au sud Cameroun. *In:* Motte-Florac, E. and Thomas, J.M.C. (eds.) Les insectes dans la tradition orale, p. 205-226. Peeters-SELAF, Paris.

Fa, J.E., Currie, D. and Meeuwig, J. 2003 Bushmeat and food security in the Congo Basin: Linkages between wildlife and people's futures. Environmental Conservation 30(1): 71-78.

Falconer, J. 1990 The major significance of "minor " forest products. Community Forestry Note 6. Food and Agriculture Organization of the United Nations (FAO), Rome. 232p.

Lepesme, P. 1947 Les insectes des palmiers. Paul Lechevalier, Paris. 904p.

Malaisse, F. 1997 Se nourrir en forêt claire Africaine: Approche écologique et nutritionnelle. CTA/Les Presses Agronomiques de Gembloux, Wageningen. 384p.

Ntiamoa-Baidu, Y. 1997 Wildlife and food security in Africa. FAO Conservation Guide No. 33. Food and Agriculture Organization of the United Nations (FAO), Rome.

Robinson, J. and Bennett, E. (eds.) 2000 Hunting for sustainability in tropical forests, Cornell University Press. 582p.

## Fruits

Adebisi, A.A. (forthcoming) A case study of *Garcinia kola* nut production-to-consumption system in J4 area of Omo forest reserve, south-west Nigeria. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Adewusi, H.G. (forthcoming) Potential for development and conservation of *Dacryodes edulis* in Sakpoba Forest Reserve, Edo State, in the Niger Delta area of Nigeria. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Aivelaagbe, I.O.O., Adeola, A.O., Popoola, L. and Obisesan, K.O. 1998 Agroforestry potentials of *Dacryodes edulis* in the oil palm-cassava belt of southeastern Nigeria. Agroforestry Systems 40(3): 263-274.

Boffa, J-M. 1999 Agroforestry parklands in sub-Saharan Africa. FAO Conservation Guide 34, Food and Agriculture Organization of the United Nations (FAO), Rome.

Emebiri, L.G., Obiefuna, J.C. and Nwufo, M.I. 1993 Technological innovation, problems and prospects for domestication of some neglected crops of southeastern Nigeria. *In:* Okogie, J.A. and Okali, D.U.U. (eds.) Lost crops of Nigeria: Implications for food security, p 193-202. National Academy Press, Washington.

Hyman, E.L. 1991 A comparison of labor-saving technologies for processing shea nut butter in Mali. World Development 19(9): 1247-1268.

Lapido, D.O. and Adewusi, H.G. 1997 Domestication needs of *Garcinia kola* in the humid lowland of Nigeria. Mimeograph No. 5. Centre for Environment and Renewable Natural Resources (CENRAD). 10p.

Leakey, R.R.B and Ladipo, D. 1996 Trading on genetic variation - Fruits of *Dacryodes edulis*. Agroforestry Today April-June: 16-17.

Leakey, R., Shakleton, S., du Plessis, P., Pate, K. and Lombard, C. 2002 Characterisation of phenotypic variation in marula (*Sclerocarya birrea*) fruits, nuts and kernels in South Africa and Namibia. James Cook University, Cairns, Australia.

Lovejoy, P. 1980 Kola in the history of West Africa. Cahier d'Etudes Afriques 20(1-2): 97-134.

Lovett, P.N. and Haq, N. 2000 Evidence for anthropic selection of the Sheanut tree (*Vitellaria paradoxa*). Agroforestry Systems 48: 273-288.

Kater, L.J.M., Kante, S. and Budelman, A. 1992 Karité (*Vitellaria paradoxa*) and néré (*Parkia biglobosa*) associated with crops in South Mali. Agroforestry Systems 18(2): 89-105.

McHardy, T. 2002 The use of marula products for domestic and commercial purposes by households in the Ophande district, Maputuland, South Africa. Institute of Natural Resources, Pietermaritzburg, South Africa.

Ndoye, O., Ruiz-Pérez, M. and Eyebe, A. 1998 Les marchés des produits forestiers non ligneux dans la zone de forêt humide du Cameroun. Overseas Development Institute (ODI). 20p.

Nyangatchou, J.N. and Kengue, J. 1989 Review of the African plum tree (*Dacryodes edulis*). *In:* Wickens, G.E., Haq, N. and Day, P. (eds.) New crops for food and industry, p. 265-271. Chapman and Hall.

Okafor, J.C. 1975 The place of wild (uncultivated) fruits and vegetables in the Nigerian diet. *In:* Proceedings of the National Seminar on Fruits and Vegetables, p. 153-171. Ibadan, Nigeria.

Okafor, J.C. 1976 Development of forest tree crops for food supplies in Nigeria. Forest Ecology and Management 1(3): 235-247.

Okafor, J.C. 1979 Edible indigenous woody plants in the rural economy of the Nigerian forest zone. *In:* Okali, D.U.U. (ed.) The Nigerian rainforest ecosystem. Proceedings of MAB Workshop on the Nigerian Rainforest Ecosystem, University of Ibadan, Nigeria.

Okafor, J.C. and Lamb, A. 1994 Fruit trees: Diversity and conservation strategies. MAB Digest 17 (Smithsonian Institute Monitoring and Assessment of Biodiversity Program).
(Online: http://www.unesco.org/mab/publications/digest/digtitle.htm)

Plenderleith, K. 1997a *Irvingia* spp.: A state of knowledge study undertaken for the Central African Regional Program for the Environment (CARPE). 38p.

Plenderleith, K. 1997b *Ricinodendron heudelotii:* A state of knowledge study undertaken for the Central African Regional Program for the Environment (CARPE). 36p.

Pugansoa, B. and Amuah, D. 1991 Resources for women: A case study of the Oxfam sheanut loan scheme in Ghana. *In:* Wallace, T. and March, C. (eds.) Changing perceptions. Writings on gender and development, p. 236-244. Oxfam, Oxford.

Ruiz-Pérez, M., Ndoye, O. and Eyebe, A. 2000 La commercialisation des produits forestiers non ligneux dans la zone de forêt humide du Cameroun. Arbres, Forêts et Communautés Rurales Bulletin 19: 29-35.

Schreckenberg, K. (forthcoming) The contribution of shea butter (*Vitellaria paradoxa* C.F. Gaertner) to local livelihoods in Benin. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Shakleton, S.E., 2002 The informal marula beer traders of Bushbuckridge, Limpopo Province, South Africa. Department of Environmental Sciences, Rhodes University, Grahamstown, South Africa.

Shakleton, S.E., Shakleton, C.M., Cunningham, A.B., Lombard, C., Sullivan, C.A. and Netshiluvhi, T.R. 2002 A summary of knowledge on marula (*Sclerocarya birrea* subsp. *caffra*) with emphasis on its importance as a non-timber forest product in South and Southern Africa. A summary, Part 1: Taxonomy, ecology and role in rural livelihoods. Southern African Forestry Journal 194: 27-41.

Tabuna, H. 1998 The market for Central African non-wood forest products in Europe. *In:* Sunderland, T.H.C., Clark, L.E. and Vantomme, P. (eds.) Current research issues and prospects for conservation and development. Non-wood forest products of Central Africa. Limbe Botanic Garden, Cameroon. 10-15 May.

Tabuna, H. 1999 Le marché des produits forestiers non ligneux de l'Afrique Centrale en France et en Belgique: Produits acteurs circuits de distribution et débouchés actuels. CIFOR Occasional Paper No. 19. Center for International Forestry Research, Bogor. 31p.

Vivien, J. and Faure, J.J. 1995 Fruitiers sauvages d'Afrique. Centre de Cooperation Agricole et Rurale ACP-UE. 416p.

Wynberg, R., Cribbins, J., Leakey, R., Lombard, C., Mander, M., Shackleton, S. and Sullivan, C.A. 2002 Knowledge on *Sclerocarya birrea* subsp. *Caffra* with emphasis on its importance as a non timber forest product in South and Southern Africa: A Summary, Part 2: Commercial use, tenure and policy, domestication, intellectual property rights and benefit sharing. Southern African Forestry Journal 196: 67-77.

## Bark/Roots

Appleton, C.C., Drewes, S.E. and Cunningham, A.B. 1992 Observations on the molluscicidal properties of warburganal South African *Bulinus africanus*. Journal of Applied and Medical Malacology 4: 37-40.

Centre for Research and Information Action in Africa - Southern African Development and Consulting (CRIAA-SADC) 2000a Petition to prevent the listing of Devil's Claw (*Harpagophytum* spp.) on CITES Appendix II pending further research on the status of the resource. (Unpublished document)

Centre for Research and Information Action in Africa - Southern African Development and Consulting (CRIAA-SADC) 2000b The sustainably harvested Devil's Claw project. Expansion of pilot project in Omaheke Region of Namibia. Final report submitted to the delegation of the European Commission in Namibia and the National Planning Commission. CRIAA-SADC.

Cocks, M.L. and Dold, A.P. 2002 The informal trade of Cassipourea flanaganii as a cosmetic in South Africa. *In:* Stepp, J.R., Wyndham, F.S. and Zarger, R.K. (eds.) Ethnobiology and biocultural diversity: Proceedings of the 7th International Congress of Ethnobiology, p. 412-427. University of Georgia Press.

Cocks, M. and Dold, T. (forthcoming) The informal trade of *Cassipourea flanaganii* as a cosmetic in South Africa. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Cunningham, A.B. 1993 African medicinal plants: Setting priorities at the interface between conservation and primary health care. People and Plants Working Paper No. 1, p. 1-50. United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris.

Cunningham, A.B. and Cunningham, M. 2000 Profits, *Prunus* and the prostate. *In:* Zerner, C. (ed.) People, plants and justice. Ch. 12, p. 309-329. Columbia University Press, New York.

Cunningham, A.B. and Mbenkum, F.T. 1993 Sustainability of harvesting *Prunus africana* bark in Cameroon: A medicinal plant in international trade. People and Plants Working Paper No. 2, p. 1-28. World Wide Fund for Nature (WWF), United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris, and Royal Botanic Gardens, Kew.

Cunningham, M., Cunningham, A.B. and Schippmann, U. 1997 Trade in *P. africana* and the implementation of CITES. German Federal Agency for Nature Conservation, Bonn. 67p.

Dold, A.P. and Cocks, M.L. 2003 The trade in medicinal plants in the Eastern Cape Province, South Africa. South African Journal of Science 98: 589-597.

Hall, J.B., O'Brien, E.M. and Sinclair, F.L. 2000 *Prunus africana:* A monograph. School of Agriculture and Forest Sciences, University of Wales, Bangor, UK. 92p.

Ndam, N. 1998 Tree regeneration, vegetation dynamics and the maintenance of biodiversity on Mount Cameroon: The relative impact of natural and human disturbance. Ph.D. Thesis, University of Wales, Bangor. 315p.

Ndam, N. and Ewusi, B. 2000 Case study: Income from *P. africana*. *In:* Price, M.F. and Butt, N. (eds.) Forests in sustainable mountain development: A state of knowledge report. p. 306-309. CABI Publishing, Wallingford, United Kingdom.

Ndam, N. and Tony, M.M. (forthcoming) 'Chop, but no broke pot': The case of *P. africana* on Mount Cameroon. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Sunderland, T. and Nkefor, J. 1997 Conservation through cultivation - a case study: The propagation of *Pygeum - Prunus africana.* Tropical Agricultural Association Newsletter December: 5-13.

Veeman, T.S., Cunningham, A.B., Kozanayi, W. and Maingi, D. 2002 The economics of production of a rare medicinal plant species reintroduced in south-eastern Zimbabwe - *Warburgia salutaris. In:* Household livelihoods, marketing and resource impacts: A case study of bark products in eastern Zimbabwe, p. 71-80. Institute of Environmental Studies Working Paper No. 18, University of Zimbabwe.

Victor, J.E. and Dold, A.P. In press. Threatened plants of the Albany. Centre of Floristic Diversity, South Africa.

Watt, J.M. and Beyer-Brandwijk, M.M. 1962 Medicinal plants of southern and eastern Africa, 2nd edition. Livingstone, Edinburgh. 1457p.

Wynberg, R. (forthcoming) Achieving a fair and sustainable trade in Devil's Claw (*Harpagophytum* sp.). *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

## Wood

Abbiw, D. 1990 Useful plants of Ghana. Intermediate Technology Publications, London.

Addo-Yobo, C., Williams, S.A. and Curzon, M.E. 1991 Oral hygiene practices, oral cleanliness and periodontal treatment needs in 12-year old urban and rural school children in Ghana. Community Dental Health 8(2): 155-162.

Adu-Tutu, M., Afful, Y., Asante-Appiah, K., Lieberman, D., Hall, J.B. and Elvin-Lewis, A. 1979 Chewing stick usage in southern Ghana. Economic Botany 33(3): 320-328.

Amponsah, S. 1978 Survey into the chewstick industry at Kejetia Lorry Station. B.Sc. Thesis, Institute of Renewable Natural Resources, University of Science and Technology, Kumasi, Ghana.

Assan, G. 1991 La problematique du bois de feu Maroua. Student research report (Ingénieur Agronome Diploma). Faculty of Agronomy and Agricultural Sciences, University of Dschang, Cameroon.

Blay, D. (forthcoming) Dental hygiene and livelihoods: A case of chewing sticks in Ghana. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Braedt, O. and Standa-Gunda, W. 2000 Woodcraft markets in Zimbabwe. International Tree Crops Journal 10(4): 367-384.

Braedt, O. Schroeder, J-M., Heuveldop, J. and Sauer, O. 2000 The Miombo woodlands - A resource base for the woodcraft industry in southern Zimbabwe. *In:* Deutscher Tropentag 2000 International agricultural research - A contribution to crisis prevention. October 11-12, Proceedings (CD-Rom). University of Hohenheim, Germany.

Choge, S.K. (forthcoming) The woodcarving industry in Kenya. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Cunningham, A.B. (video*) Carvers, conservation and consumers. Saving the wooden rhino: Ethnobotanical methods and Kenya's woodcarving industry.
**Available from the Natural History Book Service Ltd*
*2-3 Wills Road, Totnes, Devon TQ9 5XN, United Kingdom.*

Desmet, P.G., Shackleton, C.M. and Robinson, E.R. 1996 The population dynamics and life-history attributes of a *Pterocarpus angolensis* DC. population in the Northern Province, South Africa. South African Journal of Botany 62: 160-166.

Falconer, J. 1991 Non-timber forest products In Southern Ghana. Main Report. Forestry Department of Ghana. Overseas Development Administration.

Food and Agriculture Organization of the United Nations (FAO) 1990 The fuelwood crisis and population Africa. Parts 1-4. FAO, Rome.

Good Wood News 1999 Newsletter on the People and Plants campaign (UNESCO-WWF-Royal Botanical Gardens Kew) to promote 'good wood' carvings in Kenya. Issue 1 (November).

Montalembert, M.R. and Clement, J. 1983 Fuelwood supplies in developing countries. Food and Agriculture Organization of the United Nations Forestry Paper No. 42. FAO, Rome.

Munslow *et al.* 1989 The fuelwood trap: A study of the South African Development Coordination Conference (SADCC) region. Earthscan, London.

Obunga, R. 1995 Sustainable development of the wood craft industry in Kenya. Technical Progress Report, National Museums of Kenya, Nairobi.

Shackleton, C.M. 2002 Growth patterns of *Pterocarpus angolensis* in savannas of the South African lowveld. Forest Ecology and Management 166: 85-97.

Shackleton, S.E. 1996 The woodcraft industry in the Bushbuckridge district of the Mpumalanga lowveld, South Africa. *In:* Campbell, B. (ed.) The Miombo in transition: Woodlands and welfare in Africa, Box 6.5. Center for International Forestry Research (CIFOR), Bogor.

Shackleton, S.E. and Shackleton, C.M. (forthcoming) The *Pterocarpus angolensis* DC. based woodcraft industry in the Bushbuckridge district, South Africa. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Shackleton, S.E. and Steenkamp, C. In press. The woodcraft industry in the Northern Province - Mpumalanga lowveld. *In:* Laws, M., Healy, H., Shackleton, C.M. and Geach, B. (eds.) Indigenous forest and woodland in South Africa: Policy, people and practice. University of Natal Press, Durban.

Standa-Gunda, W. and Braedt, O. (forthcoming) Trading forest products in South-Eastern Zimbabwe: Ecology, economics and politics of woodcarving. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest Products, Livelihoods and Conservation: Case-studies of NTFP Systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Steenkamp, C. 1999 South Africa's woodcarving industry. TRAFFIC Bulletin 18(1): 11-20.

Tata, P.I. 1999 Determinants of fuelwood selling prices in the rural and urban centers of the Far North Province. Student research report (Ingénieur Agronome Diploma). Faculty of Agronomy and Agricultural Sciences, University of Dschang, Cameroon.

Tata, P.I. (forthcoming) Fuelwood in the Maroua area of the Far North Province of Cameroon. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

The Namibian 1999 Namibia's woodcarvers - A growing industry.
(http://www.namibian.com.na/expert.carvers.html)

Wu, D.C., Darout, I.A. and Skaug, N. 2001 Chewing sticks: Timeless natural toothbrushes for oral cleansing. Periodontal Research 36(5): 275-284.

## Rattan/Palm

Adu-Anning, C. (forthcoming) The rattan industry in the Ashanti and western regions of Ghana. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Cunningham, A.B. 1987 Commercial craftwork: Balancing out human needs and resources. South African Journal of Botany 53(4): 256-259.

Cunningham, A.B. 1990a Income, sap yield and effects of palm wine tapping on palms in south-eastern Africa. South African Journal of Botany 56(2): 137-144.

Cunningham, A.B. 1990b The regional distribution, marketing and economic value of the palm wine trade in the Ingwavuma district, Natal, South Africa. South African Journal of Botany 56(2): 191-198.

Defo, L. 1999 Rattan or porcupine: Benefits and limitations of a high value NWFP for conservation in the Yaoundé region of Cameroon. *In:* Sunderland, T.C.H., Clark, L.E. and Vantomme, P. (eds.) Non-wood forest products of Central Africa: Current research issues and prospects for conservation and development, p. 237-244. Food and Agriculture Organization of the United Nations (FAO), Rome.

Defo, L. (forthcoming) Rattan exploitation in the Yaoundé Region of Cameroon. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Falconer, J. 1994 Non-timber forest products in southern Ghana: Main report. Natural Resources Institute, United Kingdom. 224 p.

Food and Agriculture Organization of the United Nations (FAO). 1993 More than wood: Special options on multiple uses of forests. FAO Forestry Topics Report No. 4. FAO, Rome.

International Tropical Timber Organisation 1997 Bamboo and Rattan: Resources for the 21st Century? Tropical Forest Update 7(4) (Online: http://www.itto.or.jp/newsletter/v7n4/index.html)

Johnson, D.V. 1997 Non-wood forest products: Tropical palms. Food and Agriculture Organization of the United Nations (FAO), Rome.

Konstant, T.L., Sullivan, S. and Cunningham, A.B. 1995 The effects of utilisation by people and livestock on *H. petersiana* (Arecaceae) basketry resources in the palm savanna of North Central Namibia. Economic Botany 49(4): 345-356.

Mabalauta Working Group 2000 The ecology, control and economics of ilala palm in Sengwe Communal Area, Zimbabwe. Institute for Environmental Studies (IES) Working Paper No. 15.

Meredith, C.C. 1948 Vegetable ivory palm. Notes on the collection of sap of the vegetable ivory palm (*H. ventricosa*) and manufacture of palm wine spirit. Rhodesian Journal of Agriculture 45(5): 414-417.

Ndoye, O. 1994 New employment opportunities for farmers in the humid forest zone of Cameroon: The case of palm wine and rattan. Rockefeller Fellow Meeting. International Livestock Centre for Africa (ILCA), 14-18 November 1994, Addis-Abada.

Oteng-Amoako, A.A. and Obiri-Darko, B. 2001 Rattan processing and marketing in Africa: Technology needs for a sustainable industry. Unasylva 205 (52): 24-25.

Sola, P. (forthcoming) Palm utilisation for basketry in Xini Ward, Sengwe communal areas, Zimbabwe. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

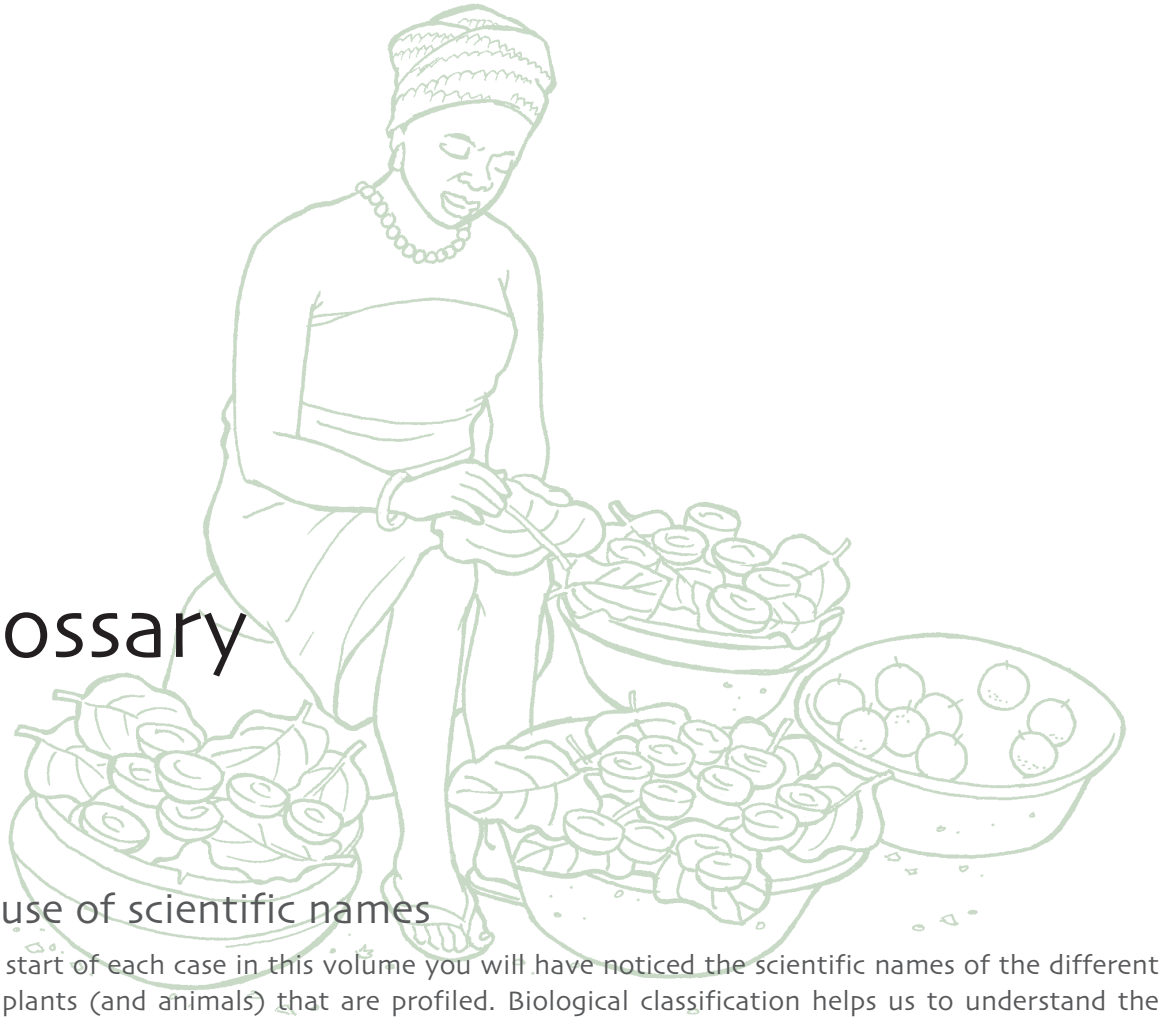
Sunderland, T.C.H. 1998 The rattans of Rio Muni, Equatorial Guinea: Utilisation, biology and distribution. Report to the Proyecto Conservación y Utilización Recional de los Ecosistemas Forestales (CUREF) - Fondo Europeo de Desarrollo, Proyecto No.6 - ACP-EG 020.

Sunderland, T.C.H. and Obama, C. 1999 A preliminary survey of the non-wood forest products of Equatorial Guinea. *In:* Sunderland, T.C.H., Clark, L.E. and Vantomme, P. (eds.) The non-wood forest products of Central Africa: Current research issues and prospects for conservation and development. Food and Agriculture Organization of the United Nations (FAO), Rome.

Sunderland, T.C.H., Balinga, M.P.B. and Dione, M.A. (forthcoming) The rattan sector of Rio Muni, Equatorial Guinea. *In:* Sunderland, T. and Ndoye, O. (eds.) Forthcoming 2004. Forest products, livelihoods and conservation: Case-studies of NTFP systems. Volume 2 - Africa. Center for International Forestry Research, Bogor, Indonesia.

Tabi-Gyansah, E. 2001 Analysis of the spatial distribution of NTFPs in the tropical forest of Ghana. European Tropical Forest Research Network (ETFRN) News 32: 21-22.

Townson, I.M. 1995 Incomes from non-timber forest products: Patterns of enterprise activity in the forest zone of southern Ghana: Summary Report. Oxford Forestry Institute, United Kingdom. 40p.



# Glossary

## The use of scientific names

At the start of each case in this volume you will have noticed the scientific names of the different forest plants (and animals) that are profiled. Biological classification helps us to understand the natural world and structure our knowledge. It enables people to identify and record species, providing a universal language of communication and serving as an important tool in nature conservation.

Each different species has a scientific name, which is a Latin binomial (or two-part name). This consists of a genus, followed by a species name and the name or initials of the person (or people) that published the first scientific description of that species (e.g. *Garcinia kola* Heckel). When it comes to naming plants, the system of 'botanical nomenclature' is used to distinguish and identify different types of plants. There are a number of reasons for this:

1. Universal Recognition

A plant can be identified in any country around the world using its botanical name - overcoming the barrier of different languages.

2. Relationships

Plant relationships can easily be determined by examining the botanical classification.

### 3. Identification
Common names are problematic and vary between districts. For instance, the name 'acacia' (wattle) could refer to any of the 1500 or so species of *Acacia*. A botanical name on the other hand points to one specific type of plant.

### 4. Origins
The origins of the plant can be established by looking at the name. For example, indicating if it is a hybrid (i.e. the offspring of two different plant species or varieties).

## Genus
Genus names are always written in italics and begin with a capital letter (e.g. *Acacia*). They may be derived from the name of a famous botanist or from classical Latin names relating to the relevant plant. Alternatively, they may be Latinised forms of more common names, drawing on languages like French or English.

## Species
This level consists of a general epithet or genus name and a specific epithet or species name (e.g. *Sclerocarya birrea*). The species name distinguishes exactly which plant is being referred to within a given genus. Species names are always written in italics, using lower case letters, and are usually descriptive. For example, they may provide clues to a plant's origins (e.g. *Pterocarpus angolensis* = from Angola). They may describe the plant or animal (e.g. *Tragelaphus scriptus*: Tragos (Greek) = a he-goat; elaphos (Greek) = a deer. In combination, the term refers to a type of antelope. Scriptum (Latin) = "something written", referring to the white coat markings). Or they may signify that a particular plant or animal is named after someone (if the species name has the suffix -i or -ii. e.g. *Cassipourea flanaganii* is named after Henry George Flanagan, a nineteenth century South African plant collector).

## Subspecies
Sometimes within a species there is significant variation but not enough to assign another species. In this instance, the classification 'subspecies' is used. Subspecies names are always written in italics, using lower case letters, and like species names, are often descriptive (e.g. *Harpagophytum procumbens* ssp. *procumbens*).

## Varietas (Variety)
Sometimes within a species (or subspecies) there is moderate variation, requiring the more subtle classification of 'varietas' or 'variety'. Varietas names are always written entirely in lower case italics and again, are often descriptive (e.g. *Prunus americana* var. *lanata*).

**Agrochemicals** - Agricultural chemicals, including fertilisers, pesticides, etc.

**Agroforestry** - Diverse farming systems whereby trees are integrated with crops to increase production and also, the social and environmental benefits.

**Agro-industrial** - A combination of agricultural and industrial elements, as in oil-palm plantations.

**Agro-pastoral Activities** - Agricultural and pastoral activities, including the growing of crops and the raising of livestock.

**Amino Acids** - A group of organic compounds containing an amino group and a carboxyl group. Twenty different amino acids are considered as the building blocks from which proteins are formed.

**Anti-microbial** - A substance which inhibits the growth of, or even destroys, microbes (micro-organisms, some of which are disease causing). Such substances are used in the treatment of microbial infection.

**Apartheid** - Racial segregation (a term particularly related to past practices in South Africa).

**Arabic Gum** - A latex fluid that is extracted from the stems of Acacia species for various applications (including industrial use and export). It can be used fresh as a binding material and when dry, as a chewing gum.

**Biodiversity** - Biological diversity. The variety of life in all its forms, levels and combinations - including ecosystem diversity, species diversity, and genetic diversity.

**Bushbucks** - Large mammals (*Tragelaphus scriptus*) which belong to the Antelope family, and are popular in the bush meat trade.

**Buttressed/Buttress Roots** - Flattened extensions of tree trunk and above ground roots, which grow out from the main trunk to support and stabilise a tree. Found in certain (often shallow rooted) trees, especially in rainforest areas.

**Calabash** - A container or vessel made from dried gourd shells.

**Canes** - The long, hollow or pithy, jointed stems of certain plants, like rattan, bamboo and sugar cane.

**Chew Sticks** - The green, split stems of certain woody plant species, which are chewed to maintain good dental health (especially in West Africa).

**CITES** - The Convention on International Trade in Endangered Species of Wild Fauna and Flora. This international agreement between Governments aims to ensure that international trade in wild animals

and plants does not threaten their survival. CITES works by subjecting international trade in specimens of selected species to certain controls. Authorisation through a licensing system is required for species covered by the Convention. These species are listed in three Appendices according to the degree of protection needed.

**Coppice** - The sprouting of shoots arising from woody stumps or the underground roots of parent plants.

**Crown** - The uppermost layer of foliage on a tree or in a forest, through which filtered light reaches the understorey trees and plants below.

**Cutlasses** - Short, heavy, slightly curved swords, which are sometimes used in the harvesting of plants or plant products.

**Dispersal of Seeds/Disperse** - The distribution of seeds from the parent plant by carriers such as the wind, water, birds or animals, or by other means.

**Domesticated** - The process by which formerly wild plants or animals are retained or integrated into farmland systems or home gardens, sometimes involving selective breeding over many generations to improve desirable characteristics for human benefit.

**Drought Resistant** - Hardy plants or trees that can withstand a shortage of water and difficult environmental conditions for a period of time during dry and drought periods, usually as a result of special adaptations.

**Duikers** - Small antelopes (*Sylvicapra* spp. and *Cephalophus* spp.) which inhabit forest or dense bushland and are one of the most highly favoured bush meat species, for both subsistence needs and the commercial trade.

**Ecologically Sustainable** - The gathering of plants or plant products in a way that does not jeopardise the reproductive capacity or regenerative potential of a particular species within a given area (and which does not have a detrimental impact on the surrounding ecosystem of living organisms and their environment).

**Ecology** - The study of the interactions of organisms with their physical environment and with one another.

**Ecosystem** - A community of living organisms interacting with each other and the physical environment in which they live.

**Ecotones** -The boundary of a transitional zone between adjacent communities or biomes (major, regional ecological communities characterised by distinctive life forms and principal plant or animal species).

**Evergreen** - Trees and shrubs that retain living leaves throughout the year. The leaves of the past season are not shed until the new foliage has been completely formed. This contrasts with deciduous plants, which lose their leaves during a certain season.

**Exotic** - Species of plants or animals that are not indigenous or native to a particular area. That is, they have been introduced from foreign locations or countries. (See also 'Introduced species')

**Extinct** - Without a living representative, as in 'species extinction'. 'Locally extinct' relates to the loss of a species within a particular area.

**Grass-cutters** - A type of rodent known as a 'cane rat' (*Thryonomys* spp.). These small mammals are popular in the bush meat trade, particularly in West and Central Africa. Their meat has a higher protein but lower fat content than domesticated farm meat and is appreciated for its tenderness and taste.

**Habitat** - The environment of an organism or species; the place where it is usually found living.

**Habitat-specific** - A species that requires or prefers a particular kind of habitat or environment in which to live, breed or obtain certain types of food.

**Hardwood** - Woody tree species belonging to the 'dicot' class of angiosperms (or flowering plants) - characterised by having two seed leaves, net veined leaves and flower parts usually in multiples of fours or fives. Hardwoods often, but not always, have hard wood.

**Headloads** - Goods, like firewood or fruits, which are carried, often in baskets, upon the head.

**Host-plant** - A plant from which a parasite (or other organism, like a fungus or insect) obtains nutrition and/or lives on. Or, a plant or tree which another plant uses for structural support (e.g. as in the case of rattan).

**Indigenous** - Originating in or characterising a particular region or country, native to an area.

**Introduced Species** - The introduction of plants, animals or other living organisms from foreign locations or countries, into a region where they were not formerly found naturally living or growing; species that are not indigenous or native to a particular area. (See also 'Exotic species')

**Midrib** - The central or middle vein of a leaf.

**Monoculture** - The use of land for growing only one type of crop.

**Montane Forest** - The lower section of vegetation in mountainous regions, which extends to the tree line (the natural border or point at which tree growth becomes less common). This cool, moist upland habitat is dominated by evergreen trees.

**Non-pastoral Areas** - Areas where pastoral activities (like tending livestock) do not take place, for reasons such as extreme aridity, remoteness, or urban/semi-urban development.

**Pangolins** - Nocturnal mammals (*Manis* spp.) that are similar to anteaters, but are covered in armour-plated scales. These animals have a specialised diet of ants and termites and are a popular species in the bush meat trade.

**Parasitic Mistletoe** - A type of plant (belonging to the Loranthaceae Family) which lives on, and obtains nutrients from, a host tree.

**Phytosanitary** - Relating to the conditions affecting the health of plants, especially in terms of cleanliness and the exercising of precautions to reduce the incidence of disease.

**Propagate** - The process of breeding or assisting plants, animals, etc to naturally reproduce from parent stock. Or the process of growing new plants from seed, cuttings or even tissue samples.

**Protozoal** - Relating to organisms, often very small or microscopic, belonging to the phylum Protozoa - which is comprised of animals consisting of one cell, or colonies of similar cells.

**Reduced Impact Logging (RIL)** - A set of practices which seeks to lessen the impact of logging and includes factors such as: reducing logging intensity; practicing directional felling; selecting trees for harvesting in a discerning manner; carefully planning skid trails, roads and log landings to cause minimal disturbance; and winching logs on to trails.

**Ringbarking** - Cutting away the bark in a ring around a tree trunk or branch - a practice which can kill the affected area or even the entire tree.

**Rooted Cuttings** - Cuttings, usually small sections of stem, which have been taken from a plant or tree and propagated - grown in a solution or soil, until new shoots and roots appear. Once established, such cuttings can be transplanted.

**Savanna/Savanna Grassland** - A grassland region with scattered trees, grading into either open plains or woodlands, usually in subtropical or tropical areas.

**Secondary Forest** - Forest regrowth following significant disturbance of the original vegetation. The new growth often differs in forest structure and species composition compared to primary forest (i.e. mature, old growth forest).

**Semi-deciduous** - Plants that shed some of their leaves in a particular season (often during dry or cold periods) or at a certain stage of growth.

**Semi-domesticated** - Neither wild nor fully domesticated. A partial state of domestication - the process

whereby plants or animals become integrated into farming systems or home gardens, often involving selective breeding to improve desirable characteristics.

**Shade-tolerant** - A plant or tree that can live and grow in the shade of taller plants and trees, or beneath other structures which reduce the level of light they receive.

**Stolon** - A slender shoot, usually in the form of a horizontal stem or runner, which can take root and eventually develop into a new plant.

**Sustainable/Sustainably** - see 'Ecologically Sustainable'

**Sustainable Extraction/Harvesting** - The gathering of plants or plant products in a way that does not jeopardise the reproductive capacity or regenerative potential of a particular species within a given area.

**Sustainable Management** - The implementation of management or harvesting guidelines to foster the regeneration of a species in a given area. Measures are put in place to ensure that the extraction of a particular type of plant or animal product does not adversely affect the ability of the remaining stocks to recover.

**Sustainable Supplies** - Supplies that are obtained in a manner which does not jeopardise the regenerative potential of the resource that they are drawn from. That is, harvesting is in balance with the productive capacity and hence over-exploitation does not occur.

**Tuber** - An enlarged, fleshy underground stem (such as that of the potato); usually an oblong or rounded thickening or outgrowth.

**Understorey** - Plants growing under the canopy of taller plants or trees.

**Veld** - Thinly forested or open country, bearing grass, bushes or shrubs; characteristic of parts of southern Africa.

**Water-storing Secondary Roots** - Roots that branch from larger, older roots or the primary root, in which water is stored (often as an adaptation to facilitate survival in arid conditions).

**Woodland** - An area of vegetation dominated by a more or less closed stand of short trees; an intermediary area between grassland and forest.

# Acronyms

| | |
|---|---|
| **CITES** | The Convention on International Trade in Endangered Species of Wild Fauna and Flora. (See the glossary for a further explanation) |
| **DFID** | Department for International Development (UK) |
| **IUCN** | World Conservation Union (formerly the International Union for the Conservation of Nature) |
| **NGO** | Non-Government Organisation |
| **NTFPs** | Non-timber forest products |
| **SAFIRE** | Southern Alliance for Indigenous Resources |
| **SEVACA** | Sengwe Vanani Craft Association (a craft trading organisation operating in Zimbabwe) |
| **TDH** | Terre des Hommes (a German NGO operating in Zimbabwe) |
| **UNESCO** | United Nations Educational, Scientific and Cultural Organization |
| **WWF** | World Wide Fund for Nature (formerly the World Wildlife Fund) |


# Authors' contact details

**Anthony Cunningham**
WWF/UNESCO/Kew Botanical Gardens
People and Plants Initiative
84 Watkins St, White Gum Valley
Fremantle 6162, Australia
peopleplants@bigpond.com
http://www.kew.org.uk/peopleplants

**Atilade Akanmu Adebisi**
Centre for Environment and Renewable Natural Resources
Management Research and Development (CENRAD)
P.M.B. 5052, 5 Akinola Maja Street
Jericho Hills, Ibadan, Nigeria
cenrad@mail.skannet.com
cenrad@ibadan.skannet.com

**Brian Belcher**
Center for International Forestry Research
Jalan CIFOR, Situ Gede, Sindang Barang
Bogor Barat 16680 - Indonesia
b.belcher@cgiar.org

**Caroline Sullivan**
Water Policy and Management
Centre for Ecology and Hydrology
Wallingford, UK
csu@ceh.ac.uk
www.ceh.ac.uk

**Charles Adu-Anning**
Department of Agroforestry
Institute of Renewable Natural Resources
Kwame Nkrumah University of Science and Technology
Kumasi, Ghana
canning@forig.org
afrirattan@aol.com

**Charlie M. Shackleton**
Department of Environmental Science
Rhodes University
Grahamstown 6140, South Africa
c.shackleton@ru.ac.za

**Citlalli López**
Center for International Forestry Research
Jalan CIFOR, Situ Gede, Sindang Barang
Bogor Barat 16680 - Indonesia
ci.lopez@cgiar.org

**Danielle Lema Ngono**
Center for International Forestry Research (CIFOR)
Regional Office in Cameroon
c/o IITA Humid Forest Ecoregional Center
PO Box 2008 messa
Yaoundé, Cameroon
l.ngono@cgiar.org

**Dominic Blay Jr.**
Forestry Research Institute of Ghana
University Box 63
Kumasi, Ghana
dblay@forig.org

**Edmond Dounias**
Center for International Forestry Research (CIFOR)
PO Box 6596 JKPWB
Jakarta 10065, Indonesia
edounias@cgiar.org

**Hassan G. Adewusi**
Department of Forest Resources Management
University of Ibadan, Nigeria
ajilete@hotmail.com

**Louis Defo**
University of Yaoundé
Yaoundé, Cameroon
ldefo@uycdc.uninet.cm
defotls@yahoo.fr

**Kathrin Schreckenberg**
Forest Policy and Environmental Group
Overseas Development Institute (ODI)
111 Westminster Bridge Road
London SE1 7JD, UK
k.schreckenberg@odi.org.uk

**Michelle Cocks**
Institute of Social and Economic Research
Rhodes University
PO Box 94
Grahamstown 6140, South Africa
M.Cocks@ru.ac.za

**Nouhou Ndam**
Limbe Botanic Garden
PO Box 437, Limbe
SW Provice, Cameroon
nouhou_n@yahoo.com
Lbg@bifunde.com
Lbgmcp@camnet.cm

**Ousseynou Ndoye**
Center for International Forestry Research
Regional Office in Cameroon
c/o IITA Humid Forest Ecoregional Center
PO Box 2008 messa
Yaoundé, Cameroon
o.ndoye@cgiar.org

**Patricia Shanley**
Center for International Forestry Research
Jalan CIFOR, Situ Gede, Sindang Barang
Bogor Barat 16680 - Indonesia
p.shanley@cgiar.org

**Phosiso Sola**
Southern Alliance for Indigenous Resources (SAFIRE)
10 Lawson Ave, Milton Park
Box BE Belverdere
Harare, Zimbabwe
sola@safire.co.zw
afpc2a@bangor.ac.uk

**Rachel Wynberg**
Graduate School of Environmental Studies
University of Strathclyde
PO Box 83
Kalk Bay 7990, South Africa
rachel@iafrica.com

**Simon K. Choge**
Kenya Forestry Research Institute (KEFRI)
PO Box 20412 00200
Nairobi, Kenya
skchoge2002@yahoo.com

**Sheona E. Shackleton**
Department of Environmental Science
Rhodes University
Grahamstown 6140, South Africa
s.shackleton@ru.ac.za

**Tata Precillia Ijang**
Institute of Agricultural Research for Development (IRAD)
Dschang - Cameroon
c/o PO Box 353
Dschang, Cameroon
ijang2001@yahoo.fr

**Terry Sunderland**
African Rattan Research Programme
c/o Limbe Botanic Garden
PO Box 437, Limbe
SW Province, Cameroon
afrirattan@aol.com
http://www.africanrattanresearch.com

**Tony Dold**
Selmar Schonland Herbarium
PO Box 94
Rhodes University Botany Department
Grahamstown 6140, South Africa
t.dold@ru.ac.za

**Wavell Standa-Gunda**
Center for International Forestry Research
Regional Office for Eastern and Southern Africa
73 Harare Drive, Mt. Pleasant
Harare, Zimbabwe
w.standa@cgiar.org

# Source material used for the illustrations

| | |
|---|---|
| Front cover | *Pterocarpus angolensis*, based on photos by Piet Van Wyk, published in Van Wyk, B. and Van Wyk, P. (1997) Field guide to trees of southern Africa. Struik, Cape Town.<br>African woman, based on a photo by Kathrin Schreckenberg, Overseas Development Institute (ODI), London |
| v | Based on a photo by Edmond Dounias |
| vi | Based on a photo by Atilade Akanmu Adebisi |
| x | Based on a photo by Terry Sunderland |
| Page 1 | Based on a photo by Anthony Cunningham |
| Page 6 | Based on a photo by Anthony Cunningham |
| Page 7 | Based on a photo by Edmond Dounias |
| Page 9 | *Rhynchophorus phoenicis*, based on photos by Edmond Dounias and Mathilde Dufay |
| Page 10 | Based on a photo by Serge Bahuchet, Avenir des Peuples des Forêts Tropicales (APFT) |
| Page 11 | Based on a photo by Stéphanie Carrière (APFT) |
| Page 12 | Based on a photo by Edmond Dounias |
| Page 13 | *Sclerocarya birrea*, based on photos by Piet Van Wyk, published in Van Wyk, B. and Van Wyk, P. (1997) Field guide to trees of southern Africa. Struik, Cape Town. |
| Page 14 | Based on a photo by Sheona E. Shackleton |
| Page 15 | Based on a photo by Sheona E. Shackleton |
| Page 16 | Top: Based on photos by Anthony Cunningham<br>Bottom: Based on photos by Anthony Cunningham and Sheona E. Shackleton |
| Page 17 | *Garcinia kola*, based on a photo by Paul Latham, from "Photos of Flowers and Plants from Bas-Congo". (http://club.euronet.be/luc.pauwels/GarcKola.JPG) |
| Page 19 | Based on a photo by Atilade Akanmu Adebisi |
| Page 20 | Based on sketches by Atilade Akanmu Adebisi |
| Page 21 | Ricinodendrum heudelotti, drawn from a botanical specimen, Bogor Herbarium |
| Page 22 | Based on a photo by Danielle Lema Ngono |
| Page 23 | Based on sketches by Danielle Lema Ngono |
| Page 24 | Based on a photo by Nicolas Césard |
| Page 25 | *Dacryodes edulis*, drawn from a botanical specimen, Bogor Herbarium |
| Page 26 | Based on photos by Hassan Adewusi |
| Page 27 | Based on photos by Hassan Adewusi |
| Page 28 | Based on photos by Nicolas Césard |
| Page 29 | *Vitellaria paradoxa*, redrawn from a botanical illustration by Margaret Stone, published in Beentje, H. (ed.) Flora of tropical east Africa. Royal Botanic Gardens, Kew. |

**Page 30** Based on a photo by Kathrin Schreckenberg, ODI London

**Page 31** Right: Based on a photo by Kathrin Schreckenberg, ODI London
Left: Based on a photo by Kathrin Schreckenberg, ODI London

**Page 32** Right: Based on a photo by Kathrin Schreckenberg, ODI London
Left: Based on photos by Kathrin Schreckenberg, ODI London

**Page 33** *Prunus africana*, redrawn from a botanical illustration by Margaret Stone, published in Beentje, H. (ed.) Flora of tropical east Africa. Royal Botanic Gardens, Kew.

**Page 35** Based on a photo by Anthony Cunningham

**Page 36** Based on a photo by Anthony Cunningham

**Page 37** *Cassipourea flanaganii*, redrawn from a botanical illustration by Tony Dold, Selmar Schonland Herbarium

**Page 38** Based on a photo published in Broster, J. (1981) Amagqirha: Religion, magic and medicine in Transkei. Via Afrika Limited.

**Page 39** Based on a photo by Tony Dold

**Page 41** *Warburgia salutaris*, redrawn from a botanical illustration by Fay Anderson, published in Gelfand, M., Mavi, S., Drummond, R.B., and Ndemera, B. (1985) The traditional medical practitioner in Zimbabwe. Mambo Press, Harare.

**Page 43** Based on a photo by Anthony Cunningham

**Page 45** *Harpagophytum procumbens*, based on photos by Rachel Wynberg

**Page 46** Based on a photo by Rachel Wynberg

**Page 47** Based on a photo by Rachel Wynberg

**Page 48** Based on a photo by Rachel Wynberg

**Page 49** *Azadirachta indica*, drawn from a botanical specimen, Bogor Herbarium

**Page 51** Based on photos by Simon K. Choge

**Page 52** Based on photos by Simon K. Choge

**Page 53** *Afzelia quanzensis*, based on a photo by Piet Van Wyk, published in Van Wyk, B. and Van Wyk, P. (1997) Field guide to trees of southern Africa. Struik, Cape Town.

**Page 54** Based on a photo by Anthony Cunningham

**Page 55** Based on photos by Wavell Standa-Gunda

**Page 57** *Pterocarpus angolensis*, based on photos by Piet Van Wyk, published in Van Wyk, B. and Van Wyk, P. (1997) Field guide to trees of southern Africa. Struik, Cape Town.

**Page 58** Based on a photo by Sheona E. Shackleton

**Page 59** Based on a photo by Sheona E. Shackleton

**Page 61** *Garcinia kola*, based on a photo by Paul Latham, from "Photos of Flowers and Plants from Bas-Congo". (http://club.euronet.be/luc.pauwels/GarcKola.JPG)

**Page 62** Based on video footage filmed by Anthony Cunningham

**Page 63** Right: Based on photos by Anthony Cunningham
Left: Based on a photo by Dominic Blay

**Page 64** Based on a photo by Dominic Blay

**Page 65** *Acacia seyal*, based on a photo by Ken Cook, from "Plant Creations Inc". (http://www.plantcreations.com)

**Page 66** Based on a photo by Tata Precillia Ijang

**Page 67** Based on photos by Tata Precillia Ijang

**Page 68** Based on a photo by Theodore Trefon, APFT

**Page 69** *Laccosperma secundiflorum*, drawn from a botanical specimen

**Page 70** Based on a photo by Terry Sunderland

**Page 71** Based on a photo by Terry Sunderland

**Page 72** Based on a photo by Terry Sunderland

**Page 73** Based on a photo by Louis Defo

**Page 74** Right: Based on photos by Louis Defo
Left: Based on a photo by Louis Defo

**Page 76** Right: Based on a photo by Charles Adu-Anning
Left: Based on a photo by Terry Sunderland

**Page 77** *Hyphaene petersiana*, based on photos by Phosiso Sola

**Page 79** Based on a photo by Anne Chishawa

**Page 81** Based on a photo by Stéphanie Carrière, APFT

**Page 82** *Rhynchophorus phoenicis*, based on photos by Edmond Dounias and Mathilde Dufay
Based on photos by Kathrin Schreckenberg, ODI London
Based on a photo by Sheona E. Shackleton

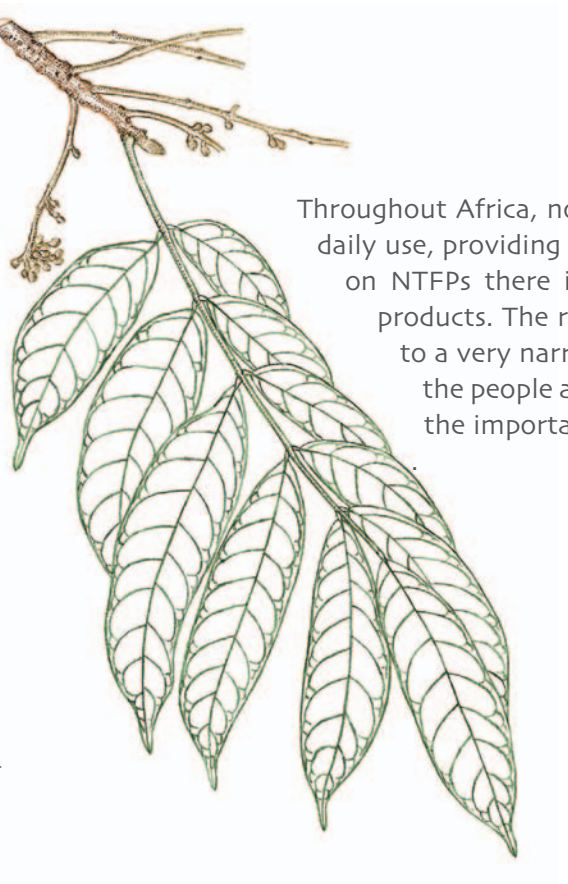
**Page 83** Based on photos by Christian Cossalter
Based on a photo by Kathrin Schreckenberg, ODI London
Based on photos by Hassan Adewusi

**Page 86** Based on a photo by Anthony Cunningham
Based on video footage filmed by Anthony Cunningham

**Page 100** Based on photos by Kathrin Schreckenberg, ODI London

**Page 107** Based on photos by Anthony Cunningham

**Page 108** Based on a photo by Nicolas Césard



Throughout Africa, non-timber forest products (NTFPs) such as plants and bush meat are in daily use, providing crucial resources for local livelihoods. Despite research that has focused on NTFPs there is still a lack of knowledge regarding the importance of these forest products. The research that has been conducted has been targeted and communicated to a very narrow audience. This book is a rare and valuable exception. It brings to life the people and products behind the research, communicating in a very readable way, the importance of "green social security".

Anthony Cunningham
WWF/UNESCO/Kew Botanical Gardens
People and Plants Initiative

CIFOR
CENTER FOR INTERNATIONAL FORESTRY RESEARCH

DFID Department for International Development