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Crafts and Conservation: The Ecological Footprint of International Markets on an African Resource

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Introduction

The concept of "ecological footprints" was developed by Rees (1992) to illustrate the large ecosystem area on which urban centers depend. The same concept can be applied at a national scale. The Netherlands, for example, requires 15 times its landmass to maintain the population it supports (Moffatt 1996). Despite its limitations (Moffatt 2000), the ecological footprint concept provides a useful way of illustrating the geographical scale and impacts of trade in plant products in response to international demand. Remote as many craft-production areas are, international market forces extend into them. The far-reaching effects of this trade are an important issue of which, unfortunately, many importers, retailers, and tourists from Europe, the United States, Canada, and Japan are completely unaware.

In this chapter we make three main points in examining the scale and complexity of a little-considered aspect of the ecological footprint of urban North America, Western Europe, and Japan on Africa. First, international trade in African crafts made by weavers and wood-carvers occurs on a geographical scale that is larger than most people realize and is growing year by year. Second, the ecological footprint resulting from international trade in African basketry and carving is having a serious impact on some species and habitats of local and, in some cases, global significance. As a result, there is a need in several African countries to shift from wild sourcing to on-farm cultivation or, in the case of dyes for Botswana baskets, to synthetic dyes of the same color as traditional dyes. Third, we discuss the opportunity that people in Western Europe and North America have, through selective buying and responsible sourcing, to play an important role in ensuring the sustainability of the crafts trade, rather than remaining contributors to rural resource depletion.

Weaving, Wood Carving, and Social Effects

Commercial craft production is an important means whereby poorer rural people, often from remote areas, are able to enter a cash economy. Although per capita income

Figure 7.1. Commercial trade in drums, including those made from *Sclerocarya birrea* wood and decorated with symbolic ochre, in the Binga district of western Zimbabwe.

from commercial crafts is normally very variable, depending on how much time individuals spend on weaving (usually women) or carving (usually men) versus other household, farming, or community activities, it often contributes significantly to the household income of rural people (Brigham 1994; Terry 1999). As a result, many people become involved in craft production in areas where few other economic opportunities exist. In Ngamiland, Botswana, for example, about half the female population of the villages of Etsha (ca. 1500 women) and Gomare/Tubu (400 women) were involved in basket making (Terry 1984, 1987). In western Zimbabwe, from a modest start in 1987, when just 25 women produced baskets for commercial sale, the Binga Crafts Association had grown to 3200 members by 1999. The commercial trade in Kenyan wood carvings started in 1919 through the remarkable efforts of Mutisya Munge, a Kamba carver (Elkan 1958). By 1954 the export value of the trade was worth U.K.£75,000 at 1950s rates (Elkan 1958). Today 60,000 Kenyan wood-carvers produce commercial carvings, primarily for export, providing household income for an estimated 300,000 dependents (Obunga 1995).

Crafts production also keeps traditional wood-carving and basket-weaving skills alive in a changing world, where enamel bowls and tin and plastic buckets replace baskets and wooden containers in household use. This is a positive attribute. Where craft development and marketing organizations need to take special care, however, is in avoiding the negative social and cultural impacts that can arise from a trade in artifacts that have sacred, ceremonial significance. In the African context, this most commonly applies to drums and masks. Nor is this unique to Africa. On the basis of many years of anthropological work in the Brazilian Amazon, for example, Ribeiro (1983) recommended that artifacts such as Tapirape masks and *ype* masks used in tribal ceremonies not be sold at all. Kenyan carvers commercially produce mock West African masks, poor-quality replicas of Buganda drums, and ersatz West African wooden fertility dolls that have no local cultural significance whatsoever, but in other cases culturally significant artifacts are in commercial trade. In northwestern Cameroon, for instance, Argenti (1998) documented the complex symbolism surrounding carved stools and masks and how "modern" carvings produced for "outside" sale compete with carvers' production of traditional objects for "inside" ceremonial masquerades. It is also tempting to suggest that the production of Gwembe Thonga drums—symbolically marked with ochre yet for commercial sale to tourists in the Zambezi valley, Zimbabwe and now being sold in large quantities (Figure 7.1)—may have two compounding negative effects, due not only to the commercialization of the drums that traditionally are objects of religious significance in this area but also to the use of *Sclerocarya birrea* (Anacardiaceae), among other species, to carve the drums (M. Mudenda pers. comm. 1998). This species is one of the most productive and nutritious sources of wild fruit, protein-rich kernels, and beer and commonly has traditional religious significance in southern Africa (Cunningham 1985; Peters 1988).

African Crafts: Commercial Trade and Resource Depletion

Weaving Fibers

Although a wide range of plant fibers, such as *Sansevieria* (Dracaenaceae) leaf fiber or the bark of many Leguminosae (*Acacia, Brachystegia*), Thymelaeaceae (*Gnidia, Lasiosiphon*), Malvaceae (*Hibiscus, Thespesia*), and Tiliaceae (*Triumfetta*), are used at a subsistence level, few species enter national trade; and even fewer, international export markets (see Appendix 7.1, Table 7.1). Nevertheless, several broad patterns of usage are evident. First, despite the small number of genera and species of African palms (19 genera, ca. 55 species) and woody bamboos (3 genera, 3 species), a similar pattern is seen in other parts of the Tropics, where the Arecaceae and Bambusaceae dominate commercially traded baskets. Second, rattans are widely used in the moist tropical forests of West Africa (particularly *Eremospatha macrocarpa* and *Laccosperma secundiflorum*) and Uganda (*Calamus deërratus*), with local overexploitation occurring in Nigeria (Morakinyo 1994) and Uganda in response to national urban demand. Third, stem fibers from the Marantaceae have an important role in basketry in West Africa (at least 4 genera used), Uganda (1 genus, 2 species in trade), and, probably, the Congo basin. Fourth, there are major regional differences in types of crafts produced: Africa's finest wood carvings are made in West Africa (northwestern Cameroon, Ghana, Mali), northern Mozambique, and southern Tanzania; some of the finest basketry in the world is made by rural women in southern and south central Africa.

The main basketry fibers used in southern Africa are *Hyphaene* (*H. coriacea, H. petersiana*) leaflets and, to a lesser extent, *Cocculus hirsutus* stems (Botswana, South Africa, Zimbabwe). The finest baskets of all, *mukenge* baskets of split *Combretum zeyheri* roots, are made by Mbundu and Lozi women from southern Angola and western Zambia. As a consequence of the high quality of this basketry and the support of rural development agencies, significant international export markets have been developed for southern African baskets in Europe (particularly Germany, Scandinavia, and the United Kingdom) and North America (both the United States and Canada). Baskets are also widely sold in southern Africa to overseas visitors or collectors. The largest volume of high-quality baskets made for export is produced in Botswana (Ngamiland), Zimbabwe (Binga area), and South Africa (KwaZulu/Natal). Although excellent, export-quality baskets are made in the northern communal areas of Namibia (from *H. petersiana*), these are mainly for household use, local barter, and sale in Namibia or South Africa. A similar situation existed in Botswana prior to 1970 and also exists today in the Turkana district of northern Kenya, where *H. compressa* woven items (baskets, mats, brooms) cater on a significant scale to a tourist trade in outlets near or in the capital, Nairobi (Hoebeke 1989).

Although supplies of *Hyphaene coriacea* leaves are abundant on the Mozambique coastal plain (Cunningham 1988), resource depletion of palm fiber (*H. petersiana*) has resulted in problems for rural women elsewhere in southern Africa (Botswana, Zimbabwe). Walking farther and paying more for palm leaves are consequences of a growing scarcity of palms in an area where palms were formerly common only along drainage lines and perennial rivers. In the Binga district of Zimbabwe, for example, the distance that women have to travel to collect palm leaves has increased with booming export sales and more people having become involved in basket production. In 1985 a reported 25 women were involved in basket production, traveling 3 km to collect *H. petersiana* leaves. By 1989 nearly 500 women were involved, but by that stage they were having to walk 18 km to collect palm leaves. In Kavango, Namibia, women are walking long distances to collect *Hyphaene* palm leaves. The majority (67%) of the 12 participants in a basketry course in Rundu, a small town in the Kavango region of northern Namibia, walked to collect palm leaves at Ngone, 30 km away (M. E. Terry pers. comm.). The digging up of edible palm hearts (the apical meristem of the palm) and, possibly, the felling of adult female palms for the edible pericarp around the fruits are considered to have had the greatest impact on wild palm populations. In 1983, 97% of 143 basket makers in Etsha and 55% of 69 basket makers in Gomare/Tubu, two villages in northwestern Botswana, complained about the scarcity of *H. petersiana* palm (Terry 1984, 1987). Less time is therefore spent on household activities, agriculture, and basket weaving itself.

Dye Resources

Although a wide range of dyes can be used to color basketry fiber, relatively few species are used for commercial basketry compared with species used on a local, subsistence scale. This subset of dye resources employed in commercial trade represents the most colorful and colorfast sources from plants. The use of silty mud to color weaving fiber a gray-black shade is also widespread in tropical Africa but is not further dealt with in this chapter. As seen in Appendix 7.1, Table 7.2, two patterns emerge: first, the importance of the Leguminosae as colorfast dye sources and the widespread use of the genus *Indigofera,* probably due to the anthropogenic dispersal of favored, fast-growing dye sources such as *I. arrecta;* and second, that the most important dye sources in commercial trade in southern Africa are from the bark of *Berchemia discolor* (Rhamnaceae), the roots of *Euclea divinorum* and *E. natalensis,* and the fruits of *Diospyros lycioides* (Ebenaceae).

Bark of the bird plum tree (*Berchemia discolor*) is a major source of dye for commercial basketry production in Botswana, Namibia, and Zimbabwe. This species is well known in southern Africa for its tasty edible fruits, the main reason why they are traditionally conserved in agricultural fields in this region. Formal monitoring of the impact of *Berchemia* bark (and root bark) use in the Etsha area of Botswana during the 1982–1993 period showed that *Berchemia* tree populations that were the main source of supply in 1982 had been killed off by 1992 (Cunningham unpubl. data). As a result, women basket makers walk farther and farther to obtain basketry dyes, spending less time in agriculture, making baskets, and looking after children. This has also resulted in changing patterns of dye use. Due to the local overexploitation of *Berchemia* and *Euclea* populations in some areas, increased use of *Indigofera tinctoria* and *I. arrecta* leaves and *Rubia cordifolia* roots as dye sources has taken place, as has use of a pink dye from fungus-infected *Sorghum* stalks.

Wood Carving: Species, Trade, and Impacts

Although many species can be carved, the wood qualities of a relatively small range of species have made them the favored sources for commercially traded carvings (see Appendix 7.1, Table 7.3). These can be divided into two broad groups. The first group comprises dense, slow-growing hardwoods, which are favored for their fine grain and for their ability to withstand cracking and take a fine polish. These are carved into bowls and figures. Many of them are from the Leguminosae, with localized overexploitation of several *Cord* species (Boraginaceae) also apparent. A growing scarcity of these preferred hardwood species has become a very relevant issue for wood-carvers in Malawi (*Dalbergia melanoxylon, Pericopsis angolensis*), Kenya (*Brachylaena huillensis,* *D. melanoxylon*), and, increasingly, Namibia (*Pterocarpus angolensis*) and Zimbabwe (*Afzelia quanzensis, P. angolensis*). Significant from the perspective of conservation of the genetic resources of valued timber trees is the likely genetic erosion taking place due to overexploitation of some wood-carving species on a national or regional scale. Examples of this are likely in *A. quanzensis* (Zimbabwe), *B. huillensis* (Kenya), *D. melanoxylon* (savanna woodlands of Kenya and Malawi), *P. angolensis* (Malawi), and, probably, *Cordia platythrysa* (Ghana), which is listed as one of Africa's threatened tree species (WCMC 1998).

The second group of carving woods has less dense, lighter-colored wood. These are generally carved into stools or drums from trees in the Apocynaceae (*Holarrhena floribunda, Funtumia africana, F. elastica*), Araliaceae (*Polyscias fulva*), or Anacardiaceae (*Sclerocarya birrea*). These are faster-growing species and can better withstand demand for carving wood, yet there are cases in which depletion of wild populations has occurred. *Polyscias fulva*, for example, is a favored species for wood carving through most montane forest areas of Central and West Africa (Rwanda, Burundi, western Uganda, Cameroon). Due to its rapid growth rate and abundance in disturbed forests, supplies of this light-demanding softwood tree species easily meet the subsistence demand for production of carved stools, spoons, and blacksmith bellows in the densely populated (150–350 people per km^2) area of western Uganda. The same does not apply in the Bamenda highlands of northwestern Cameroon, however, where carvers in a similarly dense farming population are renowned for the large, innovative, and culturally significant carvings they make from *P. fulva*. Although Argenti (1998) only recorded 40–50 carvers in the Mount Kilum-Oku area of northwestern Cameroon (out of a total population of ca. 60,000), this species has been overexploited in the forest. As a result, many carvers in the area now plant *P. fulva* on their small-scale farms (Argenti 1998).

Depletion of tree species used in carving due to felling for timber, furniture, or carving itself can have a variety of negative social impacts. First, felling female *Sclerocarya birrea* trees results in loss of a fruit and nut source that is rich in nutrients commonly lacking in a starchy staple diet (vitamin C and proteins) and of major significance to poorer rural households (Cunningham 1985; Peters 1988). Second, reduction in some tree species favored for wood carving also represents reduced local self-sufficiency in preferred sources of medicinal bark, an issue that applies to some of the hardwood species as well. In terms of the faster-growing tree species, the possibility of localized depletion of *Holarrhena floribunda* (sese), the species most favored in Ghana for carving stools for international trade, is worth investigating. Extracts of *H. floribunda*, which contains steroidal alkaloids and trichthecenes, are recognized as having significant antitumor effects and as being moderately effective against leishmaniasis (Abreu et al. 1999; Loukaci et al. 2000). Similar concerns could be expressed about other species as well. *Pterocarpus angolensis* is effective against schistosome parasites (Ndamba et al. 1994), and other species in this genus (*P. marsipium*) have been shown to be effective in treating hyperglycemia (Manickam et al. 1997). The naphthoquinones in several *Cordia* species are known to be effective anti-inflammatory (Ficarra et al. 1995), antifungal, and larvicidal agents (Ioset et al. 1998, 2000). *Dalbergia melanoxylon* bark extracts contain strong antimicrobial compounds (Gundidza & Gaza 1993); *Spirostachys africana* is

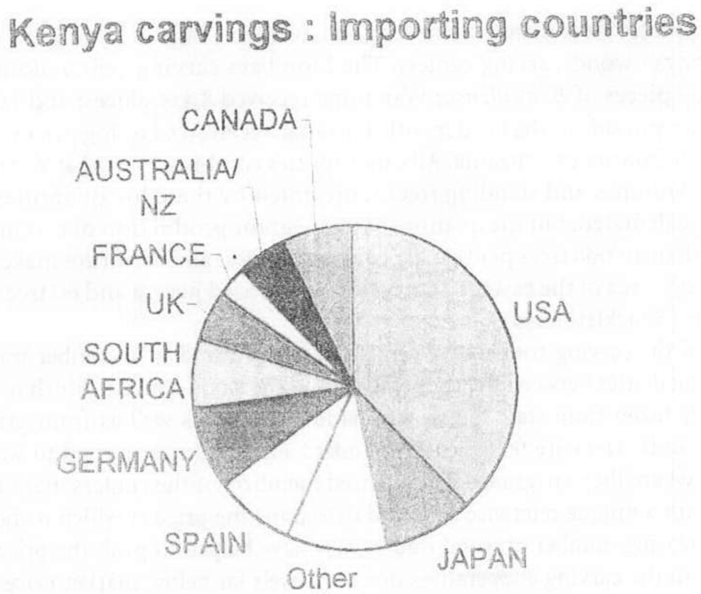

Figure 7.2. The proportion of Kenyan wood carvings imported by various countries, showing the importance of the United States as a market. *Source:* C. Alloo unpubl. data.

traditionally used as an antimalarial in Mozambique; and the burned bark of *Daniella olivieri* is an extremely effective mosquito repellent (Palsson & Jaenson 1999).

Even though we are unaware of any study carried out on the large wood-carving trade in Ghana, we suggest that the largest value and volume of African carvings in international trade comes from Kenya. The bulk of these carvings are exported to North America, primarily to the United States (Figure 7.2). With declining economic situations and rising unemployment in many African countries, income generation through carving and weaving is on the increase. For this reason, the Kenyan carving trade bears some useful lessons for organizations involved in craft development elsewhere in Africa.

Although the Kenyan wood-carving trade started 80 years ago with an emphasis on ebony (*Dalbergia melanoxylon*), over time it has become characterized by two features. The first is the successive overexploitation of favored species, beginning with *D. melanoxylon* and followed by *Brachylaena huillensis* and, more recently, *Spirostachys africana, Olea europaea* ssp. *africana,* and *Combretum schumannii.* The second feature is the movement of WaKamba wood-carvers from their home area of Wamunyu (Machakos district, Kenya) to the resource-rich frontier forests of coastal and central Kenya (Obunga & Sigu 1996). At present, seven species are found to be in use in significant quantities, but *B. huillensis* is by far the most important of these. Preliminary results from an ongoing study by S. Choge show that *B. huillensis* logs account for more than 89% of carving wood. In the first five months of 1998, for example, more than 36,726 log pieces (a standard 1.5 m long, on average 3 logs cut per tree) were delivered to Kenya's wood-carving centers. The Mombasa carving center alone received 21,106 log pieces of *B. huillensis;* Wamunyu received 8,325 pieces; and Lunga Lunga, on the Kenyan side of the border with Tanzania, received 5,897 log pieces from the resource-rich frontier of Tanzania. All other species combined stood at 4,220 log pieces (10.3%). Volumes and standing trees represented by these log quantities are currently being calculated, but the quantity of trees cut for production of carvings is certainly more than 40,000 trees per year. By contrast, carvers and furniture makers in the Bushbuckridge area of the eastern Transvaal lowveld used just 30 and 60 trees per year, respectively (Shackleton 1993).

Nearly all of the carving cooperative centers purchase wood from timber traders who act as intermediaries between the cooperatives and the wood sources. Much of this timber is illegally taken from state forests and national parks, as well as from private and communal lands. Trees are felled, cut to standard sizes, and transported to wood-carving centers, where they are graded. Experienced members of the centers mark each piece of wood with a unique reference code and determine the price at which it should be sold. The increasing number of wood traders may have helped to push the prices of timber supplied to the carving cooperatives down to levels far below market prices.

Ecological Footprints

The most widespread ecological footprint of the international trade in African crafts is generated by the wood-carving industry, rather than the basket-weaving industry. The impact of wood use for carving also needs to be compared with that of felling for timber. These relative impacts vary between sites and from country to country. In Zimbabwe, for example, in a study of wood carving along the Victoria Falls–Bulawayo road, an estimated 657 m^3 per year of carving wood, primarily *Afzelia quanzensis, Pterocarpus angolensis,* and *Kirkia acuminata,* was being cut (Matose et al. 1997). This represented only 13% of the 5000 m^3 per year of timber cut in the same area by concessionaires. However, the number of people in the wood-carving industry and the quantity of wood cut has been rising dramatically in response to drought and economic decline. In Kenya, there is no doubt that timber logging has a greater impact on montane forest such as Mount Kenya or Mount Elgon. In Kenyan coastal forests the reverse applies, and logging for carving woods has the greatest impact.

Basketry resource depletion nevertheless certainly poses a problem for rural women who walk farther or pay more for increasingly scarce resources. In addition, localized die-off of *Berchemia discolor* trees in Botswana represents loss of a popular and nutritionally valuable food source. Most eastern and southern African basketry species are widespread savanna species whose populations are affected by localized impacts on dye resources (*Berchemia, Euclea*) and, in a few cases, on *Hyphaene* palms; namely, near villages in western Ngamiland, Botswana (Cunningham & Milton 1987) and in the Binga area of Zimbabwe and part of Kavango, Namibia (Cunningham & Terry 1995). In other cases, harvesting of dyes is carefully managed by local women (Binga, Zimbabwe), or abundant palm resources and a low level of consumption of edible palm hearts mean that crafts production is sustainable (Cunningham & Terry 1995; Konstant et al. 1995; Sullivan et al. 1995).

Depletion of ebony (*Dalbergia melanoxylon*) and *Brachylaena huillensis* for wood carving has spread from Kenya to northern Tanzania in response to market demand. Most large to medium-sized *D. melanoxylon* trees have been felled in all but the most remote savanna woodlands of Malawi and Kenya, with normally vigorous resprouting heavily browsed by livestock. A similar widespread felling of *B. huillensis* has taken place in forests of Kenya and, to an increasing extent, Tanzania, initially for sawmilling (production of parquet flooring) but, more significantly in the past 30 years, for wood carving. This widespread loss of large, reproductively mature trees may erode the genetic base of these economically important tree species in the long term.

Also of concern is the ecological impact that the felling of more than 40,000 trees per year has on forest-dependent animals and on the structure of their East African coastal forest habitat, an endangered forest type and one of 200 priority ecoregions identified by Olson and Dinerstein (1998). Both *Brachylaena huillensis* and *Combretum schumannii* are forest tree species felled from (theoretically) protected areas of the last remaining forests in Kenya and Tanzania. These forests are also the habitat of endangered species such as the Sokoke Scops owl (*Otus irenae*) and the golden-rumped elephant shrew (*Rhychocyon chrysopygus*), which use hollow trees for nesting or shelter. A preliminary study in 1998 by Kyalo Solomon, who worked with woodcutters felling trees to supply wood-carving centers, recorded the proportion of felled trees that were hollow and the number occupied by birds, reptiles, and small mammals. On this basis, according to Solomon, more than 18,000 of the 40,000 trees cut per year would represent hollow-tree habitat. In just one year, the loss of hollow-tree habitat would effect more than 8000 golden-rumped elephant shrews and 2300 tropical girdled lizards, also one of the East African coastal forest endemics. Although no scientific record has ever been made of Sokoke Scops owl nests, this species certainly would nest in hollow trees, just as other Scops owl species do. In addition, Sokoke Scops owls are found mainly in *Cynometra-Brachylaena*–dominated forest in the Arabuko-Sokoke forest (the most important and—until the recent discovery of another site in Tanzania—the only known locality for this species in the world). For these reasons, it appears highly likely that the Kenyan carving industry poses the main contemporary threat to the endangered Sokoke Scops owl.

Agroforestry and Alternatives

Palms for Basketry

Palm cultivation has the potential to reverse the trend of declining availability of weaving material near basket-producing villages. Of the nine palm species in eastern and southern Africa, *Borassus aethiopum* and the three *Hyphaene* species (*H. petersiana, H. compressa,* and *H. coriacea*) have the best potential for agroforestry, due to their multiple-use potential and long, strong leaf fiber for basketry. *Phoenix reclinata,* though widespread and a source of popular edible fruits, is less suitable for basketry due to its short leaflets. Implementation of *Hyphaene* cultivation can bring several benefits to farmers. First, palms are well suited to the multiple-cropping systems of small farmers in southern Africa, for they provide a windbreak around fields that reduces wind erosion and evapotranspiration. Second, they provide a spiny barrier that discourages livestock from entering the fields and represent a multiple-use crop that yields leaf fiber, robust petioles that can be used as fuel, and edible fruits, in addition to lending itself to the more destructive uses for palm hearts and palm wine (which could be a by-product of thinning cultivated palm stands over time). In addition, unlike *Raphia,* which dies after terminal flowering at 25–30 years, *Hyphaene* palms do not die after flowering. They also sprout vigorously, providing a perennial crop that does not require replanting, and older specimens are resilient after the burning of brushwood that can accompany the clearing of fallow fields.

Pilot studies in Botswana have shown that *Hyphaene petersiana* cultivation is a viable proposition for agroforestry. This can provide a source of leaves close to basket-producing villages and an alternative to wild populations. What also needs to be taken into account, however, is that different planting systems may be required to fit local agricultural systems (Figure 7.3).

Wood-Carving Species

In Kenya, the on-farm cultivation of fast-growing introduced species such *Azadirachta indica* and *Jacaranda mimosifolia* also offers a viable alternative to harvesting in the wild, in terms of relieving shortages, promoting conservation in the overharvested wild populations, and providing an assurance of added income. In natural conditions, most indigenous tree species favored for carving are slow growing and may offer limited incentives to those who would wish to cultivate them. Carved animals from *Brachylaena huillensis* and *A. indica* are not easily distinguished by buyers, yet the two species differ greatly in growth rates. For example, *B. huillensis* trees reach 40 cm diameter at breast height (dbh) in 100 years, 45 cm dbh in 130 years, and 60 cm dbh in 175 years (Figure 7.4). By contrast, *A. indica* (neem), an introduced species that is being promoted as an alternative to *B. huillensis,* can reach 40 cm dbh in 16 years (Lemmens et al. 1995). On the Kenyan coast, *A. indica* trees in a Kenya Forestry Research Institute cultivation trial increased in height by 0.7–0.9 meters and 1.1–1.7 cm in diameter annually, with some individuals attaining a dbh of 43 cm in 21 years.

One of the ways around the problem of limited incentives to cultivate indigenous carving species due to their slow growth rates may be the cultivation of a range of wood-carving species (or multiple-use tree species) in mixed plantings. In Tanzania, for example, White (1988) recommended interplanting the fast-growing fuelwood species *Cassia siamea* with slow-growing *Dalbergia melanoxylon* as a means of offsetting the costs involved. What is lacking, however, is an economic comparison of the costs and benefits of fast-growing versus slow-growing wood-carving species, either individually or in mixed plantations. A study to provide information on values and volumes of wood-carving raw materials from different sources and on present levels of competition for the use of these resources is well advanced (Muturi & Choge 1998). This study is investigating the viability of cultivation as an alternative to harvesting

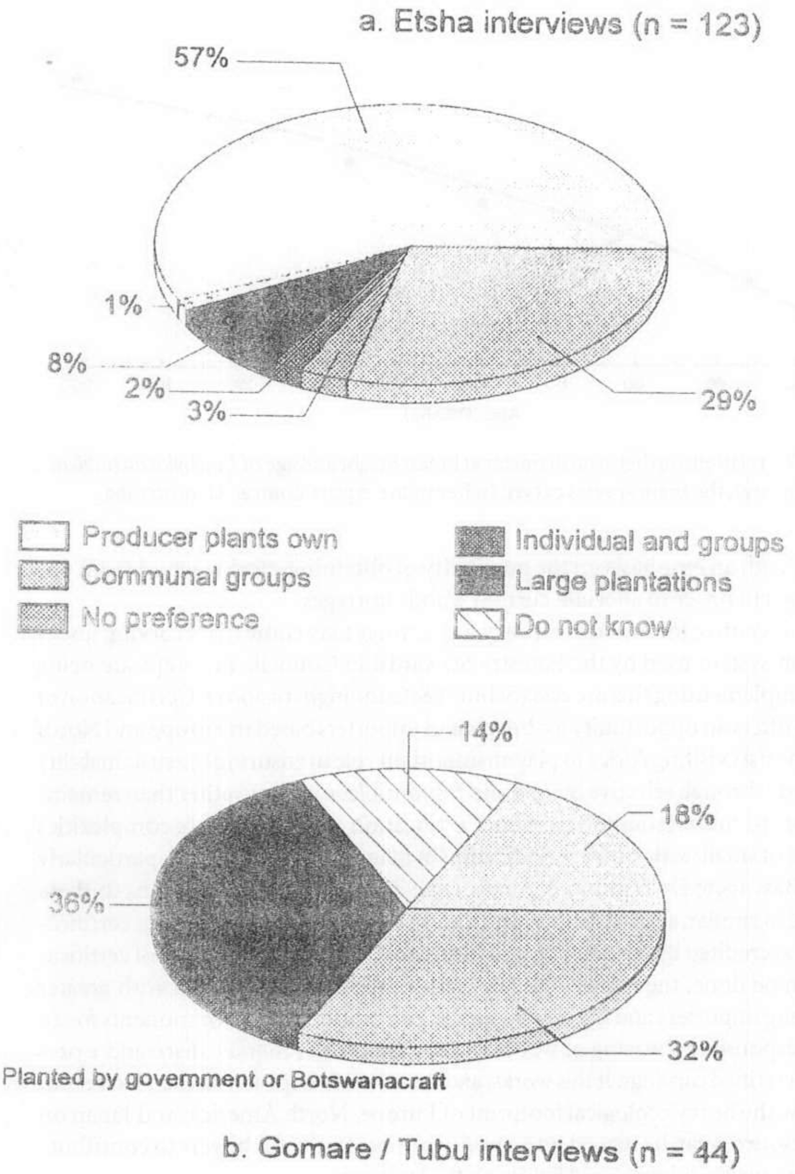

Figure 7.3. Perceptions of local subsistence farmers in two villages in northwestern Botswana to the best methods of implementing *Hyphaene* palm cultivation. a. Etsha, primarily mbukushu dryland farmers. b. Gomare/Tubu, mainly Bayei floodplain (*molapo*) agricultur-ists. *Source:* After Terry 1986.

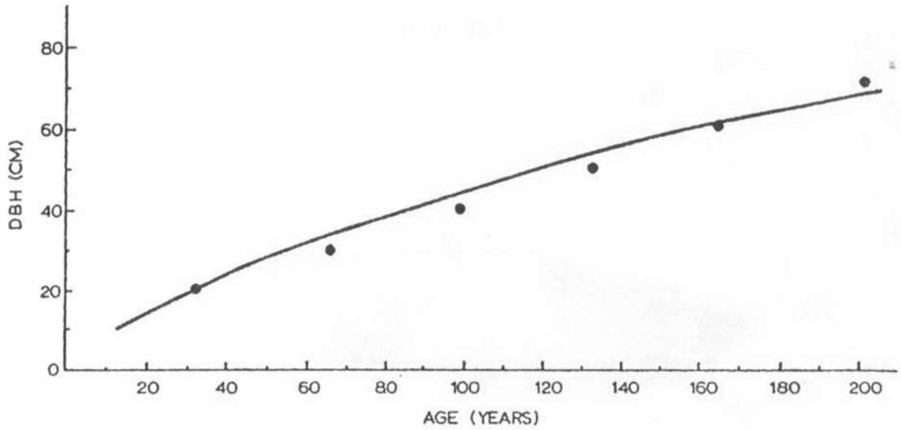

Figure 7.4. The relationship between diameter at breast height and age of *Brachylaena huillensis* (muhugu mahogany), the main species carved in Kenya for export. *Source:* Kigomo 1989.

from the wild, with an emphasis on the possibility of obtaining carving wood from on-farm plantations in order to alleviate current wood shortages.

An added incentive for on-farm forestry for carvings may come from carving under the certification system used by the Forestry Stewardship Council, and steps are being taken toward implementing this process (Schmitt & Cunningham 2002). Certification of wood carvings offers an opportunity for buyers and importers based in Europe and North America and tourists visiting Africa to play an important role in ensuring the sustainability of the crafts trade through selective buying and responsible sourcing, rather than remaining contributors to rural resource depletion. Certification of carvings faces complexities similar to those of small-scale timber certification in many parts of the world, particularly its high cost (Bass 1998; De Camino & Alfaro 1998; Tolfts 1998). The solutions to these problems are also similar, such as group certification schemes, developing local certification standards accredited by the council, and local capacity to reduce the cost of certification. If this can be done, then links with fair-trade organizations, coupled with greater awareness among importers and the buying public, can create two key components for an incentive for responsible sourcing of wood for carving: greater market share and a premium paid for certified carvings. If this works, and we certainly hope it will, then it offers an example of how the heavy ecological footprint of Europe, North America, and Japan on African craft resources can be turned into a positive opportunity for buyers to contribute to rural peoples' livelihoods yet tread lightly on the landscape.

Acknowledgments

We would like to thank Dr. P. K. Konuche and Dr. B. Kigomo, director and research director, respectively, of the Kenya Forestry Research Institute and the WWF/UNESCO/Kew People and Plants Initiative (funded in Africa through the National Lotteries

Charities Board, based in the United Kingdom) for their support. The opportunity for one of us (A. Cunningham) to attend the International Botanical Congress in Saint Louis, Missouri, where the material in this chapter was presented, was made possible through the efforts of Nan Vance and a travel grant from the U.S. Forest Service. Comments on the chapter by the book's editors, Luisa Maffi and Tom Carlson, are appreciatively acknowledged.

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Appendix 7.1: Species, Trade names, Densities, Uses and Ecoregions

The main commercially traded African basketry fibers (Table 7.1) dyes (Table 7.2), and carved woods (Table 7.3), showing the species of chief concern in terms of national (*), regional (i.e., cross-border trade within the region) (**), and international (***) trade and the ecoregions from which they are taken. Vegetation types and ecoregions follow those used by Itoua et al. (1998).

Key to parts used and main uses: ar = edible arils; ax = axe handles; b = bowls, bp = building poles; bpt = body paint; bt = boats; dr = drums; dy = dye; ch = charcoal; fu = furniture; fw = fuelwood; ins = insect repellent; mus = musical instruments; o = oil seeds; sp = spoons; st = stools; sti = sticks.

Key to tropical moist broadleaf forests: CC = Congolian coastal forests; CR = Cross-river coastal forests; NL = Nigerian lowland forests; NWCL = NW Congolian lowland forests; NECL = NE Congolian lowland forests; CCC = Central Congolian coastal forests; GL = Guinean lowland forests; VB = Victoria basin moist forests.

Key to tropical moist swamp forests: CSW = Congolian swamp forests; GSW = Guinean swamp forests.

Key to tropical montane and submontane forests: MCM = Mount Cameroon montane forests; CH = Cameroon [highland] forests; ARM = Albertine rift montane forests; EARC = Eastern arc montane forests; EAM = East African montane forests.

Key to tropical dry broadleaf forests: NZI = Northern Zanzibar-Inhambane coastal forests; SZI = Southern Zanzibar-Inhambane coastal forests; MPCF = Maputoland-Pondoland coastal forests.

Key to grasslands/savanna/shrublands: GFS = Guinean forest-savanna mosaic; WSS = Western Sudanian savannas; SACB = Somalian *Acacia-Commiphora* bushlands; MACB = Masai *Acacia-Commiphora* bushlands; ZMIO = Zambezian miombo woodlands; ZMOP = Zambezian and mopane woodlands; WMW = Western mopane woodlands; TVB = Transvaal bushveld; KAS = Kalahari *Acacia* savannas.

Key to flooded grasslands and savannas: ODFS = Okavango Delta flooded savannas; ZSM = Zambezian swamps and marshes.

Sources: 1 = Abbiw 1990; 2 = Cunningham & Milton 1982; 3 = Cunningham 1988; 4 = Cunningham & Milton 1987; 5 = Cunningham unpubl. field records; 6 = Sunderland 2002; 7 = Morakinyo 1994; 8 = Cunningham 1996; 9 = Cunningham & Davis 1997; 10 = Shackleton 1993; 11 = Obunga 1995; 12 = Bowen 1992.

Table 7.1
African basketry fibers

Family, genus, species	Part used	Ecoregion in which used	Source
Arecaceae			
Borassus aethiopum	lf	WSS, ZMIO	1, 5
Calamus deërratus+	st	VB, not widely used in West Africa	5
Dendrocalamus strictus	st	GSW	1
Eremospatha macrocarpa+	st	GSW, CR	6, 7
Hyphaene compressa+	lf	NZI, MACB	8
Hyphaene coriacea+	lf	SZI, MPCF	3, 4
Hyphaene petersiana+++	lf	ODFS	4
Hyphaene thebaica+	lf	WMW, ZMIO	1
Laccosperma opacum	st	WSS	1
Laccosperma secundiflorum+	st	GL, CR, GSW, CSW	6, 7
Raphia farinifera	lf	GL, GSW,	1, 5
Raphia hookeri	lf	VB, CC, NL, NWCL, CCC, CSW	1
Bombacaceae			
Adansonia digitata++	bk	TVB, ZMIO	5
Celastraceae			
Loeseneriella apocynoides	st	ARM, EAM	8
Cyperaceae			
Cyperus articulatus	cl	Widespread, wetlands	1
Cyperus latifolius	cl	Widespread, wetlands	3
Cyperus natalensis	cl	MPCF, SZI wetlands	3
Cyperus papyrus	cl	Wetlands throughout tropical Africa	8
Cyperus sexangularis	cl	Widespread, wetlands	3
Gramineae			
Arundinaria alpina	st	ARM, EARC	8
Oxytenanthera abyssinica	st	EAM, EARC, CH	5
Phargmites australis	cl	Pan-tropical wetlands	1, 5
Juncaceae			
Juncus kraussii+	cl	MPCF salt marshes	3, 9
Marantaceae			
Marantachloa leucantha	st	VB, CSW, GCW, ARM	1, 8
Marantachloa purpurea	st	VB, CSW, GSW	1, 5
Marantachloa ramosissimum	st	CSW, GSW	1
Sarcophrynium brachystachys	st	CSW	1
Thalia welwitschii	st	CSW	1
Thaumatococcus daniellii	st	CSW	1
Menispermaceae			
Cocculus hirsutus	st	TVB, ODFS, ZMIO	5, 9
Smilacaceae			
Smilax anceps	r	ARM, widespread but not widely used in other places	8

Table 7.2
African basketry dyes

Family, genus, species	Part used	Ecoregion in which used	Source
Anonnaceae			
Enantia polycarpa	b	GL	1
Cochlospermaceae	b	GL	1
Cochlospermum planchonii	r	GL	1
Cochlospermum tinctorium	r	GL	1
Ebenaceae			
Diospyros lyciodes	fr	MPCF, SZI, ZMOP, TBV	2, 3
*Euclea divinorum****	r	MPCF, SZI, ZMOP, TBV	3, 4
Euclea natalensis	r	MPCF, SZI, ZMOP, TBV	3
Guttiferae			
Harungana madagascariensis	br	GL,VB,ARM	1, 5
Leguminoseae			
Acacia nilotica	fr	GFS, WSS	1, 5
Adenanthera pavonina	Wd	GL	1
Baphia nitidia	wd	GFS	1
Haematoxylon campechianum	wd	GL	1
Indigofera arrecta	lv, r	MPCF, SZI, ZMOP, TBV, GL, GFS	1, 3
Indigofera spicata	lv, r	GL, GFZ	1
Indigofera suffriticosa	lv, r	GL, GFS	1
Indigofera tinctoria	lv, r	ODFS, KAS, ZMOP	1, 5
Lonchocarpus cyanescens	lv	GFS	1
Lonchocarpus laxiflorus	lv	GFS	1
Lonchocarpus sericeus	sd	GFS	1
Pterocarpus erinaceus	r	GL	1
Rhamnaceae			
*Berchemia discolor****	bk	ODFS, KAS, ZMOP	2, 4
Rubiaceae			
Rubia cordifolia	r	MPCF	3

Table 7.3
African wood-carving species

Family, genus, species	Items carved for commercial use	Other main uses	Ecoregion in which used	Source
Anacardiaceae				
Sclerocarya birrea++	dr	fr, b	MPCF, TBV	5
Apocynaceae				
Alstonia boonei	dr, b	sp, med	GL, CC, CR, NL, NWCL	1, 5
Antiaris congensis	dr	bt, med	GL	1
Funtumia africana	dr, st	med	GL, CC, CR, NL, VB	1, 5
Funtumia elastica	dr, st	med, rubber	GL, CC, CR, NL, VB	1, 5
Holarrhena floribunda+++	st (Ghanaian)	med	GL, NWCL	1
Wrightia natalensis	fu	med	MPGF, SZ	3
Araliaceae				
Polyscias fulva+++	st, figures, dr	ply, sp	CH, ARM, EAM	8
Balanitaceae				
Balanites maughamii	trays	med bark	MPCP	3
Boraginaceae				
Cordia africana	headrests	fu, fr, sp	MACB, EAM	5
Cordia millenii	b, sp	med, t, x	WSS	1
Cordia platythyrsa+++	dr, tools, sp	med, t, x	GL	1
Cordia sinensis	headrests	bp, fu, frs	MACB	5
Combretaceae				
Combretum imberbe	figures	bp, fw	ZMOP, TVB	5, 10
Combretum schumannii+++	figures	bp	NZI	11
Terminalia sericea	trays	bp, ax, fu	ZMIO, TVB, MPGF	10
Terminalia orbicularis	b	bp, ax	SACB, MACB	1
Terminalia spinosa	headrests	bp	MACB, NZI	5
Terminalia superba	st	t	GL, CC, CR, NL	1
Compositae				
Brachylaena huillensis+++	b, figures	t	NZI, SZI, EAM	5, 11
Euphorbiaceae				
Spirostachys africana+++	figures, trays, b	med, t	NZI, SZI, TVB	5, 11
Kirkiaceae				
Kirkia acuminata++	figures	med	ZMOP	5
Leguminoseae				
Afzelia quanzensis++	figures	t, fu	NZI, SZI, MPCF, ZMIO	3
Dalbergia melanoxylon+++	figures, b	t, mus	ZMIO, WSS	10, 11
Daniellia oliviera	st	t, med, ins (bark)	GL, CC	1
Pericopsis angolensis+++	st	t	ZMIO	5
Pterocarpus angolensis++	st, b, figures	c, med, t, fu	ZMIO, TVB	5, 10
Pterocarpus erinaceus	st	t, med	GL	1

Table 7.3, *continued*

Family, genus, species	Items carved for commercial use	Other main uses	Ecoregion in which used	Source
Leguminoseae, *continued*				
Pterocarpus santalinoides	xylophone keyboards	med, fw	GL	1
*Pterocarpus soyauxii***	st	bp, c, t	CC, GL	5
Meliaceae				
Trichilia emetica	figures	med, shade, oil, ar	MPCF, SZI	3
Moraceae				
*Antiaris toxicaria****	dr, st	med, t		5
Oleaceae				
*Olea europaea ssp.africana****	b, sp	ch	TVB, ZMIO	10, 11
Rhamnaceae				
Berchemia discolor	b, st	sti, dy	ODFS, ZMOP	10
*Berchemia zeyheri**	b	fr	TVB, MPCF	3
Salvadoraceae				
Dobera glabra	mortar & pestles	st, med	SACB, MACB	5, 12