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#10 — Non-Timber Forest Products Economics and Conservation Potential

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Key Concepts

- Non-timber forest products (NTFPs) from the humid forests of Central Africa play an important role in the livelihoods of African households, providing a source of food, medicine, spices, services, and income.
- For poor families, NTFPs are an essential dietary and economic safety net, and are valued through minor components of the diets of wealthier households.
- NTFPs play an important role in livelihoods, but focusing solely on them fails to capture the full range of forest values and may not offer a sufficient incentive for sustainable forest resource management.
- As NTFPs increase in value there is a trend toward overharvesting of wild resources, on-farm production, and exclusion of resource users by resource managers. Adding value to

NTFPs should coincide with efforts to minimize forest degradation and ensure equitable access.

- Formalized land tenure and NTFP-access rights are important steps towards sustainable forest management.
- As nations in Central Africa do not have a process for recording the value of NTFPs being consumed and traded, their contribution to national economies may be significantly underestimated.
- For a time, NTFPs were seen as a possible "magic bullet" to solve deforestation issues. Experience has tempered that belief while reinforcing the fact that NTFPs are an important, ubiquitous, and culturally integral part of rural and urban lives in Africa, and must continue to be considered in forest management decisions.

What Are NTFPs?

Non-timber forest products are the huge variety of materials derived from forests excluding timber and fuelwood. NTFPs include bark, roots, tubers, corms, leaves, flowers, seeds, fruits, sap, resins, honey, fungi, and animal products such as meat, skins, bones, and teeth. NTFPs are harvested from forest areas and are produced in farmers' fields. They are used for food and medicine and as a source of income. NTFPs are consumed in rural and urban homes, and are traded in local, regional, and international markets.

How Valuable Are NTFPs?

NTFPs provide small but significant sources of income, particularly for women and for families that do not have access to agricultural markets. NTFPs also provide critical supplies of food during periods when agricultural crops fail or are otherwise scarce. Transportation costs largely determine whether what is the most important source of rural household income: low value-to-weight ratio agricultural crops that can be produced consistently in large quantities or high value-to-weight ratio NTFPs that are available inconsistently in relatively small quantities. In the South West and North West provinces of Cameroon the value of NTFP production and marketing exceeded U.S. \$19 million in 1999, and contributed 2.8% to the regional economy. In contrast, timber, in this predominantly logged-over area, contributed 5% and agricultural crops 27%. In unlogged areas of old-growth forest, the value of timber is considerably higher.



Figure 1: Prunus seedlings at the Limbe Botanic Garden

Though harvested primarily by rural people, urban dwellers and the African diaspora in Europe and North America drive market demand for NTFPs. In urban markets *Gnetum africanum* leaves, called Eru in Cameroon, sells for U.S. \$0.47/kg, which is almost three times the price of a cultivated alternative called bitter leaf (*Vernonia amygdalina* or Ndole). Though African diaspora in Europe and the United States are willing to pay U.S. \$50/kg for air-freighted Eru, the volume of trade is tiny relative to that supplying the national and cross-border markets. Interestingly, high demand for NTFPs spices has driven up prices such that some families are now substituting the much less expensive Maggi seasoning in their cooking.

Pharmaceutical uses of NTFPs generate the most significant revenues. Extracts from the bark of the *Pausinystalia yohimbe* (Yohimbe) tree are consumed locally as a "cure" for many ailments, and is sold in North America and Europe as an unproven aphrodisiac and as a stimulant in soft drinks. The total value of Yohimbe bark exports from Cameroon was U.S. \$600,000 in 1998 and is growing each year. Similarly the bark of *Prunus africana* (Pygeum) is used to extract a chemical cocktail used for the treatment of benign prostate hyperplasia in Europe and North America and was worth \$700,000 to Cameroon, and \$200 million to the pharmaceutical companies in 1999.

NTFP Use Sustainable?

Though NTFPs have been used for millennia, human population in Central Africa is higher now than it ever has been, and is likely to double to over 60 million in 20 years. As with any wild plant or animal, if demand and harvesting exceeds annual production the resource will progressively be depleted and become locally extinct.

NTFPs prized for their leaves, roots, or bark are particularly prone to unsustainable use, because harvesting either damages or kills the parent plant. Demand for *Gnetum* has driven wild populations of this leafy vine to local extinction in Nigeria and much of southwestern Cameroon. Cameroon can supply approximately 200 tons of *Prunus africana* bark sustainably. Yet, over 3,500 tons were harvested and exported in 1999. Worse, for both Pygeum and Yohimbe, current "sustainable" harvesting practices that partially strip bark from live trees exposes them to stem-boring insects that can result in 50-90% post-harvest tree mortality.

Though harvesting seeds and fruits only adds to what is normally high seed mortality, and may not adversely impact plant regeneration, inappropriate harvesting techniques can put some fruit and seed NTFP species at risk. *Piper guineensis* fruits are widely harvested, dried, and used as a spice in local dishes. However, rather than picking the seeds from the live plant, harvesters typically uproot the plant and then strip all its seeds. This practice is clearly unsustainable as it both destroys the plant and reduces seed production and plant regeneration.

Studies show that as NTFPs increase in value there is a trend toward overharvesting of wild resources, increased on-farm production, and exclusion of resource users by resource managers. Of the 20 most economically valuable NTFPs in Central Africa, 11 are unsustainably harvested and 12 are now cultivated. This trend suggests that few if any commercially valuable NTFPs can be harvested sustainably from the wild, given present resource access and ownership laws.

Pathways to Sustainable Use of NTFPs

When the value of an NTFP and the intensity of exploitation are low, human impacts on that NTFP are likely to be minimal and little if any formal management of the resource is required (Figure 2). At the other end of the continuum, when the value of an NTFP and the intensity of its use are extremely high, it is highly likely that the resource is being overexploited and is threatened with local extinction. In this case substitution or domestication may be the only way to conserve the wild resource without adversely affecting local livelihoods. Between these two extremes, human use of wild resources has a measurable impact on NTFP species abundance and productivity but can be sustainable if appropriate management systems are in place (i.e., if there is control over resource access and harvest levels).

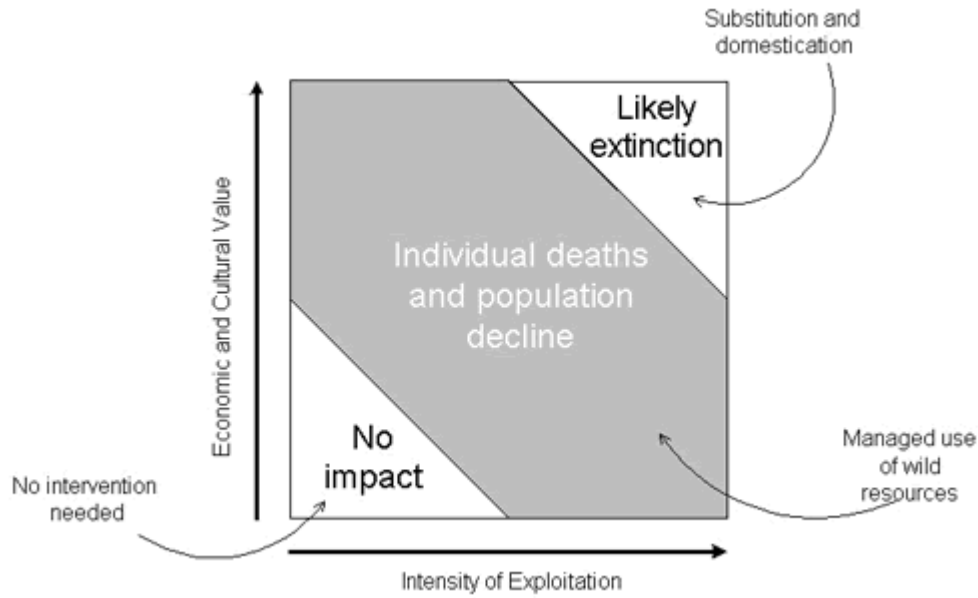


Figure 2: Effect of value and use intensity on NTFP management options

Two major options are available to manage NTFPs. The first, domestication and on-farm cultivation, is appropriate when wild resources are being over-exploited. The second, putting in place systems to define who has access to wild NTFP resources in a given area and to monitor (measure and control) harvest levels, is appropriate when wild resource use is still within sustainable levels.

Several NTFPs are already grown within farmers' fields (e.g., *Irvingia*, *Dacryodes*, *Ricinodendron*, *Piper*) and field trials are demonstrating the potential for on-farm cultivation of *Gnetum* and rattans. On-farm cultivation, however, amounts to the privatization of NTFP production and, as wild stocks are depleted, will further reduce access of landless families to NTFPs. Unclear and unenforceable NTFP access and management rights leave most NTFPs open to overharvesting. In other words too many people are harvesting too much plant and animal products too quickly. Given that economic factors are driving unsustainable use, attempts at maintaining the number of harvesters but lowering their harvesting rates and consequently their economic returns, are unlikely to be effective.

We know that market exploitation is likely to be sustainable only by exploiting those NTFP parts that do not result in the death, declining productivity, or reduced replacement of the plant. Applied research is critical to identifying and disseminating best practices. For example, though evidence shows that strip-barking of Yohimbe is unsustainable, a system of selective felling and complete de-barking of senescent individuals (the Senility Criteria Yield Regulation (SCYR) system) is both ecologically sound, as it mimics what would happen in the absence of human intervention, and economically desirable, as it is the largest trees that have the most bark with the highest concentration of active ingredients.

Future Role of NTFPs

One of the basic questions CARPE has asked in Central Africa, is: "What are the roles that the NTFP sector plays in improved farmer livelihoods, and what are the roles it plays or could play in forest conservation?"

Livelihoods

Research has conclusively demonstrated that NTFPs are important sources of food, medicines, and income to many households in Central Africa. These same studies also indicate that use of NTFPs is a symptom of poverty and not a cure. Wealthy households or those with access to agricultural markets (i.e., those that can sell cash crops) often consume NTFPs, but seldom harvest them for sale. If agricultural markets revitalize or on-farm cultivation of NTFPs increases substantially, interest in wild harvesting of NTFPs is likely to decline, except within the poorest, most marginalized, and landless families.

In the absence of NTFP access reform, most commercially valuable NTFPs will be overharvested in the wild. On-farm cultivation will increase the economic value of NTFPs to landowner families, but will decrease NTFP access for landless families. On-farm cultivation of high value NTFPs may reduce pressure to harvest from the wild, but may increase incentives to clear forest to cultivate these new crops. Expansion of international markets for NTFPs will drive up prices, increase overharvesting of NTFPs in forests, encourage on-farm production, and increase the contribution of NTFPs to local and national economies.

Forest Conservation

NTFPs have an important role to play in household livelihoods but it is unclear whether or not the commercial use of NTFPs will result in increased conservation of natural forests.

Logging and agriculture can, but do not necessarily, adversely affect abundance and diversity of NTFPs. Though NTFPs are found in primary forests, many are also found in secondary forest, roadsides, and fallow farmland. Conservation of biodiversity and reduction in the rates of deforestation in a landscape as large and varied as the Congo River watershed will not be simple, particularly as it will require reconciling multiple uses of the forest. The challenge of managing forest resources that have multiple uses is exemplified by the case of the Moabi tree (*Baillonella toxisperm*), which is valuable as a source of timber, cooking oil, and elephant food.

Clearly, any sustainable forest management or forest conservation plans or activities will need to begin with a clear understanding of local land and resource tenure and access rights. Further layers of class, education, elite, and statutory "rights" overlying these basic traditional tenure guidelines will affect how innovations and management options are implemented, and together these relationships will play a direct role in management successes or failures.

Baillonella toxisperma presents in one species the range of opportunities and conflicts present in many economically valuable NTFP. *Baillonella toxisperma*, or Moabi, is one of the most highly valued and beautiful timber trees in the Central African forests. The oil extracted from its seeds is so highly valued that it is rarely traded or found in markets; the women who are its primary users prefer to keep it for their own consumption. The tree occurs as scattered individuals across a forest, or, rarely, in small groves, so that when a tree is felled, it may remove the source of oil for many villages. Long-lived, the tree is estimated to be of far greater value for its oil producing capacity than for timber, but the short-term profit gained by logging overwhelms its long-term oil-producing value. Trees younger than about 100 years are not particularly valuable for either timber or oil. Finally, elephants are the primary mechanism for seed dispersal of Moabi. As forests are logged, converted to agriculture, and demand increases for the meat and ivory of elephants, elephant populations are rapidly vanishing. If the Moabi vanish, the elephants would lose part of their food source, and if the elephants vanish, the Moabi's principal means of distribution across the forest ecosystem will disappear. Moabi is Red Listed by CITES and steps need to be taken to integrate short-term profits from logging with long-term sustainability issues, including the provision of the valued oil (and the host of other medicinal and cultural uses for which Moabi is valued). *Baillonella toxisperma* is a prime species to be included in sustainable forest management plans and practices.

What Can You Do About It?

Ecology

- Collect baseline ecological data both for key NTFP species and for their habitats. Different harvesting regimes should be tested to verify their sustainability.
- Sustainable land management plans reflecting ecological, social, and economic concerns need to be established for forestlands, with key NTFP and timber species serving as indicator species for investment and monitoring.
- Test the senescent tree harvest/debarking methods for all bark-based NTFP to examine their economic and ecological effectiveness against current methods.
- Evaluate the effect of on-farm NTFP cultivation on common-pool forests.

Policy

- Management agreements for many potentially high-value NTFPs should be developed

and implemented, addressing intellectual property rights, land tenure, and resource access.

- Communities should possess the legal authority to regulate access to NTFPs, while ensuring that all users within the community retain access rights.
- Governments need to foster collaboration within appropriate ministries to share information on key NTFP species, bushmeat, fuelwood, and construction poles.
- The contribution of NTFPs to the economy needs to be integrated into national accounting systems.
- Collaborative networks between local and international NGOs, private industry, and the government should be developed for the sharing of information and data and in developing conservation management plans that reflect the cross-cutting nature of NTFPs, local uses, and customs.
- Review forest use and land tenure policies and make necessary changes to close open-access to the forest estate and to encourage investment in sustainable forest resource management.
- Encourage open, public debate on resource use allocation of the forest estate.

Socioeconomic and Marketing

- Accelerate on-farm cultivation of high-value NTFPs that may have a competitive cash advantage over other cash crops, and that encourage the maintenance of trees on the landscape.
 - Assessments of the cultural, religious, culinary, and medicinal uses of NTFPs should be gathered and collated to set the economic aspect of NTFPs within its cultural context.
 - Develop "green" criteria and a certification process for trade in wild-harvested and on-farm NTFPs.
 - Expand Central African participation in international markets for certified on-farm NTFPs and other domestic agricultural crops (cassava leaves, yams, coco-yams, bitter leaf, cocoa, coffee, etc.) and products (honey, paper from banana leaves, inks, dyes, soap, etc.).
 - Provide producers with timely information on the market prices of NTFPs (to allow producers to negotiate more effectively with buyers). Also make available to farmers information on transformation, packaging and marketing options, access to micro-loans, grants, and cooperative possibilities.
 - Layer the results from NTFP market surveys, non-market NTFP assessments, and traditional and statutory land management and use these to more functionally describe the picture of the roles, movement, and importance of NTFPs in various livelihood strategies of people all across the Congo Basin ecosystem.
 - Develop transparent and useful methods to monitor the effectiveness of management activities.
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For More Information

Technical Reports

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CARPE...What Is It?

Central African Regional Program for the Environment (CARPE)

Launched in 1995, the *Central African Regional Program for the Environment (CARPE)* engages African NGOs, research and educational organizations, private-sector consultants, and government agencies in evaluating threats to forest integrity in the Congo Basin and in identifying opportunities to sustainably manage the region's vast forests for the benefit of Africans and the world. CARPE's members are helping to provide African decision makers with the information they will need to make well-informed choices about forest use in the future. BSP has assumed the role of "air traffic controller" for CARPE's African partners. Participating countries include Burundi, Cameroon, Central African Republic, Democratic Republic of Congo, Equatorial Guinea, Gabon, Republic of Congo, Rwanda, and São Tomé e Príncipe.

Web site:

<http://carpe.umd.edu>

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