CHAPTER 7

NON-TIMBER FOREST PRODUCTS: CONTRIBUTION TO NATIONAL ECONOMY AND STRATEGIES FOR SUSTAINABLE MANAGEMENT

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Introduction

"Non-Timber Forest Products" (NTFPs) refers to a wide range of goods, which are common sights in households and markets across the Congo Basin. The paradox of these products, as in other tropical forests worldwide, is that despite their importance and everyday use, comprehensive knowledge on their ecology and socio-economic value is largely lacking, hindering the ability to monitor, regulate and manage them. The value chains of these products (see box 7.1) are mainly informal and remain uncaptured in statistics and policy across all Central African states. Their contribution to livelihoods and national economies is thus difficult to evaluate. Policies for sustainable economic development based on their trade and consumption are consequently largely absent. However, data from across the region has been gathered which demonstrates the multi-faceted value of NTFPs. By clearly defining, and then prioritizing the most important NTFPs for both trade and own use, approximate valuation is possible. Whilst the potential market value is difficult to gauge, given the lack of resource inventories, improved and more sustainable management is possible given revisions and harmonization of regulation, increased domestication and monitoring.

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Photo 7.1: Kola nuts (Cola acuminata) for sale in a market in Kisangani, DRC

Box 7.1: Forest products value chains

The term "value chain" is useful to understand the activities involved in bringing a product from the forest, through processing and production, to delivery to final consumers and ultimately disposal (Kaplinsky & Morris, 2000). Value chain analysis is a conceptual framework for mapping and categorizing the economic, social and environmental processes. It helps to understand how and where enterprises and institutions are positioned in chains, and to identify opportunities and possible leverage points for upgrading. This analysis encompasses the organization, coordination, equity, power relationships, linkages and governance between organizations and actors.

As there is no agreed definition on what an NTFP is across the region, one is given in box 7.2. In Equatorial Guinea, the 1997 Forest Law contains a definition and lists 24 priority NTFPs. The Cameroon 1994 Forest Law uses the term "Special Products" or "Secondary forest products" which includes both timber and non-timber species, but does not define these. The Central African Republic (CAR) Forest Law defines NTFP as "similar products of forest areas or ecosystems other than timber". The 2000 Forest Law of the Republic of Congo refers to "accessory forest products". In the Democratic Republic of Congo (DRC), the 2002 Forest Code defines NTFPs as "all other forest products such as rattans, barks, roots, leaves, fruits, seeds, resins, gums latex and medicinal plants". Finally, in Gabon, both "forest products other than timber" and "NTFP" are used in the 1993 Forest Code, which lists 15 product groups and individual species.

Box 7.2: What are Non-Timber Forest Products?

"Non-Timber Forest Products" (NTFPs), are defined as spontaneous forest products of biological origin (vegetable: including plants and fungi, and animals: including meat, insects and forest fish), other than timber, derived from forests, other wooded land and trees outside forests. Excluded are exotic forest products now farmed and found in the wild in the Congo Basin, such as rubber (*Hevea brasiliensis*) and quinine (*Cinchona* spp.). Fuelwood and its derivatives are classified as NTFPs in the legal framework in Gabon, CAR and Cameroon. NTFPs are often classified by their use: for food, forage, tools, construction, medicines, aromatic products, dyes and colorants, objects of ornament, art and cultural value. All parts can be used and classified as NTFPs. For plants, these parts are the fruits, seeds, leaves, stems, bark, resins, roots, flowers and wood; and for animals, these are meat, hides, hair, horns, hooves, feathers and other parts.

This lack of convergence or common understanding remains despite regional and national studies on NTFPs. In the 1990s, research on types and uses of non-timber forest resources, their harvest and trade (Sunderland *et al.*, 1998), and exports to Europe (Tabuna, 1999) was supported by the development of data collection and monitoring frameworks (Medicinal Plants Specialist Group, 2007; Baker, 2000; Wong, 2003). The need to go beyond national borders has been increasingly recognized, resulting in regional policy initiatives to harmonize the regulatory, monitoring, tax and institutional frameworks on a national and the Congo Basin levels (Walter & Mbala, 2006; Ebamane, 2008; FAO *et al.*, 2008; Betti, 2007).

The importance of indigenous knowledge and local rights has also been recognized (Tchatat & Ndoye, 2006; Eyong, 2007), given the predominance of local communities in harvesting NTFPs. Recent research has focussed on filling knowledge gaps, investigating the social and economic importance of NTFPs for rural and urban livelihoods, their contribution to food security, health, income generation, employment, national and regional economies (Tieguhong & Zwolinski, 2009; Tieguhong *et al.*, 2008; Noubissie *et al.*, 2008; Ingram *et al.*, 2010). Strategies for improving the sector, through small forest based enterprises (Tieguhong *et al.*, 2010a) and certification (Vermeulen *et al.*, 2009) are also being explored.

Photo 7.2: Smoked caterpillars are an important source of proteins

The proportion of NTFPs consumed and sold varies widely by area, ethnic group and the type of product. For example, for 9 plant-based NTFPs in Cameroon and the DRC, on average 67 % of the harvest is traded, whilst for bushmeat between 17 and 53 % is traded (Abugiche, 2008; Ayeni *et al.*, 2001; Nasi *et al.*, 2008; Wright & Priston, 2010; Njiforti, 1996). Such trade provides both cash and acts as a safety net, especially in times of crisis, and serving as a seasonal gap filler. It is the poorest who generally have a subsistence forest-based income, while additional cash income is generated for the relatively richer actors involved in the chains, with profits generally increasing as the product moves along the value chain to wholesaler, retailers and exporters (Vedeld *et al.*, 2007; Tieguhong *et al.*, 2009; Paumgarten, 2007). Gender is often a decisive factor determining who does what in value chains. Cultural, religious, social and family responsibilities have a strong influence on male or female involvement at different stages in an NTFP chain, as well as the product characteristics. Women, often accompanied by children, are largely involved in the collection of easy to gather NTFPs, such fuelwood, *Gnetum* and safou. Men tend to concentrate on harvesting products which require long distances and overnight stays in the forest, such as hunting, collecting *Gnetum* spp. in eastern region of DRC, or collecting bush mango (*Irvingia* spp.) which is a family activity in some areas of Cameroon, or where the harvest is physically demanding - such as collecting *Car-polobia* spp. (cattle sticks), bamboo, rattan and honey. Women tend to dominate retailing, often as this is easily combined with family responsibilities. Wholesalers, intermediaries, transporters and exporters are more likely to be male. Reasons given in Cameroon and DRC for men's involvement in these professions are that it is easier for men to travel, spend time from home and have access to capital to finance these activities. The income gained from NTFPs varies considerably depending on the market, the product and seasonality: accounting from very little to around 80 % of annual average household income, with figures of between 25 to 40 % emerging as regional averages (Angelsen & Babigumira, 2010; Ingram, 2009). How the trade in NTFPs is organized and governed also differs widely per product and country, and has a major impact on the volume harvested and traded, the distribution and equity of incomes between actors such as harvesters and intermediaries; the access to and control of resources and profits. Risks (and losses) born by the actors in value chains of traded NTFPs tend to be greatest for intermediaries, who also tend to have higher levels of dependency on individual NTFPs in which they trade, and less diverse means of income and subsistence generation (Ingram, 2011). Dependency upon a product arises from a combination of factors, including the organization, access and distance to markets and information, local culture and ethnic ties and the nature of the product itself.

Photo 7.3: Honey harvesting in a logging concession

There are wide variances in the sustainability of harvesting NTFPs and ultimately the livelihoods of those dependent on them. Examples of unsustainable practices are observed with *Prunus africana* harvesting in Cameroon, Equatorial Guinea, and DRC, for which international trade was suspended in 2007 due to fears of over-harvest. Another example is the bushmeat trade which is believed to be increasingly threatened by over-exploitation (Fa & Brown, 2009). For valuable products, such as *Gnetum* spp. (see box 7.3), the high volume trade combined with low levels of domestication results in unsustainable harvests (Nde-Shiembo, 1999; Clark & Sunderland, 2004), whereas for *Dacryodes edulis*, *Cola* spp. and *Raphia* spp. species, high levels of domestication and integration into agro-forestry and farm bush systems have helped ensure the centuries long and Africa-wide trade is sustained.

Photo 7.4: Market stall displaying various NTFPs in the Bamenda market in western Cameroon

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Box 7.3: Contribution of Gnetum spp. to income diversification and food security in Central Africa

Across Central Africa, leaves from *Gnetum africanum* and *Gnetum buchholzianum*, two understory lianas, are important articles for trade and consumption. These leaves are valued for multiple reasons including their medicinal value to treat nausea, act as a disinfectant and as an antidote to certain types of poison. The leaves also have very high nutritional value as their cellulose can extend digestion periods and reduce cholesterol levels (Toirambe, 2002), and they are rich in protein and other minerals (Isong *et al.*, 1999).

Gnetum spp. exist in a wide range of habitats and are harvested in both fallow farm areas and closed canopy forests. These species contribute to food security, for harvesters who consume them directly and for households that buy leaves in the markets, and income diversification.

Annual harvest of *Gnetum* spp. from Mbandaka, Equateur and Bandundu provinces in the DRC is estimated at 200 tons. In the southwest, coastal and central areas of Cameroon, the annual harvest is estimated at 4,180 tons. The *Gnetum* spp. sector directly involves at least 1,885 and 1,744 people in Cameroon and the DRC respectively. It represents a valuable trade that is estimated at $ 3.8 million per year in southwest Cameroon and at $ 1.2 million per year in Kinshasa.

In late 90's, annual exports to Europe amounted to between 50 and 2,000 tons, representing $ 12 million (Tabuna, 1999).

Studies show that in Kinshasa over 80 % of the population consume *Gnetum* spp. at least once a week. The reasons given for this level of consumption are taste (57.8 %) and nutritional value (19.3 %). In Cameroon, 89 % of *Gnetum* spp. harvesters are women, 60 % are unmarried and they are on average 25 years old. These harvesters can earn $ 98 to 110 per month, which is higher than the guaranteed minimum wage. In the DRC, *Gnetum* spp. traders can earn on average $ 270 per month (Awono *et al.*, 2009). In Republic of Congo, for each trip to Brazzaville, wholesalers are able to make a gross margin of $ 429. In the Central African Republic, *Gnetum* spp. retailers in the Bangui markets can earn on average $ 132 per month, which is also higher than the guaranteed minimum wage.

Incomes from sales of *Gnetum* spp. allow families to pay for food, healthcare and children's education. However, the growing importance of *Gnetum* spp. both for the purposes of nutrition and for earning income increases the pressure placed on the resource. Improved harvesting and domestication techniques are therefore required to ensure the sustainability of this non-timber forest product.

Determining the priorities for managing NTFPs

The very diversity of NTFPs requires tailored strategies for sustainable management, starting with a definition of NTFPs, and a prioritization of which ones need to be managed, where, why and how.

Species used as NTFPs

The first step in managing NTFPs sustainably is to know which species are used per country. Two bibliographies on NTFPs and their uses in the region (Dounias *et al.*, 2000; Maille, 2001) provide a good overview of management issues but omit fuelwood and animal-based products. However, these two classes of NTFPs stand out as among the most important NTFPs, both for own consumption and due to their large scale trade. They are therefore discussed in more detail in chapter 5 and chapter 6. Reviews and market assessments of NTFPs in Cameroon, Congo, DRC, Equatorial Guinea, CAR and Gabon in 2010 by the Forestry Research Network for ACP countries (ACP-FORENET) indicate that over 500 plant species and at least 85 animal species are currently used as NTFPs. For example, in Cameroon nearly 500 plants and 82 animals are used as NTFPs, the majority (67 %) of which have multiple uses, with food and oils predominating (67 %), followed by medicinal products (60 %). These uses are echoed in other countries: in CAR, at least 57 plant and animal species have been recorded with food and medical uses (N´gasse, 2010), with an estimated 70 % of the rural population depending on plants for their health. In Republic of Congo, at least 166 plant species are used for food and 176 have medicinal values used in 289 treatments (Profizi *et al.*, 1993). In the DRC, over 169 plant species have been recorded for food and 166 for medicinal use (Toirambe, 2006). In Gabon, 58 botanic families containing food species, 29 medicinal uses, and 15 construction uses have been identified (Walter, 2001). The differing numbers per country reflect an inadequate capture of indigenous knowledge by science, rather than dramatically different use levels across countries.

The species used as NTFPs, their abundance and density all change with ecosystem type, and with local variations in climate and altitude, making the selection of priority NTFPs highly location specific. For example, the mountains of Cameroon and Equatorial Guinea comprise only 2.5 % of Congo Basin forests, but contain at least 10,320 flora and fauna species, of which 25 % and 10 % respectively are endemic (Bergl *et al.*, 2007) and approximately 23 % are used as NTFPs. An equivalent number of species are used in the swamp forests in Congo, DRC and Gabon, which cover 2.9 % of the basin's landmass (WWF, 2006), and the forest-savanna mosaics covering 31 % of the area (Dounias, 1996; Zapfack & Nkongo, 1999). Unsurprisingly, the majority of species are found in the lowland dense moist forest which comprises nearly 50 % of total forest cover in the region. Anthropogenic disturbances also change natural distribution patterns, for example when useful plants are unknowingly domesticated, such as groves of *Irvingia gabonensis* found along major footpaths within villages in the Takamanda area of Cameroon (Sunderland *et al.*, 2009) and the spread of *Cola* spp. across Central and West Africa (Tachie-Obeng & Brown, 2001).

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Photo 7.5: Fumbwa (Gnetum africanum) for sale in a local market in Kisangani, DRC

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This vast number of species across countries and the region means that priorities have to be made about which species and products need to be managed and where: at the source or along the value chain. A way to do this is to define what a "priority NTFP" is, using a broad classification of value. The classification criteria are shown in box 7.4. These criteria were developed from both national and regional perspectives[38], permitting a common understanding and harmonization across the Congo Basin. Based on these criteria and values, a list of priority NTFPs per country was established (see Annex 1). Combining these national priority NTFPs results in a list of the 24 most common products used across the Congo Basin (table 7.1). These comprise at least 37 species, with potentially many more species included if all those species used as fuel and bushmeat were known.

Box 7.4: A definition of "priority NTFP"

"Priority" or "key" NTFPs have been defined (Clark & Sunderland, 2004; Wilkie, 1999) as those:

- Products which have a high economic trade value or are important for auto-consumption (i.e., value for livelihoods);

- Products whose demand exceeds supply i.e. unsustainable exploitation (this is a function of *in situ* conservation priority status and domestication).

Adding to this list, other important criteria are:

- Species which have multiple uses (including conflicting);

- Species from which multiple parts are used;

- Species which are classified as vulnerable or protected (for example, on the IUCN Red List (see box 3.2), CITES listed and/or protected by national laws).

These criteria together address holistically the economic, social and environmental aspects of "value".

Photo 7.6: Njangsa seeds (Ricinodendron heudelotii)

[38] Results of a FORENET Sub-Regional Workshop on Harmonisation of National Reviews on "Non-Timber Forest Products (NTFPs) in Central Africa", 17-18 May 2010, Douala, Cameroon.

Table 7.1: Priority NTFPs across the Congo Basin (see also Annex 1)

Priority NTFPs (trade &/or consumption)	Regional priority (number of countries)	Equatorial Guinea	Congo	DRC	Cameroon	CAR	Gabon
Bushmeat (multiple species of mammals & reptiles)	6 countries	√	√	√	√	√	√
Fuelwood (multiple species)		-	-	√	√	√	√
Cola acuminata & *C. nitida*		√	√	√	√	√	√
Gnetum spp.	5 countries	√	√	√	√	√	
Rattans (*Eremospatha* spp., *Laccosperma* spp.)		√	√	√	√	√	
Dacryodes edulis		√	√	√	√		√
Elaeis guineensis		√	√	√	√	√	
Raphia spp.			√	√	√	√	√
Snails, larvae & insects		√	√	√	√	√	
Piper guineensis	4 countries	√	√	√	√		
Aframomum spp.			√	√	√		√
Garcinia kola		√	√	√	√		
Irvingia spp.		√			√	√	√
Prunus africana	3 countries	√		√	√		
Marantaceae (*Marantochloa* sp., *Megaphrynium* sp.)		√	√				√
Rauwolfia vomitoria			√	√	√		
Baillonella toxisperma		√			√		√
Coula edulis		√			√		√
Mushrooms				√	√		√
Honey		√	√	√			
Alstonia boonei		√			√	√	
Ricinodendron heudelotii	2 countries	√			√		
Garcinia lucida					√	√	
Dioscorea liebrechtsiana			√			√	

Source: FORENET, 2010

The major uses of these priority NTFPs are for food, fuel and medicine, with many having multiple uses. Included are species such as *Elaeis guineensis*, the oil palm, which is now extensively domesticated in large and small scale plantations, but which is still found in the wild.

The criterion of vulnerability and protection specifically focuses on ensuring sustainable management. For this, NTFPs commonly classed together, such as bushmeat, need to be distinguished at a species level. An example is provided by data from Cameroon, which indicate that about 42 % of the animals recorded as most hunted (Fa *et al.*, 2006; Abugiche, 2008; Tieguhong & Zwolinski, 2009; Willcox & Nambu, 2007; Wilkie & Carpenter, 1999; Ayeni *et al.*, 2001; van Dijk, 1999; Njiforti, 1996), are either protected species under the Forestry Law or are Red Listed as vulnerable. The significant negative impacts of bushmeat trade upon biodiversity across the region indicate that the current classification system for species protection is outdated, inappropriate and ineffective from a conservation perspective (Wilkie & Carpenter, 1999; Cowlishaw *et al.*, 2004; Robinson & Bennett, 2004; Fa *et al.*, 2005; Cowlishaw *et al.*, 2005; Abugiche, 2008; Nasi *et al.*, 2008). For plants, only a minority of the priority species are actually nationally regulated as protected or vulnerable, despite studies indicating that unsustainable harvesting (where exploitation exceeds the rate of regeneration) has been signalled for fuelwood (Marien, 2009; Assembe Mvondo *et al.*, 2009), *Gnetum* spp. (Sunderland *et al.*, 1998; Shiembo, 1998; Ingram, 2010), rattans (Dione *et al.*, 2000; Sunderland *et al.*, 1998), *Prunus africana* (Ingram *et al.*, 2009; Clemente Muñoz *et al.*, 2006; Sunderland & Tako, 1999; Cunningham, 2006) and *Baillonella toxisperma* (Jochem,1995;

Clark & Sunderland, 2004; Louppe & Mallet, 2009; Romain, 2009). As the rate of sustainable harvesting per product is highly geographically specific, and given the lack of resource inventories across the region, only a "red flag" warning of potentially unsustainable extraction rates on a national or regional level is currently possible.

The vulnerability of some major traded species is exacerbated by the lack of knowledge about sustainable harvest techniques. For example, in DRC and Cameroon 40 % of *Gnetum* spp. and 70 % of all *Prunus africana* are harvested using unsustainable techniques (Ndumbe *et al.*, 2009; Nkeng, 2009) despite available guidelines.

Valuing NTFPs

The criterion concerning economic trade value reflects the adage "You can't manage what you don't measure": unless an NTFP and its chain are measured, its value and performance cannot be known or governed. The term "value", from the Latin "*valere*", means "to be of worth" or "to be strong". The term "value", however, has multiple dimensions and is perceived differently by harvesters, traders, consumers, policy makers and decision makers. Valuation methods usually focus on one aspect, economic value, namely the market value, profit or turnover. However, these indicators capture only the financial aspect and not the social value when an NTFP is consumed for subsistence, bartered or given as gifts, nor their importance for communities and households i.e. during certain seasons or when goods can only be purchased with cash or not locally. In Cameroon for example, for the Baka'a pygmies in the Centre and East regions and Anyang and Becheve groups in the Southwest region, exchange, gifts and non-cash trade account for an average between 11 to 30 % of the total quantity of fruits harvested (Ingram, 2009). Many rural, remote communities dependent upon NTFPs are also only loosely integrated into the cash economy (Campbell & Luckert, 2002). Thus, quantities and the financial value for own (household) use and local, national and international trade are important indicators of value, as well as highlighting possible sustainability tensions if demand and trade increases (Wilkie & Carpenter, 1999; Ndoye *et al.*, 1998). Financial values, however, largely ignore the environmental and ecosystem importance of a species (Ingram & Bongers, 2009; Jensen, 2009). Another problem is that current and long term economic data both on a national and regional level is largely non-existent, albeit with some exceptions, such as in Cameroon for some 26 products (Ingram & Schure, 2010) (see table 7.2 and figure 7.1). For medicinal plants, where literature has focussed on the efficacy and use of species - rather than on values and volumes - this lack of data has a distorting effect on the selection of "priority" products.

Photo 7.7: Technique used to collect NTFPs from palm trees

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Table 7.2: Market value of priority NTFPs in Cameroon

Species	Value score (*)	Annual value ($)	Forest type
Fish (Catfish & other species)	4	613,600,000	All types of forests
Fuelwood (wood, charcoal & sawdust)	4	378,641,309	All types of forests
Gnetum africanum, G. buchholzianum	4	12,197,503	Lowland dense moist forest
Irvingia gabonensis, Irvingia wombulu	4	8,089,580	Lowland dense moist forest
Prunus africana	4	2,874,928	Montane forest
Dacryodes edulis	4	989,504	Lowland dense moist forest
Pausinystalia johimbe	4	847,182	Lowland dense moist forest
Ricinodendron heudelotii	4	730,325	Lowland dense moist forest
Voacanga africana	4	585,586	Lowland dense moist forest
Cola nitida	4	430,639	Lowland dense moist forest
Rattans *(Laccosperma secundiflorum, L. robustum, Eremospatha macrocarpa)*	4	284,013	Lowland dense moist forest
Cola acuminata	4	269,083	Lowland dense moist forest
Garcinia kola	4	249,938	Lowland dense moist forest
Garcinia lucida	4	171,175	Lowland dense moist forest
Baillonella toxisperma	4	11,868	Lowland dense moist forest
Piper guineensis	4	78.9	Lowland dense moist forest
Xylopia aethiopica	4	no data	Lowland dense moist forest
Acacia senegal, Acacia polyacantha	3	4,040,000	Savanna
Bushmeat (small mammals, ungulates, reptiles, rodents)	3	2,799,330	Moist forest, savanna & montane forest
Raphia spp.	3	1,574,661	Moist forest, savanna & montane forest
Apiculture: beeswax / honey	3	244,420 / 61,105	Savanna, montane forest
Tetrapleura tetraptera	3	124,489	Lowland dense moist forest
Rauvolfia vomitoria	3	94,803	Lowland dense moist forest
Cinchona spp.	3	31,500	Lowland dense moist forest
Kigelia africana	3	18,000	Moist forest and montane forest
Carpolobia lutea, Carpolobia albea	3	5,911	Humid & montane zones
Aframomum spp.*(melegueta, daniellii, citratum)*	3	no data	Lowland dense moist forest
Alstonia boonei	3	no data	Lowland dense moist forest
Coula edulis	3	no data	Lowland dense moist forest
Garcinia mannii	3	no data	Lowland dense moist forest
Guibourtia tessmannii	3	no data	Lowland dense moist forest
Harungana madagascariensis	3	no data	Lowland dense moist forest
Khaya ivorensis	3	no data	Lowland dense moist forest
Lophira alata	3	no data	Lowland dense moist forest
Lovoa trichilioides	3	no data	Lowland dense moist forest
Megaphrynium macrostachyum	3	no data	Lowland dense moist forest
Milicia excelsa	3	no data	Lowland dense moist forest
Monodora myristica	3	no data	Lowland dense moist forest
Morinda lucida	3	no data	Lowland dense moist forest
Nauclea diderrichii	3	no data	Lowland dense moist forest
Poga oleosa	3	no data	Lowland dense moist forest
Scorodophloeus zenkeri	3	no data	Lowland dense moist forest
Terminalia superba	3	no data	Lowland dense moist forest
Trichoscypha arborea	3	no data	Lowland dense moist forest
Vitellaria paradoxa	3	no data	Savanna

(*) See table 7.3 for the meaning of score value.

Source: Ingram & Schure, 2010

Table 7.3: Value scoring system used in Cameroon

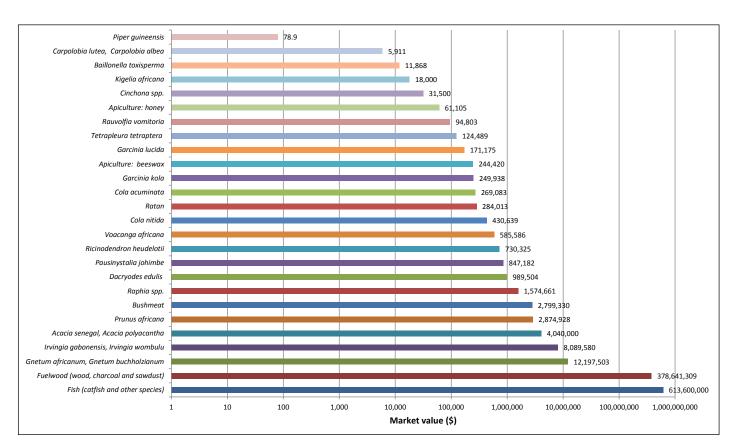| Score	Use
1	Minor consumption (for cultural, medicinal, alimentation, tools, construction use)
2	Multiple use species (consumption) Limited trade (local trade or barter/exchange)
2.5	Multiple use and local and regional trade
3	Wide scale trade (important revenue source for livelihoods, regional to national and international trade)
	Multiple use species (consumption and trade) Major consumption (important cultural, medicinal, alimentation, tools, construction use) Species classified as protected or vulnerable
4	Major consumption and wide scale trade nationally and/or internationally and/or protected

Figure 7.1: Market value of priority NTFPs in Cameroon
Note: market value is represented in logarithmic form
Source : Ingram & Schure, 2010

To compensate the fact that valuing usually focuses only on economic aspects, a multi-faceted but simple scoring system of value that incorporates own use, consumption, barter and non-cash trade is used (table 7.3). This elaborates on the values and importance rankings used in other studies (Zapfack & Ngobo, 2001; Termote *et al.*, 2010). Where data was not provided on the importance, and species had only one use, a "minor consumption" score was given. Species with multiple uses, and from which multiple parts are used, were scored having a higher intrinsic value. Market observations highlight the discrepancy between, on one hand data which focuses on the high value, wide scale often long distance trade in NTFPs such as *Gnetum* spp., *Irvingia* spp. and *Dacryodes edulis*, and on the other hand the 100 or so NTFPs, which are commonly traded and consumed in Central Africa, but for which little data on volumes and values used and traded exists. An explanation for this paradox is that as many of these species have multiple products and uses, the full trade, economic and social value of multiple uses is not captured by market surveys or market information systems, as these tend to focus on food use. *Raphia* species, with over 30 different products, derived from 6 parts, are an excellent illustration of this. Table 7.4 shows the outcome of the valuation exercise for the region.

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Photo 7.8: Bush mango (Irvingia spp.) kernels

Table 7.4: Valuing of priority NTFPs in the Congo Basin

Priority NTFPs (trade &/ or consumption)	Trade / consumption (*)		Unsustainable exploitation	Multiple uses	Conflicting uses	Multiple parts used	Vulnerable or protected species	Total score
Prunus africana	L I	C	**	**	**	**	**	13
Baillonella toxisperma	L I	C	**	**	**	**	**	13
Bushmeat (multiple species of mammals & reptiles)	L N I	C	**	**		**	* (some species)	11
Fuelwood (multiple species)	L	C	*	**	**	**	* (some species)	10
Irvingia spp.	L N	C		**	**	**		9
Rauwolfia vomitoria	L I	C		**	**	**		9
Gnetum spp.	L N I	C	**	**				8
Apiculture (honey, beeswax)	L N I	C		**		**		8
Garcinia kola	L	C		**		**	**	8
Alstonia boonei	L	C		**	**	**		8
Rattans (e.g., *Eremospatha* spp., *Laccosperma* spp.)	L N	C	* (some species)	**			* (some species)	7
Dacryodes edulis	L N	C		**		**		7
Elaeis guineensis	L N	C		**		**		7
Raphia spp.	L N	C		**		**		7
Piper guineensis	L N	C		**		**		7
Coula edulis	L I	C		**		**		7
Garcinia lucida	L	C	*	**		**		7
Aframomum spp.	L	C		**		**		6
Cola acuminata & *C. nitida*	L N I	C						4
Snails, larvae & insects	L	C					**	4
Marantaceae (Marantochloa sp., *Megaphrynium* sp.)	L	C		**				4
Ricinodendron heudelotii	L N	C						3
Mushrooms	L	C						2
Dioscorea liebrechtsiana	L	C						2

(*) L = local, N = national, I = international, C = subsistence consumption

Source: Ingram & Schure, 2010

Regulatory and policy framework

A robust regulatory and policy framework can, alongside customary practices, aid sustainable management and increase the contribution of NTFPs to national economies.

Introduction

COMIFAC members have recognized the role of NTFPs in reducing poverty, realizing economic development and conserving biodiversity (Lescuyer, 2010b; FORENET, 2010; Tieguhong *et al.*, 2010a; Chupezi *et al.*, 2009; Ndoye & Tieguhong, 2004). However, the NTFP sector is negatively affected by inconsistent legal and institutional policies that do not favour effective management and commercialization of the resources (Ndoye & Awono, 2009; Tieguhong *et al.*, 2010). In recognition of this, COMIFAC reiterated the need to improve the legal and institutional frameworks governing the NTFP sector in its Convergence Plan, which recently formed a strategic intervention by means of four pan-regional research and development projects and activities in the region (FORENET, 2010; FAO *et al.*, 2008; COMIFAC, 2008). The COMIFAC Directives however focus on vegetal products, whilst the prioritization indicates that fauna products - both bushmeat and forest fish - are equally important.

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Photo 7.9: Aiélé (Canarium schweinfurthii) fruit

Legal issues governing NTFP sector

The legal aspect in exploiting NTFPs has become clearer as concepts such as access and user rights, governance, decentralization, corruption, illegality and transparency have evolved. Current legal frameworks however are not wholly effective in sustainably managing NTFPs, instead causing administrative bottlenecks to obtain exploitation and trade permits, a multiplicity of controls and payment of bribes with resulting high administrative and transaction costs for producers and traders in NTFP value chains. As an example, in Cameroon, for the transportation and commercialization of *Gnetum* spp. from production area to export zones over one year, some thirteen groups of actors extorted CFA 114,219,600 ($ 228,439), equivalent to 33.5 % of transaction costs in the majority (82 %) of 18,368 transactions registered (Tieguhong *et al.*, 2010). Of 302 journeys made by these traders in 2008, on average 60 controls were made during the 600 km journey and at each post, between five minutes and up to five hours was spent, with an average 74 tons classed as substandard and 26 tons perishing over this period. The time wasted and loss of products raises prices for traders and consumers, reduces profit margins for traders, and increases volumes harvested to meet demand, as well as resulting in overloading of vehicles (resulting in higher risks of road accidents) and lower prices paid to local producers (Tieguhong *et al.*, 2010; Ndoye & Awono, 2009).

Photo 7.10: Collections of "cattle sticks" near Takamanda National Park, Cameroon

In most Central African countries, access to permits for NTFPs is as complicated and comparable to trading in timber. The main difference tends to be the scale of capital outlay, which is much larger for timber, with long and cumbersome administrative procedures for small and medium scale business (Tieguhong *et al.*, 2010; Ndoye & Awono, 2009; FAO, 2009). In Cameroon, for example, "Special forestry products" are regulated by the forestry administration through a system of quotas set annually. Although the committee deciding the products annually is drawn from different ministries, the quotas set and allocated are not based on any resource inventories but are demand led. In some cases, social ties to members of the quota allocation committee and the influence of higher ranking officials play critical roles in the process. The consequence is that quotas are allocated to individuals not actively participating in the NTFP value chain beyond the stage of quota allocation (Ndoye & Awono, 2009). These individuals resell quotas to traders in the form of waybills at higher prices, up to 800 % in some years, per unit of product traded than the government tax rate. These loopholes mean that small traders find it difficult to obtain permits, paying more to do business or, as the majority of small scale operations do, operating informally and illegally without permits. This is possible given the low level of enforcement of permits and high levels of corruption, plus the low level of knowledge about permitting by officials in the field. Government revenues from taxes in the NTFP sector are therefore not optimized, not showcasing the real economic or social impact of the NTFP sector to policy makers.

Improving regulation

Collective action and small initiatives, often micro-enterprises, based on NTFP value chains can be viable options to reduce poverty and combat food insecurity in Central Africa (Molnar *et al.*, 2010; Awono *et al.*, 2010). However, the weaknesses in current legal and institutional policies do not favor NTFP based business growth and expansion. Conflicting and overlapping customary and formal regulations make management difficult and recognition of positive customary regulations could aid sustainable management (Laird *et al.*, 2010). Good governance (defined as a product of good laws and their appropriate implementation) provides a yardstick for sustainable forest management including NTFP production and commercialization. The identification of weaknesses in current forest codes and legislation across Central African countries have culminated in a participative multi-stakeholder process to produce sub-regional guidelines on sustainable management of NTFP of plant origin in Central Africa, adopted by COMIFAC in 2008 (FAO *et al.*, 2008). These guidelines aim to aid the revision of existing national laws, taking more account of the realities in the NTFP sector. The national forest policies should be redrafted, drawing extensively on these sub-regional guidelines using a participatory approach involving relevant stakeholders. Cameroon has used these guidelines to revise its 1994 Forest Law. Gabon, Congo, and the CAR have already started the process of adapting the sub-regional guidelines to their national contexts, while the DRC will begin in 2011. A second step will be to elaborate decrees of application and the terms and conditions.

A strategic national action plan to promote the development and sustainable management of NTFPs has already been developed in Congo and similar plans are being carried out in Gabon and CAR.

Monitoring permits an awareness of the state of NTFPs and enables a response to changes occurring over time, for example, due to harvesting. It is an important tool to provide information on the effectiveness and efficiency of resource management and further identifying priority species for support or protection. Monitoring is based, for example, on regulations and the efficacy of control systems, level of domestication, exploitation techniques, processing and storage technologies. Currently few NTFPs are monitored for resource availability, use and trade. Only a handful of the most threatened NTFPs in Central Africa are monitored under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): elephant ivory (*Loxodonta africana*), leopard skins (*Panthera pardus*) and pygeum bark (*Prunus africana*). Whilst many countries in the region record annual permits and exports for particular NTFPs, these do not reflect actual use or trade - due to problems faced in implementing permit systems, the informal nature of most trade and the higher priority given to tracking timber for export. Given the wide range of NTFPs exploited, a key issue in monitoring is deciding which products to monitor, how and what to measure. A proposal for how to define these priorities is made in box 7.4., and table 7.5 illustrates the data required for a regional monitoring of NTFPs.

Table 7.5: Themes and indicators for NTFPs monitoring

Type of data	Monitoring indicators
Knowledge of the resource (potential of priority NTFPs in forest)	Habitat
	Inventory
Production	Main collection areas
	Collection method
	Stakeholders
	Gender
	Employment generated
	Production period
	Volumes
	Availability
	Domestication
	Constraints
Commercialization	Stakeholders
	Markets
	Origin of products
	Destination of products
	Volumes
	Costs
	Profits
	Constraints
Processing, packaging and storage	Processing tools
	Level of processing
	Derived products
	Constraints
Consumption	Local scale
	International scale
	Energy supply

A regional approach is recommended to harmonize both forestry directives as well as economic and food security, as it is clear that NTFP use and trade crosses national borders. COMIFAC, aware of the legal, institutional, and fiscal needs for convergence and harmonization, have allocated the role of NTFPs monitoring to the Observatory for the Forests of Central Africa (OFAC), to provide both COMIFAC and CBFP members with a powerful steering and data sharing tool to promote better and more coordinated research, governance and sustainable management of forest ecosystems.

The availability of NTFPs on both a national and regional level is currently largely unknown. Inventories are therefore essential for priority NTFPs on a national scale, supported by long term studies (at least five years) to determine their density, actual yields, and their qualitat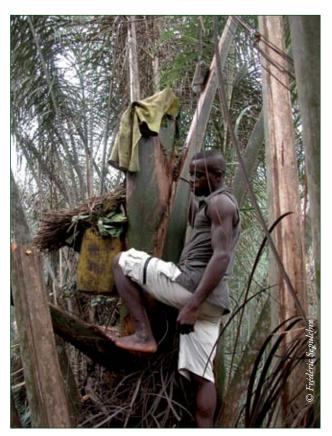ive and quantitative economic, social and ecological value. Collecting such data is only possible when harvesters are recognized more formally and the value chains of these products are understood.

The methods used to classify and monitor NTFP based commerce need to be harmonized on a national level to allow inter-country comparison, supported by multidisciplinary databases (ethnobotany, socio-economic, ethnozoology and ethnomycology). Principal monitoring activities include: (i) the selection of representative regional study sites (for moist forests, savannas, coastal areas, swamps and mountains), (ii) the selection of the types of information required (i.e. qualitative, quantitative, spatial, legal and institutional) (Betti, 2007), and (iii) agreeing on monitoring indicators to be used to indicate the state of the resource and current management. This should include (a) economic and social indicators (such as the contribution to national product, number of people employed, markets, fiscal and tax revenues, and gender and minority ethnic group implications); (b) a regulatory and institutional framework (existence of regulations, compatibility with customary rights and practices, national strategies, specialized administrative services); (c) resource availability (such as multiple resource inventories and maps of production areas); and (d) a good definition of the sampling strategy and methodology used for inventories.

Further research is needed on high value NTFPs. These are currently scientifically poorly understood. It is important to obtain herbarium specimens, and study the reproduction, propagation and domestication techniques and harvest trials to enable introduction into agro-forestry and farming system, counteracting the risk of over-harvesting in the wild. This is particularly important for vulnerable species.

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Photo 7.11: Products from palm trees are used for multiple purposes

Strategies for sustainable management

Challenges

Given the current status of NTFPs in the region, the barriers to have a local, let alone national and regional sustainable management of NTFPs are as vast as the Congo Basin forest itself. Challenges include how to ensure sustainability by moving products out of the forest and onto the farm, where issues of tenure, ownership, access and management are often less contentious. Tenure, both of forested land and individual trees, has been shown to be extremely important to ensure sustainable resource use (Guariguata *et al.*, 2011; Laird *et al.*, 2010; Molnar *et al.*, 2010). Domestication techniques do exist and are widely applied for several of the most common NTFPs such as oil palm, raphia, safou and cola. But for many with a large trade and which are difficult to cultivate (such as *Gnetum*) the challenge is to ensure they are more widely known. A major hurdle is to overcome the threat of unsustainable and insecure supply in the face of increasing rural and urban demand, coupled with a lack of checks and balances due to the current inconsistent policies, agencies and regulation, poor governance and a lack of domestication policies. The informality of the NTFP sector, combined with its "hidden" and largely institutionally unsupported nature, also means that the value chains are often inefficient due to ineffective or non-existent market information systems, access to finance and technical support. The majority of NTFPs are inefficiently marketed, resulting in losses of up to 8 % of harvest for *Irvingia* spp., *Gnetum* spp. and *Dacryodes edulis* in Cameroon and DRC, particularly at the earlier stages of the chain. Very low levels of processing and transformation often result in only minimal value and profit being added. This together with undeveloped or unapplied processing technologies, associated with lack of chain-wide knowledge and coordination, lead to improper coordination of consumer preferences and demands with supply. Corruption creates an unfavorable business climate, so that whilst NTFPs provide an income for many, how that income is distributed amongst those concerned in the trade is often highly inequitable, causing revenues for the state, individuals and small enterprises to be highly unpredictable.

Opportunities

Potential to improve the sector and its contribution to national economies and livelihoods are apparent. On a national level, stakeholders in DRC and Cameroon have shown that they are open and willing to participate in formulating policy options and proposing revisions to the national framework to rationalize, simplify, and harmonize some of the contradictory policy and regulatory extremes and inappropriate legal framework. In Gabon and CAR, discussions are underway with stakeholders to put in place national strategies on NTFP to improve the sector. Secure tenure appears critical to sustainable exploitation and domestication. Tenure rights are one of the thorny issues deeply embedded in the conflict between customary and administrative systems in Central Africa and appear less likely to be changed in the short term. Domestication however is ongoing on a small scale and continues to be a key aspect in ensuring a sustainable supply. Promising results have been shown from *Dacryodes edulis* and *Gnetum* spp. agro-forestry projects in Cameroon. However, the up-scaling of pilot projects and demonstration, coupled with extension services are essential to integrate NTFPs into everyday farming systems and take pressure off wild harvesting. Products such as *Gnetum* spp. illustrate that while they are still "freely" available in the wild, and can be harvested without too much effort, and tricky domestication techniques are unknown, uptake is modest but can be greatly improved with training and support (Wirsiy *et al.*, 2010). However, when products are of sufficient value and scarcity, such as *Prunus africana*, and domestication techniques are well disseminated, such as for *Cola* and safou, adoption is more successful (Pye-Smith, 2010). Opportunities to increase employment and profitability by developing national, cross ministerial policies to secure and professionalize the sector instead of criminalizing it, have also positive response in parts of the region. These have provided business, infrastructure, and technical support and enabled market information system trials and value chain platforms, facilitating the operating environment for individuals, small enterprises and value chains,

particularly in cross border cooperation. A focus on processing, storage and value adding techniques/technologies has also been demonstrated for products such as bush mango. They could offer enormous potential to increase profit margins but may also have negative effects on sustainability (if demand is stimulated without securing supply) unless it is well managed. Equally, sustainable harvest techniques exist for several priority species such as *Cola nitida*, *Ricinodendron heudelotii*, *Gnetum africanum* and *Irvingia* spp. (Facheux *et al.*, 2006), rattan (Tshimala-Tshibangu *et al.*, 1996; Sunderland, 2001), bamboo (Ingram *et al.*, 2010), *Garcinia lucida* and *Garcinia kola* (Guedje & Fankap, 2001), *Prunus africana* (Republic of Cameroon, 2009; Tsobeng *et al.*, 2008; MOCAP-CIG, 2007), *Gnetum* spp. (Shiembo *et al.*, 1996; Blackmore & Nkefor, 1998; CENDEP, 2010), and apiculture (Bees for Development, 2008; Anembom Consulting, 2008), but need much wider dissemination.

Future needs include reinforcing the links so that researchers can inform policymakers and NTFP value chain actors on study findings; and a debate to develop consensus among actors in the value chains (harvesters, traders, regulators, consumers) on the criteria for "priority" NTFPs, using a "holistic" approach nationally and regionally. This could be coupled with the current revision of national forestry laws and enforcement mechanisms to ensure a harmonized regional approach. Management implies measuring, and so a realistic, common methodology for data collection and monitoring, is essential.

Photo 7.12: Honey is a common and very appreciated NTFP throughout Central Africa

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