Urbanization and forest foods in Benin

A. Bertrand, G.A. Agbahungba and S. Fandohan

Urbanization is driving demand for forest foods, but a stronger regulatory environment is needed if this growing sector is to be sustainable.

The contribution of forests to the gross domestic products of "non-forest" West African countries such as Benin is usually considered to be very low, but this notion does not hold up to scrutiny. Many plant and animal forest products are used as foodstuffs in Benin – but they often do not appear in national accounts because they are harvested and traded informally, either illegal or semi-illegally.

Worldwide, the urban population is expected to grow by over 3 billion people to 2050, primarily in less-developed countries, with the result that over 70 percent of the world's population will be living in cities by the middle of the century (United Nations Population Division, 2008). An urbanization process is under way in Benin. This article reviews the implications of that process for Benin's forest sector and especially for the role of forests in the provision of food.

RAPID URBAN DEVELOPMENT IN WEST AFRICA

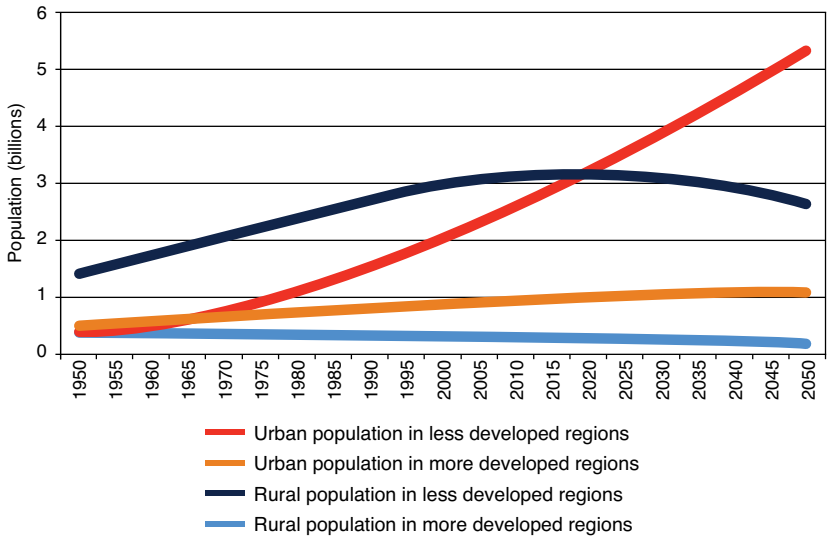
Figure 1 shows that, worldwide, the urbanization process is most dramatic in less-developed countries. Sub-Saharan Africa has a large rural population and an emerging trend of urbanization. Figure 2 shows the proportions of the total populations

A man displays the skin of an African rock python* (Python sebae) *on a rural road in Benin. Snake – caught wild or bred in captivity – is becoming a popular food in urbanizing Benin

©G.A. AGBAHUNGBA

Alain Bertrand is a forestry consultant in Tanger, Morocco, **Georges A. Agbahunbga** is an independent consultant in environment and development and professor at CIPMA, Cotonou, Benin, and **Sylvestre Fandohan** is the director of ProCGRN/GIZ, Cotonou, Benin.

1
Urban and rural population growth in developed and less-developed countries, 1950–2050



Source: United Nations Population Division, 2008

in Francophone African countries that are urban. Almost half (45 percent) of Benin's population is urbanized, although Cotonou (the country's largest city) ranks only sixteenth in size among West Africa's urban areas. The trend of rapid urbanization is also strong in many of Benin's neighbours, including Nigeria, where about 50 percent of the country's 175 million people (Government of United States of America, 2013) is urbanized.

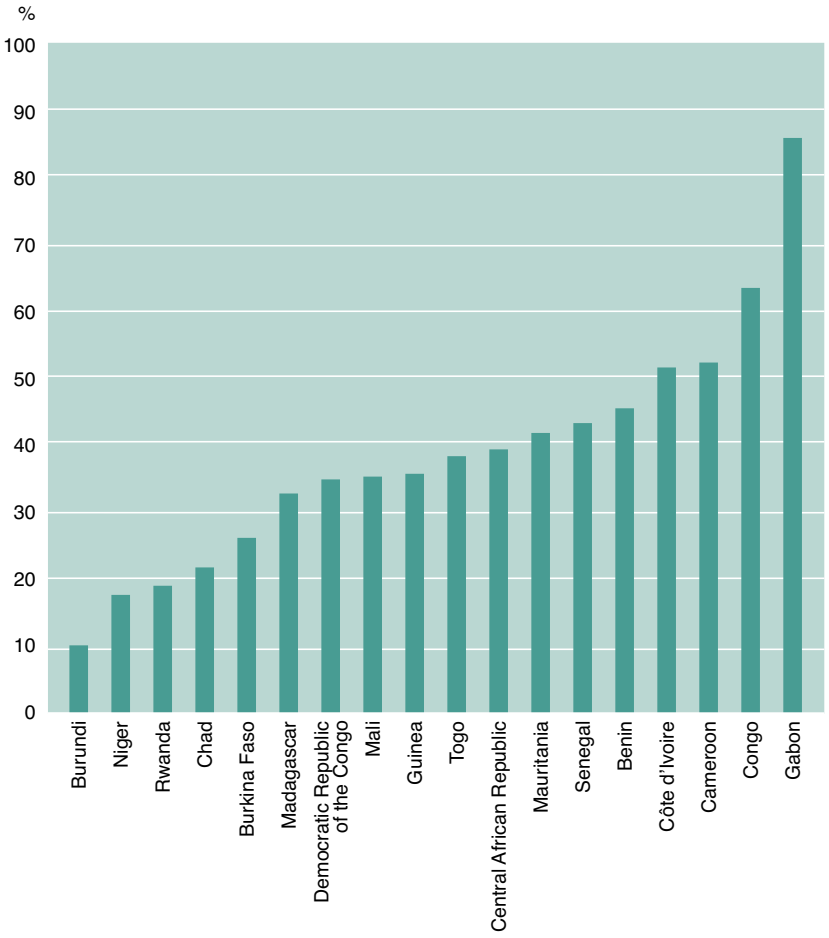
EFFECTS OF URBANIZATION ON FORESTS

Urbanization implies a shift in lifestyles and diet patterns, and food acquisition becomes a matter of monetary economics. In the rural areas of Benin, however, on-farm consumption and subsistence farming still prevail. By creating market demand, urbanization can revitalize the production and distribution of forest food products. It can also lead to social diversification as new citydwellers act as distributors and consumers of these products.

An influx of urban consumers creates new markets that can be exploited by dynamic rural producers, enabling them to diversify their production and meet the demand for multiple and increasingly processed forest products. Rural entrepreneurs have opportunities to market new products and activities that may previously have been restricted to their family circles (Codjia, Assogbadjo and Mensah Ekué, 2003). Table 1 shows that, in 2008 (the latest year for which such data are available), a range of forest products were economically significant in Benin.

Some forest products that were once secondary, such as cashew and shea, have become major agricultural products for export (Gnimadi, 2008). Supply chains with no legal status, such as those supplying small bushmeat, are now common and can no longer be ignored.

2
Percentage urban of total population, countries of Francophone Africa



Source: Government of United States of America, 2013

TABLE 1. Contribution of forests and trees to GDP in Benin, 2008

Product	Notes	Estimated total annual value added (million FCFA)
Cashew (*Anacardium occidentale*)	Export	53 000
Bushmeat (various species)		28 000
Woodfuel	Charcoal	27 886
Breadfruit (*Artocarpus altilis*)		12 430
Shea (*Vitellaria paradoxa*)	Butter consumed in Benin	6 466
Timber (natural forests)		2 923
Timber (teak, *Tectona grandis*)	Export	2 753
Shea	Almonds for export	2 237
Woodcraft		1 898
Woodfuel	Firewood	1 517
Toothbrushes		1 404
Honey		1 281
Cashew	National consumption	980
Néré (*Parkia biglobosa*)		361
Palmyra palm (*Borassus* spp.)		293
Live reptiles		127
Medicinal plants		109
Non-conventional farming		86
Irvingia spp.	Fruit	54
Mushrooms		43
Timber (teak)	National consumption	31
Snails (*Achatina achatina*)		23
Baobab (*Adansonia digitata*)		21
Irvingia spp.	Almonds	21
Service wood		15
Shea	Butter for export	8
Total forestry/trees on farms		**143 967**
GDP Benin, 2003–2005		**2 169 000**
Share of forestry in GDP (approx.)		**6.6%**

Source: Bertrand, Agbahungba and Tonou, 2009

TABLE 2. Relative share of forest subsectors in GDP, Benin, 2008

Forest product group	Forest product	Annual value added (million FCFA)	Percentage of total forest sector
Woodfuel	Firewood, charcoal	29 403	20
Plant forest products used as food in Benin	Breadfruit, shea, honey, cashew, néré, palmyra palm, *Irvingia* spp. (fruit and almonds), mushrooms, baobab fruit	21 950	15
Animal forest products used as food	Bushmeat, snails, non-conventional farming (agoutis, reptiles, etc.)	28 109	19
Export products	Cashew, teakwood, shea (almonds and butter)	58 124	40
Wood products for use in Benin	Timber (natural forests, teak), service wood, craftwood	4 867	3
Forest health products	Medicinal plants, toothbrushes	1 513	1
Total, forest sector		**143 966**	**100***

Source: Bertrand, Agbahungba and Tonou, 2009 * Does not tally to 100 due to rounding.

This is a major issue in forest policy. Also significant is woodfuel, a forest product that is used daily in most Benin households.

Table 2 shows that, combined, plant and animal forest and tree products used as food account for almost 35 percent of the forest sector's value added, second only to exported forest products and considerably more than woodfuel. The income derived from plant and animal forest products used for food represents over 54 percent of income generated in rural areas by Benin's forest sector.

This finding confirms the major part played by forests in people's food security (Kadevi, 2001). Forests should no longer be considered primarily for their wood-producing functions (woodfuel, timber and service wood), but also for their essential contributions to feeding communities, particularly disadvantaged groups (Lebel, 2003). Such recognition will require a profound shift in forest policy. Forest food products and supply chains can add to forest productivity without diminishing existing subsectors of the forest industry dealing with wood and wood products (Assogba, 2007).

REVENUES STAY WITHIN THE RURAL CONTEXT

Plant food products account for about half of rural forest incomes, followed by woodfuel and animal food products. Rural people constantly seek alternative sources of revenue to complement their income from farming and livestock, and these alternatives often vary according to the comparative advantages of particular areas (and thus certain activities may become locally widespread). A little over one-third of revenues derived from forest products are retained in rural areas.

Development of forest product chains

Urban sprawl induces major social and economic changes in and around cities throughout the hinterland. In Benin, Cotonou's hinterland extends across the entire national territory and beyond the national borders into the Niger, Nigeria and Togo.

Forest-food supply chains are developed in both formal and informal – including illegal – ways (Igué, 1983). Those based on on-farm

©G.A. AGBAHUNGBA

A man sets out baobab fruit for sale on a roadside in Benin. With increasing urbanization, new enterprises are helping to promote the remarkable nutritional benefits of this food

consumption (e.g. fruit such as *Irvingia* spp. and *Saba senegalensis*), conventional rural trade (e.g. "miritchi" or palmyra palm sprouts – Gschladt, 1972), traditional medicinal plants and snail-breeding are informal. Given their informality, obtaining economic data on them, such as the volume and value of outputs and the size of the workforce, is difficult, and it is especially challenging in the case of illegal value chains.

THE DEVELOPMENT, UPGRADING AND EXPANSION OF TRADITIONAL CHAINS

Many neo-citydwellers feel nostalgic for rural life after their urban migration, and this sense of nostalgia is fostering the spread of traditional foods into urban markets. In the past, such foods were restricted to market villages in production areas (Delvaux and Sinsin, 2003); thus, urbanization tends to expand the spatial and sociological coverage of traditional-food consumption. For example, sprouts of the palmyra palm essentially cultivated in backyards in the north of Benin (e.g. Collines, Atacora and Alibori departments) and the south of the Niger are now transported all the way to Cotonou, where they are cooked (by boiling) for consumption. Therefore, consumption extends to urban areas and reaches new consumer groups.

The baobab fruit is used as a supplementary food for infants in rural areas. With urbanization, new enterprises are helping to promote the remarkable nutritional benefits of this food. In Cotonou, some small-scale enterprises offer powdered infant formulas, while others sell energy drinks in pasteurized bottles. These enterprises have developed both innovative technologies and new products, which are marketed through an increasing number of neighbourhood convenience stores in Cotonou. Baobab juice is also served at coffee breaks and in cocktails.

Other conventional sectors, such as beekeeping, are being upgraded with the adoption of more efficient techniques to expand production and markets.

SMALL BUSHMEAT, A MAJOR ILLEGAL SEGMENT

The term "small bushmeat" refers to products derived from small-sized animals collected traditionally in the wild for food use. It encompasses diverse species of birds, snails, rodents (such as grasscutters, *Thryonomys swinderianus*, also known as cane rats),

reptiles, amphibians, insects, shellfish and molluscs (Sinsin and Sinadouwirou, 2003). The harvesting, sale and consumption of small bushmeat is illegal in Benin, but most Cotonou restaurants and food stalls sell ready-cooked small-bushmeat dishes. Although the consumption of small bushmeat is widespread, the supply chain has no legal status. It is not studied, documented, controlled, guided or administered by the official forestry authority.

The small-bushmeat market, invisible but pervasive and known to all, thrives illegally, the result of centuries-old bans, complacency and deficiencies in state control. Since colonial times, Benin's forest authority has fought small-scale rural customary hunting. Repeated bans have encouraged poaching and reinforced the symbolic value of bushmeat consumption. Urban migration and new citydwellers have extended the small-bushmeat market, and multiple supply channels have adapted to all combinations of resources (e.g. various wildlife species and geographical locations) and demand (e.g. short supply chains, cured meat and restaurants).

NEW PRODUCTION SEGMENTS: GRASSCUTTER, REPTILE AND SNAIL FARMING

New production modes based on small bushmeat are developing to meet urban demand. Specialized breeding farms have been created with significant funding and sophisticated technologies.

Grasscutter meat is highly prized and popular in both urban and rural areas (Sodjinou and Mensah, 2005). Rising demand exceeds supply, estimated at about 200 000 heads per year, equivalent to approximately 500 tonnes of meat (Igué, 1991). Although hunting supplies the majority of grasscutters, Benin has been a pioneer in grasscutter farming since 1985 (Kamoyedji, 1999), and captive-breeding techniques were developed several decades ago (Mensah, 2003). Grasscutter meat is marketed at sales points spread throughout urban areas. Mensah (2006) underscored the lack of industrial processing facilities, however.

For other wild species, such as porcupines, the domestication process (especially the challenge of captive breeding) is ongoing.

Sales of reptiles are increasing rapidly – not only farmed crocodiles (for both leather and meat) but also native snake species

Baskets of achatina snails are ready for sale in a market in Cotonou, Benin

©G.A. AGBAHUNGBA

for meat production and live export. With urbanization, customary bans prohibiting consumption among ethnic groups are disappearing, and the sale and consumption of snake meat is becoming commonplace (Toudonou, Mensah and Sinsin, 2004).

The consumption of achatina snails (*Achatina achatina*, also known as the giant Ghana snail) is also growing rapidly (Sodjinou, Biaou and Codjia, 2003): snail skewers are popular at coffee breaks and cocktail events. Snail farms can produce year-round, although during the rainy season some sales come from wild catches in southern Benin. The supply chain is still limited largely to gathering and rearing, but with rising demand, breeding farms are developing quickly. The annual supply of snails is estimated at 75.5 tonnes of meat, and the sale price is higher than that of fish, beef, sheep and kid goat.

EVOLUTION OF FOREST PRODUCT CHAINS: DOMESTICATION, PROCESSING AND MARKETING

Considerable change is being observed in forest-food supply chains in Benin today, driven largely by urban demand (Igué and Puech, 2008):

- a transition from gathering to domestication and farming (e.g. for palmyra palm, mushrooms, snails, grasscutters, snakes and honey);
- the structuring of value chains, with well-defined marketing chains;
- the development of upstream processing activities between the production and marketing stages (e.g. for palmyra palm, snails, grasscutters, *Irvingia* spp., néré and shea);
- the diversification of sales and consumption channels according to spatial and sociological changes in the urban space.

CONCLUSION

Urbanization is inducing structural changes in the demand for forest foods. The growing economic contribution of the forest sector in Benin (FAO, 1999), and especially of forest foods, poses challenges for Benin's forest administration in redefining public forest policy through a participatory approach involving rural communities (Bertrand *et al.*, 2006). There is an urgent need for a new legal and administrative framework that promotes the sustainable management of the forest resource, including the food products now in such high demand, and the domestication of certain bushmeat species.

The country cannot afford to overlook the small-bushmeat industry and cannot continue to prohibit the industry if the ban remains unenforced. A top priority is to tackle issues surrounding the small-bushmeat industry through the creation of local wildlife management programmes and local regulation of hunting, with fiscal regulations applying to the bushmeat supply chain.

The contribution of forest products to urban food supply should be viewed in the context of food scarcity risks in large cities. What role can the rural, urban and peri-urban forest sectors play in nutrition and health? This public-policy challenge requires much more coordination between the forestry, agriculture (food security) and health (nutrition) administrations. ◆

References

Assogba, T. 2007. *Evaluation de la diversité des arbres médicinaux épargnés dans les terroirs agricoles et analyse de leurs circuits de commercialisation sur les grands marchés du Sud du Bénin*. Cotonou, Benin, FSA.

Bertrand, A., Agbahungba, G. & Tonou, P. 2009. *Contribution du secteur forestier à l'économie du Bénin*. Final report, volumes 1, 2 & 3. Cotonou, Benin, Edenia Consult Tanja & Beged-Conseil.

Bertrand, A., Montagne, P., Serre-Duhem, C. & Raharimaniraka, L. 2006. Nouvelles politiques forestières et gestion économique publique des filières des produits forestiers non ligneux. *In* A. Bertrand, P. Montagne & A. Karsenty, eds. *Forêts tropicales et mondialisations: les mutations des politiques forestières en Afrique francophone et à Madagascar*. Paris, CIRAD, L'Harmattan éditeur.

Codjia, J.T.C., Assogbadjo, A.E. & Mensah Ekué, M.R. 2003. Diversité et valorisation au niveau local des ressources végétales forestières alimentaires du Bénin Cahiers d'études et de recherches francophones. *Agricultures*, 12(5): 321–331.

Delvaux, C. & Sinsin, B. 2003. Gestion intégrée des plantes médicinales dans la région des Monts Kouffé. *In* N. Sokpon, B. Sinsin & O. Eyog-Matig, eds. *Actes du IIè Séminaire international sur l'Aménagement intégré des forêts naturelles des zones tropicales sèches en Afrique de l'Ouest, Parakou, Bénin, 25–29 juin 2001*, pp. 389–405. Cotonou, Benin, FSA.

FAO. 1999. Document national de prospective: Bénin. Rome.

Gnimadi, A. 2008. Etude pour l'identification des filières agroindustrielles prioritaires (BENIN). No. de mission du consultant: TE/RAF/07/A01-1751-2008.

Government of United States of America. 2013. The world fact book (available at: www.cia.gov/library/publications/the-world-factbook/).

Gschladt, W. 1972. Le Rônier au Dallol Maouri – Niger. *Bois et Forêts des Tropiques*, 145, September–October.

Igué, J.O. 1983. *L'officiel, le parallèle et le clandestin: commerces et intégration en Afrique de l'Ouest*. Politique Africaine No. 9. Paris.

Igué, J.O. 1991, *Le commerce de l'aulacode et de sa viande au Bénin*. Cotonou, Benin, GTZ/PPEAu.

Igué, J.O. & Puech, F. 2008. *Plaidoyer pour la structuration du secteur informel au Benin*. Cotonou, Benin, PASP Com. 2.

Kadevi, K. 2001. Statistiques sur les produits forestiers non ligneux (PFNL) dans la République Togolaise. Programme de partenariat CE-FAO (1998–2001). B7-6201/97-15/VIII/FOR/ROJET GCP/INT/679/EC. Rome, FAO.

Kamoyedji, I. 1999. Impact de l'élevage des aulacodes sur les revenus des éleveurs: cas de la commune d'Abomey-Calavi. Mémoire

présenté pour l'obtention du Diplôme de Formation Supérieure, Planification Régionale et Aménagement du Territoire, DFS/PRAT, Ouagadougou.

Lebel, F. 2003. L'importance des produits forestiers non ligneux pour les ménages agricoles de la région de Thiès, Sénégal. M.Sc. thesis. Québec, Canada, Université de Laval.

Mensah, R.M.O.B.A.D-G. 2006. *Contribution des institutions de micro finance au financement des exploitations aulacodicoles au Bénin: Cas du PADME*. Mémoire de fin d'études, ENEAM/UAC/Bénin.

Mensah, G.A. & Ekué, M-R.M. 2003. *L'essentiel en aulacodiculture*. RéRE/KIT/IUCN/CBDD. République du Bénin/Royaume des Pays-Bas.

Sinsin, B. & Sinadouwirou, T. 2003. Valorisation socio-économique et pérennité du *Pentadesma butyracea* Sabine en galeries forestières au Bénin Cahiers d'études et de recherches francophones. *Agricultures*, 12(2): 75–79.

Sodjinou, E., Biaou, G. & Codjia, J.T.C. 2003. Commercialisation des escargots géants africains (achatines) dans les Départements de l'atlantique et du littoral au Sud-Bénin. *Annales des sciences agronomiques du Bénin*.

Sodjinou, E. & Mensah, G.A. 2005. Analyse technico-économique de l'aulacodiculture au Nord-Bénin: Déterminants d'adoption. International Forum on Promoting Grass-cutter for Business in West Africa, Accra, Ghana, December 2005.

Toudonou, A.S.C., Mensah, G.A. & Sinsin, B. 2004. Le serpent: une nouvelle ressource alimentaire dans les départements du centre et du sud du Bénin. *Bulletin of Agricultural Research of Benin*, 45.

United Nations Population Division. 2008. *An overview of urbanization, internal migration, population distribution and development in the world*. New York, USA. ◆