

Market potential of non-wood forest products in the Sahelian countries

A. MAISHAROU¹ and M. LARWANOU²

¹Coordonnateur National, Programme Grande Muraille Verte- Niger B.P.; 578 Niamey, Niger

²African Forest Forum (AFF), C/o World Agroforestry Center (ICRAF), United Nations Avenue P.O. Box 30677 - 00100, Nairobi, Kenya

Email: maisharoua65@yahoo.com, M.Larwanou@CGIAR.ORG

SUMMARY

Non-wood forest products (NWFPs) are important sources of dietary supplement in all countries of the Sahel. The most valued forest products are gum Arabic (*Acacia Senegal*), Shea butter (*Vitellaria paradoxa*), the Nere (*Parkia biglobosa*), honey and others. On the economic and wealth creation level, NWFPs are used to generate significant financial returns, especially in rural areas. Collection of NWFPs for commercial purposes is primarily an off-season business and generates additional revenue, especially during the period of food shortage. The NWFPs are an important source of income for women in a number of countries in the Sahel region with an example of gum arabic market in Niger. While the majority of NWFPs are collected without restriction as common products, there is a tendency to move from common to private property ownership with NWFPs of major economic values. In order to boost production and marketing, there is need to have: (i) adequate resources to meet the growing demand for these products, (ii) well trained and equipped producers / collectors, (iii) well-structured and funded value chains, and (iv) well defined and organised markets.

Keywords: market, non-wood forest products, local valuation, value chains, poverty reduction

Le potentiel du marché des produits forestiers non ligneux dans les pays du Sahel

A. MAISHAROU et M. LARWANOU

Les produits forestiers non-ligneux (PFNL) sont des sources importantes de complément alimentaire dans tous les pays du Sahel dont les plus appréciés sont la gomme arabique (*Acacia Senegal*), le beurre de karité (*Vitellaria paradoxa*), le Nere (*Parkia biglobosa*), le miel et autres. Sur le plan économique et de création de richesse, les PFNL sont utilisés pour générer des revenus financiers importants, en particulier dans les zones rurales. La collecte des PFNL à des fins commerciales est principalement une activité hors-saison et génère des revenus supplémentaires, surtout pendant la période de pénurie alimentaire. Les PFNL sont une source importante de revenus pour les femmes dans un certain nombre de pays de la région du Sahel avec un exemple du marché de la gomme arabique au Niger. Bien que la majorité des PFNL soient collectés sans restriction des produits communs, il y a une tendance à passer de commun à la propriété privée surtout avec les PFNL ayant de grandes valeurs économiques. Afin de stimuler la production et la commercialisation, il est nécessaire d'avoir: (i) les ressources adéquates pour répondre à la demande croissante pour ces produits, (ii) les producteurs et les collecteurs bien formés et équipés, (iii), les chaînes de valeur bien structurés et financés, et (iv) les marchés bien définis et organisés.

Los mercados de productos forestales no maderables como medio de reducción de la pobreza en los países del Sahel

A. MAISHAROU y M. LARWANOU

Los productos forestales no maderables (PFNM) son fuentes importantes de suplementos de la dieta en todos los países del Sahel. Los productos forestales más valorados son la goma arábica (*Acacia senegal*), la manteca de karité (*Vitellaria paradoxa*), el néré (*Parkia biglobosa*), y la miel, entre otros. En el plano económico y de creación de riqueza, los PFNM se emplean para generar rendimientos financieros considerables, sobre todo en las zonas rurales. La recolección de PFNM con fines comerciales es ante todo un negocio de fuera de temporada con el que generar ingresos adicionales, especialmente durante el período de escasez de alimentos. Los PFNM son una fuente importante de ingresos para las mujeres en varios países de la región del Sahel, como por ejemplo el mercado de goma arábica en Níger. Mientras que la mayoría de los PFNM se recolectan sin restricción por ser bienes comunales, hay una tendencia a pasar de la propiedad comunal a la privada cuando se trata de PFNM de alto valor económico. Con el fin de impulsar la producción y la comercialización, se necesitan: (I) recursos adecuados para satisfacer la demanda creciente de estos productos; (ii) productores y recolectores bien entrenados y equipados; (iii) cadenas de valor bien estructuradas y financiadas; y (iv) mercados bien definidos y organizados.

INTRODUCTION

The Sahelian countries of Africa are well endowed with a great variety of non-wood forest products (NWFPs). These NWFPs consist mainly of edible plants, medicinal plants and fodder crops.

In all countries of the Sahel, edible plants are considered important. In Mali, for example, documents report that 54% of NWFPs used are for food, mainly provided by fruits, seeds, nuts and kernels. Edible plants are mainly used for subsistence and as such provide an important additional source of food. Other products of socio-economic importance are also found in local markets and even exported to the international markets. The most valued forest products are *gum arabic* (exudates of *Acacia senegal* and *A.seyal*), Shea butter (*Vitellaria paradoxa*), Nere (*Parkia biglobosa*), honey, etc (Nakoulma *et al.* 2005).

There is still no universal consensus on the concept of Non-Timber or Non-Wood Forest Products (NT/NWFPs). With NWFPs, we mean here the “plants used as food, fodder, fuel, medicine, textile fiber or biochemical, as well as animals, birds, reptiles, fish, insects, etc. of which the flesh, skin, fur or feathers, etc. are used”. In 1999, FAO and its partners adopted a definition that is used internationally, which states that “NWFPs are goods of biological origin other than wood derived from forests, other wooded land and trees outside forests”.

There are two major groups of NWFPs, viz.:

- NWFPs of plant origin, divided into eight categories: food, feed, raw material for preparation of medicinal and aromatic products, raw material for preparation of colorants and dyes, raw material for manufacture of utensils, handicrafts and construction, ornamentals plants, exudates, and other plant products, and,
- NWFPs of animal origin, classified into eight categories: living animals, hides, skins and trophies, wild honey and beeswax, bush meat, raw material for preparation of medicines, raw material for preparation of colorants, other edible animal and non-edible animal products.

This definition gives rise to some disagreements over the inclusion of certain plant products within NWFPs, particularly products from horticulture, orchards, tree crops or agroforestry (citrus, cashew kernels, etc.). In most countries of the Sahel, the inclusion of some products derived from wildlife and honey within NWFPs also gives rise to disagreements. The main problem is lack of clarity and precision with respect to the roles and responsibilities of State Authorities to consider the management and control of these particular products.

In this paper, we consider NWFPs as “*any property of biological origin other than wood and wildlife, with the exception of insects, derived from forests and trees outside forests, made up of spontaneous plants, domesticated, and those for reforestation*”. Thus, NWFPs include leaves, flowers, fruits, bark, roots, unglified stems, sap, latex, essential oils, gums, resins, mushrooms, honey, and insects. Wild animals and

agricultural products such as mango, citrus, cashew, etc., are excluded from the above definition.

Formerly referred to as “by-products”, “secondary products”, “minor products” or “wild foods”, and other names implying that they were of less importance, NWFPs are now the focus for a growing interest due to the fact that their exploitation is an important source of improved income and food security. Almost all Sahelian households, especially in rural areas, in one way or another, exploit NWFPs for their consumption or income generation. FAO (1996) reported that about 1.2 billion people in developing countries use trees in their fields as a source of food and income. According to the same source, the quantities of NWFPs placed on the market and the revenues created are increasing over the years.

The paper highlights the importance of markets as a tool for NWFPs management, and an opportunity in poverty alleviation in local communities. It underlines the potentials of NWFP production and marketing in the Sahel and the constraints faced by their production and marketing value chains, before formulating recommendations for the establishment of some NWFP markets. Focus is given on gum Arabic and shea butter as well as their potential in some Sahelian countries.

PRESENT AND POTENTIAL USES OF NWFPs IN THE SAHEL

Local productivity, consumption and marketing

Products and by-products from a large number of trees and shrubs in arid and semi-arid Sahel greatly contribute to ecosystem services by their “resources” and “sink” functions. NWFPs have multiple local uses, both as components of forest, woodland and savannah formations and as isolated individual trees outside the forest. They play a major role in the functioning of these environments, both by their ability for replenishing them or their carbon sink function. These uses, roles, functions and services can be grouped as follows:

- Supply of wood service used for the construction or crafts;
- Supply of fuelwood;
- Supply of fodder for livestock, worms, insects, silk-worms, etc.;
- Supply of products for the local pharmacopoeia (drugs, balms, lotions, etc.);
- Provision of toxic products: hallucinogenic poisons;
- Provision of fibre (ropes, textiles, basketry, etc.);
- Provision of food (flowers, fruits, nuts, seeds, roots, stems, bark, tubers, shoots, etc.);
- Provision of derived food products and food flavourings: oils, fats, spices, beverages, teas, etc;
- Provision of non-food aromatic products: cosmetics and fragrance oils, incense;
- Supply of bio-chemicals: gums, latex, dyes, tannins, varnishes, oils;
- Provision of protective shade limiting the effects of solar radiation and evapotranspiration;

- Provision of decomposing vegetation and returning nutrients to the soil;
- Supply of organic matter to the soil;
- Enrichment of soil with nitrogen through symbiotic fixation of atmospheric nitrogen (in the case of leguminous species);
- Contribution to the fight against water and wind erosion; and,
- Contribution to the sequestration of atmospheric carbon.

Potential future uses

The economic role of trees and shrubs can greatly expand in the future if the products and by-products mentioned above are better valued by Sahelian Countries and their Governments and local communities through the establishment of enterprises for strengthening value-adding. Indeed, the development of NTFPs in arid and semi-arid areas should be achieved by considering all aspects in the value chain, from the production or gathering, collection, downstream local storage, processing in small local enterprises, local sale of ready products, or controlled exportation to processing countries.

Already today, by-products and/or plant components from NTFPs are included in perfumes, creams, medicines, food and beverages. In some cases, synthetic molecules are substituted in place of molecules of vegetable origin and the derived products are distributed in an increasingly growing market not controlled by African producers. Some of these by-products could provide significant cash income for Sahelian farmers if arrangements are made for local processing and exploring and developing foreign market opportunities.

Unfortunately, in some cases, there is competition between local uses and exports of some NTFPs which are subject to industrial transformation, such as *gum arabic*, Shea, Nere seeds, Moringa seeds, honey, etc., that supply components and derivatives used in essential oils, flavours, fragrances, dietary and cosmetic industries, and in food industries as flavourings.

Commercialization potential

All over West Africa, plants are used in many traditional ways since time immemorial - as edible plants, herbs, resins, honey and beeswax, rattan, bamboo for craft products, fodder, gums, tannins and dyes of various drinks, fruit pulps and pods for making juices, building materials (thatch), etc. Commercial uses associated with NTFPs range from food to food additives, aromatic plants, gums, resins and essential oils, medicinal and cosmetic products, ornamental products and bio fuels.

Increasing attention is today paid to such NTFPs. Several studies and experiments highlight these still less known resources and demonstrate that they have an interesting commercial potential. For example, works conducted by Zida (1990), Guinko and Pasco (1992) and Nikiema (1997) in the semi-arid zone of Burkina Faso and by Hasberg and Coulibaly (1989) Lamien *et al.* (1996a, 1996b), Lamien (1996) and

Lamien and Vognan (2001) in the sub-humid zone of Burkina Faso focused on the use and marketing of NTFPs from local trees. In Niger, the work conducted by Garba (2000), CNEDD (2001), Maisharou and Nourou (2004), Ichaou (2008), Maisharou (2008, 2009), INS (2010) and Maisharou (2011) focused on the production and marketing of NTFPs and their contribution to improving the living conditions of rural people and to the economy of the country.

The various studies have shown that exploitation of NTFPs is already generating incomes for rural people and could become a major engine of economic development for some rural communities. Some NTFPs, such as friable *gum arabic* in Chad, hard *gum arabic* in Senegal and Niger, shear butter in Burkina Faso, honey in Burkina Faso and Niger, and baobab and tamarind in Senegal and Niger, are also examples of potential engines for economic development in different countries. The analysis of the market potential of NTFPs below will focus on the production potential and diversity of the products marketed and on the potential of marketing or the availability of markets and demand.

The five countries (Burkina Faso, Chad, Mali, Niger and Senegal) in the study have a forest cover, estimated in terms of forests and forest land areas at about 103 million hectares over a total land area of about 399 million hectares, i.e. 25% of their territories. Demographic data for the countries indicate a growth rate ranging from 2.4 to 3% (CIA 2012 (estimate); FRA 2010) and a total population of 71.6 million people, mostly young, with more than 50% women and girls, and a majority rural. Women and young people are among the most active segments of the population in the promotion and development of NTFPs, especially in rural areas. Baseline studies conducted in different countries show that NTFPs contribute greatly to meeting local food needs for achieving food security, nutritional and health balance, improving incomes and creating jobs.

Surveys conducted in the different countries indicate the existence of a strong national demand for NTFPs. For example, investigations by the Ministry of Environment and Sustainable Development (MEDD) of Burkina Faso, as part of the development of a national strategy for the promotion and development of NTFPs in 2012, indicate that there is a strong national demand from processing industries, wholesalers and households for their power needs. Potential domestic markets for NTFPs exist in all areas and cities are demanding more and more NTFPs, especially Ouagadougou and Bobo-Dioulasso. Examples are:

- 43.4% of households use fermented seeds of *Parkia biglobosa* (Soumbala) as spices in their meals;
- 15.8% of households use fresh leaves of *Adansonia digitata* as a vegetable sauce in their meals;
- 15.2% of households use Shea butter from *Vitellaria paradoxa* as fat in their meals;
- Almost the entire population of Cascades uses the sap of *Borassus flabellifer* as wine;
- Over 3 000 traditional healers and therapists practice in the field of traditional medicine and are grouped into nearly 300 associations recognised by the administration.

NWFPs, including *gum arabic*, are increasingly exported to Europe, USA, Asia and Latin America. According to the report of December 2010 of the Market News Service (MNS), the global market for *gum arabic* has made a significant recovery, indicating that the effects of the 2008 economic crisis are overcome. New importers among emerging and developing economies (China, Brazil, India, etc.) are reported alongside traditional importing countries such as France, USA, Japan, etc. (table 1. World import grew by 19% between 2006 and 2008, i.e. an increase of 19 000 tonnes. The market, however, felt the effects of the economic crisis, with a decline of about 6% between 2008 and 2009. France, India and USA are major importers of *gum arabic*. In recent years, some Asian countries (India, China) and Latin America (Brazil) showed significant increases in their import of gum, higher than the average global growth.

The trend in the production and marketing of these NWFPs seems to vary from one country to another. For example, in Mali and Senegal, *gum Arabic* production is declining, while on the other hand, this production is on the rise in Chad and Niger. The importance of NWFPs as source of income for women was highlighted in the collection and processing of Shea nuts in Burkina Faso; the collection and marketing of gum Arabic in Niger and Chad; picking and processing of various fruits to juices in Senegal and Mali. The majority of NWFPs are harvested or collected without any restriction as common products, but for NWFPs of major economic value,

precious and rare, there is a tendency to move from common to private property ownership. In Burkina Faso for example, wild flora is increasingly regarded as private property. In Niger, the rights of local use are issued to the local population for most tree species, but the harvest of baobab leaves (*Adansonia digitata*) is the only responsibility of land owners.

The majority of NWFPs are collected without restriction as common access products. For selected NWFPs, however, especially precious and rare ones, there is the tendency to move from common to private property ownership. Changing rights and the legal loopholes and blocking access could cause serious conflicts between stakeholders (Sawadogo and Ouedraogo 2004). In Chad, for example, conflicts have occurred between farmers and nomads about the use of gum arabic. Traditionally, the collection/harvest of gum is done by pastoralists; however, given higher and higher price of the gum, more and more farmers are interested in its collection in their territory. That is why new arrangements need to be negotiated between the two groups in order to clarify property rights of this important resource (WWF, undated).

Nevertheless, it should be noted that besides the negative impacts of the exploitation and trade of wood and NWFPs, these activities have helped to raise awareness among people about the real value of the living, but also dead trees. As clearly noted by Lamien and Traoré (2002), the main reason for planting and maintaining woody species by the people in the Sahel is the social and economic role that they play in

TABLE 1 Trends in gum arabic import by the top 20 importing countries between 2004 and 2009

Importing countries	2005	2006	2007	2008	2009
	Quantity tonnes				
World	110 212	97 677	114 076	116 002	109 668
France	25 293	18 567	29 661	34 778	24 027
India	14 435	18 688	15 082	16 132	19 899
USA	18 335	17 866	15 956	13 114	16 975
United Kingdom	9 983	5 127	9 561	5 783	7 908
Germany	8 092	6 262	6 195	7 042	4 966
Italy	4 167	3 413	4 176	3 690	3 515
China	1 567	1 601	2 374	2 293	2 618
Japan	2 322	1 780	2 605	3 124	2 322
Belgium	1 339	1 599	1 305	1 823	2 030
Ireland	1 910	1 131	2 984	4 826	1 815
Netherlands	1 314	1 463	1 101	1 693	1 399
Brazil	981	1 155	1 220	1 494	1 365
Switzerland	1 287	1 883	2 174	1 975	1 341
Mexico	1 374	1 342	1 386	1 296	1 284
Russia	724	890	1 086	1 138	1 192
Poland	890	896	1 146	1 167	1 079
Spain	630	650	567	958	922
Sweden	1 497	1 853	1 699	372	843

Source: Trade Map, ITC.

the livelihoods of these populations. This is also the opinion of Witcover and Vosti (1995) who believe that the market development of NTFPs will result in a better use of tropical forests and encourage their conservation. According to Leakey (1999), the domestication of native species depends in part on the development of the market for their non-wood products. The motivation of rural communities to practice agroforestry can only be prompted by the development of the market for agroforestry species products.

MARKETING SYSTEMS OF NTFPs

From an ecological point of view, it was noted that in many countries of the sub-region, the availability of NTFPs is decreasing because of drought, population pressure and migration, expansion of agricultural farms, bush fires, over-exploitation of natural resources, and climatic disturbances (FAO 2011). Repeated droughts have reduced the distribution of *Acacia senegal* and *Bombax constatum* in Niger. In Chad, the frequency of bush/forest fires has caused the degradation of *Vitellaria paradoxa* and *Balanites aegyptiaca* stands. It is reported that today there is an overexploitation of a wide variety of forest products. For example, production of gum arabic in Chad is done with destructive tapping techniques and the scarcity of Shea nuts in Burkina Faso, Mali, Chad and Senegal is due to the strong competition between collectors and traders. This in turn has resulted in the value chains in recent years being characterised by irregular and insufficient supply, inadequate collection and conservation techniques, and inappropriate transport, storage and processing. It should be noted also that the availability of NTFPs is reduced due to other uses of the species. In some countries the demand for fuelwood affects the supply of NTFPs. In Niger, for example, the wood of *Combretum nigricans* (a species producing gum) is highly prized as a source of firewood. In Chad, the wood of *Borassus aethiopicum* is used as building materials, and wood of *Khaya senegalensis* for canoe/boat construction. In summary, the use of wood for fire wood or construction has a negative impact on the supply of NTFPs from these species.

NTFPs VALUE CHAINS

The value chains of NTFPs have received much attention in recent years, with funding support from several partners in all countries of the Sahel. Some NTFPs have already gone through remarkable developments and are now important sources of revenue for various actors in their value chains, composed primarily of producers/gatherers, middlemen and groups of semi-processors, wholesale traders and exporters.

The organisational capacities of actors operating in the value chains of some NTFPs are well developed to meet the consumer demand. Value chains include some NTFPs that are very popular both in domestic and export markets. This is true for *gum arabic*, Shea butter, honey, Moringa, and some others. Thus, in the studied countries, cross-border and

international trade in NTFPs seems more focussed on a limited number of products that should be specially considered and promoted in the process of value chain development in different countries. These include the products mentioned above and also baobab leaves. Other promising value chains include essential oils, resins and juices made from fruits of several forest species.

Out of these, only the *gum arabic* value chain has received special attention by governments. It is undoubtedly the most exported NTFP, both within the sub-region (to Nigeria) and beyond (to Europe and Asia). Annual global export data vary depending on climatic parameters determining its production. Between 2005 and 2009, around 100 000 tonnes were exported each year. The private sector is very active in this business in all countries, with the emergence of operators organised into *National Associations of Gum Arabic Professionals* and the creation of marketing companies in some countries like Niger, Chad and Senegal. There exist also small and medium enterprises in charge of semi processing Shea nuts and the processing of *gum arabic*.

Some specific value chains in the Sahel were described in an article by Bied-Charreton (2003). In the following section, two of these NTFP value chains, that have received particular attention nationally and internationally, are summarised.

Shea nut value chain

The Shea nut tree, *Vitellaria paradoxa*, is more or less common in the savannas of WA. The densest stands are found in the Sudano-Guinean zone of Mali and Burkina Faso, Southern Niger, Northern Benin, Nigeria and Sudan. Its density is between 1 to 50 trees/ha. Each tree can yield 15–20 kg of fresh fruit, which, when dried, provide 3–4 kg of nuts. The variability of production is high from one year to another. Little is known about the proportion that is consumed by the local people themselves. The exported quantities from countries such as Burkina Faso and Mali vary between 500 and 10 000 tonnes/yr. Shea butter is extracted from the nuts. It is the main source of fat in rural areas and it is marketed in urban centres. It is used in food/diet, by soap industries, and in traditional medicines.

Today, Shea butter is an important component in cosmetic and pharmaceutical products, as well as in pastries. The fruits are harvested in the early rainy season. The production of Shea butter itself is then an activity of women during the dry season. The quality of butter varies from one region to another. Kernels are crushed and powdered, usually by hand, then fried and grounded using a mortar. The paste is then ground between two stones, and the result is subject to churning. After evaporation, a liquid butter is obtained through decanting, which is poured into a container for freezing. Several projects have been implemented to simplify these operations and make them less energy demanding (centrifuges, presses, etc.). No technology has yet proved superior to another, and the choice of technique is related to other criteria, including the cost of material acquisition, maintenance, ability to work, the quality of butter obtained, etc.

The potential for exporting processed Shea butter has been debated for years. Until now, it is only the nuts that are exported to Europe. The locally produced Shea butter is difficult to transport beyond a certain period, and European importers prefer to process the imported kernels themselves. The largest importers are located in Switzerland and the United Kingdom. In the case of Burkina Faso, the cash received from the sale of Shea nuts in the 1970s ranked just behind cotton. World prices of Shea nuts collapsed in 1986/1987 and the quantity of the production has declined. The adoption of the Structural Adjustment Plan (SAP) has disturbed marketing of Shea nuts in the country.

The liberalisation of agricultural markets following the abolition of the stabilisation of price system has destabilised the domestic market and disorganised the value chain. Some NGOs and donors have supported Shea nut production projects (Canada, Taiwan). In 1997, one tonne of Shea nuts for export was sold at about 100 000 CFA and today it fetches 150 000 CFA. Issues that currently concern value chain stakeholders are how to expand the production and sales in the European market. Two arguments in favour of the product are:

- Shea nuts are considered as an “organic product”, and in cosmetics and in drug making, this seems to be an asset, although no market research is available;
- Shea nuts are also considered to be an “ethical product”, benefiting from the conditions of “fair trade” that ensures shorter value chains with few intermediaries and fair compensation to rural producers.

Gum arabic value chain

Gum arabic is an adhesive substance produced by some trees of the genus *Acacia* in the *Mimosaceae* family. We distinguish between “hard gum”, produced by *Acacia senegal* in rather sandy soil formations, and “friable gum”, produced by *A. seyal* growing on clay soils. *Gum arabic* is the dried exudates obtained from the trunk and branches of both *Acacias* (as defined in the *Codex Alimentarius* from 1999). The *A. senegal* tree is bled for the first time when it reaches the age of four, by a cut with machetes. The tree becomes an adult after seven years. The bleeding activity occurs in the warm season in early October. The duration of the harvest is about three months a year.

Gum is mainly used as an additive in food and certain drugs. It is also used for semi-industrial use (glue). A food additive is defined by the *Codex* as a “substance not normally consumed as food by itself, but is added to food for an organoleptic or technological purpose”, in the manufacturing, preparation, storage, transport or packaging steps. Gums, mainly *gum arabic*, fall into the category “thickeners and gelling agents” (together with starches, pectin, locust bean gum, etc.) It is also used as a flavouring agent in pharmaceutical products. In foods, it is coded as “E 414”. The main uses of *gum arabic* in 1998 were:

- 40% of friable gum consumed in confectionery;
- 8% in gum paste and drugs coating;

- 3% in animal feeds;
- 26% of hard gum used in beverages, fruit juices and other aromatic beverages;
- 10% of flavour extracts for other uses;
- 3% of both gums together used as diet food;
- 5% in ink and ink-based products;
- 5% in adhesives and glues;
- 5% in use in foundry and ceramics.

Gum arabic is processed in a few factories in Europe. There are two main ways of processing:

- The dry channel: successively crushing, sieving, mechanical purification and calibration operations are conducted to achieve two types of derivatives, viz. “kibbled” and “powered”;
- The wet channel: gum is dissolved in water, then centrifuged, filtered, and sterilised to obtain, two classes of derivatives, viz. “spray dried” and “granulated”. These derivatives have different names like “fibre gum” or “liquid gum” and are used in various industries to make a variety of products.

Organisation and structures of NWFP value chains

Gum arabic remains today the value chain that is best organised and structured. The following analyses will be focused mainly on *gum arabic* produced from *Acacia senegal* gum and from *Combretum nigricans*.

Organisation of gum arabic value chain

The *gum arabic* value chain today involves many direct actors - producers, traders and exporters - and indirect actors, associated with structures such as technical services, NGOs and associations, and development projects and programmes responsible for supervision and support of local producers.

All the studied countries have developed and adopted strategies for boosting the production and marketing of *gum arabic* in the period 2000–2010 with the support of Technical and Financial Partners such as FAO and EU. These recent policies and strategies include development agendas, how to evaluate *gum arabic* and gum trees in the overall system of economic growth, how to diversify agro-silvo-pastoral production, restore degraded land, and fight against food insecurity and poverty. These political and strategic guidelines are found in various national documents, the most important of which when it concerns development of the *gum arabic* sector are:

- The Strategic Framework for the Fight against Poverty, which recognises the existence of a link between poverty and the environment, and considers forestry as a sector for job creation and income generation for the rural population;
- Country Programme for Sustainable Land Management, supported by the Global Mechanism of the Convention for Combating Desertification (GM/CCD) in developing and operationalising a National Action Plan to Combat Desertification (NAP/CD); this will

contribute to the creation of an institutional and regulatory framework for the development of natural products for dry areas, including *gum arabic*;

- National Strategy and action plans for the conservation of biodiversity;
- Various legislation and regulations for enhancing and promoting NWFPs and protecting natural resources (Forestry Laws, Framework Law on the Environment, etc.).

The *gum arabic* value chains mobilise thousands of people in all studied countries. In Niger, about 9 000 people have been identified by Maisharou and Nourou (2004) as very much involved in the value chains of *Acacia senegal* gum and *Combretum nigricans* gum. These people are grouped into five main distinct groups or categories, each of which is characterised by its role and integration level defined in the chain. The first level is the *gatherers* or *harvesters* composed of men and women, but mainly women and children, and mostly girls. There are also *active collectors* who may also be men and women, but mostly men, who roam around the villages, camps and village markets to buy gum from the collectors or harvesters. The *passive collectors* are the fixed or sedentary collectors which operate only on the weekly village markets. The *wholesale traders* fall into two categories, viz. the *stationary merchants* (in the weekly markets of the production zones), and the *mobile wholesale merchants* and retailers (move from one market to another for gum collection). Finally, there is the *main exporters* group like *Achat Service International (ASI)* in Niger, and a group of merchants who ensures the export of the sorted *gum arabic* to neighbouring Nigeria.

All segments of the industry are, in most cases, organised in associations for the defence of their economic and material interests. Federations are often established to be even more powerful in protecting their interests.

Marketing channel of gum arabic and gum of Combretum nigricans in Niger

Two value chains of business transaction of *gum arabic* are identified by Amadou and Amani (2008) as part of an investigation conducted into the pricing structure of gum in Torodi Rural Municipality (Niger). They are the national chain and the external chain (sub-regional and World markets) as shown in figure 1 below.

The value chains of gum Arabic and gum *C. nigricans* are led by men and women with very narrow business relations represented by two patterns of commercial transactions shown in figure 2 below.

According to the same survey (Amadou and Amani, 2008), the average purchase price at the gatherers/harvesters or producers, in all production areas and all periods, is 358 CFA/kg for *gum arabic* and 203 CFA/kg for the gum of *Combretum nigricans*. Depending on the periods, this price ranges from 297 to 418 CFA for *gum arabic* and from 173 to 233 CFA for *C. nigricans* gum. Thus, at the producers' level, *gum arabic* costs on average 1.7 times more than the gum of *C. nigricans*. This variation ranges from single to double in the border areas of Burkina (Lougou, Nassirou, Kokoloko).

For transaction schemes 1 and 2, the scenarios call for the following comments:

- The purchase price for the harvesters/producers represents only 47% and 56% of the Katakò selling price for

FIGURE 1 Value chains of gum arabic and *C. nigricans* gum in Torodi Municipality (Niger)

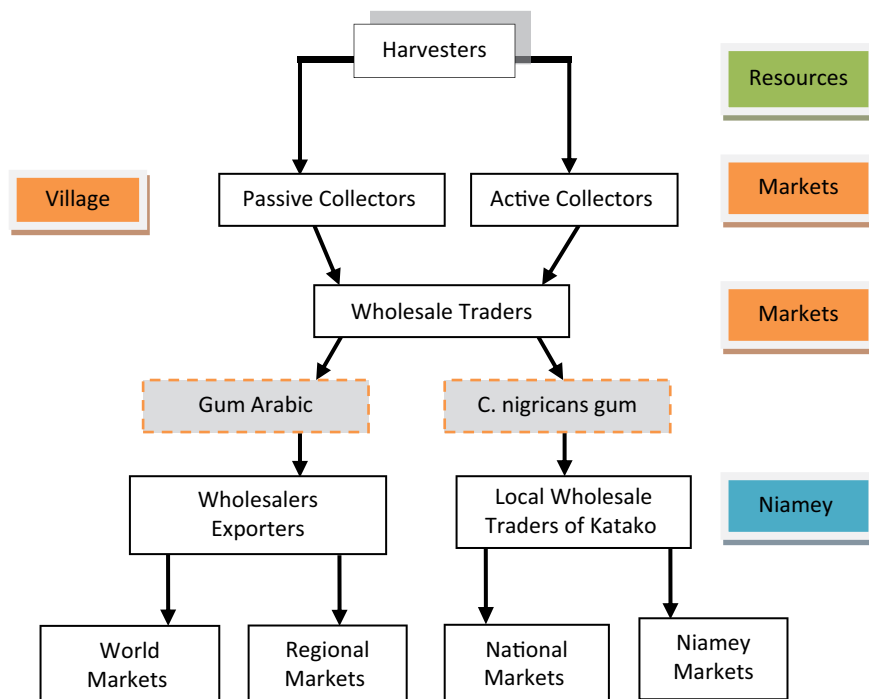
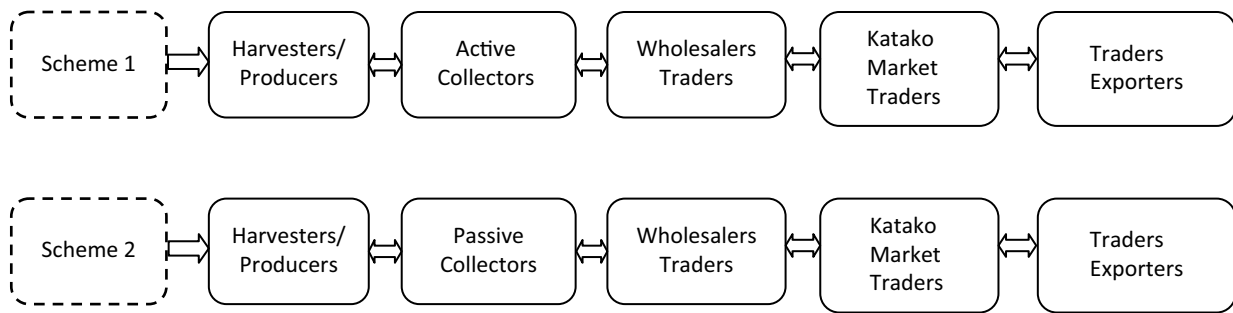


FIGURE 2 Commercial transactions pathways of gum arabic and *C. nigricans* gum in Torodi Municipality of Niger

gum arabic and *C. nigricans* gum, respectively. Among the intermediaries, the Katako traders are those that benefit most from the transactions. In the case of *gum arabic*, their profit margin is 24% of the final sale price, i.e. more than that of the active collector and the traders of the weekly market together. In the case of *C. nigricans* gum, the Katako traders also win 24% of the final sale price, against 7% for the other two intermediaries combined (active collector and wholesale trader).

- The transport and packaging expenses represent, as the case may be, between 6 and 12% of selling price of the product. The transportation charges do not vary depending on the nature of the gum, but depend on the remoteness of the production areas. In some areas, like Tombolé, Balifi, Bolsi, Koutougou, Tchangati, Nadjori, the transportation charges are almost zero because of the proximity of purchasing centres. In other areas, the transport charges vary between 750 and 1,000 CFA per bag of 75 kg.

Whatever the type of intermediary and the scenario, the profit on a kg of *gum arabic* is much higher than that of *C. nigricans* gum. Across the two transaction scenarios, the existence of intermediaries throughout the value chains considerably limits the income of producers and gatherers that in most cases bear the costs of various charges of the intermediaries. That is why the introductions of gum sales/purchase counters in the production areas of Niger was seen as an opportunity to reduce vulnerability of producers related to intermediaries and to enhance the purchase price of gum from the producers/gatherers.

MAJOR CHALLENGES AND CONSTRAINTS OF NWFP CHAINS

Major challenges

The NWFP value chains have received particular attention from the production countries and their partners in the past two decades. Unfortunately, all NWFPs continue to be exported as raw material without any value adding. Apart from *gum arabic*, that has a long and internationally accepted history, other commodities such as Shea butter and Moringa

oil, face enormous challenges for their acceptance on the world market. Among these challenges are:

- *Lack of funding*: developing a new product requires significant investment. Launching a cosmetic product, a new fragrance or a new food product, requires investment in the development of manufacturing and market studies that only a few large groups can afford.
- *The inadequacy or lack of research and development*: although there exists a number of *ad hoc* reports on the Moringa and Shea trees, and the products derived from them, there are very few and scattered scientific and technical publications. Neither the trees nor their products have really been subjected to specific scientific research programmes. Only some industrial firms in Europe have made some chemical studies, which obviously are not in the public domain. The improvement of production and productivity of these species require sustained efforts from national researchers through relevant international research programmes. Research on the local processing of raw materials is not advanced and healthy manufacturing techniques of Shea butter or Moringa oil extraction are not available.
- *Lack of knowledge on markets*: the introduction of new products is not easy and requires a good knowledge of existing markets and their trends. The financing of such studies is difficult to find and only certain manufacturers can afford them, and results remain their property. However, it may be that national operators can move forward and build on the increased interest in “organic” and “ethical” products, and on “fair trade”.
- *Weakness of regulations*: exportation to industrialised countries and launching a number of new products must meet a number of standards: customs standards for marketing, industry standards for perfumery, and finally food standards that are increasingly more and more restrictive for several reasons.
- *Lack of attractive tax policies in the producing countries*: this applies to small, medium as well as large businesses, and to entrepreneurs. It is noted that countries often tend to tax exports too heavily, hence reducing the competitiveness of local products. For now, it is clear that the countries’ tax authorities tend to view private companies as more or less inexhaustible tax deposits.

- *Rigor of investment codes*: these are supposed to provide a number of guarantees to investors, including foreign investors coming to associate with local partners for the creation of local enterprises. These guarantees must include the provisions of free movement of capital and returns to foreign investors.
- *Lack of guarantees to access to international markets*: despite the many and enthusiastic speeches on the benefits of globalisation and the WTO recommendations, these are far from being achieved.

Major constraints

Despite the apparent resurgence of interest, boosting the production and marketing of NWFPs faces several constraints. In relation to constraints identified related to the *production* of NWFPs, such as *gum arabic*, these include:

- *State of the forest resources*: the state of the forests producing NWFPs has deteriorated due to natural and anthropogenic influences. Repeated droughts in the years between 1973/1974 and 1983/1984 severely depleted natural forests. At the same time, there is the aging of trees with increased mortality. Natural regeneration remained insufficient to compensate for tree mortality. Human activities, especially bush fires and overgrazing have contributed to the poor condition of forest stands;
- *Inadequate or lack of infrastructure and equipment* suitable for harvesting, post-harvest processing and conservation;
- *Inappropriate application of operating technologies*: there is an absence of and/or lack of proper equipment and techniques for the production of *gum arabic* (bleeding, harvesting, drying, packaging and storage) and for quality grading of the gums according to the needs of the international markets, which have severe effects on the trade of *gum arabic* to Europe;
- *Inadequate institutional capacity*: the revival of NWFP value chains, such as *gum arabic* and resins, requires mobilisation and improvement of national capacities, including adequate human resources (also in the field of research), in terms of knowledge on the resource, the quality of the product and the establishment of an information system on national and international markets;
- *The lack of an overall vision for sustainable management of natural resources*: because of the persistence of a mentality that there is no need to manage so-called common goods resources, poor logistics capacity, and a continued lack of knowledge on the potential of NWFPs, there is no vision on the development of these value chains.

The major constraints related to the *marketing* of NWFPs include:

- *Remoteness and inaccessibility of most production areas*: most NWFP resources are found in marginal

and remote areas of the countries, often subject to chronic and recurrent poverty, food shortages and desertification;

- *Lack of lawns* for marketing NWFPs;
- *Lack of marketing infrastructures* (sales counters of NWFP), which severely limits the production of reliable statistical data on the production and marketing of NWFPs in the countries;
- *Porosity of interstate borders*: for example, Niger shares 1 500 km of border with Nigeria and it is in these border areas that the vast majority of areas producing *gum arabic* are located. *Gum arabic* from Niger enters Nigeria on donkey or camel, and rarely in vehicles, to be sold in the border markets and accounted for in the statistical data of Nigeria. This is also true in the Municipality of Torodi, where gum from *Combretum nigricans* travel through to Niger and Burkina Faso depending on the selling price across the two sides of the border.
- *Insufficient professional organisations* and weak commercial and technical capacities of the value chain actors;
- *Little value adding processing* due to low level of industrial capacity, lacking knowledge on norms and standards, and no information on markets and availability of NWFPs;
- *Lack of monitoring* of the contribution of NWFPs to the national economy.

PROPOSALS FOR IMPROVEMENT MEASURES FOR NWFPs VALUE CHAINS

The adequate development of production and marketing of NWFPs is conditioned by the following fundamental principles:

- adequate resources to meet the growing demand for these products,
- producers/gatherers well trained and equipped,
- well-structured and funded value chains, and,
- well-defined markets.

In order to promote the production and marketing of NWFPs, and to ensure that sufficient and relevant statistical data is available to determine their contribution to the national economy in general, and to the reduction of poverty in rural areas in particular, the following actions are recommended:

- Revitalising producer organisations and strengthening the marketing of NWFPs, especially *gum arabic*, through the construction and equipment of purchase counters of the products in different areas of production. This will not only facilitate the collection of statistical data, but also secure and even increase incomes of the rural populations;
- Strengthening the production potential of NWFPs by planting more productive varieties, improve management and enhance existing natural gum tree stands;

- Strengthening the technical and financial capacities of local organisations by funding marketing campaigns. Direct cash payments could allow the producers/harvesters to collect more NWFPs in the wild. It has been reported by Muller (2002) that less than 10% of the natural exudates of *gum arabic* is mobilised each year in Niger, the rest being lost;
- Enhancing the quality of NWFPs produced in the Sahel, through:
 - training and equipping producers with modern tools and techniques of production,
 - improving the productivity of the species,
 - characterisation of NWFPs, including gums and resins, and,
 - standardisation of NWFPs by granting a proper label for each product, common to all countries;
- Establishing a device for collecting and monitoring of production and marketing data of NWFPs, including identification of production areas to be monitored for such data.

CONCLUSION AND WAYS FORWARD

Sahelian countries have very important forest resources that contain a large variety of species producing NWFPs. There is a renewed interest in their production and marketing and, in recent years, development of their value chains has received increased attention.

Some NWFPs are important sources of cash income for actors in their value chains. The organisational capacities of actors in the value chains of some NWFPs like gum arabic are developed to meet consumer demand.

In the countries studied, a limited number of NWFPs are used in transboundary and international trade. They should be given preferential consideration in current development processes. Promoted and well organised value chains include Shea nut, *gum arabic*, honey and, to a lesser extent, Moringa and Baobab leaves and fruit for making sauces and juices.

Unfortunately, all economically interesting NWFPs continue to be exported in raw form without any value adding in the Sahelian countries. Apart products from *gum arabic*, some NWFPs, such as Shea butter and Moringa oil, are highly demanded in food and cosmetics makings, fail to reach global markets. Among major challenges to get more products into international markets, are lack of funding, lack of information on the markets, and unattractive tax policies in the producing countries, particularly with respect to business enterprises and entrepreneurs. In view of the significant potential of NWFPs and the dynamism of actors in different value chains, production can be enhanced to provide more resources to the direct actors and to the national economy. To achieve this, it is important to consolidate current achievements and further operationalise the value chains through:

- Professionalisation of the actors in the value chains and improvement of productivity and production of NWFPs;

- Introduction of selling/buying counters for NWFPs to reduce the influence of intermediaries and enhance the price of purchase from collectors/producers; and,
- Strengthening the legal and institutional framework of the management and exploitation of NWFPs, focusing on the improvement of production and marketing, and with minimum intermediaries in the value chains, minimum negative impacts on the survival of forest and woodlands and positive impacts on the livelihood of local people.

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