

NWFPS IN THE PACIFIC ISLANDS

A new bamboo initiative in the Fiji Islands

Bamboo, mainly *Bambusa vulgaris*, grows naturally in the Fiji Islands, especially in the wetter parts. It has been used mainly for rafts for transporting agricultural products down river and for plaited bamboo walls for houses. However, with improvements in road systems and the use of timber and cement for houses, bamboo is now restricted to minor uses.

Nevertheless, with the need for Fiji's rural communities to enhance their livelihoods through participation in income-generating projects utilizing natural resources, attention is now focused on the possible contribution of non-wood forest products, including bamboo, to this endeavour. Bamboo is a logical candidate because of its relative abundance, accessibility, low cost, and the fact that it is a very well known raw material for numerous products traded internationally.

Various attempts were made by the Government of Fiji in the past to try to enhance the use of local bamboo for income generation by rural communities, with the support of the Chinese Government and the United Nations Development Programme (UNDP). Initiatives entailed the introduction of Chinese bamboo weaving and furniture-making experts to teach selected youths from bamboo-owning communities the necessary skills to be able to obtain products that could earn them an income. The main objective was to build the capacity of these youths so that they would be able to return to their communities and establish their own bamboo income-generating operations. Yet, while some success was achieved in the area of technology transfer, the project was regarded as a failure because none of the youths trained were able to start up their own business after the project ended. A number of factors, including, but not limited to, issues relating to inadequate project design and the susceptibility of local bamboo to insect infestations, were identified as the reasons for the failure.

This article is a brief description of a new initiative in Fiji, Bitukau Enterprises, to revive the use of local bamboo to make furniture and woven products for the enhanced livelihoods of rural communities.

Bitukau Enterprises

Bitukau Enterprises, unlike the previous government-initiated bamboo project, is the

brainchild of a local indigenous entrepreneur. In 2000, this entrepreneur saw the potential of bamboo to contribute to the improvement of livelihoods in Fiji's rural communities. He invested his own money and labour to start a small enterprise in his community in Vusuya, Nausori, located on the southeastern side of Viti Levu, the largest of the Fiji Islands. Vusuya is a multiethnic community with a total population of approximately 300, of which youths make up 60 percent.

In 2003 the entrepreneur, at his own expense, travelled to China to participate in a bamboo training course and also built a small workshop with some basic tools to start the enterprise. But this initial investment was insufficient for his operation to progress since the skills required to start manufacturing marketable products to provide him with the income he so desperately craved were absent. His training in China was a good starting-point but it was not enough. He also needed working capital to purchase materials and to pay people to assist him in his operations.

Although Bitukau's progress up to now has been slow and difficult, it is regarded as a potential model and, if it becomes successful, will be replicated in other rural communities of the Fiji Islands as well as in other Pacific Island countries where there is a sufficient supply of bamboo.



External support

The bamboo business being pursued by Bitukau Enterprises is new for Fiji. This, together with the failure of the previous bamboo project, means that obtaining finance for development of the enterprise has been extremely difficult, if not almost impossible. Consequently, the entrepreneur has had to pursue alternative sources of support outside the traditional commercial ones.

In response to his request for assistance and in view of the enormous potential of bamboo to contribute to the enhancement of the livelihoods of rural communities, the

Governments of Fiji and Indonesia and the Land Resources Division of the Secretariat of the Pacific Community (SPC LRD) are providing limited funding and technical support. The support includes two short-term expert trainers from Indonesia, who have trained the youths in basic weaving and furniture-making skills and in designing. A total of 14 youths have so far been trained and, with these skills, the enterprise is beginning to make furniture and woven products that are being introduced on the domestic market.

But while some interest has been shown by potential local buyers, it is apparent that a great deal of effort is still needed to improve the quality of products and to reduce costs. In this regard, two of the youths from the enterprise are now in Indonesia for a 12-month working assignment, again with the support of the Governments of Fiji and Indonesia and the SPC LRD. The objective is to enhance their skills further so as to be able to contribute positively to the enterprise's performance at a higher level, in terms of improving productivity and the quality of its products. Eventually, the two youths will also train others in Vusuya, thereby establishing a critical mass of skilled people in the community.

Raw materials

Bamboo currently used by the enterprise is mostly the naturally growing *Bambusa vulgaris*, which belongs to communities with traditional ties to the entrepreneur. These are being sourced at present without any payment to the resource owners. This, however, will change once Bitukau Enterprises breaks through the market and begins to earn income. Paying landowners for bamboo from their land will mean further spreading of the benefits derived from the enterprise.

Bambusa vulgaris is known for its high starch content, making it highly susceptible to insect infestation, a problem that was cited as one of the causes of failure of the previous bamboo project. The bamboo used by the enterprise is currently dip-treated with chemicals, which is both expensive and unsafe under rural applications. In order to avoid using these chemicals, more suitable species of bamboo, coupled with appropriate post-harvest techniques, are being investigated. In 2000, an initiative by SPC LRD supported the introduction from Australia of selected species of bamboo considered to be more suitable for

construction, as well as for edible shoots. These are now in a number of trial plots in the country and the challenge is to produce the required planting materials from the introduced species for planting by farmers. Some work needs to be initiated in order to determine the best post-harvest handling practices to reduce the risks of insect infestation on the bamboo products.

Community participation

Although Bitukau Enterprises is the result of a private initiative, community support and participation have been vital to its progress so far, both in the area of material supply (at present sourced for free) and in the production of bamboo items. Continuing support from bamboo owners in this regard will be extremely important for the survival of the enterprise at this critical stage.

On the production side, the enterprise has sourced its workers from a number of families in the community close to its workshop. These workers are not being paid but in return are being trained at no cost at the enterprise's facilities. The idea is to train the workers at the workshop and, at the completion of their training, they will go back to their families and from there they will produce items to be ordered by the enterprise. Under this arrangement, the enterprise undertakes training, marketing, quality control and overall coordination. It is hoped that benefits will be equitably shared among the various interest groups, including the suppliers of raw materials, producers of bamboo items and the enterprise itself.

Conclusion

Bamboo has the potential to improve the livelihoods of rural communities in the Fiji Islands. The partnership between a local entrepreneur, Bitukau Enterprises, the Governments of the Fiji Islands and Indonesia, and the SPC LRD is working towards bringing this potential to reality.

However, a number of important lessons are being learned in the process, which need to be considered seriously by anyone wishing to venture into a similar line of business.

Bitukau Enterprises, despite its current shortcomings, is being looked at as a potential model for other rural communities in the Fiji Islands as well as in other Pacific Island countries. (Contributed by: Sairusi Bulai, Forests and Trees Programme, Land Resources Division, Secretariat of the Pacific Community, Private Mail Bag, Suva, Fiji. E-mail: SairusiB@spc.int)

***Canarium indicum* and *C. harveyi* (canarium nut)**

Canarium nut is one of Melanesia's most useful multipurpose trees, providing food (nuts), timber and oil. The nuts constitute an important seasonal food and appear to have been important in the diet of New Guineans for at least 6 000 years. Considerable selection by local peoples of individual trees with desired fruit characters has taken place in the Solomon Islands and in Vanuatu. These selections have been made on the basis of kernel size and taste, ease of opening, thin pericarp, oil content and, rarely, taste of the flesh and productivity.

In the Solomon Islands, canarium nut is considered by villagers to be the most important fruit- or nut-producing species in five of six provinces surveyed, namely, Makira, Malaita, Isabel, Choiseul and Western. It is also considered to be one of the most important timber species, providing cash income in Makira and Malaita Provinces and, to a lesser extent, in Choiseul Province. Moreover, it is the major indigenous tree species that villagers plant, tend or transplant in the Solomon Islands. Other traditional uses include the production of wood for canoes and for wooden articles such as bowls, collection of a resin for light or for canoe caulk and in traditional medicines, mainly involving preparations from the bark. Nowadays, within its natural range, canarium nut is commonly cultivated for its edible nuts. The nuts are of considerable sustenance and commercial importance, including sale in local markets, processing and export.

The kernels are an important seasonal food in Melanesia. They are nutritious and have a high protein content (8–14 percent). They are consumed either fresh, roasted or smoked and may be eaten as a snack or incorporated into various cooked dishes. (Source: extracted from *Traditional trees of Pacific Islands*, ed. Craig R. Elevitch, 2006.)

FOR MORE INFORMATION, PLEASE CONTACT THE AUTHORS OF THIS CHAPTER:

Lex Thomson, Research Director, Pacific Australia Reforestation Company, 65 Reynard Street, Coburg, Victoria 3058, Australia.

E-mail: Lex.Thomson@gmail.com; and Barry Evans, SPRIG Marketing Specialist, 30 Berry St, Sherwood, QLD 4075, Australia. E-mail: barryevans@bigpond.com

Domesticating traditional trees of the Pacific

Information about traditionally important tree species of the Pacific is crucial for efforts

aimed at developing sustainable, improved and integrated farming systems in Pacific nations. Studies are currently under way to enhance domestication of some top-priority species among these traditional trees, including cutnut (*Barringtonia procera*), Tahitian chestnut (*Inocarpus fagifer*), canarium nut (*Canarium indicum*), and sandalwood (*Santalum* spp.).

Domestication offers enormous opportunities to run "traditional trees" into cash crops with traditional values. Typically, a high degree of variation is found in traits that can be captured in new cultivars to enhance yield and a range of quality attributes. Once selected for superior market-oriented qualities, simple vegetative propagation techniques can be used to mass-produce elite tree cultivars.

TRADITIONAL TREES OF THE PACIFIC

The geographically isolated islands of the Pacific are homes to people who have used their trees for material survival, as well as to provide the essential ecological functions of soil enrichment, erosion control, watershed stability, coastal protection and wildlife habitat.

These trees have become "traditional" by virtue of being intertwined with the culture and the day-to-day lives of indigenous peoples, for whom they provide edible fruits, nuts, leaves and oils and serve as sources of medicine, fibre, fuel, gum, resin, aromatics, timber and wood for numerous valuable products of everyday importance.

Domesticating traditional trees is best implemented through partnerships between scientists and local communities, a process called participatory domestication. This process allows communities to adopt rapidly the new techniques, to be the beneficiaries of their own efforts and, most important, to retain the rights to their traditional knowledge. It also ensures that the interests of the people are foremost in the process. This kind of initiative is easily implemented using appropriate low-technology that is readily learned.

Early results from participatory domestication programmes in Africa indicate that local participants have improved livelihoods, higher incomes and

more sustainable farming systems, as well as new opportunities for commercializing and adding value to the products from a new generation of cash crops.

Extrapolation from this success suggests that if new tree crops can be developed by communities throughout the Pacific and integrated into their traditional farming systems, there can be very significant benefits for Pacific islanders and their islands. [Source: extracted from the foreword by Roger R.B. Leakey of *Traditional trees of Pacific Islands*, ed. Craig R. Elevitch, 2006.]



the plants commonly used in Fiji by WAINIMATE (the Women's Association for Natural Medicinal Therapy) to treat various ailments, especially infections of different natures.

THE ROUNDTABLE FOR NATURE CONSERVATION

The Roundtable for Nature Conservation is the largest cross-sectoral coalition of donors, non-governmental organizations (NGOs), regional organizations and national governments working in nature conservation in the Pacific.

For more information, please visit: www.sprep.org/roundtable/

Medicinal plant use in Fiji

The following table provides information on

Local name	Scientific name	General description of the plants	Uses and method of application
1. Botebtekoro	<i>Ageratum conyzoides</i>	Coarse herb up to 1 m tall. Flowers minute, whitish to pale blue, borne in sunflower-like heads. Now growing widely in the South Pacific, originally brought as an ornamental plant from the Americas	Juice or sometimes leaves are directly applied to infected wounds. Also used for eye infections, diarrhoea, dysentery, hepatitis, intestinal worms, filariasis, wounds and cuts, besides other ailments
2. Vulokaka	<i>Vitex trifolia</i>	Small tree up to 5 m tall. Flowers relatively small, bilateral, purple. Fruit a small globose, 4-seeded capsule. Grows widely throughout the Pacific and tropical region as far as South Africa	Used for mouth infections, as anthelmintic and in stomach pains
3. Uci	<i>Euodia hortensis</i>	Shrub to small tree up to 6 m tall. Small, white fragrant flowers. Fruit a 4-parted brown dehiscent follicle, with single seed in each segment. Native to New Guinea, now widely distributed in the South Pacific	Bark used for treating jaundice
4. Kaukamea	<i>Vernonia cinerea</i>	Up to 60 cm high, this herb is found throughout Southeast Asia. White to purple-tinged flowers, borne in small heads	Juice from plant is used to treat cuts from rusty knives, fish poisoning, stingrays and stonefish
5. Tarawau	<i>Dracontomelon vitiense</i>	Large tree, up to 20 m tall. Flattish branches, pinnate leaves, small whitish flowers, tough edible yellow fruits	Decoction of leaves is used for the treatment of venereal ulcers, boils in ear and earache. Liquid pressed from the bark is used to treat inflammation and filariasis
6. Wa bosucu	<i>Mikania micrantha</i>	Perennial scrambling or climbing vine. White, minute flower borne in densely packed heads resembling sunflower. Fruit a small achene with white bristles that aid in wind dispersal of seeds. Common weed of pastures, roadsides. Native to tropical America but widely distributed throughout South Pacific and tropical Asia	Used for insect bites and various skin irritations
7. Mokosoi	<i>Cananga odorata</i>	Tree up to 20 m tall. Flowers very fragrant with six large pale green to yellowish petals. Cultivated or naturalized in forests, slopes, etc. Native to Indo-Malesia	Has known antifungal, antibacterial, antipruritic, antiyeast and amoebicidal activity
8. Dawa	<i>Pometia pinnata</i>	Tree up to 20 m tall with buttressed trunk. Flowers minute, regular, 5-parted, whitish except for red stamens. Fruit red, juicy, whitish pulp with single seed. Widely planted and naturalized throughout the South Pacific	Known to have antiprotozoal and antimicrobial activity. Used for diarrhoea, coughs, fever, mouth infections
9. Kalabucidamu	<i>Acalypha wilkesiana</i>	Shrub, 2–5 m tall with hairy branchlets. Found widely in the South Pacific	Used for a wide range of respiratory ailments. The decoction of leaves is used to treat gastritis and lymphatoid swelling
10. Cevucevu	<i>Physalis angulata</i>	Herb up to 1 m tall. Found commonly in the South Pacific region. White flower; fruit a green to yellowish berry with numerous small seeds	Leaf juices are used as antipyretic and also applied on boils, ulcers and wounds. Juice also used to facilitate childbirth

Source: Kishore, K., Rao, D., Lal, R., Aalbersberg, B. & Pryor, J. 2007, in press. *Standardization of an antimicrobial assay for Pacific Island natural products*. [The authors are from the Fiji School of Medicine and the University of the South Pacific.]

MORE JOBS FROM PINE IN FIJI

The interim government has forecasted that the pine industry will provide employment to rural communities. Interim Finance Minister Mahendra Chaudhry said contract employment in the industry was expected to increase by 70 percent. He said it would be possible when the Fiji Pine Limited diversified into new ventures such as pine resin tapping operations. "This will create employment opportunities for rural communities, in particular rural women," he said. (Source: *Fiji Times*, 25 November 2007.)

Keeping tapa art alive

Kesaia Vakaola is among the limited number of women in Fiji who are adept at making *masi*, the traditional Fijian cloth produced from the bark of the mulberry tree. She now teaches other women the skills at the Veiqaravi ecumenical community training centre in New Town, Nasinu.

The consistent thudding of wood against wood is the only sound to emerge from this urban setting, as women concentrate on their individual tapa pieces. Beating the bark of the mulberry tree is probably the most integral part of the whole tapa-making process, which takes about three to five days at best. The activities provided at the centre are aimed at empowering women through acquired skills while also giving them some spiritual guidance.

"I have been making good money from tapa, roughly about \$130 a week from the sales," said Vakaola. She said that as a small girl growing up in her village of Korotolu, she picked up the skill from older women. "I used to see my grandmother, mother and aunts beating [tapa] every morning until the afternoon."

Vakaola usually derives much of the mulberry bark from the village of Viwa in Yasawa, where mulberries grow prominently. The Veiqaravi training centre is encouraging trainees to plant their own mulberry trees in their backyard or garden. This is considered a good investment because it is usually six months or more before the bark can be harvested, which is a relatively short time for a good cash crop, according to Vakaola. The trainees have also been taught how to boil the bark of the *dogo* or mangrove plant to make the dye used to paint tapa. Vakaola said that

most of her clients usually place their orders with her but, if they are not enough, she takes her wares to sell at the Suva flea market.

Vakaola is a good example of how individuals without much of an education can rely on skills such as making tapa as a means to financial independence. (Source: *Fiji Times*, 23 August 2007.)

Overview of NWFP trade in Papua New Guinea and its contribution to livelihoods

Effective NWFP policies, regulations and management strategies are needed for the economic, nutritional and cultural well-being of the people. The development of workable regulatory frameworks to reduce illegal and unregulated trade, while maximizing the sustainable management potential of NWFPs, is urgently needed. Forest economics are not just about trees and their products but also include both flora and fauna and the entire collective ecosystem itself, especially for the tourism industry, but also for research. Industrial forestry has had terrible social and environmental effects in many parts of Papua New Guinea (PNG) and there is a real need for an alternative industry focusing on NWFPs.

Rattan, sandalwood and eaglewood are leading examples of internationally marketed resources in PNG. There is an immediate need for management and policy guidelines to manage these NWFPs sustainably so that the people can benefit economically.

NWFPs have an economic value for rural people, which means that their development and improved trade will help alleviate poverty in these areas. Domestication of plant species that produce NWFPs should involve scientists and farmers so that improved silvicultural methods developed by scientists will be used by local farmers. Both eaglewood and sandalwood species are appropriate for domestication and are currently being tested at the Papua New Guinea Forest Research Institute (PNGFRI), with positive results, which will improve genetic selection, leading to incentives for market expansion.

There are many NWFPs in PNG that are traded at local, national, regional and/or international levels. For instance, rattan and sago (among other forest products) have cultural significance, used as clothing, shelter and food sources. Sago is exploited for stem starch and is both a subsistence and commercial product. Sago

starch remains a staple food for many people and communities in PNG; it has found wide uses in many traditional foods and products and strongly features in the country's food security issues. It also generates a great deal of money from the local domestic market.

Regional trade remains an important aspect of NWFP economy in PNG. Eaglewood is one of the most highly priced commodities in the Asia-Pacific Region and has been extensively traded. The current discovery of natural stands of eaglewood in PNG has led to the extension of that trade, which has impacted the rural economy.

Other NWFPs traded internationally are rattan, butterflies, sandalwood and orchids.

The economic importance of NWFPs in the livelihoods of forest-dwellers should not be underestimated, with people historically depending entirely on them for food, shelter, clothes, medicine, etc. Eaglewood and sandalwood, however, have no recorded traditional use apart from their present economic uses. Rural populations currently use NWFPs as a means towards development and poverty alleviation.

In 1992 a total ban was imposed on wild orchids and the domestication of wild flowers is being encouraged by the National Botanical Gardens in Port Moresby and Lae Botanical Gardens. Wild orchids and flowers are very important income-generating opportunities for village communities; they are often sold in local markets and are grown to attract other NWFPs, such as insects and butterflies, which in turn attract tourists.

Socially, NWFPs play a crucial role in reducing social tensions within rural households by providing cash incomes to cover basic needs such as shelter, food, clothes, school and medical fees and transportation. Nuts such as karuka from a *Pandanus* species and canarium and okari nuts can be of great social significance. Most NWFPs are traded within the informal sector where there is no proper documentation or recorded figures to indicate the actual trading.

Eaglewood and sandalwood are two of these emerging commercialized NWFPs in PNG with poorly documented production and trade. However, such commercialization and the regulations that govern them have had major impacts (both positive and negative) on the sustainability of production, as well as on the benefits that accrue to stakeholders. One possible

reason for this is that there have been no effective mechanisms to ensure sustainable production, equitable trade and to show clearly the possibility of a win-win situation for traders, local producing communities and resource conservation. This has rendered fair trade dialogue difficult. A win-win situation is one in which the sustainable supply of raw materials as well as better prices commensurate with the efforts and end value of the products are assured.

A recent paper commissioned by FAO's NWFP Programme under the Norway Partnership Programme (NPP) "Forests for Sustainable Livelihoods" (FNOP/INT/004/NOR) analyses how trade-related instruments have influenced the commercialization and livelihood contributions of eaglewood and sandalwood in PNG, and also suggests how positive impacts can be enhanced or negative impacts minimized. Sandalwood and eaglewood are important NWFPs in PNG, producing substantial amounts of money and having economic potential. Consequently, if properly managed they could help to improve people's living standards. (Source: extracted from National analysis of trade-related instruments influencing trade in sandalwood (*Santalum macgregorii* F. Muell) and eaglewood (*Acquilaria* and *Gyrinops ledermannii* spp.): applications and impacts on poverty alleviation and sustainable forest management in Papua New Guinea. Unpublished FAO case study, available only in pdf format at www.fao.org/forestry/site/40716/en)

Pandanus tectorius (pandanus)

Pandanus is one of the Pacific's most useful plants and is featured prominently in Micronesian and Polynesian creation mythology, cosmogony, proverbs, riddles, songs, chants and sayings.

Pandanus (*P. tectorius*) is a large shrub or small tree of immense cultural, health and economic importance in the Pacific, second only to coconut on atolls. Different parts of the pandanus plant are used to provide a myriad of end products throughout the Pacific Islands, especially on atolls.

Pandanus fruits are a staple food in parts of Micronesia including the Marshall Islands, the Federated States of Micronesia and Kiribati providing up to 50 percent of energy intake. They are also widely consumed in Tokelau and Tuvalu. In some

places the consumption of pandanus has decreased in recent decades as a result of the availability of imported foods. For example, it was formerly a major staple food in Nauru. In Micronesia adults may commonly consume 20 fresh keys (phalanges) or about 1 kg of fruit per day.

The fruit pulp is preserved in several different ways. A paste, which is compared with dates in taste, texture and appearance, is made by boiling and baking the keys, followed by extracting, processing, and drying the pulp. Cultivars with large amounts of pulp are preferred and the taste differs among cultivars. Fresh pandanus is an important source of vitamin C. Preserved pandanus pulp mixed with coconut cream makes a tasty, sweet food item. Pandanus can also be made into flour that is consumed in different ways, usually prepared as a drink

In the atoll islands of the Central Pacific, the fruits are often sold fresh in local markets, and preserved food items are occasionally sold.

Pandanus leaves are used to weave traditional floor mats in many Pacific countries, as well as in the construction of traditional houses (thatch for walls and roofing). A roof made from pandanus leaves is said to last about 15 years, while one of coconut leaves may last for only three years.



The main commercial products from pandanus are woven products, often of high value. Individual mats may be worth more than US\$500 in Tonga, Fiji and Hawai'i. In Tonga, mats made from thin strips of leaves with intricate designs (*fala*) are important gifts and indicators of wealth. Simpler designs using wider strips (*lotaha* and *papa*) are used as everyday floor mats. *Ta'ovala* mats are worn around the waist.

In the Ha'apai Group, 80 percent of women are involved in handicraft production, mainly using pandanus and some paper mulberry (*Broussonetia papyrifera*). Most traditional handicrafts made from pandanus are produced for home use, as gifts, or are informally exchanged for other products, including other handicrafts. Because the commodities are locally produced, non-perishable and can be processed a number of ways, there is a wide range of opportunities for producers and processors to enter into the handicraft marketing chain at any stage.

Pandanus is an important income-generating plant in the Ha'apai Group, and the islands are well known as producers of all types of mats known as *fakaha'apai* and *salusalu*.

In Tonga, producers and sellers report that prices of pandanus products are relatively stable, indicating that supply is matching demand. (Source: extracted from: *Traditional trees of Pacific Islands*, ed. Craig R. Elevitch, 2006.)

.....
FOR MORE INFORMATION, PLEASE CONTACT THE LEAD AUTHOR OF THIS CHAPTER:
Lex Thomson, Research Director, Pacific Australia Reforestation Company, 65 Reynard Street, Coburg, Victoria 3058, Australia.
E-mail: Lex.Thomson@gmail.com

Papua New Guinea Forestry Regulation and NWFPs

In Papua New Guinea (PNG), the forestry sector contributes significantly to the economy: in 2001, it contributed US\$334 million to PNG's gross domestic product (GDP), which was about 76 percent of its total.

Although the contribution is predominantly from the logging industry, NWFPs do play some role in the local economy, with 13 tonnes of sandalwood on average being exported each year. This is evident in the Forestry Regulation 1998 (consolidated in subsequent amendments of 2001 and 2003), where mentions of NWFPs include the following.

Forest industry activities, i.e. any commercial activities within Papua New Guinea directly connected with:

- harvesting or processing of timber or rattan;
- buying unprocessed timber or rattan for processing or export;
- selling or, on behalf of another person or other persons, arranging or procuring the sale or purchase of

timber or rattan (whether unprocessed or processed but not including manufactured items made from timber or rattan materials), by a person where the timber or rattan harvest, processed, purchased, sold or arranged or procured to be purchased or sold, by that person in a calendar year exceeds i) 500 m³ in volume; or ii) in the case of sandalwood or rattan 20 000 kina in market value.

Declaration of reserved trees. The Ministry in-charge of forestry may, by notice in the National Gazette, declare any trees or members of any species or class of trees to be reserved trees. NWFPs such as agarwood and sandalwood fall under the reserved species. (Contributed by: Regina Hansda, Flat 101, Teak Block, Sushant Estate, Sector 52, Gurgaon-122002, Haryana-India. E-mail: reginahansda@yahoo.co.in)

Sago palm (*Metroxylon* spp.)

The various species of *Metroxylon* (*Metroxylon amicarum*, *M. paulcoxii*, *M. sagu*, *M. salomonense*, *M. vitiense* and *M. warburgii*) have important cultural values throughout many parts of the Pacific and Southeast Asia. The two primary uses are



Metroxylon sagu (sago)

SAGO GRUBS

Papua New Guinea is known for its nutty flavoured sago grubs (*Rhynchophorus ferrugineus papuanus* or *R. bilineatus*), beetle larvae that inhabit dead sago palm trees and are honoured at annual festivals. (<http://nationalzoo.si.edu/publications/zooqoer/2005/4/edibleinsects.cfm>)

durable leaf thatch. Several secondary uses have also been recorded, but these are not comparable in economic importance with the primary uses. *M. sagu* is a staple food crop in the Sepik and Gulf provinces of lowland Papua New Guinea, where most of the sago grows in wild uncultivated stands.

Among the Asmat of Papua New Guinea, felling of the palm and harvesting of the sago starch are accompanied by ritual. In house construction, sago leaves are used for roof thatch and wall siding, and the wood is used for floorboards and rafters. In the Solomon Islands, the thatch is known to last five years or longer.

The decaying trunks of the sago palm are a source of sago palm beetle grubs (*Rhynchophorus ferrugineus/bilineatus*), an excellent source of protein.

EDIBLE STARCH

Metroxylon starch may be eaten as raw chunks of pith or as baked pieces of pith. Whole logs have been baked and taken as sea provisions on long canoe voyages.

Each of the species is currently or was previously used as a source of edible starch, with the possible exception of *M. vitiense*. The most intensive use as a food source has been in the western Solomon Islands and Bougainville. Throughout the rest of the range of distribution, the starch was eaten as a famine food, although this is questionable in Fiji and in at least one culture in the eastern Solomon Islands.

Production and use of sago starch vary somewhat from location to location. The production of sago from *M. paulcoxii* and *M. warburgii* is probably a recently introduced concept in Samoa. No starch has been observed from *M. paulcoxii*. Although starch production from *M. amicarum* is known, it is very rare since the trees are much more highly valued for thatch. At present, many cultures have virtually abandoned the production of sago starch, in favour of other starch crops such as sweet potato, taro, cassava (manihot) or imported rice.

LEAF THATCH

Leaves are highly valued for thatch for roofs and house walls in many islands of the Pacific. In Pohnpei, roofs are called *oahs*, the Pohnpeian word for *M. amicarum*, as the leaves are used for thatch. The thatch is applied in layers, with each sheet tied to the rafters by coconut sennit or vines. Walls may also be constructed from the same thatch sheets.

In northern Vanuatu, where both *M. warburgii* and *M. salomonense* are present, thatch from each species is used for different constructions. *M. warburgii* sheets are used for roofing, whereas *M. salomonense* sheets are used for wall siding. In Samoa, older informants indicated that the leaves of *M. paulcoxii* were not useful for thatch but that *M. warburgii* is considered to be a superior thatch. Younger Samoan informants did not seem to be aware of the difference between species and appeared to harvest the leaves indiscriminately.

The leaflets (basic thatch materials) of *M. amicarum* and *M. warburgii* contain highly modified and enlarged subhypodermal bundles of fibres. These explain the enduring quality of thatch made from these species. As humans have selected these species, they have probably also selected for increased fibre production and have selectively planted cultivated trees with better leaf qualities.

In other parts of the Pacific, *M. warburgii* and *M. amicarum* are viewed as emergency food and are rarely or no longer eaten by people, although they are used for thatch and animal feed. Various parts of the plant are used for traditional medicines, toys and other miscellaneous items. (Source: extracted from *Traditional trees of Pacific Islands*, ed. Craig R. Elevation, 2006.)

.....
FOR MORE INFORMATION, PLEASE CONTACT THE LEAD AUTHOR OF THIS CHAPTER:
Will McClatchey, University of Hawai'i at Manoa, Botany Department, St John 405, 3190 Maile Way, Honolulu, Hawai'i 96822, United States of America. Tel.: 808-956-6704; fax: 808-956-3923; www.botany.hawaii.edu/faculty/mcclatchey/

The crippling of the lucrative *kava* export industry in the Pacific Island countries

History. *Kava kava* (*Piper methysticum*) is a member of the pepper family. Its roots have been used for centuries in the Pacific Island countries (PICs), Vanuatu, Fiji, Samoa and Papua New Guinea, for the preparation of a ceremonial and social drink. In western countries *kava* has been mostly sold as a dietary supplement and in pharmaceutical preparations for patients suffering from anxiety, stress, nervousness and insomnia. **Kava production.** *Kava* is one of those NWFPs cultivated on a large scale, but wild sources continue to meet the market demand. Most of the PICs grow it; however, the archipelago of Vanuatu, the islands of Pentecost, Santo, Tanna, Epi, Ambae, Tongoa and Maewo are the primary *kava*-growing areas. In Vanuatu, *kava* production is less than that of copra (coconut) and cocoa, but the cash value to small subsistence Vanuatu *kava* farmers is significant.

Trade and export. During the late 1990s, *kava* was one of the top ten best-selling herbs globally. A boom in 1998 witnessed a surge in sales to an estimated US\$50 million. Only some 100 000 kg were shipped to Europe during the whole of 1996, compared with 50 000 kg of dried roots shipped every week from Fiji alone in 1998. In 1997, *kava* extract was sold for \$100/kg by processing companies to manufacturers, compared with \$250–300/kg in 1998, a 300 percent rise in price.

Trade ban in western countries. The growing *kava* export industry in the PICs received a devastating setback in 2002 when countries in the European Union, led by Germany, imposed bans on *kava* products, withdrawing licences for all products containing *kava* and/or *kava*'s active ingredient (kavalactone). This was mainly because of the alleged links between *kava* extract and liver damage. Other countries such as the United Kingdom, the United States of America, Canada, Australia, New Zealand and Singapore also imposed a ban on the import and use of *kava* extract.

Post-ban impacts and initiatives. As a result of the ban, livelihoods of thousands of households across the PICs were impacted. Phytopharm, the Germany-based consulting firm on botanical research carried out an in-depth investigation into European Union member states' market restrictions on *kava* products at the behest of the Centre for the Development of Enterprise (an ACP [Africa, Caribbean and Pacific]/EU joint institution created in the framework of the Cotonou

Agreement for promotion of small-scale enterprises among these nations) and PRO€INVEST (an EU-ACP partnership programme developed and undertaken by the European Commission on behalf of the ACP countries).

The International Kava Executive Council (IKEC) consisting of members from both the PICs and the EU was constituted in November 2003 in response to this trade disaster. The findings of the report were deliberated in the International Kava Conference 2004 organized by IKEC in Fiji, wherein participation from stakeholder representatives, scientists, health authorities and academics from 16 countries, including the Pacific ACP and EU states, took place. The outcomes of this conference led to the drafting and adoption of a resolution in 2004, which included the following.

- The efficacy and safety of *kava* in the treatment of conditions of nervous anxiety, stress and restlessness were proved through more than 20 clinical trials involving more than 10 000 patients. Of 82 reported cases of liver toxicity attributed to *kava*, only about four could be substantiated, highlighting that the incidence rate is one case in 50 million *kava* extract users.
- Toxicity studies on *kava* suggest a hypothesis that the causal factors to the reported cases may be related to the variety of *kava* utilized (many indiscriminate *kava* varieties were exported and used in the tablet industry, including even wild or false *kava*, since people were quick to exploit the high prices in the absence of any kind of quality control both between Pacific countries and export to Europe and the United States), and also possibly the extraction method used.
- The World Health Organization (WHO) was asked to work on *kava* safety evaluations.

Current status. WHO, in association with the Natural Standard Research Collaboration carried out an assessment of the risk of hepatotoxicity with *kava* products. This provides safety and regulatory information, analytical results and clinical recommendations, as well as conclusions and recommendations by the Committee appointed to handle the inquiry. Recent news briefings suggest a possible review of the *kava* import ban by the countries concerned as a result of the outcomes of the WHO report.

Lessons learned. The story of *kava* illustrates the value of understanding traditional uses of NWFPs; the significance of considering safety issues in herbal preparations; the need for introducing and enforcing quality standards and regulations to ensure that quality raw materials are used in the pharmaceutical, food and cosmetic industry; and the role of third party mediation.

IKEC's Web site (www.ikec.org) provides a comprehensive overview of this issue. (Contributed by: Regina Hansda, Flat 101, Teak Block, Sushant Estate, Sector 52, Gurgaon-122002, Haryana, India. E-mail: reginahansda@yahoo.co.in)

VANUATU DEFENDS ITS FAMOUS KAVA DRINK

Vanuatu is battling to defend the reputation of its national drink, a bitter peppery concoction called *kava*, which is famous for its medicinal, stress-relieving properties. Since 2000, *kava* has been banned by many European countries, following claims that the herbal remedy can cause severe liver damage. Now Australia has imposed tight new import restrictions because of concerns that it is being abused in some Aboriginal communities.

But in Vanuatu, *kava* drinking remains an essential evening ritual, as the roots of the *Piper methysticum* plant are washed, chopped, mashed (ideally with a stick of dry coral) and strained into coconut cups. Many people on these remote islands believe that *kava* has been unjustly demonized. They claim that the herb – once widely available globally in pill form as a natural treatment for stress and anxiety, and known as *kava kava* – was encroaching on the turf of international pharmaceutical companies. Now Vanuatu's case has been strengthened by a new report from WHO that appears to rule out a link between *kava* and liver damage.

Despite the new restrictions imposed by Australia, *kava* traders in the Pacific are now hoping to revive their export industry, which has been badly damaged by these bans. (Source: BBC News [United Kingdom], 18 July 2007.)



HISTORY OF NWFPs

The forgotten heritage

There is growing awareness on the part of international forest science and policy as regards the significance and relevance of local and indigenous knowledge about forests and traditional possibilities of utilization, as well as the need to take account of this knowledge in the development of political strategies that aim at sustainable forest management. The protection, documentation and utilization of forest-related, tradition-based knowledge are the focus of numerous political discussions held within national, regional and international organizations and fora. Countries in the European region and elsewhere have in recent years increased their attention towards the cultural heritage values in forests (e.g. Vienna Declaration and Vienna Resolution 2003 adopted at the Fourth Ministerial Conference on the Protection of Forests in Europe).

Over thousands of years a diversity of forest management practices has shaped European landscapes, affecting density, structure and species composition of forests and woodlands, according to technical knowledge, environmental conditions and the role played by forests in time and space. Traditional knowledge has greatly contributed, providing multiple goods and services, food, raw material, energy sources, livelihood security and quality of life and developing management practices that have increased the biodiversity and quality of woodlands. Over the last decades the retreat of agriculture, socio-economic development, market changes, the replacement of renewable raw materials and modern forestry have deeply changed the relationship between society and forest resources, interrupting the transmission of traditional

forest-related knowledge between generations. Thus, the demand for traditional products has decreased and former well-known techniques and uses are only partly recognized and have largely fallen into oblivion.

The gap between orally transferred forest-related knowledge and forest science can be bridged to a certain extent by forestry-related literature dating back to the eighteenth/nineteenth century. Although most of the authors (forest scientists and foresters) focused primarily on the production of highly valuable timber, they were aware that their scientific knowledge was based on traditional knowledge. This is the reason why they collected and published oral information about the various uses of trees and their different parts, such as bark, sap, leaves, blossoms and seeds. These books are of great importance for today's society because they provide information about different products and the recipes and skills necessary to produce and use them. Thus attention can be drawn to the fact that, in addition to wood, a wide variety of products can be derived from forest trees, with many traditional processing techniques known in practice only in rare cases and that have fallen into oblivion to a great extent.

The example of juniper may illustrate the importance of specific tree species for daily life and how they are used by local people. The wood of this species can be used for the manufacture of cups, plates, fuelwood and medicine. The roots, particularly from male shrubs, and the wood and berries produce a pleasant smoke. Roots can also serve as a medicine against fever and other diseases. Resin can be collected from the bark and used also as incense; needles might be used for smoking. The fruits can be the basis for the production of local brandy, medicine against various diseases and for oil. In these publications traditional knowledge is preserved, which has been handed down orally from generation to generation, that otherwise would have been lost. For a long time, some of these products have been referred to – in a mostly discrediting manner – as “by-products”, e.g. tree saps, which are of interest in pharmacy and food technology or in the chemical industry even today.

One of the most interesting authors of that time is Peter Reber, who described in a very comprehensive way the common uses of forest trees, shrubs and herbs at the beginning of the nineteenth century (Reber, P. 1831. *Handbuch des Waldbaues und der Waldbenutzung*. Jos. Lindauer'sche



Buchhandlung München). However, a considerable number of contemporary – mainly German – forest scientists have acknowledged the traditional multiple uses of woodlands.

Reber addresses the multiple products deriving from specific tree species and describes in detail not only the technical uses of wood but also the multiple uses of leaves, bark, sap, fruits and seeds. Thus different parts of the trees can be used for different purposes such as bark for tanning, dyeing, medicine, bast for weaving and ropes, or sap for the production of turpentine, resin, pitch, tar, soot, oil sugar, wine, brandy, vinegar and medicine. The leaves of various trees can serve as food for human beings as well as for fodder (green or dried) for cattle, goats and sheep and as fertilizer, but can also be used for tanning and dyeing. Multiple uses of fruits are also mentioned, such as food for human beings (green, dried, cooked), for fodder for husbandry and game, for tanning and dyeing, for beverages (syrup, coffee, brandy) and for medicine and oil. Just in the making of oil, more than 13 different raw materials are mentioned as the basis for production (such as seeds from beech, hazel, lime tree, horse chestnut, alder, spruce, fir, pine, larch; leaves from alder; buds from poplar and horse chestnut; and blossoms from roses and birch). Reber also pays attention to the importance and uses of diverse plants, herbs, grasses, mosses and lichens growing in the woodland. Other particular products are perfumes deriving from juniper (produced from wood, roots, berries and needles), larch (blossoms, needles), rose (leaves, blossoms), willow (blossoms) and spruce (bark). Different parts of trees are also highly valued because of their healing effect against diseases (mainly against fever) such as berries, fruits, leaves, branches, bark, seeds and wood (i.e. juniper and birch).



TRADITIONAL KNOWLEDGE

Traditional knowledge is a combination of ancient indigenous practices and techniques, locally adapted and distinctive in a territory or community. It is passed on through generations, packaged in folk songs, stories, dances, poetry, carvings and paintings. This knowledge has greatly contributed, and still does, to the world's natural and cultural heritage by sustaining the production of multiple goods and services that enhance livelihood security and quality of life. Traditional knowledge, cultural values and historical perspective have gained an increasingly important role in shaping policies towards achieving the Millennium Development Goals (MDGs) of alleviating poverty and ensuring economic, social and environmental sustainability.

Traditional knowledge has been used for managing the utilization of many natural resources, such as water, soil and forests, and for organizing rural and urban communities. Traditional Forest-Related Knowledge (TFRK) has long been known to have important implications for forest management and conservation of forest biodiversity, as well as for identification of valuable genetic resources.

The political commitments on increasing awareness of the role of TFRK and practices in the protection of landscapes and conservation of biological diversity were reaffirmed by many of the member states of the United Nations Forum on Forests. During its Sixth Session in 2006, countries agreed to four Global Objectives on Forests aimed at enhancing sustainable forest management (SFM) and the contributions of forests to the achievements of the MDGs. The increasing emphasis on SFM, which includes ecological, social, cultural, spiritual and economic sustainability, has prompted increasing emphasis on considering all relevant knowledge about forest ecosystems and the impact of forest management options in the development of forest policies and operational practices. (Source: APAFRI Brief, 19 June 2007.)

Active substances for pharmaceutical and cosmetic products are still being obtained from forest trees but, apart from well-established usages, new fields of use and products can also be created. Wood composites hold a huge, in many respects still unused, potential; for example, they can provide the basis for packaging materials, foils, paints and many more. At present, forest management systems based on traditional forest-related knowledge and often small-scale enterprises are not sufficiently recognized by researchers, managers and policy-makers. However, the experience of the past half century reveals a variety of relationships between science and traditional knowledge, in which the general trend has been from disapproval towards appreciation. (Contributed by: Prof. Elisabeth Johann, Oberdorfl 9, St Margareten 9173, Austria. E-mail: elisabet.johann@aon.at)



Morinda citrifolia

Ancient and traditional uses of *noni* (*Morinda citrifolia*)

Noni has probably been used by humans for at least 5 000 years and perhaps much longer. It belongs to a large plant group (genus) called *Morinda*.

Morinda species comprise a useful and widely distributed group of tropical trees, shrubs and vines. There are about 80 species, most originating from Borneo, New Guinea, northern Australia and New Caledonia. At least 20 species have significant economic and traditional value as a source of medicine, food, dyes or wood. Several species, including *noni*, have buoyant seeds that can float in saltwater for months and still remain viable upon landing on a remote coast.

These *Morinda* species became essential components of many tropical coastal and forest ecosystems, as well as serving important functions in a number of

ancient indigenous societies. In fact, ancient societies turned to *noni* and other plants for many of their needs, ranging from the mundane to the life-sustaining and spiritual.

Proof of *noni*'s status as a critically important plant can be found in the stories of ancient Polynesians, who considered it to be important enough to take it intentionally to new lands in the Pacific and plant it near their settlements.

Many of the following ancient and traditional uses of *noni* are still in use among indigenous peoples throughout the tropics.

Fire. Fire is one the most basic and universal human needs. Tropical societies used *noni* wood as fuelwood for cooking fires.

Tools. The ability to make tools from materials in the environment enabled many ancient societies to flourish. Every society can use convenient and renewable sources of high-quality woods to make tools and to construct buildings. *Noni* wood was used to make canoe paddles, digging implements and other hand tools. It was also used in fashioning weapons such as axe handles.

First aid. Preventing sickness and loss of life helps to keep a society strong. *Noni* leaves and fruits were used as immediate first aid treatments for cuts, bruises, burns and broken bones. *Noni* served a dual role of helping to promote healing and to relieve pain.

Curative or advanced medicine. Societies all over the world have a long-established healing tradition of using *noni* as one of their most important medicinal plants. The specific medical uses of the plant, what plant parts are used, and how they are used vary among tropical societies. The importance of the plant also varies among societies. Nevertheless, the plant is so widely used for medicine that this may be considered its most important function. As a medicine, healers often mixed *noni* with other herbs. Healers commonly combined herbs in specific amounts and mixtures to effect more complete cures of complex problems. Herbal treatments together with spiritual healing or god supplication activities were probably more common than using herbs such as *noni* alone.

Clothing/fabrics. Fabrics are essential to societies for clothing and other purposes. Virtually all societies dye their fabrics in some way. Very important red and yellow dyes for tapa cloth were made from *noni* by many indigenous societies.

Fodder. Most societies utilize animals for food, transportation or work. *Noni* fruits and leaves are a good supplement for the diet of ruminating animals.

Human food. Island or seafaring societies in the tropics are faced with destructive hurricanes and tidal waves. These calamitous events can destroy most of the plant life near or on the coastline. Famine often follows such events and until the vegetation can recover, people need something to eat. *Noni* fruit and leaves filled this role as a "famine food" plant. They were not particularly delicious or nutritious but could sustain life. (Source: extracted from Nelson, S.C. & Elevitch, C.R. 2006. *Noni: the complete guide for consumers and growers*. Holualoa, Hawa'i'i, Permanent Agriculture Resources. www.nonithecompleteguide.com).

Old glory

For millennia, people have thrived on products harvested from forests and for most of recorded history people have valued the forest not so much for wood but for other products. Ancient writings from China, Egypt and India record a wide variety of products derived from forest flora and fauna.

The early humans in their nomadic phase of existence lived as hunters and gatherers, living in caves and makeshift shelters. Domestication of plants and animals started with the beginning of settled agriculture. Systems of agriculture and medicine developed in different parts of the world, independent of each other.

Some 3 000 years BC, the Chinese emperor Shen Nung wrote down what is believed to be the earliest recorded use of plants as medicine. He noted that chalmugra oil, an extract from the fruit of *Hydnocarpus* spp. was an efficient treatment against leprosy. The ancient classical Ayurvedic texts Charaka Samhita, Susruth Samhita and Ashtanga Hrdaya Samhita mention a large number of medicinal plants for curing different ailments. Hippocrates, the father of modern medicine, wrote the book *Materia medica*, which discusses some 400 medicinal formulae using herbs such as mint, sage, rosemary and verbena as well as opium.

It is estimated that 35 000 to 70 000 plant species have at one time or other been used in various cultures for medicinal purposes. Indian traditional medicines are known to use 7 000 species;



Atropa belladonna

traditional Chinese medicines use some 5 000 species.

NWFPs were probably the earliest traded goods. In 1992, a team of amateur archaeologists discovered the Atlantis of the sands, the lost city of Ubar – the fabulous city in the sunken Arabian desert, which was linked to the trade of frankincense, obtained from the sap of the trees (*Boswellia* and *Commiphora* species) growing in the Dhufar mountains of Oman, which was traded on far-reaching routes from Rome to China.

NWFPs have been traded over long distances for many centuries, while wood products have only become major international commodities comparatively recently. The ancient Egyptians, for example, imported gum arabic from the Sudan and used it for the preparation of colours for painting and for mummifying. It was such an important article of commerce in the fourteenth century that it had a tax imposed on it. Other traded products included natural cosmetics, dyes, spices and food additives. Belladonna (*Atropa belladonna*) was used by Italian women to brighten their eyes. A drop of the plant extract widens the pupil and the Italians named it *belladonna* (beautiful woman). Today it is used in medicine. For example, one of its active substances, atropine, is used in tablet and injection forms to stimulate the nervous system.

The geopolitics of today have been influenced by the past trade in NWFPs – of spices, cosmetics, food preservatives and silks. The influence of trade in NWFPs continued up to the industrial revolution in the west, when the economy of scale slowly eased out the small-scale production of NWFPs.

The pre-eminence of wood (together with woodland management as against

forest ecosystem management) began with the opening of colonies. Wood was used for various purposes such as ship building, packaging commercial products (e.g. tea chests), mining, infrastructure development, the establishment of wood-based industries and urbanization.

The trend started in the 1700s still continues. Increase in population, income levels and standards of living have resulted in an ever-increasing demand for wood. Extensive areas of forest lands have been cleared for agriculture, horticulture and other uses since population growth has led to an explosion in need for food, water, clothing, education, waste disposal, health care and employment. The two world wars also impacted on forests. Inadequate protection and management, frequent forest fires, heavy overgrazing, shifting cultivation, wasteful harvesting, excessive fuelwood collection, misuse of rights and privileges and illegal activities exacerbated the situation. Spiralling deforestation has become a worldwide phenomenon, especially affecting the developing countries.

The assault on forests in the past was made easier because of the undervaluation of forest benefits. Most valuations are based on the monetary values of marketed or marketable forest products and services and this omits the real value of unpriced goods and services. NWFPs mostly fall in this category. Yet these goods and services make up the greater part of the socio-economic values of forests. Their omission automatically leads to gross undervaluation.

A recent study indicated that, in India, against the estimated contribution of forest benefits valued at US\$43.8 billion, the officially accounted contribution of forestry to national income in 1993 was only an equivalent of \$2.9 billion, representing 1.2 percent of the GNP of India. Most of those missing in the official figures were related to forest grazing, green fodder, medicinal plants, forest foods, non-wood construction materials (e.g. thatch grass and bamboo) and some other NWFPs, amounting to a value of about \$28 billion.

All along, the timber orientation of the forestry profession and the bias of planners in favour of large-scale enterprises have left NWFPs at a disadvantage. Production, at best, was considered incidental or subsidiary. This has resulted in NWFPs being left out of management prescriptions and preference

given to comparatively easier timber management.

Except for management operations of some commercially important NWFPs, such as bamboo, rattan, pine resin, *beedi* leaves, *kutch* and *katha* and sandalwood oil, others were lumped together as minor products and collection rights were auctioned off for lump-sum consideration. Apart from this, there were some isolated and disjointed activities on non-wood species introduction and domestication (e.g. *Pyrethrum*). There have also been systematic studies on several NWFP species, without commercial objectives. [Source: extracted from a key note address delivered by C. Chandrasekharan at the National Seminar on Sustainable Management of Non-Timber Forest Products of Western and Eastern Ghats held in Thiruvananthapuram on 25 May 2000.]

Entomofagia humana

La entomofagia es el consumo de insectos como alimento. Los orígenes de la entomofagia humana son muy antiguos. Es prácticamente seguro que todos los antecesores en la evolución de nuestra especie consumían, en mayor o menor medida, insectos.

Desde tiempos prehistóricos tenemos referencias del consumo de insectos en la alimentación humana. En la Cueva de La Araña en Bicorp (Valencia), que es una de las más antiguas, se representa la recolección de la miel (y probablemente también de larvas de abeja, ya que se extraían los panales completos). Estas pinturas rupestres tienen unos 8 000 años de antigüedad, sin embargo actualmente algunas tribus africanas extraen la miel (y consumen las larvas) de forma parecida.

De la cultura asiria, una de las más importantes del mundo antiguo, tenemos el testimonio del aprovechamiento de un abundante recurso natural – los saltamontes y, eventualmente, las plagas de langosta – como alimento. En un relieve del muro de un palacio de Nínive (actual Iraq) del año 700 a. C. se representa a dos esclavos que llevan a un banquete numerosos saltamontes ensartados.

Los antiguos griegos y romanos comían insectos habitualmente y existen numerosos testimonios históricos de esta costumbre. En la antigua Grecia los saltamontes o langostas eran considerados un manjar para las clases populares, las cigarras, en cambio, por su

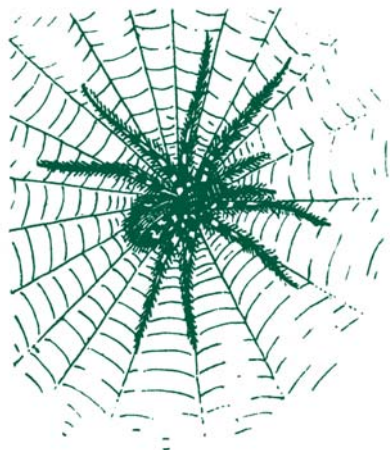
alto precio estaban reservadas para la alta sociedad.

En Europa casi desapareció la costumbre de comer insectos en épocas posteriores al imperio romano. Aunque un 80 por ciento de la población mundial come insectos habitualmente (y no sólo por necesidad, sino también por placer), en Europa, Estados Unidos, Canadá y otros países occidentales, la mayor parte de la población sigue siendo reacia a practicar la entomofagia.

México es actualmente el mayor centro de entomofagia mundial. En ningún país del mundo se consume una variedad tan asombrosa de insectos, muchos de ellos con una gran tradición histórica. En México se comen los saltamontes (conocidos allí como chapulines), los gusanos rojo y blanco (larvas de lepidópteros) que viven en el ágave o maguey, las larvas de hormigas o escamoles, hormigas odre, larvas de abejas y avispas y muchísimos otros insectos. El total de especies consumidas en México excede las 250, pero lo más extraordinario no es el número de especies sino el gran porcentaje de la población que habitualmente consume insectos y la diversidad y riqueza del recetario, ya que la gastronomía mexicana se ha enriquecido notablemente con el mestizaje entre las cocinas española e indígena. [Fuente: *Entomofagia. Alimentación con insectos* por Juan Lizama. Ediciones El Nibelungo.]

PARA MÁS INFORMACIÓN, DIRIGIRSE A:

Juan Carlos Lizama Velasco, Dirección General de Agricultura, Oficina Española de Variedades Vegetales, Ministerio de Agricultura, Pesca y Alimentación, Alfonso XII 62, 2º planta, 28104 Madrid, España. Correo electrónico: jlizamav@mapya.es



The vegetable fibre industry in the Canary Islands

Knowledge about the vegetable fibre industry in the Canary Islands comes from three main sources of information: archaeology, ethnography and ethnohistory. Thanks to archaeology, an important part of our prehistoric past can be reconstructed. Because of the particular climatic conditions of the Canary archipelago, many objects made of vegetable fibres have survived up to today.

The world of nature that surrounded the aborigines supplied them with the prime materials for their industry. Developments in the use of rush, palm and bulrush were a result of the abundance of prime materials, the needs of the aborigines and the technical knowledge they possessed.

Rush (*Holoschoenus vulgaris* Link) is a Cyperacea plant that grows abundantly in marshy areas, on the banks of ponds and streams. It can be used to bind mats, ropes, chairs, and so on. The natives used this fibre in the elaboration of their clothing, to distinguish those of different social status and those of authority. Archaeological finds are proof of its use in the aborigines' world with the existence of mats employed in shrouds for the dead, clothing and different cords.

The bulrush is a similar plant to the rush. Archaeological finds offer evidence that it was used to a lesser degree than the rush.

The date palm (*Phoenix canariensis*) is a species exclusive to the Canary Islands. Palm trees frequently grew on the lower slopes and coastal plains of the larger islands of the archipelago. At one time extensive palm groves covered the beds and sides of the *barrancos* (ravines).

The island of Grand Canary had an important vegetable fibre industry. The basic materials were rush, bulrush and palm. These three elements are those used by Don Juan Ramírez Pérez, who is considered the only artisan making cloth and objects of vegetable fibre following the techniques used by the native Canary islanders. [Source: *El Pajar*, II Época, No. 22, August 2006.]

FOR MORE INFORMATION PLEASE CONTACT:

Rafael C. Gómez León, Asociación "Pinolere. Proyecto Cultural", Revista "EL PAJAR. Cuaderno de Etnografía Canaria". Urbanización Viña Los Frailes. Calle Aceviño, 28, 38300 La Orotava. Tenerife. Islas Canarias. E-mail: directorelpajar@pinolere.org or gomezleonrafael@yahoo.es; www.pinolere.org

NWFP EXPLOITATION: LATEX FROM THE CONGO UNDER KING LEOPOLD OF BELGIUM'S RULE IN THE NINETEENTH CENTURY

Native communities in the *Domaine privé* (almost two-thirds of the Congo that was the exclusive private property of the state, in turn the exclusive private property of King Leopold) were not merely forbidden by law to sell items to anyone but the state: they were required to provide state officials with set quotas of rubber and ivory at a fixed, government-mandated price.

The rubber came from wild vines in the jungle, unlike the rubber from Brazil that was tapped from trees. To extract the rubber, instead of tapping the vines, the natives would slash them and lather their bodies with the rubber latex. When the latex hardened, it would be scraped off the skin in a painful manner, as it took off the natives' hair with it.

This killing of the vines made it even harder to locate sources of rubber as time went on, but the government was relentless in raising the quotas. (Source: Answers.com; Congo Free State history of the Democratic Republic of the Congo. Early history, migration and states (to 1867); www.answers.com/topic/congo-free-state-1)

History of NWFP use in Canada

In North America, the relationship between people and plants began thousands of years ago as the First Nation peoples developed their skills and knowledge and made their way south of the treeline. In eastern Canada, for example, not only were the forests a source of materials for fuel and shelter but also of food and medicine. Over 170 plant species have been documented as food sources. Almost all of the parts of plants were used: fruits, nuts, seeds, roots, bulbs, rhizomes, buds, flowers, shoots, leaves, inner bark and sap. Over 50 species were used as beverages.

The early colonists brought their knowledge of European herbals with them to the New World. Seeds of old world plants were brought and planted in their gardens and used as edibles and medicinals.



The federal governmental forest agency – The Canadian Forest Service (CFS) – was founded in 1899. The CFS has long been engaged in studying and demonstrating sustainable forest management practices. In 1933, the CFS established the Acadia Research Forest (ARF), near Fredericton, New Brunswick. This 9 000 ha forest was

the second in a series of research forests established by the Canadian Government and “serves as a living laboratory for the Atlantic Forestry Centre”.

ARF has been a leader in the research and development of NTFPs, for example in its early work in Christmas tree culture and management and the recent cultivation experiments of ground hemlock *Taxus Canadensis* Marsh. (Source: *Harvest beneath the trees: botanical non-timber forest products* by Deannie Sullivan-Fraser.)

FOR MORE INFORMATION PLEASE CONTACT:

Deannie S. Fraser, 61 B Hazelhurst St,
Dartmouth, Nova Scotia, Canada B2Y 3N1.
E-mail: deannie_sullivan@yahoo.com ♣

SHARING KNOWLEDGE

First Nation people often shared their knowledge of useful plants with the pioneers. The explorer Jacques Cartier had both his ships ice bound in the winter of 1635–36 at Stadacona, near the present Quebec City. During that winter he lost about 75 men from scurvy. In the spring, Cartier happened to see a group of First Nations; among them was Don Agauya who Cartier had noticed the previous autumn displaying the same symptoms as those that took the lives of his men. Cartier questioned him as to how he had recovered. Agauya sent some women in his group to collect the bark and boughs of a certain tree. He instructed Cartier how to make a tea from these and, as a result, all those who were ill recovered. Unfortunately, the tree was never described and has been the cause of interesting debates.

