

# Non-wood forest products in Lao People's Democratic Republic

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[Introduction](#)  
[NWFPs in national policy and practice](#)  
[Conclusion](#)

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## Introduction

Lao PDR has a population of about 4.5 million people, of which 81 percent are living in rural areas. With an average population of 15 people per square kilometre, the country has one of the lowest population densities in Southeast Asia. The country has vast reserves of land in contrast to the small population. However, during the last two decades, Lao PDR has experienced a rapid increase in population.

Employment opportunities are limited and a large number of people (253,000 families or 1.5 million people) depend on farming as their primary source of income. The scattered self-sufficient economic system in the rural and mountainous areas (80 percent of the land area), and the poor physical infrastructure and support services, constitute the principal factors limiting socio-economic development.

Over the years, the forests of Lao PDR (47 percent of the total land area) have provided shelter, food, medicinal products and other materials needed for household consumption. Even though the forests are still in reasonably good condition compared with neighbouring countries, they are under increasing threat from commercial exploitation, shifting cultivation and encroachment by rural people.

The forests of Lao PDR are the source of a wide range of non-wood forest products (NWFPs). Throughout the country, NWFPs play a particularly crucial role in rural households. A wide variety of NWFPs are collected for sale in local markets or for export to foreign countries. When added together, NWFPs are among the country's most important export commodities.

Numerous problems still constrain the development of NWFPs in Lao PDR. The present collection system is random and indiscriminate, with no consideration for sustainability. The quality of the collected products is still low, and up to 50 percent of the collection is often unsuitable for commercial use. The capacity for processing NWFPs is very limited in Lao PDR, even in catering to the home market. The home market is currently being flooded by foreign processed products, many of which were actually made from raw materials exported from Lao PDR at extremely low prices. Accurate data on these aspects and the actual contribution of NWFPs to social well-being and local economies are lacking.

During recent years, the interest in NWFP development has increased in Lao PDR. At present, there is general consensus among government and non-governmental organizations concerning the potential of NWFPs with respect to strengthening the forest conservation effort and satisfying the needs of people living in remote areas.

## NWFPs in national policy and practice

### Existing NWFP activities

There are some institutions in Laos which already carry out activities related to forest conservation and NWFP development. These institutions have a strong interest in NWFP development and recognise their potential, but they have limited staff with NWFP expertise.

### ***The Department of Forestry (DoF):***

DoF has many years of experience in the field of NWFPs, although it has very limited means to further develop their potential. Several organizations active in the field of NWFPs are wholly or partly under the jurisdiction of DoF.

- **The Bamboo and Rattan Research Project:** This project was established two years ago by DoF, with support from the International Development and Research Center (IDRC). The project presently carries out fundamental research on rattan, bamboo and benzoin (*Styrax*), monitors trial plantations, collects germplasm, undertakes socio-economic studies and taxonomic surveys and it has started to build a herbarium.
- **Community Forestry Support Unit:** The prime objective of this unit, which was established within the DoF in 1992, is to formulate strategies for community-based development in forest areas. The Unit, in which DoF and foreign NGOs cooperate, potentially is an effective instrument for ensuring that community aspirations, needs and constraints are considered in developing a community forestry policy.
- **NWFP study by the Dutch development organization NOVIB:** At the end of 1993 and in early 1994, NOVIB undertook a survey of NWFPs and social-economic conditions in two remote and mountainous areas of Lao PDR. One area is situated in the north and the other in the southern part of the country. Based - on this research, an NWFP Seminar was held in Vientiane in February 1994 and the outlines for a plan of action were proposed.

### ***The Department of Science, Technology and Environment***

This department is currently preparing a project which focuses on the marketing of NWFPs, in particular on the marketing of natural medicines, fungicides and biocides (non-toxic insecticides). The legislative focus of the project will be to ensure that significant and equitable economic returns from NWFPs flow to rural communities.

### **Socio-Economics of NWFPs in Lao PDR**

In each forest type, the number of NWFPs varies, depending on the season. Ubiquitous NWFPs provide food, raw materials, shelter, and medicine. Most of the rural people in Lao PDR work in the agriculture sector. Major crops are rice, corn, tubers, and maize. Sometimes people plant bamboo as a "living fence," harvest the bamboo shoots for food and use the bamboo culm as material for building and handicrafts. In the southern part of the country, rural people plant cardamom on their swiddon farms, and in the northern part they cultivate styra on their agricultural land for resin collection and as construction material or fuelwood.

### **Major NWFPs**

#### ***Benzoin***

**Extent and distribution:** In Lao PDR, styra (*Styrax tonkinensis*) grows naturally in mountainous areas in the north, at an elevation of about 400-1000 meters. Styra is found in the warmer, moister parts of the region. There is one commercial species of styra in the country (*Styrax tonkinensis*). This species produces an excellent gum called benzoin or *gum benjamin*. The wood is soft and of little use. To obtain the gum, trees are scarred or wounded. In an effort to close the wound, new wood forms. This new wood contains cavities filled with a resinous secretion (raw benzoin).

**Management:** In 1982, the Department of Forestry carried out a survey of natural stands of styra. The survey showed that there are significant styra resources in five provinces in the northern part of the country. Wild styra grows on fallow land where people practice shifting cultivation. Traditionally, people never planted the styra forests, they just allowed wild styra to grow unhindered. For the first time in 1993, the Department of Forestry planted one trial area of styra, but the results have not been encouraging. This trial will continue for several more years.

**Production:** During the first half of 1980, the collection of benzoin was about 20 tonnes per year. The price paid locally to collectors was about US\$ 8.00 to 10.00 per kilogramme. Since then the price has dropped year after year. As a result, the production of benzoin has also declined. Declines in production have occurred because raw materials are poor quality and producers lack marketing mechanisms. Thus, villagers cannot enjoy benzoin's potential economic rewards. In 1994, the price of benzoin was between US\$ 2.00 to 2.50 per kilogramme. No processing of raw benzoin is done in Lao PDR.

**Utilization:** Benzoin is composed principally of two alcohols, combined with cinnamic acid and associated with free benzoic, or free cinnamic acid. Benzoin tincture is used in Europe to treat acute coryza and the early stages of inflammation of the pharynx when the throat feels harsh and dry. It is also used in steam for acute laryngitis. In Malaysia, benzoin is used for skin complaints: itch, ringworm, the wound made by circumcision, sores on the feet, and rheumatic fever. Sometimes a little benzoin may be put into cigarettes.

**Marketing and trade:** In the past, benzoin produced in Lao PDR was exported to Europe and other markets via Thailand and Vietnam. Now, however, the bulk of Lao PDR production is exported via China. The largest single final market for processed Laotian benzoin is France.

**Income and employment:** Most styrax forests grow in areas of shifting cultivation and thus are owned by individual farmers. The yield of rice in these fields is only 1.2 to 1.3 tonnes per hectare per year, and thus it is only for household consumption. Besides work in the rice fields, men are occupied with house repairs and hunting; women collect vegetables, tap styrax and collect the benzoin gum. The income they earn is used for health care, clothes, and school supplies for their children.

**Legal aspects:** Farmers are free to cultivate, harvest and trade in benzoin. They only pay taxes of 2 percent to the local government.

**Recommendations:** Benzoin trees are well-suited to cultivation in agroforestry systems. Such systems do not damage the ecosystem, and offer an excellent method for rehabilitating degraded forests damaged by shifting cultivation. They can also lead to the development of cottage industries which create job opportunities for local people. In addition, benzoin can attain high market value per unit of volume. This feature is particularly important for a land-locked country like Lao PDR. To save rural people from subsistence-level slash and burn cultivation, Lao PDR is seeking help from international donors to improve the technology of cultivation, extraction, processing and purification of benzoin, as well as aid in the development of international trade.

### **Turpentine and rosin**

**Extent and distribution:** Turpentine and rosin are the products obtained from oleoresin distillation. In Laos there are two species of pines yielding oleoresin, *Pinus merkusii* and *Pinus kesiya*. Pine forests cover about 1,000,000 hectares, distributed in three main regions:

- Nakai plateau, Khammuane Province (central Lao PDR): 500,000 hectares
- Plateau areas of Xiengkhoang Province (northeast): 400,000 hectares
- Xekong Province (southeast): 100,000 hectares

**Production:** In the 1980s, tapping in the pine forests of Xiengkhoang Province yielded about 15-20 tonnes per year, but because destructive tapping methods were used, trees died and tapping was discontinued.

Recently, tapping began in the Nakai plateau, Khammuane province. The yield is exported to Vietnam, but no data are available on the volume and prices received.

Pine forests in the southern part of the country are not exploited, perhaps because the mountainous terrain makes access difficult.

**Utilization:** Turpentine is used in making medicine, paint, varnish and thinner. Rosin is used primarily in making paper, soap, paint, varnish and plastics.

**Recommendations:** Pine forests in Laos PDR are still in good condition, but management practices and resin production need improvement. Further studies on pine forest management and resin production are needed.

### **Damar oil (Yang oil)**

**Extent and distribution:** Damar oil is obtained by tapping *Dipterocarpus* spp. *Dipterocarpus* spp. grow in dense, mixed and open forests, predominantly in the central and southern part of the country.

**Production:** Total production of damar oil averages 100,000 tonnes per year.

**Marketing and trade:** The bulk is exported to Thailand. The cost paid to the local people is US\$ 0.15 per

kilogramme, while the export price is US\$ 0.25 per kilogramme.

**Utilization:** Damar oil is used to make torches, to preserve wood and bamboo and for waterproofing umbrellas. Freed of residual resin, the volatile oil is used in manufacturing paint, vanish and printing ink. Mixed with powdered gum and kneaded to a proper consistency, damar forms a dark brown paste which is widely used to caulk boats and water-proof bamboo baskets.

**Income and employment:** *Dipterocarpus* spp. are inherited by farmers. One fifth of farmers in lowland areas practice tapping for damar oil. Damar oil can be harvested all year long by rural people, both for their own use, and for sale to supplement their income from rice farming.

**Recommendations:** The production of damar oil in Lao PDR could be sustainable, but the price paid for damar oil in Lao PDR appears low compared with the price paid in Thailand. To promote production and conservation, producers need information on marketing and trade.

### **Honey and wax**

**Extent and distribution:** Nests of honey bees are found in all forest types in Lao PDR, but there is an especially large population of bees in Sekong Province in the south.

**Production:** Estimated production is about 5 to 10 tonnes per year. A few years ago, a honey processing factory was established in Xekong Province in southern Laos, with support from UNDP. This factory has significant underutilized capacity. In 1993, only 2,000 kilogrammes of honey were processed, although the capacity of the factory was 200 kilogrammes of honey per day.

Bee management and beekeeping are still not developed in Lao PDR, but if developed, they could provide a sustainable, long-term means of exploiting the available flora.

**Utilization:** In Lao PDR, honey is collected for household use as a food, as a sweetener and for the production of medicine. Wax is used for polishes, cosmetics, and candle making.

**Marketing and trade:** In local markets, honey and wax can be sold quite easily, but export is difficult because the volume of production (10 tonnes per year) is small and producers lack information on quality improvement and marketing. The price paid to collectors is about US\$ 0.80 to 1.00 per litre, but in town markets, the price is about US\$ 2.00 per litre. Solidified wax is sold in local markets for US\$ 4.00 to 5.00 per kilogramme.

**Recommendations:** In 1989-1990, a UNDP supported project introduced beekeeping to rural people in Sekong Province. The project introduced top bar box hives, but this innovation completely failed because the boxes were difficult to make locally and the volume (52 litres), was regarded as too large. In January 1994, an expert team from NOVIB arrived in the same area to undertake NWFP studies and provided advice on technical improvements and establishment of an association of beekeepers. People in this area still need technical advice and marketing support.

### **Cardamon**

Cardamon (*Amomum* spp.) is a zingiber which grows naturally under the cover of mixed dense forests. Commercial names are "bastard, camphor seed or siame cardamon." There are four main species: *Amomum krervanh* Pierre, *A. ovoideum* Pierre, *A. villosum* Lour and *A. xanthoides* Wall. All four are valuable for trade.

**Extent and distribution:** Cardamon grows in all the natural forests of Lao PDR, but the most productive areas are in the central and southern parts of the country; especially in the Boliven plateau.

**Management:** Most cardamon grows in natural forests. The seeds are collected in August-September. Farmers are free to collect the seeds from the forests, and in most cases farmers pay attention only to quantity. In recent years, farmers have learned how to plant cardamon during the course of shifting cultivation, using both seeds and rhizomes. The most productive planting is by- rhizomes, which yield a harvest by the third year. The yield-of cardamon is very high in the fourth, fifth and sixth years, but declines after that so farmers have to replant with a new cycle of shifting cultivation. The seeds must be fully ripe before harvest and care should-be taken not to destroy the plants. The highest yield of cardamon plantations is between 150:-200 kilogammes per hectare.

**Production:** Each year, the Commerce Department records production of 200-250 tonnes of cardamon seeds, but not all production is recorded. For 'best quality, the seeds of cardamon must be decorticated and well dried. The preferred species for trade are *A. ovoideum* and *A. villosum*. There is no processing of common seeds in Lao PDR.

**Utilization:** The seeds of cardamon are used as a spice; in the Middle East cardamon is used to flavour coffee; in Northern Europe and the USA, it is used in bakery products. Elsewhere, cardamon is used in meat seasonings. Seeds and all of the plant can be used for medicinal purposes (no available data).

**Marketing and trade:** Traders operating at the district or provincial level collect the cardamon seeds from villagers. The price paid for one kilogramme of seeds in rural areas is about US\$ 1.00 to 2.50 per kilogramme, depending on access - and distances to secondary markets. Cardamon seeds are exported primarily to Thailand and China.- The export price is about US\$ 3.00 per kilogramme. At present trade cardamon is poor due to marketing difficulties.

**Recommendations:** To reduce problems caused by shifting - cultivation, the government is promoting trial plantations of cardamon in natural forests, forest plantations and areas of shifting cultivation in southern Laos. ' In the future, higher production of cardamom is expected. Establishing solid international marketing links remains a problem. Studies are needed to improve cultivation, varieties, storage and processing.: .

### **Rattan**

**Extent and distribution:** Until today, there has been no serious inventory of natural rattan stands. Rattan grows primarily in the central part of the country.

**Management:** The harvest of rattan is still random and wasteful because after harvesting the- canes sometimes lie on the ground . for more than one month. Rural people have not been taught proper harvest and post-harvest methods.. A research and development project on rattan and bamboo which is supported by IDRC, has 'been underway since the beginning of 1992. This project has -carried out a survey of taxonomy, resources, trial plantations, germplasm collections, and determination of the growth and yield of natural rattan and bamboo. It has also examined the socio-economics of minor forest products, with emphasis- on the role women play in production- and the transfer of technology to local communities. The project has identified and 30 species of rattan and partially achieved other objectives.

**Production:** Each year, the government issues cutting permits for up to 400,000 pieces of large-dimension rattan (one piece measures 4.5 meters in length). Actual production varies from 300,000 to 400,000 pieces of large dimension rattan, and from 25,000 to 30,000 tonnes of small-dimension rattan. All come from wild plants. Large dimension rattan is mainly supplied to four large factories, with smaller volumes going to home production of furniture and handicrafts.

**Utilization:** There are many products made from rattan cane, but there is no comprehensive list of them all. Among these are furniture, baskets, fish traps, hats, walking sticks, tool handles, ropes and mats. The fruit and shoots of all species are edible and some of them are sold on the local market (US\$ 0.17 for three shoots).

**Marketing and trade:** Exports of raw rattan and canes which have had only preliminary treatment (boiling, fumigation, washing in water, sun drying, rubbing, classifying by dimension, cutting, banding and storing) have been banned since September 1990. Only processed rattan products are now permitted. The best-known rattan for furniture production and export has traditionally been "wad thoon" (*Calamus* sp.), which has qualities similar to *Calamus manan*.

**Income and employment:** Rural people earn income from the harvest of rattan either by selling to traders or to representatives from the main factories. Collectors earn about US\$ 0.60 per piece of large-dimension rattan in the rural areas. Cane delivered to factory sites earns about US\$ 1.00 per piece. Small-diameter rattan is sold for about US\$ 0.35 per kilogramme. The number of collectors is Unknown. Workers engaged in the four factories number about 700. Cottage industries employ both men and women who share the work between them. However, men usually make furniture, and women make baskets, hats, ropes and mats.

**Recommendations:** Proper inventories of rattan resources are needed to facilitate sustainable management and utilization. Training of collectors in improved harvesting techniques is needed to help reduce waste. Finally, rattan plantation trials should be initiated with a view toward supplementing declining stocks of natural rattan.

## **Bamboo**

**Extent and distribution:** There has never been any attempt to prepare comprehensive inventories of the country's bamboo resources. During forest inventories, the occurrence of bamboo (and rattan) has been routinely noted, but not quantified. It has not been possible, therefore, to analyze the abundance of bamboo.

**Management:** Rural people commonly grow bamboo in their gardens as a living fence. Some species are also grown for food (shoots) and construction material (culm). Plantations of bamboo are always small-scale (not more than one hectare). Naturally growing bamboo is also harvested.

**Utilization:** In areas where it grows naturally, bamboo is a traditional building material. Houses can be made entirely from bamboo. The same ingenious application of bamboo is also carried out in making furniture, fences, cages, mats, farm implements, ladders and blinds. Pipes for irrigation and guttering can also be fabricated when the nodes are removed from the bamboo. In each of the country's 17 provinces, people produce handicrafts - by their own US\$ for sale in local markets and for export. In Vientiane, there are around 50 handicraft and furniture factories. The most famous, the Phay Exclusive Trading Co., Ltd., uses thousands of bamboo culms from *Dendrocalamus asper*, *Bambusa nana*, and *B. blumeana* each year. Bamboo shoots are widely eaten in Lao PDR, and although there is no actual figure for bamboo shoots harvested from natural forests, it can be estimated that thousands of tonnes of bamboo shoots are harvested annually. Methods of preserving bamboo shoots for export are very rudimentary; some shoots are dried and some are steamed, but most shoots are pickled. In Vientiane, one factory (Korean-owned LAKO) produces bamboo mats. Each year this factory uses about 200,000 culms of *Dendrocalamus lanoifimbriatus*. The products are sold to Korea. This factory also processes chop sticks and toothpicks.

**Marketing and trade:** In the capital, Vientiane, the total use of bamboo culms is about 1,000,000 culms per year. The price of one culm (5 metres) is about US\$ 0.20 to 0.40. Importation of bamboo mat board from Vietnam averages 80,000 sheets per year according to interviews with traders. The price is US\$ 2.00 per 1.6 x 4.0 metre mat. The number of bamboo products that are exported is considerable (handicrafts, furniture, raw materials), but quantities are still relatively small and no accurate data on quantities or values are available.

**Income and employment:** Bamboo shoots provide both food and income for some rural people. Shoots sell for between US\$ 0.15 and 0.50 per kilogramme, depending on the season, and the value of 2 kilogrammes of bamboo shoots is roughly equal to 1 kilogramme of rice. Handicrafts made from bamboo are an important source of income for farmers following the rice-growing season. In Vientiane, factories processing bamboo provide work for about 1,500 people.

**Recommendations:** Research and development are needed in the areas of bamboo propagation, production of bamboo mat board, and the processing of bamboo shoots for export.

## **Cashew nuts**

**Extent and distribution:** The cashew tree (*Anacardium occidentale* L.) was introduced in Lao PDR in 1980 from Thailand. Plantations were promoted for degraded land which had red latosols, sandy soils or loose lateritic gravels. Some farmers also planted cashews in deep soil. According to a survey of the Department of Forestry (Minor Forest Products, 1994), there are about 100 hectares of cashew plantations in Vientiane which are between 8 and 12 years old. Because of low market prices, cashew plantations have not expanded, and some plantations have been felled for fuelwood and converted for other purposes.

**Uses:** In Laos, cashews are used primarily as food in main dishes, as desserts and as snacks.

**Processing:** In 1994, two new nut-cracking factories opened in Vientiane, but the quality of shelled nuts is low compared with those imported from Thailand.

**Marketing and trade:** Initial promotional efforts promised farmers a ready market and high prices (US\$ 4.00 to 5.00 per kilogramme) for cashews. Recent surveys, however, indicate frustration on the part of farmers due to low prices, averaging only about US\$ 2.00 per kilogramme in local markets. Export markets have failed to materialise. In fact, an estimated 10 tonnes of shelled cashews are imported yearly from Thailand and Vietnam. The price of imported cashews is about US\$ 5.00 to 6.00 per kilogramme.

**Recommendations:** To improve the living standards of the rural people who occupy large areas of fallow land, this is an opportune time for international organisations to assist the country with market development

and trials of higher-yielding species. Training and improved technology need to be provided to local communities. Scientists and foresters need training in research, development and extension methods.

### **Sugar palm**

**Extent and distribution:** Sugar palm (*Arenga pinnata*) occurs mainly on the banks of rivers, in dense or mixed forests.

**Utilization:** Fruit or nuts of this palm are used as a dessert.

**Marketing and trade:** The nuts are harvested in February and for next two months are readily available in the local markets. The price currently paid to collectors is US\$ 0.30 per kilogramme for nuts which have been decorticated and boiled. Local people do not know how to preserve the nuts for use and are able to keep them in water for just one month. The demand for this nut is always high because preservation is not practical. A survey conducted by NOVIB in 1994 recorded exports of more than 100 tons of sugar palm to Thailand and Myanmar from northern Lao PDR, and 50 tonnes exported to Thailand from the south. The export price for sugar palm nuts is 10 to 15 baht (US\$ 0.40 0.60) per kilogramme.

**Legal aspects:** In Laos this palm is never planted, but plants usually have an owner who puts a sign on the tree indicating ownership. The owner watches the tree as the fruits develop and harvests them when they ripen. Trees which grow far from villages do not have owners. These trees are sometime felled when harvesting the fruit. The Forestry Service has instructed rural people not to cut the trees in harvesting because the trees are important in preserving the quality of water resources.

**Recommendations:** The conservation of sugar palm trees along water courses is important for environmental protection. Local people need training in conservation techniques and marketing.

### **Yang Bong bark**

The Yang bong tree (*Nothaphoebe umbelliflora*) grows 15 to 20 metres in height. Its viscous bark contains laurotetanine, a toxic alkaloid. The bark is used in the production of joss sticks and insect repellent coils. The tree is usually cut before the bark is peeled off the trunk. In 1993, 90 tonnes were exported to Thailand. In 1994, exports of 100 tonnes are expected. The price currently paid to the collectors is US\$ 0.15 per kilogramme of dry weight. At present, forestry services are trying to introduce a more sustainable system of harvesting in order to conserve the forest resources.

### **Puak ko Bark**

Puak ko (*Quercus poilanei*) grows in mixed forests at an elevation of 600-1000 metres above sea level. Puak ko grows throughout the country, but is most plentiful in the north where rural people harvest the bark.

Fifty tons of bark are exported annually to Singapore and India. The bark is used locally for chewing with betel and lime.

Abroad, the bark is used in pharmaceutical products and in the tanning industry. The price paid to the collector for dry bark is US\$ 0.25 per kilogramme. An average of 40 kilogrammes of bark is harvested per tree. The tree will survive, if the tree is left standing, only one third of the bark is removed, and the bottom one metre of bark is not touched.

## **Conclusion**

In the past, the most important NWFPs in Lao PDR were benzoin, cardamon and rattan, but nowadays markets for these products have declined because rural people lack information on production, processing and marketing. In rural areas, people rely on NWFPs to augment their income from farming, but they lack experience in processing NWFPs (drying, milling, canning). Mushrooms, bamboo shoots and other agricultural products such as chillies, garlic, and cashew nuts are often produced in surplus quantities, while at the same time more and more processed products are imported from Thailand, Vietnam, and China. As a result, support needs to be provided for local efforts in cultivation, harvesting, storage and processing.

**Some major NWFPs and their applications in Lao PDR**

	Subsistence	Market (local)	Market (export)
Benzoin ( <i>Styrax tonkinensis</i> )	-	-	++
Bamboo	++	+	-
Bark of cassia ( <i>Cinnamomum cassia</i> )	-	+	+
Bark of <i>Nothaphoebe umbelliflora</i>	-	+	++
Bark of <i>Quercus poilanei</i>	-	-	++
Cardamom ( <i>Amomum</i> spp)	-	+	++
Damar ( <i>Dipterocarpus</i> spp)	+	-	++
Eagle wood ( <i>Aquilaria crassna</i> )	-	-	++
Fruit of sugar plum palm ( <i>Arenga pinnata</i> )	+	+	++
Game	++	+	-
Honey	++	+	-
Malva nuts ( <i>Sterculia lychnophord</i> )	+	+	++
Medical plants and spices	++	++	++
Pine resin	-	+	++
Sticklac ( <i>Laccifera lacca</i> )	-	-	+
Vegetable, mushrooms, tubers	++	+	-

- not important

+ important

++ very important

**Commercial rattan species in Laos**

Local name	Latin name	Diameter (mm)
Large diameter:		
Wai Thoon	<i>Calamus</i> sp.	20-40
Wai Tabong	<i>C. rudentum</i>	20-40
Wai Deang	<i>Korthansia laciniosa</i>	20-40
Wai Buun	<i>Daemonorops shmidtii</i>	10-40
Wai Taleuk	<i>Plectocomia pierreana</i>	20-40
Small diameter:		
Wai Thor	<i>Calamus pandanosmus</i>	10-15
Wai Suum	<i>C. sp.</i>	10-15
Wai Hang-noo	<i>C. javensis</i>	5-10

\* In Laotiane " Wai" = Rattan

**Major bamboo species used in Lao PDR**

Local name	Latin name	Important	Very important
May Hok wane	<i>Dendrocalamus asper</i>		X
May Hok	<i>D. hamintomi</i>	X	
May Phang	<i>D. lonoifimbriatus</i>		X



May Phay bane	<i>Bambusa blumeana</i>	X	
May Damkhuan	<i>B. nana</i>	X	
May Sang phay	<i>B. nana</i>		X
May Hia	<i>B. cephalostachyum virgatum</i>		X