Lac is a resinous protective secretion of the lac insect. In Vietnam it occurs naturally in the north-western part of the country, in Lao cao, Yen bai, Lai Châu, Sơn La, Thanh hoa, Hòa Bình, Nghệ An, and Hà Tĩnh provinces. Within these provinces, lac insects occur only in certain regions between altitudes of 200 and 700 metres. In many of these regions there are no roads, even for bikes. Most lac cultivators are tribal people practicing shifting agriculture.

Traditional lac cultivation by ethnic minorities is very simple. Two types of lac hosts are used, namely perennial trees and annual bushes. The natural preminal host trees which grow scattered in the forests are "inoculated" with lac insects. In Vietnam, there are about 40 species of lac hosts. The farmers inoculate the tree, leave it for swarming and come back to harvest it after five to six months. Harvesting involves cutting down branches bearing lac and tying broodlac to new hosts. The harvested host trees are left alone for one to two years so that new branches can come out.

*Cajanus cajan* is the only annual host species. It is sown mixed with food crops like Highland rice, soybean, maize and cassava in April. In September, the food crop is harvested and in October *Cajanus cajan* is inoculated if the plants are big enough. In this case, the lac crop is harvested in April or May of the following year. If the plants are small, they are left to be inoculated in May and harvested in October. *Cajanus cajan* not only produces lac but also improves soil productivity. This type of mixed crop is suitable for the shifting cultivation tribal people have used for centuries.

Lac cultivation is a traditional occupation of certain families in each village or commune of the lac producing areas. Expertise in lac growing is transferred from father to son. The women are not involved and they have no right to sell the products. Usually each family has only a few big host trees growing scattered in the natural forests or in the garden. Cultivation is casual. The farmers take a few days to tie broodlac onto the hosts and after 4-6 months come back to harvest it. Each lac crop only costs the farmers about one week of work. The yield of lac depends on the weather. If the weather is bad there may not even be enough broodlac to inoculate the next crop.

Highland rice, maize and cassava are the major crops of the subsistence farmers in the lac producing regions. The production of rice and maize is not always sufficient for family consumption, with the worst shortages likely to occur in July-August. Livestock and forest products, such as wood and lac, are the main ways to cover such shortages and other family expenditures. The government ban on wood exploitation makes these highland farmers more dependent on non-wood products and livestock. Thus, lac is often harvested unmatured in July or August and sold at very low prices.

**Advantages of lac cultivation**

Lac cultivation has a number of advantages, including the following:

- low labour costs;
- small investment (broodlac is the main cost, but sticklac is obtained from empty broodlac one month after inoculation and can cover two-thirds of the cost);
- quick and regular income;
• easy transportation, which is particularly important for the remote areas where the roads are bad; and
• sustainability, because perennial host trees can be used for many years.

Lac development over the past 30 years

Since 1960, agricultural cooperatives have been gradually formed in all the villages in the north of Vietnam. They involve more than 90 percent of the farmers. Most land became the property of the cooperatives. Later on state lac plantations were also established in all provinces where lac is produced. High-yield lac hosts like 
*Protium serratum* and *Dalbergia hupeana* were planted in compact areas. Up to October 1980, the total area planted was 4,425 hectares. It takes five to seven years for these trees to be ready for the first inoculation. From 1982 to 1980, very small areas of the planted hosts were used for lac production and the majority of sticklac was produced by ethnic minority farmers.

Although lac cultivation continued to be a tradition in some families, however, as members of an agricultural cooperative their own area for lac growing was very limited. Some cooperatives tried to cultivate lac and planted lac hosts in compact areas, but their efforts often failed because of bad management and lack of technical knowledge. Extension services on lac cultivation were weak and available to only some state lac plantations. Although there was financial and technical support from the government, these plantations were not run efficiently.

The sticklac price fixed by the Special Forest Products Company (SFPC) was very low and the cultivators had to walk long distances to the Company's buying branches in order to sell their lac. By the end of the 1970s, many farmers had stopped growing lac and many host trees had been destroyed for fuel wood and to clear land for agriculture.

There are no current statistics on the number of the families involved in lac production or on surviving lac host areas. In 1988, the country's economic system underwent a big change and all state enterprises became self-financing. From 1988 to 1993, there was no lac cultivation in most plantations.

Under the new land allocation policy, long-term leases were issued to farmers in 1988. By the end of 1993, all state lac plantation areas had been allocated to the worker families. Depending on labor capacity, each family was provided with from one to one and a half hectares of lac host trees and a small loan to begin lac cultivation. They retained full rights to their product. The lac market is now free and the price is high. These factors are incentives and farmers are once again keen on lac growing. However, those who are former state lac plantation workers find it easier for the following reasons:

• All of them are literate.
• Their lac hosts are more numerous and in compact areas. Cultivation is therefore easier to manage, as is protecting lac from theft (which is a serious problem for cultivators).
• They have less difficulty in getting support from the agriculture bank and forestry development programs.
• Their farms are situated in the better sites and connected with roads.

Ethnic minority farmers face many difficulties in recommencing lac growing, including the following:

• They are much poorer, and many of them are illiterate.
• The land allocation policy has not been implemented in most areas where they live.
• They have more difficulty in getting loans and support from forestry development programs.
• Their lac hosts are not in compact areas and traditional cultivation (using hosts far from home) is not possible any more because of forest protection.
• There are often no good roads connecting their villages with other regions.

Lac processing and marketing in Vietnam

Prior to 1976, the Special Forest Products Export Company (SFPC) was the only enterprise buying sticklac from cultivators, processing it and distributing it to consumers. SFPC had two big plantations located in Son la and Lai chau provinces with about 2,000 hectares of compactly planted lac host trees. There was also a lac
processing factory, a research division and representative branches in different parts of the country.

Sticklac was purchased at a price fixed by SFPC and processed in the factory located in Ha dong, 10 kilometers from Ha noid. The sticklac was processed into shellac mostly by hand. Most lac production was for export and only small amounts were used inside the country for polishing furniture. It was difficult to buy lac products on the free market at that time. The shellac was exported mainly to China and the former Soviet Union, with some sold to other buyers, including Japan and Hong Kong. As lac production decreased in the years up to 1980, supplies for export ran out.

Illegal private lac processing shops started to appear in 1976. Their numbers increased quickly and the Company found it difficult to compete with them in purchasing sticklac from cultivators. As table 1 shows, the volumes of SFPC purchases of sticklac were varied considerably from year to year and did not increase overall between 1963 and 1980.

In 1989, when the country began to convert to a market economy, all economic sectors were recognised and encouraged. SFPC lost its monopoly in lac and other non-wood forest products. Many small lac processing and trade enterprises have been established with annual capacities ranging from several hundreds to thousands of kilograms of shellac. Most of them are family businesses. They are located mainly in big cities like Ha noid, Sai gon and Hai fong. Lac processing and marketing are now entirely under the control of the private sector.

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity purchased (tonnes)</th>
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<tbody>
<tr>
<td>1963</td>
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</tr>
<tr>
<td>1964</td>
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</tr>
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<td>1980</td>
<td>53</td>
</tr>
</tbody>
</table>

Since 1988, Vietnam has imported lac from China, Laos and sometimes India. There is no statistical data on the volume of lac produced in the country and imported from elsewhere. Imported lac is often transported illegally across the borders to avoid paying tax. Lac now is used not only for polishing furniture, but also in other industries.

Lac prices in Vietnam fluctuate widely according to supply. There are two crops a year, one in May and the other in October. Due to the cold weather in winter, the May crop generally has a low yield and is used mainly for broodlac. Commercial sticklac is usually obtained from the October crop. Cold weather sometimes causes mass mortality of lac insects and this leads to a shortage of broodlac for the next crop. Lac production drops drastically, and it takes two or three more crops for production to recover again.

For the last four to five years, a free lac market has operated. Most lac cultivators are ethnic minority farmers and they usually do not store sticklac. They sell the fresh sticklac in August and September and sometimes sell unmatured sticklac in July or dry sticklac from empty broodlac in November. The lac traders and processors store just enough lac for one year's supply. Usually they have no information on lac crop failures and are aware of it only when they can't buy the product. Even the lac cultivators only know about bad crops
when the harvesting period arrives, because of the casual cultivation methods. After a bad crop, the sticklac price increases sharply and many traders (not only professional lac traders) rush to China to buy sticklac. This happened in April 1990. The large amount of imported sticklac pulled the price down from US$ 9.00 to US$1.00 per kilogramme. The quantity imported was so much higher than domestic demand, that it was only used up at the end of 1992.

In May and June 1993, the sticklac price again rose significantly because of a lac crop failure in May 1992, and because the stocks of lac imported in April 1990 were finished. However, this time the traders were more cautious and they imported lac on the basis of contracts with processors and consumers. China and Laos were the main suppliers, and a small amount of shelllac was imported from India (through the state enterprise).

Vietnam's free lac market is relatively new and not entirely stable. Small lac traders and processors do not have much free market experience, but relationships between them and the consumers are being formed and improved.

**Causes of the decrease in lac production**

Lac production has decreased over the past 30 years, despite the government's efforts to promote it. Although once lee exporter, Vietnam has become an importer for the last seven years. The following are the main causes of this decline in production:

- The monopoly in the lee market impeded production. The producers could only sell sticklac to the Special Forest Product Export Company at a low price (averaging US$ 0.50 per kilogramme). There were additional problems because of the Company's bureaucratic purchasing system.
- Cooperative and state ownership did not stimulate the production of lac. Farmers had little interest in production or the end product because they had no rights to it. As a consequence, many host trees were destroyed or used with very low efficiency and the lac growing area was reduced drastically.
- Traditional lac growing practices have been interrupted for several years. Plantations, technical expertise and cultivation experience have been lost. The remaining host trees in state plantations have just been allocated to former worker families and a very small proportion of these are being exploited.
- The government has no supporting extension services. Due to past unsuccessful efforts in promoting lac production, many leaders in the Ministry of Forestry are of the opinion that lac production is not profitable. While the Special Forest Products Research Division (FORSPARCEN) conducts research and some extension services on lee cultivation it has been self-financed for the last three years and has had great difficulty in surviving. Many trained technical staff have left the Centre for other jobs.
- Worsening security is also impeding lac production. Lac theft, even of tied broodlac, is common. Traditional cultivation on natural hosts scattered in the forests or the mixing of lac hosts with food crops far from the house cannot be used anymore.
- A land allocation policy for farmers has not been implemented in most lac producing areas. Thus, the farmers still do not have their own farms.
- The high cost of broodlac is an additional obstacle. To inoculate one medium size tree costs the farmers US$ 6.00 to US$ 9.00 for broodlac, while their income per year is about US$ 60. While the national poverty alleviation program has been launched to support the farmers, very few of them have managed to get loans (which average only about US$50 per family) from the agriculture bank.

Shortage of money, uncertainty about yields and difficulties of protecting the crop make farmers hesitate to grow lac. Nevertheless, there are signs of recovery. Lac cultivation has been started at the household scale in all state lac plantations. Many ethnic minority farmers are also trying to grow lac again, although their lac host areas are restricted and not very favorable. Farmers are realising the profitable nature of lac cultivation. For ethnic minority producers, lac provides additional income, but for those on state plantations it provides their main livelihood, which gives them more incentive.

**Projects promoting lac production in Vietnam**

To increase lac production, international assistance has been sought. One lac promotion project, with US$ 661,012 support from UNDP, was implemented between 1985 and 1987. This FAO-supported project was formulated in 1980 when the national lac production had declined dramatically. A target of the project was to
increase lac production to 300 tonnes per year, the figure achieved in 1966.

Project activities took place in three parts of the Special Forest Products Export Company, namely:

- The Special Forest Products Research Division (now FORSPARCEN);
- the lac processing factory; and
- the Lai chau lac plantation.

The Lai chau plantation was one of the biggest with 105 hectares of compactly planted host trees (*Dalbergia hupeana*). The plantation is 600 kilometers from Hanoi and transportation is very poor. Under the guidance of a Chief Technical Adviser, the workers were trained in improved techniques of lac cultivation and a broodlac farm was established. The yield and quality of lac from the broodlac farm increased significantly. Other project activities were in the Mai chau district of Hoa binh province, one of the main lac areas. There was also work in the south of Vietnam to seek new areas for lac growing.

The following recommendations arose from the project:

1. To establish broodlac farms at Mai chau and Bao loc, with adequate funding, to ensure a stable supply of broodlac for farmers at a reasonable price.
2. To train the farmers in improved lac cultivation techniques.
3. To plant suitable lac hosts in compact areas, so that cultivation is more convenient for farmers.
4. To extend lac cultivation to other areas by using local host species or by raising compact plantations of species suited to local climates.
5. To strengthen extension services on lac cultivation in the Ministry of Forestry in provinces where lac is produced.
6. To provide adequate support to farmers to form cooperative societies or associations.

With the assistance of government funding, most of these recommendations have been implemented.

In June 1994, a small project, "Lac farming for the Household at Mai chau" was approved with US$ 30,000 support from the Ministry of Science, Technology and the Environment. It began in September 1994. The duration of the project is two years and 80 percent of the funds will be reimbursed to the Ministry. FORSPARCEN is the implementing agency and project objectives are:

- To transfer lac cultivation technology to the farmers (about 100 families);
- To establish a broodlac farm at Mai chau; and
- To increase lac production of this district to 50 tonnes per year by 1996 (from the present four tonnes annually).

The broodlac farms are being established on 17 hectares of lac host, *Protium serratum*, planted in 1965. This area has been allocated to 11 former worker families of the Mai chau plantation. They are being trained in improved techniques for managing their own broodlac farms.

Training in lac cultivation has been provided to 95 farmers. To buy broodlac, they will be provided with a small loan (US$100 - US$ 200) interest-free for two years. By October 1994, 3.7 hectares of lac host had been inoculated, and by May 1995, the inoculated area will cover 40 hectares.

**Conclusions and recommendations**

For more than 10 years many farmers in Vietnam stopped lac cultivation. Currently the lac market is free and there is a stable, high demand for lac. The farmers are anxious to cultivate lac again, but there are some obstacles for them to overcome. Traditional lac cultivation techniques have been almost forgotten. Over the last two years, lac cultivation efforts have often failed due to insufficient knowledge of cultivation techniques. Shortage of investment and protection of lac from theft are also important problems.

To increase lac production and to generate income for farmers in remote mountainous areas, the following recommendations are being made:

1. The key step is to speed up land allocations to farmers. Assistance should be given for them to
establish their own farms and raise compactly planted lac hosts which can be conveniently managed and protected.

2. Loans should be given to the farmers for purchasing broodlac.

3. There is an urgent need to train the farmers in lac cultivation techniques, such as growing host plants, rearing of lac insects, and harvesting of sticklac and broodlac.

4. Farmers who are former workers of state lac plantations should be helped to establish their own lac farms. Adequate training in farming broodlac and financial assistance are essential for them.

5. Extension of lac cultivation to the south is necessary (the south has been shown to be a suitable region for lac growing). Adequate funds should be provided to establish several broodlac farms in this area.

6. Research should be conducted on developing bush-like host trees and on the introduction of new hosts, particularly dwarf forms, for intensive lac growing.

7. Assistance should be given to establish an association of lac cultivators, traders, processors and consumers. This association would contribute to promoting lac production and stabilizing the market.

8. Technology transfer of improved lac cultivation methods should be encouraged via the Ministry of Forestry and the Ministry of Science, Technology and the Environment, and in provinces where lac is produced.

9. Lac production should be encouraged in national economic and agroforestry programs for the mountainous areas? and for other forestry programs supported by international organisations.