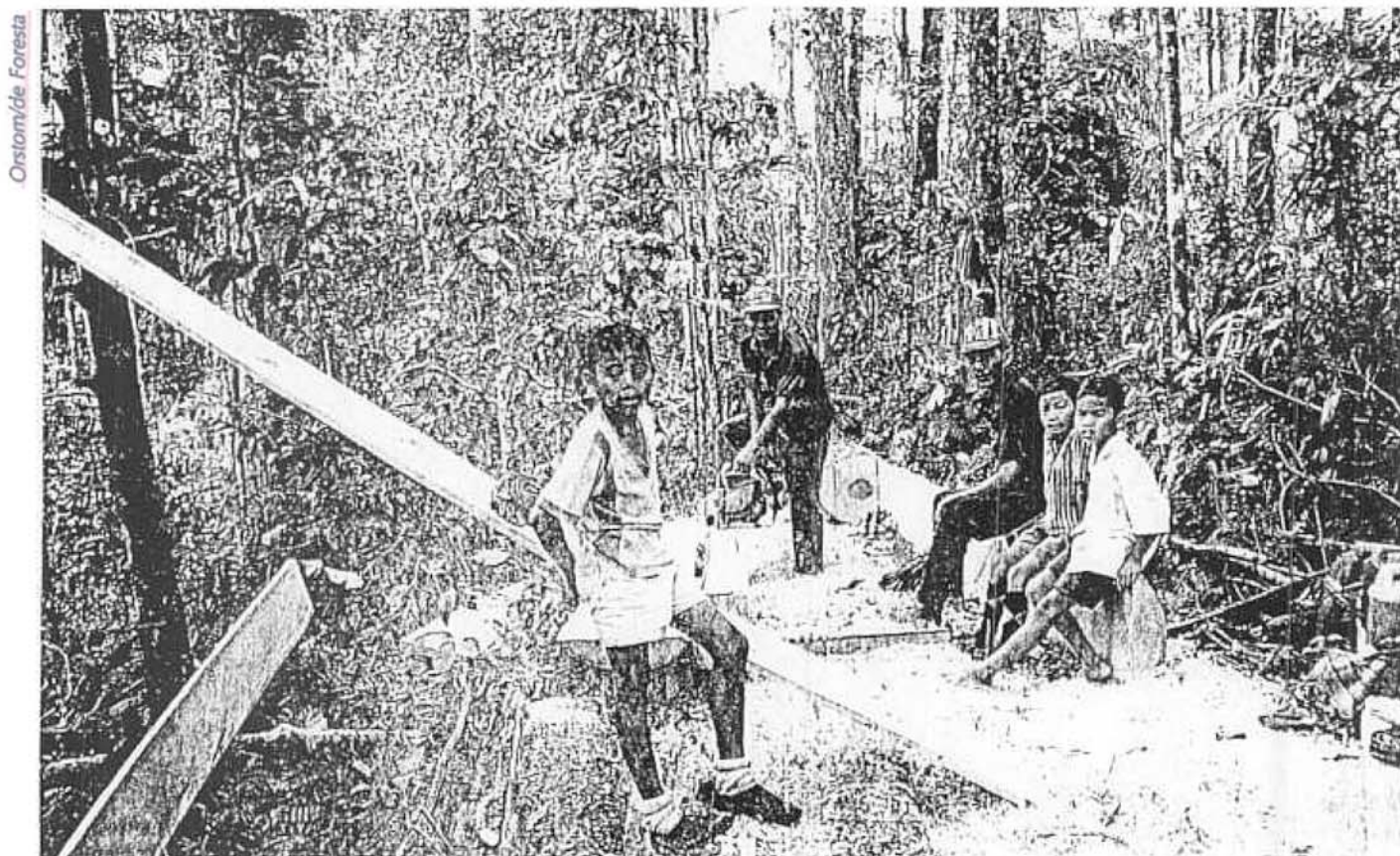


Sandrine Petit and Hubert de Foresta

## Precious wood from the agroforests of Sumatra—where timber provides a solid source of income



*An increased demand for timber products has brought new employment opportunities—and therefore extra income—to farmers and villagers living in the damar agroforests of Sumatra.*

Most studies on agroforestry systems focus on the agricultural component and consider the forestry component to be secondary. They analyse the benefits of trees mainly in terms of their contribution to soil fertility and firewood production but rarely mention the commercial production of timber.

The environmental and economic benefits of damar agroforests, which local farmers in Lampung Province, Sumatra, plant and manage, have

been described in previous issues of *Agroforestry Today* (6(4):12–13, 8(1):8–10). Now farmers in this area have added another dimension to their agroforests. A few years ago they began to harvest timber and offer it for sale. So far, rapid qualitative observations in the field to check on environmental concerns have not shown any obvious change in the agroforest structure. However, the provincial government and the Department of Forestry have

expressed worries that this new activity could, in the long run, irreversibly alter the structure and endanger the maintenance of the damar agroforests. These worries prompted the governor to issue a decree forbidding the felling of damar trees. This decree may indeed protect local farmers' interests by preventing outsiders from cutting damar, but it also may hamper the development of an endogenous sustainable timber management system. Therefore, a quantitative assessment of the ecological impact of timber harvesting under past and current regimes was recently carried out in

Pahmungan village, which is one of the most advanced in managing its timber resources.

### From local consumption to commercialization

The standing timber stock in damar agroforests compares well with that of the best primary forests, with a mean tree density of around 245 trees (those with a diameter above 20 cm) per hectare and a total clear bole volume estimated at 350 m<sup>3</sup> (Wijayanto 1993). People in Pahmungan use the timber to build their houses and make their furniture. Timber harvesting in Pahmungan is not a new practice, but until recently timber had little economic value. Wood resources were abundant, demand was low, and transforming timber into lumber with manual saws was toilsome and very time-consuming work.

Two factors explain the present increased value of marketing timber: the acquisition of chainsaws and recent sustained demand. In 1987, a village resin trader bought the 1st chainsaw; he started selling construction wood and offered felling and lumbering services. With the chainsaw, productivity in processing timber increased. Therefore, timber could be produced for sale, giving a

new value to the windfall trees that are so numerous in damar gardens.

The improvement of the road network in this area (from 1985 to 1993)—which had been quite isolated—had major consequences, both direct and indirect, on the demand for timber. Timber was needed in large amounts to build bridges for the new roads. The opened road network then allowed farmers to trade products that were already abundant in their agroforests—fruits like durian, petai and duku that can be profitably marketed in all big cities. This in turn enhanced the economic welfare of the local population and gave people increased purchasing power, which sustained the high local level of demand for timber, used for house renovation or construction. Reconstruction of the city of Liwa, about 35 km from Krui, which had been heavily damaged by an earthquake in 1994, also raised the demand for timber.

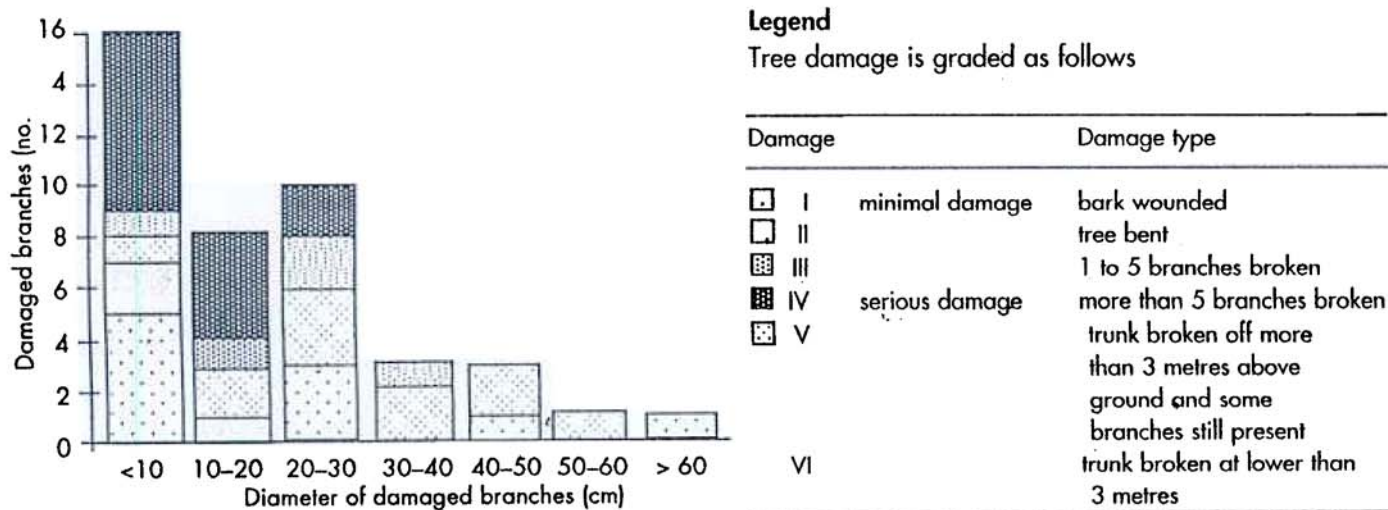
The 1st trader bought other chainsaws, and a 2nd also began timber harvesting. Independent villagers followed, until by 1995 there were 11 chainsaws in the village. In addition to the damar agroforest timber being a new source of income for agroforest owners, there is another major positive socioeconomic consequence of its commercialization: it has opened new employment oppor-

tunities in the village. Timber processing is carried out by chainsaw operators, helped by 1 or 2 assistants; they fell a tree, cut the log into sections, and saw these sections into planks or beams on the spot. Men and women transport the timber to the village and are paid according to distance and volume.

### Harvesting with limited impacts

Timber harvesting in Pahmungan is highly selective and conceived to be self-sustaining. The villagers do not clear-cut agroforest plots but fell only 1 or 2 trees per plot a year. They cut only the damar or fruit trees that are very old and no longer productive, or 1 of the few other species that serve only for timber. Felling is directional, to avoid damage to neighbouring productive trees. In the presence of the agroforest plot owner, workers carefully examine the position of the trunk, the shape of the crown, and the neighbouring productive trees before deciding in which direction they will fell the tree. Most often they skillfully fell it without disturbing those surrounding it. This skill is encouraged by an informal system of fees that must be paid to a tree owner if there is damage. Our observation confirmed the villagers' skill: figure 1

Figure 1: Distribution of damage according to tree diameter. Observations were on 44 damaged branches from 25 felled trees



shows that serious damage occurs to only a few small-diameter trees; large, productive trees are rarely damaged, but if they are, the damage level is low. In sites where felling the selected tree is likely to cause serious damage, villagers generally prune the entire tree before felling it.

On average, 30% of the trunk is transformed into lumber and taken outside of the agroforest. The remaining 70% and all the branches are left and recycled—'they become soil', Pahlungan villagers put it. In this way, hewing and sawing trees on the spot contributes to maintaining agroforest fertility.

The yearly harvest in all the village territory agroforests was assessed by inventorying remaining stumps and by monitoring felled trees and lumber volume produced over a 2-month period. The conclusion is that timber harvesting has been quite limited and prudent during the past few years: 1 stem per hectare a year on average, or 0.25% of the total standing stock volume.

Local people have definitely changed the way they manage agroforests since they began commercial timber harvesting. Previously, strong winds knocked down old fruit trees and old damar trees weakened by years of tapping, causing extensive damage to neighbouring standing trees that were healthy and productive. The careful directional felling of older trees has now changed this situation. Villagers pay more attention to timber species: they deliberately enrich damar agroforest plots by planting such species or by helping regenerate them, and they prune timber trees to obtain the straight trunks that have higher value as lumber. Timber harvesting has become part of the overall management of damar gardens and illustrates well the villagers' silvicultural know-how.

## Sustainability and flexibility

During the last meeting of the Consultative Group for Indonesian Forestry, an official from the Department of Forestry declared that the timber harvesting system developed by villagers in damar agroforests was probably the most sustainable timber management system in Indonesia. Indeed, past and current timber harvesting practices in damar agroforests involve management changes, but in no way do these changes threaten their survival.

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*Timber harvesting is an adaptation to the evolution of the timber market and a strategy to improve and diversify sources of income. Timber has the advantage of being both a source of regular income—because old, unproductive trees appear every year—and a reserve fund that can be used in case of emergency. If things go bad, a villager can cut a few specialized timber trees in the agroforest plot without reducing the income that comes from the sale of resin.*

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Integrating timber as a marketable output of the system allows villagers to intensify the use of their land and to decrease their economic dependence on the damar resin market. Agroforests constitute a complex production system because of the diversity of products and the variety of farmer strategies, but this very diversity ensures the system's flexibility. Timber harvesting is an adaptation to the evolution of the timber market and a strategy to improve and diversify sources of income. Timber has the advantage of being both a source of regular income, because old, unproductive trees appear every year, and a

reserve fund that can be used in case of emergency. If things go bad, a villager can cut a few specialized timber trees in the agroforest plot without reducing the income that comes from the sale of resin.

The development of timber harvesting and marketing confirms the commercial orientation of the agroforests: timber is connected to the local market, fruits to the regional market (Bouamrane 1996), and damar resin to the national and international markets. These new elements, introduced by timber harvesting, confirm the conclusion discussed in a previous issue of *Agroforestry Today* (de Foresta and Michon 1994)—that in the damar agroforests of Sumatra, ecology meets economy. ☺

## Acknowledgements

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