Small-scale forest operations: examples from Asia and the Pacific

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Examples from Viet Nam, Papua New Guinea and the Lao People's Democratic Republic illustrate how timber harvesting using animals and simple tools reduces damage to the environment while creating employment and income opportunities for poor communities.

In conventional logging as practiced in many countries today, large logs are removed from the forest with powerful bulldozers, skidders and yarders, loaded onto large trucks, hauled over wide roads, transported to high-volume sawmills, and then run through headrigs, edgers, trimmers and cut-off saws to produce timber for construction, furniture and other uses. This scale of operations is often justified to obtain economies of scale in supplying raw materials for industrial pulp and paper, plywood, sawn timber and panel processing plants, which generate employment and export income that is vital to the economies of many countries.

However, where communities near the forest require more modest volumes of rough sawn timber principally for their own use, sale or added-value processing (e.g. furniture), small-scale harvesting can offer benefits consistent with international goals of poverty reduction, environmental conservation and more equitable sharing of wealth derived from natural resources.

Small-scale harvesting involves breakdown of logs right in the forest. After felled trees are bucked (i.e. cut crosswise into sections), two-person ripping saws are used to reduce the round logs into boards (flitches). The boards are loaded onto sleds (travois) and skidded out of the forest by animal power or small tractors for sale or further processing, usually in neighbouring villages. These low-powered skidding methods are feasible because average sled loads (around 0.5 m^3) only weigh about 250 to 500 kg (USAID, 1998). The skid road construction required in conventional logging is replaced by establishment of narrow temporary pathways (about 0.8 m wide) cut through the underbrush with machetes. Vegetation cut in the process is laid crosswise on the pathway surface to cushion the soil and reduce friction that would otherwise impede movement of the sleds. Repeated use of a pathway, which could lead to gulley formation, is easily avoided as harvesting is shifted regularly from one location to the next.

Light loads and low-powered skidding normally cause less environmental

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Two-person handsaw is used for primary breakdown of logs in the forest

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damage than the heavy loads prevalent in conventional logging operations. Careful planning of skid trails and appropriate procedures can significantly minimize the damage in tractor skidding, but unfortunately, the observation of best practices is the exception rather than the rule in many tropical countries.

EXTRACTING TOPS AND BRANCHES IN VIET NAM

In Viet Nam, all natural forests are considered property of the State. The government-owned State Forest Enterprises hires logging contractors to harvest the timber and pays them by cubic metre of output. When the contractors buck felled trees, they generally make the last cut below the first branch and leave a portion of the main stem (trunk) and all of the crown (tops and branches) in the forest, because it is not profitable for them to extract this raw material with bulldozers, self-loading trucks or other conventional logging equipment.

Until recently, regulations governing the use of tops and branches were vague. Villagers could obtain permission to gather them for household use (e.g. fuelwood), but selling this material was either prohibited or severely restricted depending on (among others) the attitudes of the local State Forest Enterprise officers. This situation changed in 2005 with Prime Minister's Decision No. 40/2005/QD-BNN promulgating the Regulation on Exploitation of Timber and Other Forest Products, which authorizes village-based harvesting of tops and branches and promotes active community participation in forest management.

At So Pai Village, Gia Lai Province in the central highlands of Viet Nam, local residents are harvesting these portions of felled trees with buffaloes and *cong-nong* – locally assembled small tractors. The villagers sell their production to furniture makers and other wood processors in the nearby town of Kanak – about 20 km from the forest. The processors are happy to get the raw material and the villagers are happy they have a new source of income. Average direct production costs (including skidding and trucking to Kanak) are about 415 000 dong (þ) per cubic meter (approximately US$25). Processors in Kanak buy the raw material at an average price of þ840 000 (approximately US$50) (Manila, 2006). Clearly, small-scale harvesting is a profitable venture for the So Pai villagers.

In So Pai, Viet Nam, tops and branches – material that was previously left in the forest – are extracted for sale to furniture makers and other wood processors

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Using buffaloes for skidding reduces damage to soil and residual vegetation – and avoids high equipment costs and burning of fossil fuel (Viet Nam)

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Activities in So Pai are one component of the FAO-assisted regional project "Enhancing Sustainable Forest Harvesting in Asia", which promotes implementation of reduced-impact logging (RIL) practices consistent with the new directions in forest management prompted by Decision 40. Pham Minh Thoa, Deputy Director of Forestry and national focal person for the FAO project, confirms that top and branch extraction is only the beginning. Village-level processing is envisioned as the next step forward, starting with rough-cut timber sawn to dimensions suitable for Kanak processors to convert into furniture and other products. Steps required to ensure mutual profit for the So Pai villagers, Kanak processors and government will include negotiations on price, quality and delivery schedules and establishment of government regulations and procedures for collection of royalties on semi-finished products. Currently, royalties and taxes are levied per cubic metre of raw material.

In June 2007, local government officers and other decision-makers witnessed So Pai operations during a field trip sponsored by the FAO project. The visit was covered by the national television network. With increasing awareness of the financial, environmental and social

benefits of small-scale forestry, the So Pai experience may provide a model for replication elsewhere in Viet Nam.

MOBILE SAWMILLS IN PAPUA NEW GUINEA

In the late 1990s, the European Union (EU)-supported Islands Region Environment Community Development Programme (RECDP) provided mobile sawmills to residents of island communities, along with technical assistance on organization, planning and training in mill operations. The mills were used to produce rough sawn timber in the forest which was then hauled to the roadside via bullock cart for transport by truck to finishing plants. Over time, RECDP evolved into the present Papua New Guinea Eco-Forestry Programme (EFP), also assisted by the EU. Timber produced by villagers and certified as originating from sustainably managed forests has been exported to overseas markets.

Resistance from conventional loggers and government pressure to generate forestry revenue quickly by promoting log exports has hampered expansion of the mobile sawmill approach. Furthermore, government has limited capability to monitor many small operations scattered over wide areas. This constraint makes it difficult to prevent the use of mobile sawmills by illegal loggers. Thus many government foresters are reluctant to support expansion of the approach. However, the idea has been planted and communities have tasted the benefits in terms of employment, income and (importantly) recognition of their ability to participate actively in forest management. National and international non-governmental organizations (NGOs) continue to advocate for adherence to principles of community-based, small-scale, sustainable forest management. The RECDP and EFP experiences provide a platform for moving ahead on small-scale operations in Papua New Guinea.

FAO/FO-5684/P. DURST

Operating a mobile sawmill in the forest, Papua New Guinea

LAO PRODUCERS SHIFT TO SMALLER OPERATIONS

In the Lao People's Democratic Republic, policies conducive to small-scale forestry operations are already in place. Operations consistent with these policies – with an emphasis on reduced-impact logging – are being developed in Naphakeo Village in Mahaxai District, Khammouane Province, as part of the FAO-assisted regional project.

Logging quotas in the Lao People's Democratic Republic are awarded annually by the government and are for the most part in the range of 1 000 to 2 000 m3 per production forest unit. The units range in area from about 500 to 1 000 ha. Despite the relatively modest volumes per quota, conventional logging practices (e.g. extraction with heavy equipment) are the norm. However, producers are gradually shifting in the direction of small-scale operations.

The Naphakeo forests contain a mix of high-value species (e.g. dipterocarps) and currently underused *Lagerstroemia* species. Villagers handsaw the latter into boards or split the timber into roof shingles, both for local use. Building on these village-based practices, the project is exploring markets for *Lagerstroemia* wood. Initial findings indicate that drawer sides would be a potentially profitable market if linkages can be established with a small to medium-sized firm willing to absorb small volumes of rough-sawn timber. This would help transform a village-based practice into a reliable source of income for local residents. In brief, a small-scale, RIL-compliant appropriate technology already exists. Now the challenge is how to move forward towards application of this technology on a broader scale.

FAO/FO-5685/P. DURST

House built of timber from the mobile sawmill

ALL REQUIRE ENABLING REGULATIONS

While small-scale operations have proved their value in many countries, fundamental constraints to optimum deployment of Asia's vast resource of underused rural labour and traditional

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Training of Lao village foresters in reduced-impact logging techniques

skills still remain. At or very near the top of any list of constraints is the matter of scaling procedures. Regulations in most countries prohibit flitching in the forest because of fears that it would exacerbate illegal logging and make tax collection difficult. While not to be ignored, these concerns tend to inhibit the application of appropriate technology to solve what is essentially a law-enforcement and monitoring issue applicable to both small- and large-scale logging operations. Modification of scaling regulations, and permitting primary processing in the forest, is an essential first step in creating conditions that would enhance the role of small-scale forestry.

CONCLUSION

Forest harvesting is almost always a controversial topic. Small-scale approaches are no exception to this general rule. For example, some might argue that extraction of tops and branches in Viet Nam decreases the recycling of nutrients. Others, still taking an environmental perspective, might justify this by noting that removal of combustible material helps reduce the threat of forest fire. From a management perspective, government foresters may contend that efficient monitoring of many small operations would be nearly impossible. On the other hand, NGOs involved in forest management may argue that, with help, communities and local government units can develop their own monitoring skills and the ability to protect the forests on which they depend for water and other amenities.

Opponents of primary processing in the woods might cite the conversion efficiencies which are lower than those of a well-run sawmill. A study in the Philippines, for example, found that sawmill conversion efficiency ranged from 60 to 70 percent, compared with a 50 to 55 percent range when logs were converted into rough-sawn boards or flitches in the woods (Philippine American Timber Co. production statistics). This comparison highlights the decision-making trade-offs central to consideration of small-scale harvesting.

Is it justifiable to accept a lower conversion efficiency to create additional employment and spend less foreign exchange on heavy equipment? Given the variability of forest conditions, socio-economic situations and purposes for harvesting forest products, there is no single answer to this question. When applied in a manner consistent with sound management practices, small-scale harvesting and conventional logging are both important components of forestry. Indeed, combinations of conventional logging and small-scale harvesting may well be an appropriate way forward, assuming a regulatory environment that supports community–company partnerships in the forestry sector.

All pros and cons considered, the potential of small-scale harvesting to increase employment and help reduce poverty cannot be denied. The average production of a two-person handsaw team ranges from 0.25 to 0.50 m^3 per day (Bagong Pagasa Foundation, 2006). Even at a highly conservative price of US$40 per cubic metre, the average daily income per team member would be about US$5 ($0.25 \times 40 \div 2 = 5$), far more than the meager earning on which millions of people subsist in the developing world. Furthermore, from a forest conservation perspective, the employment potential of small-scale harvesting provides a practical alternative to the widespread, survival-driven, slash-and-burn deforestation that is a major constraint to achievement of the social, economic and environmental goals of sustainable forest management.

It is in these crucial contexts that small-scale harvesting deserves increased attention, particularly in the areas of policy, research, training, organization of communities, linkage to markets and opportunities for complementarity with conventional logging. ◆

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