



3.7 Chainsaw milling in the Caribbean

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Introduction

The islands of the Caribbean are a diverse group of countries. Following the pre-Columbian settlements of Amerindians in the 16th century the islands were colonized by European settlers and often changed hands between different colonial powers. Most of the smaller islands were English while the larger Antilles remained under Spanish influence. With the exception of a few smaller islands, most of the islands are now independent states.

For centuries the main income of the islands derived from agricultural production and export of agricultural commodities produced in medium- and large-scale plantations (initially sugar and later bananas). For the last 30 years, tourism has made an increasingly important contribution and is now the main source of income.

Most of the island states have a forest cover of approximately 30% of the total land area, although there are exceptions: Dominica has more than 60% of its land area under forest and Haiti has less than 5%.

Forests and the forestry sector

Throughout the insular Caribbean three main phases of forest development took place. In the first phase, forests were used as land reserves for agricultural production and as unregulated sources for timber. This phase started with colonization of the islands by Amerindian settlers and accelerated with the arrival of the European colonists in the 16th century.

The second phase was the emergence of forest management and silviculture; the first regulations to protect the forest were issued in the 17th century. As the negative impacts



IF ADMINISTERED PROPERLY CHAINSAW MILLING CAN PLAY AN IMPORTANT ROLE IN SUPPORTING SUSTAINABLE FOREST MANAGEMENT IN THE CARIBBEAN ISLANDS AND CAN EASILY BE INTEGRATED INTO A NATIONAL REDD+ CONCEPT.

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of unregulated deforestation became apparent, measures were taken to preserve the remaining forest cover. Among the first steps was the definition of forest reserves: areas where trees and timber could be harvested, but the reserve itself remained under forest cover. Rules and regulations on how to use the forests and the creation of a forest administration came in this period. Management rules were defined to preserve the forest and regulate the use of forest resources by the local population. Silvicultural systems, such as the temporary use of forests for agriculture, or the Trinidad Shelterwood System were developed during this period.

With the general decline of agriculture in the Caribbean, phase three is emerging. Following a general policy of trade liberalization, traditional agricultural exports, such as sugar and bananas, can no longer compete with world market prices. The salaries paid in the tourism industry are higher than those for agricultural labour; this contributes to the decline of agriculture. Most Caribbean islands are now net importers of food. As a consequence, areas of agricultural land are increasingly abandoned. If these areas are not converted to alternative land uses, they naturally revert to secondary forest.

The medium and large islands still produce some local timber; smaller islands produce negligible quantities of timber. All the Caribbean islands are net importers of forest products. It is difficult to get reliable data on in-country production, since the sector is very small. National production is believed to be less than 10% of each country's wood requirements.

Since most of the forests are in mountainous areas they are important to protect the watershed protection and to safeguard the provision of water for domestic use, agriculture and industry. In the past, tourism in the Caribbean has been beach-oriented but an increasing number of tourists are showing an interest in ecotourism. Many of the ecotourism attractions are in or around forest areas, which offers additional income opportunities for rural population.

Institutional and legal framework

Most of the forests in the English-speaking Caribbean islands are state owned. They are managed by forestry departments that in most cases are part of the Ministry of Agriculture. Traditionally, a person interested in buying trees approaches the local forestry officer. With the approval of the forestry officer trees are sold and released for harvest. In most countries governments set a fixed selling price per tree, also called royalty or stumpage. In many countries these stumpage fees are far below the price a private land-owner would receive for selling a similar tree.

Most persons who purchase trees do not have industrial logging equipment; they fell the trees with chainsaws and use the same saw to convert them into lumber on site. There are no additional fees or costs for converting the trees on site; all costs are included in the stumpage fee.



Chainsaw milling (CSM) appears to be an appropriate way to harvest trees on small islands. Its environmental impact is far less than that of conventional logging, removing the logs with tractors and moving them to sawmills outside the forest. The mountainous terrain makes it difficult to get the logs to the roadside and skidding them causes damage to the remaining forest. With CSM the logs are converted on site; the final product is carried out and the remainder of the tree, such as slabs and bark, remain in the forest.

While conversion on site is allowed in most Caribbean countries, in Trinidad and Tobago any equipment used to convert logs into boards is considered a sawmill and requires a licence. A larger island, Trinidad had a substantive logging and forest industry. The procedures to obtain a sawmill licence were designed for industrial sawmills and the respective fees were too expensive for chainsaw operators. CSM is practised in Trinidad and Tobago, but mostly on private land. Although it is forbidden, few chainsaw millers are caught.

In the other Caribbean islands, where the conversion of logs with chainsaws is generally allowed, chainsaw milling is often associated with illegal practices. The most common offence is chainsaw millers' stealing trees from public or private forest. This is usually more prevalent in state-owned forests, since most of them are in remote areas and lack supervision and thieves run little risk of getting caught. (This is not the case in all countries, however; in Dominica, the Forestry, Wildlife and Parks Division routinely patrols all forested state lands. Private land that adjoins these state lands also benefits from this monitoring.)



Trees are felled and converted on site and boards are carried to a location where they can be hidden for later transport.

The noise level of the chainsaw can be reduced to a point where detection is difficult by extending the exhaust pipe of the chainsaw with a hose and running the exhaust fumes through a bucket of water. This is a common practice in Jamaica.

Another illegal practice is the felling and utilization of trees without a permit even when the trees belong to the land-owner. In the Dominican Republic, for example, most of the managed forests are on private land, but all timber harvesting requires a forest management plan or an individual cutting permit for a specified number of trees. This is a long and often expensive procedure that many forest owners prefer to avoid. Any lumber produced without these permits is illegal although not stolen. Chainsaws are used to fell trees and convert them into lumber. The likelihood of people being caught felling a tree on their own land is low and the boards produced can be easily transported out of the forest.

Chainsaw milling practices

The traditional form of on-site conversion of logs was pit sawing: the log was rested on a temporary scaffold and two persons — one on top of the log and the other in the pit below — used a long manual saw to do the cutting. This form of pit sawing can still be seen in Haiti. Pit sawing disappeared with the advent of chainsaws, which are now used to cut boards and scantlings (squared lumber). In many countries, CSM was introduced after

a hurricane; when large numbers of trees were blown down and many houses destroyed, there was an immediate demand for construction lumber.

It is difficult to estimate the total volume of chainsaw lumber production (Table 1). Some forestry departments keep records on the number of trees sold from state lands, but there are no statistics on the trees harvested on private land; these may actually outnumber the number of trees sold by forestry departments, even though most of the forest is on public land. It is likely that trees on private land are sold more quickly and more consistently. Private land-owners recognize the value of timber trees and generally trees from private lands are sold at a higher price than the official stumpage fee.

Table 1. Estimated number of CSM operators and number of trees sold, 2009

country	estimated no. of chainsaw operators	average no. of trees sold to chainsaw millers per year	comments
Dominica	20	25	declined over the past years
Jamaica	35	1,500–2,500	only chainsaw operators who buy trees from the forestry department
St. Lucia	60	300	there are more than 80 chainsaw operators but they are not currently active
St. Vincent	6–8	30–50	varies from year to year
Trinidad and Tobago	30	150	estimated number of operators working on private lands

Note: Table 1 is based on the author's personal assessment and on opinions from forestry officers. The figures are not confirmed but they provide an idea of the number of persons involved in the production of chainsaw milled products. The table includes only the people operating a chainsaw, not assistants or workers carrying boards.

In most islands chainsaw milling is not a full-time job (Box 1). Two types of people are likely to get involved in CSM: most are forest workers or farmers who know how to operate a chainsaw; others are carpenters and woodworkers who want access to cheap lumber.

Box 1. Chainsaw milling income in Dominica

A chainsaw miller on the islands can produce an average of 250 board feet (BM) of lumber per day.¹ Given the local price for chainsawn lumber of approximately US\$1 per BM, a chainsaw miller could earn US\$250 per day. Deducted from this is the stumpage fee (approximately US\$20; to obtain 250 BM requires approximately two m³ of round wood at a fee of US\$10 per m³); the operating cost (approximately US\$40 per day); oil and gas for the saw (approximately US\$25 per day); and wages for an assistant or general labourer (approximately US\$25 per day). This means that daily net income could be as high as US\$140, which is approximately six times the salary of an agricultural worker. Operating a chainsaw provides a good income opportunity, provided that there is enough lumber to be cut.

Most CSM or ripping² is freehand. Many operators use the same chain as for felling the tree, although some use a special ripping chain or adapt a felling chain. Many local forest authorities consider freehand cutting a waste of wood resources and are trying to convince chainsaw millers to use a frame and a guide bar, but with limited success. Those who have learned to cut freehand claim that it is faster and as precise as with a guide bar.

Guide bars or “Alaska mills” (see photo, left) are often used by newcomers and less experienced cutters, although this varies from island to island. In Dominica, for example, only forest department chainsaw millers use guide bars; private chainsaw millers prefer to work freehand. In St. Lucia and St. Vincent, guide frames are more common. The Forest Administration of St. Vincent is introducing the Logosol mill, which is highly precise.³



Chainsaw milling is often perceived as wasteful. Although the kerf of a chainsaw cut is broader than that of a band saw or a circular saw, even freehand chainsawing can have a conversion rate of around 40% of lumber from a round log. In addition, conventional logging leaves behind some material — such as branches from large hardwood trees — which

a chainsaw miller may be able to use for smaller boards for furniture-making. A good example is the use of Caoba or Small-leaf mahogany (*Swietenia mahogani*) in the Dominican Republic. Its wood is now so rare and expensive that even small branches are converted into boards to be sold to joineries. Waste in processing is normally the result of low timber prices, so higher prices for raw material are likely to be more successful in reducing waste than any recommendation issued by national forest authorities (Box 2).

Box 2. Cooperative efforts in Dominica

A number of chainsaw millers in Dominica designed a system to encourage the more efficient use of timber: any wood left over from harvested trees was transported to a central drying facility, which also served as a small lumber market. An NGO called the Cottage Forest Industry was established as a cooperative to manage the drying facility, monitor the quality of the processed lumber and help its members get a better price for their products. Chainsaw millers were also expected to carry out timber stand improvement, environmental education, water sampling and associated research within designated concession forests.

While the idea of the Cottage Forest Industry was excellent, it was not successful in practice. The association eventually ceased operating due to internal disputes and the fact that chainsaw millers were selling better quality products directly to consumers and trying to sell the inferior material through Cottage Forest Industry. A steep reduction in the demand for locally produced lumber, due to a new furniture store on the island, also contributed to the decline of the association.

In the Dominican Republic, chainsaw milling is rare. The country has a long tradition of using small band mills to convert logs into lumber. Chainsaw milling is mostly associated with illegal harvesting of valuable broad-leaf species such as mahogany.

Forest harvesting in Cuba is practised and well regulated by state companies in the form of traditional logging operations. Chainsaws are often not available for purchase by individuals so chainsaw milling is limited. It can be assumed, however, that some chainsaw milling is carried out, despite the fact that it is illegal. It is not considered a major problem by the Cuban forest authorities.

Chainsaw milling and the market

Most chainsaw operators in the Caribbean cut lumber according to a specific order from a local buyer, for example, a carpenter or a person building a house. After securing the order the operator goes into the forest, identifies a tree and purchases it from the forestry department. The tree may contain far more timber than the order requires and the excess material is often left in the forest to rot.

Most chainsawn lumber is being sold soon after it is cut; very few chainsaw millers have the patience or the resources to stack the lumber to dry. The fact that the wood is green and often unevenly cut contributes to the perception that locally produced lumber is of inferior quality. In general the price of chainsawn lumber is 10–30% below the price of imported lumber.

The distance to the nearest forest track or location accessible by a vehicle is key to profitability. In general, chainsaw milling in the islands is limited to areas within one km of the loading point. The greater the distance, the less interested the operator is in buying trees.

It is difficult to assess the economic value of chainsaw production in the islands because the sector is very small and often part of the shadow economy (Box 3). In addition, CSM is often associated with illegal activities, which are not recorded.



Box 3. Potential value of chainsaw milling: an example from Dominica

Dominica has a forest cover of approximately 40,000 ha. Only 6,000 ha are suitable for forest management and harvesting; the remainder is protection forest. Assuming a conservative growth rate of one m³ per year per hectare, the forest could sustainably provide 6,000 m³ of harvestable wood or approximately 2,400 m³ of chainsawn lumber. This is equal to approximately 1,017,600 BM. Based on a local price for chainsawn lumber of US\$1 per BM, this represents a value of more than US\$1 million.

Conclusions and recommendations

Chainsaw milling is well suited to islands that do not have an established forest industry. It requires only a small investment; the only equipment to be bought is a chainsaw. Guide rails and other tools can be acquired locally. Boards and planks, although heavy to carry, can be moved with hand tools such as ropes, pulleys and simple trolleys. Once the boards reach a forest track they can be transported using standard pick-up trucks.



Chainsaw milling provides income for rural people. Rafters and scantlings for house construction and boards for the production of local furniture will always have a market. In light of the reduced income from traditional agricultural activities, chainsaw milling and local production of lumber may become more important. The total volume of production and employment it could provide is limited, however, given the small scale of the available forest resources and

the fact that on most islands these resources are in environmentally sensitive areas.

Chainsaw milling is less damaging than traditional logging operations to the remaining forest. The lower recovery rate from chainsaw milling can be compensated by converting thicker branches to lumber and not just the trunk of the tree. In addition, chainsaw milling is generally practised close to the end user. The chainsaw miller and the end user are in direct contact; if the end user requires short dimension lumber the chainsaw miller can cut it directly from short dimension roundwood. In conventional logging operations these shorter pieces of roundwood are seldom used.

If administered properly chainsaw milling can be an important part of supporting sustainable forest management in the Caribbean islands and can easily be integrated into a national REDD+ concept.

To unlock CSM's economic potential, it is important that national forest authorities put in place a forest management system to streamline the process of resource allocation. Silvicultural planning should indicate the areas to harvest, and administrative procedures must ensure equitable and just access to forest resources. Flexible agreements on timber bidding and sales should replace timber prices that are 10 to 20 years out of date.

Open procedures for resource allocation will avoid favoritism and corruption. Simplifying administrative procedures does not mean reducing monitoring. Although the harvesting of trees, the conversion of logs into boards and the marketing of the finished product should be left to the private sector, monitoring, compliance with silvicultural practices and harvest control should continue to be the responsibility of forest authorities.

Endnotes

1. Lumber is mostly sold in board feet measurement (BM); 424 BM is equal to one m³ of lumber.
2. Ripping is cutting along the grain of the wood.
3. The Logosol mill consists of a powerful chainsaw, mounted on a slide that moves along an aluminum guide rail and is fixed to a log rest that is raised after each cut.