



4.11 Chainsaw milling in Uganda

ROBERT K. KAMBUGU, ABWOLI Y. BANANA and GEOFFREY ODOKONYERO

Status of forests in Uganda¹

Forests in Uganda cover an area of about 4.9 million hectares (24% of the country's total land area) making them an important element of land use (MWLE 2002). They are categorized as tropical high forests, woodlands and plantations. Their ownership falls into two broad categories: government reserves and private or community forests; 30% of the forests are in protected areas and 70% are on private land (Table 1).

Government reserves constitute the Permanent Forest Estate (PFE), which is set aside permanently for forestry activities and held in trust by the government (MWLE 2002). The National Forestry Authority (NFA) manages the bulk (60.9%) of these forest reserves. District Forestry Services (DFS) manages the local forest reserves (0.3%) while the Uganda Wildlife Authority manages national parks (38.8%) (Turyahabwe and Banana 2008).

No production is allowed in strict nature reserves, which comprise 20% of the forest reserves, but non-timber utilization activities are allowed in buffer zones, which comprise 30%. The remaining 50% are production zones set aside for the production of hardwood timber (Odokonyero 2005a).

Tropical high forests and plantations produce more than 80% of the country's timber; plantations supply about 20% (MWLE 2002; NFA 2005). Most of the plantations have been harvested and are almost exhausted. The supply of timber from natural forests is declining as well and forest cover continues to disappear at an alarming rate (Figure 1). Uganda was projected to face a timber deficit by 2010 (Odokonyero 2005a).



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Robert K. Kambugu and **Abwoli Y. Banana** work for the Department of Forest Products Engineering, Makerere University, and **Geoffrey Odokonyero** works for the National Forestry Authority, Uganda.

Table 1. Forest types and their ownership in Uganda (in hectares)

forest type	government reserves		private and community	total
	forest reserves	wildlife reserves		
tropical high forests	306,000	267,000	351,000	924,000
woodland	411,000	462,000	3,102,000	3,975,000
plantation	20,000	2,000	11,000	33,000
total	737,000	731,000	3,464,000	4,932,000

Source: Adapted from National Forest Plan, 2002

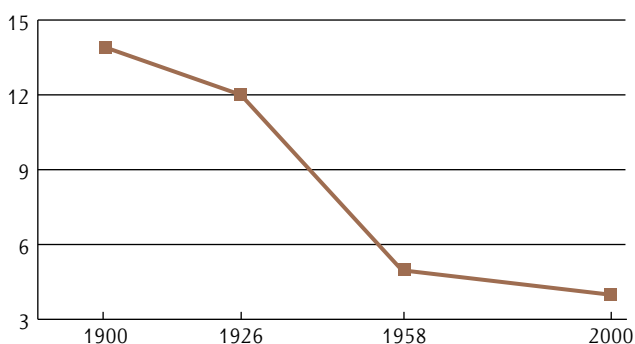
The imbalance between demand and supply of timber is increasing. This encourages illegal activities, such as the production and trade of chainsawn timber and illegal imports from the Democratic Republic of Congo (Odokonyero 2005a).

Forestry and the wood industry in Uganda

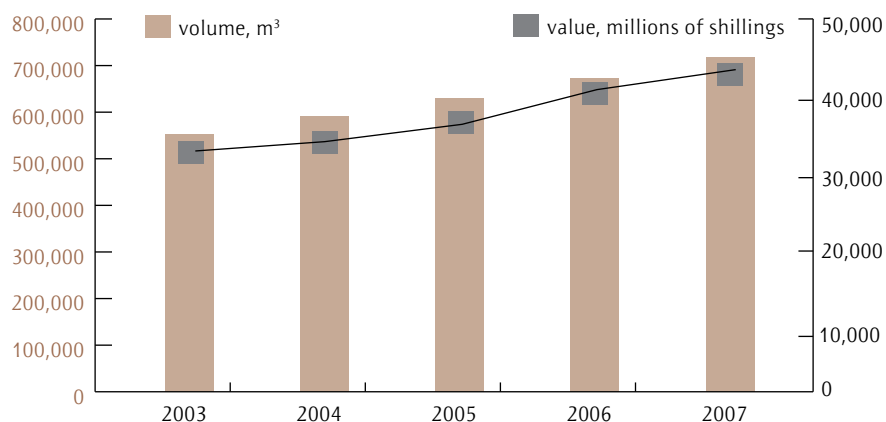
Forests are an important economic resource in Uganda. They support livelihoods by providing energy, forest products, employment and government revenue (MWLE 2002). The forest sector officially contributes about 2% to the country's Gross Domestic Product (GDP). This, however, does not include the value from wood processing, transportation and trade or the non-traded consumptive and non-consumptive benefits provided by forests (MWLE 2002). A more realistic estimate puts the contribution of the forest sector to GDP at about 6%.

Figure 1. Forest cover in Uganda (%), 1900–2000

Source: Kazoora 2007



Wood-based industries are an important part of economic development, both in employment and value addition (MWLE 2002; Plumptre and Carvalho 1988). According to the MWLE (2002), forest-based industries provide the equivalent of 3,200 formal jobs annually. The importance of the wood sector to Uganda's economy is expected to rise with the expected increased demand for wood and wood products (MWLE 2002). Figure 2 shows the timber value and volume output for five years since 2003, based on 2008 prices. Chainsawn timber is estimated to account for a third of total timber output.

Figure 2. Timber volume (m³) and value (millions of shillings), 2003–07

Source: UBOS 2008; 1750 shillings = US\$1

Timber production in Uganda is still a relatively simple process. The timber industry is highly fragmented, consisting of small-scale, labour-intensive production units that reflect the small local markets, cheap but limited raw material and low labour costs. Industrial processing of wood is not well developed.

Primary processing comprises of timber and plywood production, with only one major plywood manufacturer in the country (Auren and Krassowska 2004; UFSCS 2001). The primary wood industry in Uganda generally produces only timber. It includes three categories of producers: sawmillers, pit-sawyers and chainsaw millers. Table 2 summarizes their distribution, areas of operation and estimated output. As Auren and Krassowska (2004) noted, however, many millers operate illegally and official statistics represent only a small percentage of the actual number.

Table 2. Categories of licensed timber producers

category	licences issued	licensed volume (m ³)	estimated recovery (%)	location of operations
sawmillers	24	31,830	30–40	plantation (CFR)
pit-sawyers	183	97,000	25–30	natural (private)
chainsaw millers	—	—	20–25	on-farm/natural
others	—	—	—	urban/natural

Source: NFA and FID 2007

Pit-sawyers harvest in the natural forests and woodlands, where they are licensed as individuals or associations (Odokonyero 2005a; MWLE 2002). Their activities are restricted, especially in reserves, because they are difficult to control and regulate; the majority of pit-sawyers work on private land. They may damage the forests and their tools are inadequate for hardwood logs (Odokonyero 2005a). They produce most of the timber on the market.

The sawmill industry in Uganda is mobile and plantation-based. Odokonyero (2005a) noted that the conservation sentiment in Uganda does not favour large static sawmills since forests are small and scattered and the use of them is restricted. Moreover, the current Annual Allowable Cut (150,000–200,000 m³) can sustain only small mobile sawmills and pit-sawing.

Until recently, there has been a standing ban on the use of chainsaws in timber processing. Their use has been limited to felling and cross-cutting operations; they are considered wasteful when used for ripping. The chainsaw is an important tool for timber production on private lands, however, especially on farmland and woodlands where control is limited. In addition, some operators now transport billets, disguised as firewood, to urban centres, where they convert them to timber using chainsaws and bench sawmills.



Chainsaw lumber production

Policy and legislative framework

The policy and regulatory framework for the forest sector in Uganda is contained in the Uganda Forest Policy, the National Forest Plan and in the *National Forestry and Tree Planting Act*. This framework enables the Government of Uganda to promote a modern, competitive, efficient and well-regulated forest industry (MWLE 2002).

The forest sector is coordinated by the Forest Inspection Division (FID), which supervises the NFA and the DFS. Regulations for timber production are set by the FID and implemented by the DFS and NFA within their areas of jurisdiction. Timber production regulations restrict the use of chainsaws to felling and cross-cutting operations. It is illegal to use them for freehand ripping operations. Chainsaws are permitted if the owner uses milling attachments, registers with the NFA and pays the relevant fees. Criteria for permitting improved chainsaw milling (CSM) are evenness and smoothness of cut and limited waste.

Distribution and marketing

Timber is marketed in Uganda through formal and informal channels. The formal market is controlled and regulated through taxes on harvest, movement permits and market taxes. This regulation is difficult to apply to the informal market, which mainly comprises illegal timber producers. Most of the timber in the informal market originates in forests on private land. Forest regulations are not strictly enforced when it comes to

private forests due to corruption and a shortage of staff. Consequently, freehand chain-sawn timber does find its way to the formal market; it is easy to identify due to the distinctive marks made by chainsaws.

The key players in timber markets are the suppliers of trees, primary processors, secondary processors and consumers (Kazoora and Carvalho 2005). The timber producers are also involved in trading and so control the timber production and marketing chain (Auren and Krassowska 2004; UFSCS 2001).

Most of the timber produced is used by the building and construction sectors. Board length is predominantly 4.2 m, a major cause of inefficiency in timber production (MWLE 2001). Timber is marketed on the basis of species, size and quality, although the grading system is not fully entrenched. Due to the poor awareness of quality, there is little incentive for quality control.



Evolution of production methods

Commercial timber exploitation in Uganda can be traced back to the introduction of pit-sawing at the beginning of the 20th century (Odokonyero 2005a). Pit-sawing remained the predominant method of timber production until the 1930s, it was discouraged and sawmilling commenced.

The high demand for timber during World War II attracted many firms to the forest industry, most with little if any knowledge of sawmilling. They used very inefficient locally made or second-hand machinery and had no interest in maintaining stable conditions or high standards. After the war, a number of these firms continued operating and continued to sell timber in a non-sustainable way with low timber prices for many years (Tack 1962).

In the mid-1960s, the Ministry of Agriculture introduced the chainsaw in Uganda to facilitate pruning of coffee trees and bush clearing for planting coffee seedlings. The first chainsaws were small models with short bars and were mainly used for felling and cross-cutting small trees. Following the nationalization of sawmill industries in the 1970s, skilled workers dispersed. The industry deteriorated due to a lack of maintenance, spare parts and trained personnel (Carvalho and Pickles 1994). Most sawmills shut down and the few that remained were in a very poor condition (Windhorst 2005; Carvalho and Pickles 1994). Timber harvesting for export increased, creating a gap in the local timber market.

In the mid-1970s chainsaws and pit-saws were widely used by encroachers in Central Forest Reserves (CFRs). Since pit-sawing was considered a slow process, more and larger models of chainsaws with long bars were imported and used.

The 1980s saw the beginning of massive illegal CSM to meet the increasing demand for timber for building construction. In 1988, the European Union funded the Forest Resources Management and Conservation Program (FRMCP) of the Forest Department (FD), which emphasized biodiversity conservation. The FD had no option but to lobby for the ban on chainsaws and to licence but restrict pit-sawing. While this led to a decline in the number of pit-sawyers, the method continued to be the dominant form of timber production in natural forests and plantations until the mid-1990s. At that time, it was gradually phased out in plantations because of its inefficiency in converting small plantation logs and the difficulties associated with control of pit-sawyers (Odokonyero 2005a; McCaughan and Carvalho 2003).

CSM and pit-sawing, along with other illegal activities, peaked in the early 1990s. A ministerial ban was imposed on CSM in 1996; it restricted use to small chainsaws or agricultural tools with a bar no longer than 30 cm. In 2004, the Minister issued another public notice declaring that chainsawn timber was contraband and would be confiscated on site, together with the chainsaw and any vehicle used for transportation. This was in addition to heavy fines and prosecution.

Most chainsaw millers use the machines freehand. Almost no one uses milling attachments such as guides, frames or rails. Operators who use a chainsaw without the help of a guiding frame cannot make accurate and straight cuts. Moreover, only the rounded tip of the bar is used in cutting, leaving very rough marks of the saw teeth on the timber and increasing the risk of accidents. Freehand operation is also the reason for the waste associated with CSM.

The NFA, with FRMCP and FAO, has piloted the use of a complete chainsaw mill in two CFRs: Kalinzu and Budongo (FRMCP 2004; Odokonyero 2005b). A marked improvement in efficiency was seen: recovery increased from 25 to 55%, productivity increased from 0.02 to 0.25 m³ per effective hour, and better quality sawn timber was produced from poorly formed trees and branches.

Impact of chainsaw milling

The use of chainsaws without attachments is wasteful and contributes to deforestation and forest degradation. Chainsaws are principally designed for felling and crosscutting and not intended for rip-sawing or sawmilling.

The conventional crosscut chain has wide kerfs (about 9 mm) and wastes large quantities of wood in terms of long splitters and flakes compared to normal sawdust. Wood is also wasted to make the rough-sawn boards smooth, straight and parallel. For every three boards produced, the sawyers waste one board. Because of the relatively low recovery rates, more trees have to be harvested.

The quality of freehand chainsawn timber does not conform to market specification or standards for grading. Rough-sawn timbers are priced low, even if they are from valuable Ugandan hardwood species. Unfortunately, the low price is its major attraction in the local market where buyers have little concern for quality. Due to the high production

speed associated with chainsaws, there is also a danger of timber being dumped on the market, which suppresses prices further. This distortion makes legally produced timber uncompetitive. CSM is associated with illegal forest harvesting activities and is difficult to regulate and monitor due to its mobility, low cost and high speed. Moreover, chainsaw millers harvest selectively, searching for the best trees around, which can lead to genetic depletion.

CSM has some positive impacts as well. Chainsaws are useful in the conversion of isolated trees, especially on-farm trees, trees in difficult terrain and deformed logs. The chainsaw could have fewer ecological impacts than pit-sawing since the tree is milled at the stump; in sawmilling and pit-sawing activities logs have to be rolled, damaging young trees.

Poor households can harvest their forest resource to improve household income in the short run or add value to on-farm trees instead of selling standing trees. Data from ongoing research on the sawnwood commodity chain in Uganda indicate that tree owners get now as little as 10% of the timber value from the standing trees they sell (Muhumuza, Kutegeka and Wolimba 2007).

Conflicts associated with chainsaw milling

Most of the conflicts associated with chainsaw timber production arise because of the ban on CSM. CSM activities — from production to marketing — are usually unregulated and carried out illegally. The chainsawn timber is contraband and the timber and the chainsaw and vehicles used are confiscated in addition to heavy fines, arrests and prosecution of persons involved. This leads to loss of assets and income. This situation has resulted in a very poor working relationship between the regulatory authorities and timber producers/traders, who see themselves as victims of mistreatment.

Conflicts also arise because CSM activities involve a multiplicity of overlapping interests and a complex network that links the wide range of participants in the CSM and marketing chain.

Chainsaw timber production is closely linked to conflict. Trees are stolen by chainsaw operators and cut and converted at night. Because production is carried out illegally, exploitative business relations develop and proceeds are not shared fairly; most of them go to the timber dealers. The owners of trees or farmers are paid too little for the trees or the chainsaw operators evade payment, leading to conflict. Timber dealers often fail to compensate the farmers for crop damage caused by their unskilled felling methods.

The ban on the use of chainsaws in timber production also represents a policy conflict. The Uganda Forest Policy envisions an “integrated forest sector that achieves sustainable increases in the economic, social and environmental benefits from forests and trees by all the people of Uganda, especially the poor and vulnerable.” (MWLE 2001). Poor and vulnerable people cannot afford the technology recommended by regulations. Moreover, as trees are small and scattered they can only be profitably harvested using simple technologies such as chainsaws.

Policy response to chainsaw milling

Over the last two decades policy response to CSM has focused on the ban and on making chainsawn timber contraband. The success of this policy has varied across forest types. In plantations, the policy has been effective in locking out chainsaw operators due to the existence of licensed mobile sawmills, whose concession agreements commit them to the protection of the forest estate. In natural forest reserves, the policy has been largely successful because NFA monitors and enforces the regulation against CSM. There are, however, cases of encroachers harvesting from reserves using chainsaws.

The policy has not been successful for trees on private land. The use of chainsaws is widespread due to corruption, political interference and the inability of both NFA and DFS to effectively monitor timber production and trade. The use of chainsaws is particularly rampant on farms because the small volume of trees per unit area makes mechanized logging and pit-sawing unprofitable.

The future of chainsaw milling

Chainsaw milling is responsible for processing significant and increasing amounts of timber. The demand for timber and timber products in Uganda is increasing and cannot be met solely from remaining natural and plantation forests.

In the short term, the demand can be met from on-farm trees and other sources outside conventional forests. These sources have low timber volumes and diversity of tree size, shape and quality, however, making them of less interest to sawmillers. CSM has high portability and low cost and is suitable for milling low quality logs that would otherwise be wasted. This can help meet the increasing timber demand outside conventional forests and reduce pressure on natural forests and plantations.

Effort will be required to ensure that chainsaws are used appropriately to minimize the waste generated through freehand milling. Enforcement of existing regulations, especially on private land, is inadequate; this encourages illegal cutting, which may lead to over-exploitation. Chainsaw frame attachments are now permitted, provided the owner registers with the NFA and pays the requisite fees. This makes it necessary to streamline regulations, sensitize stakeholders and promote appropriate CSM technology.

Endnote

1. This article has been adapted from a paper presented during the Africa regional meeting on chainsaw milling in Ghana, May 25–26, 2009.

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