



# Unlocking future investments in Uganda's commercial forest sector

## UNDERSTANDING THE IMPACTS OF TIMBER TRADE RESTRICTIONS ON THE PROFITABILITY OF PINE PLANTATION AND SAWMILL INVESTMENTS

### KEY MESSAGES

- ▶ **Supplies of pine produced by commercial plantations will increase rapidly over the next 5 years.** Pine plantations planted in the early 2000's will soon mature, leading to an increase from roughly 200 000 m<sup>3</sup> of pine production currently, to 800 000 m<sup>3</sup> in 2023, and stabilizing at 1.2 million m<sup>3</sup> after that.
- ▶ **Exporting timber from Uganda is impeded by restrictive policies.** Numerous approval requirements and a lack of approved grading standards substantially hinder access to export licenses for timber. These restrictions are suppressing domestic prices relative to neighboring countries.
- ▶ **Trade restrictions hinder the profitability of commercial pine production.** Based on average production costs and current domestic prices the Net Present Value of investment in commercial pine production ranges between negative USD 368 and negative USD 657 per hectare.
- ▶ **Removing export restrictions is critical to attract and sustain future investments in pine plantations and sawmilling.** Access to higher prices offered in regional export markets contributes to a positive Net Present Value of pine plantation investments, in most scenarios, and a positive Net Present Value for investment in sawmilling.

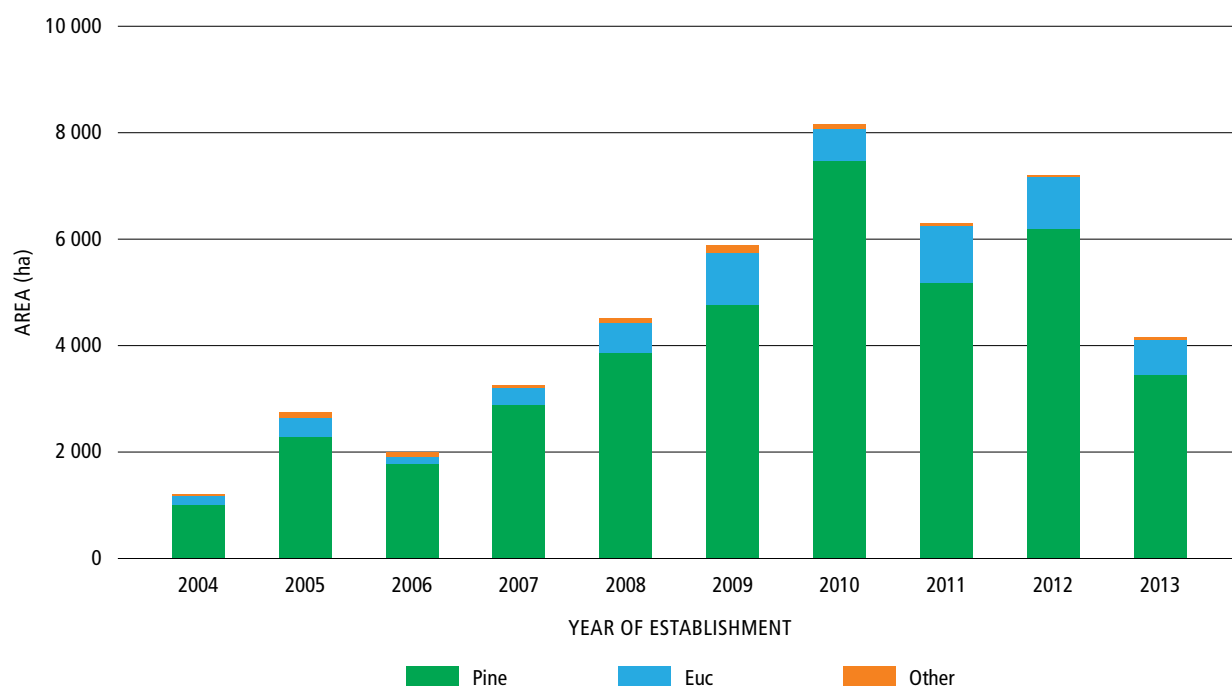
## The supply of pine from commercial plantations will rapidly increase over the next five years, but trade policy is lagging behind

In 1990, 24 percent of Uganda was covered in natural forest. As a result of settlement and agricultural expansion, illegal logging, and charcoal production, natural forests in Uganda rapidly declined, reaching as low as nine percent of the country's area in 2015. In recognition of the social, economic and environmental threats posed to Uganda by the loss of its forests, the Government of Uganda, with support from international partners, implemented a series of policies and programmes to reduce pressure on remaining forest systems.

Of particular importance was the creation of the National Forestry Authority (NFA) in 2003, which was designated through an Act of Parliament to serve as a semi-autonomous institution, mandated to manage the country's Central Forest Reserves (CFRs) and to increase the supply of sustainably produced forest products for the market. A key element of the NFA's mandate is to facilitate commercial forestry on 150 000 of CFRs, which had previously been deforested. This included 100 000 ha of CFR that were made available, through lease arrangement, to private forest plantations.

The efforts to promote commercial forestry in Uganda were bolstered by support from the European Union, the Government of Norway, the Food and Agriculture Organization of the United Nations (FAO) and the Government of Uganda, through the Sawlog Production Grant Scheme (SPGS). SPGS was designed to support investments by individuals and companies in sustainable commercial forest production through production grants to plantation owners, including community-owned plantations, provided conditional on compiling with a set of commercial forestry management standards. The first phase of SPGS began in 2004, and since that time the programme has supported the planting of over 60 000 ha of commercial forest, primarily pine forest (Figure 1). FAO is currently implementing the third phase of SPGS (2016–2021).

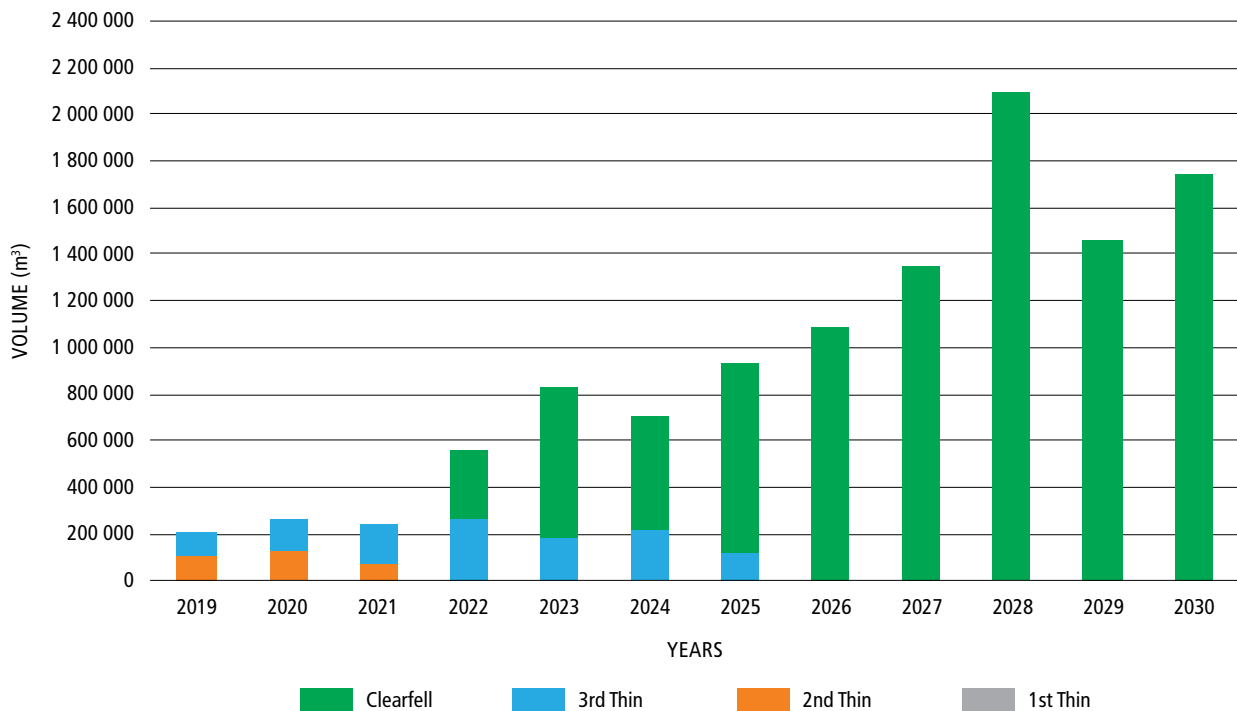
**FIGURE 1** PINE IS THE MAIN COMMERCIAL PLANTATION TREE PLANTED IN UGANDA



Source: FAO. (forthcoming). *Rapid assessment of availability wood resources and wood projection in Uganda. Sawlog Production Grant Scheme. Technical Paper.* Kampala.

As a result of the Government of Uganda's policy efforts and the support provided by SPGS, the supply of commercially produced pine is set to increase dramatically over the next few years (Figure 2). A standard commercial pine production rotation is 18 years. Therefore, pine plantations established in 2004 will be ready to harvest in 2022. Based on a detailed inventory of current plantations in Uganda, the production of pine wood will increase from current levels of approximately 200 000 m<sup>3</sup> per year, which comes mostly from plantation thinnings, to 800 000 m<sup>3</sup> in 2023. After that, production is expected to stabilize at between 1.2 to 1.3 million m<sup>3</sup> per year. Production could go as high as 2 million m<sup>3</sup> if incentives are in place for plantation owners to sustain current afforestation rates.

**FIGURE 2** UGANDA IS ON THE VERGE OF A DRAMATIC INCREASE IN PINE WOOD SUPPLY



Source: FAO. (forthcoming). *Rapid assessment of availability wood resources and wood projection in Uganda. Sawlog Production Grant Scheme. Technical Paper.* Kampala.

While there is no official data on the consumption of forest product in Uganda, several sources of data suggest that current production levels of around 200 000 m<sup>3</sup> per year are close to meeting the domestic demand for pine (FAO, 2019). First, Uganda has a processing capacity for pine of about 480 000 m<sup>3</sup> per year. Based on interviews with wood processors, most processing facilities are running under capacity, particularly formal and mobile sawmills that account for 30 percent of all processing capacity. Moreover, Uganda is the only country in the East Africa region that is a net exporter of processed forest products, mostly plywood and particleboard for which no trade restriction currently exists (ibid). Finally, in the case of sawn timber, prices in Uganda are roughly 25 percent lower than in neighboring Kenya. This price difference is likely the result of both local supply and demand conditions and restrictions on timber exports from Uganda.

It is clear that Uganda's nascent commercial pine sector stands at a crossroads. As large areas of forest plantations mature over the next five years, new investments will be needed to sustain the industry. This includes investments in replanting harvested plantations, to ensure future supplies, and a significant ramping up of investments in timber milling, to ensure the sector can absorb and process the rapidly increasing supply of sawn logs. Without these investments, the incredible strides Uganda has made in developing the commercial timber sector over the last 20 years may be lost.

However, current trade restrictions on timber exports may be undermining incentives for investments in pine production and processing. Under article 44 of the National Forestry and Tree Planting Act from 2003, it is stipulated that "No person can export timber without an export license that is issued by a licensing authority" and "An export permit can be issued only for graded timber". While seemingly straightforward, these regulations significantly restrict timber trade. This is because, on the one hand, Uganda does not yet have a set of approved grading standards for timber, and, on the other hand, the process of acquiring a license from a licensing authority involves approvals from four different government agencies, each of which can delay or reject the application for exports.

Provisions on timber exports were put in place at time when commercial forestry in Uganda was not well-developed and policy makers were motivated by a desire to reduce exports of illegally logged natural forests. However, with the rapid maturation of the commercial forestry sector there is urgent need to revisit the policy.

## The challenge facing the industry

Plantation owners and other investors require adequate price incentives to invest in future plantings and milling facilities. It is, therefore, critical to understand whether or not current market conditions are sufficient to support these investments. To answer this question, a detailed cost benefit analysis of forest plantations and sawmill investments was undertaken. This analysis provides empirical evidence on whether or not investment in commercial forestry plantation and sawmills is profitable under current real timber prices, and how profitability would be effected if export restrictions on timber are loosened.

## Methods

The cost benefit analysis presented in this document is based on interviews carried out in July 2019. In total, 56 interviews were conducted, of which 32 with plantations owners of various sizes and six with sawmill owners and wood processors. From these interviews, detailed information on the costs and benefits of operating commercial forest plantations and sawmill facilities in Uganda was collected. The information collected was then combined to derive an estimate of the average costs and benefits for these two enterprises. The specific focus of the data collection was on pine plantations, as this is the largest and most important commercial forest product in Uganda.

With this information, cost and benefit models are constructed for plantation investments (with and without export restrictions) and sawmill investments. These models involve detailed annual cash flow estimates, converted into real financial terms, using World Bank and International Monetary Fund exchange rate and inflation data. This information is used to calculate two key measures of profitability:

1. The Net Present Value (NPV), which is the difference between all future cash inflows and outflows, discounted to the present, using the Ministry of Finance, Planning, and Economic Development's suggested discount rate of 11 percent.
2. The Internal Rate of Return (IRR), which is an alternative measure of profitability and is defined as the discount rate that makes the NPV of all cash flows equal to zero. IRR's that are greater than the national discount rate of 11 percent are considered profitable relative to other potential investments.

## Is investment in commercial pine plantations profitable under current market conditions?

In the analysis below it is assumed that the average pine plantation in Uganda can produce 250 m<sup>3</sup> of sawn logs per hectare of forest plantation over an 18-years production cycle, plus marketable thinnings. To achieve this production level, the producers incur in a wide range of establishment and maintenances costs throughout the years in the production cycle, as well as in costs associated with land lease and administration. For some producers, these costs are offset partially with support from the SPGS project.

Income from pine plantations is mostly earned from mature trees, although some income is earned from the selling of second and third thinnings. When the trees are mature, plantation owners that own a sawmill can process the trees into timber of various sizes demanded in the Ugandan market and will receive different prices depending on the timber sizes produced. Recovery rates for sawmills are low on average in Uganda. In this analysis it is assumed that the average recovery rate is 35 percent, while by-products such as sawdust and shavings can be marketed. Others sell their sawn logs to sawmill owners or processors for a stumpage fee, which currently averages 80 000 UGX per m<sup>3</sup>.

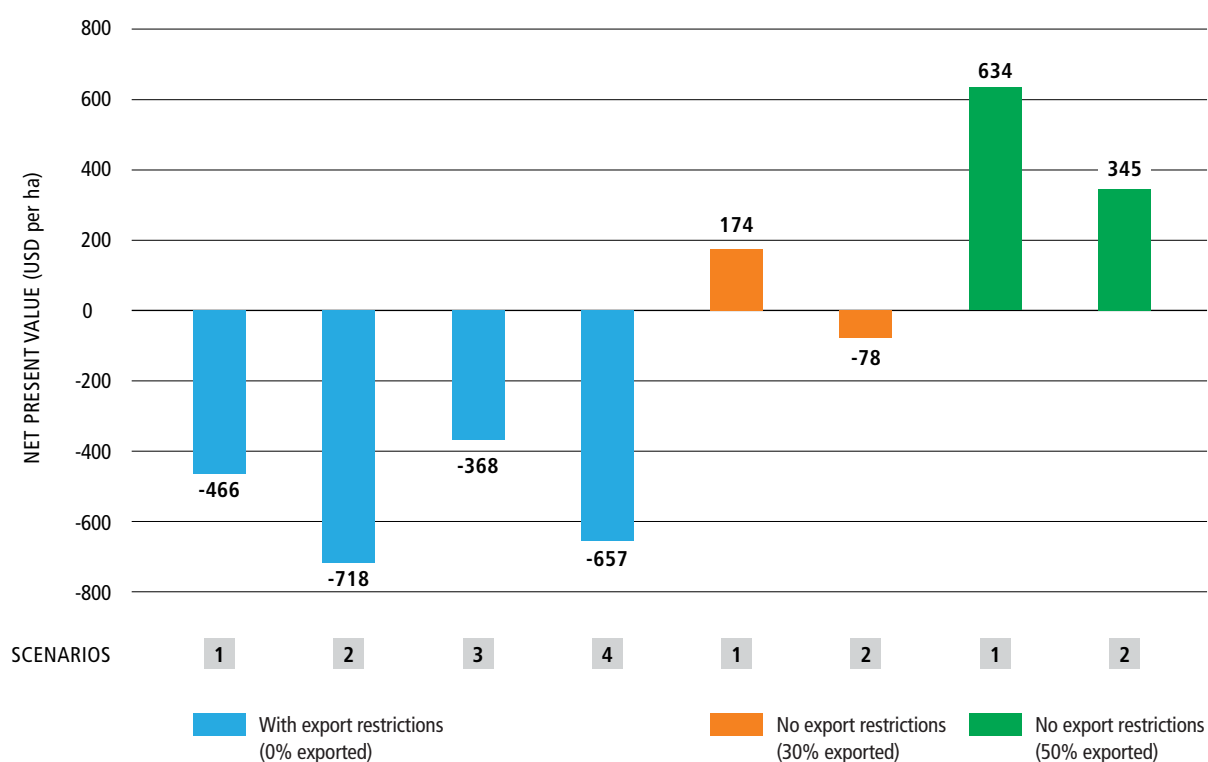
To account for the variability between plantation owners, the cost benefit analysis is run using four different scenarios. Scenario 1 is a plantation owner that receives SPGS support, owns a sawmill, and processes and sells timber. Scenario 2 is similar to 1, but the plantation owner does not receive SPGS support. Scenario 3 is a plantation owner that receives SPGS support, but does not own a sawmill and therefore sells trees based on a stumpage fee. Scenario 4 is similar to 3, but the plantation owner does not receive SPGS support.

As shown by the blue bars in Figure 3, under current marketing conditions, where exports of timber are restricted, none of the four scenarios considered have a positive NPV. While the IRR for each of these scenarios are positive, ranging from 3.6 to 6.9 percent, they are all well below the 11 percent discount rate on capital in Uganda. In other words, while the average plantation owner is not losing money under current market conditions, they would likely earn more if they invested elsewhere.

This finding highlights a significant challenge facing the sector. Without reforms to the current market situation in the country, where local timber prices are traded at 25 percent lower than those in Kenya, plantation owners are unlikely to replant pine once existing trees are harvested. It is, therefore, worth analyzing whether or not improved access to export markets is sufficient to increase the incentives for plantation owners to invest in pine production.

The orange and green bars in Figure 3 show the NPVs for plantation scenarios 1 and 2 assuming two different export levels, where export prices are based on prevailing timber prices in Nairobi net of transport. The results show that a plantation owner receiving SPGS support and exporting 30 percent of production is able to generate a positive NPV on the investment of USD 174 per hectare. Without SPGS support, this level of export is not sufficient to produce a positive NPV. It is worth noting, however, that the IRR of for this scenario is still quite high, at 10.4 percent. Moreover, these models assume that domestic prices do not change in real terms when export restrictions are lifted. It is likely that current export restrictions are suppressing domestic timber prices, and that they will rise once export restrictions are lifted. This will push up the returns on domestic sales and increase the NPV of the investments. If export levels reach as high as 50 percent of production, which is a likely scenario given current domestic supply and demand conditions, the NPVs of pine plantation investments would be high (USD 345–USD 643 per ha).

**FIGURE 3** INVESTMENT IN COMMERCIAL PINE PRODUCTION IS ONLY PROFITABLE IF UGANDA BEGINS EXPORTING TIMBER

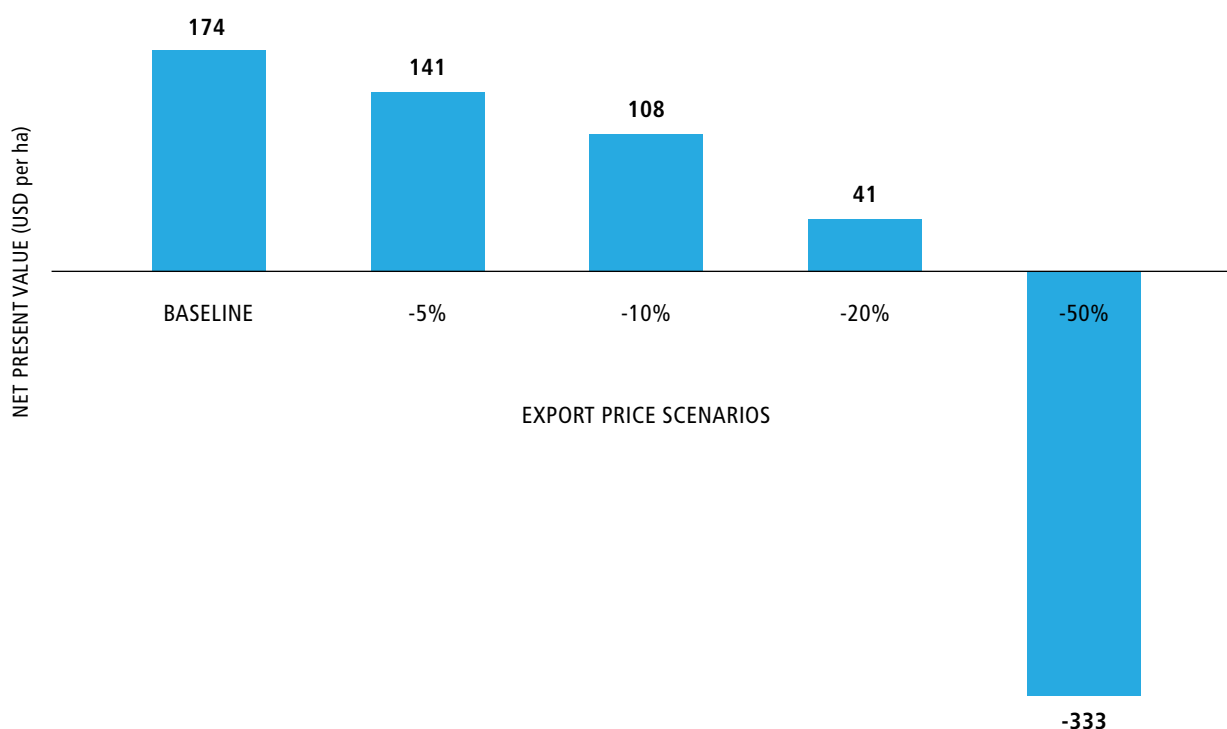


- SCENARIO 1** Processes own timber with 35 percent recovery and receives Sawlog Production Grant Scheme (SPGS) support
- SCENARIO 2** Processes own timber with 35 percent recovery and no SPGS support
- SCENARIO 3** Paid stumpage fee and receives SPGS support
- SCENARIO 4** Paid stumpage fee and no SPGS support

Source: Author's own elaboration.

As these result show, revising current export restrictions on timber is essential for supporting the necessary price incentives for plantation owners to continue to invest in pine production. Moreover, as shown in Figure 4, the positive effects of reducing export restrictions are robust under a range of export prices. Only if export prices for timber decline by 50 percent in real terms from current levels would commercial pine production become unprofitable. Given the large and growing demand for timber in the region, this scenario is highly unlikely.

**FIGURE 4** THE BENEFITS OF REMOVING EXPORT RESTRICTIONS ON TIMBER ARE ROBUST, EVEN IF EXPORT PRICES DECLINE BY 20 PERCENT



Source: Author's own elaboration.

## Is investment in sawmilling profitable under current market conditions?

As the supply of trees from commercial pine plantations in Uganda is expected to increase over the coming years, there is need to increase processing capacity in the country in order to capture the benefits of this production. In the analysis that follows, the NPV of investing in a sawmill is calculated assuming current market conditions, where timber prices are reduced relative to regional averages by timber export restrictions.

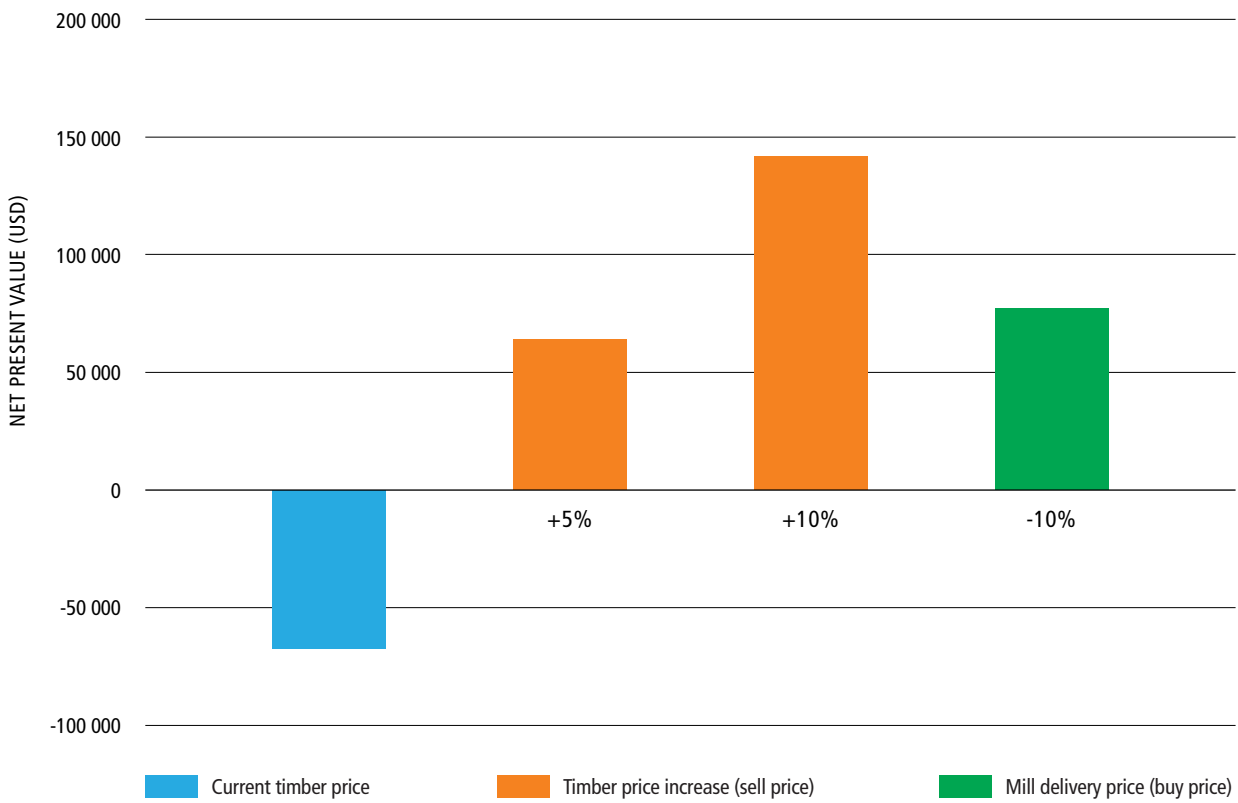
The sawmill considered in this analysis is small to medium in size. It is capable of processing 55 m<sup>3</sup> of wood per day. At a recovery rate of 40 percent, this mill would produce 22 m<sup>3</sup> of timber per day and 33 m<sup>3</sup> of by-products (chips, sawdust and shavings). Assuming that it operates for 300 days per year at full capacity, the mill is able to convert 16 5000 m<sup>3</sup> of wood per year, which amounts to roughly 66 ha of mature pine forest per year.

The total capital expenditure required for a mill of this size is USD 560 000. Given the high cost, it is assumed that a loan is required for 50 percent of the capital costs, with a repayment period of five years and an interest rate of 16 percent. Mill delivery price for wood is assumed to be 130 000 UGX per m<sup>3</sup>, which is comprised of 80 000 UGX for stumpage fee and 50 000 UGX for transport costs per m<sup>3</sup>. Labour, maintenance, and land lease costs are built into the model, which assumes a 10-year investment period.

As shown by the orange bar in Figure 5, under the current market situation for timber in Uganda, an investment in sawmilling would generate a negative NPV over a 10-year period. As result, without changes in the current export policy for timber, investments in sawmilling are unprofitable and unlikely to be made. However, as shown by the light green columns in Figure 5, a marginal improvement in timber prices (5 percent and 10 percent above current prices) turns the NPV for sawmill investment positive. Given that timber prices in Nairobi are currently 25 percent above those in Uganda, reducing restrictions on timber exports would likely lift timber prices sufficiently to make investment in sawmills profitable. Reductions in mill delivery prices might also help to make sawmill investments profitable. This can be achieved by reducing transport costs through better infrastructure, logistics, and locating the mill near major supply points.



**FIGURE 5** A MODERATE INCREASE IN TIMBER PRICES OR REDUCTION IN MILL DELIVERY PRICES MAKES SAWMILL INVESTMENTS PROFITABLE

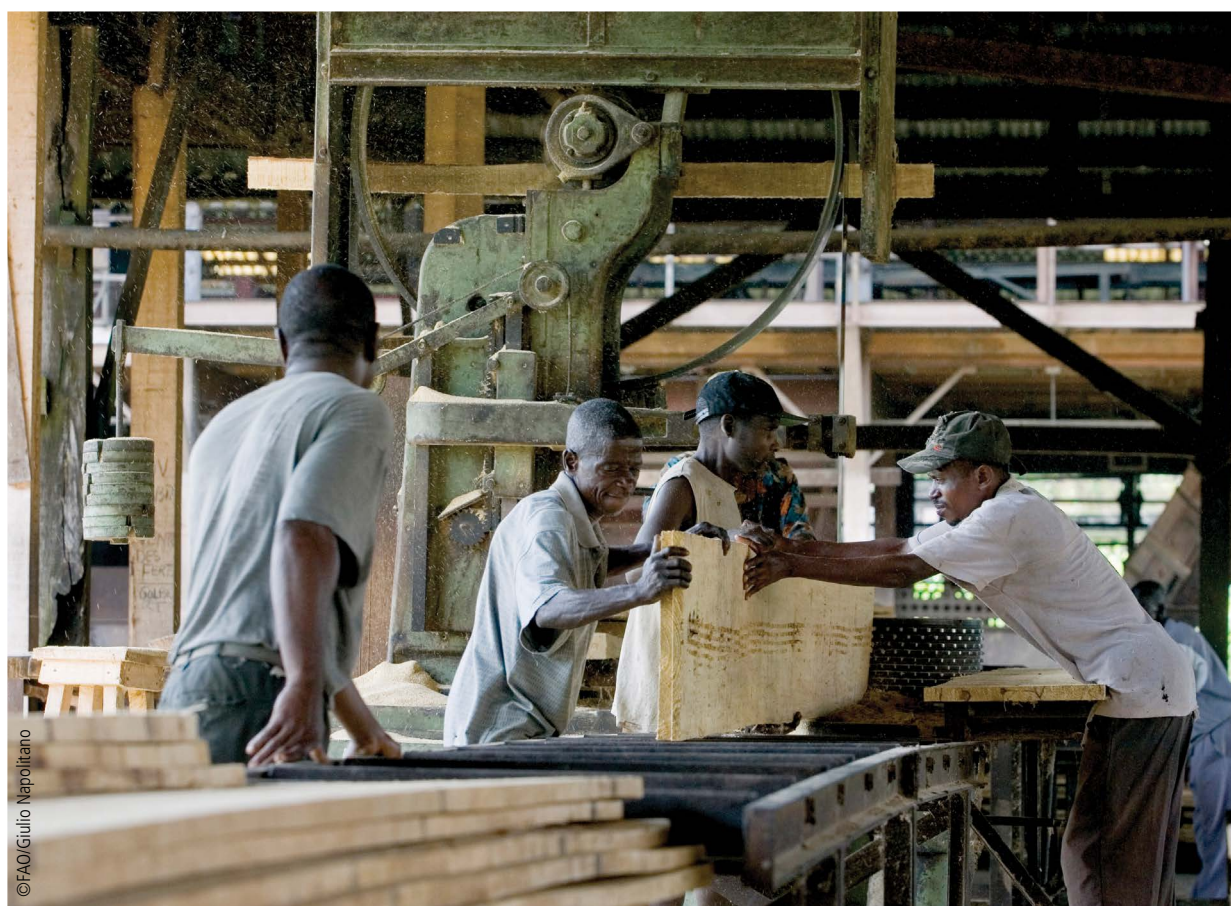


Source: Author's own elaboration.

## Conclusions

As a result of the Government of Uganda's forward-thinking policies to create a commercial forestry sector in the early 2000's, the country is now 20 years ahead of its neighbors in terms of the sector's development. The Government of Uganda now should consider implementing policies to sustain the sector, and enable it to help meet the rapidly growing demand for timber and other wood products in the region, and beyond. This depends fundamentally on enabling producers and processors to easily access to external timber markets. There are two key steps that policy makers can take to achieve this:

1. Quickly finalize standards and guidelines for grading timber. Three key points should be kept in mind when developing the standards: a) they should be consistent with regional and global market and standards; b) they can be met by local producers and processors, and; c) they do not require expensive equipment and extensive training to assess, thus allowing the standards to be verified in multiple locations of the country.
2. Harmonize the export permit process to allow exporters to acquire all necessary approvals in a single location. If feasible, this should also be decentralized to allow processors and producers outside of Kampala to easily acquire export permits.



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### Economic and Policy Analysis of Climate Change

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