

# **VALUE CHAIN ANALYSIS IN LIBERIA**

## **Forestry**

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## Abbreviations

AfDB: African Development Bank

CBL: Central Bank of Liberia

CNG: Compressed Natural Gas

GHG: Greenhouse Gas

GoL: Government of Liberia

KOAFEC: Korea Africa Economic Cooperation

MoA: Ministry of Agriculture

R&D: Research and Development

SWOT: Strength, Weaknesses, Opportunities, Threats

TSR: Technically Specified Rubber

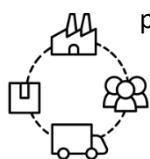
VC: Value Chain

VCA: Value Chain Analysis



## Forestry Sector

Liberia is home to the most extensive standing rainforest in West Africa, with a complex ecosystem hosting a wide range of products, including 225 species of timber, charcoal, non-timber forest products (NTFPs), and bushmeat<sup>1</sup>. High-value timber species are felled for sale on the domestic market and for international commercial export. Sawn timber is purchased for the construction of furniture, private homes, and business infrastructure. It is estimated that between 800,000 and 1.3 million cubic meters of timber is harvested from Liberia's industrial forest sector<sup>2</sup>. While the industrial timber sector exports approximately 175,000-200,000 cubic meters of round logs annually, an ample domestic market for primary processed wood exists in Liberia<sup>3</sup>. The domestic timber market, active in all 15 counties, bustles with chainsaw milling, transportation, urban market purchases and sales, and businesses for woodworking and construction. There is an abundance of potential in downstream value addition as the country's demand for construction and woodworking outpaces timber production.



## Forestry Supply Chain

Chainsaw milling is the key element of the forestry supply chain—felling trees, operating the entire primary transformation, and sectioning timber into planks using chainsaws. Wooden planks are produced in all 15 counties in Liberia, and most of the purchases made by plank depots come directly from the forest; there is often no processing beyond chainsaw milling. Rudimentary processing equipment such as ripping machines continues to be used in Liberia for production since no sawmills for timber are operational in the country.

Four species of timber make up the majority of all timber sales in Monrovia: wawa, tetra, framire, and abura, with purchase prices varying by the species and quality of the planks. Planks are sold in fixed dimension (commonly found as 2x10x14, 2x12x14, 1x12x14, and 1x10x14) and depots may offer a wider range of dimensions by making modifications to these standard sizes before selling. As it stands, informal chainsaw milling supplies construction, carpentry and woodworking businesses with planks that are undried, relatively unprocessed, and ultimately low-quality, since there are no kiln facilities or sawmills in the country. Likewise, concessions export raw logs due to the absence of primary processing facilities in Liberia. The majority of downstream businesses do not have access to power tools and produce furniture with only hand tools. The workforce is also largely unskilled, with no access to woodworking techniques or methods to improve operations. The combination of low labor productivity, absence of sawmills, and use of outdated techniques and technology has led to limited downstream value addition. Thus, outputs from domestic woodworking and construction firms remain uncompetitive in the regional and global market. A shift towards higher value-added wood



<sup>1</sup> Flora & Fauna International, High conservation values: Draft national interpretation for Liberia, 2012.

<sup>2</sup> Blackett et al. Chainsaw Logging in Liberia: An Analysis of Chainsaw Logging (Pit-sawing) in the Natural Forests of Liberia Towards a More Sustainable Production, 2009.

<sup>3</sup> Export volume projected from SGS dataset 2020

processing and production could maximize the productive capacity of Liberia’s forest cover, while supporting preservation, to meet current and future market demands.



## Investment Opportunities

### Timber Investment Attributes<sup>5</sup>

Given its short history and unique investment characteristics, basic research material for investors on timberland as an asset class is scant. The key attractions of timberland to investors can be summarized into four broad categories:

#### 1) Portfolio fit

##### *Competitive risk-adjusted returns*

Timberland has historically offered attractive average returns relative to its volatility, and its performance compares favorably with that of equities, fixed income, and other leading asset classes.

##### *Inflation hedging*

Timberland, like agricultural commodities, precious metals, and oil and gas investments, is considered a real asset—one that derives its intrinsic value from its utility. To varying degrees, different real assets are recognized as potential inflation hedges. In the case of timberland, wood-based products permeate and are used in a multitude of sectors within the global economy.

##### *Diversification*

Because timberland investment returns have been observed to move in a manner quite different from those of other asset classes, timberland can help provide portfolio-level diversification. This potentially lowers the portfolio’s total risk profile and expands its efficient frontier of risk and return.

#### 2) Intrinsic attributes

Beyond timberland’s basic financial performance, there are also features that compellingly differentiate it from other asset classes. One of these is the ability of a commercial forest to add value through biological growth regardless of what is happening in financial markets and the world economy.

#### 3) Positive market fundamentals

Investors who view commodities in a positive light also tend to view timberland favorably. The resumption of global economic growth is expected to place upward price pressure on many commodities and real assets, including timber. The world population is projected to grow from 7.8 billion in 2020 to 9.7 billion by 2050, which will lead to an increase in the global consumption of paper and wood products. Rising incomes in fast-growing emerging economies such as Asia, Central Europe, and Latin America, will further augment per capita consumption for timber.

The supply of timber is expected to be constrained even as long-term demand is expected to grow, as government restrictions and public conservation efforts begin to limit harvest from natural forests, and international pressure has curbed illegal logging. Consumer preference is also shifting towards sustainably-grown timber. This means the world’s timber demand will increasingly be met by managed forest plantations. However, the total land available for the establishment of these plantations is also limited by competitive land uses from agriculture, conservation and development. It is now an opportune time to make new and expanded commitments to the asset class within the context of these global trends.

#### 4) Soft values

Timberland investments managed responsibly are an environmentally-friendly investment option—it is “green”. Investors keen to be a part of socially responsible investments (SRI) see this as a unique feature of the asset class. Another soft value attribute of timberland investments is related to carbon credits. A forest sequesters carbon, and the sequestered carbon can be monitored and registered when the appropriate systems and processes are in place. A landowner’s capacity to certify the amount of carbon sequestered in a forest ecosystem can then monetized this in the carbon offset credits market. The carbon credits are purchased, either voluntarily or by government mandate, by entities that emit greenhouse gases (GHGs) into the atmosphere. Carbon credits can also be sold based on active preservation of a natural forest, where there is no harvesting or disturbance that will release carbon into the atmosphere; this is known as Reducing Emissions from Deforestation and Forest Degradation (REDD). The REDD market is currently concentrated in developing economies in sub-Saharan Africa, Latin America and the Pacific Rim, where deforestation is a problem.

Timberland is a relatively new asset class, having emerged as an attractive option for institutional investors in the early 1980s. From 1989 to present, the total amount of institutional capital invested

in timberland grew from less than \$1 billion USD to approximately \$100 billion USD. While the asset class was initially anchored in North America, it has since expanded to other forested regions around the world. The first institutional timberland investment outside of North America was made in New Zealand in 1992; a decade later, the global footprint has expanded to Australia and the Latin American countries of Brazil, Chile, and Uruguay. In recent years, timberland investors have further broadened their geographic scope to consider opportunities in select countries in Africa, some emerging Latin America countries, China, and Central and Eastern Europe.

## 1. Sawmills

A key aspect of the forest supply chain often overlooked by investors in timberland is the primary manufacturing of timber. The sawmilling sector is a relatively untapped area of investment. Investing in sawmill assets can be an attractive option for investors who wish to complement the lower-risk profiles of their timberland assets by investing in higher-returning infrastructure and private equity-oriented opportunities higher in the value chain.

Investments in sawmill projects also offer a number of environmental, social and governance (ESG) benefits. Facilities that manufacture lumber and wood panels create employment opportunities and support other forms of economic development, particularly in disadvantaged rural communities.



Lumber and plywood products used for building and construction also work to store carbon, which means building with wood rather than other materials helps to reduce the emission of GHGs and helps to combat global climate change.

The global lumber market is currently at its strongest in history; global lumber prices broke past \$1,000 USD per thousand board feet (MBF) during the first quarter of 2021, more than double the \$400 average MBF

observed during the previous decade. This record-setting performance is drawing investors to explore the expansion of opportunities in the sawmilling sector.

In Liberia, the domestic market for construction and woodworking continues to grow compared to estimated production and domestic lumber prices have skyrocketed in the past 5 years. According to a survey conducted in 2017, between 207,583 m<sup>3</sup> and 276,777 m<sup>3</sup> of sawn timber is sold annually on the Liberian domestic market<sup>4</sup>. On average, one cubic meter of sawn wood sold in Monrovia costs \$255 USD in 2022, a 68% increase from market prices recorded in 2017. As the supply of sawn timber increases to meet demand, the estimated minimum domestic market size for sawn timber is in excess of \$50 million USD. Investors in lumber manufacturing facilities can exploit the localized nature of wood markets because half to three-quarters of the cost of manufacturing lumber comes from the cost of purchasing logs, and the commercial tree species favored by chainsaw millers are oftentimes the same ones in demand on the international market.<sup>5</sup> The international market prices for sawn wood are also significantly higher than Liberia's domestic prices, revealing the country's cost advantage and a potentially lucrative arbitrage opportunity for discerning investors. This means that investors are well positioned to influence the long-term performance of a sawmill investment by choosing to operate in areas where logs are plentiful and where log pricing is low due to slack competition.

<sup>4</sup> Liberia: Domestic Timber Value Chain Analysis

<sup>5</sup> Source: Forest Economic Advisors

Beyond wood costs, another factor that can determine the success of a sawmill investment is productivity, i.e. how much lumber can be produced from a log. According to some estimates, the sawn timber supply chain in Liberia is hampered by a 30% efficiency rate in the production of planks from logs due to obsolete production methods and rudimentary processing capabilities<sup>6</sup>. Industry research has determined that a sawmill that is equipped with the latest proven technology and that is located in a reasonably-priced wood market can be profitable when lumber prices are above \$100 per cubic meter, a favorable metric when compared to Liberia's current prices above \$250 per cubic meter<sup>7</sup>. Several inefficiencies still exist in the market, including weak communication between actors, limited value-addition, volatile swings in supply, and all of which are ripe for disruption, providing ample opportunities for investors to profit from efficient and reliable production and improved product offerings.

## 2. Carbon Credit

The United Nations estimates the cost to decarbonize the world at \$35 trillion. Capital markets will necessarily have to play a role; corporations such as Citigroup Inc., Verizon Communications Inc., and governments in both developing and developed countries raised a record \$516 billion in green bonds in 2021, up from \$235 billion in 2020, used to fund environmentally-friendly projects<sup>8</sup>. This financing is likely to increase as a result of plans from the European Union (EU) start green bonds, and from the U.S. government's reprioritization of climate policies. The ongoing COVID-19 pandemic has also catalyzed a boom in social bonds, with issuance up eight times from the previous year. Corporations such as Walmart, Amazon, Nestlé, Alibaba, and Mahindra Group are pledging to slash carbon emissions and invest in nature as a carbon sink. To meet the increasing demand, banks and investors are working to transition financial instruments as there are currently insufficient green bonds to satisfy investor appetite. A near-record bidding for a debut green bond in Germany was observed recently with the securities trading at a premium to the country's conventional debt.

The global market for climate finance was estimated at \$622 billion in 2019<sup>9</sup>. The demand for forest carbon offsets could outstrip supply by 2025; carbon prices could quadruple by 2030 and offset values could be worth \$125–\$150 billion a year by 2050<sup>10</sup>. In order for these values to be realized, existing carbon trading schemes such as the EU Emissions Trading System, the north-eastern U.S. states' Regional Greenhouse Gas Initiative, and forest-based emissions reduction initiatives such as REDD+, will have to overcome some major hurdles.

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<sup>6</sup> Liberia: Domestic Timber Value Chain Analysis

<sup>7</sup> Source: Forest Economic Advisors

<sup>8</sup> <https://esginvest.co/the-complexities-of-esg-bonds/>

<sup>9</sup> <https://www2.deloitte.com/us/en/insights/topics/strategy/international-climate-finance.html>

<sup>10</sup> <https://www.fitchratings.com/404.html?slug=infrastructure-project-finance/tightening-climate-policy-to-drive-carbon-offsetting-emissions-trading-09-09-2020>

## Value Chain Analysis – Ministry of Agriculture Liberia - 2022



Liberia's forest cover makes up approximately 69% of the country's total land surface and extends over 6.7 billion hectares, making it the most forested country in West Africa. Since 2008, national and international stakeholders in Liberia, such as the World Bank's Forest Carbon Partnership Facility (FCPF), have been working on forestry reforms. The country's efforts to reduce emissions from deforestation and forest degradation (REDD+), as outlined by the Government of Liberia's National REDD+ Strategy in 2017, aim to deliver community, conservation, and commercial benefits while preventing further loss of its forests.

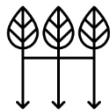
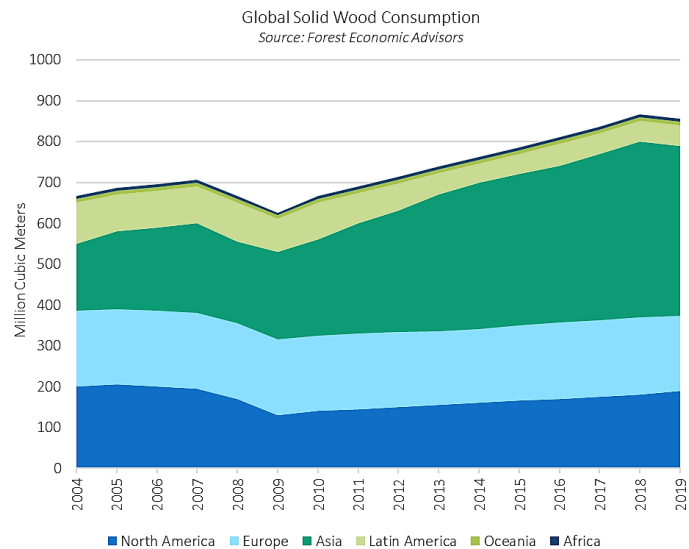
Liberia is now in the final stages of its REDD+ readiness, having made important strides in a REDD+ Feedback and Grievance Redress Mechanism, a Strategic Environmental and Social Assessment, completing its first National Forest Inventory (NFI), institutionalizing a National Forest Monitoring System, and operationalizing its forestry stakeholder information platform. Early REDD+ initiatives in Liberia did not adequately consider channels to delivery climate finance to communities in agricultural areas, who managed forests and were responsible for the nature reserves. There are international networks and models designed for this purpose, such as the SourceUp online platform that links local sustainability coalitions in sourcing areas with international markets, which can improve local community inclusion and engagement.

At this juncture, Liberia's natural endowments and recent progress under the REDD+ strategy opens the door to a wide range of results-based financing opportunities in the country's forestry sector. However, investors must continue to keep abreast of developments globally, as forestry investment opportunities linked to the production and sale of carbon credits is currently limited by the lack of effective global compliance and monitoring mechanisms for emission offsets.

## Key Takeaways

In summary, three clear arguments arise for investors to place capital in a lumber manufacturing facility:

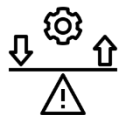
- (i) Macroeconomic trends suggest there is growing demand exists for building products.
- (ii) Investments by wood product companies in new or retrofitted manufacturing facilities have lagged behind current market growth in the building products sector globally.
- (iii) A diverse local wood market can be leveraged to create a competitive advantage for a milling facility that is targeted for capitalization



## Investment Impacts

Investments in forestry can generate the following impacts:

- 1) Improvements in well-being and prosperity as a result of increased jobs and incomes
- 2) Increase in sustainable harvesting practices will preserve and protect primary and secondary forests
- 3) Increased carbon capture for climate change mitigation



## Investment Risks

The key constraints for farmers to expand market opportunities are:

- Lack of regulation and monitoring
- Lack of equipment, low productivity and quality
- Lack of consumer considerations
- Insufficient community engagement





## Forestry Value Chain Structure

Between 207,583 m<sup>3</sup> and 276,777 m<sup>3</sup> of sawn timber is sold annually on the Liberian domestic market. Demand is assumed to be concentrated in Liberia's urban population as it is the base for the majority of construction and furniture-making businesses, and there is higher demand for timber in urban homes compared to rural homes. Currently, the supply of planks increases in response to growing demand for sawn wood, which is not filled by sales from the formal logging sector. As a result, and because the quality of finished products is not currently the top priority for harvesters or traders, domestic market prices remain low. Given an efficiency rate of 30%, we calculate that the total volume of logs processed by chainsaw milling is between 700,000 and 900,000 m<sup>3</sup> RWE. While large chainsaw milling businesses control a good portion of the domestic timber flow, there are many small, independent operations active across the counties due to the relative ease of finding and harvesting trees, low costs of entry, and a general absence of regulations.

### Production & Sales

Prior to the ban on formal logging, operations were typically restricted to converting unused felled logs and brush in formal concessions to produce sawn wood. The ban on timber exports in 2003 and the annulment of concession agreements in 2006 led to an increase in the use of chainsaw milling, as chainsaw millers became the only source to meet local market demand. The number of chainsaw millers grew exponentially to meet the construction needs of a booming urban population. Chainsaw millers either sell their timber directly to a specific plank outlet or depot based on their order (pre-sale) or sell openly on the timber market (open sale).

The pre-sale model has several variations. In one, the plank outlet owner places a specific order to the chainsaw miller and pays for the transportation of the timber (often using trucks). The plank outlet then pays their employees in the bush to cut up the planks. In a second variation, the chainsaw miller owns or rents saws and produce a plank specific order for the plank outlet owner. This transaction may be facilitated by the Liberia Chainsaw and Timber Dealers Union (LICSATDUN) via personal connections. In a third variation, a business owns saws and trucks, and has employees in the bush that cut planks; these planks do not pass through Monrovia markets but are instead transported directly to private businesses.

With an open sale model, the chainsaw miller owns or rents saws to cut the planks, and a middleman purchases planks from multiple operations to transport to plank outlets in Monrovia to sell on the open market. Alternatively, the chainsaw miller owns or rents saws to cut the planks and then hires trucks to transport the planks to Monrovia for sell on the open market.

Forestry is essentially a supply-driven sector, where the needs and expectations of secondary processors and end user are not considered throughout the supply chain and do not currently drive the create of value. Domestic opportunities are not well-communicated to suppliers, and regional opportunities are not considered at all.

### Transport

Transportation of timber by trucks from the counties to Monrovia utilizes three roads—the Buchanan-Monrovia highway, the Bomi-Monrovia highway, and the Margibi-Monrovia highway. FDA officials operate checkpoints along the route to collect the FDA tax of \$0.06 per plank. However, a portion of timber may pass through alternative routes to reach Monrovia; a feeder road that is in good addition allows trucks to travel from Gbarpolu, Grand Cape Mount, and Lofa, skirting the Bomi-Monrovia highway checkpoint.

### Market Price Information

The volume and prices of sawn wood entering the urban markets is not tracked on a regular basis.

**Regulatory Enforcement**

Because the majority of the forestry value chain remains in the informal economy, there is no formal monitoring or regulation mechanism in place that can be used to increase the sector’s competitiveness, manage its environmental impact, or bring the activity into the formal sector. The 2012 Chainsaw Milling Regulation requires that chainsaw millers register for permits that define their areas of operation, but there is no formal enforcement of these procedures. The plank tariff described above is the only regulation actively enforced by the FDA; however even this process is sometimes circumvented as chainsaw millers reported negotiate with officials for lower taxes.

 Forestry Sector SWOT Analysis

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> <li>• Abundant resources widely available in rural areas</li> <li>• Rich in traditional know-how</li> <li>• High interest in local level enterprises</li> </ul>	<ul style="list-style-type: none"> <li>• Poor marketing of products</li> <li>• Weak management capacity</li> <li>• Poor transportation network and technology</li> <li>• Insufficient community engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Growing demand in domestic and international markets</li> <li>• High potential for income and employment</li> <li>• Interest from private sector</li> <li>• Developing value addition and brand recognition</li> </ul>	<ul style="list-style-type: none"> <li>• Decreasing resource base due to over-harvesting and unsustainable harvesting practices</li> </ul>

Figures and Tables

**Forestry Supply Chain**

