World Bank Diagnostic Trade Integration Study: Wood Industry Component

Draft Report

by:

Jukka Tissari (International Wood Industry Consultant)
Anthony Taplah (National Wood Industry Consultant)
Edward S. Kamara (FDA Counterpart)

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EXECUTIVE SUMMARY

Challenge ahead

The Diagnostic Trade Integration Study (DTIS) for the wood industry in Liberia was undertaken in November 2007 by a World Bank team in response to a specific request by Forestry Development Authority (FDA). With the expected resumption of commercial forest logging in Liberia in 2008 following the lifting of UN sanctions, the FDA wishes to ensure that the forestry sector contributes its full potential to the **Poverty Reduction Strategy** as the driver of sustainable rural economic development. The next 24 months are critical, as the Government needs to address key issues in both policy and fiscal frameworks and rebuild the required government capacity to manage the sector.

The key challenge identified in this work is how to **make the domestic processing of logs into sawn timber and higher value products attractive to foreign and Liberian investors** without coercive measures such as outright bans on log exports. Restarting of the logging industry and processing investments needs to ensure an **expanding tax base for government and equitable benefit-sharing** that reaches also rural inhabitants through employment and direct revenue sharing. In the absence of an Annual Allowable Cut (AAC) established on national level, Liberia's fairly recent forest inventory provides adequate data for the planning purposes. Forest processing sector should not be allowed to grow to a disproportionate size, which cannot be supported by productivity of the forest resource. This can be safeguarded on a case-by-case basis by matching investment plans with the results of the detailed inventories being carried out for forest concession prospectuses.

There are, however, many serious obstacles for bringing Liberian forestry back into action. The wood processing sector can not develop in isolation from various supporting institutions and economic facilitators, such as education, banking, insurance systems, rules of law and environmental regulations, good governance, investment protection and incentives, other supporting industries and - in broad terms - **the enabling economic and social operating environment**. Many such crucial foundations do not exist, or are in disarray, in today's Liberia.

Maintaining the forests productive for perpetual use

Liberia has the most extensive remaining tropical rainforest in West Africa, and forestry potential is considered high in the country. The most compelling reason for Liberia to assure a guarded shift towards higher value added wood processing lies in its support for **maintaining the forest cover and its productive capacity for the present needs and for the coming generations**. This is a task where many of Liberia's neighbors have failed. If the move into value added processing gets started too late and takes too long to materialize, it becomes merely a reactive measure to cope with the dwindling log supplies.

A wide range of policy instruments for promoting domestic processing have been tried in West and Central Africa. The approaches and experiences are varied, and in some cases **industrial growth has taken place at excessively high economic, and environmental cost**. Perhaps the most worrying consequence of log export bans has been the rise of **illegal activity** to loot the forests. Logging bans for exports tend to be difficult to enforce and may lead to alliances between illicit producers, buyers and traders.

A total log export ban is an extreme measure and should be avoided in Liberia. It punishes local concessionaires who start from moderate operational levels *vis-á-vis* foreign ones with more ample resources to invest in processing from year one. A **gradually lowering log export quota** is recommendable, as it would maintain government revenue from log exports while ensuring that domestic prices of logs stay feasible for local processors. Policies aimed at concentrating timber production (more intensive logging in smaller area of total forest, regulation of the grey sector) and simplifying forest taxation can help reducing the need for costly enforcement and government oversight. Liberia would be advised to choose **regressive export taxation according to the degree of processing**, what encour-

ages further processing. The currently proposed spread between log export fees and wood product export fees is relatively narrow (2,5%-10% logs *vs.* 1%-2% wood products) by international comparison. Particularly log export fee tariffs are considerably lower in Liberia than in countries which eradicate log exports more forcefully. The system is based on the provision of a single flat rate on all value added products per species class - and not per type of product. Moving into **differentiated wood product export fees** would necessitate further studies into the yield and profitability of the value adding processes. Another option is to consider a **percentage-based reimbursement system of stumpage/collected fees** to companies who process wood efficiently into value added products.

As Liberia's forest have been creamed in the past, FDA is advised to become proactive in **capturing the potential of such lesser-used species (LUS)**. Certification, direct species substitution and concealing LUS wood into value-added products are the most promising strategies for accomplishing this task. Plywood core layers, furniture backs, laminated panels and mouldings can all consume LUS which may not otherwise show commercial potential. A study on LUS in the past concluded that most of the 19 novelty species studied in Liberia were well suited for general construction, interior joinery, parquet, simple furniture and heavy construction. On the other hand, only a few of them were considered fit for high-class furniture or sliced veneer. FDA should link up with international experts and European and West African timber trade promotion organizations working with LUS to unleash their potential.

Adding value to the resource

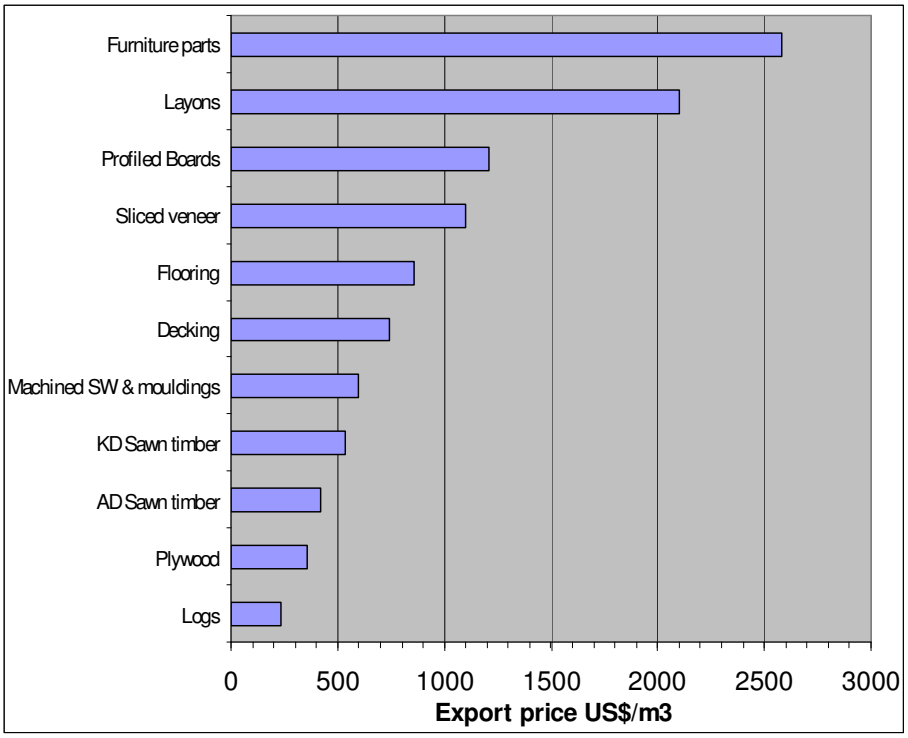
Value-addition should start from the **logging compartment level**, i.e. on planning logging operations prudently, grading and pricing the logs appropriately, and delivering them efficiently to buyers. There is a crying shortage of certified log graders in Liberia, as apparently only one ATIBT (Association Technique Internationale des Bois Tropicaux) trained grader is active. As the log quality and species mix are expected to show quite a variety in Liberia's forestry comeback, there is immediate potential to increase the value of log exports with small investments in training of officers with proper measuring and grading skills. As FDA regulations state that their **fees should be based on the log value by grade**, this would also be a quick way to improve FDA's revenue collection. Log grading competence also serves the future processing industry by means of processing optimization. In the current concession agreements, logging companies are allowed a two years grace period with 100% log exports before starting processing on the third year. FDA would do wisely in monitoring the concessionaires' operations in terms of **forestry planning, log grading, pricing and efficiency** in the initial two-year period to earn respect and a steering position.

In the next phase, value added wood products should be progressively developed by the concessionaires. **Primary processing** (sawmilling, plywood, peeling or slicing into veneer) comes first in as stipulated, and provisions should be made in the concession agreements to develop this without excuses. The highest level of value added should be defined as **remanufacturing** of primary processed wood into **further processed products** (start from treating of poles and posts, kiln-dried and S4S (surfaced four sides) timber, edge-glued solid wood panels, laminated wood, mouldings, decking, flooring stock, windows, doors, frames, garden products, furniture components, and other semi-finished and finished products).

Efficiency improvements along the value chain provide another avenue for adding value in the early stages of industrialization. In many countries in the region processing industry tends to be notoriously inefficient with low labor productivity and obsolete technology, which both render the output uncompetitive in the world markets. Secondary and tertiary processing stages (furniture-making in particular) are highly demanding in terms of **quality standards, unit cost controls and technology**. With its currently low skills pool and weak industrial infrastructure Liberia is ill advised to aim into competitive markets of the highest levels of value addition anywhere soon. Domestic markets will serve as training ground for future exporters. The regional ECOWAS market can be more realistically served for as of immediate effect. In conclusion, the development of value added processing will need to start from the establishment of a **dynamic, sustainable forestry and primary processing** activities. Over time the

sector can proceed gradually onto higher levels of secondary and tertiary processed products - provided that skills, investments and markets enable it.

Figure 1.1 FOB Prices of West African Value Added Wood Products in Exports



Source: TIDD (Timber Industry Development Division, Ghana) 2007 - Ghana's export prices adjusted for this study.

Scenario-building on Liberia's wood processing sector

A major concern will be to establish an industrial fabric that is both viable for Liberia and optimal in terms of generating value-added and export revenue in the premise of sustainability. Based on the anticipated roll-out of commercial logging, this report outlines one possible forest industry scenario. In this **"ideal" scenario Liberia would see 3-4 integrated sawmill and plywood complexes, up to 7 major sawmills with integrated remanufacturing workshops, and a significant number of rural TSC-based small sawmills**. Smaller-sized remanufacturing units would logically sprout adjacent to sawmills at a later stage. A value added product mix is suggested to convert a good half of the sawnwood volume into remanufactured products like mouldings, decking, flooring, layons, furniture parts, etc.

This study recommends a fairly sophisticated and dense tropical hardwood processing industry for Liberian policymakers' purview. Ultimately the selection of mill sites will be a **consideration of the concession operators** - guided but not stipulated by FDA through the concession agreements. The main criteria would have to be the **viable industrial economics** and logistics of the mills. These conditions should overrule rigid political and geographical selection criteria, and avoid unhealthy support to those disadvantaged areas that would accommodate only an impractical wood processing industry. Establishing an industrial fabric at any cost is not a viable strategy. In any case it develops most sustainably through a **gradual process**.

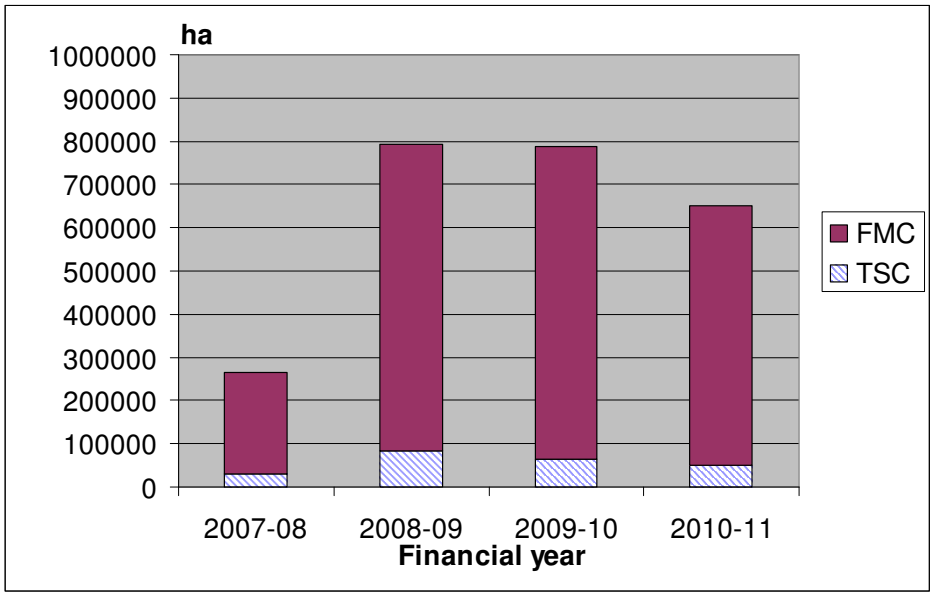
The on-going FDA mustering of a **Forest Processing Strategy** is of crucial importance to draft a realistic roadmap for value added wood processing in the country. The sector must clearly show high po-

tential and security to attract foreign investors and leverage funding from international financiers. Roadmap on strategy development is proposed in this report. Responsible organization (FDA) initiates work and sets a drafting committee, whereto institutions nominate their technical experts. Committee drafts the strategy, which will have to pass through two national consultations. The Board of Directors of FDA will finally approve the strategy.

Speeding up the roll-out of logging piles up the revenues

The logging, sawmilling and export projections of the FDA (2008-2013) have been taken in as a basis for the model presented on **future industrialization and revenue collection**. FDA's medium-term projections have been elaborated with a gradual coming into stream of further remanufactured products.

Figure 1.2 Roll-out Plans of the Forest Concession Areas in Liberia

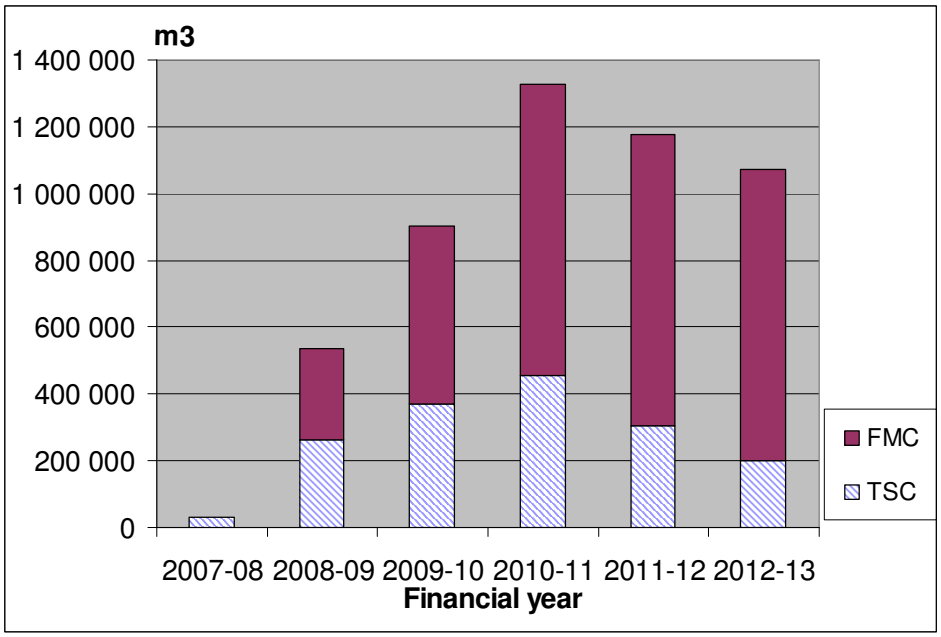


Source: Revised roll-out plans by FDA, 2008

Out of the 2,50 mill. ha area allocated to **3Cs (communities, commerce and conservation forestry)**, approximately 2,27 mill. ha will be allocated to Forest Management Contracts (FMCs). Out of this 80% is harvestable, as 20% is conserved around waterways, biodiversity and sacred sites, etc. Up to 230,000 ha of Timber Sales Contracts (TSCs) will be allocated to short-term leases, and these are subject to possible land-use change after three years or later on. No log exports after the sixth year of operation are foreseen from TSCs.

Selective logging intensity is expected to gradually rise from 7,5 m^3/ha/yr on TSCs and 9,0 m^3/ha/yr on FMCs to final level of 12 m^3/ha/yr on all areas. At full swing Liberia's logging volumes would reach 1,1-1,3 million cubic meters per year at the highest.

Figure 1.3 Roll-out Plans of the Commercial Logging Volumes in Liberia



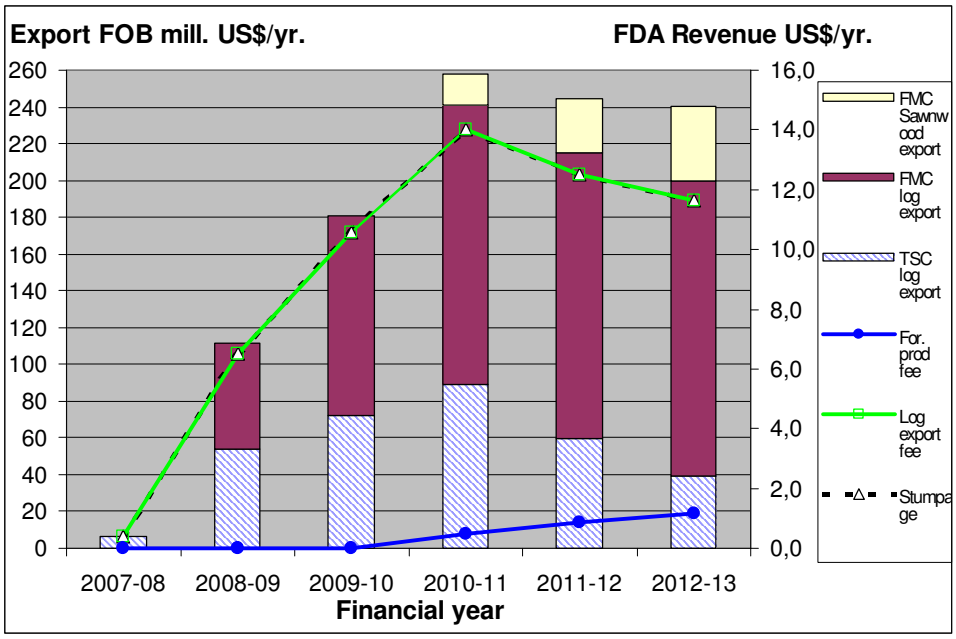
Source: Revised roll-out plans by FDA, 2008

Using an average US$ 230/m^3 export FOB value, the export value of Liberia's logs from TSCs would rise on the fourth year into US$ 89.0 million and then subside (see bars in Figure 1.4.). A much higher FOB value of log exports would naturally be generated if FMC logs would be fully sold abroad, i.e. US$ 160.4 million per year on the sixth year. Sawnwood production would reach US$ 40 million in FOB value on fourth year and start to compensate for log export decline.

A comparison between revenues from log exports and sawnwood exports is presented below in order to understand the **early impact of value added processing on revenue streams**. Revenues depicted as lines in Figure 1.4 include fees on stumpage and log exports (note that they are two identical revenue streams acc. to FDA) and forest products export fees.

With log exports close to one mill. m^3 the country would reap US$ 240 mill. export earnings in peak year 2010-2011, out of which the government revenue would amount to US$ 14 million per year in direct export fees on logs and sawnwood. Additional revenues will accrue from **stumpage, land rental and other types of fees** - so that US$ 35 mill. per year is set as the official revenue target.

Figure 1.4 Estimated Log Export Value and FDA Direct Revenue in Liberia



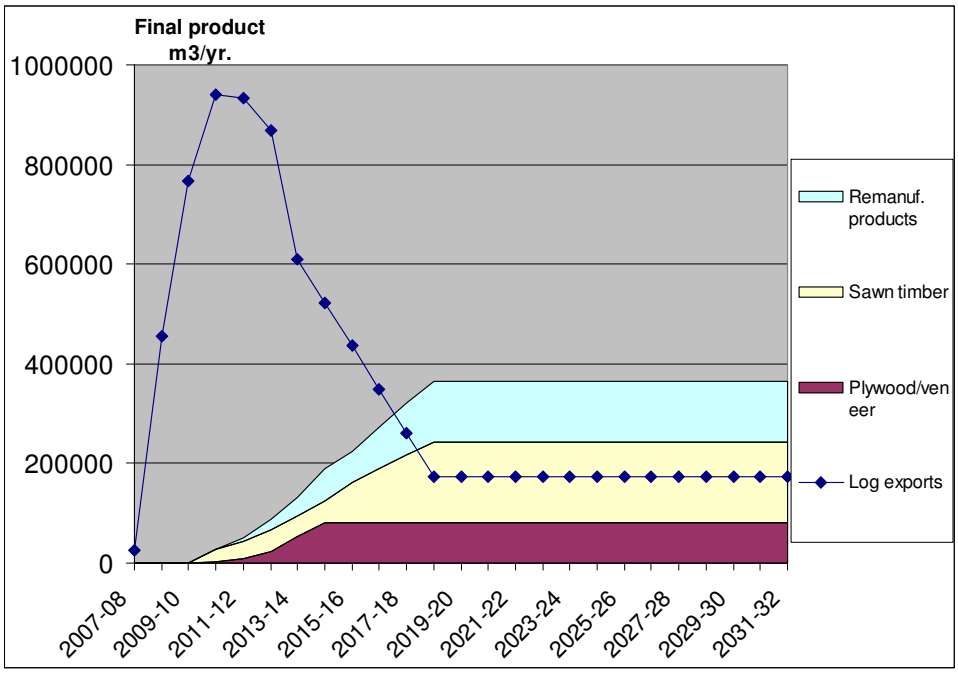
Source: Revised roll-out plans by FDA, 2008.

From this point onwards, the "ideal" scenario is put into play for projecting industrialization, export value and FDA revenue throughout the 25 year logging cycle. In aggregate capacity terms, there would be 11 mills with combined annual production of 324,000 m^3 in sawnwood, and four plywood/veneer plants with 80,000 m^3 output annually. Half of the sawnwood would be further transformed into remanufactured items, whose volume could reach 122,000 m^3 in full production, depending on the types of products manufactured. Reaching such a scenario would take at least one decade. At the end of 25 yr. cycle 39% of cumulative logging volume has been exported as logs, and 61% in log equivalent has been sold as plywood, sawn timber and in remanufactured products.

The shifting of gear takes nevertheless considerably long time. This is not necessarily a gloomy prospect, because the industry brings about multiple economic benefits to fill in the gaps in export fees in other ways. The difference would have to be compensated by:

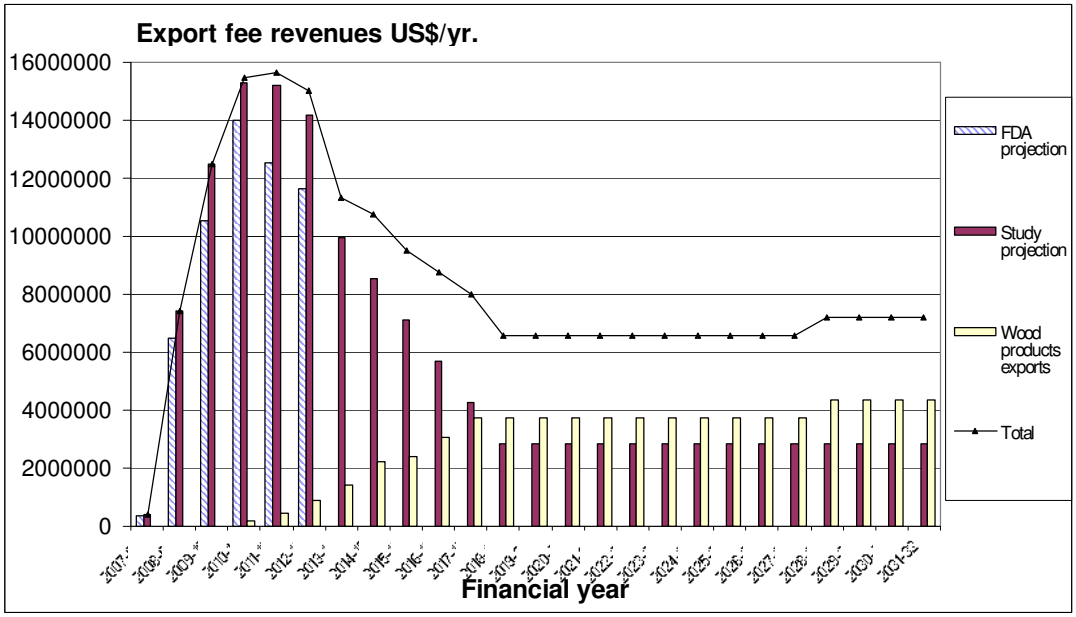
- increased investments and fixed asset formation in processing capacity,
- increased wood processing employment,
- service and local trade jobs generated,
- improved infrastructure and utilities,
- direct local community benefits from concession agreements,
- monetizing of the local communities and multiplier effects on local consumption,
- taxes on corporate incomes, wages and service fees,
- licensing fees for industrial operations.

Figure 1.5 Long-term Projection of Output from Total TSC & FMC Area: Finished Products



Source: adjusted from FDA 2008 revised production forecast

Figure 1.6 Long-Term Export Fee Forecast from Logs and Wood Products



Employment

Employment estimation is difficult as the future set-up of Liberia's forestry sector will be significantly different from its previous high season. The dividing of employment between **permanent and seasonal jobs** is often a cause for conflicting views on the sector's potential to generate income.

This study draws together estimates from existing industries in the region, and from recent investment projects in tropical wood processing. Tentative labor force estimates on the projected Liberian forest-based industry set-up comes at around 8,290 jobs, distributed in forestry, sawmills, plywood/veneer and remanufacturing. These would be formal direct employment numbers for the largest mills only, and they can be taken as the lower end estimation on jobs creation potential of the forestry and wood processing sectors of Liberia. Small and mobile sawmilling on TSCs needs to be added, as also forestry and logging work to supply their logs. The 10,000 jobs ballpark figure is therefore quite reasonably validated, but not all are permanently employed. The illegal bushmilling sector is not included in this figure.

Move into value added processing happens in phases and so does employment, too. The intermediate time should be used to train skilled wood processing workers. Value added processing tends to be more labor-intensive during its early phases (due to modest technology advancement). Processing companies train skilled workers to retain them for long-term employment. Compounded with multiplier effects on employment and consumption, the sector will maintain an important role in the national economy. Informal activities can not be eradicated, so they add up in the total impact considerably.

Non-timber forest products

Non-timber forest products (NTFPs) are of great importance in both urban and rural Liberia. Noticeably among them are e.g. bushmeat, materials for traditional and religious ceremonies, fruits, nuts, traditional medicines, and materials for construction. Typically NTFPs can yield a significant share of their total value to local communities, and are therefore and an important channel for rural development in the forestry sector.

This study focused only on bamboo and rattan (cane) because they seem to offer the largest immediate potential for commercialization. The international trade in bamboo products is estimated somewhere above US$ 7 billion p.a. (US$ 5,6 billion of it in China) with a wide range of products traded. In some cases (e.g. furniture) NTFP's and wood are components of the same final product.

It was observed during the mission that even the most basic equipment and skills for splitting, slivering and weaving of bamboo and rattan are not yet readily available to start meaningful processing in Liberia. A two-year training program on bamboo and rattan processing has been launched through Ministry of Agriculture (MoA) and funded by the Chinese government. The Chinese training courses are paving the way to new technologies and semi-industrial processing.

The knowledge base concerning bamboos and canes is evidently a constraint to efficient management, utilisation and conservation of the bamboo and rattan resource in Liberia. It was agreed during the initial talks that a better coordination between FDA and MoA would be established to promote NTFP sector in the country, and to better liaise with international NTFP networks and development work by INBAR (International Network on Bamboo and Rattan), UNHCR (United Nations High Commissioner for Refugees), Flora and Fauna International, etc.

NTFPs - including but not limited to bamboo and rattan - can become the leader industries for rural industrialization and large-scale poverty reduction in suitable producing conditions. Much of the NTFP collection and pre-processing happens still on local community level. Government and local authorities must provide sustained and consistent leadership to develop NTFP value chains.

1. INTRODUCTION

1.1 Background on IF and DTIS

The Integrated Framework (IF) was established by World Trade Organization (WTO) trade ministers in 1996 to promote the integration of the least developed countries (LDCs) into the global economy. This was in response to the slow progress of most LDCs in successfully responding to the opportunities provided by the world trading system. Participating agencies include the WTO, the International Monetary Fund (IMF), the International Trade Center, the United Nations Development Programme (UNDP), the United Nations Conference on Trade and Development (UNCTAD), and the World Bank (WB). The main objective is to assist LDCs to mainstream trade priorities in their national development plans and poverty reduction strategies, to assist in the coordinated delivery of trade-related technical assistance, and to identify priority investment projects.

The first stage of the IF process is the preparation of a Diagnostic Trade Integration Study (DTIS) to provide the analytical basis for priority setting. The World Bank has been asked to take the lead in assisting governments in conducting this study, in coordination with the IF agencies and interested donors. Such a study is now being launched for Liberia. A preliminary mission was held in July 2007 to discuss the priorities of the government, and the potential for value added activities in the wood industry was identified as a key export theme.

The Management of the Forestry Development Authority (FDA) has officially requested the World Bank to provide technical assistance in advising the Government of Liberia regarding value added within the forest sector and the way forward regarding the development of a wood processing strategy. In response, the World Bank sought to provide the answers through the Diagnostic Trade Integrated Study (DTIS). The DTIS seeks to: (i) identify the constraints the country faces in integrating into the global economy; (ii) develop a comprehensive program that outlines the actions required for removing these obstacles and making trade an integral component of the national development strategy; (iii) identify technical assistance needs and coordinate donor support.

At the moment, the Government of Liberia is preparing a Poverty Reduction Strategy (PRS) and has urged the World Bank to accelerate the DTIS process so that its findings and recommendations can be integrated into the PRS. The DTIS supports the PRS and build on in-depth analyses of sector strategies, but with emphasis on increasing growth through trade promotion, especially through exports.

The next 12-24 month period in Liberia is critical, as the Government needs to address key issues in both policy and fiscal frameworks and rebuild the required government capacity to manage the sector. The current regulatory framework and fiscal regime require restructuring and redevelopment in order to bring them into line with best practice. The weaknesses inherent in the current framework are such that the country is unlikely to derive a full share of benefits from timber sector development unless significant reforms are introduced.

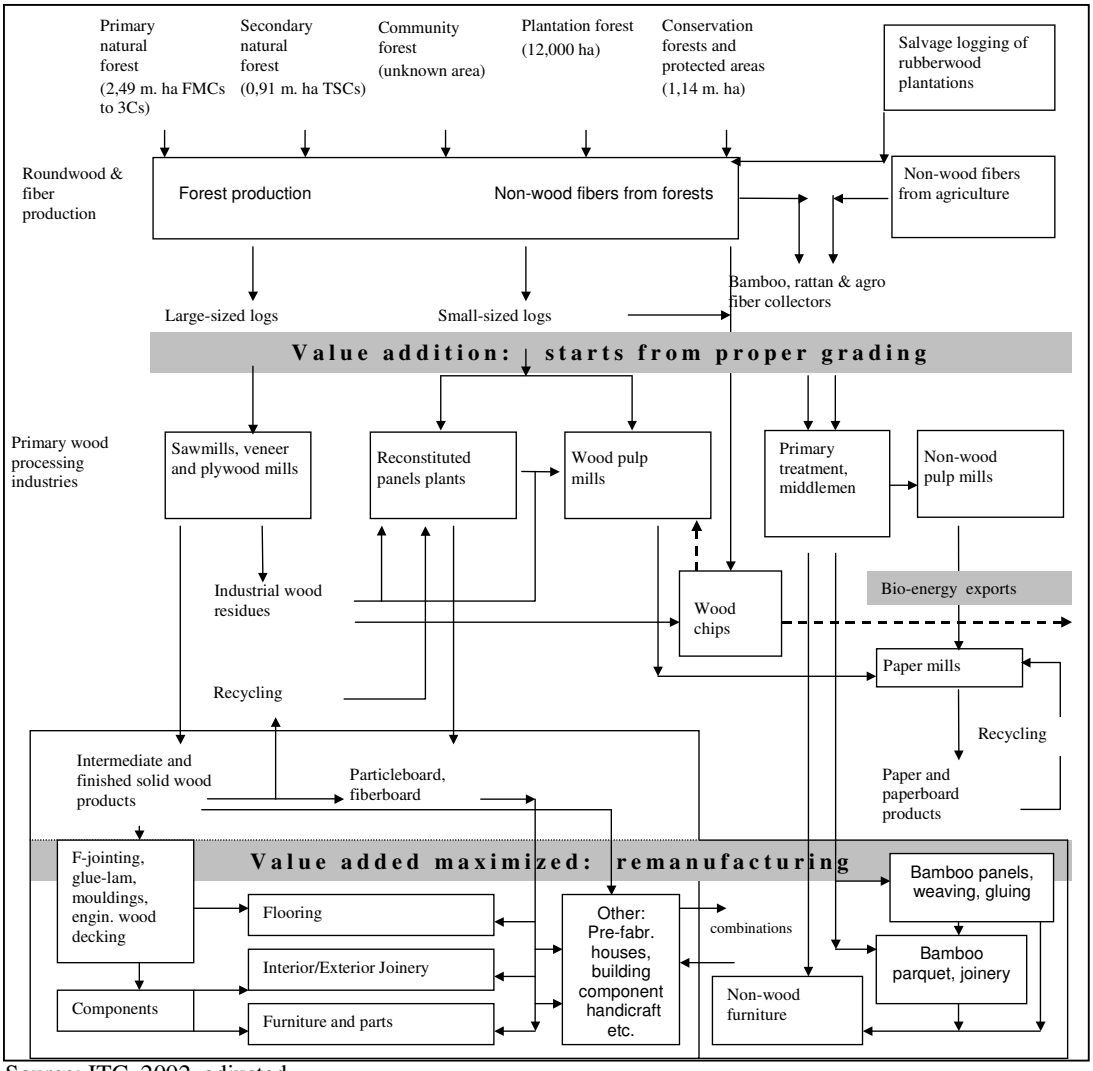
2. VALUE ADDED WOOD PROCESSING AS A POLICY GOAL AND A BUSINESS MODEL

2.1 Definition of Value Added

Value added refers to the additional value created at a particular stage of production or through image/brand and marketing. In a microeconomic context, value added is simply measured as the value of the output produced (by a firm for example) minus the costs of the intermediate goods. The result must be equal to the sum of wages and profits. Value-added method is a way to avoid double counting i.e., the counting of the same input twice. The sum of the value added in each of the different stages of production equals the value of the final product, the product that drops out of the production process and is thus not incorporated in some new product.

Wood flows and potential value chains in Liberia's forestry sector are presented in Figure 2.1

Figure 2.1 Wood Flows and Potential Value Chains in Liberia's Forestry Sector



Source: ITC, 2002, adjusted

2.2 Rationale of Value Added in Wood Sector

Liberia is a small country which is blessed with considerable natural resources, including forest and wildlife resources, gold, diamonds, arable land, abundant sunshine and sufficient water and biomass. Liberia has a population of about 3.5 million people and a land area of 111,000 square kilometers. Moreover, Liberia has the most extensive remaining tropical rainforest in West Africa, so that the forestry potential is considered high in the country.

The most compelling reason for Liberia to assure a gradual shift towards higher value added wood processing lies in its support for maintaining the forest cover and its productive capacity for the present needs and for the coming generations. This is a task where many of Liberia's neighbors have failed. In countries like Cameroon and Ghana, forests have been largely depleted owing to the overcapacity of wood processing (mostly sawing, and to a lesser degree plywood). The move into value

added processing was started too late and took too long to materialize, i.e. it was initiated as a reactive measure to cope with the dwindling log supplies.

Wood processing industries hold potentially large and relatively fast contributions to developing the national economy in countries that have a sustainable forest resource. As the sector progresses further into higher added-value production, the benefits are perceived to multiply. Processing companies create employment, which in turn expands the tax base in the country, they create a trained workforce, and contribute through consistent demand to the development of physical and institutional infrastructure (e.g. roads, power and water supplies, banking facilities, R&D capacity generation etc.). They also contribute to foreign exchange earnings and stimulate investment in a whole range of secondary support industries (e.g. from tool manufacturers to consumables suppliers). This suggests that production and trade in wood-based products can distribute benefits widely and play a significant role in propelling economic growth.

There are, however, serious hindrances for achieving the benefits in many tropical countries. The wood processing sector can not develop in isolation from various supporting institutions and economic facilitators, such as education, banking, insurance systems, rules of law and good governance, investment protection and incentives, other supporting industries and - in broad terms - the enabling economic and social operating environment. Many of such crucial foundations do not exist, or are in shambles in today's Liberia. Therefore, the development of value added processing will have to start from the establishment of a sustainable forestry and primary processing, and then proceed gradually onto higher levels of secondary and tertiary processed products.

Key Message:
Liberia has the most extensive remaining tropical rainforest in West Africa. A gradual shift towards higher value added wood processing would help generating income and employment; but a policy framework is urgently needed in order to maintain the forest cover. Many other West African countries have failed this challenge. In countries like Cameroon and Ghana, the move to value added took place too late and then was poorly managed, resulting in over-capacity in wood processing which only reinforced the earlier depletion of the forest. Liberia has a unique chance to make a fresh start after the troubled decades by designing and implementing a proactive forest and processing strategy. Policymakers should take into account both timber and non-timber forest products and services for achieving a balanced sector that benefits its people optimally.

2.3 Levels of Value-addition

There are different strategies on developing value added wood processing. The selection of appropriate strategy should be attuned to meet with the capabilities of the operators in the sector.

The most elementary (but important) work can be done by improving log and sawn timber grading. Liberia has for too long exported its roundwood as mixed or un-graded logs. This has been a demand from the buyers who seek to benefit from the situation. There is a shortage of certified log graders in Liberia, as apparently only one ATIBT trained grader is active (ATIBT is Association Technique Internationale des Bois Tropicaux). As the log quality and species mix are expected to show quite a variety, there should be potential to increase the value of log exports with investment in training in proper scaling and grading. FDA Regulations state that their fees should be based on the log value by grade, this would also be a quick way to have an immediate impact on FDA revenue collection. Log grading competence also serves the future processing industry.

Efficiency improvements along the value chain provide another avenue for adding value in the early stages of industrialization. Like the example in Table 2.2 shows, in general African forestry and processing operations are often highly inefficient. Targeted training to eliminate bottlenecks would have a significant impact on profitability and value added. This is an important notion with regard to using lesser-known species and increase overall production.

These two actions would not need massive investments, but could be potentially high in returns because they will help in laying the foundations for sustainable forestry sector management in Liberia. It should be acknowledged that roundwood production needs to be stabilized first before taking next steps towards industrialization. In the current concession agreements, two years time is allowed for the logging companies to move 100% of logs to exports, and start processing on the third year onwards. Practically this means that investment decisions need to be signed on the second year at the latest. FDA would do wisely to monitor the concession operators' operations in terms of log grading and efficiency in the initial two-year period.

In the next phase, value added wood products should be progressively developed in the wood processing industry. Primary processing (sawmilling, plywood, peeling or slicing into veneer) comes first very naturally, and provisions should be made in the concession agreements to bring it up without excuses. The highest level of value added should be defined as remanufacturing of primary processed wood (start from treating of poles and posts, kiln-dried and S4S (surfaced four sides) timber, edge-glued solid wood panels, laminated wood, mouldings, decking, flooring stock, furniture components, windows, doors, frames, garden products, and other semi-finished and finished products).

Finished furniture is a highly demanding export product, but it will be produced for the local market by the small carpentry and furniture workshops. Also 5-10% of any processed sawnwood has to be sold to the local market for keeping local construction and remanufacturing supplied. None of the West or Central African countries has managed to establish a large-scale finished furniture industry for exports. The nearest African exporters of fine furniture are found in South Africa led by Steinhoff International, which has German investors. Egypt's relatively advanced furniture clusters provide another example on success, but their production relies heavily on Moslem tradition in furniture.

It should be remembered that the economic returns may not necessarily be maximal at the highest end of the value added processing. China's, Malaysia's and Vietnam's entry into the global furniture trade has lowered prices on international markets. Their competitiveness is based on the concept of Original Equipment Manufacturing (OEM), whereby foreign furniture firms outsource furniture or components against their own designs from the low-cost, efficient furniture industry clusters in Asia. The biggest profits fall in the hands of foreign companies who reap healthy margins from outsourced furniture in their distribution networks. Asian companies have the opposite mix of resource endowments than Liberia, i.e. relatively scarce forests, abundant and productive labor and dynamic capital flows pumped into the region by foreign investors. These factors explain why they are now major centers for value added wood processing.

The fast development of overcapacity in some of the West African countries seems to imply that primary processing and sawnwood and component trade in particular has been a more rewarding business. This is also a mechanism to integrate more countries into the Global Value Chains (GVC). Log exports continues to be the fast-track business for profit, albeit unsustainable in the long run.

Proper assessment of the profitability of wood processing on different levels of value addition would be needed to guide policy makers. Such knowledge would help avoiding unfounded trust that their industries can compete in downstream processing. For example, Ghana's recent experiences show that there is faster-growing demand for kiln-dried and air-dried sawn timber exports, compared to tertiary processed products like furniture parts, mouldings, flooring, dowels, broomsticks and profile boards.

Another example is presented from Mozambique (Box 1), where log exports have become clearly an attractive (yet illegal) form of business for concessionaires. Log exports from Mozambique have been banned since 1st January 2003, but it is relatively simple to overcome this by collecting timber form individuals who hold title to small volumes under so-called *licenca simples* system, or go after unprocessed concession wood. Sawmilling is a marginal business, and it has made a painstakingly slow progress despite its acceptability as value added processing. Sawing simply does not pay off, and yield a poorer economic return than log exports, which has continued despite attempts to ban it. Box 1 pro-

vides a simple method for FDA's use in roughly estimating the attractiveness and value adding potential between log exports and value added processing. Adjustment of the model to Liberia's conditions would tell more about the relative profitability of various forms of processing.

Costing has been calculated in US dollar terms (US$ per log-m^3) from an operating wood processing company, which had done business in all the three product lines. The sawmill is based inside/adjacent to the concession area and not having to transport logs to a processing site in a city. Employment numbers are also based on existing operations in the field. A log batch of 1,000 m^3 is the basis of calculation.

Furniture making would yield the highest returns, but it is constrained by the poor interest to run sawmills, for obvious reasons. It has also been observed that concession rules have not been sufficiently enforced to meet the stipulated processing quotas that had been demanded from operators in concession agreements. This experience is much valid for the policy-makers shaping the new Liberian forest industry.

Key message:
As Liberia's log quality and species mix are expected to show quite a variety, the immediate potential to increase the value of log exports comes with proper scaling and grading, e.g. based on ATIBT rules. As FDA regulations state that their fees should be based on the log value by grade, this would also be a quick way to boost FDA revenue collection. Log grading competence also serves the future processing industry, particularly when lesser-used species are processed and launched to export markets. A two-year grace period is granted for logging companies before they are mandated to start value added processing. After that, the move into higher value added will be a phased process that takes several years to materialize. FDA should seek an active involvement in encouraging and monitoring processing capacity build-up on each concession area.

As a conclusion of the situation presented above, a comparison of advantages and disadvantages of each of the three product alternatives can be compiled as follows (Table 2.1).

Box 1. Case Mozambique: How Poor Returns from Sawmilling Discourage Value Added Processing

LOGS BASED ON 1000m3			
QTY	DESCRIPTION	UNIT COST	TOTAL COST
	COSTS		
1,000	Licences	20	20,000
1,000	Felling And Extraction	24	24,000
1,000	Transportation To Port/City	40	40,000
700	Export Documentation For Export Logs	30	21,000
	TOTAL COSTS		105,000
	INCOME		
700	M3 Export Quality Log	160	112,000
300	M3 Second Grade Log sold on Local Market	100	30,000
	TOTAL INCOME		142,000
	GROSS PROFIT		37,000
	NUMBER OF EMPLOYEES REQUIRED		40
	RETURN PER M3 LOG		142

SAWN TIMBER BASED ON 1000m3			
QTY	DESCRIPTION	UNIT COST	TOTAL COST
	COSTS		
1,000	Licences	20	20,000
1,000	Felling And Extraction	18	18,000
1,000	Saw milling Costs	40	40,000
190	Tpt Export Quality to Port/City	35	6,650
20	Tpt 2nd Quality Planks To Port/City	35	700
190	Export Documentation For Export Logs	30	5,700
	TOTAL COSTS		91,050
	INCOME		
190	M3 Export Quality Plank	650	123,500
20	M3 Second Grade Plank sold on Locally	200	4,000
	TOTAL INCOME		127,500
	GROSS PROFIT		36,450
	NUMBER OF EMPLOYEES REQUIRED		110
	RETURN PER M3 LOG		128

FURNITURE BASED ON 1000m3			
QTY	DESCRIPTION	UNIT COST	TOTAL COST
	COSTS		
1,000	Licences	20	20,000
1,000	Felling And Extraction	18	18,000
1,000	Saw milling Costs	40	40,000
300	Tpt Furniture Quality to Port/City	35	10,500
300	Kiln Drying Planks	10	3,000
300	Export Documentation For Export Logs	270	81,000
	Consumables (Glue, Varnish, Fittings)		15,800
	TOTAL COSTS		188,300
	INCOME		
100	M3 Finished Furniture	2,200	220,000
	TOTAL INCOME		220,000
	GROSS PROFIT		31,700
	NUMBER OF EMPLOYEES REQUIRED		220
	RETURN PER M3 LOG		220

Source: White, 2003 based on data from TCT Industrias Florestais, Lda – Dalmann Furniture

Table 2.1 Advantages and Disadvantages of Log Export vs. Sawn Timber vs. Furniture

Advantages	Disadvantages
Log Exports	
Low levels of technology and skills required	As only top-quality logs are marketable, foresters abandon large parts of trees / species in the forest
Limited capital investment required	Logs are expensive to transport to the ports
Currently Liberian timbers can achieve rewarding prices on the international market	No long-term benefit to the country
Fast-track to exports and foreign currency	High barriers to species diversification
Current strength of Euro vs. US Dollar makes log exports very attractive	Low employment levels
Liberian logs traded mostly in Euro, but costs occur in US$	Susceptible to large market fluctuations
	Prices are stable, i.e. not much scope for upward movement
Sawn Timber	
First level of wood industry and training of workers, what allows moving into downstream processing later on	Larger capital investment required, incl. kilns
The international prices for some species are currently very buoyant	Improper infrastructure in the rural areas to support basic industry
Allows continuous access to a concession as specified in concession agreement models	Limited "traditional" species marketable on the international market
Not as reliant on high quality road infrastructure to transport the product due to lower volumes	Prices are stable, not much scope for upward movement
Traditional export markets are in Europe and America	Lower return per m^3 than log exports (marginal business)
Except for saw doctoring, relatively low technology and skills required	The high cost of sawing may not allow for the processing and sale of lesser-known species, as the international price of approximately US$ 300 per m^3 makes it non-viable
Furniture	
Higher utilization of every tree felled if it is cost effective to use also crown / branch wood into smaller items	Very large capital investment required
Allows continuous access to a concession as specified in concession agreement models	Improper infrastructure in the rural areas to support advanced industrial establishment
Not as reliant on high quality road infrastructure to transport the product due to lower volumes - but requires proper packaging, protection and handling	Modern technology and finishing required
Offers the highest return per m^3 of log (even on the local market)	High levels of skills (including design) required
There is huge potential on the international market for well-crafted and marketed furniture	Harsh competition on the international market, and falling prices as Asian suppliers take market shares
The international furniture market has grown fast for a decade, and some tropical countries have benefited greatly	A very high quality product required
Broader range of timber species acceptable as finished products, therefore not as species reliant in marketing	Manufacturing of components requires kiln-dried sawnwood
Offers import substitution possibilities on the domestic market, which is relatively accessible	Operating capital locked onto stock-keeping
Potentially large employment creation	Adoption of quality management and standards may become necessary

2.4 Competitiveness

There may be unrealistic views on how fast a country can remobilize its wood industry and start exporting value added products. This concerns especially the tertiary level of processing, i.e. finished furniture. So why is finished furniture export a difficult goal for a country like Liberia?

The furniture sector in industrialized countries is thriving on the availability of good quality raw materials, low production costs thanks to high productivity, a flexible labour force, and good designers working with computer aided systems (CAD/CAM). In most developing countries, the furniture industry is on the contrary mainly a locally operating cottage industry. It is still rather backward technologi-

cally, labour intensive and resorts to traditions without much innovation. The lower technological level often means that manufacturers have difficulty drying the wood adequately and are unable to supply furniture of a constant quality, size and finish. They can hardly consider exports or fulfil strict quality requirements and volume orders.

A simple calculation can be presented to illustrate how an industrialized country producer always has an upper hand on competitiveness over rivals in West Africa (Table 2.2). Lower costs of raw materials and labor are not sufficient factors on their own to guarantee the competitiveness of West African made value added wood products in export markets. These are just two of the parameters in a more complex equation. The low productivity of local manpower (using lower technology and many times more labor per unit of output), poor raw material recovery rates and high freight costs all play their part in cancelling out the initial advantages. Labor productivity and technology upgrading are key issues in trying to improve the competitiveness of West African wood processing.

Due to the managerial weaknesses, quality of finishing, lack of good designs and other reasons related to the uncertainty of African producers as suppliers to the international markets, there is also a significant difference in final product's sales price.

Table 2.2 Comparison of Cost Structures in Furniture Production: West Africa vs. Industrialized Country

Cost Factor	Company in Industrialized Country		Company in West African Country	
Labour	5 hours à US$ 6	30	20 hours à US$ 0.8	16
Raw Material	14 b/ft à US$ 1.5	21	18 b/ft à US$ 0.9	16.2
Overheads	5 hours à US$ 6	30	20 hours à US$ 1.8	36
Total Cost		81		68.2
Selling Price		100		75
Profit		**19**		**6.8**

Source: ITC, 2002

Modern machinery and the related know-how are essential for producing to international commercial standards. Exporting and value added processing means accepting tighter, more complex specifications and quality control requirements set by the clients. This cannot be achieved without modern production lines. With the cost of the equipment and the added expense of shipping, installing and maintaining these production lines in remote places can prove prohibitive. Maybe one exception is the niche markets of ethnic/rustic furniture with simpler local designs, which has become more popular in the past decade in Europe and the USA. But even this niche is being served by Asian and Latin American companies that are on a totally different business skills level in comparison to West Africa.

So in the final analysis, it all comes down to the availability of basic comparative advantages, i.e. availability of land, labor and capital. Liberia has a relative abundance of land (i.e. forest) resources. Despite currently high unemployment, especially skilled labor is scarce in the country. Attracting capital to a tropical country for natural forestry investments is very challenging. These basic economic fundamentals would suggest that in the medium term, the greatest opportunities for investment returns (and probably the biggest opportunities for value added) are likely to be in activities that require relatively low levels of skilled labor input and modest capital investment. This would promote log production, sawnwood and NTFPs like bamboo. Once these segments are up and running, the higher stages of value added development can proceed. The main challenge will be to attract long-term investment capital to such ventures from foreign investors, possibly aided by international financial institutions.

Key message:
Investing in value added wood processing is costly, and it is hardly possible at all in conditions where the primary processors are incapable of exporting according to the strict quality requirements in the foreign markets. Realistic assessment of the true competitive advantages possessed by Liberia is needed in order to avoid strategies that prove unrealistic. The on-going FDA mustering of a Forest Processing Strategy is of crucial importance to draft a realistic roadmap for value added wood processing in the country. The sector must clearly show high potential and security to attract foreign investors and leverage financing from international financiers. Proper assessment of the profitability of wood processing on different levels of value addition would be needed to guide policy makers and avoid unfounded trust that local industries can compete in downstream processing. This report will provide inputs to the Forest Processing Strategy blueprint, and it is expected that the Government of Liberia through the FDA will accept this challenge.

2.5 Processing Technologies

There are different categories, or levels, of technological advancement among West African producers of value added wood products. This typology is fairly universal, as it is based on observations from a large number of tropical countries. (ITC, 2002)

Box 2. Levels of Technology in Wood Processing in Tropical Countries
1. Facilities that use basic portable tools and universal woodworking machines
2. Facilities that use basic woodworking machines (bandsaw, planer, thicknesser, spindle moulder, boring machine etc.) to produce in small batches
3. Facilities same as in 2, but producing larger batches, using low cost mechanization and jigs suitable for serial production whenever possible
4. Facilities that use special purpose machines (4 side moulders, copying lathes, edge-banders, CNC [computer numeric controls], etc.)
5. Facilities with integrated machining lines (linked machines used for production of panel furniture, doors, surface finishing, robots used for painting, etc.)

Source: ITC, 2002

Categories 1 and 2 typify the technological status of value added processing in most of the tropical producer countries, consisting of a great number of micro enterprises, usually employing max. 20-50 persons. **Category 3** is the first one to which the term 'industrial production' can really be applied. With the use of jigs, higher quality machines, low-cost mechanization and well-maintained, simple, machines it is possible to produce interchangeable components. Production units at this level of sophistication are in a position to enter export markets. Products tend to be standardized, and a series of up to 500 components may be put into production. Categories 4 and 5 usually do not exist in Africa, but are becoming common in Asia and Latin America.

Most companies may have to adopt a step-by-step approach to remanufacturing of primary products. The first achievement is to produce kiln-dried planks, flooring strips or dimension lumber, and then to proceed into mouldings, finger-jointing, laminated wood and edge-glued solid wood panels. Kiln drying is a basic export specification and as such it is an indispensable step towards further processing. This progressive approach not only requires investment and technical adaptation, but also a revamp of both commercial and administrative practices and training. There are of course also examples of successful straight entries into the higher value added processing, but these are all based on imported know-how (and expatriate staff) from foreign companies.

3. ASSESSMENT OF THE POTENTIAL OF VALUE ADDED WOOD PROCESSING

3.1 Post-Conflict Constraints in Liberia

Despite the magnitude of its inputs to the national economy and further contribution by providing some humanitarian services in rural areas, Liberia's forestry performance has been cut to a meager level by structural constraints, poor policies, mismanagement, corruption, bad governance and in recent times, armed conflict and international trade sanctions of forest products from Liberia.

The most obvious constraints in the enabling environment include:

- Investment climate in general is difficult: strict bank collateral requirements, high interest rates, administrative friction and lack of business facilitation
- Lacking of well trained and qualified human resources (machine operators, saw doctors, managers both in industry and FDA)
- Land transports and other infrastructure is badly damaged
- Distribution of supplies and consumables is extremely difficult
- Uncertain electricity supply and disturbed national grid
- Port facilities, log and timber handling, storage and inspection capacities are limited

3.2 Roll-out Plans for Commercial Logging

A Pre-qualification Evaluation Panel was established at the Forestry Development Authority (FDA) to review pre-qualification applications submitted to the FDA Procurement Unit. The Panel has completed its work with 38 applicants out of a total of 86 pre-qualified and additional six applicants provisionally pre-qualified pending the submission of outstanding documentation. The report of the Panel indicated that 40 applicants were not pre-qualified while two companies recommended for debarment by the 3rd Phase Forestry Concession Review Committee were also not pre-qualified.

The companies applying for various categories of concessions that were pre-qualified were as follows:

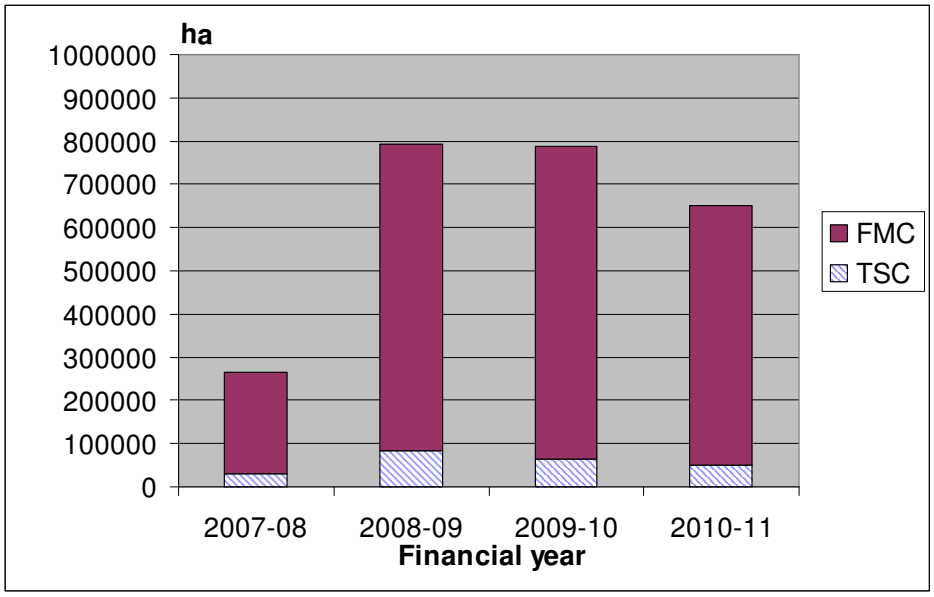
1. TSC	8
2. SMALL FMC	10
3. MEDIUM FMC	8
4. LARGE FMC	18
TOTAL	**44**

Annex 2 provides a table prepared by FDA, which indicates the roll-out plans per area and size of TSCs and FMCs. There has been a lot of confusion until recently about the timetable of the concession launch. FDA has presented both a rapid and a progressive plan in this respect.

Since the average size of TSCs will be relatively small (approx. 5,000 hectares) compared with FMCs (50,000 hectares upwards), the commercial logging sector will remain relatively small until late-2008 in terms of area, timber production, exports and government revenue. Moreover, since the TSCs are of lower timber value, there will be only limited opportunities in the near future for processing or value added, and thus for long-term employment.

The latest revised roll-out plans by FDA are presented in Figure 3.1. They serve as the basis for the calculation of future projections on the potential of wood industries and associated government revenue in the subsequent chapters. Due to the delays in FMC preparations for tendering, we expect the first FMCs becoming operational in the logging season 2008-2009. The total area mobilized for sustainable commercial forestry would be 2,5 mill. ha and this would have been reached in 2010-2011 financial year.

Figure 3.1 Roll-out Plans of the Forest Concession Areas in Liberia



Source: Revised roll-out plans by FDA, 2008

3.3 Proposed Scale of Liberia's Wood Industry

3.3.1 Harmonization between Industrialization and Sustainable Forest Management

The main goal during this PRS period (Poverty Reduction Strategy) is the revitalization of the forestry sector of the national economy to contribute to sustainable socio-economic development and growth, while simultaneously providing basic goods and services, job opportunities, income and measurable poverty reduction for all Liberians. In the forestry sector, the principle of sustainable forest management applies to ensure that the resource is used perpetually for the benefits of current and future generations.

Liberia stands in an unfortunate situation where its annual allowable cut (AAC) of forests has not been established nation-wide by a credible forest inventory. This is common flaw among the world's tropical countries, and not widely achieved elsewhere either. It may not as such be a stumbling block for achieving sustainable forest management in Liberia. As there may not be resources available to comprehensively correct the situation, concerted efforts should be made to achieve AACs on concession area level. Timber resource assessments are being carried out by FDA and Liberia Forestry Initiative (LFI) on the TSCs and FMCs coming on stream in 2008-2009. Concession bidders are also expected to carry out their own inventories on FMCs. Some practical steps are proposed to ensure that harmonization between industrialization and sustainable forest management can be achieved:

- Each concessionaire mandated to established AAC on TSCs and FMCs, and results validated by FDA & LFI
- Enforcement of related regulations (Code of Harvesting Practices, compliance with AAC, and Annual Operational Plan of the concessionaires)
- Only approved logs are harvested (based on stock maps)
- Environmental Impact Assessments should verified by Environmental protection Agency (EPA) after concessionaires provide their own assessment and documentation
- Set and control the upper sustainable limits for processing capacities (develop a calculator that establishes correlation between permissible standard mill concepts and sustainable roundwood volume use on concession level): this needs further work

- Selection of official logging intensity rule: current suggested range is from 7,5 m^3/ha/yr. - to 12 m^3/ha/yr. in Peter Hess report - to 15 m^3/ha/yr. by WB on longer logging cycle.

In the absence of reliable AAC from FDA, this study makes an attempt to set a cap on future logging and processing capacity with regard to maintaining sustainable logging levels. The approach has been developed by the team on the platform of the World Bank (Peter Lowe) and it has been supported by FDA staff. It is not validated by FDA, nor does it represent official views of the World Bank or Liberia Forest Initiative. It is prepared for highlighting certain steps that policy-makers should consider taking while considering the future scale of the wood industry in Liberia.

Key Message:
In the absence of national Annual Allowable Cut (AAC), Liberia's fairly recent forest inventory provides adequate data for the planning purposes. Forest processing sector should not be allowed to grow to a disproportionate size, which cannot be supported by productivity of the forest resource. This can be safeguarded on a case-by-case basis by matching investment plans with the results of the detailed inventories being carried out for forest concession prospectuses. Enforcement of the existing rules and regulations set forth by FDA will constitute the steering tools for sustainable forest management, strengthened by SGS (Société Générale de Surveillance) chain-of-custody monitoring.

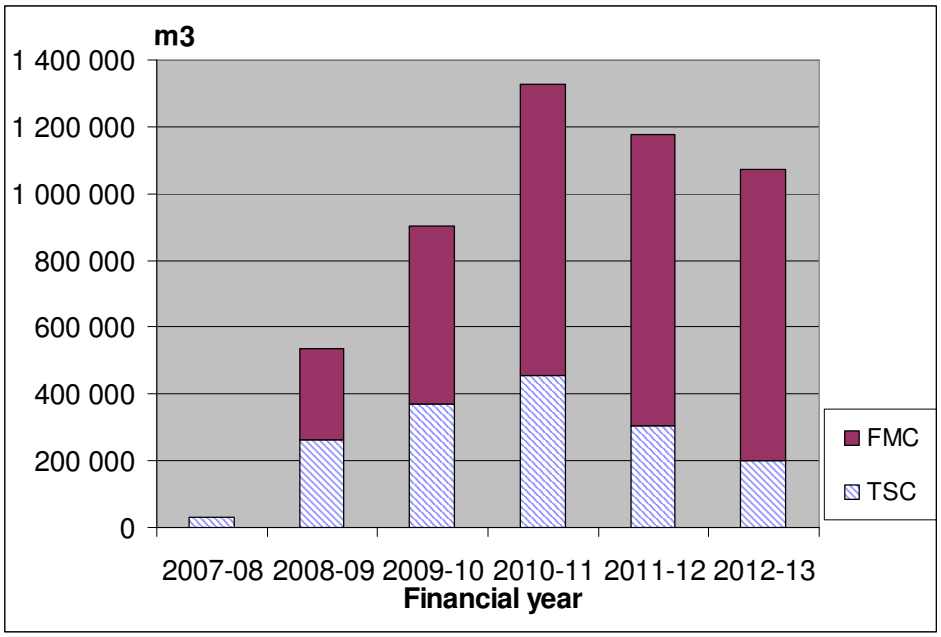
3.3.2 Estimated Potential for Log Exports

Based on the roll-out plans, the highest logging levels would be achieved after three years (Figure 3.2). TSCs will yield the majority of logs in the first two financial years, and output from FMCs will only pick up in 2009-2010 and exceed the volumes from TSCs. At full swing the logging volumes would reach 1,1-1,3 million cubic meters per year at the highest, but then moderate when TSCs have become exhausted. Log export potential would peak at 1,02 mill. m^3 in 2010-2011, but the estimate on actual exports has been reduced by assuming 15% share for non-exportable log quality plus other uses.

The basic assumptions on forestry output are:

- Out of the 2,50 mill. ha area allocated to 3Cs (communities, commerce and conservation forestry), approximately 2,27 mill. ha will be allocated to FMCs. Out of this 80% is harvestable, as 20% is conserved around waterways, biodiversity sites, etc.
- Up to 230,000 ha of TSCs will be allocated to short-term leases, and these are subject to possible land-use change after three years or later on. No log exports after the sixth year of operation are foreseen from TSCs.
- 25 year's logging cycle will make 4% of designated area available for annual coupe.
- Selective logging intensity is expected to gradually rise from 7,5 m^3/ha/yr on TSCs and 9,0 m^3/ha/yr on FMCs to final level of 12 m^3/ha/yr on all areas.
- Species class distribution assumes 35% of logs felled belonging to Class A, 35% to Class B, and 30% in Class C.
- In log exports this split is 40% to Class A, 35% Class B, 25% Class C (market acceptance is better for commercial, well-known species).
- In wood product exports, mix is different: 25% Class A, 35% Class B, 40% Class C (lesser-used species will have to be "pushed" to the market in value added products rather than logs)

Figure 3.2 Roll-out Plans of the Commercial Logging Volumes in Liberia



Source: Revised roll-out plans by FDA, 2008

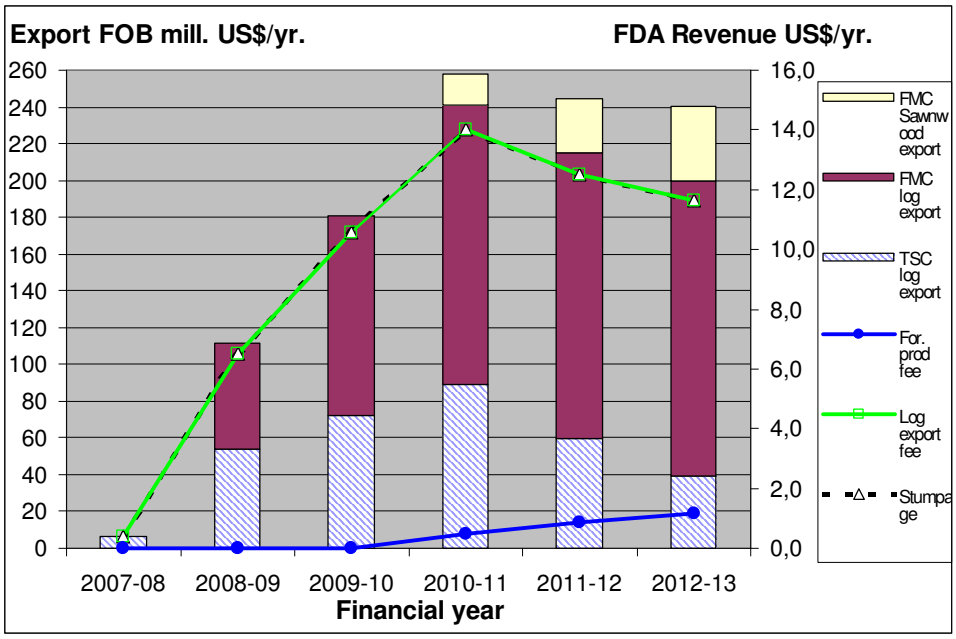
3.3.3 Estimated Revenue from Log Exports

Using an average US$ 230/m^3 export FOB value, the export value of Liberia's logs from TSCs would rise on the fourth year onto US$ 89.0 million and then subside (see bars in Figure 3.3.). A much higher FOB value of log exports would naturally be generated if FMC logs would be fully sold abroad, i.e. US$ 160.4 million per year on the sixth year. Sawnwood production would reach US$ 40 million in FOB value and continue to compensate for log export decline.

The resulting estimates on the FDA revenue contain currently valid fees from stumpage, log exports and forest product exports (the narrow definition). Land rentals, waybills, administrative, inspection and licensing fees are excluded of this. Community benefits are neither included. For the simplicity of the subsequent scenario, no log exports are foreseen from the TSCs after sixth year of logging. Fees would amount to US$ 28.5 million on the fourth year (see lines in Figure 3.3). FDA's full revenue projection table is in Annex.

A comparison between revenues from log exports and sawnwood exports is presented below in order to understand the early impact of value added processing on revenue streams. Revenues depicted include fees on stumpage and log exports (note that they are two identical revenue streams acc. to FDA) and forest products export fees.

Figure 3.3 Estimated Log Export Value and FDA Revenue in Liberia



Source: Revised roll-out plans by FDA, 2008. Revenues depicted include fees on stumpage and log exports (note that they are two identical revenue streams acc. to FDA) and forest products export fees. See footnote.[1]

Key messages: FDA has revised its roll-out plans on concessions in early 2008. Out of the 2,50 mill. ha area allocated to 3Cs (communities, commerce and conservation forestry), approximately 2,27 mill. ha will be allocated to FMCs. Another 230,000 ha of TSCs will be allocated to short-term leases. *At full swing Liberia's logging volumes would reach 1,1-1,3 million cubic meters per year at the highest. Logging intensity per hectare is increased to make up the gap between demand and forest quality. With log exports close to one mill. m^3 the country would reap US$ 240 mill. export earnings, out of which the government revenue would amount to US$ 13-14 million per year in direct export fees on logs and sawnwood. Additional revenues will accrue from stumpage, land rental and other types of fees - so that US$ 35 mill. per year is set as the official revenue target.*

3.3.4 Estimated Future Potential for Value Added Wood Product Exports

The key question is: how does the export value and government revenue change when the initial period of log and sawnwood exports comes to an end, and more diverse wood product exports are resumed? This chapter explores the issue by defining one possible scenario of wood industry's future development in Liberia. This is an "ideal" scenario which aims at a relatively fast build-up of a sophisticated industry. While this may prove difficult to achieve, it is nevertheless a useful anchor of the discussions on the future set-up of value added processing in Liberia.

The scenario is built on the following production patterns:

- Sawmilling and plywood/veneer start to come on stream from fourth year onwards (2010-2011). This requires investment decisions on processing capacity already on the 2nd year.

[1] **The export and stumpage fees will be identical if:**
(i) the tariff fee structure is the same on both;
(ii) the species class mix (A,B & C) are assumed the same for harvesting as for exports; and
(iii) all logs are exported. This is correctly assumed only for an initial period of time. In later years this will not hold as wood products are being produced for exports.

- Gradual increase in processing is achieved, so that from 9th year (2015-2016) onwards, a 50/50 split is foreseen in log volume between log exports and processed products. A further 50% of sawn timber is remanufactured into value-added products. The log export/processed products ratio is turned into 20/80 by 2018-2019 and maintained thereafter. In sawmilling the recovery factor is expected to only gradually improve from 35% to 55%. Yield varies according to log quality and species felled but this represents an estimate on average yield development.
- Remanufactured products (mainly furniture components, decking, mouldings, etc.) yield is 75% of sawnwood volume.
- When making flooring, yield from log can improve because trimmings and off-cuts can be turned into very small pieces (finger mosaic parquet 7 x 20 x 120 mm) or staves (16 x 48 x 200 mm or 25 x 75 x 300 mm). Also decking can consume small pieces when preassembled into ready-to-lay tiles.
- Plywood reaches full production on 5th year after start-up only: final yield from log to finished plywood is 50% (after deductions of: cores, bark, rounding, cross-cutting and sanding losses, clipping, trim-sawing of sheets and shrinkages in drying and gluing).

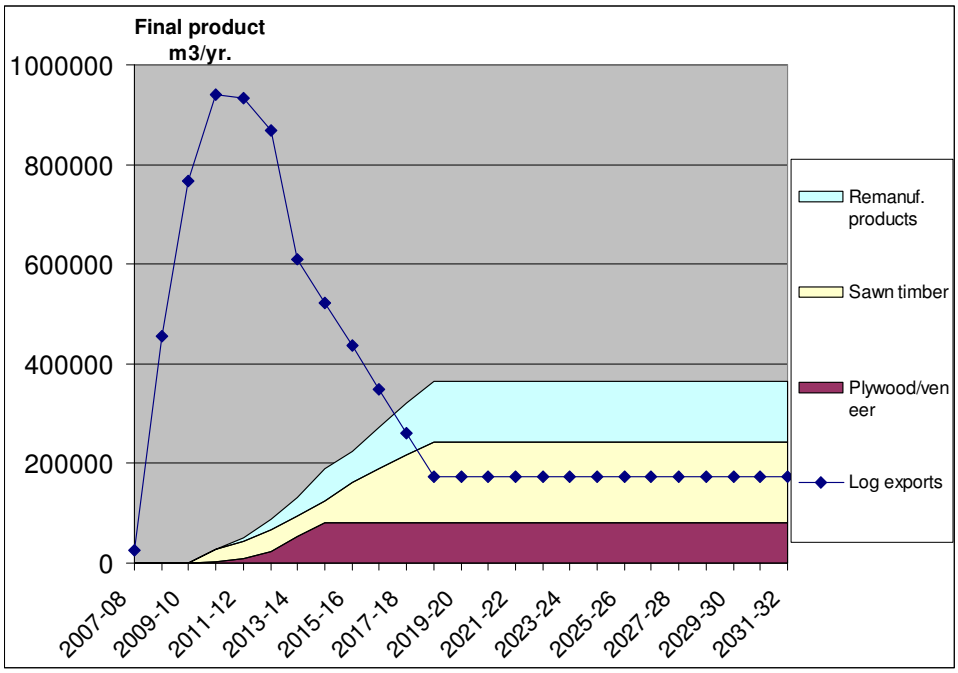
Key output figures from this scenario are:
- Wood industry production reaches its full potential gradually as different processing industries come on stream (Figure 3.4, Table 3.1).
- Log exports lay the foundation to wood industry's comeback, and as FDA suggests they are pushed to an early peak in 2010-2011, discounting low-quality logs (15%) and the start of the log conversion. Long-term log export balance will fall to 174,000 m^3 per year after the processing capacities are in place.
- Sawn timber output reaches 324,000 m^3 p.a. nine years after start-up, aided by recovery improvement.50% of sawn timber (162,000 m^3) is further remanufactured (yield 75%) and another 50% is sold as sawn timber to exports (90%) and in the local markets (10%).
- Output of remanufactured products reaches 122,000 m^3 in finished product volume (e.g. furniture and components, flooring, decking, mouldings, profiled and laminated products, etc.). A certain product mix is assumed to reflect the desired value-added component.
- Plywood reaches full production (80,000 m^3) on the fifth year after start-up, and remains on that level. Part of the output will be sold as peeled or sliced veneer. In the latter, the prime quality of the output can be further processed into layons.

Table 3.1 Output Potential of Remobilizing the Wood Industry Production 2007-2032

Financial year	Log exports	Plywood & Veneer	Sawn timber	Remanufactured prods.	Total
	Finished products m^3				
2007-08	25,500	0	0	0	25,500
2008-09	455,627	0	0	0	455,627
2009-10	767,253	0	0	0	767,253
2010-11	939,183	3,000	25,200	0	967,383
2011-12	934,077	9,000	35,800	6,750	985,627
2012-13	869,309	24,000	43,200	19,800	956,309
2013-14	610,201	54,000	40,500	37,125	741,826
2014-15	523,030	80,000	44,000	66,000	713,030
2015-16	435,858	80,000	82,500	61,875	660,233
2016-17	348,686	80,000	110,000	82,500	621,186
2017-18	261,515	80,000	137,500	103,125	582,140
2018-19	174,343	80,000	162,250	121,688	538,281
2019-32	174,343	80,000	162,250	121,688	538,281
Cumulative 2007-32	**8,611,044**	**1,530,000**	**2,790,200**	**2,080,800**	**15,012,044**

Note: 50% of sawn timber is sold as such, 50% is remanufactured into value added products

Figure 3.4 Long-term Projection of Output from Total TSC & FMC Area: Finished Products



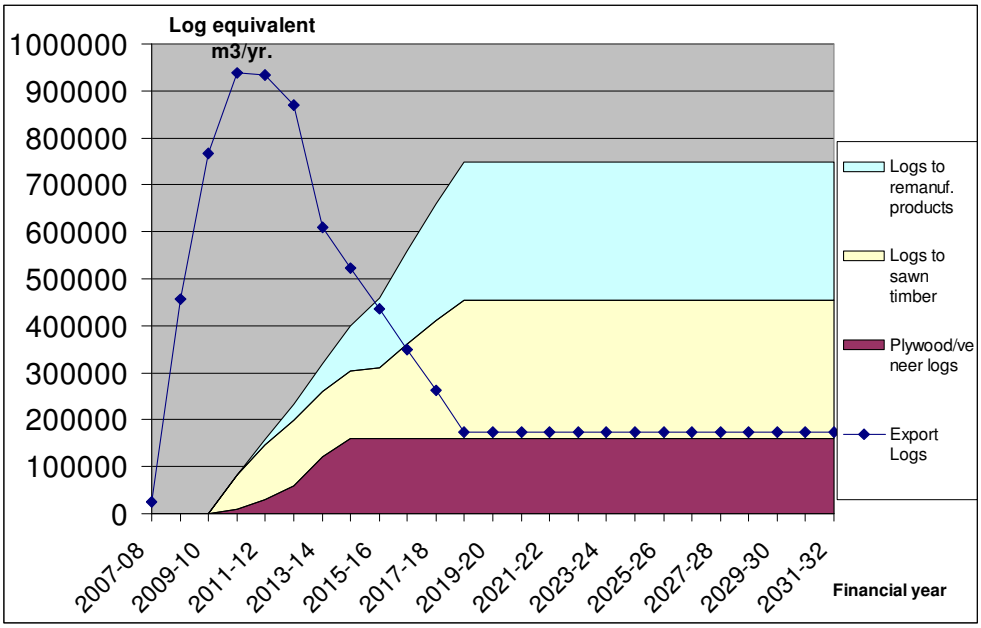
Source: adjusted from FDA 2008 revised production forecast

At the end of 25 yr. cycle 39% of cumulative logging volume has been exported as logs, and 61% in log equivalent has been sold as plywood, sawn timber and in remanufactured products (Table 3.2, Figure 3.5).

Table 3.2 Cumulative 25 Year's Output of Finished Wood Products and Log Equivalent

Log exports	Plywood & Veneer	Sawn timber	Remanufactured	Total
m^3 of Finished Product				
8,611,044	1,530,000	2,790,200	2,080,800	15,012,044
57%	**10%**	**19%**	**14%**	**100%**
m^3 of Log Equivalent				
8,611,044	3,100,000	5,340,400	4,933,600	21,985,044
39%	**14%**	**24%**	**22%**	**100%**

Figure 3.5 Projection of Output from Total TSC & FMC Area: Log Equivalent Consumed by Wood Industry



3.3.5 Estimated Potential of Export Fees from Wood Industry Exports

Indicative prices of exported tropical wood products from West Africa have been compiled in Figure 3.6 and these have been used in the calculation of the revenue forecast. Recently published prices from ITTO Market Information Service show how the value added processing could potentially pay off. The prices are presented without species or grades defined. Their purpose is to simply demonstrate the gradual rise of the value of products in exports.

It has been further assumed, that:

- 90% of "official" sawnwood and plywood goes to exports, and 10% to domestic market.
- 25% of sawn timber is air-dried, 75% kiln-dried. Green timber is not sold for exports.
- Present tariffs of wood product export fees prevail throughout the 25-year period, i.e. 2% of FOB value for class A wood products, 1,5% for Class B and 1% for Class C.

Revenue charges are estimated according to the above tariffs, so that a weighted average becomes 1.54% / FOB (free-on-board) value for any manufactured wood product for exports, and 7,08% / FOB value for log exports. These averages are based on the species class distribution adopted previously in this report (see also Box 10).

The chosen product mix (below) and adjusted price data has increased the average export price earned per cubic meter to 443 US$/m^3. This price is formed as a weighted average of prices for products made of the three species classes. There is a 50% price difference between the Class A products and Class C. Average log price for exports is 230 US$/m^3. Log value is heavily discounted in the anticipation of lower-quality logs, including lesser-known species.

The export mix has been calculated from the previously presented volumes of finished products for exports, what explains the relatively high percentage of logs in the mix. Export mix is presented in Table 3.3.

Table 3.3 Export Mix of Liberia's Wood Product Exports (% of product m^3)

Product \ Year	'09-10	'10-11	'11-12	'12-13	'13-14	'14-15	'15-16	'16-17	'17-18 onw.	'28-29 onw.
Logs	100,0	97,4	95,2	91,5	83,3	74,7	67,7	57,9	46,7	33,9
Plywood & veneer	0,0	0,3	0,8	2,3	6,6	10,3	11,2	12,0	12,8	14,0
Sawn timber (Export AD)	0,0	0,6	0,8	1,0	1,2	1,4	2,9	4,1	5,5	7,1
Sawn timber (Export KD)	0,0	1,8	2,5	3,1	3,7	4,2	8,6	12,3	16,6	21,3
Decking	0,0	0,0	0,1	0,4	1,0	1,9	1,9	2,7	3,7	4,7
Mouldings	0,0	0,0	0,1	0,4	1,0	1,9	1,9	2,7	3,7	4,7
Profiled boards	0,0	0,0	0,1	0,2	0,5	0,8	0,9	1,2	1,7	2,1
Flooring	0,0	0,0	0,0	0,1	0,4	0,7	0,7	1,0	1,3	1,7
Sliced veneers	0,0	0,0	0,0	0,1	0,1	0,2	0,2	0,4	0,5	0,7
Layons	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,2	0,2	0,3
Furniture parts	0,0	0,0	0,3	0,8	2,0	3,8	3,8	5,5	7,4	9,5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

In reality export mix has importance only from the average FOB price perspective, as the fees are not differentiated between products according to the level of value added. One flat rate applies to all value added products.

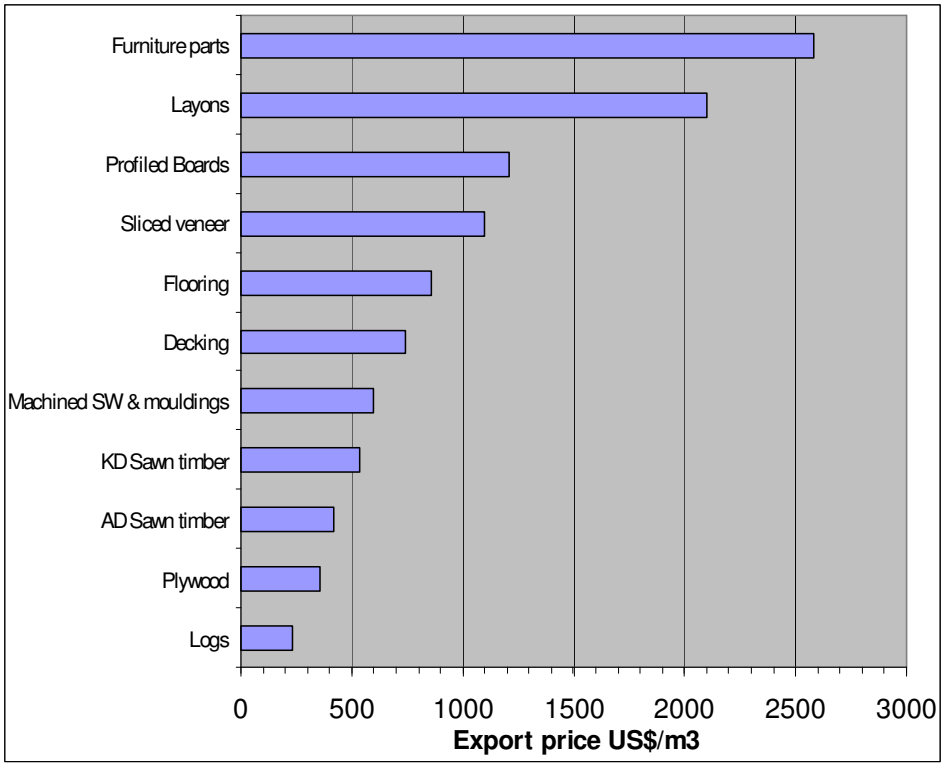
Revenue forecast is presented to highlight the gradual phasing out of pure log exports into combined exports of logs and wood products. Exports from the TSCs are expected to dry up after six years, and thereafter also FMC log exports would annually decline by 5% due to the growing scarcity of prime logs (Figure 3.7). FDA'a projection ends up to 2012-2013.

Not surprisingly, the high log export fee will initially yield a high income for FDA / Ministry of Finance. The scenario shows clearly that the revenues decline along with the introduction of value added processing. The gap spreads even wider because of phase-out of TSC log exports.

The situation would become more balanced over the years when log exports would be converted gradually into wood product exports. The increasing FOB export value (basis for the fee) compensates gradually for this loss. The shift takes nevertheless considerably long time to balance. This is not necessarily a gloomy prospect, because the industry brings about multiple economic benefits to fill in the gaps in export fees in other ways. The difference would have to be compensated by:

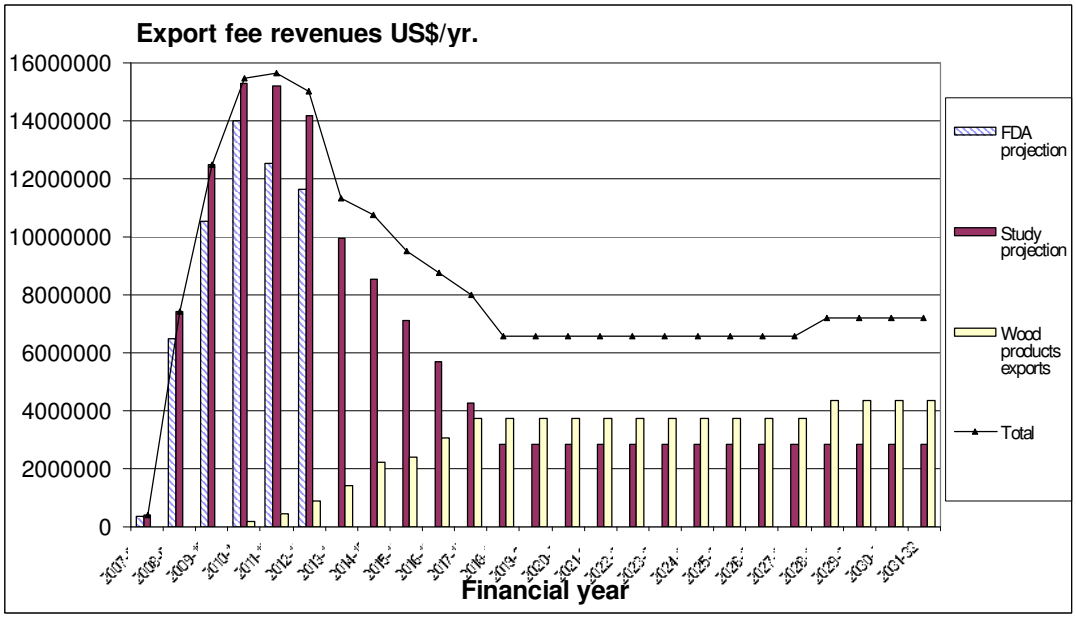
- increased investments and fixed asset formation in processing capacity,
- increased wood processing employment,
- service and local trade jobs generated,
- improved infrastructure and utilities,
- direct local community benefits from concession agreements,
- monetizing of the local communities and multiplier effects on local consumption,
- taxes on corporate incomes, wages and service fees,
- licensing fees for industrial operations.

Figure 3.6 Indicative FOB Prices of Tropical Value Added Wood Products in Exports



Source: TIDD (Timber Industry Development Division, Ghana) 2007 - Ghana's export prices adjusted for this study. These changes have been used to revise the revenue estimates of draft report of January 2008.

Figure 3.7 Long-Term Export Fee Forecast from Logs and Wood Products



Key messages: A rapid ramp-up of log exports and associated export fees for the government is being promoted by the policymakers in Liberia. Forestry is held as an utmost priority sector for generating immediate revenue for the Poverty Reduction Strategy of the country. The government revenues notch downwards with the introduction of value added processing, exacerbated by the drying up of TSC log exports. After about a decade wood products exports will yield a higher share of the revenue than log exports.

3.3.6 Phased Approach to Industrialization

Timeline for re-establishing Liberia's wood industry is a long one. Log exports resume properly maybe end-2008 (during the next logging season). Any serious exporter sawmill will take one year to construct and 1-2 years to become fully operating. This would enable first exports in 2010-2011 as the rule of two year's grace period for log exports ends. Plywood plants take 1-2 years to construct, and further 2-3 years to climb into full production.

Further processing (treated wood, KD, S4S, edge-glued & laminated solid wood panels, dimension stock & components for flooring, frames and furniture) is logically built downstream from sawnwood operations if they prove profitable. These investments come in smaller workshops and have shorter gestation periods.

The Liberian Timber Association (LTA) was firmly in the opinion that it will take up to four years to get a viable sawn timber, KD, S4S, decking, edge-glued solid wood panels, sleepers, poles etc. production up in the country. A kick-start project could be the upgrading of the railway from Yekepa to Buchanan with *ekki* ties. But a deal between FDA/NPA (National Port Authority) would have to be brokered on the abandoned logs in Buchanan Port. In the following 4-10 years, the operators would have accumulated experience and built up scale. This would enable them to gradually invest in downstream processing like flooring stock, components, doors, furniture parts, etc. First export destinations would be the regional ECOWAS markets, then possibly overseas markets.

The case of CIB Pokola in the Republic of Congo (Box 3.) illustrates the long development path of they have passed through to become one kind of a model industry in Central Africa.

Box 3. CIB Pokola: Development of Value Added Wood Processing based on Sustainable Forestry

CIB Pokola was established in 1968 by *Hinrich I. Feldmeyer* and subsequently *tt Timber International Ltd.* and *Dalhoff Larsen & Horneman A/S (DLH)*. At the two industrial sites of Pokola and Kabo in the Republic of Congo, the company operates four sawmills, a kiln (capacity of 3000 m³) and a modern moulding facility. CIB Pokola units produce:

- 250,000 m^3 yearly logging volume from 1,15 mill. ha of concessions in three main blocks
- product range includes about 25 to 30 different wood species
- the company harvests on average only one tree per hectare over a 30-year period
- in 2006 Kabo concession (296,000 hectares) received certification from the Forest Stewardship Council (FSC)
- approximately 30% of forest is now under FSC forest management and chain-of-custody certification, and CIB has pledged to certify all their concessions in the country
- exports 100,000 m^3 of logs, produces sawn timber around 70,000 m^3 per year (exports 40,000 m^3), and production of value added products (decking, mouldings) is increasing (in 2005 around 10,000 m^3)

CIB employs about 1,800 persons and provides employees with free housing, electricity, running water, primary health care and schooling. The company is considered to be one of the more economically sustainable and well-managed operations in the Central African region. It has received special recognition for the work on securing the forest rights of the indigenous communities. The Wildlife Conservation Society (WCS) is working with CIB to regulate and control bushmeat hunting so that endangered species are not threatened by hunting on some of the company's concessions. It is also building a bio-energy plant with capacity of 600 kilowatts.

Source: Internet

The different sizes of the concessions have to be considered as a limiting factor for the industrial structure of Liberia. Better organization of the small operators can be the solution to overcome such problems. Proposed solutions are explained below:

- In the small TSCs (~5,000 ha) small sawmills like Wood-Mizer LT-70 & M-7 (mobile), Canali 800, CD-10 (static) etc. bandsaws can typically yield 15-25 m^3 output per day. They can be combined with a circular two-saw edger. These can be owned through a joint venture among TSC operators or by a private investor without TSC. Small mobile mills are commonly found in the tropics as " free-standing sawmills" which do not possess a title to forest resource. They play an important role in meeting the demand of the local market and small joinery and furniture workhops. TSCs are reserved for majority-owned Liberian companies.

- Forest Management Contracts (FMCs) come in three sizes. The larger Class B (100,000-249,999 ha) and C (250,000-400,000 ha) of FMCs would establish integrated wood industry plants (sawmill with secondary processing/wood workshop) supported by their own saw-doctoring workshops, kiln-dryers and wood preservation units for allowable chemicals (CCA). These large-scale FMCs have no restrictions on their company ownership.

- Class A FMCs (50,000-99,999 ha) would have non-integrated sawmills (including re-sawing facility for better recovery), but would not own kiln-dryers but rather buy that service from a centralized kiln contractor, serving several sawyers in the region. Small TSCs are reserved for majority-owned (51%) Liberian companies.

- As a general technical rule, bandsaws should be preferred over circular saws in head-rigs primary breakdown. Circular sawing could be allowed in cross-cutting, edging, trimming, and re-sawing. Mushrooming of the chainsaw bushmilling should be avoided and the activity regulated by proven and consistent means (Box 4). A further study on chainsaw sawmillers of Liberia is highly recommended.

Box 4. Ghana: Debate on Chainsaw Milling

Ghana has imposed a ban on chainsaw lumbering in an attempt to restructure the domestic timber market. Restructuring is one principal task in Ghana's current run-up for the VPA (Voluntary partnership Agreement) with the EU.

On one hand chainsaw milling makes a sizeable local impact by its provision of building and carpentry material to local processing. But on the other hand it has been often perceived as one of the mechanisms of illegal and clandestine logging, and a source of local conflicts on community level.

Two schools of thought have emerged in Ghana on chainsaw milling in the forest:

1. First opinion is that chainsaw milling ban must be retained and the operations be fully eradicated in Ghana.
2. Second opinion sees that the ban on chainsaw milling must be removed and efforts to regularize and legalize the operators. Investment support is being considered to engage chainsaw millers into formal wood processing industry.

The issue is so important that EU has funded a five-year project to address chainsaw lumbering in Ghana. A similar initiative has been proposed in Liberia.

Source: VPA Briefing Paper 3. Ministry of Lands, Forestry & Mines, Ghana

3.3.7 Geographical Spread of Industry

Pre-selected sites for locating the new industry are depicted in Map 1. This is presented on the courtesy of FDA, who provided the base map.

This chapter is not promoting a central planning approach but it simply points towards logistically and resource-wise best fits for mills. This view is backed by the local counterparts' long experience of the past processing industry in the country. In the first place mill sites are either close to ports, in district/regional capitals, or within a good port of exit from inland to the coast. Secondly, they are situated within a reasonable distance from the major FMCs.

Potential investment projects can be identified as follows:

Sawmilling:

- Establishment of max. seven major integrated sawmills **without** plywood/veneer mills in strategic rural/urban centers (Zorzor, Gbarnga, Tapeta, Zwedru and Monrovia).
- Strategically located, small sawmills should operate in rural wood processing communities or county/district headquarters (assuming 8-10 operational months, 600-900 m^3/month, brings their max. output to 6,000-9,000 m^3/yr): to be specified when more TSCs are rolled out).
- Remanufacturing would be developed adjacent to sawmills as downstream units, but also by independent entrepreneurs who purchase sawn timber from sawmills. Furniture workshops would be developed as independent workshops to serve domestic market, but integrated in conjunction with component-making for exports.
- Production of high quality and diversified wood products export grade sawn timber - both air-dried and kiln-dried - decking, mouldings, profile boards, flooring, treated woods (including railway sleepers), doors and furniture components.
- Kiln-drying could be developed by a centrally located KD entrepreneur as a contract service, paid by wood remanufacturers (so-called freight kiln-drying concept).

Sawmilling integrated with plywood/veneer:

- Installation of three-four integrated sawmills **with** veneer/plywood factories into Tubmanburg and Southeastern Region of Liberia.

- Production of high quality and diversified wood products such as sliced veneer, plywood, film-faced plywood and furniture components later on, in combination with sawn timber and its remanufactures.

Industrial structure needs to be developed by encouraging the importation of more efficient processing machines, technology transfer and the subsequent remanufacturing of processing waste, including the introduction of wood industry's bio-energy concepts into Liberia.

Key messages: This study recommends a fairly sophisticated and dense tropical hardwood processing industry for Liberian policymakers' purview. Ultimately the selection of mill sites will be a consideration of the concession operators - guided but not stipulated by FDA through the concession agreements. The main criteria would have to be the viable industrial economics and logistics of the mills. These conditions should overrule rigid political and geographical selection criteria, and avoid unhealthy support to those disadvantaged areas that would accommodate only an impractical wood processing industry. Establishing an industrial fabric at any cost is not a viable strategy. In any case it develops most sustainably through a gradual process.

3.3.8 Unit Sizes of Wood Industries

If the pre-selected sites would prove viable to host industries, the average sizes of the units would be the following:

- 325,000 m^3/yr of sawnwood divided between 11 mills using FMC wood: approx. 30,000 m^3/yr on average.
- 80,000 m^3/yr of plywood between four plants using FMC wood: 20,000 m^3/yr on average.
- Remanufacturing plants are likely to show a varied size and type, and cannot be estimated by capacity. Many of them would be integrated with the sawmills, but also independent mills would exist.

In conclusion, the sawmills represent a fairly large African size in the tropical wood industry and can be competitive, and support a viable remanufacturing industry. The four proposed plywood mills may become too small on average but this changes easily if the number of mills is reduced.

FDA has advocated for the design of a decision-making template on where and when certain-sized mills at the reserve or concession level should be licensed. While this would of course be an important operational tool for FDA, it is advised that the Authority works to develop this on their own with the guidance of this report. The main considerations for this purpose are found in the map where potential sites for sawmills and plywood/veneer mills are put on a location, and in Annex 2 where FDA's concession roll-out plan by area and site is shown. Additionally, the proposed study on chainsaw bush-millers can provide FDA with relevant guidance to support processing facility licensing schedule and geography.

Smaller streams of sawn timber will come from the mobile saw operators on the TSCs. Currently pit-sawing is rampant and unregulated. Bringing it under formal wood processing through formation of mobile sawmill operator companies is one solution to increase the formal sawing industry and widen its tax base.

It needs to be emphasized that the concessionaires will carry out their own investment feasibility studies and operational plans. FDA will review and validate them if they are based on sound business knowledge without adverse impacts on ecological and social development goals, and not in breach with FMC / TSC contract rules.

3.3.9 Employment Opportunities

Data used to describe the past employment impact of the wood industry is not properly referenced, owing to lacking national statistics. Anecdotal evidence from a number of people who have worked in managerial positions in the sector seems to suggest that industry and logging were important both locally and nationally. Whether it will be a key to revitalizing Liberia's shattered economy remains to be seen. The sector itself may want to draw some political attention and gain weight in the public eye as it marches out to production.

Past Employment in the Sector

What is patchily known about the pre-war levels of employment is compiled in the following.

Forestry and wood industry sectors played an important part of Liberia's economic development in the 1970s-1980s. Industry peaked in that era in 1989 with 1 mill. m^3 of logging and employed around 25,000 jobs (mostly in logging). Then followed the collapse of the industry in 1990-1996, and resumption in 1997-2002, which led into acceleration of logging (level of 1,3 mill. m^3, of which Oriental Timber Company OTC[2] played a major part). Number of registered logging/processing companies went down from 56 in 1989 to 26 in 2002. Employment was just 8,000 during this second peak, and log exports dominated trade.

Around 75-80% of those jobs are believed to have been full-time employment, and the rest have been casual workers and contractors during October-May logging seasons only. There have been undoubtedly extensive indirect and consumption-related multiplier effects attached to the sector. Forestry and wood processing in fact monetized rural economies in many areas of Liberia.

It seems likely that the first peak in output and employment was different in the sense that the wood industry was providing more jobs than during the second peak, when the country simply exported logs. One concern is that the restarting the logging industry will today create fewer jobs for timber workers because of a higher level of mechanization and due to the imports of more immigrant workers and sub-contractors (e.g. the Chinese). According to the revised Investment Incentives Act, investors have the right to employ foreign nationals in accordance with domestic labor law in order to conduct their investment and business activities. FMC and TSC contracts stipulate that a preference be given to competent and qualified Liberian nationals (or ECOWAS nationals). Training and employment obligations are to be specified in the concessionaire's Business Plan, or as required by regulation or law.

Social agreements between concessionaires and communities also improve the local economy with the provision of schools, community halls, clinics, water and electricity supplies, means of transportation, entrepreneurial opportunities, etc.

Employment Calculation

Based on recent projects on the feasibility of tropical sawmilling and sliced veneer operations, tentative labor force estimates for the projected Liberian major sawmills with integrated further processing proposed in this study can be drawn (Table 3.4).

[2] OTC Chairman the Dutch baron G. van Kouwenhoven has since been sentenced to prison for weapon trade under the UN War Crimes Tribunal.

Table 3.4 Estimated Employment of Medium-sized FMC and Large Sawmill and Remanufacturing Plant in Liberia

A 100,000 ha FMC forestry operation		Sawmill & remanufacturing with output of 30,000 m^3/yr	
5	Field supervisors	50	Log yard workers
5	Inventory/planning staff	70	Sawmill workers
80	Loggers	30	Dry kiln and boiler workers
40	Access road workers	15	Maintenance
10	Office/general service	100	Further processing lines
60	Planters/nursery	40	Other (security, services, etc.)
10	Transporters	20	Sales and management
210	**Total**	20	Transporters
		345	**Total**

Taking the above estimates of jobs created and extrapolating that with the total area and proposed industry structure presented earlier in this study, we arrive at 8,290 jobs in forestry, sawmilling, plywood/veneer and remanufacturing as a sum of the following:

1. Total area used to logging: 1,9 mill. ha >> creates 3,990 forestry jobs
2. Total sawmilling capacity (incl. remanufacturing plants): 327,000 m^3 >> creates 3,760 jobs
3. Plywood/veneer mill capacity 80,000 m^3 >> creates estimated 540 jobs

These would be formal direct employment numbers for the largest mills only, and can be taken as the lower end estimation on jobs creation potential of the forestry and wood processing sectors of Liberia. Small and mobile sawmilling on TSCs needs to be added, as also forestry and logging work to supply their logs. The 10,000 jobs ballpark figure is therefore quite reasonably validated, but not all are permanently employed.

Move into value added processing happens in phases and so does employment, too. The intermediate time should be used to train skilled wood processing workers. Value added processing tends to be more labor intensive during its early phases (ref. technology levels of processing). Processing companies train skilled workers to retain them for long-term employment. Judging from CIB Pokola's experience (Box 3), the total direct employment effect in Liberia (formal sector) is well in line with their numbers. Compounded with multiplier effects on employment and consumption, the sector will maintain an important role in the national economy. Informal activities can not be eradicated, so they add up in the total impact considerably.

Another reference is given on Gabon's scale of industry and its employment figures (Box 5), to put Liberia's prospects into a proper perspective. One important difference is that Gabon has a large-scale peeler veneer export industry, run by French companies.

Box 5. Gabon: Employment vs. Processing Capacity

Number of Employees

Segment	2004	2005	2006
Forestry	9,083	9,085	9,200
Sawmills	2,200	2,300	2,500
Veneer mills	1,330	1,330	1,440
Plywood mills	965	970	970
Sliced Veneer	125	130	100
Carpentry	770	850	877
International trade	300	270	250
Total	**14,773**	**14,935**	**15,337**

Processing Industry Scale (1,000 m^3/yr.)

	2002	2003	2004	2005	2006
Sawnwood	176	231	133	230	235
Veneer	71	140	120	145	150
Plywood	98	101	103	146	n.a

Source : Direction Générale de l'Economie, Direction Générale des Eaux et Fôrets, Gabon (Jan. 2007)

Social Impacts

Prediction of social impacts of a forestry investment is a complex issue that requires a thorough understanding on the current custody and use of forest resources as well as on the distribution of benefits from these resources. In traditional use, forests provide a broad range of material and immaterial goods and services that have various significances to different genders in local communities. These goods and services may be essential for subsistence living, local trade or for cultural and spiritual life. Some groups in a community often benefit from new activities, e.g. timber logging, whereas others may be deprived of them.

It remains to be seen if the number of people who stand to benefit from community managed forestry through self-employment and improvement of livelihoods could be higher than direct jobs from commercial logging. Community forests are to be set aside from the TSC and FMC contract areas as a part of the Social Agreements. The government of Liberia is developing a community forestry law that will clarify the management rights of the communities to run their own logging operations on designated lands.

Finally, there is a direct distribution share of 1 US$/log m^3 of the FDA forest revenues to the benefit of the communities. That would yield about one million US$ in 2010-2011 and then decline gradually. Annex 2 has a distribution table of revenues between the Government, counties, communities, SGS and the protected areas fund.

Expatriates vs. locals

ITC and ITTO study in 2000 reported many cases from West/Central Africa, where wood processing mills were managed by a small number of expatriates serving either a foreign or local owner. These few managers may account for the major portion of the company's payroll. The question of how useful it is to hire 'expensive' expatriates to run the operations, instead of training local managers, is to be assessed also in Liberia.

In Côte d'Ivoire, for example, around 75% of the workforce in the wood products sector were counted as CI nationals, with the remainder were believed to consist of white-collar expatriates and migrant workers.

Liberia is setting certain requirements on the logging concession operators to provide decent working conditions in compliance with Liberian labor laws and international standards for worker safety. Preference shall be given to employment of skilled local and ECOWAS citizens. Hiring of unskilled labor force from outside ECOWAS region is prohibited.

Training centers and skills profiles

On-the-job training is normally carried out at company level. Labor is trained *in situ* and both owner and employees have only an empirical knowledge of the various jobs done, whether it be drying the wood or sharpening the tools, etc.

Training centers require a substantial investment in buildings, equipment and qualified staff, all of which are difficult to pull together in Africa. The feasibility of creating training centers at regional level should be investigated. E.g. Wood Industries Training Center (WITC) located in Kumasi, Ghana could also host students from Liberia (Box 6).

Box 6 Ghana Wood Industries Training Center

A study sponsored by the Timber Export Development Board (TEDB) revealed that the wood industry was severely hit by non-availability of professionals, skilled technicians and artisans. Most positions demanding skilled labour were occupied and performed by unskilled labour trained in apprenticeship or on-the-job. This led to low efficiency, high waste, low income, less permanent employment, poor quality of products and thus minimum returns on investment.

To address this dismal situation, TEDB and Forest Products Inspection Bureau with assistance from the World Bank, set up the **Wood Industries Training Center** at Akywkrom-Ejisu, close to the heart of Ghana's timber industry Kumasi, and the capital of the Ashanti Region. WITC's central location makes it accessible to all timber processing companies and furniture firms in the Ashanti , Brong Ahafo, Eastern, Western, Central and Greater Accra Regions.

Source: WITC homepage

The skills profiles of workers in wood industries are rarely a result of a systematic formal training, rather skills are upgraded year by year on-the-job. What is known about e.g. Malaysian worker profiles is still showing how vocational training is only extended to the managerial positions, if any. Majority of workers learn their skills by doing, and high turnover of workers empties the skill pools time to time.

(1) Forestry workers in Malaysia:

- Logging operation is usually contracted out on almost 100% to foreign workers, while only the concession holder is Malaysian
- Foreign contract workers, in most cases, are from neighbouring countries, mainly Indonesia

(2) Sawmill workers in Malaysia:

Three levels:

- Head-sawyer usually has about 10 years experience, with no formal training
- General workers have no formal training or experience (usually foreign migrant workers)
- Saw doctor usually holds 5-10 years experience, with no formal training

The most experienced workers, usually of Malaysian Chinese origin are heading the operations without formal training.

3.4 Challenges of Lesser-used Species

Liberia's forests have been creamed in the past, what means that today the concessionaires need to cut and process lesser-used (LUS) and lesser-known species (LKS) to a much greater extent. This implies that the past experiences may not be valid because market information concerning novelty species has been lost, or it is non-existent. Much of the past knowledge compiled by GTZ (*Lesser Known Liberian Timber Species, 1981*), University of Wageningen in the Netherlands, and FAO are no more available in the country).

Also, the move from log exports in the past to sawnwood, plywood, and higher value added products today represents a major challenge in terms of market information and marketing skills. The said GTZ study concluded that most of the 19 LUS species studied in Liberia were well suited for general construction, interior joinery, parquet, simple furniture and heavy construction. On the other hand, only a few of them were considered fit for high-class furniture or sliced veneer. It can be feared that much of the trade will be taken over by foreign players who have years-long lead over Liberian firms in international wood products technology and trade.

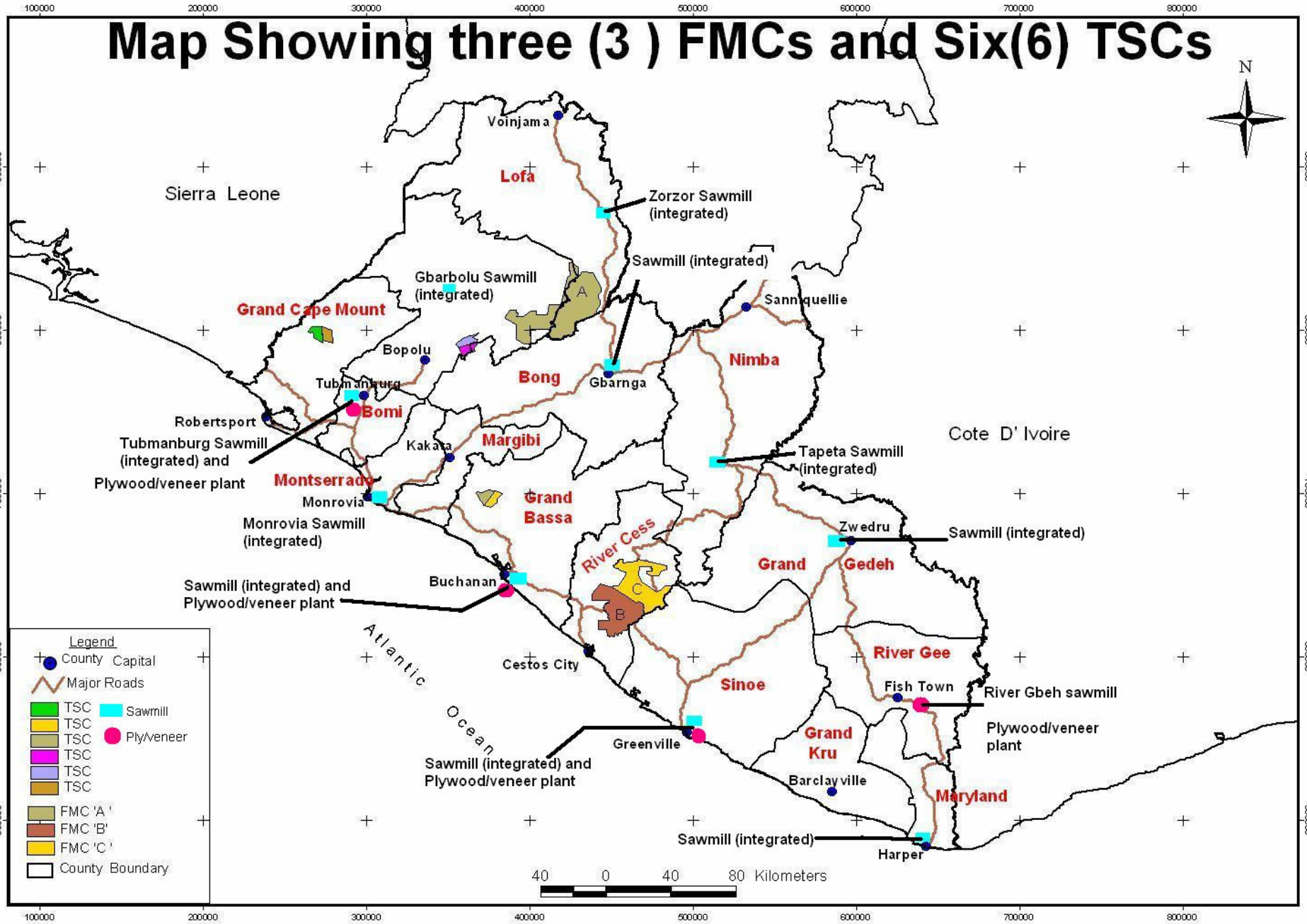
With a view of introducing LUS for value-added products in exports, it is strongly advised that FDA establishes a reference library on on-going work on the commercialisation of LUS in different parts of the world, most importantly referring to work undertaken by ITTO (International Tropical Timber Organization), Centre for the Promotion of Imports from Developing Countries (CBI) in the Netherlands and GTZ in Germany, and prepare also for the market demand by China, Malaysia, Thailand, the Philippines and India. These destinations can be developed into markets for furniture components and flooring and other dimension stock wood manufactures. Early start in preparation of market information for the roll-out of value-added products of LUSs is necessary.

There are some imminent opportunities for commercializing lesser-used species in Liberia. Mittal Steel is rumored to prepare imports of steel and concrete ties to upgrade the railway between its mining concession (Yekepa) and Buchanan. A better solution would be to substitute imports by using Liberia's under-utilized *ekki* or *dahome* logs for wooden ties. This would help kick-starting one sawmill close to Nimba, one down the railroad in the port of Buchanan. Other species that can be considered include *limbali, kusia*, and *anopyxis*. For treated poles *frake, framire (Terminalia spp.), naga* - and even pine and eucalyptus logs - can be used.

It is advised that the following species be deployed for veneer and plywood production:

- Suitable redwoods for slicing:
    - of primary species: sipo, sapele, tiama, lovoa, makore, niangon
    - of lesser-used species etimoe, ebony, camwood, *Harplomosia ssp.*
- Suitable species for peeling: did, naga, tetra, canarium/aiele, ilomba, cottontree, bombax, faro, and aniegre.

Leading international traders like DLH have indicated that they are actively pursuing lesser-used species in the global markets. Many species tend to be high-density species suitable for heavy-duty construction and peeling/slicing. Currently darker-coloured species find markets more readily in North America and lighter-colour timbers in Europe.


Map Showing three (3) FMCs and Six(6) TSCs
N
Sierra Leone
Cote D' Ivoire
Voinjama
Lofa
Zorzor Sawmill (integrated)
Sawmill (integrated)
Gbarbolu Sawmill (integrated)
Grand Cape Mount
Sanniquellie
Bopolu
Nimba
Bong
Gbarnga
Tubmanburg
Bomi
Robertsport
Tubmanburg Sawmill (integrated) and Plywood/veneer plant
Kakata
Margibi
Tapeta Sawmill (integrated)
Montserrado
Monrovia
Monrovia Sawmill (integrated)
Grand Bassa
Zwedru
Sawmill (integrated)
River Cess
Grand Gedeh
Buchanan
Sawmill (integrated) and Plywood/veneer plant
Atlantic Ocean
Cestos City
River Gee
Sinoe
Fish Town
River Gbeh sawmill
Plywood/veneer plant
Grand Kru
Greenville
Sawmill (integrated) and Plywood/veneer plant
Barclayville
Maryland
Sawmill (integrated)
Harper
Legend
County Capital
Major Roads
TSC
Sawmill
Ply/veneer
FMC 'A '
FMC 'B'
FMC 'C '
County Boundary
40 0 40 80 Kilometers

4. ASSESSMENT OF THE POTENTIAL OF NON-TIMBER FOREST PRODUCTS

4.1 Context of NTFPs in Liberia's Forestry Sector Remobilization

The non-timber forest products (NTFPs) are of great importance in both urban and rural Liberia. Noticeably among them are e.g. bushmeat (worth several million Liberian Dollars), materials for traditional and religious ceremonies, fruits, nuts, berries, traditional medicines, and materials for construction.

NTFPs are taken into account in the draft Social Agreement Draft ("*Standardized Community Rights Empowerment and Benefit Agreement*" or *CREPA*). It stipulates five responsibilities to contract holders with respect to NTFPs:

1. Respect the collection of NTFPs and local communities' right of access to NTFPs for domestic and commercial use;
2. Agree on compensation rates for damage caused to NTFPs like herbs and medicinal plants;
3. Recognize that FMC does not give the holder rights to the collection of NTFPs or limit the access of the community to them;
4. Ensure unhindered access of local communities to the areas of NTFPs for domestic consumption;
5. Ensure that specific NTFP production areas shall be excluded from the contract area, and inform the local community accordingly.

TSC and FMC concession agreement models also stipulate clearly that the contractors are allowed to utilize only timber, and not NTFPs, from the areas granted for them. Timber means standing trees and cut wood or logs, by definition. Also, the government reserves the right to allow the access of NTFP collectors to the timber sale area for traditional or customary community uses, but without unduly interfering contractor's operations or prejudicing their rights.

FDA would naturally be the logical host of NTFP development in Liberia. It was observed during the mission that a two-year training program on bamboo and rattan processing had been launched through Ministry of Agriculture (MoA) and funded by the Chinese government (see Box 4). It was agreed during the initial talks that a better coordination between FDA and MoA would be established to promote NTFP sector in the country, and to better liaise with international NTFP networks and development work by INBAR (International Network on Bamboo and Rattan), UNHCR (United Nations High Commissioner for Refugees), Flora and Fauna International, etc. Liberia will predictably apply for the membership in INBAR. African Network of Bamboo and Rattan (ANBAR) is getting organized to pave the way for regional collaboration. Plans are that Liberia would have the Secretariat, while Nigeria would chair the ANBAR. Also AFRONET (African Research Network) would support FDA on NTFP research.

The focus of this DTIS assignment does not allow any in-depth analysis of NTFPs in Liberia. For example, the potential in wild herbs, edible and medicinal plants from the forests are left beyond the scope of this chapter. Many other promising groups of nature-based products and services would deserve a separate study. Environmental services like climate change mitigation through CDM, avoided deforestation, biodiversity conservation, and watershed protection represent largely unexplored opportunities for Liberia. This has been noted by e.g. Sustainable Development Institute (SDI) in its critique on the drafting of the Liberia National Forest Management Strategy.

The main purpose of the following chapters is to identify the most potential NTFPs for exports, and propose appropriate measures which may be necessary to realize this potential. The study team worked only on bamboo and rattan, as they appear to hold a promise for a relatively fast-track mobilization into production and trade. They would also enjoy some synergies with wood industry (mainly

furniture) in harvesting, logistics and manufacturing. Simple examples of their processing into merchantable products are given to highlight their potential and low investment requirements.

It deserves to be noted that rubberwood and latex were excluded from this study - maybe for the detriment of full analysis. Fact is that now the principal use of old rubber trees is for bio-energy chips (in Buchanan), or firewood. Just a small pilot sawmill has been started by Firestone estate. Rubberwood can be a source of furniture and flooring is properly treated and processed.

4.1.1 Bamboo Products

Bamboo is naturally very abundant and accessible in many parts of Liberia. It is currently being used mostly for household uses (baskets, construction, fencing, etc.) and it fails to capture its true trade potential. More efficient mobilization of this resource is highly recommendable. Its cultivation and management should be promoted with the aim of producing higher quality of culms (more straight and longer inter-nodal sections). In many parts of Liberia, bamboos are over-aged owing to insufficient use, what leads to quality problems (rigid, easily-breaking fibre structure). For ecological protection, bamboos seem particularly appropriate as a permanent crop on steeper slopes where surface soil erosion or minor landslides are a threat to adjacent land or infrastructure, particularly along watercourses and roads.

Commercial applications of bamboo are diverse:

- In Asia, demand for bamboo fibre as a pulping material is increasing fast.
- A biomass crop for generation of electricity in some countries, with potentially high demand.
- Bamboo poles for constructing rural house walls and urban concrete construction supports.
- Basic processing through the flattening of culms, followed by interweaving these into rough mats as a finished product for building construction (such activities require little skills and are immediately achievable).
- Weaving into more advanced mats after splitting and production of slivers requires more skill and time, but results in higher added value.
- Simply woven mats, basketry and utensils for rural uses seem to bring in very low incomes and have a limited market, which is probably already saturated, as these can be made almost anywhere of any material.
- Production of high quality mats is a precursor of further processing into bonded and laminated board products (bamboo “plywood” roofs, etc.), but this requires better coordination of supply and demand. The market for durable construction materials made from bamboo is very large in many bamboo-rich countries.
- Bamboo strip flooring would be an industrial production that requires consistent supply and logistics, and advanced processing technologies in splitting, gluing, sanding and finishing the strips.
- Finally, preservation of edible bamboo shoots of certain species is a largely unexplored area with possibly the greatest potential for lucrative national and international marketing. Shoots are currently purchased for canning by Chinese entrepreneurs from several countries due to domestic shortages.

The knowledge base concerning bamboos and canes is evidently a constraint to efficient management, utilisation and conservation of the bamboo and rattan resource in Liberia. All areas, viz. from identification of species (*Bambusa spp. Dendrocalamus spp., etc.*), to appropriate management and utilisation, require adaptive and sometimes fundamental research inputs. Trials should be started on the propagation of bamboo to improve its quality and regeneration. Membership in INBAR would be a good move to gather information on international bamboo and rattan developments.

The most basic equipment for splitting and slivering bamboos may still not be available to start processing. The Chinese training courses are paving the way to new technologies (Box 7). Adaptive research is consequently required to provide suitable equipment to replace manual splitting, slivering

and weaving if semi-industrial or industrial scale is sought to be developed. Such processing activities can now be fully automated e.g. in China.

Box 7 Chinese-Funded Training Course in Bamboo and Rattan in Monrovia

The Chinese government has launched a training program on bamboo and rattan processing under the auspices of the Ministry of Agriculture of Liberia. The two-year course in now on its first year, and it has taken in 56 trainees in three cycles, six months each. Two trainees from each county have been enrolled, and seven of them from Grand Bassa. The Chinese government has covered all the technical costs, and provided with product models, hand tools and basic machinery and equipment. Teaching is mastered by six Chinese trainers. Approach is "training-of-trainers" in the sense that the first batch of artisans is intended to return to their communities and transfer their skills to production groups.

Training focuses on weaving, handicrafts and furniture-making of bamboo and rattan. The bamboo class focuses on the skills like cutting bamboo in the forest, constructing bamboo house, splitting and weaving it for doors, etc. Rattan class makes stools, tables, baskets and mixed pieces of furniture.

Liberia's bamboo species and their management are poorly known, and notable quality problems exist. The trainer interviewed was in the opinion that considerable improvements of raw materials are needed, and the introduction of new proveniences from Asia could be one solution. Also better tending of the bamboo stands and their plantation cultivation would yield better culms for processing.

Source. fieldwork

4.1.2 Rattan and Raffia Palm

Rattan (a climbing palm) is another fibrous material that grows in Liberian natural forests. The product (cane) is very destructively extracted for furniture use from the surface of living trees, and the practice is considered unsustainable. In terms of quality and processing, it was widely agreed that international standards have not yet been achieved in Liberia. Rattan could be cultivated together with plantation trees, or its harvesting restricted to sites where long-term tree support is otherwise available but where frequent access is not necessary.

Raffia palm is the third potential fibre source for furniture and weaving from Liberia's forests. Internationally, demand for rattan and raffia palm as furniture materials is high internationally, and e.g. IKEA is collaborating with GTZ in establishing sustainable rattan industries in Vietnam.

4.1.3 Semi-Industrial Processing of Bamboo and Rattan Products

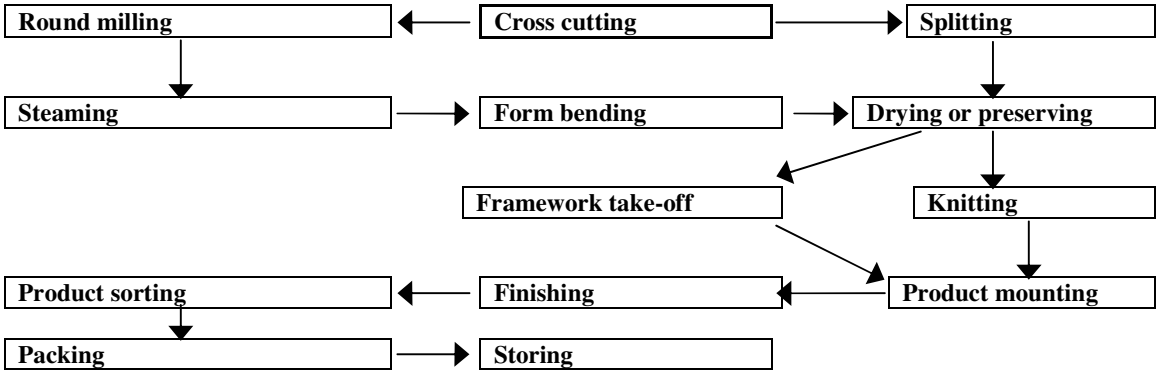
Making of **rattan furniture** is not very difficult, as mostly manual processing steps, pre-processing, glue and little mechanical aids are basically needed (Figure 4.1). Weaving of rattan is more demanding for detailed furniture structures and decorative surfaces. Such skills are currently being taught by the Chinese government funded project in Monrovia.

A typical processing cycle of **bamboo mats and corrugated bamboo boards** is presented in Figure 4.2. The primary processing (splitting, drying and weaving) is usually a cottage-level activity spread around in bamboo-rich locations or in villages where the necessary skills are available. Various middlemen organize a group of families to work together in order to supply the products in sufficient quantities to further processors. Sometimes the same middlemen organize the collection and transportation of bamboo culms from the forests to the mat-makers as well. This practically means that the primary processors become under a total control by middlemen.

The secondary and tertiary steps of processing (gluing, pressing and trimming into size) take place in local factories. Resins used for gluing of bamboo mats and corrugated bamboo sheets are (1) lignin-

phenol formaldehyde, (2) phenol-formaldehyde, and (3) urea formaldehyde. The chemicals needed to produce these are phenol, urea and formaline.

Figure 4.1 Processing Cycle of Rattan Furniture



Rattan form bending on framework	Rattan weaving training course
	

Source: Tissari, 1996

Bamboo strip flooring is produced in natural or stained brown-smoky colours. The air-dried bamboo culms are first cross-cut into desired lengths in the yard. Locally made pull-bench circular saws are used to cut the culm into six slices. The slices are then dimensioned into 4 or 6 mm thick, 20 or 25 mm wide, and 960 mm long pieces. These strips feature also the nodes of the culm in the final product. If node-free strips are to be produced, the inter-node sections determine the length of the pieces available.

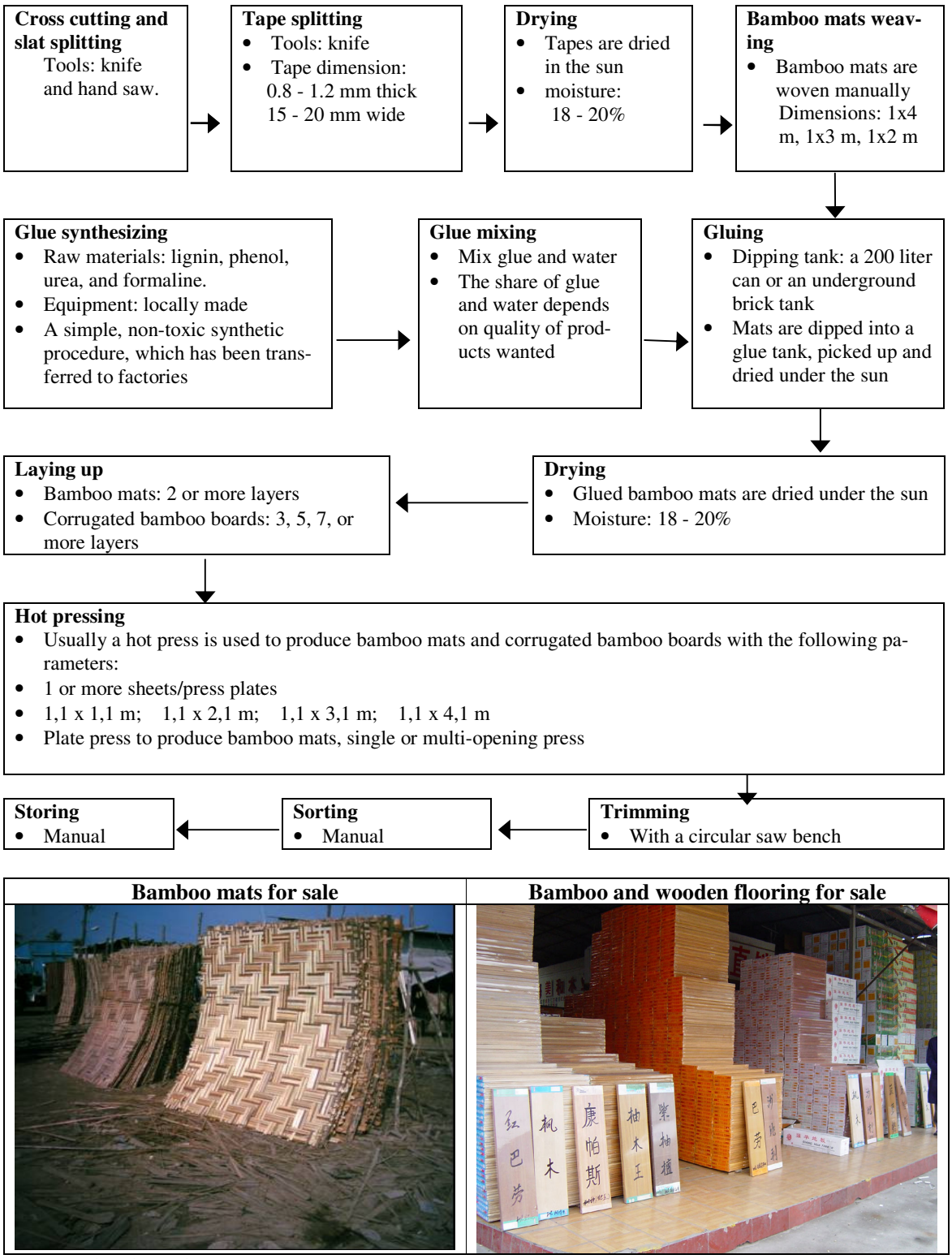
Defects and green surfaces are removed, strips are sorted into surface and core qualities by visual inspection. A three-layer bamboo strip is then laid down for press, each layer containing 5-7 bamboo strips. The core layer is usually composed of a thicker (6 mm) material, while surfaces are made of 4 mm strips. Glue is spread either manually or by a machine, and the stock is manually fed into a single-opening press. Finally, the glued strips are tongued and grooved into dimension, sanded, stained and finished with UV-hardened lacquer. The typical flooring strip size is 15 x 95 x 960 mm. Also one third of this length is produced (320 mm).

4.1.4 Market Outlook

The emergence of bamboo as a timber substitute has coincided with a growing demand for timber at a time of declining supplies, particularly from natural tropical forests. Bamboo's appearance, strength and hardness (comparable to oak) combined with its rapid growth cycle and sustainable harvesting

make it an increasingly attractive wood substitute. The outlook for world bamboo markets looks strong, driven by world's economic growth and demand for sustainable wood-replacement products.

Figure 4.2 Processing Cycle of Bamboo Mats and Corrugated Bamboo Boards



Source: Tissari, 1996

The world market for bamboo products is estimated somewhere above US$ 7 billion p.a. (US$ 5,6 billion of it in China) with a wide product range comprising e.g. handicrafts, bamboo shoots, chop-sticks, blinds, flooring, furniture, panels, builders' joinery & carpentry, charcoal and activated carbon. This figure is excluding pulp & paper and unprocessed bamboo used in construction and household uses. New processing innovations are proven in the marketplace and have helped create a specialist bamboo processing machine and tool industries. These can today supply turn-key processing lines to larger businesses and affordable equipment to household processors. China and the Far East are the main sources of this technology. (Mekong Bamboo Sector Feasibility Study, 2006)

It is important to realize that bamboo and rattan typically yield a higher portion of value to the communities and primary processors than timber (see Box 8). New, higher value added processing greatly increases the potential for pro-poor financial impact compared to traditional lower value processing industries. For example, every ton of bamboo used for producing bamboo flooring has five times the pro-poor financial impact than if it is used for paper. The competitiveness of future bamboo industries will be largely driven by its value-adding rate, with different parts of the bamboo culm being used in the most profitable way. (Mekong Bamboo Sector Feasibility Study, 2006)

Box 8 Bamboo Development Model in Vietnam

An IFC-funded bamboo supply chain development project in Thanh Hoa Province in Vietnam gives an idea of the bamboo potential:

- 500 farmers have benefited from increased earnings from the bamboo they sell to a flooring factory.
- 10 village bamboo pre-processing workshops have been established, creating 539 new jobs, and adding significantly to local incomes. They cut the bamboo to length and split it into the strips required by the flooring factory: strips comprise only 20% of bamboo volume so transport costs are slashed.
- More than 1,000 farmers were trained in techniques to improve yields of the bamboo and cultivate it in an environmentally responsible manner.
- The project supported the planting of over 500 hectares of new bamboo on degraded lands.
- New cultivating methods were tested, e.g. identifying intercrops to grow among the bamboo and provide income during the five years it takes before the bamboo is harvestable.
- From 2010, the newly planted areas will (at current prices) generate an estimated $150,000 per year for 20-30 years.
- At village level, the benefits of the pre-processing workshops have been magnified by the independent start-up of an additional eight "copycat" workshops.

Source: Internet

From natural resource planning point of view, NTFP development can be approached from different standpoints. It is the policy-makers' task to choose the appropriate focus on the NTFP resource and maximize its positive impacts on human development. The four approaches are briefly explained in the following Box 9:

Box 10 Alternative Planning Approaches on NTFP Development

NTFP management is a process involving collection, gathering, harvesting, utilization and management of resources within a given ecological, economic, social, political, institutional and legal frameworks. Alternative approaches on NTFP management may emphasize the following approaches to a variable degree:

1. Economic approach to resource management, which is based on the premise that there is a need to rationalize the allocation of natural resources and optimize their use through competitive market economies to achieve maximum economic efficiency.

2. Ecosystem approach considers the whole ecological system and the relationship among its various components. It recognizes the dynamics of the ecosystem as the basis for resource management.

3. Sociological approach which emphasizes the significance of culture, ecological and social ethics, indigenous knowledge, the role of local people and social institutional arrangements in resource management.

4. Technological approach relies on comprehensive land use/resource management plans and their implementation for rational allocation and utilization of natural resources based on the land capability classification. It aims to monitor and mitigate environmental change using physical tools and modern technologies such as mapping, Geographical Information Systems (GIS), remote sensing, environmental impact techniques, etc.

Source: Mekong Bamboo Sector Feasibility Study, 2006

Recommended actions on NTFPs include:

- Establish a market information system (MIS) on NTFPs, mainly bamboo, rattan, other fibrous materials, to be extended to medicinal plants, etc. later on;
- Establish a Division of NTFPs at the FDA (NTFP management and development should be separated from timber management);
- Liaise more actively with regional and international networks in NTFPs;
- Coordinate better between the Liberian Ministries, agencies and NGOs the sharing of responsibilities and exchange of information on activities around NTFPs;
- Build up national capacities on the foundation of on-going Chinese-sponsored bamboo and rattan training;
- Commercialize bamboo and rattan products in the domestic and ECOWAS furniture markets as wood substitutes.

Key message:
NTFPs like bamboo can become the leader industries for rural industrialization and large-scale poverty reduction in suitable producing conditions. Much of the NTFP collection and pre-processing happens still on local community level. Government and local authorities must provide sustained and consistent leadership to develop NTFP value chains. Internationally NTFPs have gained more recognition by consumers, among whom their eco-branding and alternative image has supported market penetration. Synergies with wood processing can be sought e.g. in furniture and flooring products. International networking in NTFP research and commercial data is crucial for unleashing their potential.

5. EXISTING POLICY, REGULATORY AND FISCAL FRAMEWORKS

The purpose of this chapter is to briefly evaluate the existing policy, regulatory and fiscal frameworks affecting forest and wood industry sectors. Secondly it proposes ways in which it might more effectively promote value adding activities leading to maximum employment generation and balanced re-

gional growth without compromising product quality or current or future profitability of wood industries.

The issue of regional geographical balanced but most of all economically sound industrial fabric has been discussed in the previous chapters, which assessed the future dimensions of the industry under one possible scenario.

5.1 Law, Policy and Regulation

The National Forestry Reform Law of 2006 has been passed by the legislature. It provides the basic provisions for forestry activities in Liberia. The forest resources are held in trust by the Republic for the benefit of the people. Exceptions to this rule are communal forests and forests that have been developed on private or deeded lands through artificial regeneration. The Law governs the prospecting, use, transport, processing and trade of all forest products.

National Forestry Reform Law called for the drafting of a Forest Management Strategy, which has yet to become a Policy Document after two years. It also does not address the issue of a Forest Processing Strategy (elements of which are proposed later in this report).

Other shortcomings in Law are indicated below:

- Failure to address the issues of private and deeded lands: how are they going to be managed (sizes range between 40,000-400,000 ha)
- Forest Management Strategy also fails to address this issue
- Reforestation Fund has not been established under the law
- Reforestation Strategy is lacking after two years of existence of National Forestry Reform Law of 2006
- System of accountability and transparency concerning the National Protected Area Fund and Reforestation Fund is not yet established
- The max. 5,000 ha area allotted for TSCs is inadequate, to combine two TSCs on separate locations makes it no easier to operate –is there a need to amend Law to increase the TSC size?

The revision of the forestry policy of Liberia was kick-started with the document "*Forest Policy Review: vision 2024*". In 2006, the ***National Forestry Policy and Implementation Strategy*** was endorsed. Current document is said to represent a state-of-the-art quality in forest policy, and it is built on the principle of balancing the three uses of forests, i.e. community, commercial and conservation, also known as 3Cs. Implementation of the policy will require the strengthening of financial, human and technical capacity amongst stakeholders and institutions.

Activities concerning the modernization of the wood processing industry are clearly defined in the implementation strategy of the policy document. Responsibilities are logically shared between the private sector (*as investors*) and the government (*as supporter and regulator*). The government reserves the right to negotiate the international market access matters on behalf of the sector. This is a wise proposition in light of the possible implications of FLEGT (Forest Law Enforcement, Governance and Trade) initiative and the related VPAs (Voluntary Partnership Agreements) on Liberia's future exports. Both private and government sides would contribute funds to train formal and informal wood processors, but no dedicated fund has been envisaged.

Forestry Development Authority (FDA) promulgates regulations on specific issues on implementation of the Law time to time, and is mandated to enforce them. **Ten Core Regulations** (Reg. 101-110 - 07) establish the current manual for forest decision-making, concession awarding, operations, fees, benefit sharing, chain-of custody, etc.

FDA's goal is to maximize economic benefits through sustainable management, conserve biodiversity and empower communities to ensure equitable benefit sharing and democratization of the sector. In commercial forestry FDA aims to maximize proceeds from primary and value added processing in harmony with forest resources. FDA pledges to use the returns in equitable poverty reduction for the Liberian people. Specific functions of FDA are defined to comprise:

- formulation of forestry policy,
- forest resource management,
- control and management of concessions,
- collection of revenue from forest activities,
- research (incl. market intelligence), and
- training.

With regards to poverty reduction, the FDA is committed to community forestry by awarding concessions and licenses to local communities and local, small-scale enterprises, empowering local communities to identify opportunities, and providing extension and technical assistance in community forest management.

All forest operations shall comply with the Forest Management Guidelines and the Liberian Code of Forest Practices (issued in June 2007). The latter is referenced in full to all concession contracts (TSCs and FMCs).

Finally, SGS (Société Générale de Surveillance) has been granted with a Chain-of-Custody (CoC) contractor position under FDA. It means that SGS acts as an "arms-length" independent body to build CoC system, train and manage its operations, and to ensure that forest-related taxes, charges and fees are duly collected. Contract is based on 34,8% fee on revenue collected (see Annex 2).

5.2 Fiscal Frameworks and Incentives

5.2.1 Taxes, Charges and Fees

Currently valid taxes, charges and fees have been adopted from Peter Lowe / the World Bank in the Box 10 below. The same rates have been applied (with certain assumptions) in the revenue calculations of the previous chapters. Taking the species class breakdown and estimated product prices into account, the average fees (as of USD FOB value) were set at 7,08% for logs and 1,54% for wood products in this study.

The fee structure raises the question whether they encourage into value added processing. The main points of consideration are:

- Stumpage, Log Export Fee and Wood Product Export Fees are differentiated according to classes of species. This makes it very difficult to estimate revenue or make projection without forest inventory data, which is badly lacking in Liberia.
- Liberian forests have been creamed in the past, what means that valuable commercial species make up a small portion of the total timber stocks. Species classes have been adjusted to reflect the poorer quality of the forests (some species have been "upgraded" to a higher class).
- In that sense the penalizing fees on prime species (Class A), and lower fees on lesser-used species (Classes B and C) may be pointless. Concessionaires will have to use the lower-quality species anyway. One can ask if the regressive fee structure will yield optimal revenue for the FDA / MoF.
- Same applies to wood product export fees: majority of value added processing will eventually use lesser-used species, and collect fees according to the lower rates. Revenues could be higher on one flat rate across species.
- Fee rates distinguish only between logs and any form of a processed product. This provides no incentive to move higher in the value addition, as a fixed percentage of the FOB value is

charged in each species class. The processing cost and marketability of species within the classes, and between products, can differ greatly.

The currently proposed spread between log export fees and wood product export fees is relatively narrow (2,5%-10% logs *vs.* 1%-2% wood products) by international comparison. Particularly log export fee tariffs are considerably lower in Liberia than in countries which eradicate log exports more forcefully. The system is based on the provision of a single flat rate on all value added products per species class - and not per type of product. Moving into differentiated wood product export fees would necessitate further studies into the yield and profitability of the value adding processes. Another option is to consider a percentage-based reimbursement system of stumpage/collected fees to companies who process wood efficiently into value added products.

Box 10 Taxes, Charges and Fees on Wood Processing in Liberia

Corporate tax rate	35,0%

Port fees	$/m3
	25,0

Forest charges		
Contract admin. fee:	1 000	$/yr
Coupe inspection fee:	0,50	$/ha/yr
Area fee - TSC	1,25	$/ha/yr
Area fee - FMC	2,50	$/ha/yr
Waybill:	0,25	$/m3
Export licence fee:	0,10	$/m3
Minimum financial benefit to communities:	1,00	$/m3

Ad valorem of market price (f.o.b.) by species category	Class A	Class B	Class C
Stumpage fees	10 %	5 %	2,5%
Log Export fees	10 %	5 %	2,5%
Wood Product Export fees	2,0%	1,5%	1,0%

Protected Area Levy	(%)
Stumpage fees	10 %
Forest Product fees	10 %

Community Minimum Benefit levy	$/m3
Stumpage fees	1,00

Source: Peter Lowe / WB

In conclusion, fiscal incentives need to be properly defined by processing degree to promote moving higher in the value addition. It is recommendable to:

- Determine the export prices by product and species from reliable sources (periodically).
- Follow-up closely the international prices and market developments and adjust taxes accordingly (as Liberia has done in the past).
- Study the costs of production at various levels (logging, primary and secondary processing) to understand the competitiveness and profitability of Liberian producers.

- Introduce a more diverse fee structure that takes into account different stages of value added processing and sets a more attractive regression of fees - without compromising the government revenue.

It is maintained that export taxes are the preferred instrument among the various policy options to restrict exports of an unwanted product. Taxes are a credible policy, yielding the government some revenue while being transparent and simple to administer.

One observed domestic need is to bring a good portion of the informal wood processing sector under the legal framework to avoid its criminalization. This would require registration and product standardization (of species, volumes, dimensions) of their business, to provide a basis for taxes and fees. The current flat 0.60 $/piece entry fee of sawn timber into market - irrespective of species or dimension - should be thus replaced by appropriate volume or value-based fees.

5.2.2 Incentives

National Investment Commission (NIC) oversees and develops the incentives in Liberia. *An Act Amending the Investment Incentives Act of 1973*, and *An Act Amending Section 204(e) of the Liberia Revenue Code of 2000* have been issued. These will bear some obvious relevance to the wood industry sector.

Investment Incentives Act has been revised by NIC and assisted by IFC (International Finance Corporation, FIAS / PEP Africa) according to international best practice, systematizing the incentives according to sector, employment impact and location. The draft Act has been handed over in trust to the consultant team. It has passed the Ministerial level of approval, and it will be presented to the House of Representative and consequently passed on to the Legislature in early 2008.

The Revenue Code Amendment is titled *The Investment Acceleration Incentive Act of 2008*. Upon the approval by Ministry of Finance and NIC, manufacturing investments like those in wood processing are subject to special tax incentives if they carry a minimum value of US$ 1 million. These are **additional** to any capital incentive deduction already allowed under section 204(d).

Provisions of the new special tax incentives include:

- An incentive deduction of 30% of the purchase price of equipment and machinery used in the activity in the year a qualifying asset is placed in service.
- An incentive deduction of 10% for the cost of buildings and fixtures used in manufacturing processes that produce finished products (whether for domestic consumption or for export) having at least 60% local raw material content.
- A rural development location incentive for economically deprived zones (three zones defined)
- Additional incentive deduction for investment activity certified by the Minister as meeting standards for increase in employment (for more than 100 jobs created)
- For a five-year period following the commencement of investment, exemption from GST and import duty, but not from the Customs User Fee or ECOWAS Trade Levy, for the following:

    - All medical and educational equipment and supplies purchased for use directly in or in connection with the investment activity and intended to be placed in service within one year of purchase
    - Other assets purchased for use directly in the activity and intended to be placed in service immediately upon purchase, specifically for manufacturing: equipment & machinery, raw materials, and capital spare parts.

- Additional tax incentives for investments exceeding US$20M shall be subject to approval by the President and Legislature.

The present or amended incentives are established by three criteria, namely by sector, location and employment generation. They do not take into account the level of value added created, and therefore fail to provide direct impetus for moving higher in the value chain. That is left for the market forces to decide. The domestic market for value added wood products tends to lack sufficient dynamism and much of the activity is in the grey sector, i.e. it operates unregulated and produces little fiscal income for the Government. It is probably realistic to first expect exports picking up to the neighbouring countries and ECOWAS block.

6. ALTERNATIVE MEASURES TO PROMOTE DOMESTIC PROCESSING

6.1 Limitations

Liberia can take stock of several other countries in comparing the successes and failures of log export bans, export fees/taxes, and gradual shifts of exports from unprocessed logs into more efficient processing of value added products. Most countries in West and Central Africa have introduced - some quite recently - policies aimed at increasing efficiency in logging and processing operations, and at the same time restricting trade in unprocessed logs. But in the absence of effective enforcement, such incentives may produce a paradox result, i.e. encourage illegal logging and accelerate forest degradation. Policies aimed at concentrating timber production (more intensive logging in smaller area of total forest, regulation of the grey sector) and simplifying forest taxation can help reducing the need for costly enforcement and government oversight.

Unfortunately experiences are often crippled by the poor implementation, corrupted governance and *ad hoc* changes, which tend to water down the potential impact of measures. Fiscal revenue point of view is utmost crucial in maintaining the government interest in promoting domestic processing of wood and lowering log exports.

It should be remembered that the World Bank has advised African tropical countries in using a mix of steering tools and penalties on log exports. According to the World Bank's "conventional wisdom" on forest policy, a log export ban leads to lower domestic log prices, and higher area taxes on concessions induce more efficient harvesting and processing. In the following chapters some of the experiences from the region seem to confront this theory.

6.2 Experiences and Lessons Learned

A wide range of policy instruments for promoting domestic processing (e.g. full or partial log export bans, minimum local processing quotas, differentiated export taxation according to the degree of processing) have been tried in West and Central Africa alone. The approaches and experiences are varied, and in some cases industrial growth has taken place at excessively high economic cost. Cameroon introduced a significantly higher area tax coupled with concession auctions. This lead into smaller-sized concessions, which became however quite intensively logged. In Congo and Gabon, in contrast, a negligible area tax and minimal processing capacity have resulted in very large concessions that are under relatively low pressure from logging-induced forest degradation or agricultural encroachment. Congo Brazzaville has started a log quota system recently, what affected the total supply of logs to exports. Equatorial Guinea is following suit by imposing a total log export ban from its fast diminishing forests.

Log export bans have proven insufficient alone and leak without proper enforcement. Log export bans have often encouraged illegal logging and associated trade. It appears that log export restrictions should preferably come into play phases, and the whole question should be addressed in good synchronization with the development of industrial processing capacity.

Experiences from three countries West / Central Africa are discussed in Annex 3.

6.3 ATIBT Observations on Export Structure

In its Annuaire 2007-2008, ATIBT notes that the trend in West/Central African exports of tropical logs is in freefall, i.e. down by 30% over the last four years. ATIBT cites the local processing policies applied in the countries as a reason. The trend has most visibly affected Gabon's export structure, followed by Congo and Central African Republic. Cameroon and Côte d'Ivoire show less clear of a trend, as their log exports have held quite steady despite policies to curb them.

Looking at the other side of the coin, exports of processed products have increased for these countries. In sawnwood the situation is mixed, with Cameroon, Gabon and Ghana showing growing exports and Côte d'Ivoire and Congo Brazzaville staying flat. In plywood and veneer Cameroon, Gabon and Côte d'Ivoire have increased exports but Ghana has deteriorated.

Key message:
Experiences on log export bans and other trade measures to promote domestic processing have been mixed. Perhaps the most worrying consequence of log export bans has been the rise of illegal activity to loot the forests. Logging bans for exports tend to be difficult to enforce and may lead to alliances between illicit producers, buyers and traders. Understaffed enforcers may also be tempted to seek rent. Some recent timber trade trends in West and Central Africa may indicate positive experiences as export structures have changed in favor of value added products. On the other hand, in some countries policy has failed or been watered down with ad hoc changes. Governments may overrule bans because of forgone revenue caused by restrictions in log exports. Log export ban or quota is always a strong measure, and the industry can best adapt when the chosen policy is kept in force consistently. Percentage or volume targets for gradually limiting log exports and expanding processing are more manageable and help avoiding market disturbances.

6.4 Bettering of Investment Climate

Broad improvements in the investment climate would be necessary for enhancing domestic processing in Liberia. Some issues of concern are:

- Limited strength of the local banking sector: no financing available at a reasonable cost.
- Need to improve the security of investments (e.g. machinery, fuel looted from investors's sites), and ease of doing business (one-counter service).
- Administrative friction and lack of business facilitation.
- Lacking human resources (machine operators, saw-doctors, managers, FDA).
- Insufficient port facilities, log and timber handling, storage and inspection capacities.
- Degree of processing is not properly considered in Wood Product Export Fee (based on FOB value of a wide groups of species, but not differentiated by product).
- Accumulated debts with Liberian logging companies may become a competitive disadvantage for domestic firms in the bidding against foreign investors. Debts amount to around US$ 64 million. The companies had their concession contracts revoked, some equipment were looted, and most firms are capital-starved to invest again.

It is also unclear whether the bio-energy products currently being exported from Liberia (charred rubberwood chips) are exempted from Wood Product Export Fee. This would be counter-productive for the development of value added processing of solid wood products. Rubberwood can be a major source of furniture raw material if properly treated and dried.

In the carbon constrained business environment, it would be appropriate to allow higher tax rebates for bio-energy producers as a part of their investments in wood processing facilities. Combined heat and power installations would provide a win-win solution as both processed wood products and waste utilization could be combined.

6.5 Revenue Considerations

In Liberia, the FDA & Ministry of Finance have three basic direct revenue streams from the forest concessions:

1. Stumpage on all removed logs (Class A 10% of FOB value, Class B 5% of FOB, Class C 2,5% of FOB)
2. Land Rental Fee (2,50 $/ha for FMC, 1,25 $/ha for TSC)
3. Forest Products Fees:Log Export Fee 10% / 5% / 2,5% of FOB per Species Class, and Wood Product Export Fee 5% / 2,5% / 1,5% of FOB contract price per Species Class

In international comparison, Liberia's wood products export fee seems reasonably low, and its difference from log export fee is quite narrow. For example Papua-New Guinea applies no tax on exports of processed timber products. Round log exporters pay a high tax of 28,6% of FOB value as well as a development levy of 2,80 US$/m³ of logs exported. For customary landowners log exporters pay 3,50 US$/m³ for logs harvested. PNG has for years remained as the lowest-cost source of tropical logs for Asian markets, and is now trying end the vicious cycle by strong exports tax measures.

Other associated fees in Liberia accrue independent of the degree of processing of products. These are forest charges, port fees, and corporate taxes. The following comments were received from LTA:

- Land rental fee is considered too high at 2,50 US$/ha for FMC, as it works like a fixed cost.
- It should be reconsidered at the levels of 1,25 $/ha for large FMCs and 0,75 US$/ha for small FMCs and TSCs.

One discussion point is the policy of royalty reimbursements, which has been studied and tried in some African countries. A current example is Mozambique where one incentive planned for developing the domestic industries is the 40% reimbursement of royalty taxes for companies producing value added products, such as parquet, veneer and furniture. In order to have the mechanism operational, more knowledge is needed about the efficiency of the timber industry in general as well as on the profitability of an individual company applying for the reimbursement. Only by meeting the criteria of a good average processing efficiency, industry-standard conversion factors and profitability, companies would qualify for the 40% reimbursement of value added products.

7. CONCESSION ALLOCATION PROCESS

The objective of this chapter is to briefly examine possible adjustments in the process of allocating concessions to encourage value added activities, and assess the pros and cons of a purely market-driven approach. Material is based on a review of concession agreement models (TSC and FMC), social agreement model, and interviews with a number of stakeholders.

It is understood that the allocation process and its necessary preparations are lagging somewhat behind their intended schedule. This review is not aimed at substantially revising the contracts or the allocation process. Some issues and text editorial remarks are raised in the following chapters.

7.1 Pre-qualification

All bidders are subject to compliance with pre-qualification rules as specified in FDA Regulation 103-07 and the Public Procurement and Concessions Act (PPCA). The companies must demonstrate the following:

- they are not suspended or debarred from bidding because of e.g. tax arrears or criminal convictions,
- are incorporated and headquartered in Monrovia, and involved in logging,
- managers have not violated laws or filed for bankruptcy,

- have the means for paying taxes, social security payments and other fees.

In addition, past records of logging activities prior to 2006 will be examined and full cooperation is expected from a bidder in any case of further inquiry.

Business Plan of the bidder will be examined with the aim of verifying his capability of running the logging operations. In large concessions (>250,000 ha) bidder's experience in implementing sustainable forest management and certification will be assessed.

During the pre-qualification process, the bidders have to choose between TSCs and FMCs, as both cannot be awarded to the same candidate. This mechanism also effectively closes out of the bidding process those industrialists who would not engage in forestry, but just establish processing facility. In pre-qualification form the applicant has to choose between TSC and FMC.

This has raised discussion on the status of "free-standing sawmills" in e.g. FDA. Basically sawmillers are not allowed to engage in processing without going through the bidding process. In reality, it is of course possible that such entrepreneurs buy logs or squares from TSCs or FMCs for further processing. The danger in allowing the practice is that the "free-standing sawmills" may ramp up the processing capacity with no responsibility on sustainable forest management. This mechanism was at least partly responsible for the overcapacity and forest degradation in Cameroon.

7.2 Competitive Bidding

All contracts on FMCs and TSCs must be awarded through competitive bidding by law. Only pre-qualified companies are entitled to bid, and follow procedures outlined in FDA Regulation 104-07 and in the bid document, which contains:

- timber volumes by species based on inventory data; and
- deadline for bid submission.

Bids will have to be duly prepared and sealed, and be accompanied by 1/6th of minimum annual land rental as bond. FDA selects an independent evaluator to prepare a reserve bid on contract's net timber value as benchmark to competing bids.

The highest bid wins, provided that there are no obstacles in eligibility, and the PPCC can award a no objection letter. Bids for FMCs larger than 100,000 ha are open to international companies, but PPCA/FDA may choose to adjust bids by using so-called Margin of Preference for domestic bidders. This raises some questions on the rules of the competitive bidding process, which is supposed to be market-driven. FDA must be prepared to reason well against foreign highest bidder if the Margin of Preference is applied. It may well be justified to do so for maximizing the national economic benefits, but the international bidders must be fully informed about the criteria in the bid document. Otherwise the system may be prone to dispute and legal battle.

Key message:
Some of the now idle West African wood processing capacities will be possibly relocated to Liberia, if the concession bids of the companies active in those countries will succeed. This is both an opportunity and a challenge to Liberia, because these operators should not be allowed to import their past boom-bust processing philosophy into the country. Liberia has a chance to develop its wood processing proactively and with a long-term vision of sustainable development for the people of Liberia. This will not be achieved very quickly, as a rapid return to a relatively advanced industrialized state of the sector is not feasible. Rather it is a phased process that needs to be governed with skill by FDA.

7.3 Timber Sales Contracts

FDA has announced 46 TSCs that will be awarded in the next few years for a total areas of 230,000 ha. About 107 TSCs have been previously identified in land-use classes 2.3 and 3.1. The primary purpose of their awarding will be to fast-track logging for exports and for domestic processing. Subsequently, TSCs are subject to possible land-use change afterwards. It is noted that Export Fees are not mentioned among the items of the para **B7.62 Timber Sale Account** of TSC model. Whether this exemption is for a reason or by a mistake needs to be verified.

It is known that majority of TSCs have been creamed in the past. Some are, however, very well stocked with valuable timber, but due to their remote locations cannot be combined with larger TSCs to allow a feasible processing base. The small average size and three years duration of TSCs is a disincentive for long-term investments in value added processing. Of course there are political motivations in keeping them small and thus accessible to small operators, who may choose to clear the forest into other land uses such as farming land or plantations.

Voluntary grouping of 2-3 of them to supply one central sawmill - or a larger FMC processing base - may happen and become a market-driven solution in short-term. On TSCs mobile sawmills can process logs anywhere in the forest. Suitable technologies have been discussed previously in this report. Possible types of machinery include e.g. Wood-Mizer LT-70 & M-7 (mobile), Canali 800, CD-10 (static) etc. Value adding potential is not very high as practically only logs and mobile unit sawnwood are achievable products from TSCs. But depending on technology chosen, processing at TSCs can be raised from the "pilot" level (squares, boules and planks) to more significant value added sawnwood to FMC-operators and local mills. This can be done on two levels:

1. Initially, the level of value added created depends on their skills in planning well the logging operations, delivering the logs efficiently to buyers, and grading and pricing the logs appropriately. Such actions require skills that are thinly available in Liberia's forestry sector. Export prices are lucrative and rising at the moment for logs, but not for air-dried sawnwood. Foreign buyers and processors will play an upper hand and may exploit TSC log suppliers.

2. Secondly, mobile sawmills can at best yield high-quality sawnwood with accurate dimensions and optimized breakdown sawing. The more advanced models of mobile sawmills have inbuilt computer to store information on saw kerf and the most used lumber dimensions. Log turning and clamping systems are automatic: The sawyer controls the mill by choosing one of the three modes of sawing with remote control - or runs it on manual mode. Automation and sawing programs reduce radically human error, working hazards, downtime and log wastage. Such mills are successfully used e.g. in Indonesia's teak wood furniture mills.

7.4 Forest Management Contracts

Sixteen FMCs are being prepared for contract bidding btw. 2008-2011. The first ones are two around 60,000 ha blocks in Rivercess county, and one 116,000 ha FMC in Lofa (all in 2008). Gbarpolu, Sinoe and Grand Gedeh will bring major areas on stream next year. A total area of 2,27 mill. ha is targeted for FMCs. A full table of the areas is in Annex of this report.

FMCs contractors are allowed a two-year grace period to bring up logging for exports before starting up processing facilities. Achieving this will require early commitment to start erecting processing capacity already on the first year. Contractor has to commit himself to the processing requirements as demanded in the Part A - Special Conditions of the FMC agreement. Processing facilities will have to be listed and a minimum expenditure on them specified. FDA must acquire proper understanding on the investment costs associated with serious processing facilities to avoid too relaxed conditions. "Action" should define the intended timeline and milestones of bringing the processing facilities on stream. There should preferably be space or a clause for agreeing on a percentage or volume-based

target for the gradual move from log exports to wood products in the course of the contract period. Otherwise the matter may become a subject to lingering differences of interpretation. A typical result of undecided processing targets may be a minimal "operational" or "business development" investment to meet the letter of the contract and to continue log exports unabated.

FMC model text differs in many parts from the simpler TSC model:

1. A comprehensive Sustained Forest Management Plan (one year from award date for 5-year harvest period), Environmental Impact Assessment Study (max. 90 days afterwards,) are required. On TSC Annual Operational Plan will suffice.
2. Time period for agreeing with the community on the Social Agreement terms is extended to one year from the bid opening date (30 days on TSC).
3. A Business Plan addressing the business development and investments (submitted prior to award date, completed in two years from award date).
4. Contractor is mandated to make a substantial infrastructural impact in improving the roads, ports, railways, pipelines, electrical plants, communication and transportation services, etc.
5. Contractor's operations are subject to rigid periodic reviews, most of all the Annual Compliance Review by the Forest Concession Review Committee, but also by independent auditors of forest management, civil society bodies and FDA.

Contract text is silent about any other forms of processing except "lumber". Plywood mills are not mentioned, nor are any remanufactures from sawnwood specified.

Contrary to TSCs, sawmills on FMCs are not allowed to be built anywhere in forests on contract areas, but have to be situated in rural centers. Strategically located smaller mills can be placed in rural wood processing communities or county or district headquarters towns. Contractor may apply for re-entry into previously harvested timber blocks from FDA.

7.5 Editorial Remarks on Model Contracts

There are a couple of editorial errors in the TSC contract models reviewed:

1. Under para **B4.14 - Use of Private Lands**, point (b) an erratic reference is made to FMC (*…operations of another Forest Management Contract; and….*).
2. Under para **B4.3 - Right to Take and Use Water**, the sentence should read: *…CONTRACTOR may use free of charge any water…* (not change).
3. FOB should be referred as Free-on-Board (not *freight on board* in para **B7.4** - **Export Fees**).

Other remarks:

4. An appropriate clause is stated in para **B6.31 - Merchantable Trees** to promote further use of species that are not currently marketable in the world and local markets (lesser-used species).
5. It is questionable whether CoC contractor can efficiently monitor all the volumes and species of timber harvested, processed and exported, even though this reads in the TSC model. Contractors are accountable for complying with the requirement of the CoC Manual.
6. Utilization of NTFPs is strictly prohibited and access of local communities to them protected by the government. The allowed logging will undoubtedly degrade the occurrence of NTFPs on sale area. Social Agreement can specify rates for damage caused to NTFPs.
7. The Social Agreement draft, nor the TSC draft, specifies any fixed percentage of the Annual Contract Payment or stumpage for community development (*this may have been amended in more advanced versions of the Contract models*).
8. "Periodic Review" of TSCs comprises exactly the same contents than Annual Compliance Review on FMCs. Five-year forest management audit is not applied on TSCs.

8. FOREST PROCESSING STRATEGY OF LIBERIA

On the basis of the previous chapters, the main elements to be included in a draft Forest Processing Strategy of Liberia are described. Aim is to highlight the issues to be addressed, and chart a process for developing the strategy.

Objective of drafting the Forest Processing Strategy should be to provide a roadmap for foreign and Liberian wood industry investors and the Government on the desired format of wood industry, NTFP commercialization and a set of incentives provided by the Government by degree of processing.

The ultimate goal should not less than maintaining Liberia's forest cover, its sustainable utilization for value-added products for present needs and for future generations. Industrial structure should encourage the importation of more efficient processing machines, technology transfer and the subsequent remanufacturing of processing waste.

The main elements of the strategy are listed below:

1. Setting quantitative targets for value added wood processing and NTFPs manufactured for the next 5, 10 and 15 years;
2. Spelling clearly out capacity building needs (institutional and human resources development); and outlining a plan to achieve them;
3. Harmonization between wood industry capacity and sustainable forest management needs to be based on reliable AAC at least on concession area level;
4. Monitoring of the roll-out of concessions and the development of processing capacity;
5. Establishing targets for employment and Government revenue;
6. Setting up of an organizational structure to oversee the strategy implementation.

Roadmap on strategy development is proposed as follows:
1. Responsible organization (FDA) initiates work and sets a Drafting Committee;
2. Institutions nominate their technical experts into Committee (MoC, University of Liberia, Cuttington University, MoF, NIC, MPEA, EPA, MIA, NGOs);
3. Selection of local and international consultant into Committee (if appropriate);
4. Committee prepares a Draft Strategy;
5. Sends draft out for 1st national consultation (Monrovia);
6. Collects feedback and make revisions;
7. Sends revised draft out for 2nd national consultation (in regions);
8. Finalization workshop of strategy in Monrovia;
9. Approval of strategy by the Board of Directors of FDA.

9. GOVERNMENT AGENCIES PROMOTING AND MANAGING THE WOOD INDUSTRY

The purpose of this chapter is to provide a rapid assessment of the structure, capacity and transparency of the relevant government agencies promoting and managing the wood industry sector to identify structural and capacity constraints which need to be addressed.

As FDA is in the center of attention of this assessment, its observed constraints in terms of financial, human and technical resources are not repeated here. In the context of commercial forestry, the overall aim of FDA is to maximize its contribution to equitable poverty reduction through forest production at primary and higher levels, while keeping that in harmony with forest resources. Some suggestions have been made over the years for reorganizing the FDA, by among others the following:

- A number of consultants brought into Liberia by the Liberia Forestry Initiative (LFI) have documented this advice to the Government; among these are the works of Prof. Kwabena Tuf-

for when he prepared a report to the FAO entitled "Reconstruction Plan for Forest Development Authority of Liberia (2004-06)".

- "FDA-Management Study and Financial Review" Institutional Support Programme by Dr. M.P.E. Parren, C.G. Arendt, and F.K. Odoom (Nov. 2004) under the auspices of the European Commission, Final Report Vol. 1: Main Report; Request for Services number NAGEL/LIB/015/2004. In this report, the team advised that the restructuring of the FDA administration was necessary and that it should be passed into law.

In conclusion:

- Restructuring of FDA is possible only by revisiting the 1976 Act, whereby FDA was created.
- It is advised to create posts for three Deputy Managing Directors for the 3Cs (communities, commerce and conservation), and Deputy a Managing Director for Administration.
- FDA's capacity to do law enforcement is of critical importance when the commercial forestry restarts.
- FDA may be better off in establishing an information and cooperation system with other countries to get fast access to research instead of putting its scarce resources on establishing domestic research capacity up-front.
- Research, realistically, must be prioritized secondary to law enforcement because of budgetary constraints.

FDA's resources are known to be grossly inadequate at the moment. It has remained a highly centralized institution, with a predominant focus on industrial production, which is its primary revenue source. FDA also signs all the TSCs for winners of the bidding process, and controls possible transfer or assignment of contract won to another company.

The other associated government agencies, Ministries and other bodies are briefly detailed below.

Table 9.1 Government Agencies Promoting and Managing the Wood Industry

Name	Relevance and Tasks
NIC National Investment Commission	Revenue Tax Code is revised, IFC assisted in revising Investment Incentive Code
Ministry of Finance (MoF)	Major player in concessionaire pre-qualification, member in the Board of Directors of FDA, member in the Bidding Committee
Ministry of Planning and Economic Affairs (MPEA)	Member in the concession Bidding Committee
Ministry of Justice (MoJ)	Legal aspects on concessions: help drafting and reviewing agreements
Ministry of Internal Affairs (MIA)	Member in the concession Bidding Committee
Ministry of Commerce and Industry (MoC)	Member in the Board of Directors of FDA
Public Procurement and Concessions Commission (PPCC)	Will be a major player in the concession allocation process, members in concession Bidding Committee; issues a Letter of no Objection on bidding process winner
Non-Governmental Organizations (NGOs)	A coalition of NGOs want to postpone concession opening, criticize Forest Management Strategy document of a pro-industry approach

The time and scope of this study is inappropriate to provide a detailed assessment on their future leverage on the promotion and management of wood industry in Liberia.

10. RECOMMENDATIONS ON DTIS ACTION MATRIX

This final chapter presents a WB-format table on recommend priority actions to be included in the DTIS Action Matrix.

Recommendations to DTIS Action Matrix: Liberia Wood Industry

OBJECTIVE	ACTION TO BE UNDERTAKEN	PARTY RESPON-SIBLE	ESTIMATED COST (US$)	TIMING (START-ING TIME)	PERFORMANCE INDICATORS
Wood Industry					
Policy & legislation reform					
National Forestry Reform Law 2006 amended	Re-write Chapter 13, Section 13.3 Processing of Timber Products. Build into Law incentives for investing in remanufactured (value-added) wood products (progressive per degree of processing).	FDA, MoA, MoC, MoJ, MoF, NIC	20,000	6 months	Appropriate text in Chapter 13. No disputes on definitions and associated regulations.
Design and enforce Reforestation Policy and Reforestation Fund	Establish guidelines for the reforestation of permanent and non-permanent forestlands, including private and deeded lands suitable for industrial plantations. Set up the Reforestation Fund, with transparent rules and administration.	Private sector, (supported by FDA, MoA, MoF, MoJ)	80,000	12-36 months	FDA to set policies, standards, rules and regulations. Only competent private operators develop and carry out plantations or reforestation schemes for wood production.
Feasibility studies					
Feasibility study of a sawmill to repair the Yekepa - Buchanan railway with locally sawn *ekki* sleepers	Strike a deal btw. FDA/NPA on abandoned *ekki* logs in Buchanan Port and establish the feasibility of a sawmill to produce railway sleepers (instead of imported concrete or steel sleepers).	FDA, NPA, MoC, MLME	160,000	6-12 months	Feasibility and agreement established to capture the immediate market opportunity. Export potential assessed. A kick-start to local sawmilling in Buchanan.
Value Added Processing					
Value adding with improved log grading	Adopt ATIBT grading rules on all logs for exports (later processing) by training a sufficient number of certified log graders.	FDA, LFI	40,000	3-6 months	Number of certified graders. Percentage of log harvest graded.
Draft the Forest Processing Strategy of Liberia	Provide a Roadmap for foreign and Liberian wood industry investors on desired evolution of the industry and incentives provided by the Gov't by degree of processing. Set quantitative targets for value-added and products manufactured for 5, 10, 15 yrs.	FDA, NIC, LTA, MPEA	20,000	12 months	Vision on the industry in next 5-15 years is understood by stakeholders. Fiscal revenue, employment and local capture of value-added are estimated and guide policy-making. Incentives for investors clearly set.

OBJECTIVE	ACTION TO BE UNDERTAKEN	PARTY RESPON-SIBLE	ESTIMATED COST (US$)	TIMING (START-ING TIME)	PERFORMANCE INDICATORS
Study on profitability of wood & NTFP processing on different levels of value addition	Policymakers need to understand where the profits are made along the wood and NTFP processing chain. A study into the West African profitability of log exports, sawn timber and its remanufactures, furniture components, NTFPs etc. would help steering industry development proactively. Created study methodology would be a periodic tool in the changing operating conditions.	FDA, MPEA, MoF, MoC, NIC	80,000	12-24 months	Proper understanding on the industry feasibility and profitability. Taxes and fees set against solid understanding on economic returns. Liberia's wood processing will be guided to achieve gradually a higher degree of value-added products.
Market access					
Understand the immediate potential in the regional West African ECOWAS, Maghreb & RSA wood products markets for Liberia	Conduct survey of the regional West African, Maghreb and Republic of South Africa's markets for value-added wood products (sawn timber and its remanufactured products, plywood, wooden furniture) to reveal the opportunities for exports from Liberia	FDA, MoC, MoF, NIC	40,000	3 months	Number of potential buyers identified and interviewed per product. Number of sales contacts initiated.
Launch a market information system (MIS) on commercial, lesser-used / lesser-known timber species, and NTFPs	Establish a network with African, European and Asian market information providers and timber laboratories on lesser-used and lesser-known tropical timbers relevant to Liberia, with a view of taking stock on promotional work done and results achieved. Cover also key NTFPs with immediate development potential. Network with ITTO, Ghana Timber Export Development Board, etc.	FDA, MoC, NIC, MoF	40,000	6 months	Number of potential LUS/LKS species properly referenced with on-going testing/end-use study /promotion work in the markets. Regular use of such information. Understanding which NTFPs & applications provide the fastest commercialization possibilities.
Understand the complexity and structure of the large European, Asian and US markets for value-added wood products of Liberia	Conduct market research for identified Liberian value-added wood products that would be exported to the major overseas markets. Focus on pre-identified buyers and importers and their quality and commercial requirements.	FDA, MoC, LTA	50,000	12 months	Number of potential buyers and importers identified and sensitized on Liberian supply. Number of sales contacts initiated.
Training and education					
ATIBT log grading training	Enroll Liberian foresters to ATIBT log grader diploma courses.	FDA, ATIBT	16,000	3-6 months	Number of Liberian certified log graders increased. Log grader profession re-established in Liberia.
Environmental Impact Assessment (EIA) training	Enroll Liberian foresters/engineers into EIA training abroad or with EPA (Environmental Protection Agency)	EPA; FDA, foreign training	30,000	3-9 months	Number of Liberian EIA inspectors increased.

OBJECTIVE	ACTION TO BE UNDERTAKEN	PARTY RESPON-SIBLE	ESTIMATED COST (US$)	TIMING (START-ING TIME)	PERFORMANCE INDICATORS
		courses			Bettering of EIA quality and capacity in Liberia.
Restart wood industry machine-operator and skilled laborer vocational training	Restore a wood industry training facility and develop a modernized training curricula. Start regular training as per industry's needs (operators of machines, kilns, production managers, maintenance, etc.).	MoE, MoL, FDA, LTA	60,000	12 months	Number of trained operators/skilled laborers. Type of skills up-graded. Employment of trained workforce.
Marketing and export training courses	In order to upgrade market access and practical application of MIS, assemble 3-4 days marketing courses for company sales staff & managers with exercises pertaining to their priorities in marketing.	LTA, ALL	15,000	12-18 months	Number of sales staff & managers attended the courses. Improved sales and marketing skills in exports to overseas markets.
Strengthening of networking capacity in the forestry education	Support the College of Agriculture & Forestry at the University of Liberia and FDA capacity across the 3Cs (communities, commerce and conservation). Strengthen the University of Liberia Fendall Campus. Re-habilitate the Forestry Training Institute (FTI) located in Tubmanburg.	FDA, Min. of Education, educational institutions	340,000	12-48 months	Forestry college system and higher education brought back into operation. Liberian membership in international networks resumed.

Annex 1. Terms of References

The consultant's task was defined in the revised terms of references, as amended by the Forestry Development Authority (FDA) of Liberia, to contain the following tasks:

2) Based on the roll-out plans for commercial logging in Liberia, to assess the potential for value added processing activities and employment generation in the timber sector in the various regions, and the main obstacles to their development (distinguishing between production for the local market and for export), and provide a realistic assessment of how long it may take to move into value added exports;
3) Harmonize between industrialization of the wood industry and sustainable forest management to avoid over-capacity in wood processing;
4) Similarly for non-timber forest products, identify the potential for exports and appropriate measures which may be necessary to realize this potential;
5) To evaluate the existing policy, regulatory and fiscal framework and propose ways in which it might more effectively promote such activities leading to maximum employment generation and balanced regional growth without prejudicing product quality and future profitability;
6) To contrast the options of a timber export ban, an export tax, and agreements which gradually shift the balance of exports between unprocessed logs and more processed products, perhaps linked to improvements in the investment climate;
7) To examine possible adjustments in the process of allocating concessions to encourage value added activities, and assess the pros and cons of a purely market-driven approach;
8) On the basis of the above findings, describe the main elements to be included in a draft Forest-processing Strategy for Liberia, highlighting the issues to be addressed, and chart a process for developing the strategy;
9) Discuss the matters of interest with the Liberia Timber Association (LTA) and Association of Loggers in Liberia (ALL);
10) To provide a rapid assessment on the structure, capacity and transparency of the relevant government agencies promoting and managing the wood-industry sector to identify structural and capacity constraints which need to be addressed;
11) To take into account the work already under way in the Liberia Forestry Initiative and the actions outlined in the interim Poverty Reduction Strategy paper;
12) To identify options for reform, and recommend priority actions to be included in the DTIS Action Matrix
13) To write a paper of some 25-35 pages which could serve as an annex to the study, along with a 10-12 page summary for the main report.
14) To revise the report as required after receiving comments from the Government, the World Bank, and other interested parties.

FOREST PRODUCTION CONTRACT AREAS DISTRIBUTION 2008-2011 (FDA, 2008) **Annex 2.**

COUNTY	2007-8		2008-9		2009-10		2010-11		TOTAL			
	TSC	FMC	TSC	FMC	TSC	FMC	TSC	FMC	# of TSC	TSC (ha)	# of FMC	FMC (ha)
Lofa		119 240			15 000			168 942 151 426	3	15 000	3	439 608
Rivercess		59 374 57 262	20 000						4	20 000	2	116 636
Gbarpolu	10 000			270 436	10 000			139 565	4	20 000	2	410 001
G/Gedeh			15 000	131 466 46 343			50 000	83 332	13	65 000	3	261 141
Sinoe				260 448	5 000				1	5 000	1	260 448
G/Kru			15 000			119 344			3	15 000	1	119 344
Nimba			15 000			266 910		58 834	3	15 000	2	325 744
Bassa	10 000		5 000			82 592			3	15 000	1	82 592
R/Gee					25 000	254 583			5	25 000	1	254 583
Cape Mount	10 000		10 000		10 000				6	30 000		
Maryland			5 000						1	5 000		
# of Contracts	6	3	17	4	13	4	10	5	46		16	
Total Area (ha)	30 000	235 876	85 000	708 693	65 000	723 429	50 000	602 099	230 000	230 000		2 270 097

SUMMARY OF TSC AND FMC FOREST REVENUE TAXES AND FEES (FDA, 2008)

Fiscal Year, Jun-Jul	stumpage Fees (US$)	FDA export fee (US$)	Land rental (US$)	Contract Admin. fees	Block inspect. (US$)	Waybill fees (US$)	Export license fees (US$)	Sawmill permit fees (US$)	Forest Product fees (US$)	Communities' benefit	Chainsaw Local Lumber	Non-Timber Forest Products (NTFPs)	TOTAL
2007-08	371 663	371 663	501 750	9 000	2 000	5 100	2 040			25 000	480 000	2799	1771015
2008-09	6 509 940	6 509 940	1 999 138	30 000	29 700	91 126	36 450			455 621	528 000	5000	16194915
2009-2010	10 552 601	10 552 601	3 474 328	47 000	45 150	152 450	61 381			767 253	580 800	5000	26238564,4
2010-2011	14 004 562	14 004 562	4 655 195	56 000	93 200	337 222	84 395	9 919	489 316	1 021 183	638 880	5 000	35 399 434
2011-2012	12 525 039	12 525 039	4 590 195	39 000	48 950	236 136	75 726	15 597	864 069	934 077	702 768	5 000	32 561 596
2012-2013	11 656 498	11 656 498	4 580 195	39 000	44 750	247 051	73 272	16 000	1 175 977	899 645	773 045	5 000	31 166 931
TOTAL	55 620 303	55 620 303	19 800 801	220 000	263 750	1 069 085	333 264	41 516	2 529 362	4 102 779	3 703 493	27 799	143 332 455

FOREST REVENUE DISTRIBUTION BY TYPE (FDA, 2008)

Fiscal Year Jun - Jul	2007-8	2008-9	2009-10	2010-11	2011-12	2012-13
FDA/GOL	1 278 460	11 623 358	18 659 149	26 578 58	25 104 628	26 235 922
Protected Area fund	37 166	650 994	1 055 260	1 449 388	1 338 911	1 283 248
County Benefits	150 525	599 741	1 042 299	1 396 559	1 377 059	1 374 059
Community Benefits	175 525	1 055 362	1 809 552	2 417 742	2 311 136	2 273 704
SGS Shares	129 339	2 265 459	3 672 305	3 557 159	2 429 858	
Total	**1 771 015**	**16 194 915**	**26 238 564**	**35 399 434**	**32 561 596**	**31 166 931**

Annex 3. Country Experiences in Log Export Bans

Gabon

Gabon has for a long time been the prime source of Central African okoumé and ozigo logs to the world markets. Traditional European importers from Gabon have been Italy, Germany and France. More recently, the Chinese have taken over much of the trade by importing large quantities of okoumé and mixed species logs from Gabon to feed their export-oriented okoumé-faced plywood mills (**Table**).

A state-run SNBG (Société Nationale des Bois du Gabon) has played a powerful role in Gabon's log trade. SNBG was created as early as in 1975, with 3 objectives:

a) Marketing of Gabon's logs and wood products;
b) Development of Gabon's forest industry and help their products entering to the markets;
c) Keeping the prices of logs and wood products from Gabon steady and increasing.

In the past logging companies in Gabon sold all their okoumé and ozigo logs first to SNBG, which then sold them to the international market. Miscellaneous woods could be directly marketed by logging companies. This meant that while controlling okoumé and ozigo log trade, SNBG ran into competition against its own suppliers in other species. More recently, the future of SNBG has been debated against the on-going process of disengaging the state from production and trade. In December 2004, the Government decided to remove the monopoly of the SNBG as of January 2006 to liberalize timber trade in the country and raise its actual competitiveness.

Table 1. Gabon's Log Exports 2000-2006

m3	2000	2001	2002	2003	2004	2005	2006
Okoume	**1 721 854**	**1 504 188**	**1 240 354**	**1 105 862**	**848 701**	**814 189**	**861 856**
Asia	*1 208 207*	*982 527*	*857 178*	*765 357*	*481 570*	*562 529*	*617 084*
Europe	*413 234*	*404 176*	*296 390*	*243 621*	*249 328*	*185 208*	*164 793*
Africa	*100 413*	*117 485*	*86 786*	*96 884*	*117 803*	*66 452*	*79 979*
Other species	**857 278**	**802 877**	**683 744**	**606 836**	**668 062**	**771 954**	**906 224**
Asia	*425 301*	*356 857*	*360 720*	*321 336*	*308 942*	*470 588*	*673 010*
Europe	*422 552*	*435 586*	*314 208*	*278 671*	*349 226*	*294 190*	*226 599*
Africa	*9 425*	*10 434*	*8 816*	*6 829*	*9 894*	*7 176*	*6 615*
Total	**2 579 132**	**2 307 065**	**1 924 098**	**1 712 698**	**1 516 763**	**1 586 143**	**1 768 080**
Asia	*1 633 508*	*1 339 384*	*1 217 898*	*1 086 693*	*790 512*	*1 033 117*	*1 290 094*
Europe	*835 786*	*839 762*	*610 598*	*522 292*	*598 554*	*479 398*	*391 392*
Africa	*109 838*	*127 919*	*95 602*	*103 713*	*127 697*	*73 628*	*86 594*

The share of okoumé logs in exports has dropped from 67% in 2000 to 49% in 2006. China was the major destination of all logs from Gabon, with a dominant share of 60%, followed by France (12.2%) and India (7.4%).

A log quota system is being implemented to avoid resource depletion beyond sustainable regeneration. It was formerly thought that okoumé can withstand repeated and frequent logging quite easily, because of the rapid growth and good regeneration properties. However, new evidence indicates that growth and post logging regeneration success rates may be slower than previously thought. It has also been suggested that selective cuttings of trees with best properties (length, straightness etc.) would affect to quality of Gabon's future okoumé generations.

Excluding January 2008, the planned log export volume for the remaining 11 months of 2008 is just under 1.6 million m³. Of this, 350,000m³ was allocated to the State owned SNBG, the enterprise that previously held the monopoly for export of logs. All the exporting companies with the exception SNBG now have to be equipped with or be advanced in building processing facilities. More stringent

controls are proposed on checking volumes by a technical facility that was separated from SNBG and the customs department.

The current management of SNBG has indicated that diversification of their operations is necessary and the higher degree of domestic processing of roundwood prior to exports is a goal for the future. But concrete steps towards making such changes are difficult to observe and quantify at the moment.

The French imports from Gabon have been transformed into value added products and away from logs. Sawn timber, veneer and plywood imported from Gabon have increased dramatically. Gabon supplies 11% of sawn tropical timber imports of France and 86% of tropical veneer imports to France. For tropical plywood Gabon's market share is 11%. France is the only European country still importing significant quantities of okoumé logs for the production of plywood (193,000 m^3 in 2004). Although the import of okoumé logs has declined, it has been replaced to a greater extent by imports of veneer and plywood, principally from Gabon.

It is still early days to judge what Gabon will achieve with its recently announced log quota system. It appears that Gabon's export structure has moved into downstream products in a relatively short time. Much of the processing capacity is in the hands on French, Italian and Malaysian/Chinese companies.

Cameroon

Cameroon's forest sector is heavily dominated by foreign companies. A small number of foreign companies controls over 60% of all the logging and timber processing and 3/4 of all timber exports. The country has been best known for its ayous and sapele in export markets. In the recent years Asian buyers have helped diversifying species range outside the common ones.

In an attempt to reduce the environmental impact of the logging industry and increase economic returns for Cameroon, the World Bank pushed for new forestry legislation (Law 34/01 of 20 January 1994), which introduced major reforms:

- A log export quota (30%) leaving 70% to domestic wood processing - enforced by SGS;
- A public auction system for concession allocation to the highest bidder, with upper limit of the concession area at 200,000 hectares per company;
- Use of market prices as a basis to determine export tax rates.
- Higher area taxes were imposed, and these were partly offset by lower log export taxes in order to maintain a constant forest tax burden.

The permission to export 30% of logs was a time-limited privilege intended to foster foundation of new forest-sector industrial firms. This condition was set for the first five years following company establishment. After expiry of that five-year grace period, 100% of the firm's harvested logs are to be processed locally. Exceptions were granted if e.g. logs were exported for promoting lesser-known species in the international markets (purpose of which is hard to control). (ITTO 2006)

The aim was to change the government's way in allocating, taxing, and managing forest concessions. Objective was to prevent the worst environmental damage and increase tax revenue. The need for reform was also motivated by the increased pace of industrial investment in wood processing and the huge increase in demand for wood from Asia. Cameroon had promoted industrialization before ensuring how sustainable forest management can be safeguarded.

In the course of implementing the new law, the government revenues went from 10 billion CFA in 1990 to 14 billion CFA in 1994 and 24 billion CFA in 1997. Over the same period, wood production rose from about two to three million m^3. The government therefore increased its share of the value of the wood from 6,000 CFA/m^3 to 10,000 CFA/m^3.

Widespread irregularities have since then been reported both in the status of concession allocation and in the enforcement of existing legislation, both for which tasks human resources are extremely weak. In fact an administrative order in June 1999 loosened log export ban on ayous and sapele. In August 1999 sapele was again banned for exports in logs.

In retrospect, the critics of Cameroon system have pointed out that an unwanted result of the log export ban was over-capacity of domestic sawmills. Also, due to the seasonality of logging and poor quality of road network, logs were in short supply for most of the year and domestic log prices remained high. In the absence of any real government control in the forest, high demand and reduced legal supply resulted in widespread illegal logging. Policies that favor inefficient processing, such as taxing processed wood leaving the mill rather than logs entering the mill, also worked against bettering the level of forest management.

Conclusions on Cameroon:

- Increased log demand by the uncontrolled expansion of domestic processing and reduced log supply from delayed concession allocation resulted in very high log prices.
- Weak law enforcement at the time of overheated log demand triggered illegal logging.
- Complete log export ban is an extreme measure and should be avoided. A log export quota could work better, as it would maintain government revenue from log exports while ensuring that domestic prices of logs stay feasible for local processors.
- Cameroon's log export ban prompted other Central African nations to increase production to satisfy increased demand for African logs and sawn timber in Asia and Europe. Log export bans tend to have impacts that are felt on regional level.

Ghana

Ghana's timber industry has grown considerably in size, driven by two government interventions: (i) a log export ban; and (ii) the under-pricing of timber. The log export ban was introduced for high value species as early as in 1979 and extended to all species in 1994. This caused the log prices to fall below comparable international levels. In the same time exporters continued to sell their wood products at world market prices. This inflated profit levels within the timber industry, which had thus little to do with efficient processing or clever marketing (Birikorang et al., 2001).

The second main driver of industrial expansion has been the under-pricing of timber by the Government. The policy of administrative allocation of concessions (instead of competitive bidding) and the application of unrevised stumpage charges have been instrumental in this sense. Companies benefited considerably from such relaxed policy measures, with an effective halving of forest taxation levels in the mid-1990s (World Bank, 2005).

Ghana has without a doubt made extensive efforts to promote both value added processing and exports. Many of the export-oriented processing industries are foreign-owned and produce components for the captive markets controlled by their overseas owners. Côte d'Ivoire and Cameroon followed the example of Ghana in banning log exports, and experienced a steady growth in primary processing, which eventually led into a structural overcapacity. The move into secondary/tertiary processing happened relatively slowly, and it was more forced by dwindling log supplies than a result of a strategic industrialization policy.

Some lessons to be learned are:

- Log export ban associated with rigid and administrative pricing mechanisms domestically may collapse log prices and induce windfall profits in primary processing. Tax revenues are lost permanently and the processing industry may grow into unsustainable size.
- Avoid proliferation of unregulated sawmills that create overcapacity and operate partly on illegal supplies.

- Early build-up of sufficient value added processing industry can channel activity towards using the resource more perpetually and lower the pressure on forests.
- Make re-saw mandatory in investments, audit operations periodically and demand changes if needed (incorporated in Concession Agreements).
- Set percentage or volume targets for gradually limiting log exports and expanding processing. Step-wise target-setting brings manageable volumes into markets and helps avoiding market disturbance.
- Reduction of export taxes in favor of value added products easily leads into reduced rates of government revenue in short to medium term, and may therefore be abandoned before it proves itself rewarding.

In Ghana the industry is presently characterised by considerable unused capacity at the value added processing levels, too. It is estimated that the sawmills, plywood and veneer plants are operating at an average of 53% of their installed capacity while the remanufacturing industries are operating at much lower capacities.

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