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Reducing the uncertainty for forest investors in Uganda

Value chain assessment for timber and timber products

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Executive Summary

The objective of this study is to decrease the uncertainty for potential forestry investors by providing an analysis of the timber value chain and by estimating the plantation area needed to fulfil the future demand for sawn timber in Uganda. Apart from lacking data about market structure, prices and volumes the following deficiencies remain to hamper the development of the sector:

- Low technological standards, poor skills and lack of control resulting in degradation of forests and low quality products
- Growing resource shortage because of insufficient area of established plantations and over-exploited natural forests

Key observers and informants along the value adding chain have been interviewed following an interview guideline. Additionally, a market survey among timber dealers and small-scale carpenters has been carried out with particular focus on quality.

Key Findings

The value chain consists of four major links: Forestry, Sawmilling, Timber dealers and Secondary processors (mainly furniture and construction). Vertical integration is commonly found along the chain, particularly sawmilling and timber dealing are often integrated. The majority of the businesses are small, producing for the low quality segment. Recently, there has been significant growth in the upper quality sector of the furniture market with companies expanding or new companies entering the market.

The results from the market survey showed a growing understanding for quality, especially among timber dealers, but the lack of financial incentive to invest in improved handling practises. Due to the shortage even poor quality timber sells quickly. Generally, the timber value chain is characterised as a low-trust chain, the lack of standards resulting in need for control and high transaction costs. The growing demand by the upper quality furniture producers for quality timber is partly unfilled but tendencies for establishing more trustful and stable relationships with selected suppliers are visible. Another reaction to this environment is further vertical integration; some processors started to establish sawmilling operations in Southern Sudan and DR Congo.

There is a clear distinction between the low-quality and the upper-quality segment. Key attributes for successfully benefiting from the growing upper quality market are:

- Adequate technology, especially kiln-drying capacity
- Adequately skilled personnel, which has to be trained in-house
- Management skills, particularly concerning financial management and operations

The possession of those attributes in turn results in high profit margins and good positioning to benefit from the further expansion of the upper quality market.

The recent developments in the timber market can be summarised as follows

- Market participants perceive a growing shortage of timber

- Clear upward price trend developing, both for Pine and native hardwoods
- Natural forests are depleted – native species are increasingly imported

The price increase for Pine is mainly due to the introduction of competitive bidding through the NFA. While overall the new system contributes to more fairness and market-oriented prices, there is a need for more transparency concerning the calculation of the reserve price and the required technological standards.

Forecasting the future demand for sawn timber is difficult. Because of the lack of reliable data the use of econometric models for the Ugandan context cannot be recommended. Using the available data and justified assumptions, the study provides a range for the plantation area needed in 20 years in order to sustainably fulfil the projected demand for sawn timber. Assuming an annual growth of between 2%-3% for the sawn timber consumption and a recovery rate of 35%-40% the needed area is expected to be between 45,000 and 55,000 ha.

Overall, the timber value chain is characterised as a sellers market and still dominated by price. Accordingly, the bargaining power of suppliers is high but buyers with significant processed volume start to influence standards. Because of the growing shortage there is an increasing trend for substitution. Particularly, wood-based panels (chipboards, fibreboards, plywood) are increasingly used and construction companies reduce the share of timber. Competition is high in the low-quality segment of the market but businesses in the upper quality segment do not (yet) feel competitive pressures due to strong growth of demand.

Conclusions and recommendations

As can be seen in the following table, upper quality furniture and forestry are the most promising areas for investment in the future while sawmilling and timber dealing are likely to become less attractive because of the low value added and the low flexibility to adapt to the growing resource shortage.

	Profit Margin (Forestry: Rate of Return)	Initial Investment	Longevity of the business (sustainability)	Expected future development
Forestry (incl. available grants)	12 -16%	Medium to High	High	↗
Sawmilling	Highly variable, positive scenario: 15-25%	Low	Low	↘
Timber Dealers	Not determined	Low	Low	↘
Furniture	25-30%	High	Medium to High	↗

As key success factors for forestry investors were identified:

- Carefully select site and species
- Prepare detailed investment plan and cash-flow analysis to prevent under-financing
- Implement proper forest management techniques to assure quality timber
- Enter into primary processing, employing efficient technology, once the resource is harvestable

While increased cooperation between the actors along the value chain could contribute significantly to the development of the sector, the potential is particularly high among the secondary processors

- Introduction of buyer-driven quality standards should result in improved efficiency and reduced transaction costs
- Cooperation in developing training programs, e.g. in designing modules, helps to resolve the scarcity of skilled labour

1 Background

In Uganda, investment in the forestry sector has been very slack due to several reasons. One major impediment is high uncertainty. Reliable information to assess the financial potential of investments in forestry is lacking. The investor guidelines available through the Uganda Investment Authority do serve as general orientation but do not address the needs of serious forestry investors. The existing data about market structure, prices and volumes is often missing or very fragmented and not up to date. This in turn results in 'best-guess'-scenarios for market opportunities in the sector.

Available studies for the sector indicate no significant improvements in the forestry and sawmilling sector in the last 10 to 15 years. The main problems as described in PLUMPTREE (1988), CARVALHO & PICKLES (1994), JACOVELLI & CARVALHO (1999), AUREN & KRASSOWSKA (2004) basically still persist today:

- Low transparency of the sector, lack of standards and control over the utilisation of natural forest resources
- Low technological standards in the sawmilling sector (cheap mobile sawmills, lack of skilled personnel) resulting in wasteful harvesting techniques, low recovery rates and low quality sawn timber. Despite the very low efficiency pitsawing is still common practise, especially in private forests.
- Growing resource shortage concerning both timber from plantations and natural forests because of unsustainable harvesting rates resulting in price increases and legal and illegal timber imports from Southern Sudan and DR Congo.
- Poor storage, lack of drying or treatment and no quality grading of the sawn timber by timber dealers and secondary processors result in low value products
- The record of private sector tree planting is rather poor. Even the few areas planted often are in poor condition because of inadequate site preparation and neglect (no weeding or thinning).

Overall, the situation in the primary sector has not improved in the recent years despite some initiatives to increase efficiency. Instead of increasing efficiency through improved technology the resource shortage resulted in the increasing utilisation of mobile sawmills to reduce capital investment; stationary equipment is employed below capacity or even sits idle. As a consequence the harvesting and sawmilling practises are as or even more wasteful than ten years ago.

The aftermath of restructuring the forestry organisation can still be felt. Inefficiencies attributed to the former Forest Department still are not overcome because of the short period the NFA is established. The sector was long characterised by lack of transparency, corruption and lack of enforcement resulting in widely spread illegal activities (AUREN & KRASSOWSKA 2004). Currently, however the NFA set to tackle those problem but it yet has to be seen if the NFA will be successful in addressing those issues and will be able to establish transparent systems inspiring trust among the stakeholders in the forest sector.

PICKLES and CARVALHO recommended as early as 1994 the establishment of a forest products database but despite identifying the need for more detailed information not much was achieved in this respect. Market information is fragmented and hard to come by. According to the study by AUREN & KRASSOWSKA (2004), timber markets in Uganda are distorted "due mainly to cheap illegal timber ("Congo Effect") and poor administration and ineffective enforcement of the regulations." Additionally, prices fluctuate highly and traders and middlemen are using the existing information asymmetries to their advantage.

The development of the sector has been slow. In the early 90s several investors, namely the Commonwealth Development Corporation (CDC) and different Scandinavian investors, seriously were researching potential investments in installing modern technology in the wood processing sector (e.g. hardboard plant, plywood mill). None of those plans was implemented. CDC shifted its focus to the Information Technology sector completely withdrawing from forestry investments even though the consultant analysing the venture in Uganda recommended a 'go-ahead' for the project (KAMAU 1993). Accordingly, investment activity in the Ugandan forestry and timber sector was minimal. In the last five years, however, the atmosphere changed with significant investments in the secondary processing sector (particularly furniture). On account of the booming economy and foreign money pouring into the country new companies entered the market and others diversified into upper quality furniture slowly changing the face of the sector.

Consequently, there is an urgent need for a better understanding of the processes, interactions and impediments found along the timber value chain in Uganda. What triggered recent investments and what consequences does this development have for the primary sector and potential investors in tree planting. Of particular interest is at what links along the chain value is added, to what extent and what requirements the "new" businesses have which do add significant value to the resource. Furthermore, this study addresses which information is needed for gaining greater certainty about volumes demanded, future consumption patterns and price developments. The results in turn should be a further step towards attracting more investors to the forestry and timber sector.

2 Objectives

The overall objective of this study is to reduce the uncertainty for investment decisions in the forest and timber sector in Uganda by addressing the need for a better understanding of the timber value chain. Additionally, the study tries to identify a suitable approach to estimate the future timber demand with more certainty and transparency. This information should help to establish a basis for a more reliable prediction of investment scenarios.

The study aims to answer the following 3 key questions:

1. What are the key constraints/threats and opportunities along the value chain?

2. Where and to what extent is value added along the market chain and which are the processes with the highest potential from an investors point of view?
3. Can a suitable approach be identified to estimate the demand for timber and timber products in Uganda for the next 5-10 years? Are there quantifiable indicators for the development of timber consumption and prices in Uganda (e.g. correlation to construction activity, GDP-growth etc.)?

3 Study approach

For the purpose of the study, rapid market appraisals along the value adding chain have been conducted based on questionnaires and interviews with key observers and informants (HOLTZMANN 2000). The study used both primary and secondary data to answer the key questions.

The interviews were designed to build on and complement existing surveys and studies. Given the time constraints, the interviews focused on exemplary data rather than trying to achieve a representative sample.

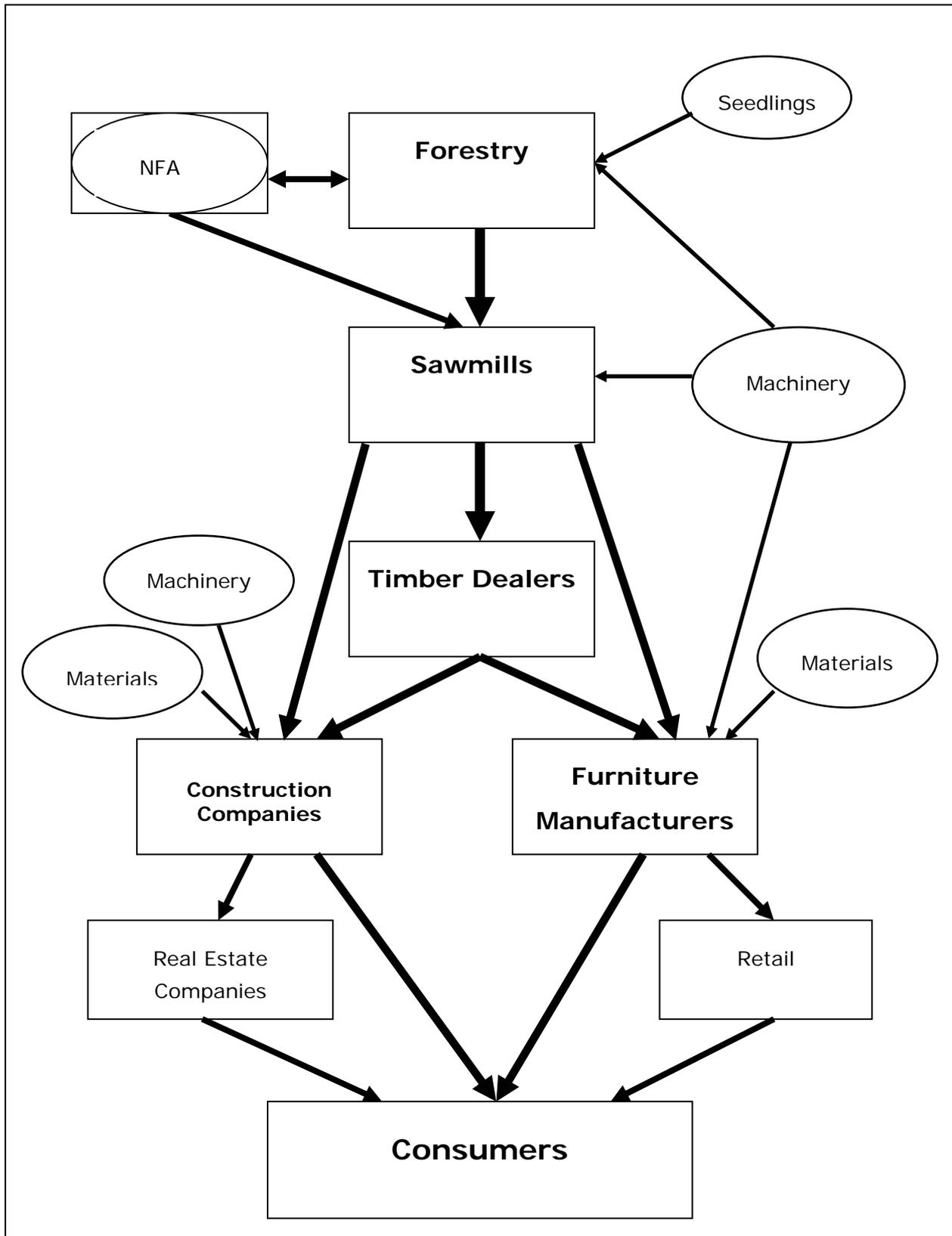
There was a two-pronged approach concerning the field data collection:

1. Surveying timber dealers and carpenters about their Marketing and wood handling practises with particular focus on their perception of quality. 38 interviews were carried out in clusters in the Kampala area (Bwaise, Ndeeba, Ntinda and Kireka) by two staff members of the Sawlog Production Grant Scheme (SPGS) according to a specifically designed questionnaire.
2. Interviewing 14 key businesses in the value adding sectors (mainly furniture producers and construction companies) concerning their operations, problems and views about the market. These findings were complemented with interviews of key observers.

4 The forestry, timber and furniture value chain

The timber value chain in Uganda is depicted in Figure 1 and shows the main links which are involved before the products reaches the consumer:

Figure 1: The forestry, timber and furniture value chain



- Forestry with 30% of the Ugandan forests being administered by the NFA while the remaining 70% are privately owned forests.
- Sawmilling, which is done on site by private enterprises
- Timber Dealers, which are the main timber distributors in urban areas
- Secondary processors (mainly furniture and construction), which to a large extent also market the products to the consumers

To date the supply chain is not very sophisticated: support or extension services are very limited. Interaction with players external to the chain is limited to procurement of goods.

There are only rough estimates about how many businesses operate in the primary sector. AUREN & KRASSOWSKA (2004) estimated the number to be around 4,000 including charcoal burning whereas PLUMPTREE (1988) estimated the number of pit sawyers alone to be around 2,000. The primary sector is very fragmented; especially concerning the timber harvested in private forests. Authorities do not ascertain control over this trade. The majority of the private timber is harvested without informing the local authorities.

Stationary sawmills are rare and the few existing ones with significant capacity are not operating or even dismantled; mobile sawmills and pit sawyers dominate the sector. sawmillers often own and operate a timber store/yard in the urban areas where the sawn timber is sold. These stores generally also are the outlets for the pitsawed timber. Due to the fragmented structure and the high share of illegal or semi-legal businesses there are no commercial extension services supporting the sector. The NFA, and particularly the SPGS, are currently the only sources for professional advice in the forestry sector. The role of the NFA in the value chain is special: the NFA is mainly responsible for managing the Central Forest Reserves (CFR) and ensuring proper forest management practises (hence having the mandate to provide at least limited extension services) while it also is an actor in the market by selling plantation timber. It both has a regulatory function external to the chain but also actively participates in the chain, influencing market prices.

The secondary sector consists of both industrial operations and traditional trades but the vast majority of businesses are small roadside workshops. The overall number was estimated to be around 2500 (AUREN & KRASSOWSKA 2004). Within the last five years more medium sized businesses (annual revenue above \$US 100,000) entered the furniture market including foreign companies (mainly Asian owned, e.g. Hwan Sung). Construction companies are generally bigger in size and often vertically integrated.

BOX 1: Businesses in Wood Processing:

- **Primary Processors (excluding charcoal)** estimated number of businesses: **2,000+**
- **Secondary Processors** estimated number of businesses: **2,500** (incl. Carpenters, Joiners, Artisans, Furniture production and Construction)

5 Survey Results from the Low Quality Segment

5.1 Situation of the business

Interviewees were very reluctant to reveal any financial information. When figures were provided the named revenues significantly underestimated the actual number in 80% of the cases. This fact became obvious when comparing the revenue numbers with the amount of timber turned around in a year (particularly when assuming these statements to be on the low side). People expressed fears of financial information being used for tax purposes or even assessing the legality of the timber traded. The NFA was mainly perceived as a threat to the profitability of the business indicating the share of illegal timber still being significant. For obvious reasons, quantifying the dimension of illegal timber on the market was not possible within the time-frame of the study. Nevertheless, a regular assessment of the timber dealers concerning the quantities traded combined with a summary of the amount of timber stamped legal by the NFA and the local authorities would allow for a rough quantification.

Table 1 gives an overview about the size of the surveyed businesses. The revenue numbers in the table were crosschecked with the annual timber use and respectively adjusted, still they rather underestimate the real figures. The vast majority of timber dealers has an annual revenue of above US\$ 50 Million. Whereas most carpenters turn around less than US\$ 25 Million a year.

Table 1: Size structure of the surveyed businesses

	#	Annual Revenue (Mio US\$)			Annual Timber Use (in m ³)		
		<25	<100	>100	Maximum	Minimum	Average
Timber Dealers	20	6%	52%	42%	6000	200	1000 (740)
Carpenters/Joiners	18	80%	20%	0	150	40	75

The single biggest player identified in this study was ERIMU Ltd. with a traded volume of about 6,000m³. Other important players include Bwaise Timber Stores and FMB Enterprise with annual turn-over of about 2,000m³. The majority of interviewed dealers estimated their turn-over to be well under 1,000m³/year. These volumes are rather rough estimates based on truck loads per months since most dealers do not keep detailed records or do not disclose them. The average amount of timber traded by a dealer annually was about 1,000m³ including Erimu and 740m³ excluding Erimu. According to the answers, about 40% of the timber traded are native species. The single most traded species is Pine with a share of just above 50%.

Table 2 shows the development of the business in the last five years according to the perception of the interviewed people. The vast majority of carpenters experience a stable or growing business meaning they could also participate from the growing economy. Timber dealers give a more mixed account, almost half see their business decline.

Table 2: Perception of the development of the business

In the last 3 years the business was	Shrinking	Stable	Growing
Timber dealers overall	44%	28%	28%
Timber dealers (plantation timber only)	30%	30%	40%
Carpenters	13%	40%	47%

55% of the interviewed timber traders deal exclusively with plantation timber, out of which 90% is Pine. Those perceive the situation as slightly better than their colleagues who partly or exclusively deal with native species showing that the resources of natural forests in Uganda are decreasing. Traders turning around more than 1,000m³ annually rather experience a shrinking business, which could be attributed to the decreasing resource availability.

40% of the timber dealers invested in sawmilling equipment in the last three years. 66% plan to invest in expanding the business in the coming three years out of which 22% plan to invest in sawmilling. 40% plan to expand their property and/or to move into carpentry. These numbers contradict the above findings of less than a third seeing their business grow in the last years. The findings indicate that most of the interviewed dealers see problems in the sector but also are convinced of the future potential of value-adding activities. The tendency to plan diversification into carpentry complements well with the results from the interviews of the selected secondary processors (see Chapter 6.)

5.2 Timber Usage and Sourcing

Asked for their preferences for certain tree species most timber dealers mentioned foreign species, in particular Pine, whereas the carpenters preferred hardwoods. Due to the restricted availability of the most favoured hardwoods – Mahogany and Mvule – and the resulting high prices, carpenters often revert to lesser known species like Nkalati or Nkuzganyana. Maesopsis in contrary was rarely named. Availability is the main criteria according to which the interviewed people ranked their preferences for certain wood species. Demand on the market or customer preferences were just the second most important criteria indicating a strong sellers market and a resource shortage. Basically all timber – irrespective of species or quality – can currently be quickly sold. Among the carpenters durability was the most important criteria followed by workability and customer preferences. Overall, the perception of the interviewees is that timber has become more or much more expensive, only three people perceived the prices as being stable, while 60% saw wood become much more expensive.

BOX 2: Preferred Timber Species:

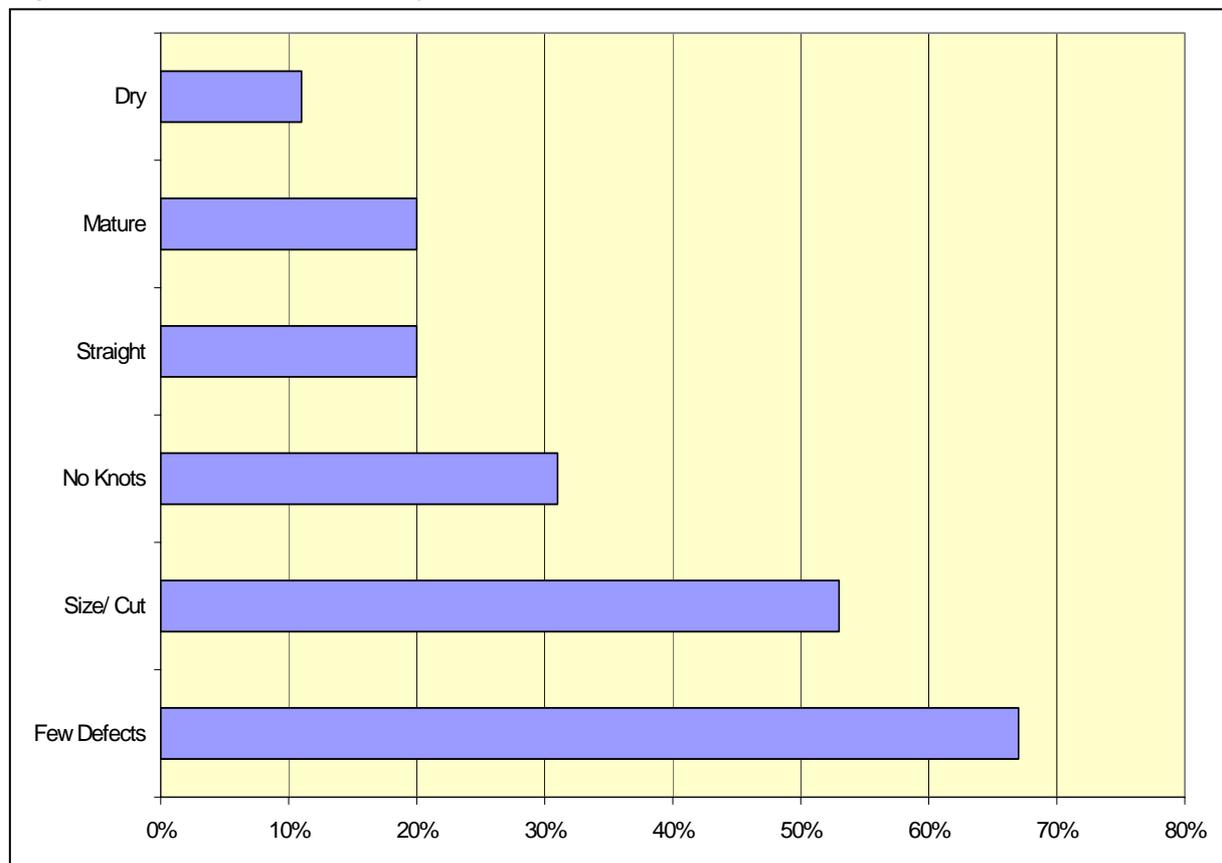
- Dealers prefer Pine because it is still available and sells quickly
- The "classic" species, Mahogany and Mvule, are the most sought after but increasingly hard to come by
- Carpenters increasingly use lesser known species, especially Nkalati (*Chrysophyllum albidum*) and Nkuzganyana (*Blighia unijugata*) because they are cheaper and available

Overall, business relations tend to be rather stable. For the timber dealers the number of suppliers varies but seldom is higher than 5. It has to be considered, though, that most timber dealers mainly source the wood from their own sawmilling operations. More than half of the Carpenters do have more than 10 different suppliers which are generally located in the same local cluster (e.g. Bwaise). Especially smaller businesses hand-select the wood they want to process according to customer specifications. The main criteria for selecting suppliers is the availability of the tree species and some, very basic, quality criteria. Additional services, e.g. like provision of transport, are not important. It was not possible though, to determine clearly if this is because there is no demand or because it has not been offered yet. Interestingly, trust was rated as low as transport. However, the own trustworthiness was mentioned by 25% when asked for the reasons why customers choose a supplier. In summary, trust along the chain is low. During the survey several businesses expressed fears that by revealing information competitors might benefit. Companies who do turn around significant quantities of wood (>700m³) establish stable relationships with a few main suppliers but fill the rest of their contingents from various sources.

5.3 Importance of quality

Figure 2 shows according to which quality criteria wood is sourced by the surveyed businesses. More than two thirds of the interviewees said they look for wood without major defects, particularly concerning cracks and traces of insect attacks.

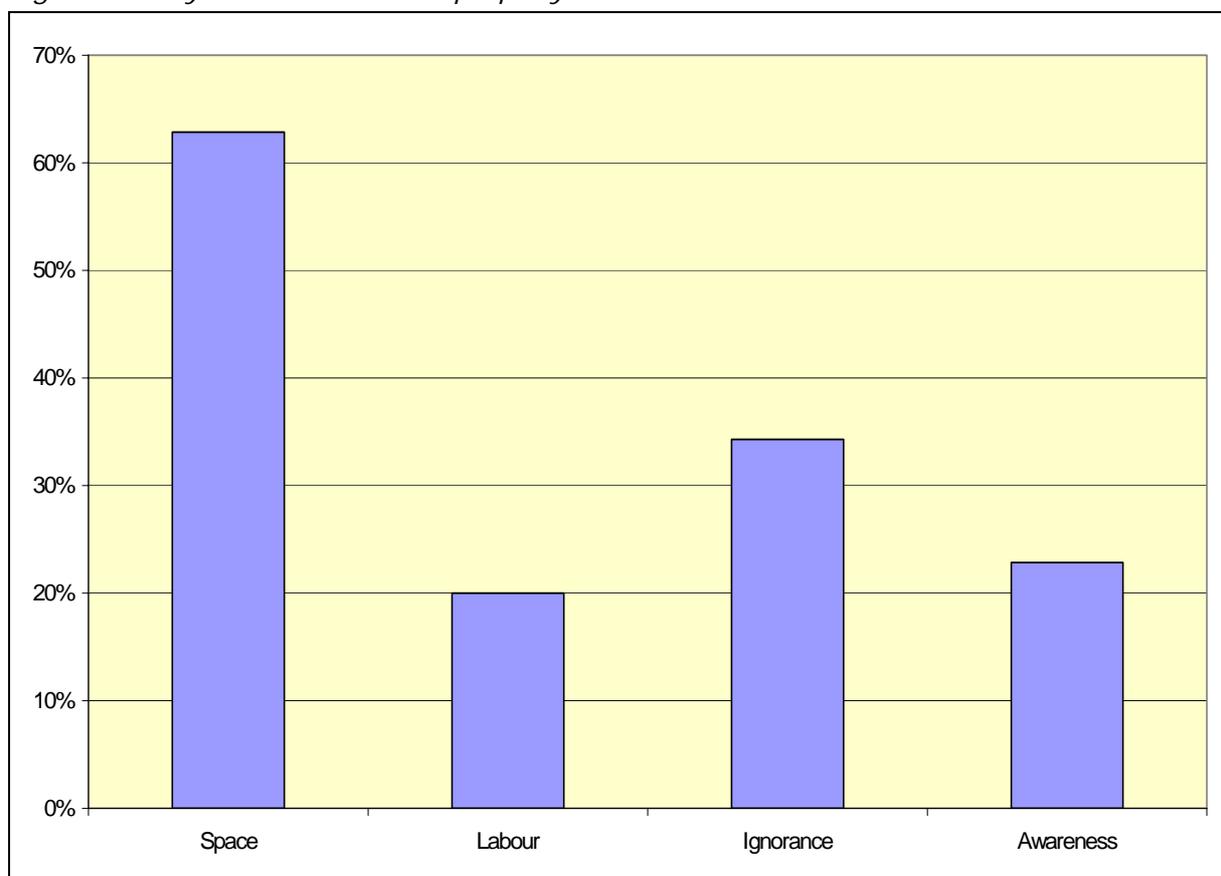
Figure 2: Importance of quality criteria for wood selection



Above 50% indicated they look for wood which is cut to size; complaints about poorly cut wood were frequent. Only 10% regarded dryness as an important criteria for their wood selection. Other criteria mentioned were free of knots (30%), straightness of the pieces (20%) and maturity (20%).

As depicted below (Figure 3), the incurred costs are the main reason for not putting more effort into storing the wood properly; the lack of space being the main constraint. Ignorance and lack of awareness also were frequently mentioned. Interestingly, the knowledge about proper storage of timber was significantly higher among the timber dealers. More than half of the carpenters did not indicate any concern about the storage practises, some said the customers would not care. 20% of the carpenters demonstrated their lack of knowledge by saying that they are actively drying the wood in the sun.

Figure 3: Why is wood often not properly stored?



More than 50% of the timber dealers do store at least some of their wood by using stickers and avoiding direct ground contact. Out of those businesses, most also indicated long-term relations to bigger wood users like construction companies (e.g. Roko or HL Investments). The results, however, do not show that proper storage is necessary (yet) to establish a long-term relation.

40% of the interviewees indicate interest in dried timber, but only half would be willing to pay a premium. The range - between 500-4,000 US\$ per piece - is well below the current fees drying chambers charge (6,000-8,000 US\$ per piece). The majority, though, does not see the need for properly dried timber; the timber dealers have a very quick turn-over and do not see the potential for obtaining a premium price for dried timber. The

carpenters do not really perceive a need since they are selling to the low-price segment of the market where price dominates quality. Treated wood is only sought after on customer demand. Two thirds of the interviewees do not see a need to look for treated timber in their business.

5.4 Marketing

Concerning the relationship towards the customers there is no clear picture emerging. Results are evenly distributed between businesses which mainly have return customers to businesses who have a varying client-base. Two thirds of the interviewed persons believe their clients mainly come because they get the quality they are looking for. About 25% think they can offer more competitive prices. More specific answers were: "provide standardized pieces" and "having better marketing skills". The majority of timber dealers indicate that their clients make specifications concerning the wood quality. 60% of their clients ask for pieces cut to size, about 50% ask for wood without defects, particularly wood without cracks. Only 15% overall ask for dried wood. According to the carpenters only 50% of their customers ask for certain quality criteria in the wood used for the purchased products.

BOX 3: Does Quality matter?

- The turn-around of timber is too quick to provide an incentive for proper handling and storage
- Demand for dried timber in the low quality segment remains low
- Still, quality understanding especially among timber dealers is growing

Pricing information is acquired rather irregularly. About a third each use the suppliers, their colleagues or their own costs as the base for setting the selling price. The survey suggests that financial planning is hardly done; costing or budgeting happens at the end of the month on the basis of what is left in the cashier.

6 Results of the interviews with secondary processors

6.1 General Data

The interviewed companies (see Annex 1) all work in secondary processing and were selected according to references given by industry experts. The majority is involved in furniture production. Additionally, four construction companies and Uganda's only plywood processor were interviewed. As can be seen from Table 3 all but one of the interviewed companies have annual revenues of at least US\$ 150,000, some companies even generate more than US\$ 1.5 Mio. The number of employees is 50 or more, bigger companies like Erimu employ about 350 people, NilePly even around 650.

Table 3: Size Structure of the interviewed businesses

	#	Annual Revenue (in US\$ 1,000)			Annual Timber Use (in m ³)		
		<150	150-500	>500	Maximum	Minimum	Average
Overall (incl. sawmilling)	14	7%	57%	36%	12,000	250	2,900
Furniture	10	10%	70%	20%	1,000	150	570

As the average cost structure of the interview companies (Table 4) shows the main costs are incurred for sourcing the timber. These figures are reflecting the estimates of the interviewees; despite the resulting uncertainty they give a good indication about how value is added to the product. Whereas for sawmilling the raw material and transport costs currently are about 80% of total costs, furniture producers do add significant value through use of technology, skilled labour and management.

Table 4: Cost Structure of the interviewed businesses

Percentage of Total Costs for				Profit Margin (Selling price – total costs)
Raw Material (mainly timber)	Machinery and Depreciation	Labour	Marketing and Administration	
45-50%	15-20%	20-25%	8-10%	20-30%

75% of the businesses involved in furniture production do have their own kiln dryer, the rest are planning to build one. Most of the interviewed persons considered a kiln as key technology to be successfully established in the market. The capacities range between 30-100m³, the companies with the smaller kilns expressed interest in expanding. Only rarely is timber dried for external customers, the dryers are generally operated at full capacity. The majority of the companies entered the upper quality segment in the last three to four years. Four companies possess their own pressure treatment chamber. It is mainly used to impregnate electricity poles or poles for fencing, the interviewed construction companies do treat timber which is exposed to weather effects.

6.2 Business Strategy

In contrast to the low quality sector the interviewed secondary processors made strategic choices in regards to their position in the market. Certain consumer segments are targeted and the operations structured accordingly. Obviously, there is a gradient concerning the elaboration of the strategic focus. For some companies a stronger strategic focus evolved through reactions to changing market conditions whereas other companies took explicit decisions to enter a certain market segment. More than half of the interviewees expressed their serious interest in expanding the business. The main investments are planned in modernising and upgrading machinery to grow the business. The sums mentioned were significant, in two cases several hundred thousand US dollars.

Vertical integration is a business strategy commonly found along the timber value chain in Uganda. Most of the bigger businesses (revenue above US\$ 100 Mio and/or more than 20 employees) are vertically integrated; some encompassing all stages along the chain. An example for horizontal integration – integration of businesses from the same level of the chain, e.g. two sawmilling companies joining – could not be identified in the course of this study. Most companies grow generically and there is hardly any cooperation between individual players. The examined companies do not yet see benefits of cooperation or did not even consider this option to date. Despite the fact that competitive pressures are still low and competitors are not perceived as threat there is a prevailing atmosphere of disinterest or even mistrust. Consequently, there is no influential association or other forms for coordinated lobbying initiatives for the sector.

The difficulties in accessing resources forced several sawmilling businesses to shift their focus. Instead of downsizing or even going out of business the more entrepreneurial sawmillers diversified downstream into furniture production with several businesses realising the growing potential of the upper quality segment. Additionally, the irregular supply on the market resulted in secondary processors integrating upstream into sawmilling and partly even into forestry to secure resource access. The trend, however, clearly points to businesses increasingly concentrating on secondary processing.

BOX 4: Why Vertical Integration?

- Changing business environment forces companies to adapt strategic focus
- Upwards integration increases procurement security but dilutes core competencies
- Downwards integration promises increased profitability but requires significant investment

6.3 Procurement

Depending on the level of vertical integration the timber is mainly sourced from the own sawmilling operations as far as plantation species are concerned. Native species mostly come from private forests and are bought through timber dealers; the most sought after species Mahogany and Mvule, which are close to depletion in Ugandan forests,

increasingly are imported from Eastern Congo (DRC) and Southern Sudan. More than half of the interviewed companies acknowledged to partly rely on importing those hardwoods from the neighbouring countries. Bigger companies like Roko or Erimu are in the process of establishing their own sawmilling operations in those countries. Roko plans, for example, to saw timber in Southern Sudan with a capacity of 450m³ roundwood per month. The trade from Sudan is likely to increase in the future because of the improving security situation both in Northern Uganda and Southern Sudan (where the peace treaty just has been signed). Nevertheless, high uncertainty about the political development of this region persists. Additionally, the legal status of those imports remains blurry – especially concerning the clearance of the timber by the respective authorities in Congo and Sudan since those are still feeble and unable to control illegal activities (or even actively involved: a recent study about the timber value chain in Southern Sudan identified high costs for corruption and for transport (due to non-existent infrastructure) as the most limiting factors for a viable forestry and timber industry (TENNIGKEIT 2005) – import regulations have to be revised and effective controls established.

Procurement security in terms of quantity and quality is the major concern of all businesses commenting. This concerns both the secondary processing and respective sawmilling operations. In this context it is interesting to note how the introduction of the competitive bidding for NFA plantation timber was received:

Reactions varied from condemning the system for decreasing procurement security and causing skyrocketing prices to welcoming the system for the fairness and transparency. The transparency should be increased by disclosing the calculation for the reserve price. The majority of the interviewees took sort of an intermediate or even indifferent position. The expectation is that prices will stabilise around 50,000 US\$/m³ of standing pine. There was, however, significant complaint about new businesses entering the market without being properly assessed towards their business practices and harvesting standards. Generally, it would be highly welcomed if established businesses with a need for continuous supply – generally involving high capital investment – could be accommodated for within the system. For those businesses the costs for machinery and depreciation are the second biggest cost factor putting them at a severe disadvantage in competing with pitsawyers or mobile sawmills even though they can operate more efficiently and with higher environmental standards.

The majority of the interviewed companies used internal quality standards to select the timber. Those standards, however, vary significantly in terms of sophistication and in their influence on the procurement policy. Some companies source their wood still primarily according to price just considering basic criteria like: no severe defects (cracks, splits, knots) or widespread fungi or insect attack. Wood is sourced according to need – based on actual orders. Other companies give specifications already to the suppliers and hence establish more long-term relationships. Basic quality control systems are in place. Quality timber is sourced when available and stored until used. One company established their own grading system with a few stable suppliers adjusting the prices according to clearly specified quality criteria.

BOX 5: Quality Does Matter!

- Kiln dryers are a key technology for business success
- A growing number of companies employ internal quality controls and pass those standards on to their suppliers
- Customers become more sophisticated, hence the demand for quality furniture is continuously growing

Overall, the willingness to pay a premium for better and, in particular, constant quality is growing. There is a clear tendency to establish more long-term relationships to suppliers being reliable to deliver according to quality specifications. In the upper quality segment relationships between buyers and suppliers become increasingly more trustful. Examples from the interviewed companies in this respect are:

- Provision of credits to well known customers
- Reducing the number of suppliers
- Agreement on quality standards and respective price structures (grading) with selected suppliers

6.4 Operations

The work processes are still mostly organised in a manner resembling single production. The utilised machinery is old but reliable, work flows are just partly optimised resulting in unwanted bottlenecks. The utilisation of machinery could be improved by reorganising processes and adequately adjust the workshop outlay. Increasingly companies work according to their own designs. With investment in modern machinery work-flows become better organized moving to batch production processes hence increasing efficiency and the overall output. However, because of the lack of skilled labour reorganisation of processes is time-consuming and hence costly.

On the other hand, some companies reacted to the increasing difficulties in getting adequate timber by shifting to wood-based panels (especially chip-boards and fibre-boards) which are imported from South Africa (mainly through P.G. Bison Ltd.) or China. Companies like Kitchen & Office Concepts or Kapkwata Sawmills are in the process of out-phasing solid wood completely. The wood-based panels can be sourced without major difficulties, do have reliable quality standards and are competitively priced. This in turn allows for efficiency gains in the production process. As a consequence, more than half of the companies interviewed said that they are currently considering to continuously increase the share of wood-based panels in their production.

Several businesses complained about the irate supply with electricity resulting in productivity losses and defects on the machinery. The installation of back-up systems based on diesel-generators is costly and inefficient (especially environmentally). Alternatives could be the implementation of wood-gasification technologies thereby also utilising wastage like sawdust or poor quality offcuts. The economic viability of such a system, however, has to be assessed independently for each individual business.

6.5 Human Resources

Adequately skilled and motivated labour is one of the key success factors for the upper quality segment of the furniture market and for NilePly as the only Ugandan plywood processor. The lack of skilled personnel was lamented by all companies interviewed and presents one of the biggest inhibitors to further growth. This observation also holds true for the management. As can be expected the skill level increases with the size of the business; it cannot be clearly determined, though, if the respective skills were improved while growing the business or if strong management skills were the prerequisite for successful growth. It can be assumed, however, that it is a mixture of both, meaning certain skills are indispensable (e.g. workshop organisation) while others can be acquired in the process (e.g. marketing, accounting). The requirement of certain skill-sets results in significant "imports" of personnel from outside Uganda. Several companies acknowledge the need for skilled management and deliberately build up promising candidates internally (e.g. Roko now has for the first time an Ugandan work-shop manager).

In the recent years, significant capacity in the carpentry sector was built through in-house training. The companies producing for the upper quality sector subsequently train their employees thereby making sure that the established quality standards are met. The strong requirement for in-house training, however, results in lower productivity. According to the interviewed businesses, it can take up to two years to bring new employees up to speed. Additionally, the acquisition and modernisation of machinery is highly problematic because of the lack of experienced operators. External experts have to be employed for establishing new machines or expensive training courses visited abroad otherwise a high risk of underutilisation or even wrongful use of the technology is incurred. Three companies remarked that the lack of adequate skills forces them to reconsider expansion plans and the investment into modern machinery. Careful planning is needed to compensate for this problem.

According to the interviews, the turn-over of personnel is not (yet) at critical levels, still companies like Roko, Erimu or Lotus mentioned a drain on their resources because of trained personnel leaving the company. To date there are only a few vocational training schemes working to improve the skills of carpenters in Uganda (for more detail see CARVALHO & EICHINGER 2004). Lotus Arts initialised a module-based training programme which should have been implemented with the help of an expert funded by the German government. But due to several organisational and administrative problems the initiative is currently on hold.

BOX 6: Skill is Key

- Successful companies constantly train their personnel
- Management skills also have to be trained, clear structures are required for sustainable growth
- The return on investment in modern machinery directly depends on adequately skilled labour (and management)

6.6 Financial Management

Financial management is most likely the weakest point of most companies interviewed. Few companies do really have a structured approach to managing their finances. In depth analysis of the cash-flows is rarely done, financial planning mostly carried out on a day to day basis and investment only roughly assessed. In favourable market conditions that does not cause significant problems but in the case of strong competition or an adverse market environment this poses a severe threat to the viability of the business. In publications analysing the reasons for business failure it is widely acknowledged that up to 90% of bankruptcies are the consequence of poor cash-flow management and lack of financial planning. According to the interviewees, access to financing and management of working capital presents a significant concern in expanding the business or pre-financing big contracts. Capital costs are generally high in Uganda with interest rates for lending between 17-20% for long-term and 22-25% for short-term credits according to the interviewed businesses. The individual rate, however, strongly depends on personal negotiations and on the working relationship between bank and client. Investors who have access to credits from outside Uganda are at a significant advantage since lending rates can potentially be cut by more than 50%. Though none of the interviewed businesses was severely restricted in their operations or planning due to limited access to working capital or financing most of them did see the banking environment in Uganda as an impediment for growth in the sector.

6.7 Marketing and Planning

Marketing to date is limited to basic concepts and generally understood as synonym for advertising. The current situation is characterised by a strong and growing demand for upper quality products. This environment does not encourage companies to put emphasis on improving their marketing capacities. Most companies even fear that increased marketing efforts would create a demand which cannot be fulfilled with existing capacities. The most commonly used technique is reliance on word-of-mouth. Customer feedback is incorporated as seen fit. Customer records are generally kept but the information is only partly utilised. As pointed out for the financial management, those deficits or shortfalls currently do not pose a threat to the viability of the businesses in the short or medium term. With increasing competition, however, marketing skills will become more and more important to obtain market share. The recent initiative of Hwan Sung – shown by a strong presence on billboards along all major roads in Kampala – gives an indication about potentially more competitive scenarios in the market.

A few companies (e.g. Kapkwata, BMTS, Erimu) are planning to investigate the export potential for their products. Despite the fact that none of those businesses already does export it indicates the entrepreneurial potential within those companies. The main source of information for analysing export options is the internet. Due to the lack of direct contacts to potential export markets the available information is limited and only suited for preliminary analysis. To date there is no institutional support for the furniture sector by e.g. providing statistics for potential export markets or information about the respective regulatory requirements.

In general, the collection of market information is not done in a structured way. Main sources of information are customers and suppliers. The information is gathered in irregular intervals. There was considerable interest for more detailed information about timber prices and volumes available on the market. The price summary published in "The Forester" was widely welcomed and should be expanded, if possible even in more detail (e.g. by giving indications about quantities and qualities or regularly showing a graph depicting the price development for the most sought after species like Pine, Mahogany and Mvule).

BOX 7: Demand for Information on:

- Market prices, volumes and trends are wanted by all companies
- Assessing export potential: sources of information about markets and regulations, links and contacts
- Characteristics and utilisation of lesser known species

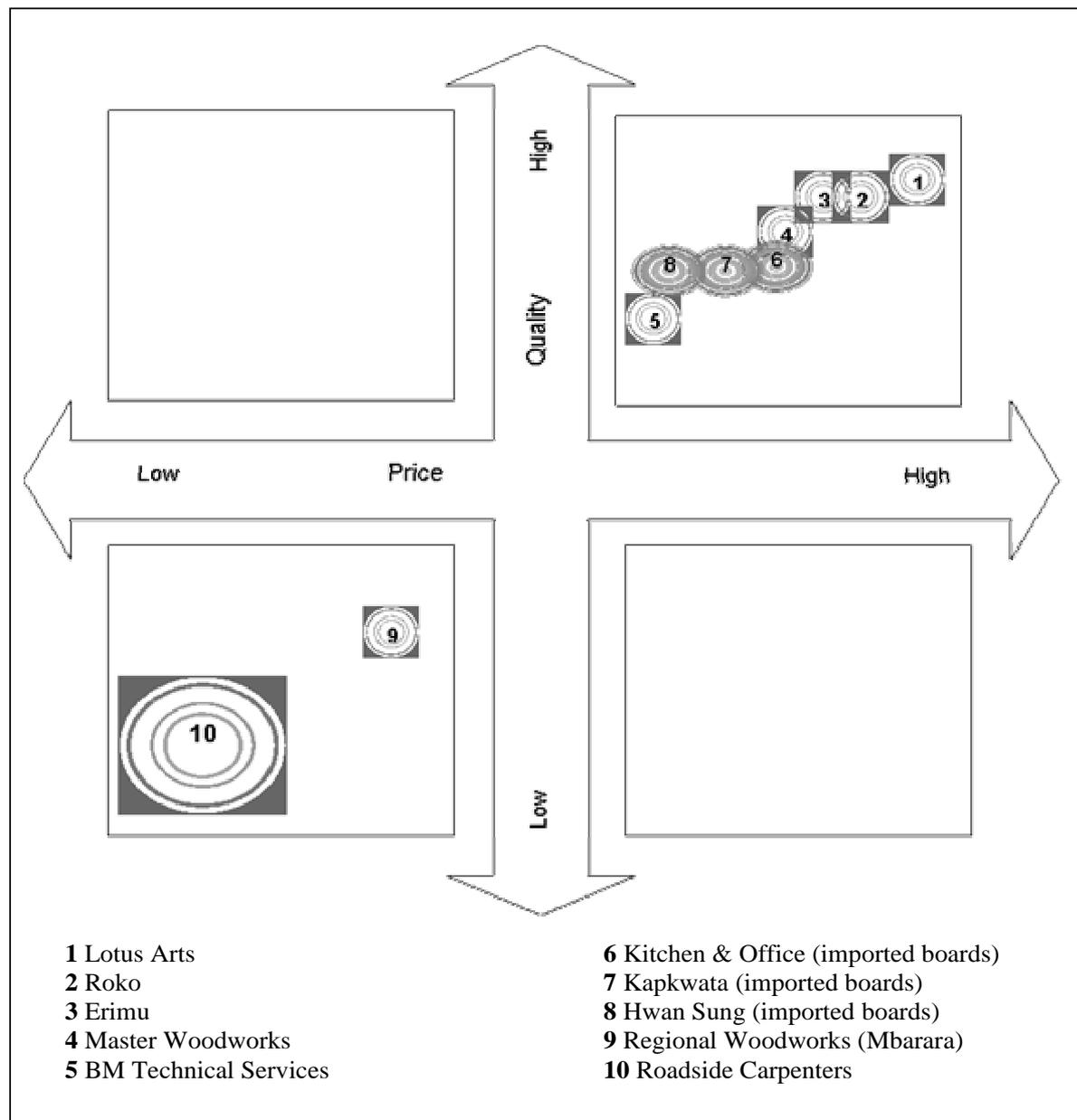
6.8 Particularities of the Construction Sector

The interviewed construction companies are major players in the Ugandan market, Cementers and Roko being subsidiaries of international companies. The timber is generally sourced from a pool of five to ten stable suppliers. The suppliers are chosen according to price, quality and service. The requirements for construction wood can generally be met in the market. Nevertheless, it becomes increasingly difficult to source straight timber without defects and species with high natural durability. Consequently, timber treatment done by the construction companies is growing in importance whereas in the market treated timber is still hardly offered. As important as quality is the reliability of the supplier especially concerning delivery on time since the builders have to meet strict deadlines. The main areas where wood is used are: roofing, windows, shutters, doors, frames and parquet. Due to the irregular supply in the market there is an increasing substitution of timber with wood-based panels or even other material as steel, aluminium or plastic. NHCC, for example, did phase out the wooden furniture production and increasingly also substitutes wood in floors, doors and windows because of problems in securing a constant supply of proper quality timber. Recent price increases in the market further prompted this development. The other interviewed companies are moving in a similar direction. Since the construction activity in Uganda is still expanding the timber demand of construction companies remains stable in terms of volume but the share of timber used in buildings is decreasing (according to the interviews for building a medium size town house currently an average of about 10m³ of timber is used).

7 Segmentation of the Furniture Market

The furniture market offers the highest potential for adding value to the resource. The results described in Chapter 5 and 6 show that the furniture market in Uganda is strongly segmented according to quality and price. In accordance with economic development and a growing middle class in Uganda the demand for upper quality furniture has continuously increased in urban areas in the last five years. Additionally, the cultural attachment to furnish representative village homes with quality furniture strengthens this trend (CARVALHO & EICHINGER 2004). Several companies entered the market, either being founded (e.g. Lotus Arts), expanding their business (e.g. Erimu) or diversifying into furniture (e.g. Master Woodworks). Figure 4 depicts the positioning of several important players according to quality and price.

Figure 4: Positioning of Companies in the Ugandan Furniture Market



It has to be noted, however, that the positions are just a rough indication since detailed business data was not disclosed by the companies. Nevertheless, it becomes clear that several players occupy the upper quality sector. Differences in quality and price are not high but still significant. Particularly, the companies applying imported wood-based panels from South Africa or China offer their products at lower prices thereby becoming important competitors for companies focusing on producing furniture from solid wood.

The interviews showed that the upper quality sector is currently the most attractive in terms of volume and profit margins. Producers start to employ modernised machinery moving into batch production thus capitalizing on significant efficiency gains. The significant expatriate community and the growing share of upper-middle class Ugandans adopting Western furnishing styles result in a high demand in this segment. The high quality sector – mainly custom-build furniture- is only a niche market where the high prices limit the amount of potential customers. Furthermore, this segment is very labour intense both in skill and time.

BOX 8: Quality "Revolution"

- Void for upper quality furniture in Uganda is being filled
- New materials (processed boards), machinery and processes give an efficiency boost for the sector
- Demand for quality wood products still partly unsatisfied

8 Summarising Analysis of the Chain Links

The following chapter shall bring together the information from the individual companies and deliver a broader picture of the forestry, timber and furniture value chain in Uganda.

Overall the timber value chain in Uganda can be described as a **low trust chain**:

- Most trading relationships are rather short-term
- The number of suppliers and customers in general is high
- Product quality has to be carefully controlled by the buyer
- There is hardly any sharing of information or technical assistance within the chain
- Communication between the different actors is – apart from personal relations – generally limited to price negotiations
- Price determination is adversarial and information is hidden
- Credits granted are rare and if granted mostly based on power relations (or personal relations), payments are often delayed without agreement or even informing the other party

These observations hold particularly true for the low quality segment. Even though most of the companies are located in dense clusters in urban areas there is hardly any cooperation between those businesses. This observation fits well with other studies looking at clusters of Small and Medium Enterprises in developing countries (ALTENBURG & MAEYER-STAMER 1999). One reaction to a low trust environment is vertical integration: by encompassing operations upstream or downstream along the value chain dependencies on other actors are minimised thereby reducing transaction costs. The main transaction cost in a low trust environment result from:

- Lacking standards – adequate quality has to be sought after
- Lack of trust in suppliers or customers results in high costs for control

The downside of vertical integration is clearly the broadening focus of operations making it more difficult to develop core competencies and a clear focus for the business.

In the following, the timber value chain will be examined according to the rents accrued along the different links of the chain with particular focus on the secondary processing sector. For the purpose of this study interviews deliberately focused on companies which stand out because they possess scarce attributes resulting in economic rents. In simplified terms the concept of economic rents refers to a company's ability to capture above average profits because they do business in more innovative ways than the majority of their competitors.

Those scarce attributes can be categorised according to KAPLINSKY and MORRIS (2002) in:

Table 5: Types of Economic Rents

Type of Rent	Description
Technology	Having command over scarce technologies (e.g. modern machinery)
Human Resource	Access to better skills or skilled personnel
Organisational	Possessing superior forms of internal organisation (e.g. organisation of the workshop)
Marketing	Possessing better marketing capabilities and/or valuable brand names
Relational	Having superior quality relationships with suppliers and customers
Resource	Access to scarce natural resources
Financial rents	Access to finance on better terms than competitors

8.1 Forestry

The timber resources are scarce. Hence **resource rents** can potentially be accrued by forest owners. The NFA as largest single forest owner does benefit from the resource scarcity in raising the price for its timber. With the introduction of the bidding system prices for standing Pine increased by about 150%. The plantation timber – especially Pine – is in high demand on the market. Competition from private plantations hardly exists. The current scarcity is additionally increased since the NFA plans to stretch the supply from the few remaining plantations (approx. 6000ha) over a period of at least ten years. This strategy is meant to buffer the projected timber shortage in the future. Technological or human resource rents might be incurred in areas where the resource was particularly well managed but those are the very exception in the forestry sector in Uganda. For the future, however, proper plantation management is crucial for maximising profits from forestry. Calculations based on current establishment costs and current timber prices indicate a realistic range of 12% - 16% for the Internal Rate of Return (IRR) achievable in forestry.

8.2 Sawmilling

As described earlier, the technological standard of sawmilling in Uganda remains low. Due to irregular access to timber resources operations are designed to be highly flexible and as cheap as possible with little or no attention to quality or environmental standards. The key success factor is access to harvestable timber thus saw millers can incur **resource rents**. Those are no rents in the classic sense of the economic theory since those rents are mainly originating from informal agreements allowing to cheaply exploit

the resource. This is either done semi-legally or even illegally. Contact networks and knowing the right people allows for profits which are above average. Better control through the authorities, mainly the NFA results in those rents eroding. Some enterprises are forced out of business. Nevertheless, growing shortage and rising prices will increase the incentive for engaging in illegal activities – be it illegal harvesting in the remaining natural forests or illegal imports from DR Congo or Sudan. Other attributes like human resources (skills), organisation or marketing play a minor role in determining the success of a sawmilling business.

Despite profit margins of 15-25%, which still can be earned in sawmilling when there is an adequate stand to be harvested, a lot of companies incur losses. Equipment is underutilised and resources are poor resulting in low recovery rates and poor quality sawn timber. The value added to the product is low. The general quality of sawn timber in Uganda is bad. Apart from bringing the resource to the market (via timber yards in urban areas) the saw millers capitalise on information asymmetries, meaning they benefit from low market knowledge of their suppliers. Small private forest owners often do not have a clear idea about the value of timber on their property nor do they have the means to bring it to market. Accordingly, some sawmillers are still able to incur significant profits despite the inefficient harvesting techniques.

With increased prices through shortage the situation should change. Efficiency gains will pay off directly leading sawmillers to become more innovative and effective in their operations. Based on current market prices for sawn Pine an increase of 10% in recovery rate results in an additional revenue of US\$ 38,000 per m³. As can be seen in Box 9 investment in better machinery already pays off at volumes well below 1000m³. It is questionable, however, to what extent the financial incentive to improve efficiency will be offset by the lack of procurement security which is a crucial requirement for potential investors to invest in technology.

BOX 9: Increase Efficiency in Sawmilling	
Back-of-the-Envelope Calculation for the financial attractiveness of employing a Woodmizer LT 15 bandsaw instead of a mobile Lucas sawmill in a Pine plantation:	
Parameter	Woodmizer instead of Lucas
Additional Purchasing Costs	~ US\$ 13,000
Minimum expected increase in recovery	~ 10%
Additional Revenue per m ³ of Pine through 10% increased recovery	~ US\$ 22 (current price per m ³ of sawn Pine ~US\$ 220)
Timber volume needed to recover higher purchasing costs through higher recovery	~ 600m ³ (US\$ 13,000 divided by US\$ 22)
Additional Net Revenue for 1,750m ³ (average volume per lot of Pine from NFA tender in October 2004)	US\$ 38,3000 minus US\$ 13,000 = US\$ 25,300
Additional Benefits	<ul style="list-style-type: none"> ➤ Better cut quality ➤ Longer lifetime

8.3 Timber Dealers

The timber dealers do not incur rents in the classic sense. Since most timber dealers are part of a sawmilling business potential rents are incurred upstream. To a certain extent timber dealers can capitalize on information asymmetries or lack of resources of their suppliers: small pitsawyers sell their timber directly at the forest not being aware about the current market prices and/or do not have the means to transport the timber to the market. The only value added is by organising the transport to the market and by providing a physical outlet for the timber. As pointed out in Chapter 5 poor handling and storage practises and the quick turn-over do not add any physical value to the resource but under the current market conditions this is not reflected in the prices. Profits generally result from buying cheap timber frequently coming from unspecified sources. The profits in turn basically result from evaded royalties and taxes. The suspiciousness and reluctance of the timber dealers to reveal information supports this conclusion.

8.4 Secondary Processing

Based on the results from the interviews the focus is on the furniture producers since the determinants for the construction business (some of which do produce furniture) are mostly lying outside the timber value chain. This part summarises which areas are contributing to adding value in their current order of importance:

1. Technology rents: Kiln dryers and pressure treatment chambers are still the exception in Uganda allowing companies utilising this technology to capitalise on the technological advantage. Kiln-dried timber is a prerequisite to enter the upper quality market. Installation of modern woodworking machinery requires access to training and proper maintenance, especially since the humid climate increases the wear of parts, hence increasing the risks the investment. Nevertheless, modern machinery is crucial for more efficient production techniques and the continuous expansion of the business
2. Human resource rents: Are currently incurred in combination with technology rents. Properly trained personnel is required for the upper quality segment and allows for efficiency gains resulting in higher profits. Managers are aware of the value of their skilled work-force but with increasing competition innovative human resource management could be needed to limit the risk of losing highly skilled personnel to the competition. In the Ugandan context this is especially important since there is no pool of externally trained labour.
3. Resource rents: Vertically integrated businesses like Roko or Erimu can already benefit from established access to resources in Southern Sudan (and DRC). If the sawmilling operations produce according to the specified quality criteria transaction costs are reduced, production planning can be significantly improved and expansion of the production is less threatened by timber shortages on the market. On the same token, companies utilising significant quantities of wood-based panels can strongly benefit from established links with suppliers abroad.

4. Financial rents: Considering the banking environment in Uganda financial rents are incurred by most companies which do have access to foreign capital either through personal credit-lines or foreign headquarters. Lending rates are significantly lower and the services provided generally more reliable and customised. Access to financing is elementary for establishing a business in the upper quality segment because of the required investment in technology. It remains difficult for new entrants to establish a working relationship with a bank in Uganda and hence the initial investment/access to financing presents a strong barrier to entry.
5. Relational rents: A stable relationship to suppliers becomes more and more important. To date there are only tendencies visible but an established trustful relationship with suppliers can significantly reduce transaction costs and decrease the costs for storing large quantities of quality timber. With increasing competition the importance of return customers will increase.
6. Marketing rents: Some companies like Roko were able to establish brand names in the market. Without further expansion, however, the perspectives of capitalising on this advantage are limited because the production is at capacity. Overall, marketing rents are currently hardly incurred but fast movers with a clear marketing concept could capture a significant share of the growing market.
7. Organisational rents: Could not be determined on the basis of the interviews.

9 Timber Price Development

As the Figures 5 and 6 show there has been no clear price tendency in the market. The data was compiled from different studies (KAMAU 1993, CARVALHO & JACOVELLI 1999, HARDCASTLE 2004) to gain a longer perspective about the development of the market. It has to be noted, however, that the quoted sources generally do not specify how price information was obtained. It has to be assumed that few selected timber dealers were interviewed. Hence, a margin of error has to be figured in. Pieces in Uganda are generally still cut to a standard length of 14 feet with a depth of one or two inches and width of 4, 6, 8 or 12 inches. Indications for inconsistencies can particularly be found within the price data for lesser used sizes like 6x1 or 9x1. The interviews further suggest significant price differences for native species depending on the source and individual negotiation skills.

Consequently, the analysis focuses on the 2inch sizes but also displays the prices for the commonly used 12x1 size as a comparison. The data shows that the one inch sizes are far more expensive and fluctuate a lot stronger than the 2 inch sizes. In addition to the fact that – due to poor plantation management – stems allowing for bigger width (9 and 12 inch) are more difficult to be found, the main reason for the price difference is the low recovery rate: the additional cut necessary results in significantly more wastage being reflected in the prices. However, a premium of up to 100% per m³ either points to additional factors influencing the price (e.g. high price elasticity of demand meaning that buyers cannot substitute those products and consequently also pay very high prices) or far less efficient sawing practises than commonly acknowledged in the available studies.

Figure 5: Price development for sawn wood from 1993 to 2004: Cypress and Pine

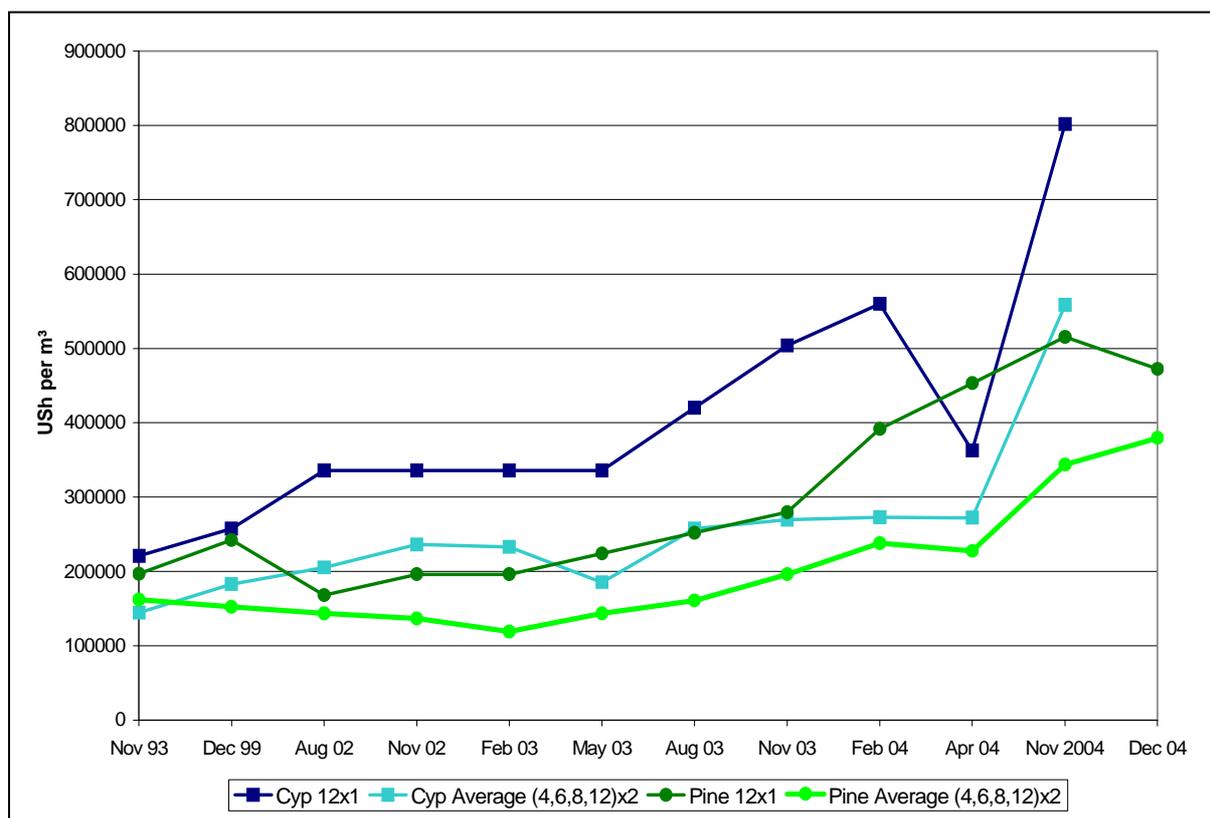
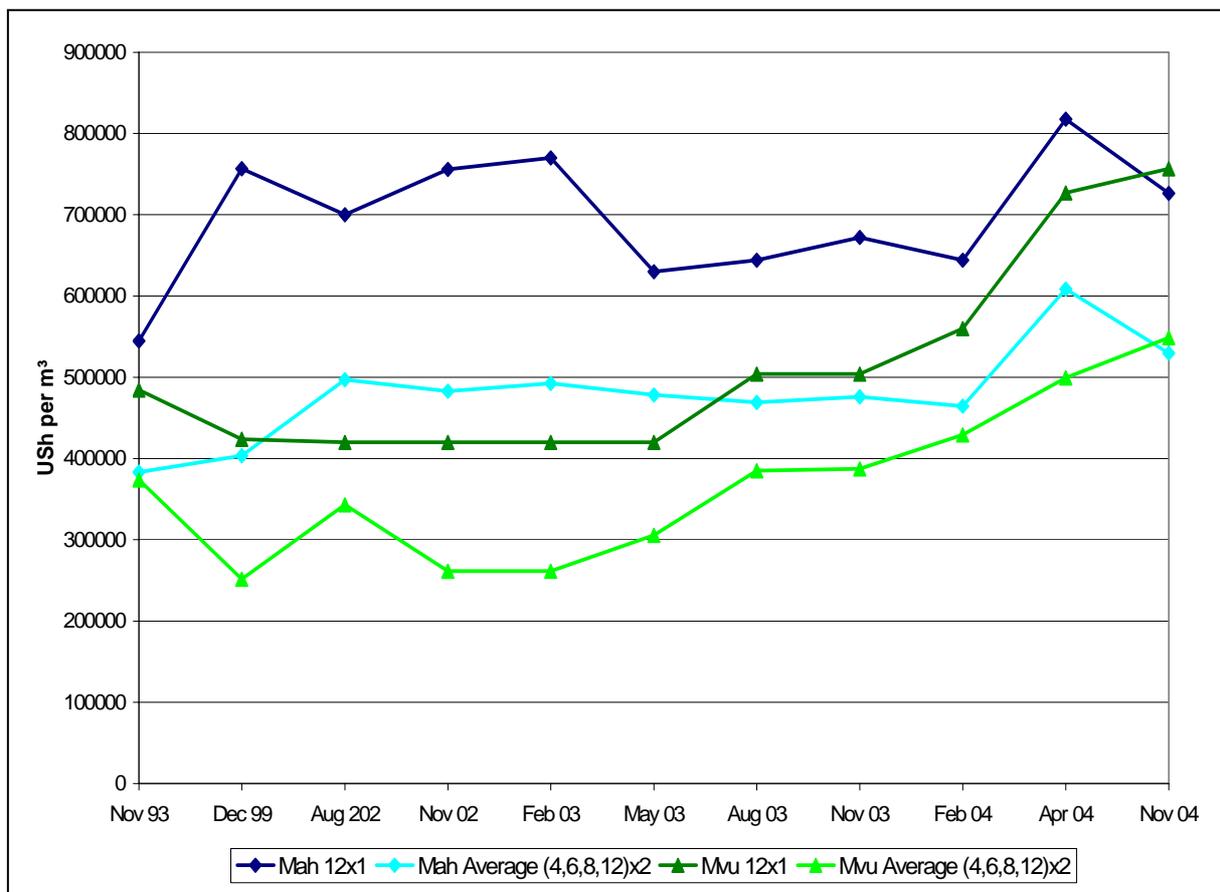


Figure 6: Price development for sawn wood from 1993 to 2004: Mahogany and Mvule



Overall, prices did go up slowly – FALKENBERG & SEPP (1999) calculated an average increase of 4-5% for the 1990s – but fluctuate strongly. A clear upward trend for plantation timber (particularly Pine) starting in early 2004 can be attributed to the implementation of the competitive bidding by the NFA. A more than 150% price increase for standing Pine – from previously 28,000 US\$ per m³ to an average price of 80,000 US\$ in the second round of bidding – is reflected in the strong increase of the market price for sawn timber. Interestingly though, the prices for sawn timber just doubled and even slightly decreased recently. This is not clearly displayed in the available price data but was consistently remarked by the interviewees. Peak prices were indicated to have been up to 500,000 US\$ per m³ of sawn pine wood.

In the period between 1993 and 2003 prices were even slightly on the decline according to the data available. At the same time the production of sawn timber was increasing by about 50% according to FALKENBERG & SEPP (1999). Underutilisation of the timber reserves diagnosed in 1989 (PLUMPTREE & CARVALHO) turned into what is widely acknowledged to be a strong overexploitation of the natural timber resources (JACOVELLI & CARVALHO 1999; KANABAHITA 2001; BUSH et. al. 2004). Already in 1994, the extraction rate was considered to be seriously threatening the continuous supply in the mid- and long term (CARVALHO & PICKLES 1994).

BOX 10: Timber: Increasingly Scarce

- Clear upward price trend developing
- Market participants perceive a growing shortage of timber
- Natural forests are depleted – native species are increasingly imported

The results of this development start slowly to show in the prices for local hardwoods. Especially for Mvule, prices started to climb significantly in the last two years, having almost doubled to date. Even though undefined quantities enter the market from Southern Sudan and particularly from Eastern Congo, the almost complete depletion of the Ugandan stands (EBERT 2004) results in continuous shortage in the market. Mahogany being cut in private forests and large quantities imported from Sudan and Congo could so far prevent a strong price rise. Particularly the market for Mahogany is highly distorted and basically impossible to control (AUREN & KRASSOWSKA 2004). Nevertheless, prices for Mahogany did increase by about 50% over the last 10 years and according to the majority of the interviewed businesses the quality is deteriorating – in particular in respect to problems with wood borers and other insect attacks.

10 Estimating the future demand for timber

There has been continuous work on long-term forecasts for the demand for forest products. Models employed are generally based on econometric approaches adjusting observed trends for expected changes in the future.

Requirements for the time series cross sectional approach, the basic model recommended for developing countries by BUONGIORNO (1977), are time series of

- Consumption volumes
- domestic prices and real import prices
- GDP figures and growth projections

This data is modelled to estimate the price elasticity for demand and supply, which in turn is used together with GDP growth projections to forecast the future demand for forest products.

The main weakness of all models is that – even with elaborated relations between the parameters – the over- or underestimation of the expected growth causes huge variations in the predicted outcome. Projections over a period of more than 10 years are subject to great uncertainty and high forecasting error even in the context of industrialised nations where reliable and detailed statistics do exist. Generally, in developing countries the amount of work needed to provide the necessary input to adjust and feed an econometric model cannot be justified by the improvement in forecasting precision (BECKER 2005).

The available data in Uganda for timber production and consumption is fragmented and unreliable. The FAO database (FAOSTAT), for example, shows the sawn timber demand in Uganda with a constant 269,000m³ for the 5 years between 1998 and 2003. For this period the Ministry of Tourism, Trade and Industries neither has any data about the woodworking sector.

Accordingly, it cannot be recommended to develop and use an econometric model to forecast the future timber demand in Uganda. Given the inherent uncertainty of forecasting models it is advisable to generate estimates based on available data using very basic correlations and clear assumptions. When estimating future timber demand in the Ugandan context it is most important to make the used approach transparent so that – with more precise information – the estimates can be adjusted. The following parameters are needed to give an estimate for the future demand of saw-logs:

Current annual consumption of sawn timber: To date there is no reliable figure available. There are several estimates of which the most coherent ones are based on different studies done by the FAO indicating a current consumption of about 270,000 m³ of sawn timber per year (FAOSTAT 2004, CARVALHO & JACOVELLI 1999, FALKENBERG & SEPP 1999).

Growth rate of sawn timber consumption (linear): The growth of timber consumption is closely related to the GDP growth. In the last 10 years the GDP in Uganda grew in average about 6.7% annually (WORLD BANK 2004). This growth is expected to

continue in the next years with an average of about 5%. With a more mature economy, however, the annual GDP-growth will most likely slow down in the long term. European Studies (UNECE & FAO 2002, KANGAS & BAUDIN 2002) show that – with growing maturity of the economy – the average growth in timber consumption is lower than the average GDP-growth. For the period between 1993 and 2010 the FAO estimated an average rate of 4% growth in sawn timber consumption for Africa. Based on the available data this was roughly confirmed for Uganda by FALKENBERG & SEPP (1999). With the lack of adequate figures for price elasticities, substitutional effects have to be estimated and figured in. Growing shortage of timber will result in price increases and strengthen the trend towards substitution. Considering these observations, the most realistic average growth rates for the next 20 years for sawn timber consumption are estimated to be between 2-3% annually.

Recovery rate: With proper management, usage of more efficient technology and capacity building the average recovery rate of sawmilling operations in plantations is conservatively expected to be around 40%.

As displayed in Table 6, a demand for saw-logs of about 1 Million m³ can be expected in 20 years time based on the assumptions detailed above (see also Table 7).

Table 6: Estimated future demand for saw-logs depending on consumption growth (in 1,000 m³)

Annual growth rate	2005	2010	2015	2020	2025
1.50%	675	727	783	844	909
2%	675	745	823	908	1,003
2.50%	675	764	864	978	1,106
3%	675	783	907	1,052	1,219

For the purpose of the study and for potential forest investors it is helpful to estimate the area of plantations needed in 20 years to sustainably fulfil the timber demand. Hence there are additional parameter needed which are detailed in the following:

Rotation period: Assuming that the majority will be Pine plantations (rotation period 20-25 years) and some Eucalyptus timber plantations (12-15years) the average rotation period for timber plantations is assumed to be 20 years.

Harvesting volume: Based on available growth tables and some risk adjustments the average harvestable volume at the end of the rotation period is estimated to be an average of 350m³ per hectare. Potential on-site harvesting losses from poor felling practises are not considered.

Share of timber from natural forests: The survey among timber dealers indicated currently a share of native species of about 40%. Since most of the Ugandan forests already are highly degraded the contribution of native species to satisfy the demand for timber will decrease strongly in the future; imports and stronger utilisation of lesser

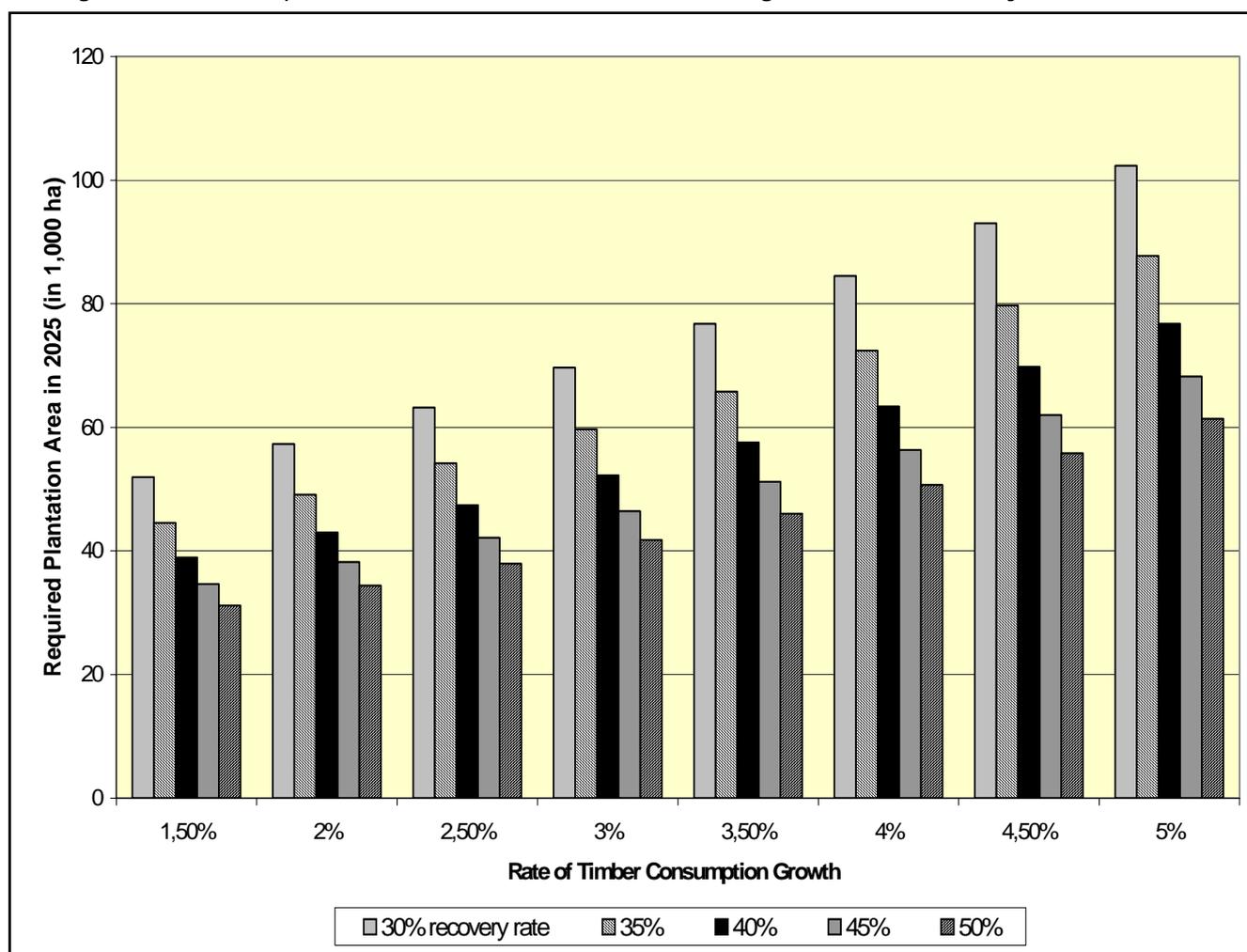
known species will partly buffer this effect. Hence, for the following scenario a share of 25% of native tree species is assumed.

Table 7: Overview of the assumptions used for the projections in Table 6 and Figure 7:

Parameter for saw-log demand forecast	Assumption	Parameter for estimating needed plantation area	Assumption
Current consumption of sawn timber	270,000m ³	Rotation period	20 years
Growth rate of consumption	1.5%-3%	Harvesting volume	350m ³ /ha
Recovery rate	40%	Share of native species	25%

Table 7 summarises the assumptions used for the projected demand figures. Figure 7 shows the range of the projected plantation area needed in 20 years in order to sustainably fulfil the demand for sawn timber in Uganda. According to the current knowledge (see above) the area is expected to be between 45,000 and 55,000 hectares (consumption growth 2%-3% and recovery rate 35%-40%). Considering that under the SPGS about 4000 ha of private plantations can be supported and the NFA plans to establish about 1000 ha of plantations annually there is still a large gap to be expected.

Figure 7: Needed plantation area in 2025 in relation to growth and recovery rate



11 Conclusions

11.1 Estimating Timber Demand

As pointed out above, demand forecasts are highly uncertain. In the Ugandan context this is especially true since hardly any reliable figures about the actual timber consumption are available. Current figures are based on flawed statistics and very rough estimates. In order to provide more reliable data about timber consumption and the businesses involved in the value chain better cooperation between institutions, namely the NFA the Ministry for Tourism, Trade and Industries and the Bureau of Statistics, is needed.

Even a very basic approach to data collection has the potential to improve the situation significantly. This study, in conjunction with others, confirmed that most timber on the market is sold through timber dealers. As of yet there are no reliable numbers about how many timber dealers there are and what the average annual turn over is. According to the Commissioner for Industries at the Ministry for Tourism, Trade and Industries there was no data collection since 1998. This study could give an indication about the average amount of timber sold annually per timber dealer – about 740m³ (see chapter 5.1.). For a more accurate estimate of the total consumption a census to determine the number of timber dealers in Uganda would be helpful. Since basically all timber dealers do need a physical location for storage and there are dense clusters in the urban areas, counting the number of stores by simply assessing those clusters would provide a solid base for improved consumption estimates. Additionally, regular surveys (e.g. every 6 months) of a selected sample of timber dealers should be carried out to assess the volume, the prices and the respective species sold. Using a short and simple questionnaire the methodology could follow the one used for this study.

The assessment of consumption of wood-based panels should be easier. Since NilePly is the only producer of plywood in Uganda, the rest of the panels is imported. Respective import statistics (e.g. from customs), complemented by an assessment of the main importers, like P.G. Bison, should provide a clearer picture of the development of the demand for wood-based panels.

11.2 Increase Transparency of the Competitive Bidding

Common complaints about the new bidding system were that it results in higher uncertainty concerning the continuous supply with raw material and lack of transparency. Particularly affected are businesses with significant installed capacity and accordingly high capital investment (e.g. NilePly).

There is a significant amount of data available about the bidding process:

- The name, address and company data of the bidders
- The amount bid according to lot, amount and species
- The total volume sold and the respective prices

Analysis, however, is missing. Data should be analysed according to:

- Tree species, respective quality and location of the lot (distance to market)
- Average price offered according to company and the overall volumes bid for in comparison to installed capacity and technical standard of the equipment.

The data should be compiled in a data bank, regularly updated and general results should be published (e.g. by utilising "The Forester") serving mainly two purposes:

1. The bidding process and the respective results become far more transparent. A more open communication between the NFA and businesses in the timber/forestry sector will ultimately result in an improved image of the NFA and a proper working relationship.
2. The basis for decision making is improved. Readily available data about the current resource prices, the process and the participating actors will serve to decrease transaction costs. Availability of adequate information is the first step in increasing the planning security.

Since irregular access to resources is one of the main inhibitors for investments in technological improvements, the competitive bidding process should be regularly reviewed for options to improve the procurement security of selected businesses. These businesses should be selected according to defined criteria for minimum installed capacity (capital investment), technological and environmental standards. The compliance with those criteria should strictly be monitored and enforced. Options for such mechanism could be:

- Granting long-term concessions to the selected businesses applying the average winning bidding price as baseline
- Preferential treatment in the next tender based on the assessment of the respective forest management practises

11.3 Lessons learned from the value chain analysis

Figure 8 summarises the competitive situation in the Ugandan timber market.

Barriers to Entry describe how difficult it is to enter the market. The concept is directly linked to economic rents since scarcity defines barriers of entry and is a prerequisite for rents. Accordingly, there are basically no rents to be incurred in the low quality segment of the market since machinery is basic and the products generic.

Bargaining Power of Suppliers: describes the power of the suppliers in the chain. Because of limited access to resources the suppliers can play a dominant role in the market. So far the suppliers can afford to widely ignore the demand for quality timber in certain segments.

Bargaining Power of Buyers: consequently the buyers are less influential in the market. Only buyers of significant quantities can ascertain procurement criteria on their suppliers. Nevertheless buyers are dependent on the suppliers since the choice is very limited.

Figure 8

THE TIMBER MARKET IN UGANDA

ACCORDING TO

PORTER'S FIVE FORCES

(PORTER 1985)

BARRIERS TO ENTRY

- Generally low, few regulatory requirements
- Possession of scarce attributes (technological, organisational, skills etc.) only in upper market segment
- Main barrier: initial investment (hence majority of businesses with low technological standard)
- Growth in the upper quality segment of the furniture market: new companies (e.g. Lotus Arts), diversification (e.g. Master Woodworks), expansion (e.g. Erimu)

BARGAINING POWER OF BUYERS

Generally low,

- Increasing with processed volume (few bigger players can guarantee secure and timely payments)
- Increasing with improved access to market information (information asymmetries are especially used by traders)
- Price determined market

COMPETITION

- Low for the upper market sector, market expanding (growth phase), interviewed businesses do not perceive competition as threat, demand partly not satisfied
- High for low quality: products generic, no competitive advantages, weak skill base
- Competition rather for access to resources than for market share

BARGAINING POWER OF SUPPLIERS

- Medium to high due to limited resource availability
- Increasing with increasing volume
- NFA able to fetch high prices through bidding system (average: 80,000 US\$/m³ for Pine in October 2004)
- Marketing and procurement channels highly informal

THREAT OF SUBSTITUTES

- Medium to high, unstable supply forces processors to look for alternatives
- Construction: steel, aluminium, processed boards
- Furniture: imports, assembly of processed boards
- Competitive prices and consistent quality main reason for switching to substitutes

Threat of substitutes: refers to the tendency in the market to switch to other products or materials. Already there is a clear tendency towards substitution visible. In the future this trend might increase; particularly if quality standards of sawn timber are not improving and consumer perceptions change – currently there is still some reluctance concerning products made from wood-based panels –the demand for solid wood products will be decreasing. Imported timber from Sudan or Congo replaces Ugandan timber but cannot be considered a direct substitute since the imported species – Mahogany and Mvule – just cannot be provided in sufficient quantity in Uganda. It is true, however, that those imports contribute to limiting the use of lesser known native species.

Competition: competitive pressures are to date only felt in the low quality segment of the market. The upper quality segment still offers significant opportunities for investors. This is underlined by the fact that all interviewed furniture manufacturers have plans for expansion. Sawmillers, however, do compete for the remaining resources clearly shown by the significant price increase through the bidding system.

Table 8 gives a brief overview about threats and opportunities along the value chain. Generally, the environment becomes more favourable for forestry and secondary processors. For sawmillers and timber dealers future prospects are less promising.

Table 8: Threats and Opportunities for the Links of the Timber Value Chain

Chain Link	Threats	Opportunities
Forestry	<ul style="list-style-type: none"> ➤ High initial investment and long-term commitment ➤ Lack of forestry skills ➤ Weak infrastructure (distance to market) ➤ Unfavourable Taxation policy 	<ul style="list-style-type: none"> ➤ Growing shortage of timber in the market ➤ Access to Grants or Carbon money ➤ Environmental Services (Water, Soil)
Sawmilling	<ul style="list-style-type: none"> ➤ Limited access to resources ➤ Sawn timber from outside Uganda ➤ Enforcement of regulations 	<ul style="list-style-type: none"> ➤ Benefit from efficiency gains through improved technology ➤ Add value to plantation timber in the future
Timber Dealers	<ul style="list-style-type: none"> ➤ Enforcement of regulations ➤ Substitution (wood-based panels and other materials) ➤ Vertical integration of secondary processors 	<ul style="list-style-type: none"> ➤ Improve quality through storage and handling ➤ Establish trustful business relationships
Secondary Processors	<ul style="list-style-type: none"> ➤ Low quality timber ➤ Lack of skilled labour ➤ High initial investment 	<ul style="list-style-type: none"> ➤ Growing markets for quality ➤ Profit margins of 25% or higher

Overall the timber market is clearly a sellers market, the value chain is more producer-driven but there are no clear forms of governance meaning there is no clear coordination along the chain which would evolve to the establishment of industry standards. The furniture value chain shows signs of transforming to a buyer-driven chain with governance by the bigger companies in the sector leading – with external support – to the establishment of quality and training standards.

11.4 Investment Opportunities

As can be seen in Table 9, the upper quality segment of the furniture market – including office and household furniture, doors, windows, shutters and frames – currently presents the most promising investment opportunities in the sector. Prerequisites for successfully participating in this market are:

- Instalment of adequate machinery, of particular importance is kiln-drying technology with sufficient capacity
- Well organised work-flows, there is a clear tendency towards batch processing
- Adequately skilled personnel which is able to produce according to quality standards

The current growth for those quality timber products will result in an increased demand for quality timber on the market and promote the establishment of standards.

Whereas Sawmilling and Timber Dealer do not require high investment they also do not offer promising long-term potential. The profit margins still can be attractive but with more mature markets and a shift towards higher quality the potential seems to be limited.

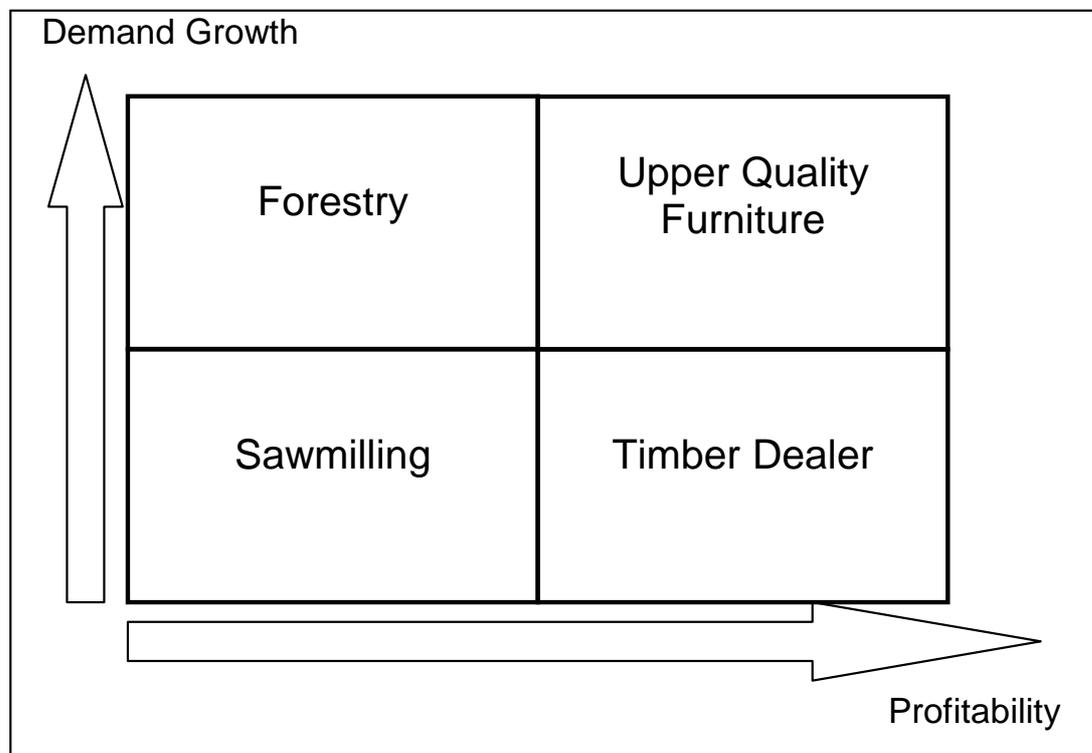
Table 9: Investment Criteria for the Links of the Value Chain

	Profit Margin (Forestry: Rate of Return)	Initial Investment	Longevity of the business (sustainability)	Expected future development
Forestry (incl. available grants)	12 -16%	Medium to High	High	↗
Sawmilling	Highly variable, positive scenario: 15-25%	Low	Low	↘
Timber Dealers	Not determined	Low	Low	↘
Furniture	25-30%	High	Medium to High	↗

The perspectives for **investments in plantations** are promising, particularly with programmes like the SPGS helping to decrease the initial investment and hence reduce potential cash-flow problems. The demand for timber is still growing. Particularly, quality plantation timber is highly sought after in the markets. Pine is the most widely traded species and Eucalyptus is increasingly utilised also in carpentry and furniture production, since the qualities of Eucalyptus wood concerning workability and visual appearance are

better communicated (CARVALHO & EICHINGER 2004). Despite the uncertainty about future demand patterns even very conservative estimates predict a significant timber shortage in Uganda. Especially, the demand for quality timber will increase significantly and stabilize on a higher level with a more mature economy in Uganda.

Figure 9: Attractiveness of Value Chain links



The matrix in figure 9 visualises the potential of the different links along the value chain from an investors point of view. While forestry is not as profitable as upper quality furniture the growing need for timber in the market provides an attractive opportunity. Timber dealers can still incur significant profits because of semi-legal operations and low transparency. With an increasing demand for quality, however, and more trustful relations between the individual actors those profits are likely to erode and the sector is likely to consolidate.

BOX 11: Key Success Factors for Forestry Investors

- Carefully select site and species
- Prepare detailed investment plan and cash-flow analysis to prevent under-financing
- Implement proper forest management techniques to assure quality timber
- Enter into primary processing once the resource is harvestable

Sawmilling was very attractive with ample resources in the natural forests but with limited access to resources there is increasing pressure to restructure. With growing importance of plantations it is likely that sawmilling and timber trade in the future will be integrated into forestry operations or secondary processing as tendencies in other

countries with big plantations show (e.g. Sweden, New Zealand). In this context, a favourable taxation policy for forestry is of high importance. Considering the cash-flow pattern of a forestry investment, with high initial investments and late returns, it is crucial that losses in the early years can be adequately held against profits at harvesting time to reduce the tax burden. An additional issue is the value adding tax which is waved for agricultural products but is charged for forestry products.

The consequence for the forest investor should be to put strong emphasis on producing high quality timber since only high quality guarantees high rates of return on the investment. Even now poor stands of timber achieve significantly lower prices in the market. With improving sawmilling standards timber qualities like straight growth, high per stem volumes and long knot-free shafts will also become more important. The results of this study show that these criteria already have significant importance for the selection of timber. These quality criteria are directly influenced through forest management practises: proper site preparation, use of quality seedlings, professional thinning and timely pruning significantly increase the value of the resource.

11.5 Potential for Cooperation

Though cooperation between companies to date hardly exists some of the most pressing problems of the sector could be mitigated through a joined approach. In the following two of the major problems for secondary processors are looked at.

11.5.1 Quality and introduction of respective standards

A quality grading system has been recommended in several studies previously undertaken (CARVALHO & PICKLES 1994, JACOVELLI & CARVALHO 1999) but to date hardly any progress was made. As pointed out above, a grading system for sawn timber could significantly help to strengthen the sector but in order to be effective it has to be market driven, not imposed through regulatory interference. The increasing demand for quality timber from secondary processors in recent years provides a real window of opportunity. Because of the frequent integration of sawmillers and timber dealers market driven standards – imposed by secondary processors on their suppliers – should also result in pressure to improve the sawmilling standards. With an increasing number of companies paying premiums for better qualities there is a monetary incentive for sawmillers and timber dealers to provide better qualities. Previous efforts to establish standards were rather technical and were not yet supported from the market side; hence they never were implemented successfully. In the following several steps are proposed which could help establish market driven quality standards:

- Businesses which have certain quality requirements concerning processed wood get together and agree on a basic grading system accommodating for their needs. Given the lack of an influential association and the current reluctance for cooperation this should be initialised by an external institution. This could be the NFA, the Ministry of Tourism, Trade and Industries (as the responsible administrative body) or through a separate initiative imbedded in one of the donor-funded private sector support programmes.

- The initialising body should contact potentially interested companies (e.g. Lotus Arts, Erimu, Roko) and help to develop basic standards which should be discussed and adjusted in the process. The grading system recommended by CARVALHO & EICHINGER (2004) – similar to the one employed by Lotus Arts – could serve as a starting point. Given the results of the interviews it can be expected that once started several companies will join the process. Nevertheless, commitment from progressive companies and the initialising organisation will be needed to establish trust and the willingness to commit resources to the process.
- The grading system and the respective price ranges are communicated to the suppliers (timber dealers and sawmillers) via the procurement practises of the companies thus establishing the standards by creating a quality-sensitive demand.

11.5.2 Training

All secondary processors – be it furniture manufacturers or construction companies – have significant problems in finding adequately skilled labour to meet their quality requirements. The establishment of a training scheme could follow a similar approach as described for the introduction of quality standards. It has to be demand driven and accordingly catered to the concrete needs of the participating companies. The programme initiated by Lotus Arts is – despite the current problems – an encouraging sign for private sector initiative. Nevertheless, efforts are needed to involve more companies in such schemes to increase the impact on the sector. In the long-term, improved skill-levels in the secondary processing sector should lead to "spill-over" effects in other stages of the value chain. More detailed elaborations on how to generally improve training in the carpentry sector are presented in CARVALHO & EICHINGER (2004).

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Annex List of People interviewed

Name	Organisation	Position
Peter Odeke	BM Technical Services	Head Accountant
Deepak Waomar	Cementers Ltd.	Workshop Manager
Michael Kizito	Erimu	Marketing Officer
Clemens Fehr	Gourmet Garden	Consultant
Otto Haring	Hacom Ltd.	Managing Director
Franz Eichinger	Horizont 3000	Consultant
Jaspal Phaguda	Kapkwata Saw Mills Ltd.	Managing Director
Faridah Namuleme	Kitchen&Office Concepts	Marketing
Naffe Ebrahimi	Lotus Arts Ltd.	Managing Director
Willy Byandusya	Master Woodworks	Managing Director
Leo Ishanga	Mbarara General Works Ltd.	Managing Director
Joseph Kitamirike	Ministry for Tourism, Trade and Industry	Commissioner for Industry
James Ndimukulaga	NFA Forest Products & Utilisation	Coordinator
Aloysius Lubowa	NHCC	Technical Manager
V.R.L. Narsim Han	Nile Plywood (U) Ltd.	Managing Director
Moses Esunget	Roko Construction	Workshop Manager
John Carvalho	Techna Sawmills	Managing Director
Hans	Timber Products Ltd.	Manager