

## ASSESSING THE CURRENT SITUATION OF GHANA'S FOREST PRODUCTS INDUSTRY

R. Bonsi<sup>1</sup>, A. L. Hammett<sup>2</sup> and G. Ametsitsi<sup>3</sup>

<sup>1</sup>Scientific Certification Systems, 2000 Powell Street, Suite 600, Emeryville, CA 94608, USA

<sup>2</sup>Department of Wood Science and Forest Products, College of Natural Resources and Environment, Virginia Polytechnic Institute and State University, 230 Cheatham Hall, Blacksburg, VA 24061, USA

<sup>3</sup>CSIR-Forestry Research Institute of Ghana, University Post Office Box UP 63, KNUST, Kumasi Ghana

### ABSTRACT

*The forest products sector in Ghana is a major contributor to the country's employment and economic growth. Nonetheless, the industry is increasingly being constrained by acute raw material shortages due to excessive harvest of timber, illegal logging and other anthropogenic activities. The extent to which the industry is impacted by raw material decline is uncertain. To determine appropriate future steps to help curb the overexploitation of timber, we have investigated the current situation by determining the log felling volumes of the leading exporters of wood products, the scope of the industry and the impacts of raw material decline. We have also determined the benefits that companies offer to neighboring communities. Data was gathered from a survey of the managing directors of the companies. Key indicators of natural resources scarcity were used to determine some of the variables that were studied. The results show that, more than just providing jobs and income locally, the industry also undertakes rural development projects. However, the total volume of logs that the industry consumes far surpasses the annual allowable cut. The impact of raw material decline is reflected in the rise in the adoption of lesser-used species, increasing raw material costs, and declining raw material quality. It is suggested that the government support the Timber Validation Department to help curb illegal logging. Continued research to develop a policy and change management framework for the adoption of alternative fast growing fiber materials to supplement natural timber is also proposed.*

**Keywords:** Ghana's forest products industry, current situation, illegal logging, impacts of raw material decline, adoption of lesser-used species and alternative fiber materials

### INTRODUCTION

The wood industry is a very important sector in Ghana's economy, ranking fourth and trailing only gold, tourism and cocoa in export earnings (Ghana Forestry Commission (GFC), 2009). In addition, the industry provides direct employment to several thousand people, and partial employment and livelihood for an estimated two million people (Bank of Ghana, 2004). Agriculture (including fisheries and forestry) offers 47.9% of total

employment to the country's total workforce of 11.1 million and contributes significantly to the country's GDP (Bureau of African Affairs, 2011; FAOSTAT, 2011; World Bank, 2011).

The Ghana Forestry Commission reported a total export value and volume of US\$243 million and 528,570 m<sup>3</sup> respectively for wood products in 2007 (GFC, 2011). In 2008, all exports amounted to a value of US\$246 million with a corresponding volume of 545,915 m<sup>3</sup> (GFC, 2011). Exports in

2009 totaled US\$169 in value and 426,221 m<sup>3</sup> in volume. In 2010, exports totaled US\$181 million in value with a corresponding volume of 426,220 m<sup>3</sup> (GFC, 2011). The average production volume (domestic and export) of Ghana's wood products in the period 2000-2004 as reported by the Ghana Gazette (GG), the official government source of industry data, was 56% sawn wood, 31% veneer sheets, 12% plywood and 1% particleboard. In 2004, lumber and boules accounted for 50% in volume of all exports; panel products accounted for 39% and machined products, (e.g., furniture parts, moldings and parquet flooring) accounted for 11% (GFC, 2006.) From 2000-2004, about 48% of the sawn wood, 40% of the veneer sheets and 60% of the plywood produced were exported (GFC, 2006). The average export volume of sawn wood, veneer sheets, plywood and particle board from 2006-2010 was about 72% sawn wood, 22% veneer sheets, and about 6% plywood. The average volume of particle board exported in this five-year period is negligible at 0.01% (GFC, 2011).

Western Europe was the largest importer of Ghana's wood products by value and volume for several years until 2008. The major importers were Spain, Italy, The Netherlands, France, Belgium, Germany and the UK. Outside this region, major importers included the U.S., India and Nigeria (GFC, 20011). In 2009 and 2010, ECOWAS countries in Africa were the leading importers of Ghana's wood products followed by Europe (GFC, 2011). For many years, Ghana's forest products industry has been adequately supplied by the domestic forest resource.

There are 266 forest reserves, 204 of which are in the high forest zone and 62 in the savanna zone. The total area of forest reserves is 1.76 million hectares, 1.634 million hectares of which fall under the jurisdiction of the Forestry Services Division of the Forestry Commission. Most of the country's merchantable timber is located in this

area (Kasanga, 2002; Odoom, 2002; Fineman, 2004; ITTO, 2006a). Commercial timber can also be harvested from the off-reserve forested areas estimated to be 400,000 hectares (Kasanga, 2002). The remaining 126,000 hectares in forest reserves is managed by the Wildlife Division of the Forestry Commission as national parks. Ghana's forests also harbor a small but healthy eco-tourism sector based in part on game reserves (Kasanga, 2002).

As reported by the Ghana Forestry Commission and other sources, the wood industry currently faces acute raw material shortages due to illegal logging and other anthropogenic activities (Eastin, 2003; Bank of Ghana, 2004; GFC, 2006). Some premier species such as Odum, (Iroko (*Milicia excelsa*)), Afrormosia (*Pericopsis elata*) and Sapele (*Entandrophragma cylindricum*), have been harvested above the established annual allowable cut (AAC) and have been classified as threatened species (Oldfield *et al.*, 1998; Ofori *et al.*, 2003; Upton and Attah, 2003). The installed capacity of the domestic wood products industry is 5.7 million m<sup>3</sup> per annum (Bank of Ghana, 2004). This high capacity compels companies to illegally harvest, or overexploit timber reserves above the annual allowable cut of 1.5 million m<sup>3</sup> to adequately supply their mills (Bank of Ghana, 2004). As part of a number of forestry sector reforms, including a provision for the allocation of timber resources for competitive bidding, the government raised the annual allowable cut of timber from one million m<sup>3</sup> to 1.5 million m<sup>3</sup> in June 2002 (Kasanga, 2002a).

The Food and Agriculture Organization of the UN (FAO) has estimated that Ghana's annual deforestation rate is around 135,000 hectares (FAO, 2011). Deforestation due to slash and burn and fuel wood collection is further exacerbated by logging, mining and quarrying (Eastin, 2003; FAO 2003). Given the average growing stock volume of 49 m<sup>3</sup> per hectare (ITTO, 2005), the country might

be losing almost 6 million m<sup>3</sup> of timber per annum at the current rate of deforestation. Without replenishment, Ghana would likely preclude future generations from forest access. The Ghana Gazette reports that the market trend in volume and value of the country's wood product exports prior to 2004 was decreasing at 6% and 10% respectively, an occurrence that was assumed to have been due to the diminishing trend in raw material availability, and the excessive dependence on commodity products (GFC, 2006).

Quite a number of interventions are possible for salvaging the dwindling rate of Ghana's natural forest resource. The Ghana government has initiated some plantation projects for the establishment of fast growing species. Forest plantations in tropical countries are seen as good alternatives to natural forests because they are cost-effective, potential substitutes and reliable sources of raw material (Tomaselli, 2007). The adoption of lesser-used species is another way to ensure adequate supply of raw material to forest products companies in Ghana (Eastin, 2003; Upton and Attah, 2003; Donkor, Vlosky and Attah, 2005). There is already a trend towards the gradual introduction of lesser-used species to supplement the supply of the premier species (GFC, 2004). For instance, in 2004, the timely release of Teak plantations by the Ghana Forestry Commission for harvest by the industry reversed the decreasing trend in export volume and value. Teak has gained great importance in India and became the third most important species exported in lumber form in 2005 (GFC, 2006).

The volume of flooring produced from Odum/Iroko dropped from 503 m<sup>3</sup> in the first quarter of 2003 to 324 m<sup>3</sup> in the same period in 2004 and was replaced with Papao (a lesser-used species) with a higher premium per volume. For example, in 2010, the average price for flooring produced from Papao was about \$1555/m<sup>3</sup> as compared to \$1269/m<sup>3</sup> for Odum (GFC, 2011).

Some of the other lesser-used species for floorings are Afrormosia, Teak, Rubberwood, Danta, Essa, Yaya, and Mansonia. Many more lesser-used species were introduced in 2004 for other products (GFC, 2004).

In addition, bamboo, a fast growing lesser-used fiber species with good attributes has been confirmed to be a superb non-timber material that can substitute for wood (Ruiz-Perez *et al.*, 2001; Hiziroglu *et al.*, 2005; Sumardi *et al.*, 2006). Bamboo matures within three to eight years if managed well and regenerates naturally after the first planting. Its mechanical and quality properties are versatile and well-studied (Chen *et al.*, 2000; Weber, 2002; Suttel, 2004; Sumardi *et al.*, 2006). Its product profile and market potential are expanding (Bonsi, 2009). Products such as floorings, furniture parts and panel products are being made from bamboo and sold at competitive prices (Chen *et al.*, 2000; Suttel, 2004; Bonsi, 2009). The most common bamboo species growing in Ghana, *Bambusa vulgaris*, matures in four to six years and is naturally found in almost all the forest vegetation zones in the country (Oteng-Amoako *et al.*, 2004).

*Bambusa vulgaris* in Ghana is used for various products including fencing, roofing and garden furniture. Recently, bamboo has become an important raw material in the forest products industry in Ghana. Its current uses include floorings, moldings, ceiling panels, window blinds, doors, furniture, and artifacts, but there is the need for quality improvement and commercial expansion within the processing sector (Oteng-Amoako *et al.*, 2004; Bonsi, 2009). Given its benefits, the adoption of bamboo in Ghana's forest products industry could supplement certain timber species for manufacturing tertiary products (Bonsi, 2009).

Several mills have shut down or downsized due to raw material scarcity and this was evident in the

course of conducting this study. The extent to which the industry is impacted by the decline in raw material supply is not certain. To obtain the information needed to facilitate appropriate future planning, a determination of the current situation is crucial. Proactive strategies are important in ensuring firm competitiveness and sustained competitive advantage (Bonsi, Gnyawali and Hammett, 2008). Based on these premises and to set the stage for a larger part of our research, we first sought to examine the current situation of the forest products industry in Ghana, including the volume of logs consumed, volume of products manufactured and exported, the range of products manufactured, the number of markets served and the importance of the industry to rural communities in Ghana. We also assessed the impacts of raw material decline on the industry and proposed future steps. The indicators of natural resources scarcity (e.g., factors such as price, labor cost, production cost, etc., which rise as a result of resource scarcity), were used to determine some of the factors that might impact the industry.

## METHODS

### Population, Sample Frame and Sample

The total number of manufacturing companies in Ghana's forest products industry is estimated to be approximately 200 firms although this number may not be current as some companies have gone out of business, and industry directories are not updated regularly. For example, at the time of conducting this study some companies that were still found in directories were no longer extant. This study focused on the leading producers of tertiary (downstream) and panel (plywood and particleboard) products for export. The total number of companies studied was 26. This was obtained from the most recent publication of the Timber Industry Development Division (TIDD)

list of principal exporters (GFC, 2004). Most of these companies are also the leading exporters in most products including lumber. Data was collected from the managing directors of the companies in four timber producing regions; Ashanti, Western, Brong-Ahafo and Eastern. Figure 1 shows the regional distributions of the companies that were surveyed.

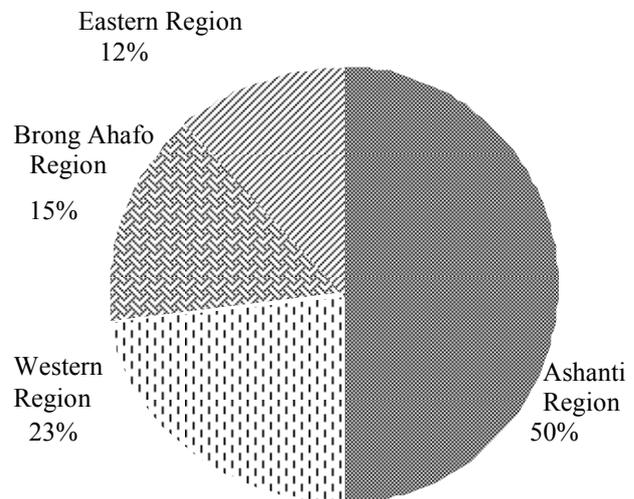


Figure 1: Regional distribution of companies studied

About 20 large companies account for 90% of Ghana's wood export volume and 66% of value whilst about 160 small and medium-sized companies account for the remaining 34% of export value (Bank of Ghana, 2004). Thus, focusing on the leading exporters was a good representation of the export oriented industry.

### Determining the Impact Variables Indicators of Natural Resources Scarcity

In addition to our own assumptions and experience, some of the variables for determining the impact of raw material decline on the industry

were obtained using the indicators of natural resources scarcity (Cleveland and Stern, 1998). Generally, an increase in scarcity is defined by a decline in economic well-being due to a reduction in the quality, availability or productivity of a resource (Cleveland and Stern, 1993). The classical, neoclassical and biophysical models of scarcity are used to determine these indicators (Cleveland and Stern, 1998; Conrad, 1999). The classical model assumes that it is more difficult and costly to extract scarce forest resources due to their declining quality and remoteness. The neoclassical model of scarcity posits that stumpage rent and price increase with increased scarcity (Conrad, 1999).

The biophysical model of scarcity assumes that cost of energy increases with resource scarcity as the extraction of poor quality raw material is accompanied with high energy demand and emission of residuals. Changes in the quality of resources affect the energy cost of extraction and the capital costs for residuals (Cleveland and Stern, 1998). From these theoretical standpoints, some of the variables for determining the impact of raw material decline on the industry were determined. They include rise in operation cost, rise in the cost of raw material, decreasing raw material quality and drop in raw material volumes.

### Data Collection

Interviews were conducted between November 2007 and February 2008. The managing directors or their representatives were canvassed using a semi-structured interview schedule (Dillman, 2000; Houtkoop-Steenstra, 2000; Aldridge and

Levine, 2001; Neuman, 2003; Alreck and Settle, 2004). As indicated earlier, the data presented in this paper is a small part of a bigger study.

## RESULTS

### Size, Scope and Markets of Leading Exporters

The leading exporters of processed wood products are located in four regions as shown in Figure 1. Fifty percent of these exporters are in the Ashanti region, 23% in the Western region and 15% and 12% in the Brong-Ahafo and Eastern regions respectively. The total workforce for the companies studied is 20,311 (see Table 1). The largest company employs 3,500 workers. It was determined that the seven largest companies each employ more than 1,000 workers. Most of the companies studied run multiple production shifts; 31% run three shifts, 50% run two shifts and only 19% run a single shift. Most of the companies running one or two shifts were previously running an additional shift but were forced to curtail production due to the decline in raw material availability. Table 2 shows the log consumption volumes and the corresponding production volumes. The annual volume consumption of logs as reported by 25 respondents is 1,124,688 m<sup>3</sup>. This value runs very close to the annual allowable cut of 1.5 million cubic meters and surpasses the previous AAC of one million cubic meters which was changed in 2002 (Kasanga, 2002a). Given that these companies are leading exporters, their high volume of log consumption is not surprising.

Table 1: Workforce of forest products companies studied

Total number of companies	26
Total workforce	20,311
Minimum workforce	12
Maximum workforce	3,500

Table 2: Consumption and production volumes of leading exporters

	Volume (m <sup>3</sup> ) of logs consumed (n=25)	Volume (m <sup>3</sup> ) of products produced (n=24)
Mean per month	3,748.96	1,613.83
Total per month	93,724	38,732
Total per year	1,124,688	464,784

However, adding the volume consumed by the remaining companies in the industry suggests that the volume of timber harvested in Ghana greatly exceeds the AAC.

The volume of products being manufactured is an improvement over previous estimates as a result of more efficient downstream processing which extends to the use of rejected rotary veneer cores to manufacture moulding profiles. A lean manufacturing strategy such as this helps to maximize recovery from harvested logs, conserve timber and increase revenues.

Figure 2 shows a collection of triangular moulding profiles that were manufactured from rejected rotary veneer cores at one of the surveyed mills.

Ghana's forest products industry manufactures a wide variety of products for export. Table 3 shows the export product profile of the industry. Nineteen companies (73%) export kiln-dried lumber. The most common value-added product is molding, which is manufactured by 18 (69%) of the companies studied.



Figure 2: Triangular profiles made from rejected peeler cores

Fifty percent of the respondents manufacture and export floorings and plywood. Other tertiary export products not included in Table 3 include parquet, finger jointed wood, S4S lumber, tongue-and-groove lumber, decking, laminated particle board, door components, cabinet components, casement and Venetian windows.

Most of these tertiary products and panel products can be processed from small diameter timber, discarded off-cuts, and promising lesser-used species or even from other natural fiber materials such as bamboo.

Table 3: Product profile for Ghana's leading forest product exporters

Product	Number of companies (n=26)	Percent
Kiln-dried lumber	19	73.1
Molding	18	69.2
Flooring	13	50
Plywood	13	50
Air-dried lumber	12	46.2
Profile boards	12	46.2
Rotary veneer	11	42.3
Doors	10	38.5
Sliced veneer	9	34.6
Broomsticks	9	34.6
Treated lumber	8	30.8
Dowels	7	26.9
Furniture	6	23.1
Air-dried boules	6	23.1
Windows	5	19.2
Carvings	4	15.4
Veneer curls	3	11.5
Kiln-dried poles	2	7.7
Treated poles	2	7.7
Handicrafts	2	7.7

As shown in Table 4, about 85% of the leading exporters export to Europe whilst 50% export to African countries and North America. About 35% of the respondents export to Asian countries whilst 27% export to the Middle East. A major product exported to African countries is plywood. Doors and windows are also exported to African countries.

### Benefits Offered by the Industry to Communities

In an open-ended format, respondents were asked to list the services that they provide to their neighboring communities. The results show that the industry provides numerous benefits to local communities. This is a demonstration of

companies' corporate social responsibility that encourages communities to support their logging activities rather than launching protests against them. Table 5 provides a list of the services that companies provide to local communities. Employment is the most commonly mentioned benefit followed by building and rehabilitation of schools, building of clinics and hospitals, construction of roads in forest operation areas and provision of potable water systems in the form of boreholes to local communities. Other benefits mentioned by survey respondents include supply of wood products to local markets, support in electrification projects, supply of roofing materials to institutions, assistance to district assemblies, financial support to churches, and building and rehabilitation of police stations.

Table 4: Regional distribution of exports by leading forest product exporters

Region	Frequency (n=26)	Percent
Europe	22	84.6
Africa	13	50
North America	13	50
Asia	9	34.6
Middle East	7	26.9

Table 5: Services offered by Ghana's forest products companies to local communities

1. Employment	11. Building and rehabilitating of police stations
2. Building and rehabilitation of schools	12. Supply of wood products
3. Building of clinics and hospitals	• Wood for local market
4. Construction of roads in forest operation areas	• Fuel wood
• Changing wooden bridges into concrete bridges	13. Assistance in general community projects
5. Provision of potable water systems, e.g., boreholes	14. Assistance to district assemblies
6. Repair of police vehicles	• Donations
7. Assistance in electrification projects	• Community development
• Supply of electric poles	15. Assurance of corporate social responsibility
8. Building of palaces for chiefs	• Assistance in poverty alleviation projects
9. Assistance to churches in fund raising	• Assistance to farmers to grow plantations with cash crops, e.g., citrus
10. Supply of roofing material to institutions	

This list of services demonstrates the industry's commitment to improved livelihoods of local communities and its contribution to the country's economic growth. As long as the industry continues to operate, neighboring communities will benefit.

### Impact of Raw Material Decline on the Industry

It was assumed that the dwindling raw material resource has adversely impacted the industry in several ways. To this end, respondents were asked to rate on a categorized percentage scale of 1-100, the level of impact felt in the past five years with respect to certain important variables. Some of these variables are indicators of natural resources scarcity (Cleveland and Stern 1998).

Figure 3 summarizes the impacts being felt by the industry as a result of raw material decline. The midpoints for the categorized range of responses were used to obtain a value for each response (Kent, 2001; Neuman, 2003; Alreck and Settle,

2004). The average response for each question was then calculated.

The respondents reported that their operation cost had risen by 44% from 2002-2007, which indicates that companies are increasingly facing financial difficulties. Although raw material related factors contribute to this rise, several factors including increasing fuel cost and utility tariffs are also accountable. Interestingly, the drop in raw material availability (volume) and the increase in raw material cost of 34% and the 33% decline in volumes of good quality raw material as reported by the companies may have led to the incredible 36% rise in the adoption of lesser-used species in the past five years. As reported by the respondents, both export volume and value have also dropped by 33% and 31% respectively. Other impact factors include a decline in the opportunities for loan acquisition, downsizing, and loss of customers. Export tax payments remained very low from 2002 to 2007.

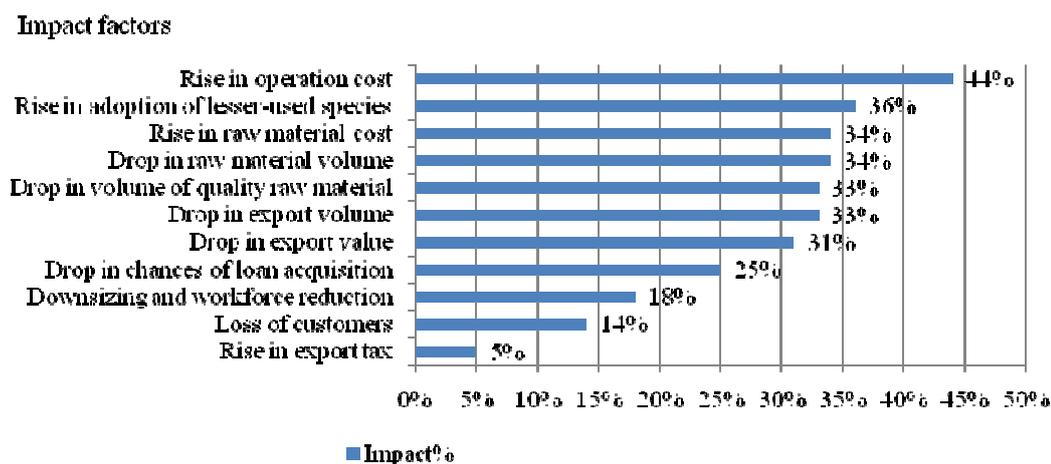


Figure 3: Impact of raw material decline on the wood industry from 2002-2007

Due to the extremely large size of some of the surveyed companies, the study sample was categorized into small and large companies to determine the degree of impact on each category. Companies with a total workforce of 500 or less were categorized as small and those with a workforce above 500 were classified as large. The distribution was 14 small and 12 large companies. As shown in Table 6, a mean comparison using ANOVA shows a significant difference between small and large companies with respect to drop in volume of good quality raw material ( $p < 0.043$  and means 38.9% for small companies and 26.7% for large companies respectively).

This implies that, it is significantly more difficult for smaller companies to procure raw material.

There is also a significant difference in the means of loss of customers (20.7% for small companies and 6.3% for large companies respectively) with  $p < 0.033$  implying that the loss of customers reported by small companies was significantly higher than that reported by large companies.

There is no significant difference in the means of the remaining variables. Apart from these two variables, both small and large companies have been similarly impacted by the decline in the raw material supply. The survey also used open-ended questions to help identify other challenges affecting the industry that were not necessarily due to the raw material decline, (Table 7). They include high fuel prices, increased input costs and the supply of small sized logs.

Table 6: Mean comparison between small and large companies

	Size of company	N	Mean	p-Value
Drop in volumes of quality raw material procurement	Small	13	38.9	0.043
	Large	12	26.7	
	Total	25	32.8	
Loss of customers	Small	14	20.7	0.033
	Large	12	6.3	
	Total	26	14	

Table 7: Other impacts on the forest products industry

<ul style="list-style-type: none"> <li>• Difficulty paying salaries</li> <li>• Inability to pay bills on time</li> <li>• Inability to pay workers on time</li> <li>• Inability to meet minimum social needs</li> <li>• Increased wages</li> <li>• Increased tariffs, i.e., water and electricity</li> <li>• High cost of inputs e.g., spare parts and glue for panel products</li> <li>• High fuel prices; shipping costs go up, fuel constitutes about 30% of operation cost</li> <li>• Poor cooperation from government</li> <li>• Small log sizes; poor quality</li> <li>• Shifting workers to other departments – this is de-motivating and requires new training</li> </ul>	<ul style="list-style-type: none"> <li>• Competition from other regions</li> <li>• Price of products determined by international markets</li> <li>• Inability to meet all customer needs</li> <li>• Inability to meet delivery schedules</li> <li>• Inability to pay high stumpage fees promptly</li> <li>• Inability to buy new equipment</li> <li>• No new investment in industry</li> <li>• Complex certification requirements</li> <li>• Little help from government in certification</li> </ul>
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## LIMITATIONS OF THE STUDY

Although this study focused on leading exporters, the sample size of 26 appears to be too small and could not permit multivariate analyses. The study covered four regions but the small sample size could not allow for regional analysis (Kent, 2001; Alreck and Settle, 2004; Hair *et al.*, 2006) to determine the impact in each region as raw material availability varies with regional location. However, since this was one of the few extensive surveys of the forest products industry to date, some general, useful observations could be made.

## DISCUSSION AND CONCLUSIONS

This study determined the current situation in Ghana's timber industry. The scope of the industry, e.g., its importance to neighboring communities, volume and value of wood product exports, size, scope and markets, and the impacts of raw material decline were determined. The results show that the forest products industry remains an important contributor to employment and economic growth in Ghana. The forest products industry is large, manufactures a broad product mix, services a diverse set of markets and supports local communities in many ways. Nevertheless, the decline in the natural raw material base appears to pose a substantial obstacle to the industry's future survival.

Although deforestation is attributable to other factors such as fuel wood collection and farming, allowing timber harvest to exceed the annual allowable cut cannot be permitted. The 26 forest products companies included in this study harvest timber at levels far above sustainable levels. Considering that the average timber growing stock volume is 86 million cubic meters in forest reserves and given the current rate of deforestation, Ghana could possibly preclude forest access to future generations. The

government is urged to strengthen the capacity of the Timber Validation Department to help counteract all illegal logging activities. The variable with the biggest impact on the industry is operation cost, which is comprised of several factors including fuel prices, electricity and water tariffs. In the past five years, there has been a 36% increase in the adoption of lesser-used species. This is not a surprise as the premier species are becoming more expensive as their availability declines. The quality of the raw material has also decreased, and it is becoming more costly to reach further into rough terrains to harvest timber.

There is significant evidence from the results that small companies are more constrained in raw material procurement than large companies. It is suggested that the government make adequate provision for small companies to bid for Timber Utilization Contracts (TUC). In addition, small companies have lost significantly more customers than have large companies. If the raw material is equitably distributed in the TUC system, it is believed that small companies would have increased access to raw material and compete effectively to maintain their customers. Other difficulties faced by the industry are: inability to pay salaries on time, increased costs of water and electricity consumption, high cost of inputs (e.g., glue and spare parts) and the increased proportion of raw material supply coming in small-sized logs.

Identifying an alternative to the declining natural resource base cannot be overemphasized. In addition to controlling illegal logging, lean manufacturing and the adoption of lesser-used species can help slow the pace of exploitation of the premier species. This trend has been shown in the increased adoption of lesser-used species. For continued research, this highlights the need to develop appropriate policies and change management frameworks in order to slow deforestation and illegal logging, and promote the adoption of alternative fast growing raw materials

to adequately supply the wood manufacturing industry.

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