




# U.S. Demand for Certified Tropical Hardwood Products: The Supply Chain Perspective

Shadia Duery
International Market Associate
Metafore
Portland, Oregon

Richard P. Vlosky
Director and Professor, Louisiana Forest Products Development Center
School of Renewable Natural Resources
Louisiana State University Agricultural Center
Baton Rouge, Louisiana

**Louisiana Forest Products Development Center**
**Working Paper #78**

Louisiana Forest Products Development Center
School of Renewable Natural Resources
Louisiana State University Agricultural Center

November 15, 2006

## Abstract

Tropical forests, which contain 50 percent of the planet's biodiversity, are threatened by deforestation and illegal logging. Forest certification was initially promoted as a potential solution to reduce illegal logging practices. The United States is the largest market for secondary, or value-added, tropical hardwood products (THPs) and, as such, influences forest management practices in supplier countries. In 2004, this study was conducted to measure demand for certified tropical wood products in the U.S. The objectives were to identify characteristics of U.S. demand for secondary (value-added) tropical hardwood products and to understand market perceptions regarding certification of secondary tropical hardwood products. Using mail questionairres U.S. supply chain members were surveyed including importers, brokers, wholesalers, manufacturers and retailers. Fifty-nine percent of respondents sold or distributed wood products manufactured from tropical hardwood species in 2003. Brokers and wholesalers are the dominant purchase channels for tropical hardwoods for this group. More than 50 percent of respondent THP purchases originate from South America with Brazil being the primary export country. The main THPs imported are doors, flooring, cabinets, and millwork. Certification is not an important product selection attribute relative to price and quality. Generally, respondents do not pay certified product premiums relative to non-certified alternatives. Finally, respondents are somewhat likely to promote certified product to their customers.

## Overview

Tropical forests (TF) contain 50 percent of the world's biodiversity (SLW 1996). In addition, they regulate greenhouse gases and provide freshwater and timber and non-timber forest resources. With a global deforestation rate of 31 million hectares/year (Rainforest Action Network 2005), remaining TF resources are rapidly vanishing in many countries. TF are primarily found in developing countries, where significant illegal logging takes place (ITTO 2002).

Forest certification came into existence in 1992 as a result of the Earth Summit in Rio de Janeiro, Brazil. Concern about the pressure that population growth puts on natural resources was foremost on the Summit agenda. Sustainability became an integral element of certification as applied to forest management. The foundation for certification is the need for consumers to be assured by neutral third-party organizations that companies involved in the forest products supply chain from the forest to the consumer are employing sound practices that will ensure sustainable forest management (Ozanne and Vlosky 1997). For any market system to function properly there should be a balance between supply and demand. Successful market-driven certification would strike a balance between consumers (demand) and producers (supply).

Ironically, although the early objective of certification was to slow rampant deforestation in the tropics, certification has been most successful in developed countries. Developing countries have encountered problems in creating sustainable forest sectors and defensible markets for certified wood products. For example, Bolivia, the developing country with the world's largest area of certified tropical forestland, enacted a new forestry law in 1996 to encourage sustainable forest management. The law codified regulations very similar to the requirements that the Forest Stewardship Council (FSC) has in place to certify forests. The similarity of standards facilitated the rapid conversion of forest land in Bolivia from non-certified to certified status. By 2005, Bolivia had 1.5 million hectares of certified forests (Bolfor II 2005), more than any other nation in the world. Although Bolivia is a leader in certification

implementation, there remains a lack of information for producers on how to efficiently and profitably export forest products into the U.S. market, which accounts for 50 percent of Bolivia's exports (Camara Forestal de Bolivia 2002).

A strategy being attempted by many developing countries to increase wood product export revenue is to transition from exporting raw materials or semi-processed products towards exporting secondary value-added products (CADEFOR 2004). The focus of this study is to better understand the U.S. market for secondary processed tropical hardwood products. The intent is to provide producers of finished tropical hardwood products information and guidelines about the opportunities, constraints, and characteristics these products face in the U.S. marketplace.

The objectives of this study were to identify characteristics of U.S. demand for secondary (value-added) tropical hardwood products and to understand market perceptions regarding certification of these products. In this paper, we discuss demand for certified tropical hardwoods from the perspective of U.S. supply chain members. These include importers, brokers, wholesalers, manufacturers and retailers. Many respondents fulfill multiple functions in the supply chain and accordingly, these groups were combined for analysis.

Results can be used to help secondary wood product manufacturers in tropical countries to better understand the U.S. demand structure for the products they manufacture as well as U.S. manufacturers to develop strategies to create a sustainable supply of tropical species and products.

**A brief overview of certification**

To certify means to accredit a product or a practice for some special attribute, characteristic, feature or quality. In a global market it is difficult to have consistent international policies and definitions for sustainable forest management practices. If policies cannot be created under command and control practices such as laws and regulations, an alternative option is to create a market value for the goods in question. In this case the goods are wood products with an additional attribute; to have come from a forest managed in a sustainable manner.

Certification has been used to attempt to slow tropical deforestation (Cote 1999) and to reduce trading of wood products coming from illegal logging. Regardless of the reasons, certification of forest products supply chain flows and forestry practices continue to proliferate worldwide.

In addition to reducing negative perceptions by consumers and the general public, it is believed that companies that prove to be environmentally responsible will benefit from certification by differentiating their products in the marketplace and thus acquiring a larger share of this market (Ozanne and Vlosky 1997).

Certification is supported by many non-governmental organizations (NGOs), governments, and companies. The total area of certified forests in the world was 219 million hectares in 2004. The majority of certified forests are in the United States, Europe, and Canada (Ingram 1998). The four main certification schemes in the world are: the Programe for Endorsement of Forest Certification (PEFC), the Forest Stewardship Council (FSC), the Sustainable Forestry Initiative (SFI), and the Canadian Standards Association (CSA). These four schemes certify almost 94 percent of the world's certified forests.

There are four main constraints to certified wood products (CWP) adoption: market, material, capacity, and logisticals. Market uncertainty and low consumer demand for CWP make it difficult to introduce CWPs into the market and to maintain sufficient capacity to satisfy demand once it is developed. This uncertainty requires market planning strategies to minimize

risk. The material constraint is linked to the supply of the primary CWP in source countries. One possible solution is for buyers to enter into strategic partnerships with forest landowners wish to supply CWPs. Logistical constraints are caused by the complexity in the management of CWPs through the supply chain. Production flows, purchasing, and the need to maintain separate CWP inventory add to the cost of the final manufactured CWP.

**Chain of Custody**

In addition to certification of forest management practices, Chain of Custody (CoC) certification is a mechanism used to track wood originating from well-managed forests to the end consumer or to a pre-consumer supply chain member. CoC is an inventory control process developed to verify certified forest products through supply chains. In the wood products industry, this process requires significant coordination and planning. "Chain-of-custody is a bottleneck in today's certification markets, resulting in products originating from certified forests being sold without a label documenting their source" (UNECE 2002). Managing non-certified-wood-products (NCWP) and certified wood products (CWP) concurrently in the same manufacturing process adds even complexity to inventory process control.

As an example of the complexity in the certified wood supply-chain management "it is estimated that over 80 percent of FSC certified lumber is "lost" on the way to the consumer, and ends up being sold as uncertified"(Conservation and Community Investment Forum 2002).

The U.S. has been experiencing a trend of green building, using energy efficient designs and materials, non-toxic materials, and sustainably produced wood products. This trend makes the use of tropical hardwoods less favorable due to lack of accountability in the sustainability of the forests from which they come (Environmental Building News 2001).

In 2004 there were 73 primary manufacturers and 198 secondary manufacturers in the U.S. that provided FSC certified forest products (Forest Certification Resource Center 2004).

Vlosky and Ozanne (1998) studied U.S. wood products manufacturer perceptions of certified wood products and found that larger companies tend to be more committed to environmental principles. In the same study, overall, manufacturers were not predisposed to certification. The main concern was the costs of managing the CoC for certified products. One of the issues we examined in this study is the willingness of supply chain mewmbers to absorb these costs.

## The Study

Primary data collection was conducted using mail surveys. The sample frame of supply chain members was developed a variety of sources including the 2004 Random Lengths Big Book 2004 (Random Lengths 2005), Metafore (2003b), the International Wood Product Association (IWPA) member list, and personal contacts. After consolidating these sources and remoiving duplicates, 1,284 companies were surveyed at the headquarters level.

The mail survey process followed the Tailored Design Method (Dillman 2000). The survey was divided into three sections. The first section was designed to compile general information about the company, the second section asked questions related to tropical hardwoods, and the third section asked questions specifically related to certified tropical hardwoods. The survey was pre-tested by 10 companies randomly selected from the list. Those companies provided feedback on survey structure, flow and ease of completion. In order to increase response rate, a letter was sent prior to the first mailing informing companies that a survey would be arriving a week later. Each survey included a hand signed explanatory cover

letter, and a reminder letter was sent out a week after the survey was sent. A second mailing to non-respondents was sent three weeks after the first mailing.

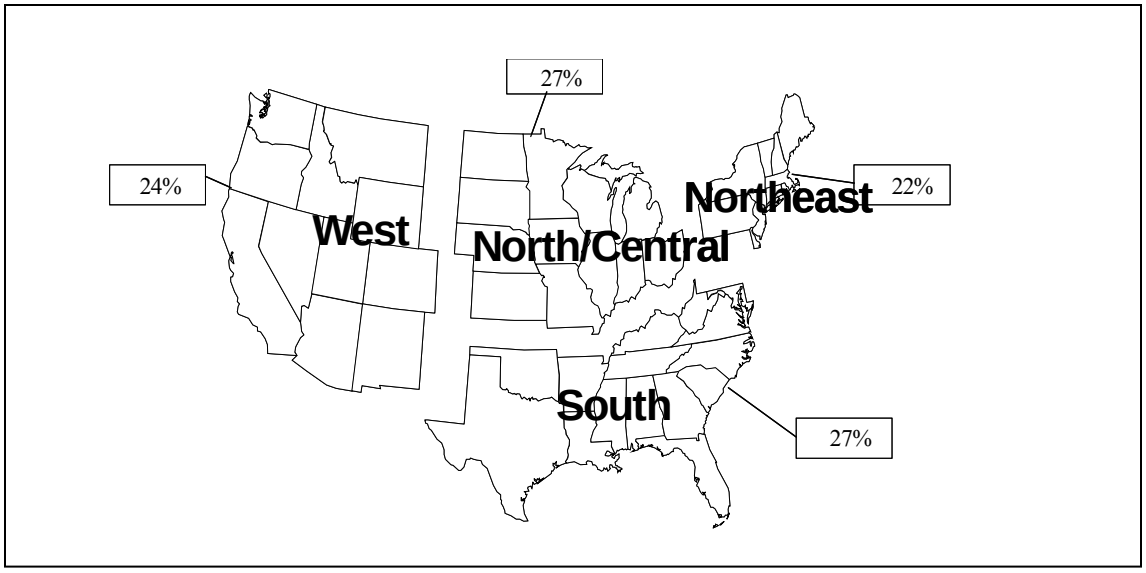
Non-response bias was measured by using a two-tailed t-test conducted by comparing frequencies of respondents by state. No difference in state distribution was detected at $\alpha$=.05. In addition, research has shown that late respondents typically respond similarly to non-respondents (Donald 1960). Accordingly, second mailing respondents, as a proxy for non-respondents, were compared to first mailing respondents by state of origin. In this case as well, no difference in state distribution was detected at $\alpha$=.05. Because a priori information on company size or sales was not available, non-response bias tests were not conducted on these factors.

After accounting for non-deliverable questionairres, 231 returns were useable for an adjusted response rate was 18.3 percent. Results indicate that there were no statistical differences in responses between importers, brokers, manufacturers, wholesalers, and retailers (using two-tail t-tests at $\alpha$=0.05) for 88 percent of the questions in the questionnaire. Hence, this supports our decision to combine responses to reflect the perceptions of these supply chain members as a group.

**Demographics**

Respondents were primarily small companies with annual gross sales under US$ 5 million (42 percent). The balance of respondent companies was distributed as follows: $6 to 10 million (17 percent), and $11 to 25 million (17 percent). Thirty-eight percent of respondent companies had 1 to 25 employees, 33 percent had 26 to 100 employees, and 29 percent had more than 100 employees. Respondents were fairly evenly distributed geographically across the U.S. (**Figure 1**).

**Figure 1. Geographic Distribution of Respondents (n=231)**




**Tropical hardwood product sales**

Overall, 59 percent of respondents (n=136) said that they sold or distributed wood products manufactured with tropical hardwood (TH) species. Of the 41 percent of respondents

that did not sell or distribute TH (n=95), nine percent (n=8) said they were planning to do so in the future.

The discussion in the balance of the paper is limited to the sub-set of respondents that sold or distributed wood products manufactured with tropical hardwood (TH) species. Of this group of respondents, 48 percent stated that 1 to 9 percent of their company's annual gross sales in 2003 were attributed to TH. On the other end of the scale, 6 percent of respondents stated that 90 to 100 percent of their annual gross sales in 2003 were attributed to TH (**Figure 2**). Doors, millwork and molding, and cabinets were the most cites wood products trhat respoindents sold or distributed that were manufactured with TH (**Figure 3**).

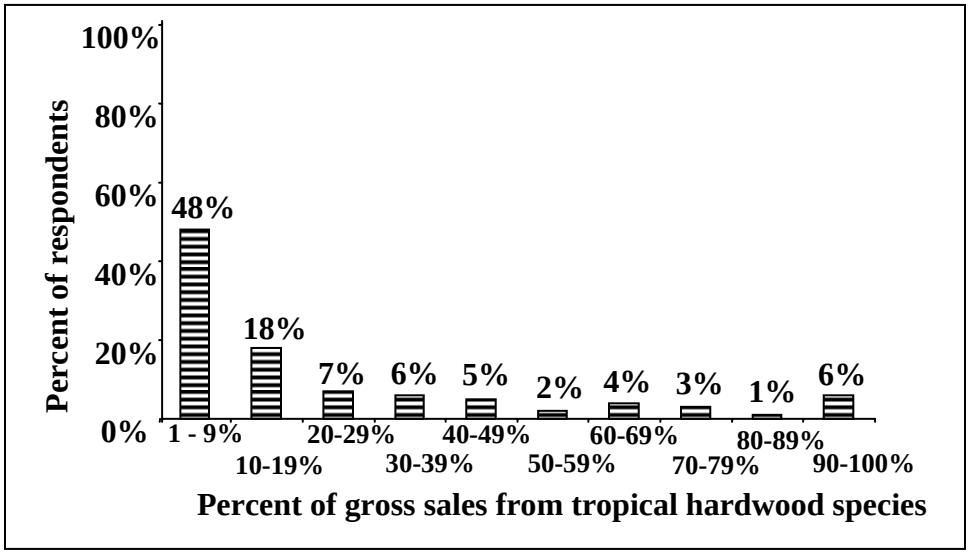



**Figure 2. Percent of 2003 gross sales from tropical hardwood species (n=135)**

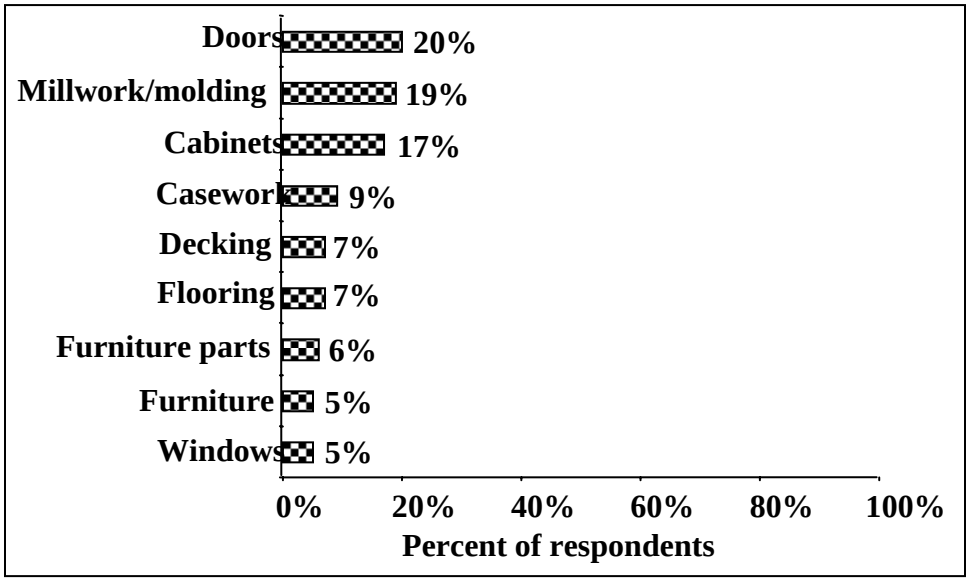



**Figure 3. Products that Supply Chain respondents use, specify or handle that are manufactured with tropical species (n=106) (multiple response possible)**

Forty-three percent of respondents stated that they purchased their TH from U.S. broker/wholesalers. This was followed by "directly from international producers" (17 percent of respondents), "international brokers/wholesalers" (9 percent), and "company agents" (3 percent). Multiple responses were possible.

**Tropical hardwood product purchases**

Forty-eight percent of respondents said that TH they purchase come from South America followed by Southeast Asia (29 perecent of respondents), Central ASmerica (24 percent), and Africa (24 percent). Multiple responses were possible. Five percent of respondents did not know where their TH originated from.

The countries where most of the TH originated were Brazil with 20 percent of respondents, Indonesia (9 percent), Malaysia (6 percent), and Honduras (6 percent) (**Figure 4**). This supports previous studies that reported that Brazil has been the largest supplier of tropical hardwood products to the U.S. since 1990 (The World Forestry Center 2003).

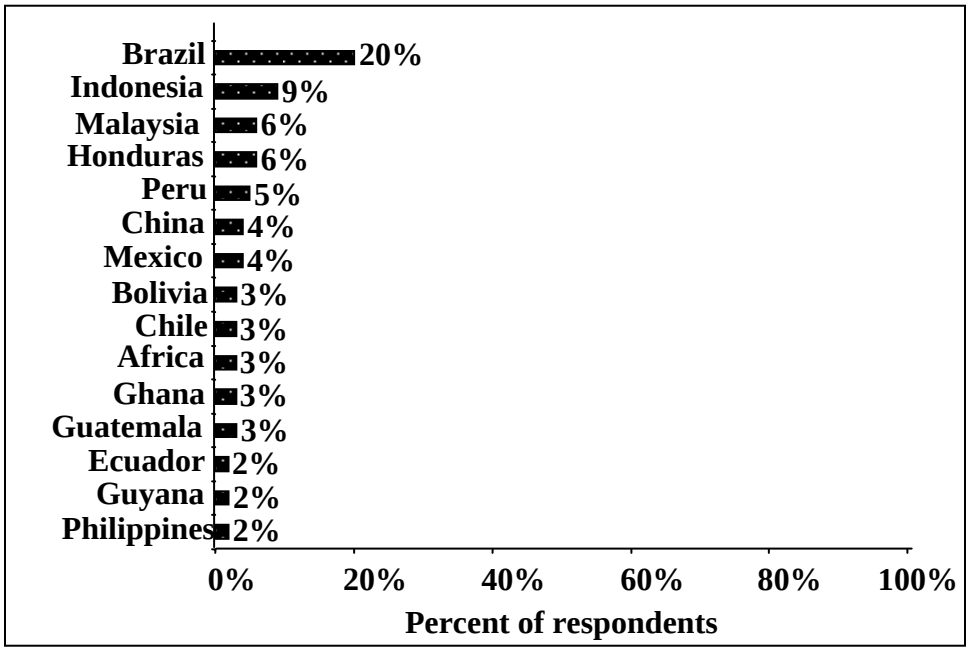



**Figure 4. Top 15 countries where tropical hardwood products originate for Supply Chain respondents (n=136) (multiple responses possible)**

Fifty-four percent of respondents have been purchasing/selling TH for 10 or more years. Twelve percent of respondents have done so for 7-10 years; 14 percent for 4-6 years, and 20 percent for 1-3 years. Seventy percent of respondents bought 1 to 25 containers of TH in 2003. On the other end of the scale, 15 percent of respondents said they purchased more than 100 containers of TH in 2003. We did not ask respondents to specify container size.

Using a 5-point scale anchored on 1=Not Important at All to 3=Somewhat Impoprtant to 5=Very Important, the three highest ranked sources of information for respondents (stating Very Important) to locate tropical hardwood product/wood raw material suppliers were distributors (52 percent), company sales representatives (49 percent), and "Word of mouth" (30 percent) (**Figure 5**). A commonality between these three sources is that they require direct human communication. One inference may be that trust is animportant criterion in developing TH exchange relationships.

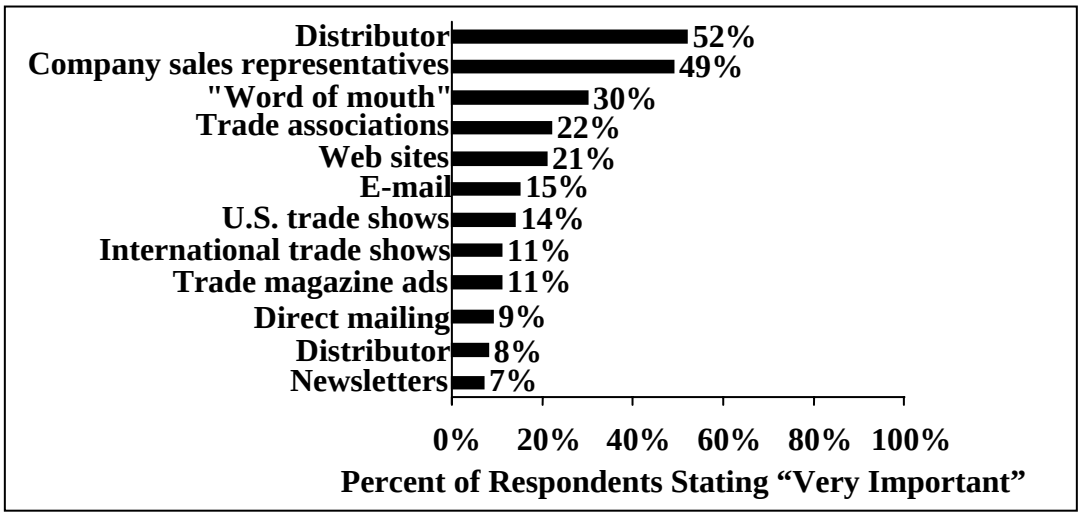



**Figure 5. Importance of sources of information Supply Chain respondents use to locate tropical hardwood product/wood raw material suppliers (n=108)**

Respondents stated that the three most significant barriers to purchasing or specifying TH are consistent supply (43 percent of respondents), punctual delivery (38 percent), and product quality (32 percent) (**Figure 6**). The four most important criteria when selecting tropical hardwood product/raw material suppliers are product quality (90 percent of respondents), product availability (84 percent), product performance (74 percent), and consistent delivery (72 percent) (**Figure 7**).

**Certified tropical hardwood products**

With regard to certification, 38 percent of respondents that bought THs in 2003 also purchased certified tropical hardwood products (CTH). One-third of the 62 percent that currently did not buy CTH said they were planning to do so in the future. Thirty-three percent of respondents experienced unexpected costs due to participating in certification while 13 percent experienced unexpected benefits due to participating in certification. One-third of respondents said they convey products that are "Eco-Labeled", indicating that they are certified, and 44 percent actively promote their products as certified to customers.

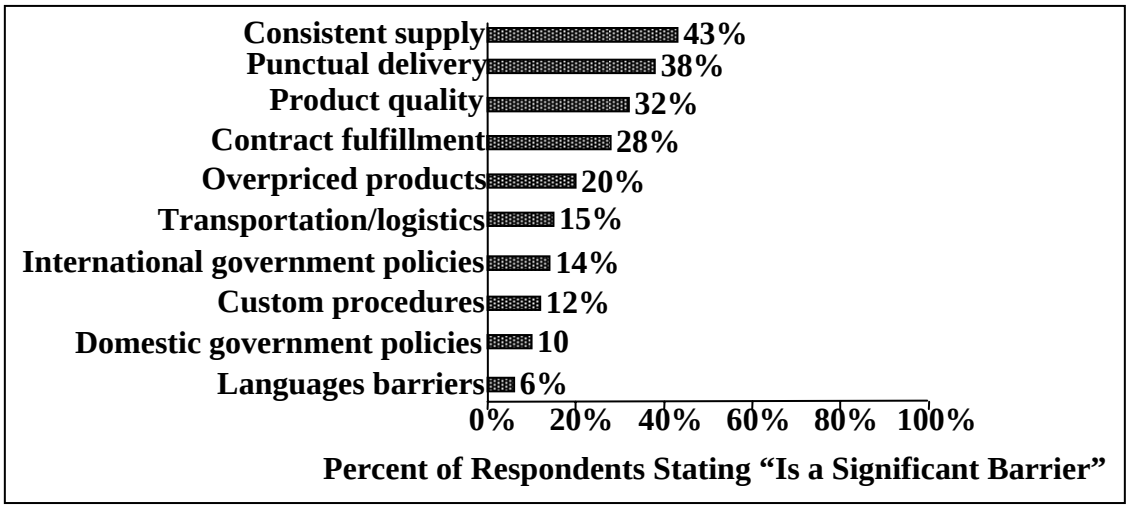



**Figure 6. Barriers that Supply Chain respondents have to purchasing/specifying tropical hardwood products (n=120)**

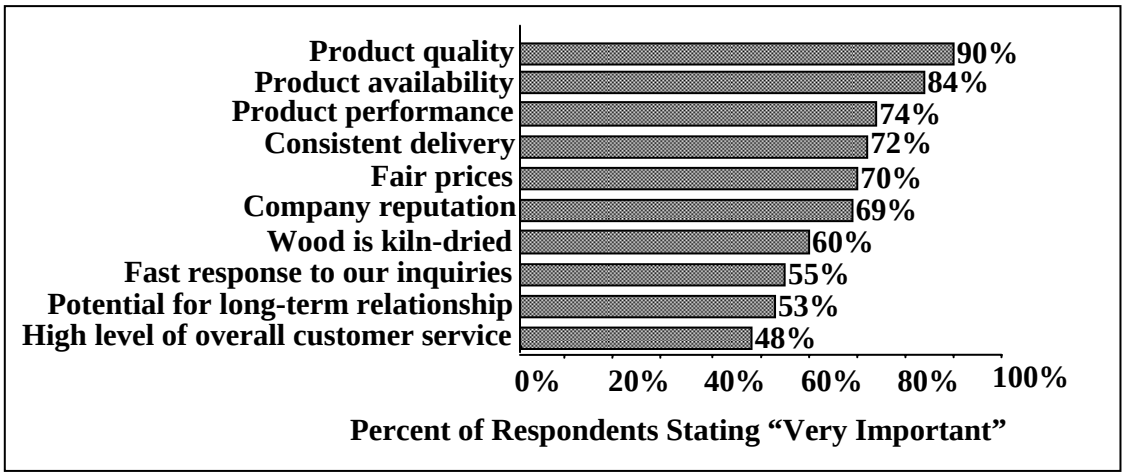



**Figure 7. Importance of criteria for Supply Chain respondents used in selecting tropical hardwood product/raw material supplier (n=125)**

Why do respondents participate in certification for tropical hardwood products? Forty-eight percent of respondents stated that they entered into the certified market because their customers demanded it, 31 percent did it because of business owner's commitment to environmental issues, and 29 percent did it seeking product diversification.

From the 38 percent of Supply Chain that buy CTH, 31 percent have chain of custody (CoC) certification, 42 percent do not, and 27 percent said they did not know if their company had CoC certification. This suggests that potential added value for CTH leakages exist in the supply chain because CTH are not sold or marketed as certified.

Forty percent of respondents said that they do not pay any price premium for CTH relative to non-certified alternatives (**Figure 8**). In addition, 32 percent of respondents that are engaged in certification have requested that their TH suppliers become certified.

On the sell side, the approximate value of CTH products sold by respondents in 2003 was US$ 2.5 million. Forty-one percent of respondents reported that the percent of sales of CTH products sold in the past 5 years increased somewhat and 12 percent said sales increased dramatically (**Figure 9**). Looking five years into the future, 56 percent of respondents say they expect that their CTH sales will increase somewhat and 16 percent believe sales will increase dramatically.

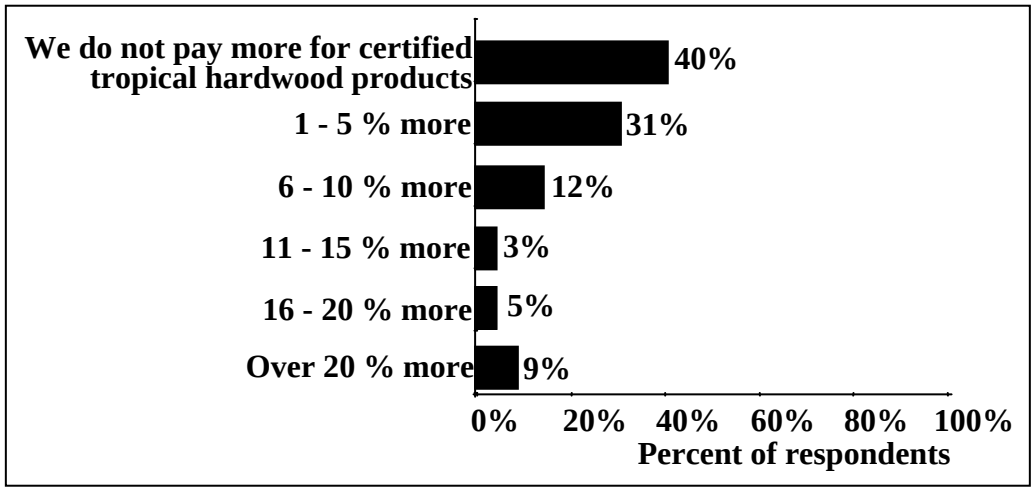



**Figure 8. Premium paid for certified tropical hardwood products by Supply Chain respondents (n=59)**

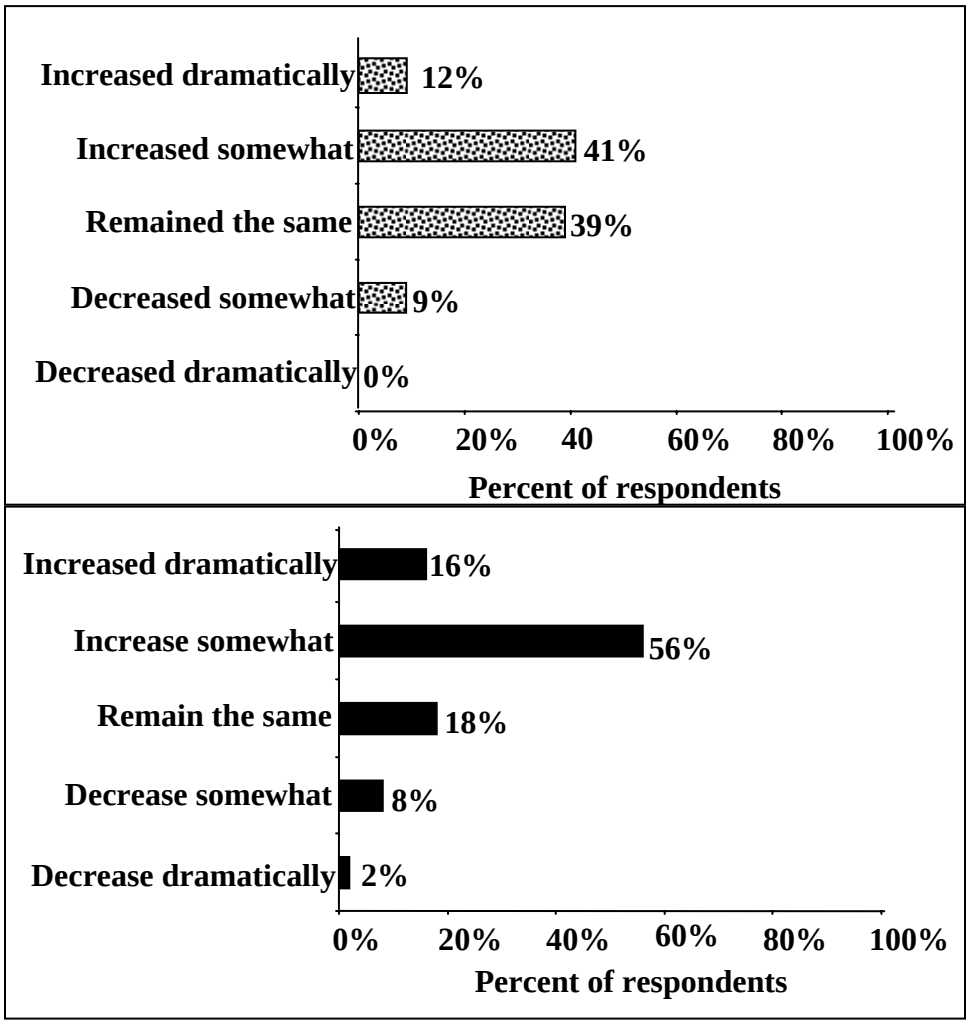



**Figure 9. Change in sales of certified tropical hardwood products for Supply Chain respondents in the past 5 years and next 5 years (n=59)**

**Discussion and implications**

One of the objectives of the study was to identify opportunities, constraints, and characteristics for secondary tropical hardwood products in the U.S. marketplace. Results show that tropical hardwood products are a small part of respondent total wood product imports, implying that their markets for TH is relatively small compared to other hardwoods and softwoods.

Metafore (2003a) found that TH products are mainly used for decorative purposes, and that they represent only four percent of the total wood market in the U.S. Similarly, only a small fraction of respondents import TH. Since the U.S. market has been opened to China, secondary wood product manufacturing in the U.S. has declined, given that the low cost of Chinese production is difficult to compete with. For example, International Wood Products Association statistics showed that from 2000 to 2003, China increased exports of tropical hardwood molding to the U.S. by 433 percent, becoming the major player in the market (IWPA 2004). On one hand, China has become one of the largest importers of hardwood raw materials in the world (tropical

and temperate), absorbing a large part of global production (USDA 2000). On the other hand, the U.S. is the largest importer of secondary TH (ITTO 2004).

One-third of respondents that buy certified TH hold Chain of Custody (CoC) certification. Non-CoC certified wood products lose potential added value because they are not sold or poromoted as certified. This suggests that Chain-of-Custody may be a weakness in the commercialization of certified wood products.

Another finding from this study shows that respondents do not generally have a preference for certified over non-certified forest products, and a majority does not pay premium prices for certified TH. Certification is only one attribute of the product but not the most important one. Price and quality remain as the most important factors when choosing a product. One of the possible reasons why certification is not an important attribute may be an overall lack of knowledge of certification among respondents.

Based on the majority respondents reporting that sales of CTH has increased in the past 5 years and will increase in the future, it appears that respondents purchases of CTH will continue on an upward trend in the future.

Results from this study suggest that if producer countries are expecting to be paid premium prices for certified TH they might be better off by targeting non-US markets. However, niche markets could potentially be explored in the U.S in regions or sub-regions where consumers have a greater environmental awareness. Examples are West Coast and Northeast states. In order to target U.S. markets, suppliers need to provide high quality products at competitive prices. If producing countries are trying to sell to large retailers like Home Depot and Lowe's, they need to be able to compete not only with competitive prices but also high volumes that can be supplied consistently.

Chain of Custody is a bottleneck in the supply chain for certified wood products. If this step in the commercialization process is not exploited, efforts to bring certified wood products to the market may fail. From a business perspective, it is illogical to incur the expense to certify forest management practices if the resulting wood products are sold to the final consumer as non-certified. If final consumers were informed about the difference between a certified and non-certified product and the benefits of certification, then perhaps demand would increase. At the end of the day, certification is firmly established globally and research to monitor the perception and the acceptance of certified products in the marketplace should be continued in the future.

**Literature Cited**


Bolfor II. 2005. Perfil Forestal de Bolivia. Available online http://www.bolfor.org/contenido/perfil_forestal.asp. Accessed on 07/20/05.

CADEFOR (Amazonia Center for Sustainable Forest Enterprise). 2004. Situation of the Bolivian Forest Sector and Main Objectives of the Amazonian Center for Sustainable Enterprise. Santa Cruz, Bolivia.

Cámara Forestal de Bolivia. 2002. Anuario Estadístico Forestal 2002 (Forest Statistical Yearbook 2002). Santa Cruz, Bolivia. (in Spanish).

Conservation and Community Investment Forum. 2002. Analysis of the status of current certification schemes in promoting conservation. San Francisco, California.

Cote, M. 1999. Possible impact of forest product certification on the worldwide forest environment. The Forestry Chronicle 75(2):208-211

Dillman, D.A. 2000. Mail and Internet Surveys: The Tailored Design Method. Secon Edition. John Wiley and Sons. New York.

Donald, M.N. 1960. "Implications of Non-Response for the Interpretation of Mail Questionnaire Data", *Public Opinion Quarterly*, 24(Spring): 99-114.

Environmental Building News. 2001. Checklist for environmentally responsible design and construction. Available online http://buildinggreen.com/ . Accessed on 09/20/05.

Forest Certification Resource Center. 2004. Certified products. Online http://www.certifiedwood.org/search-modules/SearchProducts.aspx Accessed on 08/07/04.

Ingram D. 1998. An update on timber certification: potential impacts on forest management. In: Proc. Society of American Foresters Convention. SAF, Bethesda, MD. Pp.1-8.

International Wood Products Association (IWPA). 2004. Search for products/services. Available online http://www.iwpawood.org/member_lookup.asp Accessed on 09/21/04.

International Tropical Timber Organization (ITTO). 2002. The global problem of illegal logging. Tropical Forest Update. 12(1):3-5. Available online www.itto.or.jp/live/contents/download/tfu/TFU.2002.01.English.pdf. Accessed on 08/22/04.

ITTO. 2004. Annual review and assessment of the world timber situation. Yokohama, Japan. Available online http://www.itto.or.jp/live/Live_Server/377/E-AR04-Text.pdf Accessed on 05/14/05.

Metafore (a). 2003. El proceso de importación de madera a EEUU. Portland, Oregon

Metafore (b). 2003. List of companies surveyed in 2003. Portland, Oregon.

Ozanne, L.K. and R.P. Vlosky. 1997. Willingness to pay for environmentally certified wood products: the consumer perspective. Forest Products Journal. 47(6):39-48.

Rainforest Action Network. 2005. Rates of Rainforest Loss. Available online http://www.ran.org/info_center/factsheets/04b.html Accessed on 07/20/05.

Random Lengths. 2005. Big Book. Eugene, Oregon

SLW, 1996. Tropical Broadleaf Evergreen Forest: The Rainforest. Available online http://www.radford.edu/~swoodwar/CLASSES/GEOG235/biomes/rainforest/rainfrst.html. Accessed on 08/12/04.

UNECE. 2002. UNECE Timber Committee Market Statement on Forest Products Markets in 2002 and 2003. Promotion of sound use of wood is key to sustainable forest products markets. Geneva, Switzerland.

United States Department of Agriculture (USDA). 2000. Permanent normal trade relations with China: what's at stake for solid wood products? Fact sheet.
Vlosky R.P.and L.K. Ozanne 1998. Environmental Certification of Wood Products: The U.S. Manufacturers' Perspective. Forest Products Journal. 48(9):21-26.