UNDERSTANDING CHAIN-OF-CUSTODY CERTIFICATION IN THE APPALACHIAN HARDWOOD REGION: PRIMARY MANUFACTURERS' PRACTICES AND PERCEPTIONS

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Abstract.—Many obstacles may deter hardwood manufacturers from obtaining chain-of-custody certification. Because the hardwood and softwood forest products industries have many differences between them, current certification systems may not fit the unique demographics of the hardwood industry. For this reason, it is important to understand chain-of-custody certification as it relates to hardwood forest products producers. The objectives of this study were to define the characteristics of Appalachian primary hardwood manufacturers and determine their attitudes towards chain-of-custody certification. The study included a questionnaire that was mailed to 1,239 primary hardwood manufacturers in the Appalachian region. The majority of the producers surveyed were small, noncertified manufacturers. Although certification levels were low and many of the producers held negative attitudes towards certification, many of the producers felt that they were environmentally conscious. Results indicate that many companies pursue certification for their customers and to gain some type of market advantage. Although most felt knowledgeable about the certification process, many producers still have little or no knowledge of chain-of-custody certification.

INTRODUCTION

Based on total value, lumber is one of the most important products derived from eastern hardwood forests (Luppold and Bumgardner 2008). In fact, 96 percent of all U.S. hardwood is produced in the eastern United States (U.S. Department of Commerce, Census Bureau 2006). However, the structural changes that have occurred in the domestic hardwood lumber market as well as the increase in globalization and the deterioration of the economy have led to the hardwood industry's decline (Schuler and Buehlman 2003; Luppold and Bumgardner 2006, 2008).

Adding to hardwood producers' concerns of foreign competition and economic decline is the concern of whether to pursue forest product certification. According to "Hardwood Review Weekly," certification is considered one of the four most important challenges currently facing the hardwood industry (Barrett 2008). Forest management certification and chain-of-custody (COC) certification were created with the goal of helping to sustain the forest resource, one of the earth's most valuable natural resources. Forest management certification is the process of verifying that forests are sustainably managed, and COC certification is the process of verifying that wood products come from sustainably managed forests. However, the complexity and expense of existing certification systems effectively exclude sustainable hardwood timber from green markets (Barrett 2008).

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Although the hardwood industry has a long record of sustainability (Barrett 2009), failure to pursue certification may prohibit manufacturers from entering some markets. For example, the U.S. Green Building Council has a policy of allowing only Forest Stewardship Council (FSC)-certified wood to receive the certified wood credit from the Leadership in Energy and Environmental Design (LEED) (Barrett 2009). If manufacturers refuse to certify their products, they are essentially excluding themselves from LEED projects and other markets that accept only certified wood. Because COC certification has been in existence for a couple of decades and appears to be an important issue to the industry, it is worthwhile to determine how to enhance the current systems to ensure they are efficient and beneficial to hardwood manufacturers. To achieve these goals, it is necessary to determine the dynamics of the hardwood industry and the certification movement. This information will inform company managers of the opportunities and challenges of COC certification so that they may make the certification adoption decision that is best suited for their situation. The objectives of this study were to: (1) define the characteristics of Appalachian primary hardwood manufacturers, and (2) determine the attitudes of Appalachian hardwood manufacturers towards COC certification.

STUDY AREA

To understand certification and the U.S. hardwood industry, this study focuses on the primary hardwood manufacturers in the Appalachian region. The Appalachian geographical region was set by the boundaries that the Appalachian Hardwood Manufacturers Association, Inc. (AHMI) uses to define its membership. This region contains 344 counties in New York, Pennsylvania, Ohio, West Virginia, Maryland, Virginia, Kentucky, Tennessee, North Carolina, Alabama, Georgia, and South Carolina (Fig. 1). A list of primary hardwood manufacturers in these regions and their contact information was created using listings from association bulletins, state directories, governmental documents, and other resources. The survey population comprised all primary hardwood solid wood products manufacturers identified in these resources.

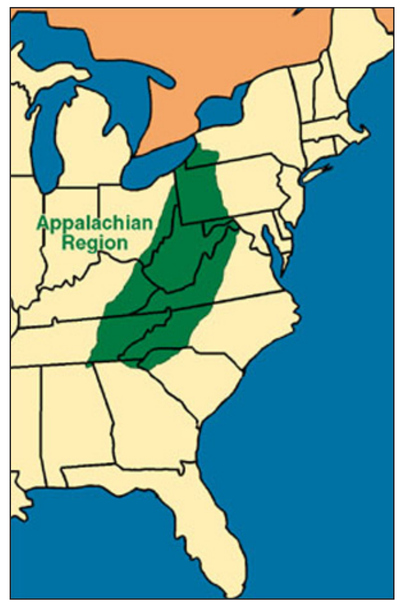

Figure 1.—Appalachian region as defined by the Appalachian Hardwood Manufacturers, Inc. (AHMI)

METHODS

A mail-based survey was developed using Dillman's Tailored Design Method (Dillman 2000) and methods adapted from Churchill's "Procedures for Developing a Questionnaire" (Churchill 1999). Other published certification-related surveys also were used as templates. The questionnaire was divided into three sections. Section 1 contained demographic questions about the responding company. Section 2 contained questions about the company's beliefs and attitudes on chain-of-custody certification. Section 3 contained questions relating to the decision process that a manufacturer uses when deciding whether to provide COC certified products.

In October 2008, the initial survey mailing was sent to 1,239 primary hardwood manufacturers. The questionnaires were mailed first class along with a cover letter and a stamped return envelope. The cover letter explained the importance of the survey and respondent participation. Four weeks after the initial survey was mailed, a follow-up questionnaire was mailed to those manufacturers who had not yet responded. After the initial and follow-up letters were mailed, it was necessary in some cases to call manufacturers to determine if addresses were correct or if they were still in business.

Of the 1,239 questionnaires mailed to Appalachian primary hardwood manufacturers, 55 were returned with bad addresses or were otherwise undeliverable. The first question asked the respondents whether they were primary hardwood manufacturers. If the respondents answered "No," they were thanked for their time and asked to return the questionnaire. One hundred and ninety-nine respondents either responded "No" to that initial question or phoned to say that they were not primary hardwood manufacturers (62 of these responded that they were closed or no longer in business). Of the remaining 985 questionnaires, 192 were returned completed and were deemed usable for the study. The returned questionnaires represent a 19-percent response rate for operating primary processors.

RESULTS

CERTIFICATION AND CERTIFICATION PRACTICES

Out of the 192 usable returned surveys, 189 indicated their COC certification status, of which only 43 (22.8 percent) indicated that they were certified. Of the remaining 77.2 percent, 68 respondents (46.6 percent) indicated they were interested in or actively seeking certification.

Certified respondents were asked to indicate what system was used to certify their products and noncertified respondents were asked to indicate what certification system would be their first choice for certifying their products. Of the 43 manufacturers indicating they were certified, slightly more than half (53.5 percent) had products certified by FSC. However, when it came to noncertified manufacturers, 28.2 percent indicated they would prefer the Sustainable Forestry Initiative (SFI) and 16.1 percent indicated a preference for FSC.

To understand the reasons that manufacturers pursue certification, respondents who were certified or considering certification were asked to indicate which entities most influenced them to consider certification. Respondents indicated that customers, followed by certification organizations, were the most influential. Third-party certifiers, suppliers, and other entities were cited as the least influential entities in respondents' decision to pursue certification (Table 1).

Respondents were then asked to indicate the level of importance of 10 factors in their decision to pursue certification. The respondents were provided a Likert-style scale and were asked to mark the appropriate

Table 1.—Entities that influence the certification decision of the Appalachian hardwood manufacturers (n = 183).

Entities	Number of firms	Percentage of firms
Customers	65	35.5
Certification organizations	30	16.4
Trade organizations	24	13.1
News organizations	16	8.7
Third-party certifiers	5	2.7
Suppliers	5	2.7
Other	5	2.7

responses (1 = unimportant, 2 = somewhat unimportant, 3 = neither important nor unimportant, 4 = important, 5 = very important). To analyze the decision-making factors of the respondents, the mean and standard deviation of the responses to each statement were calculated. The respondents indicated that all of the listed factors were slightly important (rating above 3 but below 4) in their decision to pursue certification. Cost was the most important factor to the respondents in their decision to pursue certification. This factor was followed by the amount of resources needed to pursue certification and the complexity of pursuing certification. Improving the company's image was the least important factor to the respondent.

It also was important to determine whether any differences existed between certified and noncertified respondents in terms of certification decision-making factors. The mean and standard deviation of the responses for each statement and for each group were calculated. The responses from each group were analyzed using the Wilcoxon test to assess whether differences existed (Table 2). Results indicate that differences exist between the two groups. Of the 10 statements, differences existed between 3 statements at $\alpha = 0.05$ and one at $\alpha = 0.01$. Certified respondents indicated that improving the company's image was slightly important (mean = 3.58; median = 4) in the decisionmaking process, while noncertified respondents felt that it was unimportant (mean = 2.99; median = 3). Results indicate that both groups acknowledge that the amount of resources needed to pursue certification were important; certified respondents felt it was significantly more important (mean = 3.76; median = 3). Noncertified manufacturers ranked the complexity of pursuing certification higher than did certified manufacturers (mean = 3.73; median = 4).

To allow respondents the opportunity to address certification issues that were not included in the survey, three open-ended statements were included. Respondents were asked to list reasons they have pursued or will pursue certification, to list reasons they have not pursued or will not pursue certification, and to express any further comments and concerns that they had with certification.

There were 131 responses to reasons the respondents have pursued or will pursue certification. These responses were grouped into five categories and are shown in Table 3. From these responses it can be seen that many manufacturers (60 responses, 45.8 percent) pursue certification so that they may gain market access or a competitive advantage. These results can be compared with other studies that indicate gaining market access/competitive advantage as a key factor in the decision to pursue certification (Berg and Olszewski 1995, Haener and Luckert 1998, Jensen and others 2003, Vidal and others 2005). The second most frequently cited

Table 2.—Differences between certified and noncertified respondents in terms of certification decisionmaking factors.

Statement	Cert. mean	Non-cert. mean	Sig. diff.
The cost of the certification process	3.53	3.77	
Improving the company's image	3.58	2.99	*
The ability to charge a premium for certified products	3.30	3.15	
The ability to meet the demands of customers	3.74	3.40	
Being able to expand market access	3.79	3.39	
The availability of certified products/raw materials	3.33	3.22	
Gaining a competitive advantage	3.79	3.22	*
The ability to increase or maintain profits	4.00	3.51	
The amount of resources needed to pursue certification	3.76	3.36	**
The complexity of pursuing and maintaining certification	3.28	3.73	*

*significant at $\alpha = .05$, ** significant at $\alpha = .01$

Table 3.—Reasons primary hardwood manufacturers have pursued/will pursue certification (n = 131).

Reasons to Pursue Certification	Number of Responses
To gain competitive advantage/market access	60
To accommodate customers	41
To have a "green image"/good for industry/environment	19
Required to do business/company policy	9
To gain financial benefits	2

reason for pursuing certification is to accommodate customers' needs/demands (41 responses, 31.3 percent). It is important to note that although most respondents consider themselves to be environmentally conscious, only 19 respondents (14.5 percent) listed "green" image or environmental benefits as their reason for pursuing certification. Nine respondents (6.9 percent) stated that certification is required to do business or that it is company policy. Only two (1.5 percent) respondents cited financial benefits as a reason to pursue certification.

One hundred-sixty reasons were provided by respondents to explain why they have not pursued or will not pursue certification (Table 4). These responses also were grouped into six categories. Of these responses, cost and the inability to receive financial benefits were cited 51 times (31.8 percent). Numerous respondents (42 responses, 26.3 percent) also believed that certification was not necessary and did not have environmental benefits. Twenty-six respondents (16.3 percent) believed that the demand for certified wood did not exist. One respondent stated "Our company will not get certified until our customers demand it." Other respondents (18 responses, 11.3 percent) indicated certification systems are too complex and time-consuming. The last two reasons for not pursuing certification were the lack of sources (12 responses, 7.5 percent) and supply of certified raw materials and the distrust/dislike of the certification systems (11 responses, 6.9 percent).

CERTIFICATION ATTITUDES

Since the implementation of forest certification, there have been numerous arguments for and against certification. To understand how primary hardwood producers in the Appalachian region feel about chain-of-custody certification, respondents were asked to indicate their level of agreement/disagreement with 18 COC-related questions. A five-point Likert Scale was used to measure the respondents' level of agreement/disagreement (1 = strongly disagree, 5 = strongly agree). The mean and standard deviation of each response was then calculated to analyze the data.

Table 4.—Reasons primary hardwood manufacturers have not pursued/will not pursue certification (n = 160).

Reasons not to pursue certification	Number of responses
Costly/no financial benefit	51
Not necessary/no environmental benefits	42
No demand	26
Too complex/time consuming	18
No supply	12
Distrust/dislike of systems	11

The results indicated that the majority of the respondents had negative attitudes towards most of the statements; for 15 of the statements the results indicated the respondents disagreed or strongly disagreed. Two of the statements had means indicating the respondents slightly agreed with the statements (a rating above 3 but below 4). For only one statement did the mean response level indicate a positive attitude: "Our company considered themselves to be environmentally conscious," (mean = 4.37). Respondents disagreed most strongly with the statement "Our company always purchases certified wood" (a mean rating of 1.57). "Our company will pay a premium for certified wood products or raw materials" evoked a very similar set of negative responses (mean = 1.58).

To determine whether attitude differences existed between certified respondents and noncertified respondents, the attitudes of these groups were compared. The responses from each group were analyzed and compared using a Wilcoxon test to assess whether differences existed. Results indicated that differences existed between the two groups (Table 5). The certified respondents tend to be more positive towards the statements than the noncertified respondents. While the certified respondents indicated they slightly to strongly agreed with 10 of the statements, noncertified respondents slightly to strongly agreed with only two of the statements. Of the 18 statements, responses between the two groups are statistically different for all but two statements. No differences were found in the statements, "Our company believes that the chain-of-custody certification process is complicated" and "Our company cannot find an adequate supply of certified wood to justify our becoming certified." Both certified and noncertified respondents slightly agreed to agreed (rating more than 3 but less than 4) with the first statement and disagreed (rating less than 3 but more than 2) with the second statement.

Although the respondents largely agreed with the statement "Our company is environmentally conscious," giving it a 4.37 rating out of 5.00, 77.2 percent of the respondents were not certified. When asked to indicate important factors in deciding whether to pursue certification, noncertified respondents were concerned about the complexity and cost of certification and the ability to increase or maintain profits. Certified respondents were concerned about maintaining and increasing profits, gaining a competitive advantage, and expanding market access.

DISCUSSION

Although the majority of primary hardwood manufacturers indicated negative attitudes towards COC certification, 22.8 percent were certified and an additional 36.5 percent were actively pursuing certification or were interested in certification. Given these numbers, it is very likely that the number of certified primary hardwood manufacturers in the Appalachian region may increase in the next few years.

When it comes to choosing a certification system to certify their products, certified manufacturers had a preference for FSC, while noncertified manufacturers preferred SFI. These results are not surprising considering the current statistics on forest certification. According to Bowyer (2008), there are 144.7 million SFI-certified acres of land in Canada and the United States, compared to only 90.3 million FSC-certified acres of land. Because there is a larger supply of SFI-certified timber in North America, it is understandable that more U.S. manufacturers would choose to have their products certified by SFI. Until recently, however, SFI was considered an American-based program and was not accepted in foreign countries. It was not until 2005 that SFI was endorsed by the Programme for the Endorsement of Forest Certification (PEFC) and recognized by other countries (SFI 2008). This delay in global recognition may explain the difference in certification system preferences between certified and noncertified manufacturers. The certified manufacturers may have based their system choices on the final destination of their products. Products that would remain in the domestic markets could pass with only SFI certification while products that were destined for foreign markets would require FSC certification (PEFC does not endorse FSC). The manufacturers that are currently certified may have chosen FSC when it was the only option for international acceptance and the noncertified manufacturers may prefer SFI now because of the abundance of SFI-certified raw material and the system's recent international acceptance.

Table 5.—Ranking of certification statements by certified and noncertified manufacturers and differences (1=strongly disagree, 5=strongly agree).

Statement	Cert obs. (n=)	Mean/ std. dev.	Non-cert. obs. (n=)	Mean/ std. dev.	Sig. diff.
Our company is environmentally conscious	42	4.62/0.58	144	4.30/0.84	*
Our company is familiar with the certification process	42	4.19/1.06	135	3.33/1.45	**
Our company has purchased certified wood in the past year	40	3.80/1.52	139	2.94/1.40	**
Our company plans to be certified next year	34	3.56/1.52	134	2.87/1.53	**
Our company believes that the COC certification is complicated	42	3.52/1.23	139	2.28/1.36	
Our company believes certification is necessary to be competitive	42	3.43/1.23	138	2.13/1.34	**
Our company believes certification has environmental benefits	42	3.31/1.15	138	2.05/1.15	**
Our company believes certification is necessary	42	3.14/1.33	140	2.01/1.61	**
Our company believes certification has financial benefits	40	2.98/1.37	138	1.98/1.27	**
Our company seeks suppliers of environmentally certified wood products or raw materials	40	2.95/1.43	140	1.92/1.51	**
Our company believes the benefits of certification are worth the costs	42	2.90/1.48	137	1.90/1.27	**
Our company feels pressured by our customers to supply certified wood	42	2.83/1.21	136	1.88/1.24	*
Our company feels pressured by outside groups to produce environmentally certified products	42	2.83/1.17	137	1.83/1.19	**
Our company cannot find an adequate supply of certified wood	37	2.46/1.35	140	1.78/1.19	
Our company only buys certified wood when there is a demand	40	2.40/1.10	136	1.71/1.23	**
Our company believes consumers will pay a premium for certified wood products or raw materials	42	2.36/1.19	137	1.58/1.24	*
Our company always purchases certified wood	40	2.15/1.27	139	1.43/1.04	**
Our company will pay a premium for certified wood products or raw materials	42	2.10/1.16	137	1.41/1.06	**

*significant at $\alpha = .05$, ** significant at $\alpha = .01$

Many factors affect a company's decision to pursue certification. However, it was not surprising that the cost of certification is still the most important factor to the manufacturers in their decision to pursue certification. The fact that these respondents felt certification is not financially or environmentally beneficial and that certification is not necessary may be the reason they chose not to pursue certification. Another important reason given by respondents for not pursuing certification is the lack of demand for certified wood products. Although prior studies have indicated that demand for certified products is weak (Lyke 1996, Ozanne and Vlosky 1996, Ozanne and Smith 1998), more recent studies have indicated that demand from wholesalers, architects, and builders is increasing (Anderson and Hansen 2004, Wickham 2004, Tikina and others 2008, Perera and others 2008).

When the relative importance of these decision-making factors is analyzed, differences in how certified and noncertified manufacturers ranked the factors may explain the difference in certification adoption between these groups. Noncertified respondents were concerned about the complexity and cost of certification and the ability to increase or maintain profits. Certified respondents were more concerned about maintaining and increasing profits, gaining a competitive advantage, and expanding market access. Although the respondents want to receive direct benefits from COC certification (e.g., increased profits), Miles and Colvin (2000) indicate that benefits associated with certification may be indirect. There is strong support for the concept that being a good environmental steward creates a reputational advantage that leads to enhanced marketing, a competitive advantage, and improved financial performance (Miles and Colvin 2000, Vidal and others 2005). Certified respondents may have a better grasp of the possible indirect benefits of certification than do noncertified respondents.

Although this study did not survey respondents on their understanding of the COC process, it is important to note that several respondents stated that they had limited understanding of the process. This response indicates that additional educational marketing of the COC process may be needed, with special emphasis on the indirect benefits of certification, to help increase certification adoption levels. However, respondents also indicated that the complexity of certification was an important factor in their decision to pursue or not pursue COC certification. Current COC certifying bodies must address the unique structure of the hardwood industry and determine a way to decrease the complexity and cost so that firms may be better able to handle the certification process.

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