

## The Role of Sustainability Reporting in the Agri-Food Supply Chain

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### Abstract

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Agricultural sustainability is a growing concern for the general public because of agriculture's considerable use of land, water, and other natural resources. In response to this concern, companies have started to publish sustainability reports to highlight sustainable practices. The purpose of this study was to examine the role of sustainability reporting from agri-food supply chain companies. In total, 66 agribusinesses were included in this study, of which 16 had published sustainability reports. Data for the quantitative content analysis were collected using a scorecard based on the Global Reporting Initiative (GRI) guidelines. Results indicated that sustainability reporting is limited among companies involved in the agri-food supply chain and reports focus primarily on environmental aspects of sustainability. Though better than sectors studied in previous research, agribusinesses need to align sustainability report content more closely with the three components of the triple bottom line model – environmental, economic, and social.

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**Keywords:** sustainability reporting, sustainability, triple bottom line, agri-food supply chain, corporate social responsibility

### 1. Introduction

A 2013 report issued by the United Nations stated that the global population is projected to reach 9.6 billion by 2050; a dramatic increase from the current population of 7.2 billion (“World population projected to reach 9.6 billion by 2050,” 2013). This increasing population also will put pressure on the agricultural sector to produce enough food and resources to meet the growing demand, so sustainability is a more important issue now than ever before (Accenture, 2012). As a result of this projected population increase and pressure to produce food, the issue of sustainability in agriculture has become a growing concern for the general public (Wurth, 2014). Specifically, 81% of consumers claim to care about sustainability in agriculture (BASF, 2014; Wurth, 2014). In response, numerous companies have started to implement sustainable practices and promote these practices to the general public through sustainability reports (Ihlen, Bartlett, & May, 2011; Kolk, 2004).

The concept of sustainability and sustainable development became well-defined less than 30 years ago when introduced in the October 1987 report issued by the World Commission on Environment and Development (WCED) (Voinov, 2008). This commission's report, known as the Brundtland Report, identified three core principles of sustainability (Rankin & Gray 2011; WCED, 1987). These three pillars of sustainability – environmental, social, and economic – are frequently addressed in sustainability reports issued by businesses (Kolk, 2003). Businesses have been encouraged to publish sustainability reports in an effort to practice corporate social responsibility (CSR) (Nidumolu, 2009). The concept of CSR has existed for more than 50 years; however, research suggests that globalization has resulted in more rigorous discussions about the relationship between business and society (Ihlen et al., 2011). In recent years, consumers have started asking companies to “engage in stakeholder dialogue and implement transparency/accountability through the publication of non-financial reports” (Ihlen et al., 2011, p. 4).

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While businesses have engaged in CSR in a variety of ways, an increasing number of businesses are responding to this stakeholder request for transparency and are indicating adoption of CSR practices through the publication of sustainability reports (Ihlen et al., 2011). In addition, while many initial non-financial reports focused only on the environment, the number of pure environmental reports is declining and an increasing number of reports now include social and economic components with environmental aspects (Kolk, 2003). Stakeholders also have started raising concerns about the impact of companies on the environment. Issuing sustainability reports is one way for companies to address these concerns and build trust with stakeholders (Mock, Strohm, & Swartz, 2007). There are a multitude of reasons for companies to focus on sustainability besides stakeholder pressure, including enhanced reputation, increased risk management capabilities, and reduced costs and increased revenue (Accenture, 2012). The focus on sustainability is rapidly increasing for companies along the agri-food supply chain (Aigner, Hopkins, & Johansson, 2003; Rankin et al., 2011); largely as a result of increasing concern from consumers regarding the sustainability of the agricultural industry (Wurth, 2014). The agri-food supply chain is complex and includes input suppliers, farmers, food manufacturers, and retailers (Carolan, 2012; KPMG International Cooperative, 2013). The agriculture industry is a significant user of land, water, and other resources, which makes sustainability an important consideration for the industry (Aigner et al., 2003; Rankin et al., 2011). Many researchers argue that the issue of sustainability reporting is growing in importance for businesses in the agricultural sector due to its large environmental and social impacts (Rankin et al., 2011). In addition to no legal requirement for practicing or reporting sustainability, there are no universal reporting guidelines for businesses to follow (Golob & Bartlett, 2007). Some reporting standards, such as the Global Reporting Initiative, Carbon Disclosure Project, and Dow Jones Sustainability Index, have been introduced in recent years to aid businesses in publishing sustainability initiatives (Accenture, 2012; Detre & Gunderson, 2011).

Quantifying the value of CSR to a company can be difficult. While some research suggests strong CSR practices lead to increased sales (Sen & Bhattacharya, 2001), other research indicates it is difficult to identify any relationship at all (Feldman & Vasquez-Parraga, 2013). Regardless of the value CSR has to a company, a growing number of consumers are eager to learn about the CSR practices of companies (Mohr, Webb, & Harris, 2001). Issues of sustainability have moved to the forefront for all food system companies due to rising input costs, population growth, increased demand from developing economies, regulatory compliance, and stakeholder pressure (Accenture, 2012). Many companies have responded by publishing sustainability reports; however, the diverse nature of the businesses involved in the agri-food supply chain creates unique challenges and opportunities associated with sustainability reporting (Rankin et al., 2011). Despite increased concern from consumers about agricultural sustainability (Wurth, 2014), there has been relatively little research on how agribusinesses engage in demonstrating CSR through published sustainability reports. The purpose of this study was to examine the role of sustainability reporting from companies involved in the agri-food supply chain. The focus was on understanding how sustainability reports align with the triple bottom line sustainability model.

### **The following research objectives guided the study**

- **RO1:** Determine the prevalence of sustainability reporting among agri-food supply chain companies;
- **RO2:** Identify, to what extent, the three components of the triple bottom line sustainability model were represented in sustainability reports; and
- **RO3:** Determine if/how sustainability reporting differs among sectors of the agricultural supply chain.

### **2. Literature Review**

With a rapidly growing global population, the agriculture and food industry is only one of a few industries experiencing continued growth (KPMG International Cooperative, 2013). On a global scale, the agricultural supply chain is valued at \$5 trillion and encompasses input suppliers, farmers, food manufacturers, and retailers (Carolan, 2012; KPMG International Cooperative, 2013). For the commodity-based agriculture sector, the input sector is dominated by 10 to 20 suppliers, which includes seed, fertilizer, chemical, and equipment companies (Carolan, 2012). The agricultural input sector has experienced frequent consolidation in the last several decades. For seed companies, 56% of the global seed market is controlled by four seed companies (Lowry & Allen, 2014). Additionally, in the 1960s, there were eight full-line machinery manufacturers, but recently that number has dropped to only three (Gustafson, 2012). The farm sector is the largest sector in the agriculture and food supply chain. There are 2.1 million farms in the U.S. and 914.5 million acres of farmland (United States Department of Agriculture, 2012). In 2012, America's 3.2 million farmers sold \$394.6 billion of agricultural products (United States Department of Agriculture, 2012).

This sector is very complex as it involves numerous crops and livestock, which each has its own distinct supply chain (KPMG International Cooperative, 2013). The food manufacturing industry has experienced growth recently as well and is one of the largest manufacturing sectors in the U.S., accounting for more than 10% of total manufacturing shipments (U.S. Department of Commerce, 2008). There are approximately 25,000 food manufacturers in the U.S. (Carolan, 2012) that are responsible for transforming agricultural products for intermediate and final consumption (U.S. Department of Commerce, 2008). Just like input suppliers, the retail sector also has experienced consolidation in the past two decades (Carolan, 2012). There are approximately 112,600 food and beverage retailers in the U.S. (Carolan, 2012). With food manufacturers and retailers representing more than 50% of the total market share for the agriculture and food supply chain (KPMG International Cooperative, 2013), these two industries have a significant impact on the sustainability of the entire agri-food supply chain.

## 2.1 Corporate Social Responsibility

Corporate social responsibility can be traced as far back as the 1930s and 1940s. (Carroll, 1999). While CSR has a long history, the concept began growing in importance in the 1950s. Frank Abrams, a former executive with Standard Oil Company, suggested in 1951 that as management became more professional, companies could no longer focus solely on profits but needed to also start thinking about employees, customers, and the general public (Carroll & Shabana, 2010). Two years later Howard R. Bowen, who has been credited with launching the start of the modern period of CSR literature, published *Social Responsibilities of the Businessman* (Carroll, 1999; Ihlen et al., 2011). Bowen's (1953) initial definition "refers to the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of actions which are desirable in terms of the objectives and values of our society" (p. 6). Beginning in the 1980s, the focus began to shift from defining CSR to adapting it into numerous concepts, theories, and models (Carroll, 1999), which include business ethics, stakeholder theory, and corporate citizenship (Carroll & Shabana, 2010). By the 1990s, there was expansive literature on CSR and in the 1990s and 2000s the quest for CSR accelerated on a global level (Carroll & Shabana, 2010; Carroll, 1999). The concept of CSR continues to grow in prominence (Carroll & Shabana, 2010; Ihlen et al., 2011; Moon, 2007; Sen & Bhattacharya, 2001). A Google search in April 2014 revealed 117 million CSR results compared to 81.4 million in April 2006 (Moon, 2007). This significant increase in information during a relatively short timeframe supports the notion that CSR is growing in importance. In its infancy, CSR was considered primarily a domestic business issue; however, CSR initiatives are occurring in nearly all developed nations, as well as expanding to emerging nations (Carroll & Shabana, 2010; Junior, Best, & Cotter, 2013).

One reason for the increased discussions about the relationship between business and society is requests from consumers (Ihlen et al., 2011; Moon, 2007). Specifically, consumers are asking companies to "engage in stakeholder dialogue and implement transparency" (Ihlen et al., 2011, p. 4). Consumers continue to challenge businesses to look beyond profit maximization and also consider societal goals (Carroll, 1991, 1999; Wilson, 2003). A growing number of consumers are interested in learning about companies' CSR practices (Mohr et al., 2001). Companies have recognized the increased attention towards CSR and are increasing commitments to CSR practices in an attempt to influence consumer perceptions of the company and to influence purchasing decisions (Becker-Olsen, Cudmore, & Hill, 2006; Du, Bhattacharya, & Sen, 2007). However, despite the increased interest, many consumers who view CSR as important do not rely on CSR to make purchasing decisions (Mohr et al., 2001). Specifically, "consumers' beliefs about CSR (i.e., that companies should be socially responsible, that social responsibility ultimately leads to higher profitability for companies) are often inconsistent with their behaviors (i.e., not purchasing based on CSR)" (Mohr et al., 2001, p. 69). Despite a growing interest in CSR, consumers lack knowledge of CSR because of its complex nature (Mohr et al., 2001). As consumers become more knowledgeable about CSR, their responsiveness to CSR practices may increase (Mohr et al., 2001). Consumer CSR beliefs are believed to be formed based on consumer awareness of a company's CSR activities and consumer beliefs regarding a company's motivation for engaging in CSR practices (Du et al., 2007). The benefit to companies engaging in CSR activities extends beyond increased sales. In fact, it "is less a short-term sales generating mechanism as it is one that deepens customer relationships over time, creating brand advocates or champions" (Du et al., 2007, p. 237). While CSR continues to grow in importance (Carroll & Shabana, 2010; Ihlen et al., 2011; Moon, 2007; Sen & Bhattacharya, 2001), sustainability reporting is becoming a more prevalent CSR activity used by companies to engage with stakeholders (Ihlen et al., 2011).

## 2.2 Sustainability

The concepts of sustainability and sustainable development were introduced fewer than 30 years ago when the General Assembly of the United Nations asked the World Commission on Environment and Development (WCED) to formulate a global agenda for change (World Commission on Environment and Development [WCED], 1987). In its October 1987 Brundtland Report, the commission defined sustainable development as seeking "to meet the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 8). In that same report, which is often acknowledged for giving sustainability its widespread recognition (Kuhlman & Farrington, 2010), the WCED acknowledged three core principles of sustainability: environmental integrity, social justice, and economic prosperity (Rankin & Gray, 2011; WCED, 1987). Throughout the years, many definitions and models of sustainability have been introduced. While each definition is unique, to some degree they all typically include the same three core principles: environmental integrity, social justice, and economic prosperity. In its Agenda for Development, the United Nations stated "economic development, social development, and environmental protection are interdependent and mutually reinforcing components of sustainable development" (United Nations, 1997, p. 11). One popular model of sustainability is the triple bottom line (TBL) concept introduced by John Elkington (Elkington, 1994). The TBL model gained popularity in the 1990s (Elkington, 2004) and includes three areas: "economic prosperity, environmental quality, and social justice" (SAGE Brief Guides to Corporate Social Responsibility, 2012, p. 207). This concept suggests care for the environment and concern for people should be added to profit, the traditional bottom line of companies (Elkington, 2004; Kuhlman & Farrington, 2010).

Starting in the 1990s, stakeholders began asking businesses to report activities engaged in that avoid human rights violations and minimize pollution, among other things (Kolk, 2003). As a result, many businesses began publishing non-financial, sustainability reports (Kolk, 2003). The number of businesses issuing such reports has dramatically increased (Fifka & Drabble, 2012; International, 2011; Junior et al., 2013; Kolk, 2003). As recently as 2011, nearly 80% of Global Fortune 250 companies issued non-financial reports; compared to 37% in 1998 and 50% in 2003 (Ihlen et al., 2011). The agricultural sector is not exempt from an increased focus on sustainability. Due to its significant use of land, water, and other resources, sustainability is becoming increasingly important in agriculture (Aigner et al., 2003; Rankin et al., 2011). The paradigm is shifting away from focusing on financial gain to embracing sustainability, which poses various challenges for agribusinesses (Heller & Keoleian, 2003). Some challenges facing the agricultural sector include "ensuring a secure food supply, addressing the environmental impacts of agriculture, practicing fair labor standards, and providing safe and healthy products" (Rankin & Gray, 2011, p. 2). Agribusinesses also face considerable pressure to pursue sustainability from consumers and from within the supply chain (Rankin et al., 2011).

## 3. Methodology

This study was a quantitative content analysis to gain a better understanding of the information in sustainability reports published by companies involved in the agri-food supply chain. Content analysis is "a research technique for the objective, systematic, and quantitative description of the manifest content of communication" (Berelson, 1952, p. 18). Content analysis is an example of unobtrusive research, which allows researchers to examine content after it has been created and infer about how it was produced without affecting its production (Babbie, 2013; Krippendorff, 2004; Riffe, Lacy, & Fico, 2005). Content analysis is a valuable research methodology because it can be used to examine written, verbal, and visual communication (Riffe et al., 2005). In addition, content analysis has been a frequently used method to analyze sustainability reports (Fifka & Drabble, 2012; Michelon, 2011; Moreno & Capriotti, 2009; Morhardt, Baird, & Freeman, 2002). For this study, a content analysis of sustainability reports from companies along the agricultural supply chain was conducted.

### 3.1 Population and Sampling

Sampling was designed to gain an accurate representation of commodity-based agri-food supply chain companies and to include companies at every point in the supply chain. The agricultural supply chain is comprised of more than 2.3 million companies that are divided among four main sectors: input suppliers; farms; processors and manufacturers; and retailers (Carolan, 2012). There are approximately 20 dominant input suppliers in the commodity-based agriculture supply chain including seed, fertilizer, chemical, and machinery companies (Carolan, 2012); 2.1 million farms (United States Department of Agriculture, 2012); 25,000 food manufacturers; and 112,600 retailers in the U.S. (Carolan, 2012).

Considering the vast amount of companies in the agricultural supply chain, a stratified random sampling method was used to give each company an equal chance for inclusion in the study (Wimmer & Dominick, 1983). Due to the variability among crop and livestock sectors of the agricultural industry and the tight, vertical integration of the livestock sector (USDA Economic Research Service, 2009), this study only included businesses and input companies specifically related to crop-based agribusinesses. The farm sector is the largest of the four sectors with 2.1 million farms (Carolan, 2012; United States Department of Agriculture, 2012); however, initial attempts to identify reports from farms revealed that few farms publish sustainability reports. Since there is no database that lists the farms with reports, extensive Google searches were used to identify reports that could be used in this study. Following the extensive search, only four farm-level reports were identified: The two reports from livestock operations were excluded because this study was focused on crop-based agriculture. Thus, based on the parameters of this study, only the two crop farms were eligible for inclusion in the study. It was then decided not to include the farm sector in this study due to the underrepresentation of the segment. To determine the population size for each sector, the researcher determined the overall market share for each sector based on total sales. Approximate total sales for the sectors are \$400 billion (input suppliers), \$4.5 trillion (manufacturers and traders), and \$5.4 trillion (retailers); for total sales of the agricultural supply chain of \$10.3 trillion (KPMG International Cooperative, 2013). Based on these figures, the researcher was able to determine the share of each sector to be 4% for input suppliers, 44% for manufacturers, and 52% for retailers. The percentage of sustainability reports analyzed for each sector corresponded with its respective total share.

To determine the companies from which a random sample was selected, the researcher identified a list of the top companies for each sector. A list of the Top 100 U.S. food manufacturers, based on 2013 food sales, ("Food Processing's Top 100," 2014) and a list of the Top 75 U.S. food retailers, based on sales, ("2014 Top 75: The clickable list," 2014) were obtained. Forty-three companies were removed from the list of manufacturers because they were manufacturers of livestock-based products; therefore, the total population of manufacturers was adjusted to 57 companies. The researcher was unable to find a comprehensive list of the top agricultural input suppliers; however, a report by the United States Department of Agriculture's Economic Research Service included lists of the leading seed companies, leading crop protection firms, and the top farm machinery companies (Fuglie et al., 2011). Although agricultural input companies include animal health and nutrition companies (KPMG International Cooperative, 2013), companies in these areas are used only in livestock entities, not crop-based entities and were therefore excluded from this study. Also, while the manufacturer and retailer lists only included U.S. companies, the agricultural input suppliers list included international companies. Due to the global nature of agricultural input companies (Lowry & Allen, 2014), non-U.S. companies were not excluded. The list of agricultural input suppliers included 50 companies. Table 1 indicates how the supply chain contribution for each industry sector was used to stratify the study sample.

**Table 1. Using supply chain contribution for stratified sampling**

	Industry Sector		
	Input Suppliers	Food Manufacturers	Retailers
Total companies identified	50	57	75
% contribution to supply chain	4.0	44.0	52.0
Total sample size	2	25	39
Companies with reports	2	8	6

Once the list of companies for each sector was identified, the lists of companies were randomized, giving each company an equal chance of inclusion in the study sample (Wimmer & Dominick, 1983). Once the companies in each sector were randomly ordered, a sample of companies was selected using the percentages described in Table 1. The sample size for each sector was found by multiplying the percent market share and the total number of companies listed for each sector. For example, the input supplier sector controls 4% of the market share for the agri-food supply chain and a list of 50 companies was available for sampling. The sampling method thus suggests that two companies representing input suppliers should be included in the study sample. After the study sample was selected, the researcher conducted a series of Google searches to locate non-financial reports for each company in the study sample.

Companies that did not publish a report were not excluded from the study because these companies were used to explain the prevalence of sustainability reporting among companies in the agricultural supply chain. Sixty-six companies are included in the study sample 16 of which had published reports.

### 3.2 Data Collection

The codebook used to analyze individual reports was the same as that used to analyze reports in a 2002 study conducted by Morhardt, Baird, and Freeman. The study analyzed environmental and sustainability reports using two guidelines: the Global Reporting Initiative (GRI) 2000 guidelines and ISO 14031 standard (Morhardt et al., 2002), where the reporting guidelines were converted into two individual, comprehensive scoring systems (Morhardt et al., 2002). Since the GRI reporting framework is used by companies around the globe ("What is GRI?," 2013), the GRI scoring system developed by Morhardt et al. (2002) was used to analyze reports in this study. The scoring system is comprised of 139 topics that came directly from the 2000 GRI guidelines. The scoring system is as follows: "0, not mentioned; 1, anecdotal or briefly mentioned; 2, more detail, but characterizing only selected facilities or using only self-comparison metrics; 3, company-wide absolute or relative metrics that could be compared with other companies" (Morhardt et al., 2002, p. 221). The nature of the GRI topic list makes some topics on the scorecard worth up to four points, while others are only worth one point (Morhardt et al., 2002). The scorecard is divided into four categories: general organization features, environmental performance, economic performance, and social performance; individual topics are summed to give a score for each category and the sum of the individual category scores result in a company's total sustainability score (Morhardt et al., 2002). The total points possible on the scorecard is 429 (Morhardt et al., 2002). The maximum points for each sector is as follows: 134 total points for general indicators, environmental indicators are worth a total of 115 points, 69 points for economic indicators, and 111 points for social indicators (Morhardt et al., 2002). The general organization category includes 43 indicators, there are 34 environmental performance indicators, nine indicators of economic performance, and 48 indicators of social performance.

### 3.3 Intercoder reliability

Since reliability is an important feature of content analyses (Riffe et al., 2005), intercoder reliability was established. As recommended by Riffe et al. (2005), the researcher trained a second coder using the codebook. During training the researcher explained the codebook, then the researcher and coder scored a report together. Following this, they each coded two reports independently and discussed results. Discrepancies that arose during training were discussed by the researcher and coder and additional details about the codebook were discussed to clarify confusion; content analyzed during coder training included sustainability reports that were not included in the study, as recommended by Riffe et al. (2005). After training, the researcher and coder each coded a random sample of 20% ( $n = 3$ ) of the reports in the study (Wimmer & Dominick, 2003). After the reports had been analyzed, Krippendorff's alpha was used to determine intercoder reliability. An intercoder reliability score of 0.913 was obtained; absolute agreement for Krippendorff's alpha is 1.0, so the score of 0.913 is considered to be a strong level of agreement (Hayes & Krippendorff, 2007). The remaining reports ( $n = 13$ ) were then divided between the two coders for coding. Data were analyzed using SPSS v. 20.

## 4. Results

### 4.1. RO1: Determine the prevalence of sustainability reporting among agri-food supply chain companies.

The sample for this study included 66 companies. Of those companies 3.0% ( $n = 2$ ) represented agricultural input suppliers; 37.9% ( $n = 25$ ) were food manufacturing companies; and 59.1% ( $n = 39$ ) represented retailers. The number of companies in each sector are represented in Table 2.

**Table 2. Frequency of companies by sector**

Sector	Frequency (f)	Percent of Sample (%)
Input Supplier	2	3.0
Manufacturer	25	37.9
Retailer	39	59.1

While 66 companies were analyzed in this study's objective 1, not all of those companies published sustainability reports.

For this study, a published report was characterized as being publically accessible to stakeholders either through the company website or other external webpage. Nearly a quarter (n = 16) of companies analyzed in this study published sustainability reports. Specifically, 100% (n = 2) of input suppliers, 32.0% (n = 8) of food manufacturers, and 15.4% (n = 6) of retailers published sustainability reports (Table 3).

**Table 3. Frequency of sustainability reporting by sector**

Sector	Frequency (f)	Percent (%)
Input Supplier (n = 2)	2	100
Manufacturer (n = 25)	8	32.0
Retailer (n = 39)	6	15.4

The specific companies in each industry sector that published sustainability reports are outlined in Table 4.

**Table 4. Companies in sample with sustainability reports**

Company (N = 16)	Industry Segment
Monsanto Co.	Input Supplier
Deere & Company	Input Supplier
Flower Foods, Inc.	Manufacturer
PepsiCo Inc.	Manufacturer
Seneca Foods Inc.	Manufacturer
Kellogg Co.	Manufacturer
J.M. Smucker Co.	Manufacturer
Coca-Cola Co.	Manufacturer
Mars Inc.	Manufacturer
Campbell Soup Co.	Manufacturer
Weis Markets, Inc.	Retailer
SpartanNash	Retailer
Delhaize America Co.	Retailer
Publix Super Markets, Inc.	Retailer
Whole Foods Market, Inc.	Retailer
Kroger	Retailer

Given that there is no legal requirement for businesses to publish non-financial reports, it is possible that the remaining 50 companies in the study sample did not issue a report. However, despite not having a published sustainability report, 14 (21.2%) of the remaining 50 companies had sustainability or corporate responsibility sections on the company’s website. Seven (50%) of those companies were food manufacturers, while the remaining seven (50%) were retailers.

**4.2. RO2: Identify, to what extent, the three components of the triple bottom line sustainability model were represented in sustainability reports**

While the scorecard instrument collected data in five areas, only three (environment, economic, and social) are a part of the triple bottom line model and were used to assess objective 2. All companies with published reports (n = 16) reported environmental information in sustainability reports. Although the scores differ among companies, the mean environmental score was 23.1, with scores ranging from 12 to 54 out of a possible 115 (20.1% mean attainment), with higher scores being better. Fifteen (93.8%) companies included economic information in reports, which ranged from 4 to 20 with a mean economic score of 8.4 out of a possible 69 (12.1% mean attainment). Social information was reported by 14 (87.5%) companies with scores ranging from 2 to 46 out of a possible 111 (12.4% mean attainment). The mean social score was 13.8. Table 5 shows the environment, economic, and social scores for each company.

**Table 5. Component scores for agricultural supply chain companies (item score, percent attainment)**

Company	Sector	Environment <sup>a</sup>	Economic <sup>b</sup>	Social <sup>c</sup>
Deere & Company	Input Supplier	24, 20.9%	18, 26.1%	19, 17.1%
Monsanto Co.	Input Supplier	43, 37.4%	19, 27.5%	32, 28.8%
Seneca Foods Inc.	Manufacturer	12, 10.4%	7, 10.1%	5, 4.5%
Flower Foods Inc.	Manufacturer	21, 18.3%	0, 0%	0, 0%
PepsiCo Inc.	Manufacturer	17, 14.8%	8, 11.6%	7, 6.3%
Campbell Soup Co.	Manufacturer	54, 46.9%	20, 28.9%	46, 41.4%
Mars Inc.	Manufacturer	28, 24.3%	6, 8.7%	27, 24.3%
J.M. Smucker Co.	Manufacturer	13, 11.3%	11, 15.9%	7, 6.3%
Coca-Cola Co.	Manufacturer	26, 22.6%	6, 8.7%	31, 27.9%
Kellogg Co.	Manufacturer	16, 13.9%	6, 8.7%	14, 12.6%
Weis Markets Inc.	Retailer	27, 23.5%	7, 10.1%	2, 1.8%
Publix Super Markets Inc.	Retailer	18, 15.7%	6, 8.7%	3, 2.7%
Whole Foods Market Inc.	Retailer	12, 10.4%	4, 5.8%	0, 0%
Delhaize America Co.	Retailer	23, 20.0%	4, 5.8%	16, 14.4%
SpartanNash	Retailer	18, 15.7%	7, 10.1%	5, 4.5%
Kroger	Retailer	18, 15.7%	5, 7.2%	6, 5.4%
<sup>a</sup> Maximum possible score for environment was 115				
<sup>b</sup> Maximum possible score for economic was 69				
<sup>c</sup> Maximum possible score for social was 111				

The economic component was the component with the lowest score for 50% (n = 8) of companies. The social component was the second weakest segment, which was the component with the lowest score for 43.8% (n = 7) of companies. For one company, Flower Foods Inc., both the economic and social components were the lowest sector, each receiving a score of zero. The environmental sector was the component with the highest score for 87.5% (n = 15) of companies.

#### 4.3. RO3: Determine if/how sustainability reporting differs among sectors of the agricultural supply chain.

The scorecard instrument collected data related to five areas – general organization, environmental performance, economic performance, social performance, and total score. While the second study objective specifically addressed environmental, economic, and social performance indicators, data from all five areas were used to assess objective 3. Sixteen companies (100%) reported general organization information in sustainability reports. General organization scores ranged from 7 to 93, with a mean score of 41.6 out of 134 (31% attainment). The total sustainability score ranged from 19 to 176 with a mean of 86.8, out of a possible 429 (20.2% attainment). Table 6 shows the maximum, minimum, and mean scores for all five sustainability areas.

**Table 6. Minimum, maximum, mean scores, and percent attainment for sustainability indicators**

Indicator	Companies <sup>*</sup>	Score			% Attainment <sup>**</sup>
		Minimum	Maximum	Mean	
General <sup>a</sup>	16	7	93	41.6	31.0
Environment <sup>b</sup>	16	12	54	23.1	20.1
Economic <sup>c</sup>	15	4	20	8.4	12.1
Social <sup>d</sup>	14	2	46	13.8	12.4
Total <sup>e</sup>	16	29	176	86.8	20.2
<sup>*</sup> n = 16					
<sup>**</sup> % Attainment = mean score/maximum possible score					
<sup>a</sup> Maximum possible score possible was 134					
<sup>b</sup> Maximum possible score possible was 115					
<sup>c</sup> Maximum possible score possible was 69					
<sup>d</sup> Maximum possible score possible was 111					
<sup>e</sup> Maximum possible score possible was 429					

A one-way between subjects ANOVA was conducted to compare the effect of industry sector on general, environment, economic, social, and total sustainability scores. All tests were conducted at the p < .05 level. There was a significant effect of industry sector on general scores [F(2,13) = 5.95, p = 0.02], economic scores [F(2,13) = 6.93, p = 0.01], and total scores [F(2,13) = 4.84, p = 0.03].

There was no significant effect of industry sector on environmental scores [ $F(2,13) = 1.22, p = 0.32$ ] and social scores [ $F(2,13) = 2.55, p = 0.12$ ]. Post hoc comparisons using Fisher's LSD test were used to identify where differences identified by the ANOVA were located. The test indicated that the mean score for the general component was significantly different between input suppliers and manufacturers (MD = 45.6), as well as between input suppliers and retailers (MD = 61.5), with input suppliers having significantly higher scores than the other two sectors. However, the mean score for the general component was not significantly different between manufacturers and retailers (MD = 15.9). The post hoc comparison also indicated the economic scores for the input suppliers were significantly different than the manufacturers (MD = 10.5) and retailers (MD = 13.0), with input suppliers again having scores that were significantly higher than food manufacturers and retailers. However, the mean economic score for manufacturers did not significantly differ from the retailers (MD = 2.5). Post hoc comparisons indicated the mean total score for the input suppliers was significantly higher than both manufacturers (MD = 74.6) and retailers (MD = 109.2). However, the mean total score was not significantly different between manufacturers and retailers (MD = 34.5). The results of the post hoc comparison are displayed in Table 7.

**Table 7. Results of Fisher's LSD post hoc comparison**

		Scorecard Component					
		General		Economic		Total	
Industry Segment Comparison		p	MD	p	MD	p	MD
Input Supplier	Manufacturer	.020	45.625	.009	10.500	.047	74.625
	Retailer	.004	61.500	.003	13.000	.008	109.167
Manufacturer	Retailer	.201	15.875	.301	2.500	.161	34.219

\* Significant difference at  $p < .05$

**5. Conclusions / Discussion**

The results of this study indicated that only about a quarter of companies along the agricultural supply chain published non-financial reports. Although voluntary sustainability reporting has been increasing in recent years (Fifka & Drabble, 2012; Junior et al., 2013; Kolk, 2003), the results of this study suggest the agricultural industry appears to be slow in its reporting efforts. This is consistent with other literature that also suggests agribusiness' response to sustainability has been reactive, not proactive (Accenture, 2012). Companies along the agriculture and food supply chain could be laggards in sustainability reporting because companies are not mandated to issue reports (Kolk, 2008). Limited research on how markets react to the adoption of CSR practices (Detre & Gunderson, 2011) could be another contributing factor that might explain the lack of sustainability reporting from agribusinesses.

Additionally, the prevalence of sustainability reporting also varies by industry segment. Based on the descriptive analysis, the input sector has the highest prevalence of reporting (100%), followed by food manufacturers (32.0%), and then retailers (15.4%). However, with the small sample for input suppliers based on focused sampling, it is hard to generalize that, as a whole, input suppliers are the most active sector in regards to sustainability reporting. Sustainability reporting may be more prevalent by companies at the start of the supply chain because, as Rankin et al., (2011) suggests, "upstream members of the supply chain such as input suppliers and producers bear the costs of innovation and environmental damage while downstream supply chain members such as processors and retailers often receive the economic benefits and value added from sustainability" (p. 2). With the increased pressure of stakeholders asking companies to publish sustainability reports and the growing environmental and social impacts of the agricultural industry (Rankin et al., 2011), it is surprising that so few agribusinesses issue sustainability reports. Despite not publishing a report, 14 companies in the study sample did have website sections regarding sustainability or other related topics. This suggests that companies have recognized the importance of communicating about sustainability. While there is no guarantee that companies will experience positive financial gains as a result of publishing a non-financial report, companies are likely to experience increased reputation (Detre & Gunderson, 2011; Ihlen et al., 2011; Kolk, 2004), strengthened customer relationships (Du, Bhattacharya, & Sen, 2010), and competitive differentiation (Accenture, 2012; Kolk, 2004). There are also internal advantages for companies that elect to publish reports, such as an "enhanced ability to track progress against specific targets; greater awareness of broad environmental issues throughout the organization; improved all-around credibility from greater transparency; and ability to clearly convey the corporate message internally and externally" (Kolk, 2004, p. 54).

Not all companies along the agri-food supply chain analyzed in this study include information related to all three elements of the triple bottom line model of sustainability. Environmental information was reported to some extent in all 16 sustainability reports analyzed in this study and was never the lowest component for any of the companies. These findings could be due to the fact that many initial sustainability reports focused solely on environmental factors (Kolk, 2003; Sridhar, 2012), so companies have the most experience reporting environmental information. Eight companies had the lowest score in the economic component. Since publically traded companies are legally required to publish an annual financial report, companies may not consider it necessary to include economic information in sustainability reports (Morhardt et al., 2002), which may account for the low scores in this area. Although there has been a shift towards reports that include economic, environmental, and social aspects (Kolk, 2004), it is apparent that businesses still put the most emphasis on environmental factors in published reports. However, since the various definitions and models of sustainability include economic, environmental, and social factors (Elkington, 1994; United Nations, 1997), companies need to shift from focusing strictly on environmental factors to more holistic reports that include all three factors to a greater degree. Despite having sustainability reports, companies along the agriculture and food supply chain had low scores in all areas of the TBL model; mean scores for each company were less than 50% of the total possible points for each area. Additionally, agri-food supply chain companies only attained 20.2% of the total points possible using the scorecard. This finding aligns with the initial research using the GRI scorecard instrument where each of the companies analyzed scored less than 20% of the total points available (Morhardt et al., 2002). The current study and the initial study suggest there is a “tremendous gap between what large companies think is appropriate to report and what is hoped for by the Global Reporting Initiative” (Morhardt et al., 2002, p. 225). The results of this study indicated some significant differences in sustainability reporting between input suppliers and food manufacturers, as well as between input suppliers and retailers. However, there was no significant difference in mean scores for sustainability reports between food manufacturers and retailers. Specifically, in the areas of general, economic, and total scores, input suppliers had significantly higher mean scores than both food manufacturers and retailers.

These results suggest that there is some difference in sustainability reporting among companies in the agricultural supply chain. Specifically, input companies in this sample have stronger sustainability reports in the general and economic areas compared to other segments. Despite having relatively low scores, input companies in the sample have the strongest sustainability scores overall as total scores for input companies are significantly higher than both food manufacturers and retailers. By identifying which industry sector excels at sustainability reporting in terms of both prevalence of reporting among companies in the sector and the comprehensiveness of reporting of companies in that sector, as indicated by sustainability scores, other companies can begin to identify the types of information to include in sustainability reports. Beyond looking at the reports from input suppliers, companies should consider the recommendations from sustainability reporting guidelines and report information that specifically addresses sustainability indicators. The lack of significant difference between environmental and social scores among industry segments suggests that companies along the agriculture and food supply chain are fairly consistent in reporting information related to these areas. The consistently higher environmental scores is likely due to companies having the most experience and familiarity with reporting environmental information (Kolk, 2008). However, despite having the most experience reporting this information, it is surprising that, on average, companies only received 20.1% of the total environmental points possible. Conversely, the relatively new addition of social components in sustainability reports (Kolk, 2004) suggests that companies lack experience reporting social information, which provides support for the consistently low scores for agribusinesses in the area of social performance, with agribusinesses only receiving 12.4% of the total possible points in the social category. These results suggest that even though companies provide a consistent level of reporting related to environmental and social performance, there is an opportunity for increased, more thorough and in-depth reporting of information related to specific indicators for both performance areas. Additionally, the relatively low scores in the social category also may suggest a lack of familiarity with social elements as part of sustainability. This study provided exploratory details regarding sustainability reports from companies involved in the agri-food supply chain. Given the large size and complex nature of the agricultural supply chain, this study paints a small picture of sustainability reporting in the agricultural industry. Descriptive analysis of the data collected suggests that sustainability reporting is lacking by agricultural companies, specifically from companies involved in the manufacturing and retail sectors. Although the literature suggests that an increasing number of companies are publishing sustainability reports, the results of this study suggest that sustainability reporting is not a priority, in terms of both quantity and quality of published reports, for all companies along the agricultural supply chain.

Additionally, while a growing number of reports include economic, environmental, and social information, the results of this study show that companies put the strongest emphasis on environmental information; this is likely because initial non-financial reports were strictly environmental reports (Kolk, 2003; Sridhar, 2012). However, with 14 of the 16 (87.5%) companies including information in all three areas (economic, environmental, and social), this research provides support for the literature that shows an increasing number of reports that are no longer strictly focused on the environment. Although it appears companies along the agri-food supply chain have not holistically embraced sustainability reporting, this does not mean the industry has not made strides to improve sustainability activities. However, it does reveal that an emphasis has not been placed on highlighting sustainability activities with a non-financial report. With a growing number of consumers concerned about agricultural sustainability (BASF, 2014), companies should consider the potential benefits of sustainability reporting.

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