

LOCALIZATION OR STANDARDIZATION?
A COMPARATIVE ANALYSIS OF MULTINATIONAL AGROCHEMICAL CORPORATIONS'
ENVIRONMENTAL DISCLOSURE PRACTICES IN INDIA

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Author's Declaration

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Abstract

Localization or Standardization? A Comparative Analysis of Multinational Agrochemical Corporations' Environmental Disclosure Practices in India

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This thesis research seeks to provide insight into the corporate environmental disclosure practices of multinational agrochemical parent corporations, their public subsidiaries in India and domestic Indian agrochemical corporations. The study analyzes whether environmental disclosure practices are more strongly influenced by country-of-operation or country-of-origin. These analyses use a recently developed content analysis instrument named consolidated narrative interrogation (CONI), which is capable of measuring the diversity, quantity and quality of environmental disclosures.

Results indicate that the quantity, quality and diversity of Indian agrochemical subsidiaries' corporate environmental disclosures are more similar to domestic Indian companies than their parent companies. These results may be explained by the institutional theory. The results of this study are of significance because they provide evidence that multinational corporations may not transfer their environmental disclosure practices to host countries. Instead, environmental disclosure practices of subsidiaries are localized to their host country and are not standardized with parent company practices.

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1.0 Introduction

Over the past 50 years, as the media has documented a series of disasters caused by the lack of environmental, health, and safety standards of individual companies, awareness and concern relating to the operations of agrochemical industry has spread throughout the world. Within a relatively short period of time, there were multiple cases of industrial disasters. One of the most widely referenced industrial catastrophes is the Union Carbide pesticide plant explosion in Bhopal, India, which on December 3, 1984 killed between 7,000 and 10,000 people in the first three days (Sheoin, 2009) and injured over 120,000 others (Browning, 1993). This catastrophe has been attributed to lax environmental, health and safety regulations within the chemical industry. The Bhopal disaster made the general population aware of corporate activities in developing countries, while also providing activists and NGOs with a strong narrative against careless corporate behaviour.

In fact, for decades, the chemical industry has been at the center of environmental concern, as observed best in Rachel Carson's "Silent Spring" (1962). Here, Carson highlighted the negative environmental impacts of agricultural chemicals by detailing how bioaccumulation of DDT, and other pesticides, led to a drastic reduction in numbers of fish-eating birds. The public's concern regarding the environmental, health and safety impacts of agrochemical companies continues to exist today. This concern has been addressed, by corporations and industry associations, through the development of environmental management systems (EMS), like the Responsible Care® standard, and environmental reporting practices. However, even with established environmental initiatives, the agrochemical industry continues to negatively impact the environment through non-point source pollution causing ground water contamination (Eke et al., 1996), nitrate leaching, eutrophication (Ritter et al., 1995) and endocrine disruption (Falconer et al., 2006). Broader examples of environmental impacts include: the release of emissions to air, water and land; excess energy and water usage; and the destruction of biodiversity and natural habitats due to the clearance of land for agricultural operations (BASF Annual Report, 2010).

The public scrutiny that the agrochemical industry has historically received (and continues to receive) is just one example of the many industries whose reputations have been tarnished due to the negative environmental and social impacts of their operations. Over time, companies have realized that their operations must consider and address stakeholder concerns; this realization has led to the increased use of EMS and environmental disclosures amongst corporations (Wilmshurst & Frost 2000). A thorough literature review reveals that there is minimal available research that compares the environmental disclosure practices of multinational corporation's (MNCs) subsidiaries operating in developed and emerging economies, nor has any research compared the environmental disclosure practices of local Indian companies and MNC subsidiaries. Most research remains Western country-specific and focuses on comparing environmental disclosure and reporting practices between companies from differing industries (Langer, 2006; Chatterjee & Mir, 2008; Uwalomwa & Uadiale, 2011). In addition, although CSR has become an increasingly important component of agrochemical business operations, research comparing the environmental disclosure practices specifically amongst agrochemical firms has been minimal.

1.1 Reasons for Research

This research was influenced by the "world's worst industrial disaster" (Varma & Guest, 1993), the historic Bhopal explosion which occurred in India's Madhya Pradesh region between December 2 and 3 in 1984. The release of methyl isocyanate and other chemicals originated from the Union Carbide India Ltd pesticide plant, a subsidiary of Union Carbide Corporation (Varma & Guest, 1993). The explosion was caused by corporate negligence and a lack of environmental, health and safety regulations present at the Indian subsidiary's plant (Walters, 2009). The Bhopal disaster drew attention to the activities of foreign countries in developing and emerging economies (Sheoin, 2009). Without heightened local stakeholder pressure, or strict government regulations and industry standards in India, companies were able to operate in India at reduced costs by neglecting environmental, health and safety concerns (Sheoin, 2009). The Bhopal

disaster “exposed the environmental fragility of companies as well as differential environmental behaviour of multinationals” (Sahay, 2004, p. 16). Although international outrage brought increased attention to Union Carbide, it will be interesting to determine if multinational agrochemical chemical companies operating in India have truly learned from the Bhopal disaster. Have foreign subsidiaries brought their established home-country environmental reporting practices to India? Or, do they continue to take advantage of India’s low-level of environmental awareness (Jalan et al., 2009) by reducing their level of environmental initiatives, programs and reporting at their Indian subsidiaries? Although it is difficult to examine the environmental performance and practices of said companies, corporate environmental disclosures (CEDs) provide insight into whether parent companies transfer a component of their environmental activities, corporate environmental reporting across national borders. Therefore, this research examines CED reporting practices in order determine whether parent companies transfer their best CED practices to their Indian subsidiaries. This will provide insight into the CED behaviour of multinationals in an emerging economy, as well as, the importance that these multinationals place on environmental issues.

Similar to Momin’s (2006) research, this study was conducted due to “the concern about the growing power of MNCs [and] their social responsibility...in a lesser developed country (LDC)” (p. 2). The lack of environmental concern by large MNCs and their subsidiaries in LDCs is an issue that has been previously researched (Donaldson & Preston, 1995; Donaldson & Dunfee, 1994) but it has not been thoroughly examined in the Indian national context. Following the Bhopal disaster, the United Nations reassessed their policies and eventually added an additional and separate item to the Commission on Transnational Organization’s agenda: transnational companies and issues related to the environment (Levy, 1995). This illustrates that the issue of environmental impacts in LDCs is important. Using content analysis, Momin’s (2006) dissertation research compares the nature and quality of CSR disclosures found in MNC’s annual reports of foreign subsidiaries in Bangladesh with the CSR disclosures of UK MNCs. This research will seek to do the same, but focus instead on the Indian

context. Similarly, this study uses a recently developed content analysis method, named Consolidated Narrative Interrogation (CONI), to compare the quantity, quality and diversity of environmental disclosures found in both annual reports and separate sustainability reports of MNCs foreign subsidiaries in India, the parent companies of those same MNCs and local Indian companies.

An additional impetus for the research conducted here is to contribute to the literature empirically by providing an analysis of CED behaviours in a region that has been relatively neglected in the research up until this point: India. As an emerging economy, India will continue to play a large role in the growth of the global economy. However, in a country with relatively lax environmental regulations and fines, economic growth could prove extremely detrimental for the environment. Being that developed countries have established environmental regulations, pollution release inventories, strong corporate watchdogs and strict fines for non-compliance, companies located in this region are conscious of environmental issues. However, this may not necessarily be the case in India. This research will provide insight into Indian CED practices, which are oftentimes reflective of corporate environmental behaviour and the importance that is placed on environmental issues by top management.

This research is underpinned by institutional and legitimacy theories, which have shown in previous research (Christmann, 2004; Dasgupta et al., 2000) that foreign subsidiaries' corporate environmental disclosures are more strongly influenced by country-of-operation than country-of-origin. The study's primary objective is to evaluate whether the corporate environmental disclosures of multinational agrochemical companies' Indian subsidiaries are more similar, in quantity, quality and diversity to domestic Indian agrochemical companies or their parent companies. The research will seek to highlight what types of environmental disclosures are more similar between parent and subsidiaries and what types of environmental disclosures are more similar between subsidiaries and domestic Indian companies.

A secondary aim of this research is to determine if corporate environmental disclosures have changed in quantity, quality and diversity over the 10-year sample

period. The purpose of the longitudinal component of the study is to examine whether the foreign subsidiaries changes in corporate environmental disclosures are standardized with parent companies' changes or localized to domestic Indian companies' changes.

The final objective of this study is to analyze whether the quantity, quality and diversity of corporate environmental disclosures are larger for parent multinationals, who operate in developed economies, than their Indian subsidiaries and domestic Indian companies, who operate in an emerging economy. The researcher will seek provide insight, using the institutional theory and previous corporate environmental disclosure research, into reasons for differences and similarities that may exist between parent companies and their Indian subsidiaries.

2.0 Literature Review

This chapter outlines the history of corporate environmental disclosure practices by first defining the term and then providing a description of the various types of disclosures. This is followed by a brief history, which outlines the development of CEDs. The review then covers the theoretical frameworks for CEDs, which include legitimacy, stakeholder and accountability theory. Following this, an overview of the Global Reporting Initiative is provided, outlining the history of the organization's development. In Reasons for Reporting and Report Users, the motivations and stakeholders to the CED process are described in detail. This chapter then provides a detailed background into the previous CED research conducted.

The literature review then extends to provide an overview of India and its environmental regulations. This is followed by a discussion of literature focused on multinational corporations and international business theories. Finally, gaps in current CED knowledge are identified. This chapter will provide the reader with a thorough understanding of corporate environmental reporting research and corporate environmental disclosure practices of multinational companies.

2.1 Corporate Environmental Disclosures (CEDs)

Research indicates that over the past two decades, there has been an increase in the number of companies that provide information to their stakeholders about their environmental and social performance (Kolk, 2004; Jose & Lee, 2007; Deegan & Gordon, 1996). Friedman (1970) once theorized that the only role of business is to maximize its profits for shareholders. This doctrine not longer holds true and, therefore, many researchers have further examined role of corporate social responsibility, social disclosure, and environmental disclosure (van der Laan, 2009).

2.1.1 What are Disclosures?

Corporate environmental disclosure (CED) can be defined as “those disclosures that relate to the impact companies have on the physical or natural environment in which they operate” (Wilmshurst & Frost, 2000, pg. 161). Araya (2006) defines disclosures as “the revelation of information to external audiences (NGOs & regulators) and internal audiences (employees)” and the “public release of sensitive information” (p. 88). Araya (2006b) classifies CEDs into the following seven categories:

- 1) *Disclosures in accordance with environmental regulations:* These CEDs include any disclosures that result from mandatory reporting regulations/requirements and can include the following: environmental impact assessments (these are often limited to facilities and domestic operations), national pollution or toxic release inventories and energy usage disclosures.
- 2) *Disclosures in accordance with securities law:* These are CEDs that follow accounting law. An example of this type of disclosure is the SEC environmental liabilities and compliance reporting requirements. The main audiences of these CEDs are shareholders and/or investors.
- 3) *Voluntary CED in Annual Reports:* These CEDs can include information about environmental management systems and outcomes, environmental programs, environmental initiatives, emissions, and environmental policies amongst others. The main audiences of these CEDs are external stakeholders such as government agencies, multilateral organization, NGOs and the public. Some companies limit this type of CED to discussion of their parent companies while others discuss their worldwide activities (Araya, 2006b).

- 4) *Voluntary CED in Separate Reports:* These CEDs are released in the form of stand-alone environmental reports, CSR reports or sustainability reports and information can include, but is not limited to, the following: environmental policies and goals, EMS, emissions, environmental initiatives and energy usage. Often, large companies publish these reports annually for external stakeholders.
- 5) *External disclosure to voluntary programs:* These CEDs are in line with the specific voluntary environmental program adopted. For example, Responsible Care®, Sustainable Forestry Initiative, Global Reporting Initiative and/or Global Compact. The companies that choose to adopt these voluntary environmental management schemes and programs must provide reports to the governing bodies of these organizations.
- 6) *External Disclosures in Other Media:* These CEDs include any environmental information released on websites, press releases, videos, staff newsletters and other media.
- 7) *Confidential Disclosures:* These CEDs are not released to the public but are provided to banks, insurers and joint-venture partners in order for companies to identify, and discuss how their environmental aspects and risks are managed.

Note that corporate environmental reporting (CER) is a type of disclosure that can be internal or external (Araya, 2006b). External corporate environmental reports tend to be public, but some are confidential, such as those made to regulatory bodies and shareholders.

2.1.2 A Brief History

Lin's (2008) literature review of historical environmental and social accounting practices indicates that some companies began disclosing both social and environmental information to their stakeholders in the early 20th century. In Western societies during the 1950s and 1960s, the public's expectations of corporations changed quite significantly. The public was not only concerned with the products and services that companies provided, but also with their social and environmental impact (Lin, 2008). In fact, the origins of sustainability reporting began with the emergence of "modern corporations" and the growth of knowledge related to their activities (Buhr, 1999).

The overall popularity of social accounting first rose in North America and Europe during the 1970s with the production of social and corporate citizen reports, which focused on human rights issues, employees and products. Ernst & Ernst's (1972) groundbreaking series of studies between 1972 and 1978 indicate that nearly 90% of the Fortune 500 firms disclosed some form (albeit in a small volume) of social and/or environmental information by 1978 (Lin, 2008). The early 1980s saw the emergence of voluntary "Environmental, Health & Safety (EHS)" Reports (Araya, 2006b). For the most part, large MNCs in environmentally sensitive industries produced these EHS reports (Araya, 2006b). These reports were a mechanism for companies to maintain societal legitimization and restore public trust following the negative publicity they may have had following industrial disasters. Companies operating in the oil and chemical industries tended to be early adopters of CED practices because these industries were faced with increased scrutiny over their negative environmental impacts, specifically, their role in large industrial disasters, such as Exxon Valdez and Bhopal.

During the late 1980s and 1990s there was a significant growth in popularity of environmental reporting by companies operating in the U.S. and UK (Harte & Owen, 1991, Lin, 2008). As identified by Araya, (2006b) this growth was assisted by two important historical events. The first event occurred in 1987 with the United Nation's Brundtland Commission's definition of "sustainable development" and their argument for the production of sustainability reports (Schmidheiny, 1992, p. 94). The second event

followed the Exxon Valdez spill in 1989, when the Coalition for Environmentally Responsible Economies (CERES) launched the Valdez Principles. These ten environmental principles introduced a simple set of CED guidelines and required signatories to report on their compliance (Lin, 2008).

The first stand-alone environmental report was published in 1989 by Norsk Hydro, a Norwegian oil, energy and aluminum firm (Brophy & Starkey, 1998; SustainAbility et al., 1996). Norsk Hydro was also the first company to produce and verify a stand-alone environmental report at the subsidiary level – for Norsk Hydro UK (Araya, 2006b). BASF, a company included in this study's research's sample, followed closely behind Norsk and also published its first environmental report in 1989 (Araya, 2006b). At the same time, Dow Chemical released a statement declaring that, "the environment is the single most important thing facing the company" (Araya, 2006b p. 27). The company subsequently began including CEDs in their annual reports. Union Carbide, the company at the center of the Bhopal disaster also recognized the necessity of disclosing environmental information and therefore, published its first environmental report in 1991 (Araya, 2006b).

It should be noted that due to its connection with the historical Bhopal disaster, the chemical industry has always been closely intertwined with the development of voluntary and mandatory CED practices. In fact, the chemical industry assisted with the growth of corporate environmental awareness when the Chemical Industry Association of Canada created and launched their beyond compliance, voluntary industry-wide program, Responsible Care® in 1985 (Delmas & Toffel, 2008). This program is still active with signatories agreeing to improve environmental and safety performance of their operations. Currently, the program has spread to more than 50 countries and participants are recognized by their stakeholders as leaders in the area of environmental protection.

It was the occurrence of another chemical accident, this time in West Virginia, that prompted the U.S. government to create a mandatory system of environmental information disclosure, the Toxics Release Inventory (TRI) in 1986 (Araya, 2006b).

Another important development in CER occurred in 1992, when ten leading North American corporations (including the agrochemical giants Dow and Dupont), created the Public Environment Reporting Initiative (PERI). PERI developed detailed guidelines for CED practices that were used into the mid-1990s (Araya, 2006b). This provides evidence that, motivations for CEDs stemmed partly from mandatory environmental disclosure systems, like TRI, and partly from voluntary guidelines, like PERI, developed during this time.

Although there was increasing awareness of CED throughout the 1970s and 1980s, the true growth in CED practices has occurred in the last 25 years following the rapid increase in CER seen in the 1990s (Parker, 2005). During the 1990s, the majority of companies published self-laudatory qualitative CEDs that lacked quantification or comparability (White, 1999). Additionally, most of the disclosure found in separate reports focused on environmental themes over social issues (Kolk, 2004). In fact, environmental issues continue to be a dominant theme in current stand-alone sustainability reports today (Lin, 2008). As CED practices became more popular, concerns were raised about the comparability of reports and disclosures (Gilbert et al., 2011). Therefore, certain interested parties decided to create the Global Reporting Initiative (GRI), an international global reporting platform. Additionally, popular environmental management systems (EMSs) like the European Union's Eco-Management and Audit Scheme (EMAS) and ISO 14001 and international organizations like, UNEP/SustainAbility and the Global Compact, offer guidelines for environmental reporting (Gilbert et al., 2011). The GRI is not the only CED framework, but is perhaps the most important and significant to this research.

Significant developments in CED frameworks in the early 2000s increased the quality and rigor of CEDs and instead of disclosing minimal amounts of data, companies now chose to adopt best practices. White (1999) describes this trend as a "race to top" versus a "race to the bottom." In fact, companies can now be acknowledged for their CED practices via awards such as the European Environmental Reporting Awards, Corporate Register Awards and CERES-ACCA Reporting Awards. Along with voluntary

developments in CED practices, there have also been regulatory developments that outline laws and guidelines in the area of corporate reporting. An overview of these various regulations and guidelines is provided in Table 1. This table is adapted from Harvard's Institute of Responsible Development (2012). Being that this study examines companies operating and/or headquartered in India, Germany, Switzerland and the U.S., only these countries were included in this table. Data regarding Switzerland's mandatory and stock exchange initiatives were not provided by Harvard's Institute of Responsible Investment and therefore the country was omitted. Table 1 illustrates that there are mandatory and voluntary mechanisms unique to national contexts that exist to encourage increased environmental disclosure. It is important to highlight that stock exchange initiatives have emerged in recent years in India, but Germany does not have any country-specific stock exchange initiatives.

The existence of mandatory environmental disclosure regulations means that companies who did not previously report environmental information will increase their quantity of environmental disclosures due to regulatory pressure (Frost, 2007). This is highlighted by research conducted by Frost (2007), who found that upon introduction of a mandatory environmental reporting requirement in Australia, named the s. 299(1)(f), companies who previously did not disclose any environmental information disclosed, for the first time, information related to their environmental performance. Additionally, Kolk et al.'s (2001) research, which compares the CEDs of company's operating in different national contexts, indicates that companies who operate in countries with strict mandatory environmental disclosure requirements, tend to have a higher quantity of CEDs than companies operating in countries with lax environmental reporting requirements.

Country	Environmental Disclosure Efforts Made by Governments	Stock Exchange Initiatives	Voluntary Initiatives
Germany	<p>2004: Companies are required to report on key financial and non-financial indicators that materially affect the company.</p> <p>2002: Pension fund trustees must inform beneficiaries how ecological, ethical and social needs have been considered in investments.</p>		<ul style="list-style-type: none"> • Global Reporting Initiative • Global Compact • Responsible Care • EMAS • ISO14001 • ISO 2600
India	<p>2009: Voluntary guidelines for CSR are issued.</p> <p>2008: The Companies Act suggests that board of directors' reports shall contain information on conservation of energy.</p> <p>1986: Specified corporations shall submit an annual pollution audit to the State Pollution Board.</p>	<p>2012 The Bombay Stock Exchange launches GREENEX</p> <p>2011: The SEBI suggests that listed companies report on Environmental, Social and Governance (ESG) initiatives.</p>	
U.S.	<p>2010 Large emitters of GHG are to collect and report data with respect to their greenhouse gas emissions.</p> <p>2002: When certifying annual and quarterly reports, public companies must disclose of environmental information that affect asset values. (i.e. SEC requirements: regarding environmental liabilities and legal action).</p> <p>1986: The EPA and individual states are required to collect and publicized data on releases of certain toxic chemicals from industrial facilities (Toxic Release Inventory).</p>	<p>1999 Dow Jones Sustainability Indexes are launched to track the performance of the leading sustainable companies worldwide.</p>	

Table 1. Environmental Disclosure Initiatives in Germany, India and the U.S. (Harvard's Initiative for Responsible Investment, 2012)

**Being that this thesis research examines companies operating and/or headquartered in India, Germany, Switzerland and the U.S., only these countries were included in this list. Data regarding Switzerland was not provided.*

This brief history has revealed that over time, CER has become increasingly common for public companies in developed economies. The emergence of CER is evaluated not only by shareholders but also by external accounting companies who research CED practices and offer accounting, auditing and assurance practices to companies seeking to obtain third party assurance (KPMG, 2011). In fact, KPMG has become a leader in researching companies' CED practices by offering a series of detailed surveys every three years. These international surveys focus on the CED practices of large corporations (KPMG, 1993, 1996, 1999, 2002, 2005, 2008, 2011) and tally the quantity of disclosures in order to highlight leading and lagging companies and countries. However, it must be remembered that just because there has been growth in the reporting of environmental information and research of CED practices, does not necessarily mean that reporting companies are improving their environmental performance. In fact, King and Lenox (2000) indicate that without explicit sanctions, environmental reporting is not an incredibly effective mechanism for improving environmental performance of reporting companies.

This section has provided a simplified historical overview of the development of CED practices. This review indicates that although mandatory reporting requirements have stimulated environmental disclosure either directly or indirectly, voluntary CER has increased. In fact, voluntary disclosures, like those first seen by Norsk Oil in 1989, provide information to stakeholders in order to maintain legitimacy (Kolk, 2008).

2.1.3 Theoretical Background, Motivations, Costs & Benefits

This section outlines the various theoretical perspectives used to explain motivations for CER practices. Legitimacy theory will be discussed first, followed by stakeholder and accountability theory. These theoretical perspectives are commonly used by researchers to better understand CED reporting practices.

Being that the bulk of CEDs examined in this study are voluntary, it is important to understand the underlying theoretically perspectives, motivations, costs and benefits

associated with voluntarily disclosing environmental information. The theoretical literature for CED focuses on socio-political rationales more commonly than strict economic explanations (Araya, 2006a). Although CED scholars use differing theories to describe CED practices the overall consensus is that, “although legal compliance is an important component of corporate legitimization, it is not, the only source” (Araya, 2006b p. 105). Araya (2006b) believes that companies operate in systems with “open and porous” organizational boundaries and therefore, external pressures can impact the firms' disclosure processes.

The disclosure of environmental and social information is motivated by a variety of external and internal factors and over the, “past 30 years, empirical researchers investigating corporate social and environmental reporting have explained results using the stakeholder, legitimacy and accountability theories” (Joshi & Gao, 2009, p. 29). These theories play an important role in developing a comprehensive picture of CED practices because businesses do evolve within a broader society with various political, social, economic, and institutional frameworks (Patten, 1992a; Gray et al., 1995a; Deegan et al., 2002). Firms that fail to comply with environmental regulation or that have poor environmental performance records risk reputational damage if they do not report environmental information to stakeholders (Brammer & Pavelin, 2008). However, with that being said, it is often non-compliant firms that take a reactive position to CEDs. Therefore, proactive companies, with favourable environmental performance may seek to distinguish themselves from their non-compliant counterparts by readily disclosing environmental information (Brammer & Pavelin, 2008). A survey completed by KPMG (2005) indicates that economic considerations, ethical considerations, innovation and learning, are key drivers of MNCs’ widespread CED practices. A more recent KPMG study (2011) cites innovation and organizational learning are key motivators for corporate responsibility reporting.

2.1.3.1 Legitimacy Theory

Legitimacy theory advocates that, “businesses operate in society via an expressed or implied social contract upon which their survival and growth are dependent” (Uwalomwa & Uadiale, 2011, p. 259). A social contract is an association that people and organizations freely enter in order to improve the overall wellbeing of society (Cormier & Gordon, 2001). Many researchers agree that legitimacy is the dominant theory responsible for influencing corporate social and environmental reporting (Hogner, 1982; Wilmshurst & Frost, 2000). Ensuring and maintaining legitimacy amongst stakeholders is especially important for companies with a high degree of environmental sensitivity and social impact; therefore, these companies are more likely to use environmental and social reporting in an effort to legitimize their corporate activities (Sahay, 2004, p. 18).

This is illustrated nicely by Patten’s (1992) study on legitimacy, which examines petroleum firm’s environmental reporting disclosures following the Exxon Valdez oil spill. Patten’s research concludes that, “at least for environmental disclosures, threats to a firm's legitimacy do entice the firms to include more social responsibility information in its annual reports” (Patten, 1992, p. 475). Williamson and Lynch-wood (2008) indicate that environmental reporting remains a corporate strategy used to rationalize a company’s existence by influencing or manipulating society’s perceptions of legitimacy gaps. In environmentally-sensitive industries, a failure to address environmental and social issues can lead to negative public perceptions, government regulation and/or financial sanctions (William & Lynch-wood, 2008). A striking example of this is the Canadian asbestos industry, which continues to receive harsh criticism due to its perceived lack of concern for human health and the environment (Tilling, 2004). For negatively perceived companies and industries, environmental and social disclosures may be used as a mechanism to re-establish or maintain a favourable reputation, which is an essential component of a firm’s competitive advantage (Wilmshurst & Frost, 2000).

2.1.3.2 Stakeholder Theory

Stakeholder theory is aligned with, and complementary to, legitimacy theory (Deegan, 2002) as it plays a role in ensuring legitimacy by “managing its stakeholders” (Gray et al., 1997, p.333). Stakeholders are defined by Freeman (1999, p. 46) as, “any group or individual who can affect or is affected by the achievement of the organization’s objectives.” A firm’s stakeholders can include, shareholders, employees, customers, society, suppliers, lenders (Kolk, 1999) and more according to many (Carroll, 1991; Delmas & Toffel, 2004). Increasingly, companies are remaining accountable to their stakeholders by managing, and reacting to, expectations through corporate communication and disclosure of information (Guthrie & Parker, 1989; Patten, 1992; Wilmshurst and Frost, 2000). Studies confirm that not only do various stakeholders demand environmental disclosure from companies, but they can even play a pivotal role in shaping the development of disclosure policies (Deegan & Blomquist, 2006; Eljido-Ten et al, 2010). This research indicates that a company’s existence depends heavily upon the support of stakeholders, and therefore, it is a manager’s responsibility to develop relationships with, and deliver value to, all stakeholders (Joshi & Gao, 2009). Environmental disclosures can create a competitive advantage by improving relationships with stakeholders, while also improving a firm’s reputation (Cormier & Magnan, 1999). It is important to note, that not all stakeholders rely upon the same communication tool to obtain details about corporate environmental performance; for that reason, companies must tailor formats and media of environmental disclosure to the preferences of each identified stakeholder group.

2.1.3.3 Accountability Theory

Accountability theory acts in concert with both stakeholder and legitimacy theories. It is based on economic agency theory, which posits that external stakeholders maintain an agency relationship with business, or agents, by allowing them to perform a service and make decisions (Jensen & Meckling, 1976). This means that business is held

accountable by society for, “maintaining acceptable social and environmental outputs, methods and goals” (Joshi & Gao, 2009, p. 28). Therefore, businesses may react by disclosing corporate social and environmental information. With this theory, these disclosures can be motivated by legal or normative conditions and beliefs (Likierman & Creasey, 1985).

Accountability theory is concerned the stakeholders “right-to-know,” meaning that business (the one who is accountable) is required to provide public information that explains or justifies their actions (Gray et al., 1995a). Under accountability theory, CED is determined by the power of the external stakeholders to, “demand it and/or the willingness of the organization to provide it” (Joshi & Gao, 2009, p.28) and is driven by a firm’s desire to “create an impression of sensitivity to important non-market influences that may be in the long-term interest of the shareholders” (Belkaoui and Karpik, 1989, p. 39). This theory also states that patterns of disclosure will differ between industries, with the expectation that environmentally sensitive industries will provide more CED than other industries (Joshi & Gao, 2009). This parallels research completed by Patten (1992), which concludes that firms with high environmental impacts (chemical, oil, forest and paper products) and a high public visibility, as determined by revenue, disclose more social and environmental information to stakeholders. These theoretical perspectives underpin the bulk of CED research and the CED practices of organizations are often driven by one, or more, of these theories.

2.1.4 The Global Reporting Initiative

The Global Reporting Initiative (GRI) offers a common framework in order to facilitate the comparability of environmental reports (White, 1999). CERES launched the initiative in 1997 with the goal of increasing the “quality, rigor and utility of sustainability reports” (Araya, 2006b, p. 56). With the GRI guidelines, companies are encouraged to disclose the following information related to environmental performance: materials, energy, water, biodiversity, emissions, effluents and waste, suppliers, products and services, compliance, transport and overall performance (Araya,

2006b). However, it must be noted that the GRI guidelines do not just recommend that companies disclose environmental information but social and financial environmental as well. In fact, it advocates for true “triple bottom line reporting.”

These guidelines were created following a stakeholder engagement process that included over 30 companies and 2,500 individuals from over 65 countries (Global Reporting Initiative, 2002). The GRI’s first sustainability guidelines were made available in 1999 and the third, most widely used version, in 2006 (Kolk et al., 2010). Credibility is achieved through external verification by accounting professionals using the GRI official verification statement (Pleon, 2005). However, although the GRI has increased in popularity, analysts argue that the framework is problematic because it is too general to meet sector-specific reporting needs, specifically in industries where CED practices are mature (Farneti & Guthrie, 2009). Additionally, although the GRI framework encourages the improvement of environmental performance, the organization does not assure the performance is actually improving.

2.1.5. Reasons for Reporting and Not Reporting

In order for companies to be motivated to disclose environmental information, the actual and perceived benefits of disclosing must outweigh the actual and perceived costs of disclosing, as well as, the benefits of non-disclosure. The most widely cited benefits and goals of, and reasons for, disclosing environmental information have been gathered here from previous literature:

- Gaining a competitive advantage – cost savings identification, enhanced efficiency, increased business development opportunities and improved employee morale (Kolk & Pinkse, 2005)
- Ability to track progress against specific environmental goals (Kolk & Pinkse, 2005)
- Improved corporate reputation and brand image (Solomon & Lewis, 2002)
- Legitimization of corporate activities, products and services (Beck et al., 2010)
- Benchmarking against competitors (Solomon & Lewis, 2002)

- Increased transparency, accountability and credibility (Toms, 2002)
- Greater awareness for environmental issues within the organization (Solomon & Lewis, 2002)
- Ability to clearly and concisely convey the corporate message externally and internally (Kolk & Pinkse, 2005)

In contrast, the most widely recognized reasons for non disclosure of information include the following factors gathered from Araya's (2006b) research :

- Competitors are not disclosing environmental information
- Monetary costs are too high
- Company is not a member of a highly-polluting (environmentally sensitive) industry (Patten, 1992)
- Stakeholders are not interested in the environmental information
- Existing positive reputation regarding environmental issues
- Difficulty collecting consistent and reliable information across operations
- Potential for information to have negative legal implications or ruin the company's reputation
- Difficulty deciding what information to disclose and who to direct this information towards

In terms of monetary costs, Araya (2006b) indicates that the cost of producing a separate environmental report ranges based on company size, the scope of the report and the geographical location. However, on average, the cost to produce such reports is \$300,000 USD with costs reaching as high as \$3,000,000 USD for some large multinationals, which require verification and assurance (Araya, 2006b). For companies operating in developing and emerging economies, the cost of production tends to be lower.

2.1.6 Report Users & Relevant Stakeholders

A challenge for companies wanting to disclose environmental information is what audience(s) focus on. These audiences can also be referred to as stakeholders or “users” as they are indeed the readers of environmental reports (Araya, 2006b). Companies must ensure two things, the first is that they report information to users that value CEDs, and the second is that the disclosed data is of value. Therefore, they must ensure to identify key stakeholder groups and then inform these groups about environmental issues to secure legitimization of corporate activities. Deegan and Rankin (1996) provide the following definition for “users” of annual reports and CEDs:

[Users of annual reports include] equity investors, creditors, employees, analysts/advisers, business contact groups, government and the public. The public was deemed to include taxpayers, ratepayers, consumers and other community and special interest groups such as political parties, consumer and environmental protection societies and regional pressure groups (p. 564)

Jose & Lee (2007) indicate that stakeholders have an expectation for environmental disclosure and therefore, companies must ensure that they provide sufficient environmental information to ensure that an expectation gap does not exist. The investment community has become an increasingly important user of environmental reports (Araya, 2006b) but this community oftentimes disregards “soft” disclosures that lack a financial component. Pleon (2005) found that financial community also likes to see information that outlines the business case for adopting environmental programs. However, most companies have not included this information for investors (Pleon, 2005).

2.1.7 The Importance of CEDs

KPMG’s (2011) study indicates that corporate social and environmental reporting has, “become virtually mandatory for most multinational companies, regardless of where they operate around the world” (p.6). Hence, companies that are not currently

reporting on environmental and social activities are under significant pressure to start their bottom lines. This is especially true for companies with a global presence, because it will help them stay competitive which, in the long-term, will positively impact their bottom lines (KPMG, 2011). Stakeholders now demand that CEDs go beyond legal compliance and therefore, this demand motivates companies to include information about product impacts, biodiversity, climate change and commitment to multilateral environmental agreements (KPMG, 2011). CEDs allow for stakeholders to gauge the environmental activities, proactivity and behaviours of companies. Corporate environmental information may include issues concerning environmental compliance, environmental management, climate change and related risks, emissions, waste treatment and recycling (Lin, 2008). Companies can include CEDs in annual reports and financial reports or they may wish to draw attention to their commitment to environmental issues by issuing stand-alone environmental reports often called “Corporate Social Responsibility Reports” or “Sustainability Reports” (Lin, 2008). However, even with increased number of stand-alone reports, when examining global CED practices, the annual report is still the key medium corporations use to disclose environmental information to investors (Araya, 2006a).

CED has become an important global issue, as illustrated at best by the \$3,000,000 grant the United Nations Foundation provided to the GRI (Solomon & Lewis, 2002 p. 155). The reason(s) for environmental reporting vary between firms and can be attributed to, a strategic decision made by management, a component of a wider environmental management system, and/or purely a communication tool (Kolk, 1999). Environmental disclosure can be either mandatory or voluntary in nature; and unlike most emerging economies, many developed economies require that companies operating in certain industries publically disclose information regarding waste toxicity, pollution levels and energy usage (Kolk, 1999). An example of a mandatory disclosure mechanism in Canada is the National Pollution Release Inventory, which provides emission and release information for key pollutants and toxins (Dasgupta et al, 2002).

Although legal requirements for CED offer a good foundation for voluntary disclosure practices, these requirements still remain very narrow in operational and geographical scope by oftentimes focusing on parent companies without extending to foreign subsidiaries (Araya, 2006a). For example, disclosure requirements like toxic release inventories, emissions trading, greenhouse gas (GHG hereafter) and environmental liabilities are often present in developed economies (the North America or Europe) but not in emerging or developing economies (Araya, 2006b). In fact, historically, the scope of CED research has focused on developed economies and/or large MNCs headquartered in countries with established environmental regulations i.e. Australia, Canada, the U.S. and European countries (Rizk et al., 2008). This focus does not mean that CEDs are immaterial to emerging economies. In fact, for both emerging and developed economies, CED “plays an important role in terms of economic prosperity, environmental sustainability and social stability”(Lin, 2008 p. 3). CED is an important global issue as indicated by the recent incorporation of corporate social responsibility and transparency aspects into development policies of the World Bank and United Nations (Lin, 2008). Therefore, over the past 10 years CED scholars began to pay more attention to emerging economies. However, overall it has been observed that institutional factors in emerging economies vary from those in developed economies and therefore, the CEDs in emerging and developing countries may not be similar to those commonly disclosed in developed economies (Lin, 2008).

2.1.8 Types of Corporate Environmental Disclosures

Using an input-output model, Araya (2006b) outlines the three types of CEDs that companies can disclose to internal and external stakeholders. Araya notes that the four possible types of CEDs must be presented via indicators, otherwise known as measures of performance, for a particular period. Indicators can either be environmental performance data regarding a company’s operations (input data, data about the production process, data about outputs) or information about a company’s management system. The four types of CEDs are shown in Table 2 and have been

adapted from Araya's (2006b) dissertation research. This table outlines the four categories that environmental disclosures may be classified. Table 2 shows that CEDs regarding inputs include Includes information about the consumption of products. Additionally, CEDs about the production process Include information about operations, management, legal and financial aspects. CEDs classified as outputs include Information about products and byproducts and CEDs about other environmental information can include information related to awards and certificates.

2.1.9 Previous CED Research

This section provides an overview of previous research focused on the analysis of CEDs. The four main areas of CED research are identified and then an overview of the relevant research focused on these areas is provided. This section provides an examination of the results of studies which have examined the relationship between CEDs and financial performance, the medium of disclosure, contextual and firm factors and environmental performance.

An extensive review of CED literature indicates that there are four main areas of interest within CED research. The first area deals with the impact of CEDs on a firm's stakeholders and financial performance (Mandula, 2005; Nieminen & Niskanen, 2001). The second area of research focuses on the medium in which environmental disclosure takes place. For example, many studies research the use of annual reports as a medium of environmental disclosure (Langer, 2006; Uwuigbe & Uadiale, 2011), while others detail the use of company websites and promotional materials (Davis & Searcy, 2010; Jose & Lee, 2006; Joshi & Gao, 2009). The third area of research focuses on the impact of external factors and internal firm factors on the content (quantity and quality) of CEDs; this research often draws upon comparative analysis between companies or industries (Chatterjee & Mir, 2008; Langer, 2006). This third area of research is of particular interest as it is the focus of this study. The final area of research examines the relationship between CED practices and environmental performance, often searching for correlations between disclosure and performance (Magness, 2006).

Types of CED	Details	Example from Annual Reports & Environmental Reports
Inputs	<ul style="list-style-type: none"> • Energy • Raw Materials • Toxic or dangerous substances • Water • Operational Materials 	“Overall, Bayer’s water consumption fell by 13.2 percent in 2011 compared to the previous year” (Bayer SD Report, 2011 p. 62)
Production Process	<ul style="list-style-type: none"> • Environmental Management Systems • Liabilities • Environmental, Health & Safety (EHS) Issues • Environmental costs • Legal Compliance • Environmental Policies • Reporting Guidelines • Supply chain 	“All units of the Company are certified for OHSAS-18001 and ISO-14001 and maintaining the standards with regular review at various levels and aligning the system with the Company’s Enterprise Process Management” (Rallis Annual Report, 2011, p. 28)
Outputs	<ul style="list-style-type: none"> • Contents and transport • Emissions to air, water and land • Waste • Noise and odours • Product life cycle impacts 	“In 2009, emissions to air in BASF’s chemical operations worldwide totaled 31,300 metric tons (2008: 36,500 metric tons)” (BASF Annual Report, 2009, p. 100)
Other Environmental Aspects	<ul style="list-style-type: none"> • Certification programs • Environmental awards • Sustainability issues (forward-looking information and policy stances) 	“Syngenta is included in two leading financial indices that measure the way companies contribute to sustainable development: the Dow Jones Sustainability Indices and the FTSE4Good*” (Syngenta CSR Report, 2006, p. 4)

Table 2. Types of Corporate Environmental Data (Adapted from Araya, 2006b)

*FTSE4Good is a series of ethical investment stock market indices launched in 2001 by the FTSE Group

These four areas are described, with examples from the literature, in more detail in this section. Many large companies rely on the use of environmental reporting frameworks when measuring environmental information and disclosing this information to their stakeholders. These frameworks reduce the uncertainty surrounding questions of “what to report?” and “what information do stakeholders value?” while also

increasing the credibility and comparability of CEDs over time and between companies. Reporting frameworks like GRI, AccountAbility 1000, UNEP/Sustainability, Tomorrow magazine, and Deloitte Touche Tohmatsu have two functions; one, they can be used as a model for standardized reporting and two, they can also act as a ranking, and/or content analysis coding tool for researchers who wish to evaluate a company's CEDs.

Environmental reporting and disclosure is important within the agrochemical industry because this sector is environmentally sensitive and remains under the scrutiny of civil society (Sahay, 2004). Adoption of environmental management systems and disclosure practices amongst large, highly visible MNCs is important for this industry because research indicates that the public does not discriminate between the environmental activities of individual companies; therefore, the reputation of the agrochemical industry, as a whole, is the main determinant of the public's opinion for individual companies (Moffet et al, 2004). Without a favourable perception, companies will be subject to scrutiny from external stakeholders, which could lead to the development of more stringent government regulations.

2.1.9.1 Previous CED Research: Impact on Financial Performance

Certain CED studies have examined the impact that CEDs have on a company's financial performance (Nieminen and Niskanen, 2001; Mandula, 2005; Stanwick & Stanwick, 2000). The goal of this research is to examine whether firms, that have a higher quantity and quality of CEDs, will also have a superior level of financial performance. This research is based on claims such as Dechant and Altman's (1994), which indicate that a competitive advantage can be created by improved environmental performance and by developing relationships with environmentally focused stakeholders. Basically, the goal, of studies focused on this CED aspect, is to find whether increased environmental responsiveness and disclosure creates a competitive advantage that leads to increased profit for companies.

Belkaoui conducted a study in 1976 that examined the stock market impact of environmental responsiveness, which is defined as the disclosure of environmental

information. His results indicate that firms who disclose more information yield higher stock market returns than firms who did not disclose environmental information. These results support evidence that CEDs can improve a company's reputation and lead to improved relationships with investors and bankers (Orlitzky, 2003). This improved reputation and relationship can attract better employees (Greening & Turban, 2000) and facilitate access to capital that then improves financial performance.

Other researchers have indicated that no significant relationship exists between increased CEDs and financial performance (Chen & Metcalf, 1984; Freedman & Jaggi, 1986). Murray et al.'s (2006) research examines the CED practices of large UK firms and compares this information to stock market returns. The results of this study indicate that no direct relationship exists between the quantity level of CEDs and stock returns. However, the longitudinal data from this study do indicate that there may be some sort of relationship between consistent high performance on the stock exchange and inclination for disclosing a high quantity of environmental information. Ullmann (1985) argues that most studies focused on CEDs and financial performance use ineffective methods, which produce measurement errors; therefore, results have become inconsistent and lack credibility. In response, Orlitzky et al. (2003) use meta-analysis to statistically aggregate the results of over 50 CED-financial performance studies. The results of this study indicate that higher environmental disclosures and better environmental performance is associated with improved accounting-based measures of financial performance.

Other studies have examined the impact that high financial performance has on environmental disclosure practices (Cormier & Magnan, 1999; Freedman & Jaggi, 1988, 1992; Neu et al., 1998). Magness' (2006) study examines the relationship between CED practices in the mining industry and financial performance following an environmental accident. Her results indicate that financial performance does not appear to impact CED content following an environmental accident. However, these results do show that highly visible companies tend to disclose more environmental information than less

visible companies. Overall, this research indicates that no direct correlation has been found between CED practices and a firm's financial performance.

2.1.9.2 Previous CED Research: Medium of CEDs

CED research indicates that the annual report remains the main medium for disclosure of environmental information (Damak-Ayadi, 2010; Gamble et al., 1996; Momin, 2006; Neu et al., 1998; O'Donovan, 2002; Tilt, 2001). However, large MNCs may often publish environmental information separately in a stand-alone environmental report (Sutantoputra, 2009). Tilt (2008) indicates that although the subject of "where" a company should report their environmental information is an interesting one, it has not received a lot of attention in CED research. Zeghal and Ahmed (1990) and Unerman (2000) indicate the need to include a variety of communication outputs in CED research, besides the annual report, when examining the sustainability reporting of corporations. Zeghal and Ahmed's (1990) research examines the CEDs made by Canadian companies in mass media, such as radio, corporate brochures, magazines. Their results indicate that companies use mass media extensively to disclose environmental information. However, this information tends to be narrow in scope and lack quantification. Interestingly, Branco and Rodriguez (2006) indicate that the choice of the medium is indicative of the target audience and, therefore, different mediums will disclose different types of environmental information. In fact, results of their study indicate that companies with higher environmental impacts will disclose more environmental information in their annual reports.

Companies are increasingly using their corporate websites to disclose environmental information because this information can be updated easily and it not as costly to produce as other media (Davis & Searcy, 2010; Jose & Lee, 2006; Joshi & Gao, 2009). In fact, previous studies have shown that there are differences in the type, quantity and quality of CEDs commonly found on websites and those in annual reports (Williams et al., 1999, Villiers & Staden, 2011). Villiers and Staden's (2011) research found that when in an environmental crisis, such as an oil spill, firms disclose more

environmental information on their websites. However, when faced with a negative environmental reputation, they disclose more information in annual reports. Another study that compares websites and annual report usage for CEDs is Suttipun and Stanton (2012) who use content analysis to determine if any difference exists between CED content on Thai company websites and annual reports. Their results indicate that in the sample, more companies (96%) disclose CEDs in their annual report than on their websites (88%). Jose and Lee's (2006) study examines the CEDs on the websites of the top 200 global corporations. Their results indicate that CEDs on websites are popular amongst companies in their sample group. In fact, they found that disclosure of CEDs related to EMS, pollution and environmental policies were commonly found on company websites.

Other studies have examined the importance of sustainability reports in CED practices. Langer (2006) uses content analysis to explore the CEDs present in sustainability reports. The results indicate that Austrian sustainability reports include a large quantity of CEDs than MNCs but, Langer suggests that initiatives be developed in order to standardize the information presented in these reports because there is a large variety of disclosed information. Boysen's (1997) thesis research examines the GRI-based CEDs in sustainability reports and finds that in 2007 CER had low level of environmental indicator data and high levels of social information. Therefore, he recommends mandatory GRI assurance for all companies that use the reporting framework.

Overall, this short review of the CED literature indicates that more companies are using alternative mediums to disclose environmental information to their stakeholders. The various media target different stakeholders and therefore, the CED presented in each of the mediums will be slightly different from CEDs found in alternate disclosure media.

2.1.9.3 Previous CED Research: General Contextual and Firm Factors

There is an extensive amount of literature that examines the impact that firm-specific factors and other general contextual factors have on CED practices (Al-Tuwaijri et al. , 2004; Brammer & Pavelin, 2008; Branco & Rodriguez, 2008; Brown & Deegan, 1998; Choi, 1999; Cormier et al. , 2004; Cormier & Magnan, 1999, 2003; Deegan et al., 2002; Deegan & Gordon, 1996; Freedman & Jaggi, 2005; Gray et al., 1995a, 2001; Hackston & Milne, 1996; Holland & Foo, 2003; Hughes et al., 2001; Patten, 1992, 2002; Sahay, 2004; Stanny and Ely, 2008). Many of these studies are comparative and compare company and national CED practices to one another. In this section the main factors analyzed in “General Contextual and Firm Factor” CED research will be discussed.

Company Size

When companies are visible to external stakeholders, such as the media, customers, governments and NGOs, they are targets of increased scrutiny (Araya, 2006b). Therefore, CED researchers have tested the impact that visibility – often determined by number of employees and/or market capitalization – has on CED quantity, quality and content. Many researchers have determined that CED practices are positively associated with the size of a company. Therefore, large, highly visible companies tend to have a higher quantity and quality of CEDs than small, less visible companies (Al-Tuwaijri et al., 2004; Brammer & Pavelin, 2008; Choi, 1999; Cowan et al., 1987; Deegan & Gordon, 1996; Freedman & Jaggi, 2005; García-Sánchez, 2008; Gao et al., 2005; Gray et al., 1995b; Haddock-Fraser & Fraser, 2008; Hackston & Milne, 1996; Patten, 1992a; Stanny & Ely, 2008).

Cowan et al.’s (1987) study examines the relationship between firm size and the content of CEDs. The results of this research indicate that firm size is associated with an increase the quantity of some categories of CEDs, such as those focused on environmental issues and energy, but does not necessarily impact all of them e.g. product disclosures. Cowan et al. indicate that this may be explained by the fact that large companies have more shareholders and stakeholders who are be concerned with

the number of environmental programs that a company is actively using. Brammer and Pavelin (2006) use regression analysis to examine the impact that a variety of firm-specific factors have on CED practices. Their results indicate that the quality of disclosures is positively correlated with firm size, which is a representation of the amount of environmental impact a company can have. These results parallel Cormier and Magnan's (2003) research, which finds that larger Canadian companies tend to report more environmental information than smaller companies. Overall, this research indicates that large highly visible companies disclose more environmental information than smaller less visible companies.

Financial Factors (Profit, Leverage, Stock Exchange Membership)

The majority of studies indicate that there is only a weak association between a company's profitability and its level of CEDs (Choi, 1999; Hackston & Milne, 1996; Moneva & Llana, 1996; Stanny and Ely, 2008). Other studies have found that a positive relationship between profitability and CED practices (Li & McConomy, 1999; Neu et al., 1998). Joshi and Gao's (2009) research results are in line with results obtained by Roberts (1992) and Parsa and Kouhy (2008). Joshi and Gao (2009) examine the impacts that a variety of firm-specific factors have on CED practices of MNCs. Their results indicate that profitability is strongly associated with increased quantity of CEDs. This may be because profitable firms use positive CEDs to create a positive brand image. Cormier and Gordon's (2001) study examines another financial factor, leverage (debt to equity ratio). They seek to discover whether there is a relationship between corporate leverage and CEDs. The results indicate that there is a negative relationship between corporate leverage and CEDs. This is because with more debt, companies do not use their limited resources to produce environmental reports. Additional financial research has examined the influence of stock market exchange membership on the level of CEDs (Hackston & Milne, 1996; Moneva & Llana, 2000; Monteiro & Aibar-Guzmán, 2010). Results of these studies have been mixed and do not indicate a direct relationship between stock exchange membership and level of CEDs. The past research conducted

on this topic reveal that a company's financial factors can have varying degrees of influence on their CED content, quality and quantity.

Industry Membership

Research that examines the impact that industry membership has on CED practices has found that companies from environmentally-sensitive industries disclose more environmental information than companies from less sensitive industries (Brammer & Pavelin, 2008; Campbell, 2003; Cho & Patten, 2007; Deegan & Gordon, 1996; Gao et al., 2005; Hackston & Milne, 1996; Haddock-Fraser & Fraser, 2008; Moneva & Llana, 1996). Certain studies have found a strong association between industry membership and quantity and quality of CEDs (Gamble et al., 1996; Oyelere et al. 2003). Campbell's (2003) research uses content analysis to examine whether a companies' "environmental sensitivity" impacts their CED quantity. Companies were grouped into "high sensitivity" and "low sensitivity" groups and results indicated that companies in high sensitivity industries, such as those in the chemical industry, disclosed more environmental information than companies in low sensitivity industries such as the retail industry. This supports Adams et al.'s (1998) suggestion that environmental disclosures are of greater relevance to some industries. For example, remediation activities and sustainability of activities are more important to companies who produce or use large quantities of natural resources. Joshi and Gao's (2009) study on CED practices of MNCs also indicates that industry membership impact CED practices strongly. By grouping sample group companies into "manufacturing" and "services" groups results indicate that manufacturing group companies disclose more environmental information than those classified as service companies. This short review indicates that industry membership is an important indicator of a company's CED practices. However, this research will not be of direct impact to this study because all sample companies are members of the same, environmentally-sensitive, agrochemical, industry.

Country Effect (Country-of-Operation and Country of Origin)

Previous research has shown that there are clear differences in sustainability reporting practices in different national contexts. In fact, data from KPMG's (2005, 2008, 2011) international survey indicates that MNCs from developed countries are the leading producers of environmental reports. Dammak's (2009) study analyzes the annual reports of 72 MNCs and finds that European companies report more information than American companies. These results illustrate that a company's nationality, geographic location, and the number of countries, defined as the degrees of internationalization, in which a company operates are positively associated with an increase in CEDs. Although American companies were subject to more mandatory disclosure requirements, European companies operate in an environment with environmentally conscious consumers and therefore, this also impacted the CED practices. Dammak's conclusion is supported by Bichta's (2003) results, which indicate that the national culture and socio-economic values influence Greek firms' environmental behaviour and CED practices.

Chappal and Moon's (2005) research shows that MNCs are more likely to disclose more environmental information companies that operate in just one country. Additionally, results of their study find that MNCs CED practices are likely to resemble the reporting practices of the country-of-operation instead than reporting practices in their country-of-origin. Araya's (2006a) study on CED practices in Latin America draws on research from Kolk (2005) and Adams et al. (1998) to examine the impact that country-of-origin has CED practices. She hypothesizes that CEDs will be higher for Brazilian companies, where sustainability reporting is increasingly popular, than companies from Mexico or Chile. Her results support her hypothesis, while also adding that companies with high degrees of international sales are more like disclose environmental information

Additionally, Adams (2004) determines that country-of-origin and operation are two factors that play a large role in determining the nature and extent of disclosures. However, the results of Adams' study show that is difficult to draw conclusions about these two factors due to the intertwined social, political and economic factors, also

referred to as institutional factors, that impact companies' behaviours. Adams et al. (1998) studied the CED practices of companies in France, Germany, the Netherlands, Sweden, Switzerland and the United Kingdom. The results of this study indicate that when controlling for internal company factors, CED practices still differ across each of the six national contexts. The reasons for these differences are complex and draw from the institutional theory. Overall, it is accepted that country-of-origin and country-of-operation are two institutional factors that can shape a company's CED practices. Araya (2006b) states that "it is the mix of regulatory pressures, government encouragement and political action" (p. 99) that influences a firm's decision on what, and how much environmental information to report.

Other: Impact of Ownership Structure and Adoption of EMSs

Although scarce, certain studies have examined the relationship between ownership structure and CED practices (Rizk et al., 2008). Rizk et al.'s (2008) study examines the relationship between corporate ownership structures of Egyptian companies and their CED practices. The results of this study indicate that private companies disclose more information than government owned entities (public companies were not included in this sample). Momin's (2006) dissertation research examines the differences between parent MNCs and their Bangladeshi subsidiaries. The results of this study indicate although MNCs own foreign subsidiaries, the CED practices of these companies more closely parallel domestic Bangladeshi companies than their parent companies. This indicates that institutional factors appear to be more important in CED strategy development than foreign association.

Another interesting line of research examined by CED scholars is the impact that adoption of EMS, specifically ISO 14001 and EMAS, may have on the quantity and quality of CEDs (Llenva & Moneva, 2000; Mitchell & Hill, 2009; Sumiani et al., 2007). Results of such research generally indicate that ISO 14001 and EMAS increase the quantity of CEDs. This is because, EMSs tend to include guidelines for environmental

disclosure processes and require that certified companies produce environmental reports (Mitchell & Hill, 2009).

2.1.9.4 Previous CED Research: Environmental Performance

The final area of CED research examines the relationship between CEDs and environmental performance (Ingram & Frazier, 1980; Patten, 2002; Wiseman, 1982). Patten's (2002) study inspects CEDs made in the annual reports of 131 US companies for the year 1990. This data are then compared with environmental performance information based on the TRI. The results of this research illustrate that CED practices do not necessarily encourage companies to improve their environmental performance. Instead, companies with a negative environmental performance tend to report more CEDs. This may be due to an effort to curb negative publicity and remain legitimate. Wiseman's (1982) study is widely referenced in CED literature being that it compares CED practices of highly sensitive industries to environmental performance information issued by the Council of Economic Priorities (CEP). Wiseman calculated a total CED score and when this score was compared to environmental performance data; it appeared that no relationship existed between these variables. In fact, throughout the bulk of environmental performance research, there have been no statistically significant relationships found between CED practices and environmental performance (Freedman & Wasley, 1990; Fekrat, et al, 1996; Hughes et al, 2000; 2001; Ingram & Frazier, 1980).

2.1.10 CED Practices in Developing Countries and Emerging Economies

Although CED in developed economies is a subject that has been highly researched (Campbell, 2004; Harte & Owen, 1991; Jose & Lee, 2007; Thompson & Cowton, 2004), little attention has been paid to emerging economies. This leaves a large gap in current CED knowledge, especially since emerging economies will likely play an increasingly important role in the global economy in the coming years. This gap illustrates the need for the research conducted in this study. In order to provide a background of CED research in emerging economies, this section will provide a short

overview of some important CED studies focused on developing and emerging economies.

The economic significance of emerging economies has increased rapidly over the past 15 years. Now, many of these emerging economy countries contribute significantly to global economic growth. Initially, sustainability reporting was restricted to large industrialized OECD countries. In fact, it was not until recently that sustainability reporting and CED gained popularity in emerging economies (Muller & Kolk, 2009; Preuss & Barkemeyer, 2011). This is because, now, corporations in emerging and developing economies are increasingly held responsible for environmental impacts and sustainability issues such as environmental proactivity, waste management and resource depletion (Mian, 2010).

As highlighted in Preuss and Barkemeyer's (2011) study, the literature focused on corporate social responsibility (CSR) in emerging economies can be broadly placed into two themes. The first theme indicates that CSR, in emerging economies, is not a new concept because in these countries, there have historically been a focus on the role and impact that business has on the society. This focus is particularly prevalent in countries, such as India, wherein philanthropy is a large part of the country's cultural and religious fabric (Preuss & Barkemeyer, 2011). However, traditional CSR in emerging economies focused primarily on philanthropic and human resource issues without much mention of environmental or sustainability issues (Preuss & Barkemeyer, 2011).

The second theme shows that the CSR priorities set by companies operating in emerging economies differ from those seen in developed economies (Chappal & Moon, 2005). This difference has been attributed, by researchers, to unique institutional factors, differing investor behaviour and accounting standards (Rizk et al., 2008). Additionally, certain studies have identified various factors that influence CED practices; these factors include country-specific environmental legal frameworks (Gray et al., 1995a; Guthrie & Parker, 1990), the maturity of environmental reporting (Peiyuan, 2005; Thompson, 2002), or the emphasis on specific sustainability-related aspects in a given context (Chen & Bouvain, 2009; Hackston & Milne, 1996; Kolk, 2005b).

Over the past 10 years, CED research focused on the BRICS (Brazil, Russia, India, China and South Africa) emerging economies and developing countries has become increasingly popular, due in some part to the increased amount of environmental reporting by both domestic companies and foreign-owned subsidiaries in BRICS countries. Momin's (2006) literature synthesis indicates that CSR broadly, and CED research specifically, is a less organized activity in emerging and developing economies, with companies operating in these locations exhibiting an overall lower quantity of CEDs. The lower quantity of CEDs and absence of developed CED practices in emerging economies has been linked to the lack of environmental technology (Christmann & Taylor, 2001), greater importance of social issues like corporate corruption (Singh & Zammit, 2004), and weaker systems for implementation (Muller & Kolk, 2009) in these locations. Kolk et al. (2008) indicate that the recent growth in awareness of environmental reporting in lesser-developed countries (LDCs) can be partially attributed to government support, increasing media attention and available environmental guidelines in native (and local) languages.

However, it should be remembered that the emerging market context is deemed to be a distinct setting for CSR and environmental issues because of the differences in value systems and cultural contexts in each of these countries (Muller & Kolk, 2008). In recent years, awareness of environmental problems, like pollution, has grown in emerging economies. An example of this growing awareness was highlighted in a 2007 report published by the Chinese government, which pointed to the premature deaths caused by pollution and toxins (Kolk et al., 2008). Even further, the Asian Development Bank recently stated that protecting the environment is not at odds with promoting economic growth and development (Suttipun, 2012). The growth of environmental regulations in BRICS countries indicates an acknowledgement, by government, of the negative environmental impacts caused by companies. However, oftentimes these regulations are ineffective at improving environmental performance because sanctions are not sufficient to curb harmful behaviours (Kolk et al., 2008). The overall growth in environmental awareness in LDCs illustrates that emerging and developing-economy

focused CED research is important. Being that many MNCs operate in these locations, research is timely not just for developing and emerging country companies, governments and stakeholders, but also for stakeholders in developed societies (Gray & Kouhy, 1993).

Rizk et al. (2008) contribute to the developing economy CED research by examining the CED practices of 60 companies operating in Egypt in 2002. This research uses content analysis in order to code social and environmental disclosures made by firms in the following highly polluting industries such as, food, beverage and tobacco, ceramics, chemicals, cement, pharmaceuticals, construction, utilities and mills. Results indicate that when disclosing environmental information, developing country companies tend to focus on CEDs related to energy conservation and recycling instead of emissions data. Additionally, 94 percent of these CEDs were qualitative in nature, thereby, lacking comparability and benchmarking capabilities. This was found to be a function of the lack of government regulations and CED reporting frameworks provided to companies in these countries. Suttipun and Stanton's (2012) study also uses content analysis to inspect the CED practices in the annual reports of the companies listed on the Stock Exchange of Thailand. The researchers used "word counts" as the content analysis coding recording unit, allowing the authors to determine the quantity of CEDs and the location of these disclosures in annual and stand-alone sustainability reports. Results indicated that high profile companies preferred to include more CEDs on their websites than annual reports and in contrast, low profile companies included more CEDs in their annual reports than websites. The most common CED categories were environmental spending, waste management and environmental policy. By comparing CED practices of various industries in Thailand, the results allowed Suttipun and Stanton to provide insight into the CED practices in Thailand, a developing economy.

Another previous study, Mahadeo et al. (2011), uses a longitudinal study to determine the impact that firm-specific factors, i.e. leverage, size, profitability, industry differences, may have on corporate responsibility disclosure practices of companies in a developing African economy, Mauritius. All companies listed on the Stock Exchange of

Mauritius were included in this sample and using data coded from annual reports from 2004-2007, the researchers were able to analyze CED practices of domestic companies. The goal of Mahadeo et al.'s study was to observe the evolution of CED practices over the 4-year sample period. Their findings indicate that overall, both the number of companies who disclose environmental information and the quantity of CEDs increased substantially over the 4-year period. Additionally, researchers found that the pattern of increase differs significantly from the evolution of CED practices in other developing economies (Belal, 2001; Haniffa & Cooke, 2005; Ratanajongkol et al., 2006). However, like many other developing nation-focused studies, Mahadeo et al. (2011) found that overall, there was a lower interest in reporting environmental information and instead, the majority of CSR disclosures were focused on social or humans resources aspects (Villiers & Van Staden, 2006; Imam, 2000). Researchers also found that, like Suttipun and Stanton (2012), large companies had a higher volume of CEDs than small companies. This means that firm-specific factors may have an impact on the CED practices of companies' operating in LDCs.

Pruess and Barkemeyer (2011) compare the CEDs from Russian firms to companies operating in developed countries and other emerging BRICS countries. The purpose of this research is to determine whether CED practices in emerging economies are similar to the practices seen in developed countries. Their results indicate that distinct differences exist between the CED content in developed countries versus emerging economies. The results of the research conducted by Pruess and Barkemeyer (2011) indicate that emerging economy countries have been very enthusiastic about the adoption of sustainability reporting, particularly in line with the GRI standards. India and Korea are two newly industrialized countries that have high levels of environmental disclosure that follows the GRI G3 guidelines (KPMG, 2011). In fact, the percentage of companies that report environmental information in line with G3 guidelines is higher in these countries than other industrialized nations (Pruess & Barkeymeyer, 2011). Therefore, it is evident from this research that a clear North-South differences exist in the CED practices of companies.

Other research has highlighted additional observations about environmental activities and CED practices in developing markets. Similar to the research conducted in this thesis research, Mian's (2010) research examines CEDs in Pakistan's agrochemical (fertilizer) industry. Mian's (2010) results indicate that CER is a relatively new concept in Pakistan and although environmental regulations exist at a national context, there is no national accounting standard that outlines the importance of reporting environmental information to stakeholders. Araya's (2006b) dissertation research examines the CED practices in numerous developing and emerging Latin American markets. She is interested in determining where, in Latin America, companies disclose the highest quality, transparent environmental information. Her results indicate that Brazil is the most advanced country in reporting detailed environmental information to their stakeholders. Results also indicate that a growing south-south gap exists in the "incidence and quality of environmental reporting in Latin America" (Araya, 2006b, p. 3), with Mexican practices lagging significantly behind those in Chile and Brazil. Interestingly, Araya's research also discovers that not only does industry-of-operation impact a company's CED practices but country-of-origin and international sales orientation may also greatly impact the quantity and quality of CED practices. Overall, companies from the U.S. and Europe are less likely to disclose environmental information than Brazilian companies. Furthermore, companies with high levels of global sales orientation are almost 4.7 times more likely to disclose high-quality CEDs (Araya, 2006b).

In developing and emerging economies, domestic companies do not have the same stakeholder pressure as MNCs (who have international pressure) and therefore, it makes sense that the concept of CED (and CED practices) will differ between domestic companies and MNCs (this is explained in more detail in Section 2.3). Although the research discussed here provides some insight into the CED practices in developing and emerging economies, it is apparent that research focused on CED reporting practices in developing and emerging economies still remains relatively limited with inconclusive results.

2.1.11 CED Practices in India

For centuries, business in India was conducted with little, or no, concern for the environment (Govind, 1989). In fact, the lax environmental and safety regulations and standards have attracted subsidiaries of MNCs who may wish to reduce the costs associated with environmental regulations in their home countries (Dasgupta et al., 2002). However, over the past two decades, with the opening of the Indian economy and economic deregulation, India has seen increased concern and awareness for environmental issues (Bhate, 2002). The policy framework for environmental protection in India includes the following: National Conservation Strategy on Environment and Development (1992), Policy Statement for the Abatement of Pollution (1992), National Forest Policies (1988), and the National Agenda for Governance (1998) (Chatterjee & Mir, 2006). The regulatory environment is explained in more detail in Section 2.2.1.

The National Agenda for Governance is a national policy, which seeks to balance India's economic development with environmental protection (Das, 2009). Chatterjee and Mir's (2006) Indian-based CED research indicates that environmental disclosure practices are now common in Indian industries with high environmental impacts. Additionally, although the Indian government has not yet made environmental disclosures mandatory, large firms view disclosure and reporting practices as a necessity in order to compete with international competitors (Chatterjee & Mir, 2006). The growing importance of CEDs in the Indian national context was recently made apparent when the Bombay Stock Exchange's (BSE) launched their first energy efficiency index, the GREENEX (Patil, 2012). The GREENEX is a measurement of company performance based on energy efficiency and carbon emissions. Even further, India's National Stock Exchange (NSE) has adopted the S&P's ESG Index (environmental, social and governance), which provides investors with information regarding the top 50 performing stocks, as determined by ESG parameters.

KPMG's famed CED survey first included India, as a country of interest, in its most recent 2011 report (KPMG, 2011). This indicates that environmental issues in general, and CEDs in particular, are becoming increasingly important for businesses

operating in India. However, KPMG's (2011) researchers do note that much work exists in the area of CEDs in India being that only a small percentage of the companies operating in this region disclose environmental information to their stakeholders (KPMG, 2011). In fact, KPMG's (2011) study indicates that India still lags behind the majority of developed countries with only 20 percent of companies reporting on environmental and social issues. Being that CED is still in its nascent stage in India, little research has focused on the content, extent and/or quality of environmental reports in various Industries. Most of India's public companies do not have sustainability reports, and those that do, focus on qualitative data without detailing quantitative measures of waste reduction pollution, and/or emissions (Baxi & Ray, 2009).

Of the top 100, based on revenue, Indian companies included in KPMG's 2011 study, only 16 percent have a corporate responsibility strategy in place. However, of the firms who do have CED practices and reports, 52 percent seek third-party verification and assurance from global organizations such as GRI (KPMG, 2011), this percentage is higher than the global average of 46 percent. The reason that such a high proportion of Indian companies seek third-party verification arises from the desire to enhance credibility, quality and reliability (KPMG, 2011). This parallels the desire amongst Indian companies to obtain ISO 14001, and other EMS certifications (Malarvizhi & Yadav, 2012). Oftentimes, downstream buyers and international clients require these EMS certifications. Therefore, this certification allows for companies to access to the environmentally conscious European and North American markets (Nishitani, 2010).

Companies in developed nations are legally obligated to disclose certain environmental information in line with guidelines and frameworks, e.g. SEC regulations regarding toxic releases and environmental liabilities. In contrast, India lacks strong CED regulations and therefore CED practices are, for the most part, voluntary in nature (Sen et al., 2011). The mandatory and voluntary environmental reporting requirements of interest to this study are outlined in further detail in Table 1. This information allows for comparison of the various CED practices and illustrates that there are much less required CED practices in India than in developed economies. Indian companies are

required to disclose environmental information related only to conservation of energy and beyond that, the government only provides weak suggestions for disclosure of additional environmental information in annual reports.

The regulatory framework that governs corporate disclosure practices in India includes the following: The Companies Act, 1956 (now known as Companies Amendment Act, 2002); The Securities and Exchange Board of India (SEBI) Amendment Act, 2002 and the Indian Accounting Standards (Sen et al., 2011). The Ministry of Environment and Forest requires that companies in polluting industries submit an environmental statement to the Pollution Control Board (Sen et al., 2011). However, this information is not made publicly available to company stakeholders. Perhaps the most important reporting regulation for this study is India's Companies Amendment Act, (2002), which requires that within their annual reports, all Indian companies disclose information related to their "Energy Usage and Conservation" (Singh, 2007). However, besides this "Energy Usage and Conservation" requirement, none of the other frameworks included in Table 1 legally require companies to disclose additional environmental information in their annual reports. Therefore, when Indian companies go beyond compliance, reporting of information related to their environmental aspects and performance in their annual reports is a voluntary action.

Although there is no strong legal framework surrounding CEDs in India, some government agencies and industry groups have provided suggestions and proposals relating to Indian companies' CED practices. The Ministry of Environment and Forest (1991) released the following advice:

Every company shall in the report of its Board of Directors disclose briefly the particulars of steps taken or proposed to be taken towards adoption of clean technologies for prevention of pollution, waste minimization, waste recycling and utilization, pollution control measures, investment on environmental protection and impact of these measures on waste reduction, water and other resource conservation. (Sen et al., 2011, p. 140)

Additionally, the Institute of Chartered Accountants of India (ICAI) decided to adopt the International Financial Reporting Standard (IFRS) (Sen et al., 2011). There is potential that the convergence of India's accounting standards with IFRS will assist in providing guidelines regarding CEDs and sustainability reporting to Indian companies (Sen et al., 2011). The ICAI also set up a committee in 2008 to further research various aspects of environmental reporting and accounting (Chatterjee & Mir, 2008). At the same time, the Ministry of Corporate Affairs also pledged its support to assist in the development of sustainability reporting guidelines (Chatterjee & Mir, 2008). Unfortunately, since this time, there has been little progress on the development of a sustainability-reporting framework by the ICAI or the Ministry of Corporate Affairs.

The Ministry of Corporate Affairs released National Voluntary Guidelines on the Social, Environmental and Economic Responsibility in July 2011 (GIZ, 2012). These guidelines were created in assistance with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), a German organization dedicated to international cooperation related to sustainable development. GIZ's research indicates that there is a growing concern of environmental and sustainability issues in India and that sustainability reporting is becoming increasingly important in the Indian context. Yet, they found that in India, there is still a lack of government environmental initiatives like environmental impact assessments or validation of disclosures (GIZ, 2012). This is explained by Araya's (2006b) research, which shows that in countries with lower standards of living and overall economic wellbeing, citizens are less concerned with environmental issues. The lack of CED validation in India raises concerns about the credibility and validity of CEDs found in Indian companies' annual and stand-alone environmental reports (GIZ, 2012).

Although environmental reporting is still in its infancy in India, there are a few detailed studies that examine CED practices in India (Hedge et al., 1997). Singh and Ahuja conducted the first Indian CED study in 1983. In fact, not only was this the first study focused on India's CEDs, but it was also the first CED study conducted in the context of a developing country that was published in an international journal, the International Journal of Accounting (Belal, 2000). This study examined social and

environmental disclosures in 40 of the public sector companies' annual reports (for the year of 1976). These data were then analyzed to see if firm-specific factors (company age, size and profitability) impacted the quantity of disclosures. In order to identify the status of CED practices, Sen et al.'s (2011) pilot study uses content analysis to compare the CEDs across four core sector Indian industries — petrochemicals, steel, cement and mining. These industries have high environmental impacts and therefore, are under increased pressure from government organizations to disclose environmental information. Results indicate that almost all of the 22 sample companies disclose environmental information in the director's reports and/or chairman's reports. The results also show that popular CED categories include conservation of natural resources, compliance with environmental standards, environmental policies, awards for environmental protection, and adoption of environmentally friendly technology. However, Sen et al. (2011) finds that these CEDs are, "incomplete more qualitative and provide inadequate disclosure" (p. 153) and therefore this study recommends that in the future, Indian companies disclose more meaningful, quantitative information to their stakeholders. Sen et al. (2011) also believe that a reporting framework can assist companies in reporting credible environmental information to their stakeholders.

Similar to the above study, Chatterjee and Mir's (2008) research indicates that most of the CEDs made by Indian sample companies are qualitative in nature. Their research also uses content analysis to compare the CED practices (in annual reports and websites) of 39 Indian companies from a variety of industries. Their results provide interesting insight into the differences in CEDs on websites versus annual reports. For example, out of the entire sample, oil and gas companies have the lowest number of CEDs (by volume) on their websites but the highest in their annual reports. However, the sample companies disclose more environmental information on their websites than in their annual reports. Chatterjee and Mir (2008) determine that although CEDs are not mandatory for Indian companies, most firms provide CEDs to their stakeholders in order to maintain and/or improve their corporate image.

Using a case study approach, Baxi and Ray (2009) find that the majority of established listed Indian companies do not have a stand-alone environmental report and, for those that do, these reports are more qualitative than quantitative in nature. Being that there are no governmental requirements for environmental reporting, the Indian companies that are reporting are often adopting the GRI guidelines and obtaining third-party assurance. Baxi and Ray (2009) find that a limitation of social and environmental reporting is the assumption, made by some Indian companies, that the general population is illiterate and not educated enough to understand CEDs. Therefore, when CEDs do exist, the content is directed at international stakeholders, government bodies, NGOs and multilateral institutions.

In another Indian-focused study, Dutta et al. (2011) highlights the importance of the Kayamayog CSR Rating in India. This rating agency provides an annual review and ranking of CSR initiatives of the Top 500 Indian companies. In addition, their research also points out, similarly to Baxi and Ray's (2009), the growing importance and popularity of the GRI G.3 guidelines in India. In fact, according to their research, CED in India can take the form of GRI reporting, satellite reporting, sustainability reporting and/or internet reporting (Malarvizhi & Yadav, 2009). Overall, the growing popularity of CEDs in India can be linked to the increased number of companies who include environmental practices into their operations. A 2001 survey conducted by India's Business Today magazine and The Energy Research Institute found that,

[M]ore than 75% of the sample had environmental policies; about 70% have environmental audit systems; 60% had an environmental department; and four out of every 10 Indian companies had form ISO 14001 certification (Malarvizhi & Yadav, 2009 p. 212)

This is very interesting because it shows the desire by Indian companies to implement environmental practices. Based on CEDs found on the websites of Indian companies, Malarvizhi and Yadav (2009) support this fact by stating that diverse CED practices indicate that Indian companies show interest towards sustainable development.

However, they also indicate that the lack of comparability between different companies' CEDs presents a significant challenge to CED practices in India.

Sahay's (2004) research found that in India, most CEDs are non-comparable and unsystematic and therefore, good quality CED practices must be encouraged and rewarded. By surveying the top 250 Indian companies (by sales) and then analyzing the annual reports of said companies, Sahay was able to provide insight into the general state of CED practices in India. By comparing the CED practices of companies from a variety of industries, results indicate that for the majority of these companies, CED practices are "piecemeal and inadequate" and "devoid of strategic intent" (p. 21). Sahay attributes this to a lack of environmental awareness and a lack pressure from Indian stakeholders and he recommends implementing a reward system to encourage CEDs.

Both Mukherjee et al. (2010) and Pahuja (2009) examine the influence of firm characteristics on Indian CED practices. Using multiple regression analysis, Pahuja examines the impact of sector, nature of industry, foreign association, control by large business houses, size, profitability, debt-equity ratio, exports, and environmental performance, on CED practices. The results of these analyses indicate that environmental performance had the highest impact on CED practices, with better "environmental performers" providing higher quality information than "poor performers." Additionally the profitability and size of companies also impact CED practices, with larger and more profitable companies disclosing significantly more information than small and less profitable companies. The results of this research differ slightly from Mukherjee et al.'s (2010) study, which uses multiple regression analysis, that effective tax rate, leverage and liquidity are the firm specific factors that most significantly impact CED practices.

Tewari and Dave's (2012) interesting study examines the sustainability reports of India's top 100 Information Technology companies in order to compare the corporate social responsibility disclosures made by domestic Indian companies versus MNCs operating in India. Their results indicate that while only a few Indian companies (13%) publish stand-alone sustainability reports, the reports that are published were of high

quality and often in compliance with the GRI reporting guidelines. In fact, the quality of the reports published by domestic Indian companies matched the content and data that MNCs included in their CEDs. The above-mentioned studies detail the status of CED practices in India and are representative of the available research on this topic. This review shows that although research on Indian CED practices does exist, it is limited in its scope. Therefore, this study seeks to add to the current research in hopes of providing additional information to the scope of current research.

2.2 India: A Relevant History

India's Department of Environment was created relatively recently, in 1980, and is responsible for ensuring a healthy environment for the country. This department later became the Ministry of Environments and Forests (MOEF) in 1985. Although environmental legislation began in 1974, with the development of the Water Prevention and Control of Pollution Act, 1974 and subsequent constitution of the Central Pollution Control Board (CPCB) it was the Bhopal accident that sparked development of the Environmental Protection Act in 1986 (Chatterjee & Mir, 2008). The Environmental Protection Act has the objective of protecting and improving the environment and is responsible for preventing pollution and working to amend unique environmental problems that include, but are not limited to, ozone depletion, eco-sensitive zones, environmental standards and coastal regulation (Ministry of Environment and Forests, 2012). This Act is considered to be an umbrella legislation because it fills many previously existing gaps in environmental regulation. Due to extensive economic growth through the 1980s and 1990s, India created environmental regulations to mitigate pollution and environmental damage. Some other important environmental rules and regulations, present in India, include the, Hazardous Waste Rule 1989, Public Liability Insurance Act (1991), Manufacture, Storage and Import of Hazardous Chemicals Rules (1989), Recycled Plastics Manufacture and Usage Rules (1999), The Ozone Depleting Substances Rules (2000), Noise Pollution Rules (2000), Forest Conservation Rules (2003).

Following elections in 1998, a comprehensive national policy was created in order to balance economic growth and environmental protection was created. This national policy built upon previous regulations, which included:

- 1) National Conservation Strategy of Environment and Development, 1992: This focuses on sustainability and resource conservation and highlights the importance of integrating environmental concerns in to government policies and initiatives (Chatterjee & Mir, 2008).
- 2) Policy Statement for Abatement of Pollution, 1992: This focuses on the prevention of pollution at its source by adopting the “polluter pays” mentality. The polluter is responsible for the protection of the natural resources that they impact (particularly rivers) and this therefore, encourages the development and adoption of clean technologies (Chatterjee & Mir, 2008).
- 3) National Forest Policy, 1988: This policy outlines the need for preservation, maintenance and restoration of India’s natural resources, particularly focusing on increasing the acreage of forests (Prabhu, 1999).

Additionally, air quality regulations have impacted businesses strongly because stringent equipment specifications have imposed mandatory requirements on polluting industries, making the production and abatement technology mandatory (Chatterjee & Mir, 2008). Interestingly, India’s emerging regulations motivated many businesses to adopt the ISO 14001 EMS because, this voluntary standard requires that companies meet all legislative requirements and implement internal management systems (Sahay, 2004). However, it should be noted that although India has an established regulatory environment, environmental regulations have failed to prevent pollution problems in India because enforcement of regulations remains weak and market mechanisms do not exist (Sahay, 2004).

This was highlighted further in the OECD’s (2006) study focused on the state of pollution control and the Control Board of India. This found that there have been a lot of

discrepancies and variations in the enforcement of environmental policies across Indian states (Sahay, 2004). Therefore, there is concern that lax enforcement and a lack of consistency may have attracted and continue to attract foreign companies who wish to benefit from India's relatively relaxed regulatory environment here. Since the creation of India's comprehensive national policy, concern for the environment has grown further due to "economic liberalization and market deregulation" (Chatterjee & Mir, 2008, p. 615). However, despite environmental regulations, pollution levels continue to rise rapidly and are reaching unsafe levels (Greenstone & Hanna, 2013). This growth highlights the need for companies to address their environmental impacts, mitigate their environmental damage (specifically pollution) and disclose environmental information to their stakeholders.

2.2.2 India's Agrochemical Industry

The agrochemical Industry is characterized by companies that develop and produce patented crop protection materials that include, pesticides, fungicides, herbicides, and insecticides. With its history rooted in both the agrifood industry and the pharmaceutical industry, the Indian agrochemical industry continues to play an important role on a global scale. The agrifood and agrochemical industries are highly integrated and this is observed best by the acquisitions, of chemical companies, that many agrifood companies have made in order to diversify their portfolios and gain a competitive advantage (Yoon, 2006). The success of the agrochemical industry is directly related to the global demand for commodities and agricultural products. Predictions indicate that the agrochemical industry will experience growth, in the crop protection segment, as food demand increases globally. This growth in food demand is directly influenced by population growth and an increased demand for alternative energy sources like biofuels (Business Monitor International [BMI], 2011). More specifically, projections indicate that Indian agrochemical companies, that specialize in crop protection, products will continue to experience value growth (BMI, 2011).

The Indian chemical industry is one of the oldest in the country and contributes significantly to the overall national industrial and economic growth. It is the twelfth largest in the world and the third largest in Asia, with a compound annual growth rate (CAGR) of over 10 percent (Lokohare, 2010). The Indian chemical industry has evolved substantially from being a basic producer of chemicals, to an innovative industry valued at over USD \$35 billion (Lokohare, 2010). This value represents 3 percent of India's national gross domestic product (GDP) and 13.8 percent of the country's exports (IBEF, 2010). The Indian agrochemical industry is the fourth largest producer of agrochemicals in the world and has a domestic industry of over USD \$1 billion and a market size over USD \$1.75 billion (Lokohare, 2010). The industry exports over USD \$500 million per year worth of products primarily to North American and European markets (Lokohare, 2010). This industry is projected to grow substantially being that there is an increasing national and global population, a high emphasis on achieving food grain self-sufficiency, limited farmland availability, and the pressure to increase agricultural yield per hectare and growth (IBEF, 2010).

Interestingly, due to the fact that India encourages high rates of foreign direct investment, MNCs occupy 50 percent of the agrochemical industry (IBEF, 2010). The major agrochemical MNC's present in India includes Dow Chemicals, Syngenta, BASF, Bayer Crop Science, and Monsanto. Most of the large trans- and multi-national agrochemical companies have diversified portfolios with specialties in agricultural solutions, biotechnology, pharmaceuticals, plastics, oil and energy, and performance products (Euromonitor International, 2010). The negative environmental impacts associated with the production, sale and use of agricultural chemicals are described in Appendix 1. The information provided in Appendix 1 is important because it indicates that agrochemical companies do indeed have a negative impact on the environment, and should therefore be disclosing environmental information and strategies to stakeholders. Of interest to this study is that all of the major multinational agrochemical companies cite increasing environmental regulation at the global and national levels as potential threats to business operations (Euromonitor International, 2010). However,

they do recognize that green products and marketing can also act as a potential opportunity, increasing their competitive advantage.

2.3 Multinational Corporations (MNCs) & CEDs

This section illustrates why the central focus of this thesis is focused on the CED practices of MNCs, notably in the subsidiaries of MNCs operating in an emerging economy, India. Although this section will provide an overview of the theoretical perspective of MNCs and past MNC CED research, it is not within the scope of this study to provide a full review of literature on MNCs.

The first use of the term multinational corporation (MNC) can be traced back to April 1960 when David E. Lilienthal used the term in his paper titled, "Management and Corporations" (Momin, 2006). The terms "multinational corporation" and "transnational corporation" can be used interchangeably and are broadly defined as international business that has originated from one country (parent country) with foreign operations in a different country (host country). This means that the parent company will control and manage the operation of their foreign subsidiaries (Allison, 1993). However, depending on the legal form of control and regulations relating to foreign direct investment (FDI), the extent of control that parent companies can have over subsidiaries can differ (Kostova & Zaheer, 1999). The origin of the modern MNC has its roots in the 16th century with the British East India Company (Bendell, 2005). It is of interest to note that this thesis research focuses on the Indian national context, where the first MNC operated.

It was only recently, with rapid globalization that the number of MNCs increased. For example, there were 7,000 MNCs in 1970 and by 2003 there were over 63,000 MNCs and 69,000 subsidiaries operating around the world (UNCTAD, 2003). Globalization continues to promote the expansion of MNCs to new countries (Dowell et al., 2000). This expansion leads to the creation of subsidiaries with institutional profiles that can vary greatly from parent companies (Dowell et al., 2000). The topic of MNCs and their environmental behaviour and environmental impacts has historically been a

controversial one. On one side of the argument, people believe that MNCs “exploit cross-country differences in environmental regulations by racing to the bottom and locating dirty operating in countries with lax environmental regulations and by adapting their subsidiaries environmental policies, technologies and standards to local country conditions” (Christmann, 2004, p. 747; Clapp, 1994; Gladwin, 1989; Korten, 1995). This phenomenon is also termed the “pollution haven” hypothesis. Others argue that MNCs self-regulate their environmental behaviour by adopting practices and standards that exceed country regulations (Christmann, 2004; Jaffe & Stavins, 1995). Companies can use strategies that are country-specific or globally integrated and standardized (Christmann, 2004; Prahalad & Doz, 1987; Yip et al, 1997).

Historical research indicates that throughout the mid to late 1990s, companies chose to adapt to local conditions by using a localization strategy (Christmann, 2004; Gladwin, 1987). However, the choice for companies to standardize their environmental operations is a more recent phenomenon. Many studies have examined the factors that influence a company’s environmental behaviour in a specific country (e.g., Aragoén-Correa, 1998; Christmann & Taylor, 2001; Henriques & Sadosky, 1996; Sharma, 2000). These studies have identified external stakeholder pressure, government pressure and internal firm factors, as factors that may influence standardization or localization of CED practices (Christmann, 2004). It should be noted that, MNCs are subject not only to pressures from their home and host countries but also by supranational institutions, like the OECD and the United Nations. Interestingly, much of the research on this topic indicates that when operating in emerging economies, MNCs generally have improved environmental activities due to their increased resources, international exposure and greater experience (Fossgard-Moser et al., 2012).

As mentioned earlier, there is a significant debate surrounding the issues of globalization and the impact of MNCs in host emerging and developing economies; with some believing that MNCs can bring technology, growth, and improved standards (UN, 1986) and others believing that MNCs are “engines of global injustice which allow rich nations to enrich themselves at the cost of poor nations” (Momin, 2006 p. 100). Those

with the latter perspective may believe that MNCs have the ability to unfairly influence societal norms, politics and environmental conditions and the Bhopal disaster only strengthens this argument (Garvey & Newell, 2004). Overall, there is a large amount of concern that large MNCs neglect social and environmental responsibilities in LDCs (Donaldson & Dunfee, 1994; Donaldson & Preston, 1995; Momin, 2006).

With limited liability legal structures, parent companies have control over the actions of their subsidiaries but they cannot be held formally responsible for the actions of their subsidiaries (Momin, 2006). Donaldson (1992) believes that parent companies must be held accountable for the social and environmental impacts that they have in host countries. In fact, Momin (2006) argues that in order to maintain legitimacy, MNCs must be held accountable to the societies in which they operate. In fact, there is increased societal scrutiny over the impact that MNCs have on the environment. Public surveys and opinion polls indicate that MNCs are amongst the least trusted institutions (Araya, 2006b). For MNCs, this scrutiny is particularly high “because of the expanding scale of their operations and the low trust - by the public, activists and communities – in the private sector’s ability and willingness to achieve environmental and social progress” (Araya, 2006b p. 6).

Although environmental research and development efforts have become a critical component of corporate activities in home countries, this is not necessarily the case for host countries (United Nations, 1988). Depending on the strategy that MNCs adopt (standardized vs. localized), not all of the pollution control technologies, environmental management systems, sustainability strategies, CER practices applied in one country are necessarily transferred to others. This is because different countries have varying strengths and types of stakeholder pressures and conceptions regarding CSR. Prahalad and Doz (1987) first described this phenomenon by introducing their “integration-responsiveness grid” to describe forces for local integration and forces for global standardization. Previous studies have found that in order to ensure a positive brand image, large MNCs are likely to focus on environmental and social issues in their home country (Bohdanowicz, 2005; Kasima, 2004). Additionally, Chappal and Moon

(2005) argue that MNCs are more likely to produce more CEDs than companies operating solely in their home country. However, there is a debate regarding whether this strategy will be transferred to their foreign subsidiaries (Momin, 2006).

Studies have indicated that CSR reporting of MNCs tends to “reflect the profile of country of operation rather than the country-of-origin” (Joshi & Gao, 2009). Overall it must be noted that for Western MNCs operating in developing and emerging economies, Kolk et al (2010) indicates that there, “is a complex balance of costs and benefits, and of societal pressures from home countries” (p. 292). Although difficult for MNCs, many people now believe that they have the power, with their resources and extent of operations, to make a significant contribution to sustainable business practices (Haugh & Talwar, 2010). The theoretical perspectives, that surround the decision-making process of MNC’s regarding environmental practices, are discussed in more detail in Section 2.3.1. These perspectives and literature frame the narrative for this thesis research.

2.3.1 International Business Literature & Theoretical Perspectives

Institutional Theory

The Institutional theory is a widely studied concept within International Business literature that has been used to describe the adoption of business practices among organizations (DiMaggio & Powell, 1983; Kostova & Roth, 2002). The theory is based on the belief that companies operating in similar environments will employ similar business practices and “thus become isomorphic with one another” (Kostova & Roth, 2002, p. 215). This theory is often combined with the legitimacy theory, which describes a company’s desire to maintain legitimacy in the society in which it operates. Environmental legitimacy is important for MNCs because low environmental legitimacy can negatively impact corporate profitability and stock prices (Bansal & Clelland, 2004; Payne & Raiborn, 2001) while high environmental legitimacy can improve the company’s reputation.

Being that countries have differing legal, socio-political and cultural contexts the institutional theory argues that companies operating in different national contexts will have different behaviours. In fact, Kostova and Roth (2002) argue that companies are subject to an “institutional duality” whereby MNCs are exposed to institutional pressures from both host and home countries. Studies that provide evidence for this phenomenon include Christmann (2004), Orru et al. (1991), Kostova and Roth (2002), and Strang and Meyer (1993). Being that MNCs operate in a variety of national contexts, this creates tension because they must decide whether to adapt its practices to local conditions, which is vital for maintaining legitimacy, or gain potential competitive advantages by unifying (standardizing) their global operations (Rosenzweig & Singh, 1991).

Accountability Theory

MNCs are accountable to all the societies in which they operate and therefore, the accountability framework promotes the standardization of environmental reporting practices. This theory is based upon the fundamental assumption that MNCs need to take responsibility for its actions – both in their home country and host country (Momin, 2006). Additionally, MNCs are responsible for providing environmental information to their relevant stakeholders who are located not just in home countries but also in host countries. The growing concern over MNC accountability with regards to environmental issues is detailed in the initiatives from international organizations, NGOs and government bodies — most notably the United Nations (United Nations, 1993, 2000). Momin (2006) describes the United Nation’s draft Code of Conduct for Transnational Corporations, which includes a list of environmental activity and disclosure obligations. Unfortunately, this draft was never officially adopted. However, the OECD’s recent (2011) updates to their “Guidelines for Multinational Enterprises” suggest that MNCs should,

provide the public and workers with adequate, measureable and verifiable (where applicable) and timely information on the potential environment

health and safety impacts of the activities of the enterprise, which could include reporting on progress in improving environmental performance (OECD, 2011, p. 48)

Parental Control

The resource dependency theory states that if a company is dependent on another institution (parent company or supplier) for critical resources, then their behaviour and strategies are more likely to be determined by these controlling institutions. This is important because foreign subsidiaries are dependent on parent companies for financial resources, finished goods and technology (Christmann, 2004; Martinez & Ricks, 1989; Prahalad & Doz, 1981). Therefore, the level of control that a parent company has over its subsidiaries' operations is an indicator of how standardized environmental reporting practices will be throughout all locations. However, even with high levels of parental control, environmental managers at parent companies may have a hard time gaining the support, to adopt standardized environmental practices, from local managers working at local subsidiaries (Christmann, 2003). This is because these local companies are operating in contexts with differing environmental pressures, where the perceived benefits of strict environmental policies and CED practices do not necessarily outweigh the perceived costs (Christmann, 2003).

Regulatory Impact on MNC's Business Practices

There are some researchers who believe that MNCs have incentives to develop standardized environmental practices using the strict regulations that parent companies follow in their home countries (Christmann and Taylor, 2001; Porter & van der Linde, 1995; Rappaport & Flaherty, 1992). Others believe that companies will adopt localized strategies and conform to regulations present in the host countries (Kostova & Roth, 2001). Much of the environmentally-focused international business research has focused on the impact that differing regulations have on environmental practices of MNCs (Christmann, 2004; Scholtens & Dam, 2007). Additionally, certain studies indicate

that country-specific regulatory pressures are the main determinant of a company's environmental practices in various countries (Christmann, 2004; Dasgupta et al., 2000; Henriques & Sadosky, 1996). However, this is not a simple area to study because the institutional environments within which subsidiaries and parent companies operate are incredibly complex. These institutional environments are not only defined by regulatory pressures, but also by, socio-economic and cultural factors. Therefore, when large differences between the institutional environments exist, there will most likely be differences in the environmental practices of the corporations operating in each environment (Scholtens & Dam, 2007).

Aguilera-Caracual et al.'s (2012) research explores the impact that institutional distance (differences in national operating contexts) and parent companies' financial performance have on the level of environmental standardization between parent companies and foreign subsidiaries. Results indicate that MNCs with low institutional distance between subsidiaries and parent companies are more likely to adopt the environmental standardization strategy. However, those with high levels of institutional distance are more likely to adopt localized approaches in each national context. Results also indicate that in order to maintain legitimacy companies with strong financial performance are likely to standardize environmental practices across global operations rather than "racing to the bottom" (Aguilera-Caracual et al., 2012)

Additional regulatory impacts include the existence of international and multilateral environmental regulations and environmental treaties. These can include treaties such as the Kyoto Protocol, which can create a harmonized regulatory environment and therefore, is likely to standardize environmental activities. Although these agreements are not regulations, Christmann (2004) indicates that industry associations and voluntary programs can play a very important role in standardizing a MNC's environmental practices. In environmentally sensitive and highly visible industries there is pressure from industry associations and competitors to protect the reputation of the industry as a whole (Christmann, 2004; Hoffman, 1999; King & Lenox, 2001). Additionally, voluntary programs and codes of conduct like the GRI and

Responsible Care® motivate companies (regardless of country of operation) to adopt similar environmental practices or imitate competitors (DiMaggio & Powell, 1983). In other cases, companies may be under pressure to maintain their positive reputation in both host and home countries because informed customers and non-governmental organizations are able to track the activities of MNCs in both operating environments.

Standardization

Different studies have examined the factors that encourage standardization of environmental policies in general, and of CED practices specifically (Hunter & Bansal, 2007). One of the most widely cited studies is Christmann's (2004), which thoroughly examines the factors that encourage firms to adopt the "standardization" strategy for their environmental policies. Christmann examines stakeholder pressures and firm-specific factors in the chemical industry in order to determine how MNCs respond to pressure for environmental policy standardization. Although it is understood that standardization is difficult for MNCs because of differing political, social, economic and legal operating environments, Christmann describes the following three dimensions of environmental standardization:

- 1) The creation and standardization of worldwide environmental performance targets: MNCs may decide to set worldwide environmental performance goals but allow for foreign subsidiaries to adapt policies, initiatives and technologies to local conditions.
- 2) The standardization of environmental policies: MNCs may decide to standardize environmental management systems, environmental control and auditing procedures, and sustainable supply chain management across global operations.
- 3) The standardization of CED practices: This is the dimension that is applicable to this thesis research. MNCs may decide to standardize the content of environmental disclosures released to internal and external stakeholders (UNCTAD, 1993).

Christmann (2003) indicates that governments, industry participants, and customers are the external stakeholders that most strongly influence standardization strategies. This especially holds true for the chemical industry, where stakeholders care not only about the company's domestic operations but also international operations. The results of Christmann's study indicate that cross-country harmonization of environmental regulations, perceived industry pressures, and concerned customers contribute significantly to the standardization of environmental performance standards, environmental policies and CED practices. Additionally, due to the increasing globalization of business and the awareness of global environmental impacts of business operations e.g. climate change, Bustamante (2011) indicates that the concerns of various local and global stakeholders cannot be seen independently from each other. This "global" concern encourages MNCs to implement standardized environmental practices.

Localization

The process through which MNCs adapt to a country's institutional environment is termed "localization." The institutional theory supports the idea of localization, because it is more important that MNCs maintain legitimacy and reduce negative impacts associated with liability of foreignness by fulfilling the demands of their local, host-country environments (Zaheer, 1995). Certain studies have indicated that "local responsiveness" is an important factor for companies wanting to maintain legitimacy in host countries (Rosenzweig & Singh, 1991). Overall, these subsidiaries must be able to thrive locally, even if they are a part of a global business model. In fact, Peng and Lin's (2008) study determines that the level of environmental management in foreign subsidiaries is directly correlated with local regulatory factors. Ruud (2002) examines the environmental practices of foreign subsidiaries in India to determine whether MNCs are creating environmental excellence in a country with relatively low levels of environmental awareness. His research indicates the foreign subsidiary environmental management practices are strongly influenced by parent companies; however, these

subsidiaries are deviating from the intentions specified in the parent companies environmental policies. These deviations are a result of financial constraints and lax environmental regulations in host countries. Interestingly, Epstein et al (2007) notes that foreign subsidiaries will deviate from parent company practices when the costs of implementing EMS are too high.

2.3.2 Previous CED Research: MNCs

Research indicates that MNCs from developed countries are leading in the area of CED practices by being the largest producers of environmental reports (KPMG, 2005; Sustainability et al., 2004). KPMG's (2011) study indicates that, regardless of location of operation, CER has, for the most part, become mandatory for large MNCs. However, previous research has shown that the type, quantity and quality of CEDs vary among companies from different national contexts. The popularity and visibility of CEDs by the MNC population has led to the exploration of their CED practices by numerous researchers (Momin, 2006). However, the purpose of each of these studies differ from each other with some focused on the impact of nationality (Dammack, 2009), others on the impact of firm-specific factors and industry association, with only a few examining the difference between MNCs, subsidiaries and domestic companies (Kolk et al., 2010; Momin, 2006; Moneva & Llana, 2000, Monteiro & Aibar-Guzmán, 2010). Some of these studies are described in more detail below.

Impact of Nationality, Country-of-Operation and Firm Specific Factors

There are numerous studies that specifically examine the CED practices of MNCs, in host countries, with no inclusion of domestic firms in the sample (Cho et al., 2012; Dammak, 2009; Hassan & Burgess, 2011; Fortanier & Kolk, 2007; Kolk et al., 2001; Kolk 2003; KPMG, 2005, 2008, 2011; Perego & Kolk, 2012, Kostova & Zaheer, 1999, Rondinelli, 2007). These studies seek to provide insight into the differences and trends in CED practices between countries or between industries (Kolk et al., 2001; Kolk, 2003; KPMG, 2003, 2005, 2008, 2011). Additionally, studies like, Kolk's (2005) "Environmental

Reporting Evidence from the Triad: Convergence or Divergence?”, examine whether CED strategies are converging or diverging between MNCs themselves and countries, as a whole. The literature review below provides further detail into some studies that examine the CED behaviours of MNCs.

Araya’s research (2006b) indicates that that environmental reporting follows “country-specific trajectories” (p. 20). Specifically, Brazil has higher quantity and quality of CEDs and this is thanks to the high number of environmental initiatives present in the country. Araya also shows that in the absence of environmental disclosures regulations or requirements, the market plays a pivotal role in shaping CED practices of MNCs (2006b). She indicates that differences in CED practices between companies operating in emerging countries and developed countries may be explained by, institutional arrangements in the country-of-origin of the company and the structure of the industry in the country-of-operation, (Araya, 2006b). These differences may explain why some MNCs limit their disclosures to parent companies while others include discussion of global activities in their CEDs.

Additionally, Araya (2006b) points out that companies who are involved in, or members of, global sustainability networks, such as the World Business Council for Sustainable Development, tend to adopt high-quality disclosure strategies. By examining emerging markets specifically, Araya indicates that low levels of demand for corporate transparency reduces disclosure while the internationalization of companies increases their likelihood of disclosing environmental information. Therefore, in emerging economies, non-reporters tend to be domestic companies that are not exposed to global scrutiny. In fact, these non-reporters are likely to be secretive about a variety of issues, not just their environmental performance (Araya, 2006b). It is not surprising then, that MNCs, with their commitment to global markets, disclose more environmental information than domestic companies. This supports statistical data that reveal that between 1990 and 2003, 58 percent of all separate environmental reports published in the world originate from Europe while 20 percent originates in the Americas and 20 percent comes from Asia (mainly Japan and Australasia) (Araya,

2006b). These locations are where the majority of MNCs are headquartered and where mandatory CED regulations are prevalent.

Similar to Araya, Kennelly and Lewis' (2003) research examines whether the degree of internationalization impacts a firm's environmental performance. The researchers compare measures of internationalization, such as scope, depth and dispersion of operations, to environmental performance data provided by Kinder, Lydenberg & Domini (KLD), a social rating service for 138 U.S. firms. Results indicate that between 1991 and 1996, a higher level of internationalization was associated with improved environmental performance. This research directly contrasts with the belief that MNCs are leading a "race to the bottom" and instead lends support to the belief that MNCs are leading proactive and positive environmental change.

Many CED studies examine and compare CEDs of Fortune 500 or Fortune 200 companies (the majority of which are MNCs) in order to draw conclusions about the disclosure practices in a variety of industries or countries (Jose & Lee, 2007). Jose and Lee (2007) examine the CEDs on the websites of the Fortune 200 companies and eventually determine that companies operating in Western Europe and Japan disclose more environmental information than companies operating in the U.S.

Like Jose and Lee (2007), Joshi and Gao (2009) also analyze MNC's website CEDs in order to test if firm-specific factors influence CED practices. They build on research conducted by Chappal and Moon (2005), Gray and Robert (1989), Guthrie and Parker (1990) and Tan and Tower (1999) to hypothesize and demonstrate that "there is no significant association between country effect (country-of-origin or country-of-operation) and environmental-related disclosures on the internet" (p. 36). Ildiko's (2009) study examines the CED practices of the top 20 Romanian MNCs and finds that 55% of companies disclose environmental information. This research, coupled with others (KPMG; 2008, 2011; Vuta et al., 2007) indicates that in Romania a multinational ownership structure increases the amount of CEDs in annual reports. Cho and Patten's (2007) study adopts the legitimacy theory and indicates that the unique social and political pressures a company faces will determine the quantity, quality and diversity of

CED practices. Being that these pressures are unique in each national context because of differing cultural, political and legal factors, it then follows that CED practices will differ between countries.

Parent-Subsidiary Relationships & Impact of Foreign Ownership

Researchers that have examined the impact of ownership structures on CED practices cite the “agency theory” as a mechanism to explain why managers decide to disclose environmental information to internal and external stakeholders. Previous studies that provide insight into the impact of corporate ownership structures on CED practices include, Chau and Gray (2002), Chen and Jaggi (2001), Darus et al. (2009), Gabrielsen et al. (2002), Haniffa and Cooke (2005), and Ho and Wong (2001). However, this thesis research focuses on the impact of foreign ownership in particular (parent vs. subsidiaries), and therefore the literature review below provides some insight into previous studies that are focused on this ownership structure.

Baxi and Ray (2009) show that ownership of a company can indeed impact whether a company discloses environmental information and can also impact the content of these disclosures. This statement is in line with Gray et al.’s (1996) study, which indicates that the nationality of the parent company affects the CED practices of its subsidiaries. Gray et al. found that the parent company’s culture and norms related to the environment are usually reflected in the subsidiaries’ environmental behaviour and CED practices (Monteiro & Aibar-Guzmán, 2010). Additionally, research conducted by authors Moneva and Llena (2000) examine whether the CED practices of companies operating in Spain are influenced by their parent company. Using statistical analysis, they found that although subsidiaries of foreign MNCs disclose more environmental information, there was no significant difference between domestically owned companies and foreign subsidiaries.

Similar results are shown by Darus et al.’s (2009) study, which uses the agency theory as a theoretical perspective to hypothesize that managers of foreign subsidiaries have large incentives to provide detailed CEDs in order to reduce agency conflict and

maintain foreign investments. However, this hypothesis is not supported by the results, which indicate that for Malaysian companies, foreign ownership does not impact the level of CEDs. Monteiro and Aibar-Guzmán (2010) also investigate the influence of foreign ownership on Portuguese companies' CED practices. Like Moneva and Llena (2000) and Darus et al. (2009), their results indicate that there is no statistically significant correlation between foreign ownership and CED practices. Hossain et al. (2006) also concludes that foreign subsidiaries do not disclose more environmental information than domestic companies in Bangladesh. This means that foreign subsidiaries' CED practices are not significantly different from domestic companies.

Another relevant study is Kolk et al.'s (2010), which compares the sustainability disclosures of foreign retailers and domestic retailers in China. This research uses quantitative and qualitative methods in order to provide more information about the differing CSR reporting strategies taken by foreign firms operating in China. The results of this study indicate that foreign retailers disclose more environmental information than Chinese companies. Additionally, like this thesis research, Kolk et al. (2010) also compare the host and home country CED practices of MNCs headquartered in Western economies. These data show that MNCs disclose a higher quantity and quality of environmental information in their home country than in the China, host country.

Overall, it is apparent, to the researchers, that to some degree, foreign subsidiaries mirror their parent company's environmental (CED) practices — thus bringing some of their home countries norms and traditions to the host country. However, these foreign subsidiaries are also locally responsive (Kolk et al., 2010) and adapt their practices to the specific Chinese cultural and economic context. An example of this is the addition of environmental information in categories that are important to Chinese consumers, such as product responsibility and environmental protection. Overall, Chinese consumers believe that foreign subsidiaries have superior sustainability performance than their Chinese peers (Liu, 2007). Freedman and Jaggi (2005) probe into this topic in more specificity by determining whether CEDs made by subsidiaries from countries that adopted the Kyoto Protocol were different from those who did not adopt

the Protocol. They find that “even though subsidiaries are operating in countries that are less environmentally proactive, they are affected by the environmental culture of their country of origin and parent company” (Monteiro & Aibar-Guzmán, 2010, p. 190).

Hunter and Bansal (2007) believe that standardized (and credible) CED practices across parent companies and foreign subsidiaries increases the legitimacy of these organizations. Therefore, their study compares the CED practices on the websites of 113 subsidiaries and their respective parent companies to examine the credibility of the CEDs. Results indicate that although strong institutional pressures for standardization exist, only 27 subsidiaries disclosed credible environmental information. Therefore, it is apparent that subsidiaries face an “institutional duality” (p. 143) and are more responsive to local environments than head offices.

The study that is perhaps the most comparable to this thesis research is Momin’s (2006) dissertation research focused on the CSR disclosure practices of foreign subsidiaries and domestic companies in Bangladesh over a two year period, 1999-2000. His research uses both content analysis, to capture the content and nature of disclosures, and interviews, to determine the reasons that subsidiaries and domestic firms practice CSR. His results indicate that foreign subsidiaries have CSR disclosures that are more similar to national Bangladeshi companies than their MNC parents. However, he does find that some foreign subsidiaries disclose slightly more environmental information than domestic companies. Momin recommends that global CED frameworks, like the GRI, provide guidelines on the standardization (centralization) of subsidiaries’ CED (and environmental performance) strategies and practices to their parent companies’ practices.

This section has provided insight into the MNC international business literature, which has been used to frame the narrative for this thesis research. It is apparent that MNCs will choose to either standardize or localize their CED practices depending on both the institutional pressures they face in each country of operation and, the institutional distance between these countries-of-operation.

2.4 Gaps in Literature

Gaps: Subsidiary vs. Parent Company CED Practices

Although numerous CED studies focus on the behaviour of large multinationals (KPMG, 2002, 2005, 2010), there is a lack of research that provides very specific detail about the CED practices of MNCs' subsidiaries in developing and emerging economies (Momin, 2006). There is a noticeable lack of research focused on the CED practices and behaviours of foreign subsidiaries in international markets (but see Araya, 2006a; Momin, 2006; UN 1991, 1995). This is because the bulk of the research focuses on the large Fortune 250 or 500 companies (Jose & Lee, 2007; Kolk et al., 2001; Kolk, 2003, 2005; Cho et al., 2012) and the largest companies by market capitalization (Chatterjee et al., 2006; Ildiko, 2009; Dammak, 2009; Sen et al., 2011) without separating subsidiaries and domestic companies into separate sample groups.

Additionally, for the most part, the purpose of CED research with a sample that includes both foreign subsidiaries and domestic companies is not to examine the differences between these two groups of companies. Instead, these two unique populations are grouped together in order to draw longitudinal (Deegan et al., 2002; Gray et al., 1995a; Mahadeo et al., 2011; Stanwick & Stanwick; 2006), inter-industry (Hackston & Milne, 1996; Tilt, 2001; Rikz et al., 2008; Mukherjee et al., 2010) or inter-country (Kolk et al., 2001; Nyquist, 2003; Dammak, 2009; Beck et al., 2010) comparisons. This gap in research is of growing importance because "concerns about the social and environmental impact of MNCs in LDCs, both in home countries and amongst western agencies working in LDCs, are increasing" (Momin, 2006 p. 80). There is some research that examines the impact of ownership structures, country of origin and country of operation on CEDs in developed countries (Hackston et al., 1996; Cormier & Gordon, 2001), but this research does not thoroughly examine The similarities and differences in subsidiary and parent company CED practices.

Interestingly, Araya's (2006a) research focused on CED in the Latin American context indicates that almost all foreign corporations (besides BASF-Brazil) operating in

this national context do not disclose environmental information on their Latin American operations. However, whether this phenomenon holds true in other emerging countries has not yet been studied. Momin's (2006) purpose of his research directly aligns with the purpose of this research, as he seeks to investigate whether subsidiaries of UK MNCs are practicing corporate social and environmental reporting similar to that found in their home country (the UK) or whether they are similar to CSR practices in Bangladesh. This is a relatively novel area of research and similar studies have not yet been conducted in other emerging economies, such as India.

Interestingly, in contrast to previous research, Muller and Kolk (2008) argue that because foreign subsidiaries often have high market capitalizations and environmental impacts, they are included in the majority of CED research. However, most of this research does not study or highlight the impacts of foreign ownership. Additionally, with regards to emerging markets, most research has focused on foreign subsidiaries of MNCs and therefore, there is a gap in the research examining local domestic companies' CED information (Muller & Kolk, 2008). This gap is addressed in this study by only examining the CED practices of subsidiaries but also comparing these practices to oftentimes less visible domestic companies.

2.4.2 CED Practices in Developing & Emerging Economies

Historically, environmental accounting originated in developed countries and therefore, CED practices are more established in developed countries (Gray et al., 1995a). This historical development is examined by Gray et al.'s (1995a) research, which shows that following a surge in environmental concern in the late 1980s and early 1990s, environmental reporting has grown steadily in the UK and other European countries. Therefore, the bulk of previous CED research has focused primarily on the differences and development of CED practices in developed countries and regions like, the European Union, Japan, Canada and the U.S. For example, studies by Guthrie and Matthews (1985), Deegan and Rankin (1996), Hackston and Milne (1996), Deegan et al. (2002), Cowan and Gadenne (2005) each focus on Australia and New Zealand. The

studies conducted by Gray et al. (1995a), Cormier and Magnan (2003), Cormier et al. (2005), Damak-Ayadi (2010), Lungu et al. (2011) each concentrate on CED in European countries. Stanwick & Stanwick (1998), Cormier and Gordon (2001), Patten (2002), Holland and Foo (2003), Kolk (2005) and Fonseca et al. (2011) concentrate on environmental reporting theories and practices present in North America while Fukukawa and Moon (2004) and Stanwick and Stanwick (2006) focus on Japanese companies. Interestingly, even the bulk of international comparison studies have focused on CED differences and/or similarities between developed countries (e.g. Stray & Ballantine (2000), Jose & Lee (2007), Beck et al. (2010), Jindrichovska & Purcarea (2011), KPMG (1999, 2002, 2005).

Gaps: CED Practices in India

Despite growing interest in CED in developing and emerging economies, few studies have focused on the South Asian context, where India is located. Hedge et al.'s, (1997) case research examines the non-financial voluntary disclosure of a single corporation, the Steel Authority of India Limited. Their results indicate that this company provides limited CEDs with just a few general statements about their environmental initiatives and product safety (as cited in Momin, 2006). In contrast to Hedge et al.'s research, Sen et al. (2011) compare the CEDs of multiple Indian industries using content analysis. Interestingly, results of this study indicate the CEDs provided lack quantification and the largest percentage of CEDs (amongst all industries) focus on the conservation of natural resources. However, this research only covers a one-year period between 2007 and 2008 and only uses the annual report as a source of data. This neglects the separate sustainability reports, which are often published by large companies and are indicative of the importance that companies place on environmental issues and disclosures (Holland & Foo, 2003).

Chatterjee et al.'s (2006) study examines both the annual reports and websites of the top 45 Indian companies (by market capitalization) to examine the overall state of environmental reporting in India. Their results indicate that many of these companies

disclose environmental information on their website as opposed to their annual reports. Another interesting conclusion drawn by Chatterjee et al. is that none of the companies disclosed negative environmental information. This can be attributed to the fact that because there is no thorough disclosure regulations (like those seen in developed nations), companies can decide which information they would like to disclose to report users. On a positive note, Chatterjee et al. (2008) find that although there are no disclosure regulations in India, most of the Indian companies have disclosed information.

Although there are studies on CED practices within India, these studies are relatively broad and focused on a variety of industries instead of a specific industry. In addition, the majority of these studies do not examine CEDs in both annual reports and sustainability reports and therefore, there is a large gap in these data presented up to this date. Perhaps most significantly, is the lack of available research examining the evolution of CED practices in India. This thesis research seeks to address and provide insight into the gaps presented here.

Gaps: The Agrochemical Industry's CED practices

This research will focus specifically on agrochemical companies. This is of particular importance because one would assume that in India, industry players would have heightened environmental disclosures in order to maintain legitimacy. The chemical industry has a large environmental impact and is included in a large amount of CED research (Stanwick & Stanwick, 1998; KPMG, 1999, 2002, 2010; de Villiers & Barnard, 2001; Tilt, 2001; Cowan & Gadenne, 2005; Rizk et al., 2008). However, a limited number of studies highlight the activities of the agrochemical industry specifically, which is a smaller subset of the chemical industry (Mukherjee et al., 2010; Djajadikerta & Trireksani, 2012). This research seeks to provide insight into the CED practices of the agrochemical industry in order to address this current gap.

3.0 Hypotheses Development

Moneva and Llana (2000) found that in Spain, there was no statistical difference in the quantity of CEDs disclosed (number of sentences) by foreign subsidiaries and domestic companies. This indicates that foreign subsidiaries adopt a localized strategy with regards to their CED practices. The results of Darus et al (2009), Monteiro and Albar-Guzman (2010) and Moneva and Llana (200) all indicate that foreign ownership does not appear to impact CED practices. Therefore, they observed that foreign subsidiaries quantity and content of CEDs were more similar to the domestic companies than their parent companies. These results are indicative of a lack of standardization between P-MNCs and I-MNCs. The results of these studies support the institutional theory, which states that in order to maintain legitimacy and reduce liability of foreignness, companies adapt to local practices. This study uses the institutional theory as a basis for analyses and hypothesizes the following:

H1a: Foreign subsidiaries (I-MNCs) have adapted corporate environmental disclosure practices to local conditions and consequently, the diversity of I-MNC's corporate environment disclosures is more similar to the diversity of domestic companies than to parent companies.

H1b: Foreign subsidiaries (I-MNCs) have adapted corporate environmental disclosure practices to local conditions and consequently, the quantity of I-MNC's corporate environment disclosures is more similar to the quantity of domestic companies than to parent companies.

H1c: Foreign subsidiaries (I-MNCs) have adapted corporate environmental disclosure practices to local conditions and consequently, the quality of I-MNC's corporate environment disclosures is more similar to the quality of domestic companies than to parent companies.

The majority of longitudinal CED studies indicate that over time there has been in an increase in the quantity, quality and a broadening of the type of environmental information (diversity) disclosed to internal and external stakeholders (Araya, 2006b; Beck et al., 2010; Campbell, 2004; Deegan & Gordon, 1996; Deegan et al., 2002; Li et al., 2008; Tsang, 1998). Tsang's (1998) study examined the evolution of non-financial corporate disclosures of 33 companies operating in Singapore between 1986 and 1995. The results of this study indicate that there has been a significant increase in the quantity of disclosures between 1986 and 1993. Campbell (2004) conducted a similar study by examining the quantity of CEDs for ten UK-based companies (from five different sectors) between 1974 and 2000. The results of this longitudinal study show that the quantity of CEDs has increased substantially during this time period with a marked increase during the 1980's. Campbell uses the legitimacy theory to account for this increase in CEDs. Li's (2008) longitudinal analysis examines the evolution of CED practices in China between 2002 and 2006. Results indicate that there has been a rapid increase in the quantity and quality of CEDs amongst the top 100 Chinese companies within the sample period.

Using longitudinal studies, CED researchers have shown that there tends to be an increase in CED quality over time (Brammer & Pavelin, 2006; Moneva & Llenda, 2010; O'Donovan, 2000; Gamble et al., 1995; van Staden & Hooks, 2007). Moneva and Llenda (2010) indicate that over time, the quality of CED increased for a sample of large companies in Spain. It should be noted that these companies had a range of ownership structures, from domestic to foreign-owned subsidiaries, and all sample companies had an overall increase in quality of CEDs over time. Gamble et al.'s (1995) study examines the change in CED quality between industries in more detail. By developing their own quality index, results indicated that the quality of CEDs increased over time in the petroleum, hazardous waste and steel industries.

Diversity of information has not been studied in detail in past studies, indicating that this subject is ripe for research. However, Beck et al.'s (2010) study examines the changes in CED practices of German and British companies between 2000 and 2004. Her

results indicate that not only does CED quantity and quality increase, but diversity of content broadened (increased) during this time period as well. Using this, and previously discussed literature, the following hypotheses were developed:

H2a: Over the 10-year sample period, there has been an increase in the diversity of corporate environmental disclosures for all sample groups (P-MNCs, I-MNCs and Indian domestic companies).

H2b: Over the 10-year sample period, there has been an increase in the quantity of corporate environmental disclosures for all sample groups (P-MNCs, I-MNCs and Indian domestic companies).

H2c: Over the 10-year sample period, there has been an increase in the quality of corporate environmental disclosures for all sample groups (P-MNCs, I-MNCs and Indian domestic companies).

This study is important because it will add to the small body of literature focused on CED practices in an emerging economy, India. The review of the literature indicates that there only have been a few studies focused on CED practices and trends in India. It has only been recently that scholars have focused on CED practices in emerging and developing economies. However, many CED studies have indicated that CED practices are much less established in LDCs (Araya, 2006b; Belal, 2000; Chappal & Moon, 2005; Momin, 2006). This parallels KPMG's (2005, 2008, 2011) surveys, which indicate that the development of CED practices is much more advanced in OECD countries than emerging and developing economies. KPMG (2011) also indicate that although very few companies in India report their environmental information, the bulk of the companies who do, have high quality disclosures and seek external assurance.

Researchers indicate that the lack of CER in LDCs may be due to differing institutional forces, particularly the lack of regulatory requirements, low level of

environmental awareness, unique political systems and less-developed corporate culture (Li, 2008). Li's (2008) dissertation research indicates that although CED practices are increasing in China, this level of CED is lower than in developed countries. Belal (2000) reviews the annual reports of 30 Bangladeshi companies and finds that when excluding energy disclosures, only 20 percent of companies disclose environmental information. When comparing these disclosures to those made in developed countries, Belal indicates that the quantity and quality of Bangladeshi companies' disclosure is low.

Like Belal, Dutta and Bose (2012) also focus on Bangladeshi companies' CED practices. The results of their content analysis research parallel those found by Belal; that CEDs are still in their infancy in Bangladesh. Gamble et al. (1996) completed an international comparative study of CED practices between 27 countries and indicated that CEDs of Indian companies lag significantly behind companies from developed nations, particularly Europe. Being that there are no mandatory environmental reporting requirements, besides energy conservation and usage, in India, most environmental disclosures are voluntary in nature. This review is the basis for the development of the following hypotheses:

H3a: CED practices of companies operating in India, I-MNCs and Indian companies, are of lower diversity than companies operating in developed economies (P-MNCs).

H3b: CED practices of companies operating in India, I-MNCs and Indian companies, are of lower quantity than companies operating in developed economies (P-MNCs).

H3c: CED practices of companies operating in India, I-MNCs and Indian companies, are of lower quality than companies operating in developed economies (P-MNCs).

4.0 Research Methodology

4.1 Sample

This research focuses on Indian market for two reasons, the first being that the Bhopal explosion occurred here and second, it is an emerging economy. Even further, the operating language of business in India is English and therefore, it was possible to understand and code all data present in the corporate reports examined. Similar to Beck et al. (2010), by introducing a control for industry it will be possible in this study to determine how CED practices differ between P-MNCs, I-MNCs and domestic Indian companies over time. The research focuses on an environmentally sensitive industry, the agrochemical industry. Additionally, studies indicate that the chemical industry tends to disclose the largest amount of environmental information (Momin, 20006). Therefore, by examining this sector, the best practices for CEDs can be examined.

4.1.1 Selection of Multinational Agrochemical Parent Companies and Indian Subsidiaries

Using the online database Datamonitor (2011), a search for the largest (by revenue) multinational agrochemical companies was undertaken. This search provided a list of over 200 companies, from which the top 20 companies, as determined by revenue, were sorted in descending order based on revenue. Appendix 2 and Appendix 3 provide a complete overview of the companies included in this selection process. Working downwards, the researcher eliminated the companies that were not a multinational agrochemical company with headquarters in a European or North American country. Additionally, companies must have had a public subsidiary in India between the period of 2001-2011 and have a primary language of English (for corporate communications).

Following this elimination, a list of 19 companies remained, from which sample companies were chosen at random. These companies were BASF SE, Monsanto Corporation, Syngenta AG and Bayercropscience AG.

The second sample of companies, the I-MNCs, was then chosen based on the parent company selections because, the subsidiaries must be matched to their parent companies. Therefore, the I-MNCs included in the sample were BASF India Ltd, Bayer Cropscience Ltd (India), Monsanto India Ltd and Syngenta India Ltd. Although BASF India Ltd, Bayer Cropscience Ltd (India) and Monsanto India Ltd were listed on the BSE between the sample period of 2002-2001, Syngenta India Ltd was publicly listed on the BSE only between 2002 and 2007; the company was delisted following 2007. Although the company was not publicly traded in 2007-2011, all annual and stand-alone environmental reports required to complete the study were available.

4.1.2 Selection of Domestic Indian Agrochemical Companies

Using the online database Datamonitor (2011), all companies with profiles in the Indian agrochemical industry were selected. This search yielded a list of 54 companies, from which the publicly traded companies with their primary business in agrochemicals were sorted in descending order by revenue – this list totaled 26 companies. This list can be found in Appendix 3. From these, four companies were randomly selected. The domestic Indian Agrochemical companies included in this study are United Phosphorus Ltd, Zuari Agro Chemicals Ltd, Rallis India Ltd and Coromandel International Ltd.

Table 7 provides an overview of the companies included in this research with some firm characteristics. Table 7 gives readers an indication of the relative location of operations and visibility, as determined by revenue and number of employees. Throughout this research, parent companies of multinationals are labeled as such: (P-NAME OF COMPANY) and Indian subsidiaries are labeled as such (I-NAME OF COMPANY).

Company	Location	2011 Total Revenue (US\$ Millions)	Number of Employees (2011)
P-Monsanto	USA	\$11,822.0	26,100
P-BASF	Germany	\$102,339.1	111,141
P-Bayercropscience	Germany	\$50,862.5	111,800
P-Syngenta	Switzerland	\$13,268.0	26,300
I-Monsanto	India	\$78.0	357
I-BASF	India	\$704.4	2,012
I-Bayercropscience	India	\$393.6	1,102
I-Syngenta	India	\$460.0	N/A
Rallis	India	\$265.9	857
Coromandel	India	\$2,081.7	N/A
Zuari	India	\$272.8	776
United Phosphorus	India	\$1,265	N/A

Table 3. Profile of Sample Companies - Location, Revenue and Number of Employees

4.2 Source of Data

Being that the primary research method used for this study is content analysis, the first step to this method is choosing which documents to analyze. Ideally, in order to capture all environmental information disclosed, all communications released by an organization would be included as a source of data (Unerman, 2000). This would include the following: annual reports, employee reports, environmental reports, press releases, websites, magazine articles, newspaper articles, government documents and investor documents. However, the bulk of CED researchers include only the annual reports of companies in their content analysis process (Ahmad et al., 2004; Eljayash et al., 2012, Gamble et al., 1995; Sen et al., 2011; Suttipun & Stanton, 2012a; Yusoff et al., 2006) with others focusing on company websites (Jose & Lee, 2007; Suttipun & Stanton, 2012b). Annual reports are often preferred sources of data for research because they are accessible to researchers (Eljayash et al., 2012), are provided at a regular basis (Buhr, 1998) and certain studies have indicated that some stakeholder groups consider them as the only source of credible environmental performance information (Deegan & Rankin, 1997; Tilt, 1994; Unerman, 2000).

Literature indicates that with the growing popularity of stand-alone environmental reports and alternative methods of communication, an exclusive focus on annual reports will provide an incomplete picture of all of the environmental activities of a company (Momin, 2006; Unerman, 2000; Zeghal & Ahmed, 1990). Therefore, this study will include both the annual reports and stand-alone environmental/sustainability reports provided by the sample companies between a ten-year period, 2002-2011. Addition of a longitudinal component to this research increases the robustness of these data and allows for insight to be gained into the evolution of CED practices in India (Beck et al., 2010)

Stand-alone environmental reports are also referred to in the literature as Corporate Social Responsibility Reports, Sustainability Reports, Triple-Bottom Line Reports or Non-financial Reports. Using these sources of data, this study sought to examine, the quantity, quality and diversity of corporate environmental disclosures. For this purpose it should be noted that all sections of the annual reports, including financial reports and 10Ks were examined thoroughly to record the presence of any environmental disclosures (Gamble et al., 1995). The stand-alone environmental report was included in this study because it has been acknowledged that by combining annual reports with other sources of corporate environmental information, the results will provide “more robust empirical evidence for understanding social and environmental accounting practice” (Guthrie & Abeysekera, 2006, p. 122). Additionally, it is argued that companies that produce a stand-alone environmental report believe that social and environmental disclosure are just as important as financial reporting (Holland, 2003). In fact, A number of studies use environmental reports as the basis of their CED research (e.g., Beets and Souther, 1999; Idowu and Towler, 2004; Lober et al., 1997).

It should be noted that stand-alone environmental reports were not published for all of the sample companies. An overview of the length and types of reports included in this study is found in Table 8 and Table 9. These tables note whether companies had sustainability reports or available annual reports for each sample year. In fact, in India, stand-alone environmental reports were rare and environmental disclosures were often

found in annual reports. For the parent companies of MNCs, integrated reporting (the combination of environmental reports and annual reports) has become increasingly common (KPMG, 2010) and therefore, for sample companies, BASF and Syngenta, stand-alone environmental reports were not available in recent years because environmental information has been integrated into the annual report. Additionally, being that the parent company Bayer, did not produce a separate annual report for the Bayer Cropscience division, the researcher examined the entire Bayer Annual Report while leaving out CEDs that pertained to other divisions of the company.

Being that all of the companies included in the sample are public, most historical and current annual and environmental reports were available on their respective websites, online databases (Proquest Annual Reports, ISI Emerging Markets), stock exchange websites (Bombay Stock Exchange) and the fee-based website, CorporateRegister.com. The annual reports that were unable to be accessed online (Syngenta India Ltd Annual Report 2006-2007, Syngenta India Ltd Annual Report 2005-2006 and BayerCropScience India Annual Report 2007-2008) were requested from the company using the online enquiry forms. However, multiple requests to these companies were to no avail and, therefore, these annual reports were excluded from the sample. Corporate websites and additional corporate documents were not included in this study due to the impracticality and impossibility of examining the wide range of documents over the 10-year period in a limited amount of time (Momin, 2006).

Documents Chosen for Analysis:

Table 4 outlines the documents chosen for analysis. When a document was not produced it is described as Not Applicable (N/A) and when the researcher was not able to obtain the document it is described as Not Included (N/I). Those documents included are identified as those with detail regarding their length in pages and whether or not they are integrated (INT) reports.

Company	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
P-BASF:	240	232	224	258	228	172	170	148	144	180
	INT	INT	INT	INT	INT					
P- Syngenta	62	60	56	58	40	40	42	42	48	52
	INT	INT	INT							
P-Monsanto	119	120	116	106	128	126	148	127	108	78
P- BayerCrop Science	265	273	274	262	239	248	224	159	150	124
I-BASF	64	104	104	96	88	88	44	57	56	42
I-Syngenta	60	51	56	48	N/I	N/I	48	44	44	44
I-Monsanto	144	124	75	76	68	67	51	51	48	46
I-BayerCrop Science	69	70	74	N/I	73	102	113	125	131	11
United Phosphorus	101	100	100	96	88	83	91	233	237	59
Rallis Chemical	121	115	115	106	78	82	76	80	108	208
Coromandel	112	112	90	91	79	71	71	145	93	80
Zuari	121	113	113	111	108	51	128	97	101	106

Table 4: Overview of Annual Reports Chosen for Analysis (with Page Length)

INT = Integrated Reports

N/I = Not Included

Company	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
P-BASF:	N/A	N/A	N/A	N/A	N/A	92	100	84	76	148
P- Syngenta	N/A	N/A	N/A	N/A	34	27	25	25	33	33
P-Monsanto	101	57	48	61	53	57	N/A	N/A	N/A	N/A
P- BayerCrop Science	80	80	124	120	120	97	97	171	N/A	N/A
I-BASF	64	38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
I-Syngenta	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
I-Monsanto	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
I-BayerCrop Science	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
United Phosphorus	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rallis Chemical	N/A	N/A	47	33	33	N/A	N/A	N/A	N/A	N/A
Coromandel	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zuari	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 5: Overview of Separate Environmental Reports Chosen for Analysis (with Page Length)

N/A = No report produced

4.3 Content Analysis

In this study, content analysis is used to investigate the environmental information from annual reports and stand-alone environmental reports of the sample companies. This research focused solely on environmental disclosures as distinct from social and/or financial disclosures. Content analysis is an incredibly useful quantitative technique that has been used by environmental accounting researchers for a number of years. It allows researchers to interrogate narrative, extract content and then analyze these data (Beck et al., 2010). Krippendorff, who is recognized as the frontier content analysis researcher, notes that the goal of content analysis is to reduce data into manageable amounts for analysis. He defines the method as “a research technique for making replicable and valid inferences from text (or other meaningful matter” to the contexts of their use” (as cited in Momin, 2006 p. 192). It is defined in more detail by Abbot and Monsen (1979, p. 504) as, “a technique for gathering data that consists of codifying qualitative information in anecdotal and literary form into categories in order to derive quantitative scales of varying levels of complexity.”

Ernst and Ernst’s (1976) research is recognized as the first well-established environmental and social disclosure study that uses content analysis (Momin, 2006). They created coding schemes based on the results of the surveys they distributed to Fortune 500 firms. Initial categories included issues such as environment, energy, product/consumers, community and fair business practices (Milne & Alder, 1999). These coding categories have been used in many content analysis studies (Gray et al., 1995b) while other researchers have added or modified these categories to include more appropriate/up-to-date categories and quantification schemes based upon emergent environmental disclosure issues (Guthrie, 1982; Guthrie & Matthew; 1985; Trotman & Bradley, 1981). The creation of content analysis categories allows for researchers to examine the level and changes in the volume (quantity) of a company’s or country’s CEDs over time or at a specific point in time (Gray et al., 1995b; Sen et al., 2011; Stanwick & Stanwick, 2006). Additionally, detailed content analysis methods, with

extensive categories, allow for researchers to draw industry comparisons (Brammer & Pavelin, 2006, Mahadeo et al., 2011; Singh, 2007) and international comparisons (Beck et al., 2010; Guthrie & Parker, 1990, Holland & Foo, 2003).

A critical step in the content analysis method is determining what “recording unit” to use for the research. A “recording unit” refers to a specific segment of the context unit in the written material that is placed in a category” (Sen et al., 2011, p. 146). In past CED content analysis studies, researchers have used the following recording units: number of words (Deegan & Gordon, 1996; Deegan & Rankin, 1996; Eljayash et al., 2012; Suttipun & Stanton, 2011), number of pages (Cowen et al., 1987), number of sentences (Hackston & Milne, 1996; Holland & Foo, 2003; Cowan & Gadenne, 2005; Sen et al., 2011), number of lines (Belal, 2001; Choi; 1998), proportion/percentage of page (Guthrie & Parker, 1989; Gray et al., 1995b), and percentage of total disclosure (Trotman & Bradley, 1981). However, use of proportion of page and words has been criticized as lacking reliability and providing meaningless measures and results (Cowan & Gadenne, 2006; Milne & Adler, 1999). Milne and Adler argue that, “individual words have no meaning to provide a sound basis for coding... without a sentence for context” (p. 240). Additionally, the use of proportion of page is seen as problematic because of differences in font sizes, margins and graphics (Tilt, 2010).

Therefore, this research uses “number of sentences” as the content analysis “recording unit.” This means that sentences are used to determine which category the text is classified. “Number of sentences” is used exclusively in the consolidated narrative interrogation (CONI) technique adopted for this study. Number of sentences has also been used in a number of empirical CED studies and appears to be the preferred “recording unit” for both comparative studies (Beck et al., 2010; Tilt, 2010) and studies focused on developed and emerging economies (Chatterjee et al., 2008; de Villiers & Barnard, 2001; Sen et al., 2011). Researchers who use this “recording unit” agree that number of sentences is the most appropriate measure for coding and analysis (Sen et al., 2011).

Although certain studies exclude the use of graphical data (Sen et al., 2011; Tilt, 2001), like Momin (2006), this content analysis research includes information found in graphs and tables. Momin (2006) indicates that disclosures in graphical and chart formats include a lot of information and provide “value-added information” (p. 231). Additionally, following the review of the annual and stand-alone environmental reports included in this study, it became evident that many of the sample companies communicate high quality environmental data, specifically related to emissions, in the form of graphs or tables. Therefore, leaving this information out would not provide the full picture of environmental disclosures.

A single row in a table accounted for the equivalent of one sentence and each trend line on a graph was given the equivalent weight of one sentence (but a quality rating of Type 5). For example, if a row in a table was dedicated to a pollution sub-category, it was coded in this category and given the a quantity score of 1. The quality score given to this disclosure was dependant on whether the informaton was purely qualitative, quantitative or compared to previous data (see section 4.3.3). If a graph had three trend lines, each trend line was coded in the correct category, given a quantity score of 1 and a quality score of Type 5. However, similar to Ahmed and Sulaiman (2004), photographic and other images of activities related to the environment were not included in this analysis, as their inclusion would involve a high-level of subjectivity. However, if these images were accompanied by a descriptive sentence, this sentence was including in the analysis.

Sen et al.’s (2011) study uses content analysis in order to investigate the volume of environmental disclosures found in the annual reports of 22 core sector companies in India. Data from the director’s report and chairman’s speech sections of the annual report were coded and placed into 15 various themes (categories) using “number of sentences.” Additionally, Sen et al. also analyzed the “form” of the disclosure, categorizing data into qualitative, physical or financial categories. Results revealed significant differences in CED practices between various industries. For example, cement

companies exhibited a lack of environmental disclosures (a total of 50 sentences) while steel companies had a much higher volume of CED at 206 sentences (Sen et al., 2011).

Tilt (2001) also uses “number of sentences” in her content analysis method to compare the environmental disclosures in annual reports with environmental policies of Australian companies. As in this research, Tilt focuses solely on environmental disclosures believing that these disclosures belong in a stand-alone category apart from social disclosures. Tilt created her own content analysis categories from previous corporate environmental policy literature and then tested for reliability and validity of coding. This was calculated by determining the Krippendorff alpha value between three coders. A similar pre-test process (Section 3.3.1) is used in this thesis research in order to ensure reliability and validity of the coding categories. Tilt’s results provided insight into the state of CED practices in Australia and the level of priority that companies place on external disclosure practices.

Mukherjee et al.’s (2010) research is another study that provides insight into the use of “number of sentences” in the content analysis method. This study focuses on an emerging market by examining the impact of firm characteristics on the CED practices of Indian firms. By coding content into 20 different environmental categories using a methodology developed by Al Tuwaijri et al. (2004), with an associated score; 0 for no mention, +1 for general or physical mention of environmental information, +2 for qualitative environmental information and +3 for quantitative information. A total score was then calculated for each sample company, and multiple regression analysis provided insight into the impacts of each firm characteristic on environmental reporting. This research is similar to this thesis research, because it uses “number of sentences” for content analysis while also scoring the disclosure quality on a numerical score (Section 3.3.3).

It is understood and generally assumed that the quantity and extent of disclosures is indicative of the relative importance of that category to the reporting organization (Deegan & Rankin, 1996; Krippendorff, 1980; Momin, 2006). Quantitative methods, like content analysis, are useful in answering research questions that begin

with “what” and “how much.” (Cowan & Gadenne, 2005). This is adequate for this thesis research because the goal is to determine “what” the sample companies are disclosing; “what” the differences are in CEDs amongst sample companies and “how much” have CEDs changed over the ten-year sample period. Additionally, use of the newly developed CONI content analysis technique allows for the researcher to determine both mechanistic (quantity) and interpretive (quality) data (Beck et al., 2010).

Similar to Momin’s (2006) research, this thesis research uses content analysis to not only analyze and compare the quantity and quality of environmental disclosures at a cross-country level but also at a cross-company level i.e. at the MNCs parent company and Indian subsidiaries. A modified version of Beck et al.’s (2010) CONI content analysis approach is used for content analysis because it does not only provide extensive insight into the quantity of disclosures but also into the quality and diversity of these disclosures (Beck et al., 2010).

4.3.1 Reliability of the Data

As discussed by Milne and Adler (1999) content analysts must prove that “the coded data or data set that they have produced from their analysis is in fact reliable” (p. 238). Additionally, Milne and Adler state that:

Content analysts need to demonstrate the reliability of their instruments and/or reliability of the data collected using these instruments to permit replicable and valid inferences to be drawn from the data derived from content analysis (p.238)

When using a single coder, this is achieved when the coder has undergone a period of training. The single coder must then conduct a pilot study to assure that the reliability of coding decisions has reached an acceptable level before moving forward with the research sample (Milne & Adler, 1999). In order to ensure reliability, a thorough coding manual with well-specified decision categories and decision rules was created. This coding manual can be found in Appendix 5. This manual was then used to code the pilot sample, 2009-2011 annual reports for Dow Chemical.

The single coder then used Milne and Adler's (1999) test-retest method, to determine the stability, or the ability to code data the same way over time, of these data. As suggested by Milne and Adler (1999) the coder waited three weeks before recoding the same annual report again. Once recoded, the Krippendorff's alpha was calculated in order to measure for reliability. The results of test-retest method returned an average alpha score of 0.88. Further statistical data is provided in Appendix 4. This alpha score is well over the acceptable level of 0.80 (Tilt, 2001) and therefore, these results mean that the coder is sufficiently trained and the coding manual is thorough enough to produce reliable and stable results. It should be noted that the number of categories used with the CONI method is large and an increase in the number of categories can increase inter-rating coding errors. Therefore this research used a sole coder and a thorough coding manual to ensure reliability of results.

4.3.2 Consolidated Narrative Interrogation (CONI): A Description

The present study adopts a methodology in accordance with Beck et al. (2010) for CED measurement. CONI is a content analysis method developed by Beck et al. (2010) to provide "a measure of information diversity, information content and volume" (p. 207). Following a thorough literature review, Beck et al. (2010) conclude that prior content analysis techniques can be classified as either mechanistic or interpretive. Using different "recording units" (Section 3.3), mechanistic studies provide insight into the quantity or frequency of CEDs, and can also include information about what internal or external variables impact disclosures practices (Adams et al., 1995; Beck et al., 2010; Campbell 2003; Patton & Crampton; 2004; Unerman, 2000). For these studies, the assumption is that quantity of disclosures is a measure of the relative importance of these disclosures for the company. For example, Mukherjee et al.'s (2010) study analyzes the quantity of environmental disclosures in annual reports via "number of sentences" in order to determine what firm characteristics (e.g. size, profitability, and/or leverage) impact the environmental disclosure practices of select companies.

Mechanistic studies can vary from each other in the richness of data that the content analysis method captures. Dichotomous indices (Gray et al., 1995b; Harte & Owen, 1991) simply record whether a company discloses a specific category or not by providing a score of “0” to non-disclosures and a score of “+1” for disclosure. However, more complex two-dimensional mechanistic studies not only record the volume of content but also code the quality of this content (Wiseman, 1982). CONI builds upon this two-dimensional approach by presenting, a “matrix approach to narratives, with multiple dimensions being taken into account when analyzing disclosures” (Beck et al., 2010, p. 210).

In contrast to mechanistic studies, interpretive studies seek to gain insight into the “what is communicated and how” (Beck et al., 2010 p. 208), i.e. the qualitative character of the narrative and the quality and/or the richness of these data (Laine, 2005; Tregidga & Milne, 2006). For example, Laine’s (2005) study examines how the term “sustainable development” is constructed (the meaning of the term) in the corporate disclosures of the top 103 Finnish companies. Following a thorough interpretive textual analysis, of both annual reports and sustainability reports, Laine finds that the definition of “sustainable development” is not uniform amongst all sample companies but certain similarities do exist. Overall, in the corporate disclosures, the term “sustainable development” is, “constructed as a win-win concept, which allows society to enjoy economic growth, environmental protection and social improvements with no trade-offs or radical restructurings of the social order” (Laine, 2005 p. 395).

It is evident from these two examples that mechanistic and interpretive studies take very different approaches to researching CED practices. Although strong empirical methods exist for determining quantity (volume of disclosures) there has been debate regarding what determines “quality” in CEDs, and how this can be measured. Toms (2002) argues that the presence of quantifiable (and therefore, verifiable) information represents higher quality environmental information (Beck et al., 2010). In addition to quantity and quality, another important factor in CEDs is information diversity; because an increased level of information diversity is reflective of a company’s awareness of its

wide-range of impacts and its commitment to reducing its negative environmental impact (Beck et al., 2010). Beck et al.'s (2010) CONI method seeks to consolidate the mechanistic and interpretive methods in order to provide the researchers with insight into both CEDs quantitative and qualitative information.

4.3.3 An Overview of CONI's Coding Steps

CONI is a content analysis method that uses a matrix approach to provide high resolution of meaning – quantity, quality and diversity of disclosures. Beck et al. (2010) developed 12 content categories and 48 (mutually exclusive and reliable) sub-categories by reviewing the CED literature; GRI guidelines (2002), UNEP/Sustainability guidelines (2004), and annual reports of top FTSE stock exchange companies for common themes and patterns. The development of these categories took place because existing frameworks and categories (Cormier & Gordon, 2001; Ernst & Ernst, 1978; Warsame et al., 2002; Wiseman, 1982) did not adequately address all the environmental disclosures found in disclosure documents (Beck et al., 2010). Both voluntary and mandatory environmental information is included in the coding process being that they both represent CEDs.

Mandatory information includes data such as SEC requirements, environmental litigation, liabilities and India's Companies Act, which requires companies to report on their energy conservation and energy usage. Certain studies examine either mandatory or voluntary information (Beck et al., 2010) while others do not make the distinction (Sen et al., 2011). Herein, there is no distinction made between the two types of environmental disclosures. The annual reports and stand-alone environmental reports of the sample companies were examined in detail and analyzed using the three steps explained below. Note that the order of these steps has been altered slightly from the original CONI method in order to provide a clearer understanding of the CONI process.

Step 1: Coding for Diversity

Each CED sentence was examined to determine which sub-category it fell within (Appendix 5). Once isolated, each CED sentence was coded/placed in this sub-category representing the environmental message of the CED. This allows the researcher to capture all relevant meaning (Beck et al., 2010; Cormier & Gordon, 2001). Once all data have been collected, the results can be analyzed to see which companies disclose information from a variety of sub-categories: a representation of the diversity of environmental information. Additionally, this may allow for the researcher to determine what types of categories are similarly or differently disclosed by each group of sample companies. As mentioned earlier, an increased level of diversity represents a companies' understanding of their environmental impacts and commitment to improve their performance (Beck et al., 2010).

Step 2: Coding for Quantity/Volume

The quantity of each CED by sub-category was coded in order to provide insight into the quantity of disclosures by category and the overall total quantity of disclosures. This was measured using a dichotomous scale, with "0" representing no disclosure, and "1" representing disclosure. For example, if a category had a total of 5, this means that there are 5 CED sentences in this category. Additionally, if a company has a total quantity score of 150, this means that they have a total of 150 CED sentences in their annual reports and stand-alone environmental reports. The measure of quantity is important because it provides insight into the importance of various categories and of CED overall. The overall assumption here is that an increase in the quantity of disclosures represents an increased importance of this category and of environmental issues overall (Beck et al., 2010). From this information, the researcher can compare both quantities over time, and between companies to draw conclusions about the differences and similarities in CED practices between parent companies, subsidiaries and Indian companies.

Step 3: Coding for quality (information content scale)

The final interrogation of CED data is the measurement of content quality, i.e. the information character, depth and detail. Toms (2002) indicates that when disclosures are quantified, they are more likely to represent actual environmental activities and therefore, are of higher quality. Five different levels of disclosure quality were used as coding categories and are described in more detail below and detailed examples are provided in Appendix 6.

Type 1: This type codes purely narrative CEDs with no detail related to content sub-categories, i.e. there is a mere mention of a sub-category. This type of disclosure is described by SustainAbility (2006) as “sketchy in terms of the content value, providing little/no details and minimal coverage” (Beck et al., 2010, p. 213). For example, Monsanto India’s (2010) CED, “Monsanto conserves resources” was coded as Type 1 as it merely mentions the sub-category SUST-3 – resource conservation.

Type 2: This type codes CEDs with a more detail than Type 1 disclosures. A Type 2 code “provides the reader with more narrative information on that sub-category” (Beck et al., 2010, p. 213). For example, in Monsanto India’s (2010) CED the quote “Private and public sector researchers are developing seeds to manage climate change (drought tolerance), lower input intensity (nitrogen-efficient seeds use less fertilizer)” was coded as Type 2 because it provides an important explanatory statement on how they will be managing climate change (sub-category: SUST-4). In most cases the difference between Type 1 and Type 2 codes was obvious but for cases where distinction was difficult, the coding manual was referenced and used. Note that coded sub-categories that included numerical information were coded as Type 3, Type 4 or Type 5.

Type 3: This type codes CEDs that address sub-categories in a numerical, purely quantitative, way with minimal/no narrative. Data coded as Type 3 is believed to have a higher information value (quality) than Type 2 disclosures because of the inclusion of a

numerical element (Beck et al., 2010; Garcia-Meca & Martinez, 2005; Toms, 2002). Typically, numerical data refer to energy consumption, emissions levels and/or environmental liabilities. Numerical elements such as years and mention of numbers in reference to number of goals and aims did not classify as Type 3 disclosures, e.g. this is the case with “We have three environmental aims” (Monsanto India, 2010). It should be noted, however, that these data does not include detail descriptions or narrative. In essence, the narrative component of Type 3 data is equivalent to Type 1 data. For example, “BASF avoided 330 million metric tons of greenhouse gas emissions” (BASF Annual Report, 2011) would be classified as Type 3.

Type 4: This type codes CEDs that address sub-categories in a numerical fashion while also containing added detail, qualitative descriptions, narrative and/or explanation or clarification of this numerical information. For example, “In 2009-10, as our contribution towards the South India flood relief efforts, MIL and its employees made a donation of Rs. 70 lacs to the Chief Minister’s Relief Funds of Andhra Pradesh and Karnataka” (Monsanto India, 2010 p.43) would be classed as Type 4. This includes a numerical value (Rs. 70 lacs) while also providing further explanation of the cause to which this donation amount was given.

Type 5: A CED is considered to be Type 5 if the “number it conveyed was contextualized by means of comparison” (Beck et al., 2010, p. 214). This involves comparing the numerical information with previous years' data, a target, trend, or industry average/figure. For example, “In 2007, emissions of greenhouse gases from BASF’s chemical operations amount to 27.5 million metric tons (2006: 25.0 million metric tons)” (BASF Annual Report, 2007, p. 101) would be classified as Type 5. These CEDs are of higher value than a mere mention of a figure because report users, such as socially responsible investors, can easily determine if environmental improvements exist or, how the company performs in comparison to competitors/industry standards (Beck et al., 2010; SustainAbility/UNEP, 2006). Numerical data that were graphed over time or

compared to previous figures in a chart were coded as Type 5. A sample of the Excel spreadsheet template used to record data can be found in Table 11 in Appendix 8.

The combination of these three unique steps for each piece of coded content produces detailed results and, therefore, represents the uniqueness of the CONI method. The process combines a mechanistic method (Step 2) with an interpretive method (Step 3) to provide richer results and an in-depth look at the quality, quantity and diversity of CED practices.

4.3.4 Why CONI & Coding Decisions

After a review of the literature, the CONI method was chosen because it provides detailed information on CED quality, quantity and diversity (Beck et al., 2010). Unlike other approaches, it consolidates both mechanistic and interpretive studies (Campbell, 2003; Cormier & Gordon, 2001; Momin, 2006; Mukerjee et al., 2010; Patten & Crampton, 2004; Sen et al., 2011; Unerman, 2000). Being that is also a relatively novel method, this study will contribute to the body of knowledge that examines its utility and ease of use for future content analysis studies.

Coding Decisions

As previously mentioned, both voluntary and mandatory information is included as a representative of CEDs. An essential element of content analysis is the "selection and development of categories into which content units (sentences) can be classified" (Tilt, 2001, p. 196). Fortunately, because the CONI method was used for this study, most of the categories and subcategories were already created. However, upon review of the CED literature and numerous annual reports, it becomes evident that important content categories were missing from Beck et al.'s (2010) CONI coding category scheme (the original, unmodified, category scheme is provided in Appendix 7). These categories were tested for their mutual exclusiveness.

In addition, Milne and Adler's test-retest method was used to ensure data are reliably coded. The addition of categories and sub-categories was necessary because the original CONI method was created only using historical literature and annual reports published until 2010 (Beck et al., 2010). There have been significant developments and changes in the environmental issues following 2010 that have become important to companies' CED practices. In terms of coding decisions, if more than one category was mentioned in a sentence, the coder determined what the sentence primarily focused on and then placed the disclosure in this category. If this was not possible, the coder placed the CED in the sub-category first mentioned in the sentence.

Limitations of Content Analysis

Some researchers note that precaution should be taken when using content analysis methods in studies such as this because there are inherent limitations with the instrument (Gray et al., 1995b; Guthrie & Abeysekera, 2006, Milne & Adler, 1999; Unerman, 2000). There are two major limitations associated with content analysis. The first is its inability to explain CED quality and the second is the fact that it is subjective and captures various narratives.

There are many studies that have found that content analysis was unable to explain the quality of CEDs. For example, in order to measure for content quality, Hackston and Milne (1996) examined the quantity of disclosure, news, themes and evidence (Guthrie & Abeysekera, 2006). However, these researchers highlighted the difficulty of finding the relationship between CED quality and these factors. Researchers indicate that content analysis cannot truly measure quality because it does not address user or stakeholder preferences. In order to determine whether information is of high quality, it must be relevant to, and desired by users of environmental disclosures. Therefore, coding categories must be created based on feedback from relevant stakeholders.

This research uses CONI, which is an instrument that codes for quality based on the type of information disclosed (qualitative, quantitative and comparative). Although

this method may not identify the users' needs, it does indicate that quantified data are more likely to represent actual environmental activities and therefore, this is why such data is given a higher quality score (Beck et al., 2010). The second limitation arises from the fact that narratives of environmental information must be captured using a coding instrument, which is a difficult process. Therefore, in order for results to provide valid information, the coding instrument must be reliable. Being that CONI has been used and tested for reliability in the past by previous scholars (Beck et al., 2010) and that a coding manual was created for this research, this limitation has been minimized.

4.3.5 Addition and Removal of CONI Categories & Subcategories

Following the review of a number of annual reports and stand-alone environmental reports, it became evident that a number of relevant categories were missing from Beck et al.'s, (2010) original CONI method. Therefore, as described in detail below, this research has included four additions of sub-categories to existing categories (GEN, ACT, SUST and ENE) and has created an additional six categories: Products (PROD), Responsible Care® (RC), Suppliers (SUPP), Inputs (INP), Compliance (COMP) and External Climate Events (ECE). Of these six new categories, two of them have sub-categories (four in total). Overall, the modified CONI method (m-CONI) has a total of eighteen categories with fifty-nine sub-categories. The categories and sub-categories are provided in more detail in Appendix 5 In order to ensure mutual exclusivity, two of Beck et al.'s (2010) original categories were removed from the content analysis framework. The justification for addition of these new categories and removal of old categories is explained in more detail below.

GEN-8: Need for Improvements/Continual Improvement

This category was added with the ISO 14001 environmental management system and stakeholders' demand for accountability in mind. Reid (2006) argues it is imperative that companies continually improve their environmental performance. With that being said, companies must not only disclose general environmental information and results but

also provide disclosures related to their desire to continually improve environmental practices and performance. This CED category can provide insight into the environmental proactivity and performance of a company (Qadir & Gorman, 2008). These disclosures include any mention of a desire to improve environmental practices and/or performance without discussing another category such as emissions and/or EMS. For example, GEN-8 disclosures include: “our goal is to continuously improve [environmental] safety at our sites and plants” (BASF Annual Report, 2007 p. 105); and “Employees, acting as owners, embrace the principles of excellence and continuous improvement” (Monsanto CSR Report, 2011, p. 26).

PROD-1: Life Cycle Analysis/Product Stewardship

The importance of product-related disclosures, particularly life cycle assessments (LCAs), has increased in recent years. Molina-Murillo and Smith’s (2009) study examines the importance of, and mechanisms used in disclosing, LCAs information to stakeholder via corporate disclosures. Their research indicates that LCAs are a “promising international tool, by which improved communication effectiveness of environmental/sustainable claims may materialize” (Molina-Murillo & Smith, 2009, p. 184). Additionally, the availability of guidelines outlining the LCA process have grown in recent years (GRI, 2012); with some of these provided to corporations by large international organizations (UNEP, 2011). The GRI recently resumed discussions regarding the inclusion of LCA in their global reporting framework (Deloitte, 2012).

Packaging issues are a key component of LCA, and therefore are included in this coding sub-category. Like LCAs, eco-labels convey the environmental and social impact of products (Deloitte, 2011). Additionally, being that strong eco-labels and eco-labeling uses the LCA process to verify that products are environmentally sound (Deloitte, 2011), this component is also included in this sub-category. Upon reading annual and stand-alone environmental reports, it became obvious that many companies included disclosures related to this category. Some companies have developed their own proprietary LCA, risk assessments, global product standards and ecological testing

initiatives; therefore, indicating that this issue is relevant and important to the sample companies. Examples of CEDs that fall into this category include:

[The Global product stewardship offers] transparency thanks to database containing environmental, health and safety information on substances and products (BASF Annual Report, 2010, p. 101)

Another important area of stewardship is application technology, where product safety and preservation of the environment remain top priorities (Syngenta Annual Report, 2010, p. 28)

PROD-2: Environmentally Friendly Products

The addition of the product category and this sub-category was deemed important because a number of CED studies include product disclosures as separate content analysis categories (Hackston & Milne, 1996; Kreuze et al., 1996; Islam & Islam, 2011). The need to add this category was reinforced after examining annual and stand-alone environmental reports and noting that there were many CEDs related to the production of environmentally-friendly products. The production of “green” or environmentally-friendly products has increased greatly over the past 10 years as companies in environmentally-sensitive industries try to maintain their legitimacy. Examples of CEDs coded as PROD-2 include:

[Monsanto] encourages the development and diffusion of environmentally friendly technologies. (Monsanto CSR Report, 2011, p. 35)

New, more effective and environmentally safe chemistry molecules are being widely accepted by the farmers across the country for use in various crops. (Bayercropscience India Annual Report, 2010, p. 31)

Coromandel is spearheading this initiative of rejuvenating soil health by adding organic carbon content in the form of municipal compost. (Coromandel Annual Report, 2011, p. 13)

SUST-4: Climate Change

Climate change is an issue that has become increasingly important for companies. Nearly 85 percent of the top 250 Global Fortune companies address climate change in their annual and/or environmental reports (Araya, 2006b). Many global organizations now recommend that companies disclose information related to climate change; and therefore, in February 2012, the SEC released guidance on climate change disclosures (McTague, 2012). When addressing climate change, most companies mention emission trading schemes or the Kyoto Protocol, two relevant issues that are putting more pressure on businesses (Araya, 2006b). A large component of climate change in the disclosure of data and management strategies related to greenhouse gas emissions. Nearly 70 percent of the 250 Global Fortune companies offer data on GHG emissions (KPMG, 2005). Global initiatives that pressure companies to voluntarily measure GHG emissions and climate change include the Carbon Disclosure Project, the GHG Protocol and shareholder relations on climate change (Araya, 2006b). Interestingly, 59.4 percent of report users would like to see information related to climate change protection (Pleon, 2005). When examining the disclosure documents for this thesis research, it became apparent that CED disclosures mentioning climate change have become increasingly popular and important. Therefore, it was added as an additional sustainability sub-category. Examples of CEDs coded as SUST-4 include:

Extrapolation of current trends paints a picture of an unstable world; an increasing gap between the rich and the poor; billions of people who do not have access to clean water, proper sanitation, adequate food, shelter and health care; and the steady decline in key global ecosystems mainly caused by global warming/climate change (Rallis CSR Report, 2009, p. 45)

Growers must contend with external environmental impacts: climate change, weather volatility, and water scarcity. (Syngenta Annual Report, 2011, p. 17)

We make an important contribution with our climate protection products and our efforts to further reduce emissions along our value-adding chain. (BASF Annual Report, 2011, p. 107)

ACT-5: Environmental Partnerships

In recent years, there has been a steady increase in the popularity of public-private (NGO) partnerships. Environmental partnerships are different from corporate-led environmental activities (categorized as ACT-2) because in many ACT-5 cases, the NGO partner is responsible for management and direction of growth of these joint environmental programs (Hsieh, 2012). Jose and Lee's (2006) study includes a separate sub-category for "environmental partnerships with NGOs" and delineate a clear difference between this subcategory and those from others, which include environmental donations, educational initiatives to promote environmental awareness and corporate initiatives for ecological preservations/environmental clean-ups. Additionally, Stanwick and Stanwick (2000) note that voluntary environmental partnerships with governmental regulatory bodies, like the EPA, can improve corporate environmental practices. Upon recognizing the importance of environmental partnerships, this sub-category was added to the original environmental activities (ACT) category. Examples of CEDs coded as ACT-5 include:

As a member of the European Water Partnership (EWP), we played a decisive role in the development of the European Water Stewardship (EWS) standard, a voluntary industry initiative (BASF Annual Report, 2011, p. 112)

Bayer is also committed to partnerships and collaborations, including public-private partnerships (Bayer Sustainable Development Report, 2011, p. 22)

The goal is to promote the sustainable intensification of agriculture through an innovative partnership model involving public and private cooperation (Bayer Sustainable Development Report, 2011, p. 22)

RC: Responsible Care®

In the original CONI method, disclosures mentioning Responsible Care® (RC) were grouped with GEN-4 (mention of environmental initiatives). However, being that this study examines the chemical industry and RC is a standard used specifically within the chemical industry, it is believed that it was an important metric to track separately from

other environmental initiatives. Non-disclosure may indicate a lack of RC awareness or adoption and differing quantities of CEDs will provide insight into the differing levels of significance companies place on this management standard. Examples of CEDs coded as RC include:

With the aim of further improving our performance in the area of environmental protection, health and safety, and standardizing the associated organizational processes worldwide, we began in the summer 2007 to implement our Responsible Care® Management System (BASF Annual Report, 2007, p. 105)

In addition, we are committed to the International Responsible Care® initiative of the chemical industry... (Bayer Annual Report, 2009, p. 123).

The company has implemented various codes of practice under Responsible Care® program, an initiative of the Indian Chemical Council, which addresses broadly various aspects related to Safety, Health and Environment (United Phosphorus Annual Report, 2011, p. 12)

ENE-3: Energy Usage

Although the original CONI method included a category dedicated to energy disclosures, there was no separate sub-category related to energy usage. In the annual report of companies operating in India, the energy usage is tracked over time and this tracking allows for these data to indirectly provide insight into conservation efforts. It should be noted that CEDs were coded as ENE-3 if they did not mention conservation explicitly; this would place the CED in the ENE-1, energy conservation, sub-category. Additionally, it is widely accepted that usage of energy has many environmental impacts. This added category is also very important to this study because companies operating in India are required, legally, to disclose information related to energy usage. An example of a CED coded as ENE-3 is:

Global energy consumption has grown dramatically in the last few decades and will continue to increase significantly in the future (Bayer Annual Report, 2008, p. 25)

INP-1: Water Inputs

Perhaps one of the most noticeable gaps in Beck et al.'s (2010) original CONI sub-categories was the lack of a category dedicated to "water inputs", classified as INP-1 in this research. The creation of a separate category related to inputs is necessary because although it is obvious that outputs (emissions) have an environmental impact, the extraction and use of certain inputs can also lead to environmental degradation (Araya, 2006b). The amount and source of water being used by these companies is an important environmental issue that surfaced numerous times in the annual and stand-alone sustainability reports. This is because water disclosures are required by the Carbon Disclosure Project, which has been adopted by many of the companies included in this sample (Carbon Disclosure Project, 2009; Daniel & Sojamo, 2012). For example, Bayer's Sustainability Reports (2004-2011) and BASF's Annual Reports each had separate sections with extensive qualitative and quantitative information focused on water consumption, water usage goals, the source of water and efficient use of water (Bayer Sustainability Report, 2011). Additionally, environmental and CED studies have recognized that there is an environmental cost associated with water consumption, and as with energy consumption, the use of water should be efficient (Chan & Lam, 2001; Deegan & Rankin, 1996). Examples of CEDs coded as INP-1 include:

We use water as sparingly as possible at our sites, thus contributing to responsible usage (BASF Annual Report, 2011, p. 112)

A list of examples of efficient use of water attests to our systematic commitment to sustainable water usage in the 2010 reporting year (Bayer Sustainable Development Report, 2010, p. 62)

INP-2: Resource Inputs: Renewable, Non-Renewable and Toxic

The input of renewable, non-renewable and toxic resources to company operations also represents an important sub-category of disclosures. The CEDs focused on the inputs of oil, minerals and metals often note the environmental risks and impacts inherent in

their usage. Additionally, in its G.3 Guidelines, the GRI recommends disclosing information related to use of materials (by weight or volume) (Global Reporting Initiative, 2011). Therefore, this research included INP-2 as an additional sub-category.

An example of a CED coded at INP-2 is:

Highly developed nations are reliant on the available of a range of raw materials including oil, natural gas and metals (Bayer Sustainable Development Report, 2011, p. 66)

SUPP: Sustainable Supply Chain

The creation of a category focused on sustainable supplier issues and it was added because of the topic's recent emergence in literature and guidelines outlining sustainable supply chain management. Tate et al.'s (2010) research examines the disclosure of content related to sustainable supply chain management in companies from a variety of industries (e.g. industrial goods, technology and/or utilities). Results from this study indicate that sustainable supply chain management is an increasingly important component of sustainable development – particularly for companies in the industrial goods and services industries, where operations are dependent on supply chains (Tate et al., 2010).

Additionally, results from Rondinelli's (2007) study indicate that the CSR strategies for most of the large transnational corporations include greening of the supply chain. This is supported by the fact that KPMG's study found that 80 percent of the 1,600 companies included in its survey of CED practices mention supply chain issues; while 70 percent of these companies require suppliers to comply with EHS codes of conduct (KPMG, 2003). Both the GRI and CDP mention the importance of CEDs related to sustainable supply chain issues. The GRI recently created a working group to discuss the inclusion of supply chain disclosures in their reporting framework (GRI, 2012). Furthermore, the CDP notes that for an average corporation, over 50 percent of their emissions originate from the supply chain (Carbon Disclosure Project, 2011). Therefore, the organization notes the importance of disclosing information related to sustainable

supply chain management – with a focus on carbon management (Carbon Disclosure Project, 2011). Therefore, it is increasingly important for companies to report on the environmental impacts of their supply chain, including environmental compliance of suppliers and other supply chain stakeholders. Being that sustainable supply chains have grown in importance in the business sustainability and CED field, it was added as a separate category. Any mention of sustainable supply chains and environmental aspects of supply chain management were coded as SUPP. Examples of CEDs coded as SUPP include:

Our global standards for suppliers harmonize existing local requirements on HSE and ethical behavior with our Code of Conduct (Syngenta Annual Report, 2010, p. 36)

Sustainability audits of 15 suppliers in four countries (China, Thailand, India and Japan) were conducted in cooperation of external auditors (Bayer Sustainable Development Report, 2011, p. 36)

To effectively address the wide-ranging challenges associated with sustainable supply chain and the constant growing demands of stakeholder groups while at the same time developing synergies, Bayer joined two industrial initiatives in 2011 (Bayer Sustainable Development Report, 2011, p. 36)

COMP-1: Compliance with Environmental Regulations

Compliance with environmental regulations is an important CED because it indicates that a company is mindful of environmental regulations. These organizations may also monitor changes in these regulations to minimize environmental risks. Compliance with EPA regulations (including product registrations) and Emissions Trading Schemes (EU-ETS) were disclosures commonly seen in companies operating in the U.S. (Monsanto Annual Report, 2011) and Europe (Bayer Sustainable Development Report, 2011). The GRI also includes a “compliance” category in their G.3 Reporting Guidelines and this is indicative of the growing importance of corporate environmental compliance disclosures (GRI, 2011). Therefore, COMP-1 was added as an additional sub-category for this research. Examples of CEDs coded as COMP-1 include:

Key regulatory approvals were obtained for the 2010 commercial launch of our next generation corn product... as a result, the U.S. EPA and the Canadian Food Inspection Agency allowed reduction of the typical structured farm refuge from 20 percent to 5 percent (Monsanto Annual Report, 2010, p. 47)

Bayer manages its business responsibility in compliance with the statutory and regulatory requirements of the countries in which it operates (Bayer Annual Report, 2010, p. 96)

COMP-2: Compliance with Industry Standards & Norms

These disclosures include any mention of beyond compliance behaviour and/or compliance with industry standards or norms. This disclosure category is important because it differentiates companies that solely comply with regulations from those that go beyond regulations to further improve environmental performance. In fact, for certain industries simple compliance is no longer enough to maintain a social license to operate or their legitimacy (Gunningham et al., 2004). This is because a large proportion of their competitors may exhibit proactive environmental strategies like, the adoption of voluntary environmental management systems and/or a commitment to industry standards (Gunningham et al., 2004). Some companies that have adopted a “beyond compliance” environmental strategy have strong reputations, while also realizing significant cost savings (Canning, 1999). Being that compliance with industry standards and norms is an important environmental consideration, it was added as a separate sub-category, COMP-2. Examples of CEDs coded as COMP-2 include:

Our goals go beyond legal compliance (BASF Annual Report, 2010, p. 111).

This [beyond compliance] was a sign of our voluntary approach to protect the community from any impact (Rallis CSR Report, 2007, p. 28)

COMP-3: Non-compliance and Legal Action

This is an important sub-category as it represents CEDs that are negative in nature. Although there is a separate category for environmental liabilities (LIAB), legal

proceedings related to environmental impacts are separate in nature and therefore were included in the COMP-3 sub-category. This sub-category also includes disclosures related to non-compliance with voluntary standards, initiatives and EMSs. By separating this information from the environmental liabilities information, it is possible to gain insight into the amount and extent of negative environmental impacts that each company had and how this changed over time. Being that the SEC mandates that information related to legal proceedings be disclosed in financial reports, companies operating in the U.S. tend to include a large amount of this information in their CEDs (Monsanto Annual Report, 2001-2011). Based on Mobus' (2005) study, most companies choose to comply with environmental regulations being that non-compliance must be reported and this disclosure can impact operational legitimacy. An increase in COMP-3 disclosures means reduced compliance and therefore, the companies that disclose more COMP-3 disclosures may likely do not highly value environmental issues. Examples of CEDs coded as COMP-3 include:

In respect of a subsidiary of a joint venture entity (PPL), Orissa State Pollution Control Board (OSPCB) issued a notice for closure of the plant due to non-compliance of their direction against which the Company moved to the High Court of Orissa (Zuari Annual Report, 2009, p. 98)

On Sept. 17, 2007 the EPA issued a Notice of Violation to us, alleging violations of the Clean Water Act at the South Rasmussen Mine near Soda Springs, Idaho (Monsanto Annual Report, 2010, p. 28)

ECE: External Climate Events (Weather Related)

This category was added following the review of numerous annual and stand-alone environmental reports. The agrochemical industry is strongly impacted by external weather conditions, climate condition, and events, and therefore, there were numerous CEDs related to weather related impacts, i.e. hurricanes, droughts and rainfall (particularly in India). When these disclosures were mentioned as risks, they were included in the BRR category. However, when they were simply stated, without mention of the risks to the company, they were coded as ECE. These weather-related disclosures

are environmental aspects that impact the company, and therefore they were included in the analysis of CEDs. Examples of CEDs coded as ECE include:

Though overall monsoon was normal with a marginal deviation of -1%, Central India received excessive rainfall as against North-East India which had a deficient monsoon (BayerCropScience India Annual Report, 2006, p. 30)

During the year under review, the Kharif season was good in the Southern states due to good distribution of the South West monsoon; but was erratic in the North and the West (Rallis Chemicals Annual Report, 2009, p. 24)

Removal of Categories:

In order to provide more detailed results, the original CONI POLL-5 (Results) subcategory was removed and the results data for pollution content was categorized under each pollution type (e.g. air, water and/or land) with pollution goals: POLL-1B, POLL-2B, POLL-3B, POLL-4B. In addition, the sub-category POLL-6B: Pollution Related Discourses for Product Development was removed to ensure mutual exclusivity with the newly added PROD category. Being that the new PROD category was created to code data related to product development, LCA and environmentally friendly products, this sub-category was no longer needed. However, it should be noted that the POLL-6 sub-category was kept in order to code data specifically related to pollution aspects of products. Due to the fact that the POLL-5 category was removed, POLL-6 is renamed POLL-5 in the m-CONI framework (Appendix 5). All new categories were tested and subsequently ensured to be mutually exclusive via the test-retest methodology. The newly added categories and subcategories are explained in detail in the detailed coding manual to prevent errors in coding. The data Test-retest methods were calculated using an put data into an online calculator¹ to ensure intracoder reliability:

¹ <http://dfreelon.org/utls/recalfront/>

4.4 Analysis

Diversity Analysis

A total of 18 categories were used in the content analysis method. In order to determine the diversity of the environmental information in annual and stand-alone reports, the coder used a dichotomous scale methodology (as seen in Magness, 2006; Patten, 2002; Wiseman; 1982). The coder gave companies a score of “1” (presence of content related to the category) and a score of “0” (no content) for each category. For each company, the coder summed these data for all categories giving a score out of 18 for each company. The coder then added the diversity scores of the four companies grouped in the same sample (i.e. all P-MNCs, all I-MNCs and all Indian companies) to provide a total out of 32.

These data were then averaged in order to find the Diversity Index for the entire sample group. The Diversity index was scored out of a total of 18 possible points which represents perfect diversity — meaning that all coding categories are disclosed in the reports. However, an index score of “0” represents no disclosure of any environmental information and, therefore, no diversity. In contrast, an index score of “9” indicates that environmental information from 9 categories was disclosed in the reports.

The Diversity Index was then calculated for all sample groups using the formula:

$$\text{Diversity Index} = \frac{\text{Total Summed Diversity Score}}{\text{Total Potential Diversity Score (i.e. 18)}}$$

Once the Diversity Index was calculated for each sample group, the results were compared to each other in order to examine the overall change in diversity over time and differences in diversity of CEDs between sample groups.

Quantity Analysis

After data were collected, quantity information was analyzed by summing the quantity for each sub-category, category and year for each sample group. These quantities were

compared in order to evaluate the overall CED trends and to also compare CED practices between companies (Mukherjee et al., 2010; Tuwairjri et al. 2004). However, like Momin (2006), being that the sample size is relatively small, results are not necessarily representative of the entire population of agrochemical companies. Due to the large amount of data collected, the choice was made to focus on analyzing a smaller sub-set of categories and subcategories for volume analysis. These 10 categories and sub-categories include the following: GEN-3, GEN-4, RES-1a, POLL-TOTAL, PROD-1, SUST-TOTAL, SUST-4, RC, ENE-TOTAL and SUPP.

For each of these categories and subcategories, both the total quantity of disclosures and percentage of total disclosures were calculated. The percentage of total disclosures calculates the proportion that the category/sub-category CEDs occupied of the total CEDs. The assumption was made that the higher the Disclosure Index for a specific category/sub-category, the more important this category/sub-category is to the reporting company (Rizk et al., 2008). This allowed the researcher to compare the CED practices across sample groups to determine if any country-specific trends exist. The Disclosure Index was calculated using the formula:

$$\text{Percentage of Total Disclosures} = \frac{\text{Quantity of CEDs in Category/Subcategory}}{\text{Total Quantity of CEDs}}$$

For the longitudinal and comparative analyses components of this research, average quantities of CEDs were compared using paired and two sample t-tests. Paired t-tests were used to determine if there were significant differences in quantity data over time, i.e. whether there were increases in the data over the 10-year time period. Two sample non-paired t-tests were used when comparing the average quantities of CEDs between each sample group. The one-tailed t-tests were conducted for each sample year to compare the average quantity of P-MNCs CEDs with I-MNCs CEDs and I-MNCs CEDs with domestic Indian companies' CEDs. The use of t-tests in CED research is also used by Stray and Ballantine (2006) and Campbell (2006). If results of these non-paired t-tests

indicated that the quantity of P-MNCs' CEDs were statistically different from I-MNCs' in more years than I-MNCs quantities were statistically different from domestic Indian companies, then it was deemed that I-MNCs' overall quantity of CEDs was more similar to domestic Indian companies.

Quality Analysis

For quality analysis, the decision was made to analyze the data set as a whole, without discussing individual categories and sub-categories. The quality of the CEDs were coded as Type 0 to Type 5 throughout the CONI process and these data were analyzed by comparing not the quantity, but the percentage of the quality Type as a whole of the CED data (Rizk et al., 2008). In order to examine if there had been any significant changes in the quality of the CEDs from 2002 to 2011, the percentage of total disclosure were compared for each quality type. Rizk et al. (2008) also uses percentages in order to describe and compare CEDs. These data were then compared using one-tailed two sample non-paired t-tests to examine if there were statistical significant differences in quality, as determine by percentage of total data, between the sample groups.

$$\text{Percentage of Type "Y"} = \frac{\text{Quantity of Type "Y" CEDs in Year X}}{\text{Total CEDs in Year X}}$$

The "Percentage" data provides insight on the change in quality over time, without accounting for a change in the quantity of CEDs. The data is examined in all sample years, to analyze for overall changes in quality over time, and between sample groups.

5.0 Results, Analysis & Discussion

This section outlines the results, analysis of these results and discussion of the important similarities and differences between sample groups. The data were collected using all available annual reports and stand-alone sustainability reports between the years 2002 and 2011 for the 12 samples companies. Using content analysis the data were coded manually by a single coder and subsequently analyzed. This section is organized in order of the hypotheses established in Section 4.0.

5.1 Diversity of CEDs

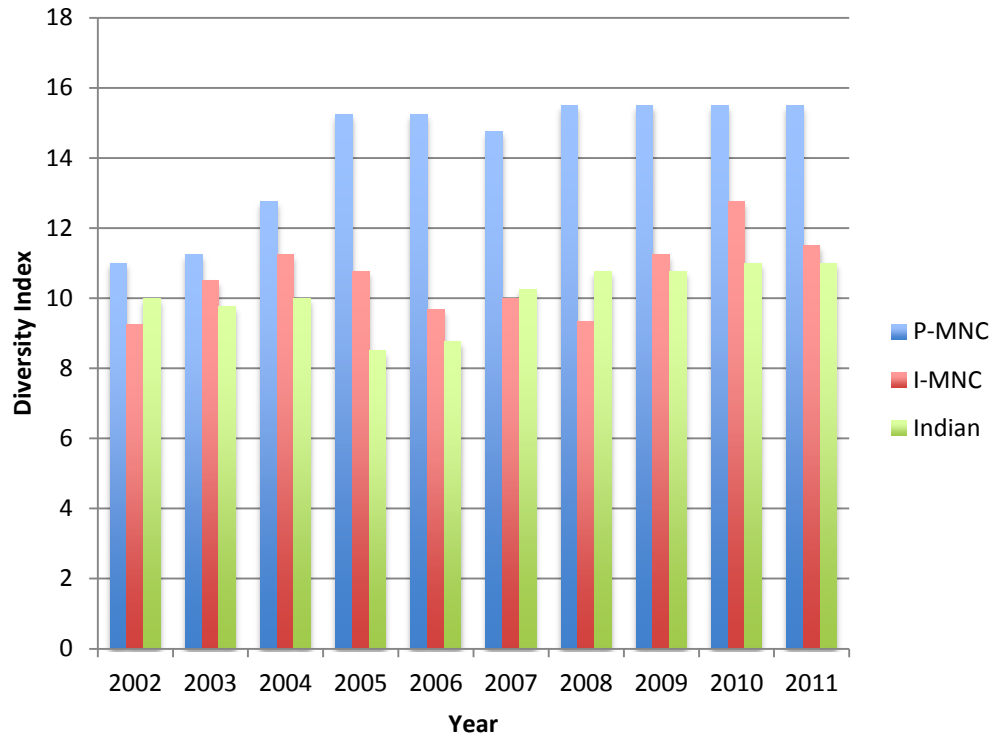
Analysis of Hypothesis H2a:

H2a states that over the 10-year sample period, there has been an increase in the diversity of corporate environmental disclosures for all sample groups (P-MNCs, I-MNCs and Indian domestic companies). This section analyzes the data in order to test this hypothesis.

P-MNCs:

As seen from Figure 1 and Table 6, the average diversity score increases from 11 to 15.5 between 2002 and 2011 respectively. The Tables in Appendix 9 provide a breakdown of diversity score for each P-MNC sample company. This indicates that over time, the diversity of P-MNC's CEDs increases over time with companies originally disclosing information from 11 different environmental categories in 2002 to 15.5 categories in 2011. Originally, most of the P-MNC's CEDs fell into GEN, SUSTAIN, RES and ACT categories. However, by 2011, P-MNCs increased their environmental disclosure diversity to include information in SUPP, INP, ENE and PROD categories.

Figure 1: Diversity Index of CEDs in 2002-2011



	P-MNC	I-MNC	Indian Companies
2002	11	9.3	10
2003	11.3	10.5	9.75
2004	12.8	11.3	10
2005	15.3	10.8	8.5
2006	15.3	9.7	8.75
2007	14.8	10	10.25
2008	15.5	9.3	10.75
2009	15.5	11.3	10.75
2010	15.5	12.8	11
2011	15.5	11.5	11

Table 6. Average CED Diversity Index – P-MNC, I-MNC and Indian companies

Monsanto and Bayercropscience showed a marked increase in the diversity scores between 2002 and 2011 with 7 and 6 categories mentioned respectively in 2002 and 15 and 17 categories of information disclosed in 2011. For Monsanto, the increase in diversity stemmed from inclusion of disclosures related to INP, ACT and PROD, which

were not seen in 2002. For Bayercropscience, the increase in diversity between 2002 and 2011 is due to the growing inclusion of information related to SUPP, INP, ENE, ACT and POLL (categories that were not mentioned in 2002). For P-MNCs, between 2002 and 2011, IRP and COMP are categories that are not commonly mentioned in annual reports and stand-alone environmental reports

I-MNCs:

The average diversity score increases from 9.3 categories disclosed to 11.5 categories disclosed between 2002 and 2011 respectively. Table B in Appendix 9 provides a breakdown of diversity score for each individual I-MNC company. Over the 10-year sample period, I-MNCs broadened the diversity of the information included in their annual reports. The increase in diversity is noticeable for both Bayercropscience India and BASF India with diversity scores increasing from 6 and 11 (2002) respectively to 12 and 16 (2011) respectively. This means that Bayercropscience disclosed environmental information from approximately twice as many categories in 2011 than was disclosed in 2002. For BASF India, the CED diversity increased over time primarily due to the inclusion of disclosures in RES, POLL and INP categories. For Bayercropscience, the increase in the diversity of CEDs was primarily due to growing inclusion of environmental disclosures in ACT, SUSTAIN, POLL and PROD categories, which were not commonly disclosed in 2002. This increase indicates a growing awareness of the diverse environmental issues facing their companies.

Indian Companies:

As seen in Table 12, the average diversity score increased slightly from 10 categories disclosed to 11 categories disclosed between 2002 and 2011 respectively. Table c in Appendix 9 provides a breakdown of diversity score for each individual domestic Indian company in the sample. The Indian company diversity data indicate an increase in diversity score from 55.6 percent (2002) to 61.1 percent (2011). This means that over the 10-year sample period, Indian companies broadened the diversity of the information

included in their annual and stand-alone environmental reports. The increase in diversity is the highest for Zuari and United Phosphorus with diversity scores increasing from 7 and 9 (2002) respectively to 9 and 12 (2011) respectively. For Zuari, the CED diversity increased over time due to the inclusion of disclosures related to POLL and SUST, which were not present in 2002. However, there are still many categories (RES, PROD, BRR, PRESS, SER, RC, INP, IRP or SUPP) that are not mentioned by this company in either 2002 or 2011, which indicates that there is room for improvement in the CED practices of this company. For United Phosphorus the CED diversity increased over time due to the inclusion of disclosures related to RES, PROD, RC and INP.

Overall: This data supported Hypothesis H2a by providing evidence that throughout the 10-year sample period, the diversity of CEDs increases for P-MNCs, I-MNCs and Indian companies.

Analysis of H3a:

H3a: CED practices of companies operating in India, I-MNCs and Indian companies, are of lower diversity than companies operating in developed economies (P-MNCs). This section analyzes the data in order to test this hypothesis.

Throughout the 10-year sample period, the diversity score is consistently lower for I-MNCs than P-MNCs. I-MNCs diversity score is never higher than P-MNCs in any given year during the sample period. For example, in 2002 P-MNCs had an average diversity score of 11.0 categories while I-MNCs only had a score of 9.3. Additionally, in 2011 P-MNCs had an average diversity score of 15.5 while I-MNCs had an average diversity score of 11.5. Even when I-MNCs diversity score peaked in 2010 at 12.8, P-MNCs continued to have a higher diversity score, at 15.5. In fact, generally speaking there are certain categories that are not mentioned commonly for I-MNCs but are mentioned by P-MNCs. These include environmental disclosures in the SUPP, INP, ACT, RES and POLL categories.

Similarly to I-MNCs, Indian companies' diversity score is never higher than P-MNCs diversity score. These means that Indian companies disclose information from fewer categories than P-MNCs. Indian companies' diversity score peaks in 2008 and 2009 at a score of 10.75, but, P-MNCs diversity score is still higher at 15.5 in both years. For Indian companies, there is an overall lack of CEDs in the POLL, PROD, RES and SUST categories. This contrasts with P-MNCs, who commonly include CEDs from these categories in their annual and stand-alone environmental reports.

Overall: This data supported Hypothesis H3a and indicated that the diversity of CEDs was lower in companies operating in India, I-MNCs and Indian, than in companies operating in developed economics, P-MNCs.

Analysis of Hypothesis H1a:

Hypothesis H1a states that foreign subsidiaries (I-MNCs) have adapted corporate environmental disclosure practices to local conditions and consequently, the diversity of I-MNC's corporate environment disclosures is more similar to the diversity of domestic companies than parent companies. This section analyzes the data in order to test this hypothesis.

Interestingly, the original diversity scores and increase in diversity score was more similar between I-MNCs and Indian companies than between I-MNCs and P-MNCs. In 2002, I-MNCs disclose environmental information from 51 percent of the total coding categories while Indian companies disclose information from 55.6 percent of the categories and this percentage increases to 63.9 percent and 61 percent respectively. The percent diversity is higher for P-MNCs in all years, growing from 61 percent in 2002 to 86.1 percent in 2011. This supports Hypothesis H1a. Additionally, both I-MNCs and Indian companies had a lack of POLL, PROD and RES disclosures in all sample years. These same disclosures were present in the annual and sustainability reports of P-MNCs. Additionally, the increase in the diversity index for both I-MNCs and Indian

companies was due in part to the disclosure of information from the SUST category. This validates that I-MNCs adopt a localized approach to CED diversity practices. These data show that I-MNCs and Indian companies' diversity of CEDs lags behind that of P-MNCs.

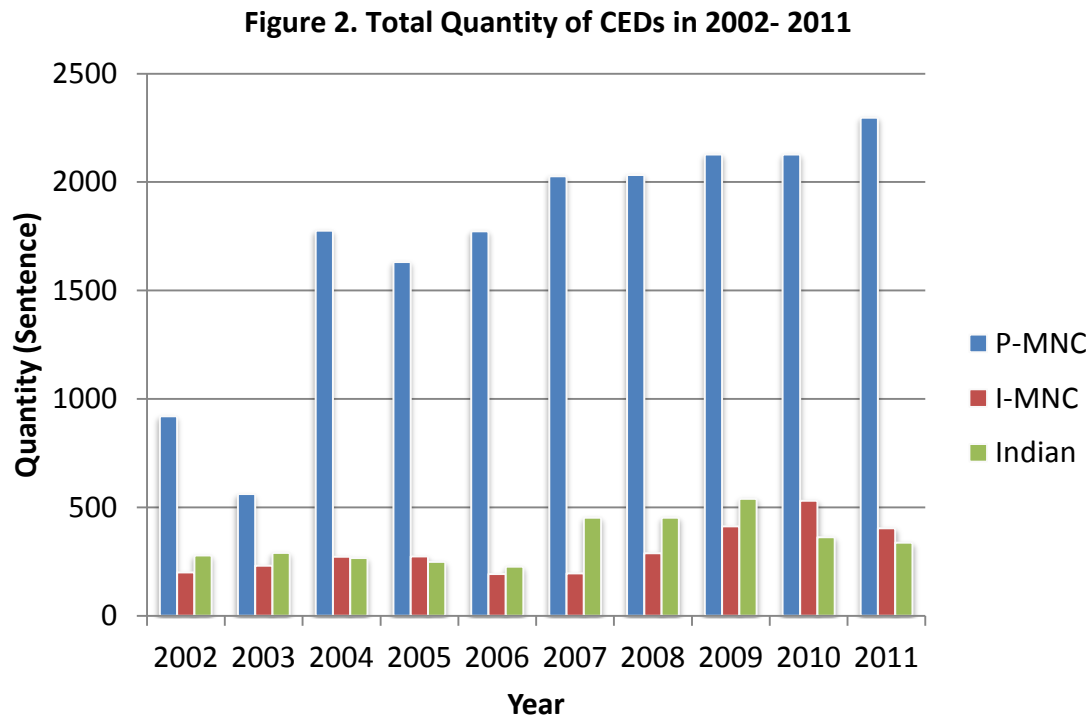
Discussion:

The results from the diversity analyses parallel Pruess and Barkemeyer's (2011) research, which found that there were distinct differences in the type of environmental disclosures made by companies operating in emerging economies and those operating in developed economies. For both I-MNCs and Indian companies, there was a lack of POLL, RES and PROD disclosures. This is in line with Rizk et al.'s (2008) results, which indicate that companies operating in LDCs tend not to disclose information about emissions and instead focus on energy conservation disclosures. Similar results were found by Baxi and Ray (2009), who state that India's public companies tend not to include information about pollution, waste reductions or emissions in their CEDs. The overall increase in diversity indices for all sample groups, may be indicative of a growing awareness of environmental reporting (Kolk et al., 2008) or of a desire to legitimize activities internationally (Araya, 2006b). The observed increase in diversity indices for companies operating in India may be due to the increasing popularity of CED practices in India (KPMG, 2011). Overall, these data show that I-MNCs have adapted the diversity of their CED practices to local Indian conditions. This is supported by Ildiko's (2009) research which states that the unique social and political pressures present in foreign countries may lead to the adaption, by foreign subsidiaries, to localized CED approaches.

5.2 Quantity (Volume) of CEDs

This section details the research results related to the quantity of CEDs throughout the 10-year sample period. The discussion of the results is organized as according to hypotheses H1-3b, with H2b discussed first, followed by H3b and finally, H1b. Within the results discussed here, quantity represents the number of sentences

dedicated to a specific CED category or subcategory i.e. a score of 1 represents one sentence. Figure 2 and Table 7 show the quantity of CEDs for each sample group between 2002 and 2011.



	P-MNC	I-MNC	Indian
2002	921	200	278
2003	562	231	290
2004	1776	272	267
2005	1632	274	249
2006	1774	192	226
2007	2027	196	452
2008	2033	289	452
2009	2127	412	540
2010	2127	531	363
2011	2297	404	337

Table 7. Total Quantity of CEDs 2002-2011

Analysis of Hypothesis H2b:

Hypothesis H2b states that over the 10-year sample period, there has been an increase in the quantity of corporate environmental disclosures for all sample groups (P-MNCs, I-MNCs and Indian domestic companies). This section analyzes the data in order to test this hypothesis.

As seen in Table 8, the P-MNCs CED quantity increased from 921 sentences in 2002 to 2297 sentences in 2011. This was due primarily to CED quantity increases from P-Monsanto and P-Bayercropscience, which grew from 29 and 43 sentences respectively in 2002 to 607 and 897 sentences respectively in 2011. Bayercropscience had the largest quantity of CEDs over the 10-year period at 7305 sentences, while Monsanto had the lowest quantity of CEDs at 2681 sentences. This indicated that Monsanto's negative reputation (Yoon et al., 2006) does not necessarily encourage the company to report more corporate environmental information.

P-MNC: Total Quantity of CEDs

	P-Monsanto	P-Syngenta	P-Bayercropscience	P-BASF	Average
2002	29	260	43	589	230
2003	76	147	40	299	141
2004	106	165	1141	364	444
2005	282	214	743	393	408
2006	318	258	735	463	444
2007	398	339	857	433	507
2008	91	258	1046	638	508
2009	376	273	903	575	532
2010	398	277	900	552	532
2011	607	258	897	535	574
Total	2681	2450	7305	4841	4319

Table 8. P-MNCs' Total Quantity of CEDs 2002-2011: P-MNC's Total

Using a one-tail paired t-test, the quantity data from 2002 and 2011 were compared in order to determine if the increase in average CED quantity, over this period of time, was significant. The null hypothesis states that P-MNCs' average quantity of CEDs is the same in 2002 and 2011. The alternative hypothesis states that P-MNCs' average quantity of CEDs is higher in 2011 than in 2002.

$$H_{0P} = \mu_{2002} = \mu_{2011}$$

$$H_{aP} = \mu_{2011} > \mu_{2002}$$

The p-value for this one-tail paired t-test was 0.0564, indicating that at a 90 percent confidence level, the null hypothesis could be rejected. Additionally, the alternative hypothesis, that the average quantities of P-MNCs' CEDs in 2011 were significantly higher than the average quantity in 2002, may be true.

I-MNC: Total Quantity of CEDs

The I-MNC CED quantity data, in Table 9, indicate that there was an overall increase of 404 CEDs between the years 2002 and 2011. Over the 10-year period, BASF India produced the highest quantity of CEDs at 1061 sentences and Syngenta India produced the lowest quantity of CEDs at 318 sentences—albeit based on only eight years. When comparing data to P-MNCs, it was evident, based on absolute figures, that I-MNCs disclose a lower quantity of CEDs than their parent companies.

	I-Monsanto	I-Syngenta	I-Bayercropscience	I-BASF	Average
2002	54	38	48	60	50
2003	67	38	53	73	58
2004	73	38	93	68	68
2005	63	33	106	72	69
2006	53	Ø	75	64	64
2007	44	Ø	79	73	65
2008	65	34	94	96	72
2009	179	45	91	97	103
2010	129	42	100	103	94
2011	71	50	85	64	68
Total	798	318	824	770	710

Table 9. I-MNCs' Quantity of CEDs 2002-2011

Ø = Annual or Sustainability Report was not made available for this year

Using a one-tail paired t-test, the quantity data from 2002 and 2011 were compared in order to determine if the increase in average CED quantity, over this period of time, was significant. The null hypothesis states that I-MNCs' average quantity of

CEDs is the same in 2002 and 2011. The alternative hypothesis states that I-MNCs' average quantity of CEDs is higher in 2011 than in 2002.

$$H_{0I} = \mu_{2002} = \mu_{2011}$$

$$H_{aI} = \mu_{2011} > \mu_{2002}$$

The p-value for this one-tail paired t-test was 0.049, indicating that at a 95 percent confidence level, the null hypothesis could be rejected. Additionally, the alternative hypothesis, that the average quantities of I-MNCs' CEDs in 2011 were significantly higher than the average quantity in 2002, may be true.

Domestic Indian Companies: Total Quantity of CEDs

The CED quantity data, as seen in Figure 2 and Table 10, for domestic Indian companies indicated that there was a 59 sentence increase between the years 2002 and 2011. When comparing these values to P-MNCs' quantity data, it was evident that domestic Indian companies have a lower quantity of CEDs than P-MNCs throughout the 10-year sample period. Over the 10-year period, Rallis Chemicals produces the highest quantity of CEDs at 1383 sentences and Zuari produces the lowest quantity of CEDs at 590 sentences.

	Coromandel	Rallis	United Phosphorus	Zuari	Average
2002	101	89	22	66	70
2003	106	61	60	63	73
2004	88	58	67	54	67
2005	48	55	74	72	62
2006	40	54	83	49	57
2007	46	275	78	53	113
2008	56	264	80	52	113
2009	60	344	80	56	135
2010	101	89	106	67	91
2011	90	94	95	58	84
Total	736	1383	745	590	864

Table 10. Domestic Indian Companies' Quantity of CEDs in 2002-2011

Using a one-tail paired t-test, the quantity data from 2002 and 2011 were compared in order to determine if the increase in average CED quantity, over this period of time, was significant. The null hypothesis states that Indian companies' average quantity of CEDs is the same in 2002 and 2011. The alternative hypothesis states that Indian companies' average quantity of CEDs is higher in 2011 than in 2002.

$$H_{0d} = \mu_{2002} = \mu_{2011}$$

$$H_{ad} = \mu_{2011} > \mu_{2002}$$

The p-value for this one-tail paired t-test was 0.244, indicating that at a 90 percent confidence level, the null hypothesis could not be rejected. This indicated that there is no statistically significant increase in the quantity of domestic companies' CEDs between 2002 and 2011. This contrasts with the significant increase CED quantity observed in P-MNCs and I-MNCs' data.

Overall, each sample group, as a whole, exhibited an increase in the quantity of their CEDs from 2002 to 2011, and this supports Hypothesis H2b. However, only P-MNCs' and I-MNCs' increase in CED quantity between 2002 and 2011 was statistically significant.

Analysis of Hypothesis H3b:

Hypothesis H3b states that CEDs of companies operating in India, I-MNCs and Indian companies, are of lower quantity than companies operating in developed economies (P-MNCs). This section analyzes the data in order to test this hypothesis.

Statistical Testing:

Using a one-tailed two sample t-test, the means of the CED quantity data for P-MNCs, I-MNCs and domestic Indian companies were compared to see if there were statistically significant differences observed throughout the 10-year sample period.

P-MNC and I-MNC Quantity:

In order to determine whether there was a significant difference in the mean quantity of CEDs between P-MNCs and I-MNCs, a one-tail t-test was conducted on the sample data for each sample year. The null hypothesis, H_{0PI} , stated that in every sample year, P-MNCs' mean quantity of CEDs equal to I-MNCs' mean quantity of CEDs. The alternative hypothesis, H_{aPI} , stated that P-MNCs' mean quantity of CEDs is larger than I-MNCs' mean quantity of CEDs.

$$H_{0PI} = \mu_{I-MNC} = \mu_{P-MNC}$$

$$H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$$

Year	P-MNCs	I-MNCs	P-Value
2002	230.3	50.0	0.1309
2003	140.5	57.8	0.1224
2004	444.0	68.0	0.1067
2005	408.0	68.5	**0.0310
2006	443.5	64.0	**0.0161
2007	506.8	65.3	**0.0165
2008	508.3	72.3	*0.0663
2009	531.8	103.0	**0.0255
2010	531.8	132.8	**0.0269
2011	574.3	101.0	**0.0164

Table 11. Average Quantity of P-MNCs and I-MNCs CEDs and P-Values

*Significant at the 0.1 level; **Significant at the 0.05

Based on these data, the H_{0PI} was rejected in favour of H_{aPI} in 2005-2011. Data indicated, with a confidence level, of 95 percent that there are no significant differences between P-MNCs and I-MNCs mean quantity of CEDs in 2002-2004. However, data indicate with a confidence level of 95 percent that there was a statistical significant difference between the two datasets here P-MNCs' mean quantity of CEDs being higher than I-MNCs mean quantity.

P-MNC and Domestic Indian Companies:

The same one-tail two sample t-test was conducted on the CED quantity data for P-MNCs and domestic Indian companies' to determine whether there was a significant

difference in the mean quantity of CEDs in each sample year. The null hypothesis, H_{0PD} , stated that in each sample year, P-MNCs' mean quantity of CEDs is equal to the domestic Indian companies' mean quantity of CEDs. The alternative hypothesis, H_{aPD} , stated that P-MNCs' mean quantity of CEDs is larger than the domestic Indian companies' mean quantity of CEDs. The results of the one-tail t-test can be found in Table 12.

$$H_{0PD} = \mu_{DOM} = \mu_{P-MNC}$$

$$H_{aPD}: \mu_{P-MNC} > \mu_{DOM}$$

Year	P-MNCs	Domestic Indian Companies	P-Value
2002	230.3	69.5	0.1537
2003	140.5	72.5	0.1615
2004	444.0	66.75	0.1061
2005	408.0	62.25	**0.0301
2006	443.5	56.5	**0.0176
2007	506.8	113	**0.0183
2008	508.3	113	*0.0795
2009	531.8	135	**0.0286
2010	531.8	90.75	**0.0233
2011	574.3	84.25	**0.0166

Table 12. Average Quantity of P-MNCs and Indian Companies CEDs and P-Values

*Significant at the 0.1 level; **Significant at the 0.05 level

Based on these data, H_{0PI} was rejected in favour of H_{aPD} in 2005-2011. Similar to the data retrieved with P-MNCs and I-MNCs, the results show that, at a confidence level of 95 percent, there were no statistically significant differences in the mean quantities of CEDs in 2002-2004. However, in 2005-2011 there were statistically significant differences in the mean CED quantities between the two sample groups. Upon further examination of the data, it was evident that P-MNCs mean CED quantities were larger than the domestic Indian Companies' mean quantities in 2005-2011. This provides evidence that P-MNCs mean CED quantity in 2002-2004 is significantly higher than domestic Indian companies' mean quantity. These results parallel, Kolk et al.'s (2001) research, which indicates that national context can impact the quantity of CEDs. In fact, Momin's (2006) indicates that companies operating in emerging and developing

economies exhibit a lower quantity of CEDs than companies operating in developed economies.

Overall:

The content analysis data collected indicates that overall, the total environmental disclosures of P-MNCs greatly exceed those of both I-MNCs and domestic Indian companies. These data partially support Hypothesis H3b by indicating that P-MNCs' average CED quantity is significantly different, in fact larger, than the I-MNCs and Indian companies' average CED quantities in 2005-2011. However, this was not the case in 2002-2004 where the data showed that differences were not statistically significant. This indicates that over time, the differences in the quantity of CEDs have become more pronounced between P-MNCs and I-MNCs and P-MNCs and domestic Indian companies.

Analysis of Hypothesis H1b:

Hypothesis H1b states that foreign subsidiaries (I-MNCs) have adapted corporate environmental disclosure practices to local conditions and consequently, the quantity of I-MNC's corporate environment disclosures is more similar to the quantity of domestic companies than to parent companies. This section analyzes the data in order to test this hypothesis.

Indian Companies and Domestic Indian Companies

As previously described, a one-tail t-test was used to determine if there was a significant difference in the average quantity of CEDs between I-MNCs and domestic Indian companies. This t-test was completed for each sample year. The null hypothesis, H_{0ID} , stated that in each sample year, I-MNCs' mean quantity of CEDs is equal to the domestic Indian companies' mean quantity of CEDs. The alternative hypothesis, H_{aPD} , stated that P-MNCs' mean quantity of CEDs is larger than the domestic Indian companies' mean quantity of CEDs

$$H_{0ID} = \mu_{I-MNC} = \mu_{DOM}$$

$$H_{aID}: \mu_{I-MNC} > \mu_{DOM}$$

In order to test hypothesis H1b, the frequency of instances of statistically significant differences were compared. If there were statistically significant differences in the mean CEDs compared in Table 11 but none in Table 13, hypothesis H1b would be supported. Table 13 data indicate that, for each sample year, the null hypothesis, H_{0ID} , is accepted.

Year	I-MNCs	Domestic Indian Companies	P-Value
2002	50.0	69.5	0.1749
2003	57.8	72.5	0.1628
2004	68.0	66.75	0.4653
2005	68.5	62.25	0.3605
2006	64.0	56.5	0.2678
2007	65.3	113	0.2247
2008	72.3	113	0.2444
2009	103.0	135	0.3464
2010	132.8	90.75	0.2163
2011	101.0	84.25	0.3274

Table 13. Average Quantity of I-MNCs and Indian Companies CEDs and P-Values

*Significant at the 0.1 level; **Significant at the 0.05 level

At a 95 percent confidence level there is of no statistically significant difference in the mean quantity of CEDs between domestic Indian companies and I-MNCs. This is similar to Moneva and Llena's (2000) research, which shows that there is no statistical difference in the quantity of CEDs made by foreign subsidiaries and domestic companies operating in Spain. However, Table 11 showed that in 2005-2011 there were significant differences in the average quantity CEDs made by P-MNCs and I-MNCs, with P-MNCs disclosing a higher average quantity of CEDs. This indicates that I-MNCs appear to adapt to localized CED reporting practices in India. The CED reporting practices of foreign subsidiaries are more similar in quantity to their country-of-operation than country-of-origin. This supports foreign ownership research conducted by scholars, who indicate that foreign subsidiaries do not necessarily disclose more environmental information

than domestic companies in the same industry (Darus et al., 2009; Hossain, 2006; Moneva & Llena, 2000; Monteiro & Aibar-Guzmán, 2010).

Discussion

The longitudinal results indicated that CED quantity has increased over time for all sample groups with statistically significant increases observed for P-MNCs and I-MNCs. This means that companies operating in both developed and emerging economies have disclosed more environmental information over time. These results parallel research focused on companies operating in developed economies (Beck et al., 2010; Gray et al., 1991), as well as, Rizk et al.'s (2008) study, which found that the quantity of environmental disclosures increase over time in LDCs. These increases may have been attributed to changes in external pressures, like stakeholder pressure (Kolk et al., 2008), or internal company-strategies, such as use of environmental reporting standards (KPMG, 2011). Based on Stanwick and Stanwick's (2006) theory, an increase in the quantity of environmental disclosures over time may indicate that P-MNCs, I-MNCs and Indian companies are more aware of the importance that disclosures have in serving the needs of their various stakeholders. They also argue that an increasing quantity of environmental disclosures means that a company is becoming increasingly environmentally proactive. Therefore, following this assumption, all sample companies' may have become more environmentally proactive over the 10-year sample period. Overall, the longitudinal increase in the quantity of environmental disclosures indicates that the practice of disclosing environmental information has become more important for all sample groups.

Similar to Momin's (2006) results, these data showed that throughout the 10-year period, P-MNCs had a high quantity of CEDs than I-MNCs and Indian companies. This difference may be explained by differences in the maturity of environmental reporting practices in developed economies versus India (Peiyuan, 2002). Christmann and Taylor (2004) indicate that this decreased level of CEDs in emerging economies may be due to lack of government support or weaker systems for implementation of

reporting. It is known that India does not have strong legal requirements, like those seen in developed countries, for CER and therefore, this may have led to a reduction in the quantity of CEDs. In fact, this explanation is supported by research, which indicates that the quantity of CEDs are higher in developed countries due to stricter environmental disclosure accounting regulations and heightened pressure from external stakeholders.

Another observation made from the results, was that the quantities of I-MNCs' CEDs were more similar to domestic Indian companies than their parent companies. These results are similar to those found in Momin's (2006) research, and they support the theory that I-MNCs adapt CED practices to local Indian context to institutional duality. Overall, it appears that institutional factors were more important in shaping CER than foreign association (Momin, 2006). In fact, these results also parallel Araya's (2006b) findings which indicate that companies operating in an emerging economy, but headquartered in a developed economy are less likely to disclose high quantities of environmental information. Overall, these results support Muller and Kolik's (2005) observations, which state that due to varying institutional factors, the emerging market setting is unique. In turn, these varying factors may lead to differences in quantity of CEDs between parent companies and their foreign subsidiaries.

5.3 Quantity of CEDs: Subcategory Analysis

The purpose of this detailed subcategory analysis is to provide insight into Hypothesis H1b. H1b states that foreign subsidiaries' (I-MNCs) CEDs are locally responsive and consequently the quantity of I-MNC's corporate environment disclosures will be more similar to the quantity of domestic companies than their parent companies. These analyses will highlight, for each sample group, the similarities and differences in the quantity of disclosures in various sub-categories.

For each sample year, CEDs from a total of ten categories and sub-categories were analyzed using one-tailed non-paired t-tests. The ten sub-categories and categories analyzed were GEN-3, GEN-4, RES-1A, POLL-TOTAL, PROD-1, SUST-TOTAL,

SUST-4, RC, ENE and SUPP. By doing so, the results will indicate whether there are statistically significant differences in the proportion of CEDs in sub-categories. This will illustrate whether I-MNCs' quantity of CEDs is more similar to their parent companies or domestic Indian companies. The detailed tables in Appendix 11 provide an overview of the percentage of total CEDs that each coding sub-category occupied for each year in the 10-year study period. Tables 14 - 16 illustrate the percentage of total CEDs that each analyzed sub-category occupied in 2002-2011. Changes to the percentages represent either an increase or decrease in the quantities of disclosures from a specific subcategory or category. The percentage figures illustrate what disclosure make up the majority of the total CEDs. This table is referenced often in the subcategory analyses, results and discussions.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
GEN-3	4%	3%	2%	2%	2%	2%	4%	3%	2%
GEN-4	4%	3%	5%	4%	4%	3%	4%	5%	5%
RES-1A	2%	1%	1%	1%	1%	1%	2%	1%	1%
POLL	17%	17%	32%	15%	17%	14%	17%	14%	12%
PROD-1	7%	3%	3%	2%	2%	4%	4%	5%	3%
SUST-TOTAL	9%	12%	10%	11%	14%	13%	19%	13%	11%
SUST-4	1%	0%	0%	1%	3%	3%	4%	2%	1%
RC	4%	1%	1%	2%	1%	1%	2%	2%	1%
ENE	4%	5%	7%	6%	5%	5%	7%	7%	4%
SUPP	1%	2%	0%	1%	2%	2%	2%	2%	2%

Table 14. P-MNCs' CED Subcategories as a Percentage of Total CEDs

	2002	2003	2004	2005	2006	2007	2008	2009	2010
GEN-3	4%	3%	3%	2%	4%	3%	2%	1%	2%
GEN-4	2%	2%	2%	2%	3%	3%	2%	1%	1%
RES-1A	0%	0%	1%	0%	0%	0%	0%	0%	1%
POLL	1%	1%	1%	1%	2%	1%	1%	2%	6%
PROD-1	0%	0%	0%	0%	0%	0%	1%	0%	1%
SUST-TOTAL	3%	3%	1%	4%	2%	2%	7%	15%	14%
SUST-4	0%	0%	0%	0%	0%	0%	1%	3%	2%
RC	1%	1%	1%	0%	1%	1%	0%	1%	2%
ENE	51%	55%	54%	53%	52%	63%	55%	39%	31%
SUPP	0%	0%	0%	0%	0%	0%	0%	0%	1%

Table 15. I-MNCs' CED Subcategories as a Percentage of Total CEDs

	2002	2003	2004	2005	2006	2007	2008	2009	2010
GEN-3	4%	6%	3%	3%	2%	3%	3%	1%	2%
GEN-4	2%	2%	2%	2%	2%	5%	5%	1%	1%
RES-1A	1%	0%	1%	0%	0%	2%	1%	0%	0%
POLL	5%	8%	11%	3%	4%	12%	10%	3%	6%
PROD-1	0%	0%	0%	0%	0%	1%	1%	0%	1%
SUST-TOTAL	2%	1%	0%	0%	0%	6%	5%	1%	2%
SUST-4	0%	0%	0%	0%	0%	1%	1%	0%	0%
RC	0%	0%	1%	1%	0%	1%	1%	0%	0%
ENE	51%	38%	34%	59%	56%	33%	32%	25%	40%
SUPP	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 16. Indian Companies' CED Subcategories as a Percentage of Total CEDs

GEN-3: Environmental Management System Disclosures

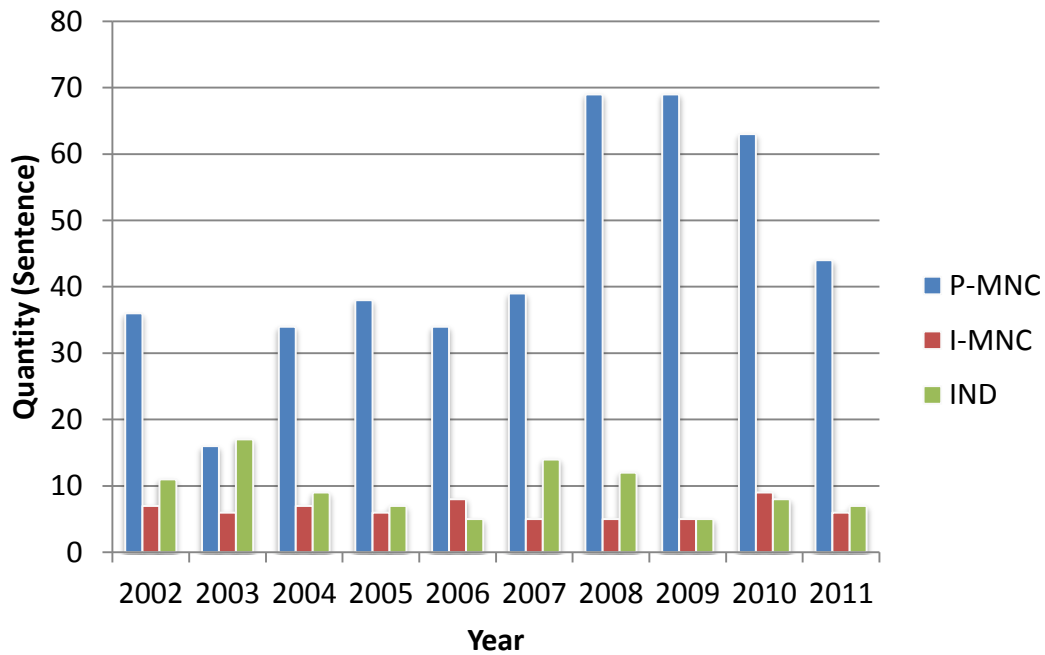
There have been many CED studies that examine and create a separate category in content analysis methods for the disclosure of information related to environmental management systems (Beck et al., 2010; Davis & Searcy, 2010; Jose & Lee, 2007; Kolk, 2005). Companies looking to legitimize their environmental activities may seek external ISO 14001 or EMAS verification (Bansal & Bogner, 2002; Delmas & Montiel, 2008; Nishitani, 2009). This certification or verification can assist companies legitimize their activities to their governments, customers and suppliers. The total disclosure of information related to environmental management systems shows a large difference in the GEN-3 disclosure quantities between P-MNCs and I-MNCs (Figure 3).

P-MNCs: Quantity of GEN-3 disclosures

As seen in Figure 3 and Table 17, the GEN-3 data for P-MNCs indicated that the quantity of GEN-3 disclosures increased by 8 sentences from 2002 to 2011. The percentage that GEN-3 disclosures occupied of the total disclosures decreased slightly over the 10-year sample period dropping for 4 percent in 2002 to 2 percent in 2011 (Table 14). The percentages are indicative of the value that a company places on reporting information from a certain category (Rizk et al., 2008). Therefore, when there are a large percentage

of total disclosures dedicated to a sub-category, the company strongly values the reporting of information from this sub-category. Therefore, a decrease in the percentage of GEN-3 disclosures of total disclosures may indicate that reporting of GEN-3 disclosures have become less valuable for P-MNCs in 2011 than 2002.

Figure 3: Quantity of GEN-3 CEDs in 2002-2011



Year	P-MNC	I-MNC	IND
2002	36	7	11
2003	16	6	17
2004	34	7	9
2005	38	6	7
2006	34	8	5
2007	39	5	14
2008	69	5	12
2009	69	5	5
2010	63	9	8
2011	44	6	7

Table 17. Total Quantity of GEN-3 CEDs in 2002-2011

P-MNCs: Quantity of GEN-3 disclosures

As seen in Figure 3 and Table 17, the GEN-3 data for P-MNCs indicated that the quantity of GEN-3 disclosures increased by 8 sentences from 2002 to 2011. The percentage that GEN-3 disclosures occupied of the total disclosures decreased slightly over the 10-year sample period dropping from 4 percent in 2002 to 2 percent in 2011 (Table 14). The percentages are indicative of the value that a company places on reporting information from a certain category (Rizk et al., 2008). Therefore, when there is a large percentage of total disclosures dedicated to a sub-category, the company strongly values the reporting of information from this sub-category. Therefore, a decrease in the percentage of GEN-3 disclosures of total disclosures may indicate that reporting of GEN-3 disclosures have become less valuable for P-MNCs in 2011 than 2002.

I-MNC: Quantity & Percentage of GEN-3 disclosures

The disclosure of EMS information for I-MNCs remained below 10 sentences per year throughout the 10-year sample period, indicating that do not disclose much information related to EMS. The GEN-3 quantity data for I-MNCs indicated that there was a slight decrease in the quantity of GEN-3 disclosures over the 10-year sample period from 7 sentences in 2002 to 6 sentences in 2011, this represented a decrease in percentage of total disclosures of 14 percent.

Indian Companies: Quantity & Percentage of GEN-3 Disclosures

The GEN-3 quantity data for Indian companies indicated Indian companies disclosed slightly more GEN-3 information than I-MNCs with 11 sentences in 2002 and 7 sentences in 2011. This slightly higher amount of disclosure may be the Indian companies desire to gain legitimacy by external and foreign purchasers, as discussed by Qadir and Gorman (2008). However, like I-MNCs and P-MNCs, there was a decrease in the quantity of GEN-3 disclosures over the 10-year period, which was a 36 percent decrease in quantity.

Comparison of Data using One-tailed Two Sample T-tests:

In order to test Hypothesis H1b and determine whether I-MNCs average quantity of GEN-3 disclosures were more similar to P-MNCs or the domestic Indian companies, a one-tailed two sample t-test was conducted. From this statistical test, the p-values were calculated and compared to see whether there were statistically significant differences between the datasets in each sample year.

The null hypotheses used for these statistical tests were as follows:

- a) $H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were as follows:

- a) $H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$
- b) $H_{aDI}: \mu_{DOM} > \mu_{I-MNC}$

	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.1824	0.2350
2003	0.2562	*0.0881
2004	0.1029	0.3277
2005	0.1224	0.3677
2005	0.1426	0.3120
2006	0.1024	0.2104
2008	*0.0924	0.2148
2009	*0.0854	0.5000
2010	0.1030	0.4343
2011	0.1004	0.4173

Table 18. P-Values for Mean Quantity of GEN-3 CEDs in 2002 - 2011

*Significant at 0.1; **Significant at 0.05

This data indicated that for dataset a), the null hypothesis can be rejected at a 90 percent confidence level in 2008 and 2009. Therefore, in these same years, the alternative hypothesis may be true. In contrast, at the same confidence level, there was only one statistically significant difference observed in dataset b). These data comparisons supported Hypothesis H1b by indicating that I-MNCs GEN-3 disclosures are

more similar to domestic Indian companies than their parent companies. This is because there are more statistically significant differences between the P-MNCs' and I-MNCs' mean quantity of GEN-3 CEDs than I-MNCs' and domestic Indian companies' mean quantity of GEN-3 CEDs. These data therefore support the localization theory for I-MNCs' GEN-3 corporate environmental reporting.

Discussion

The disclosure quantity of GEN-3 for I-MNC is more similar to the GEN-3 disclosure quantity for Indian companies, than P-MNCs. The large quantity of GEN-3 disclosure for P-MNCs indicated that these companies placed a higher value on reporting information related to EMSs than I-MNCs or domestic Indian companies. An example of high EMS disclosure is found in Bayercropscience's 2011 Sustainable Development Report with the following disclosures:

To meet this goal, the company has established HSEQ management systems in all subgroups and service companies that are based on recognized international standards and are regularly reviewed and updated (p. 66)

More than 80 percent of our business activity worldwide (in relation to production volume and energy consumption) takes place at sites that are externally certified or validated according to recognized international standards such as ISO 14001, EMAS and OHSAS 18001 or local standards such as Industria Limpia in Mexico (p. 66)

The high quantity of GEN-3 disclosure indicated that P-MNCs might have viewed this topic as important for managing risk and increasing shareholder value (Morrow & Rondinelli, 2002). When GEN-3 disclosures were present in I-MNC and Indian annual and stand-alone reports, these disclosures often focused specifically on ISO 14001 verification/certification. For example, Rallis, Coromandel and Bayercropscience India included the following disclosures in their annual reports:

Environmental Management System at all locations has been re-certified under ISO 14001: 2004 version based on the concepts of sustainable development, continual improvement and aspect-impact assessment (Rallis Annual Report, 2008, p. 21)

Mitigation plan for environmental/economic/regulatory risks includes ISO 14001 & OHSAS 18001 (Coromandel Annual Report, 2011, p. 35)

The Environmental Management System for Himatnagar was audited by TUV and recertified to ISO 14001: 2004 certificate (Bayercropscience India Annual Report, 2007, p. 10)

This focus indicated that companies operating in India value ISO 14001 certification as it may increase their international operating legitimacy (Bansal & Bogner, 2002). In fact, Qadir and Gorman (2008) indicate that in some industries, ISO 14001 certification is necessary if companies want to do business with other companies in developed economies. The GEN-3 disclosures of P-MNCs were more diverse than both I-MNCs and Indian companies. In fact, P-MNCs mentioned of a variety of EMS, that included but were not limited to Sustainability Management Systems (BASF Annual Report, 2010), Ecoefficiency Management (BAF Annual Report, 2011) and Environmental Audits and HSEQ Management (Bayercropscience Annual Report, 2011). However, it should be noted that the P-MNC Monsanto does not mention ISO 14001 verification or certification or any other EMS processes.

Quantity of GEN-4 CEDs: Environmental Disclosure Guidelines

GEN-4 disclosures are environmental information related to the disclosure/ reporting guidelines adopted by companies, such as the Global Reporting Initiative or Independent Assurance Practices. Araya (2006b) indicates that, in order to prevent accusations of green-washing, companies use standard environmental disclosure guidelines and also adopt external verification and assurance. This is in order to verify the credibility of the information included in the reports. Two major global assurance standards exist, the International Standard on Assurance Engagement designed by the International Federation of Accountants, and the Assurance Standard designed by

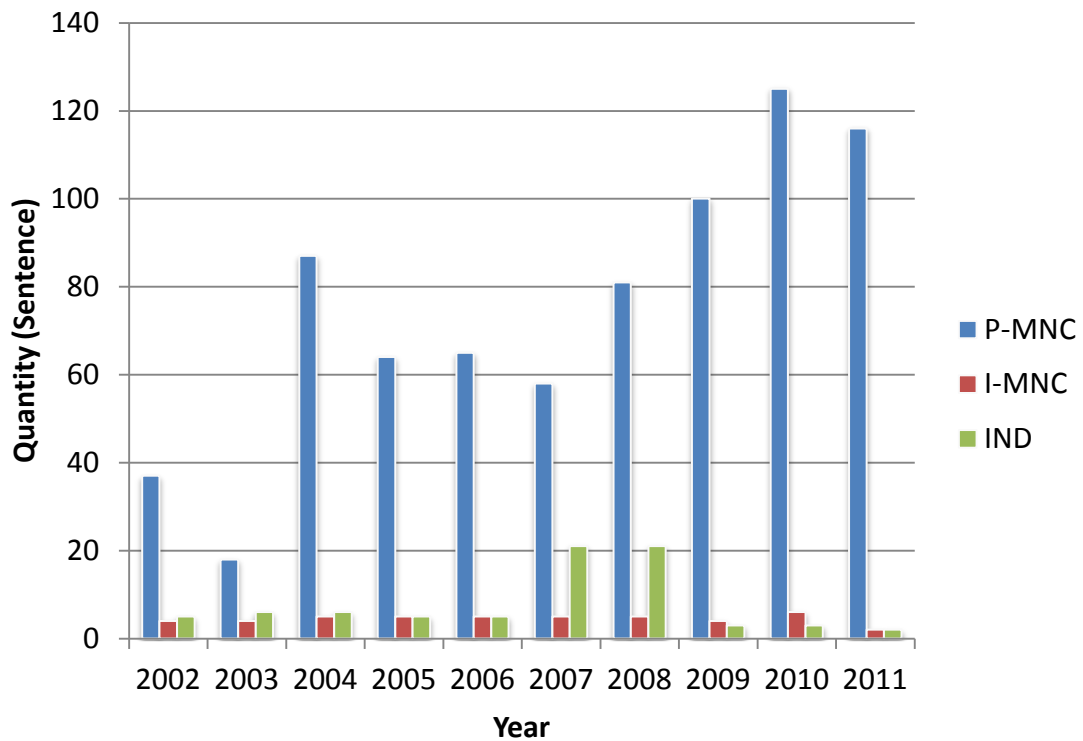
AccounAbility (Araya, 2006b). In addition, certain countries (Australia, Germany, Japan, Sweden and the Netherlands) have developed domestic assurance standards (Araya, 2006b).

In order to verify CEDs, a third-party evaluator, such as an accounting firm or NGO may audit information and data, certify EMS or evaluate the quality of the stakeholder engagement process (Roz, 2005). KPMG's (2011) study indicates that approximately 45 percent of the top 250 companies use assurance processes to verify their sustainability report information. In fact, although the number of companies that produce sustainability reports is low in India, of those companies included in KPMG's (2011) study, 80 percent of Indian companies use assurance to verify their report information. This is the largest percentage amongst all countries, compared to 56 percent of UK companies, 35 percent of German companies, 27 percent of Swiss companies and only 13 percent of American companies who use assurance (KPMG, 2011). This is similar to Indian companies' desire to externally verify EMS in order to gain legitimacy. The inclusion of GRI information has become increasingly popular in environmental reports. In fact, Davis and Searcy's (2010) review of CED research indicates that the examination of GRI guidelines is a reoccurring theme in the literature. Figure 4 and Table 19 show the quantity of GEN-4 CEDs for all sample groups over the 10-year sample period.

MNCs: Quantity & Percentage of GEN-4 Disclosures

The GEN-4 data for P-MNCs indicated that quantity increased by 79 sentences between 2002 and 2011. This increase in quantity was also accompanied by an increase in the percentage of total disclosures from 4 percent in 2002 to 5 percent in 2011. This increase in P-MNCs' GEN-4 quantity is supported by KPMG's (2011) research which indicates that for MNCs, guideline-based environmental reporting, i.e. the use of guidelines like the GRI, has increased over time. Overall, the quantity of P-MNCs GEN-4 CEDs remains higher than the quantity of I-MNCs and domestic Indian companies' disclosures.

Figure 4. Quantity of GEN-4 CEDs in 2002 - 2011



Year	P-MNC	I-MNC	IND
2002	37	4	5
2003	18	4	6
2004	87	5	6
2005	64	5	5
2006	65	5	5
2007	58	5	21
2008	81	5	21
2009	100	4	3
2010	125	6	3
2011	116	2	2

Table 19. Total Quantity of GEN-4 CEDs in 2002 - 2011

I-MNCs: Quantity & Percentage of GEN-4 Disclosures

The GEN-4 quantity data for I-MNCs indicated that this sample group did not commonly report information regarding environmental disclosure guidelines. It does not prove that these companies do not use guidelines, but only that they do not find the disclosure of

such information important. In fact, over the 10-year period, there was a slight decrease in the number of GEN-4 CEDs, from 4 sentences in 2002 to 2 sentences in 2011.

Indian Companies; Quantity & Percentage of GEN-4 Disclosures

The GEN-4 quantity data for Indian companies indicated that like I-MNCs, these companies did not commonly disclose information related to external environmental reporting guidelines. Like I-MNCs, there was a slight decrease in the number of CEDs, from 5 sentences in 2002 to 2 sentences in 2011. In absolute terms, the quantity of I-MNCs and Indian companies' GEN-4 disclosures were more similar to each other than to the quantity of P-MNCs CEDs.

Comparison of Data using One Tail Two Sample T-tests:

The null hypotheses used for these statistical tests were as follows:

- a) $H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were as follows:

- a) $H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$
- b) $H_{aDI}: \mu_{DOM} > \mu_{I-MNC}$

	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.1727	0.3188
2003	0.1610	0.2475
2004	0.1100	0.3684
2005	0.1100	0.5000
2005	*0.0853	0.5000
2006	*0.0879	0.2384
2008	**0.0315	0.2381
2009	**0.0419	0.3526
2010	**0.0467	0.2953
2011	**0.0441	0.5000

Table 20. P-Values for Mean Quantity of GEN-4 CEDs in 2002 - 2011

*Significant at 0.1 **Significant at 0.05

This data indicated that for dataset a) P-MNC and I-MNC, the null hypothesis can be rejected at a 90 percent confidence level in 2005 and 2006. Additionally, the null hypothesis can be rejected at a 95 percent confidence level in 2008-2011. These data indicated there are significant differences in the average quantity of GEN-4 CEDs between P-MNCs and I-MNCs. Therefore, in 2005-2011 the alternative hypothesis, that the quantity of P-MNCs' GEN-4 disclosures are higher than I-MNCs, may be true.

In contrast, there are no statistically significant differences between the average quantity of Indian companies GEN-3 CEDs and the average quantity of I-MNCs GEN-3 CEDs in 2002-2011 (at a 90 percent level of confidence). These data comparisons supported Hypothesis H1b by indicating that I-MNCs GEN-3 disclosures are more similar to domestic Indian companies than their parent companies. Again, these data support the localization theory for I-MNCs GEN-3 corporate environmental reporting.

Discussion

Throughout the 10-year period, there were significant differences between the quantity of GEN-4 disclosures of P-MNCs and I-MNCs. However, throughout the 10-year period, the quantity of I-MNCs' and Indian companies' GEN-4 disclosures had no significant differences. The higher quantity of GEN-4 disclosures reported by P-MNCs indicated that this sample group highly values the disclosure of information related to external reporting guidelines. These results appear to be impacted by the introduction of extensive Global Reporting Initiative guidelines, sector specific guidelines and environmental auditing practices of accounting firms. P-MNCs want to be able to have third party assurance in order to validate their reporting practices and environmental activities (KPMG, 2011). As discussed by Hedburg and von Malmburg (2003), companies tend to use environmental reporting guidelines, specifically the GRI, to increase their credibility of disclosed environmental information.

In fact, all four P-MNCs reported information from this category, in at least 8 out of the 10 sample years. This may be due to the fact that these companies are large, in terms of revenue (KPMG, 2011), and therefore, wish to make their environmental

disclosures more credible to reduce public scrutiny (Hedburg & von Malmburg, 2003). Additionally, a large amount of P-MNCs' GEN-4 disclosures were found in the stand-alone environmental reports and integrated sustainability reports. This provides evidence that the quantity of CEDs increases when companies decide to use guidelines for CER practices (Branco & Rodrigues, 2006).

In contrast, the low quantity of GEN-4 disclosures made by I-MNCs and Indian companies indicated that the reporting of third party assurance practices or the adoption of environmental reporting guidelines has yet to become an important issue for these sample groups. Being that India does not have strong mandatory environmental disclosure requirements (Chatterjee & Mir, 2008), there is less regulatory pressure for disclosure of environmental information. Additionally, unlike P-MNCs, I-MNCs and Indian companies did not produce a large quantity of stand-alone CSR reports or sustainability reports throughout the 10-year period. In fact, only BASF India and Rallis Chemical produced sustainability reports during the 10-year time period. These sustainability reports were published in 2007-2008 for Rallis Chemicals and in 2010-2011 for BASF India. This parallels Baxi and Ray's (2009), which shows that most Indian companies do not produce stand alone environmental reports. I-MNCs data contrasts starkly to P-MNCs, where each of the four sample companies from this group published sustainability reports in at least one, if not multiple years during the 10-year sample period.

KPMG's 2011 report, on the global environmental disclosure practices, indicates that many companies operating in India still fail to disclose separate or integrated CSR reports, but when they do, they assure that such information is externally assured and that this assurance is reported (KPMG, 2011). This indicates that a lack of a separate sustainability report will likely reduce the amount of GEN-4 disclosures. The results of the GEN-4 quantity analyses indicated that the I-MNCs' quantity of GEN-4 disclosures is more similar to Indian companies' quantity than P-MNCs' quantity.

RES-1A: Top Management Commitment Disclosures

It is widely recognized amongst environmental management researchers that top management commitment to environmental initiatives, environmental management systems and sustainability strategy improves the chances for the ultimate success of these programs and initiatives (Andersson & Bateman, 2000; Rondinelli & Berry, 2000; Zuthsi & Sohal, 2004). Therefore, it is important to examine the differences and/or similarities in CEDs that focus on top-managements support for environmental issues. Figure 5 and Table 21 show the quantity of RES-1a CEDs for all sample groups over the 10-year sample period.

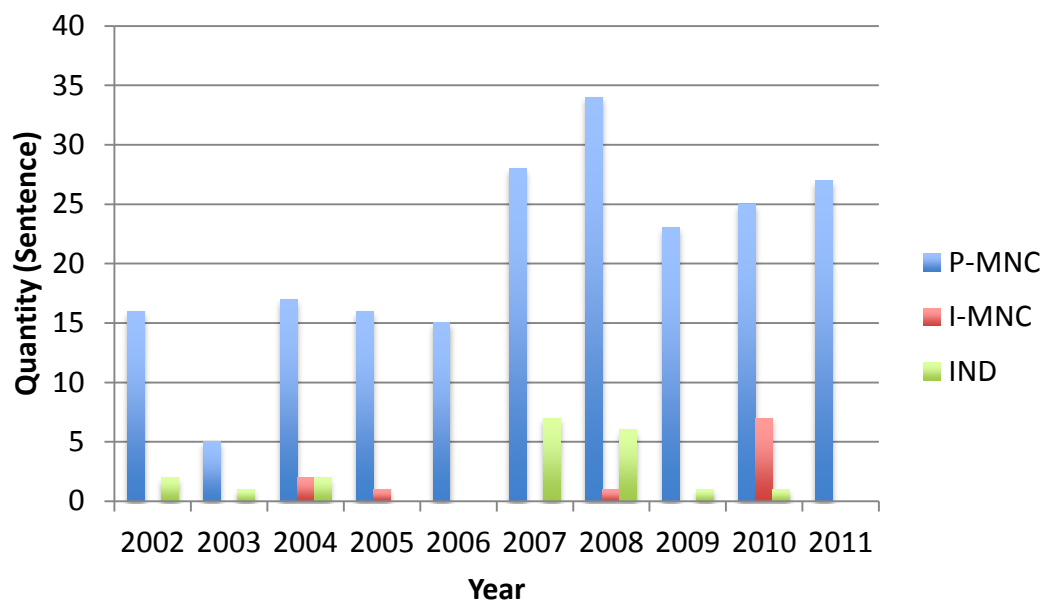
P-MNCs: Quantity of RES-1a Disclosures

As seen in Table 21, The RES-1a quantity data for P-MNCs indicated that there was an overall increase in the number of CEDs from 16 sentences in 2002 to 27 sentences in 2011. However, the percentage that RES-1a disclosures occupied of the total disclosures decreased slightly over the 10-year sample period from 1.74 percent in 2002 to 1.18 percent in 2011. This indicated that although the quantity of disclosures increased over time, the value of reporting information from this category decreased. Overall, the quantities of P-MNCs' RES-1a CEDs were higher than I-MNCs and Indian companies' disclosures in all sample years.

I-MNC: Quantity of RES-1a Disclosures

The overall quantities of I-MNCs' CEDs remained low throughout the 10-year sample period, showing no overall increase or decrease and a peak disclosure year in 2010 at 7 sentences (Table 21). Even though I-MNCs reported environmental information from other categories, they failed to disclose RES-1a information in 6 of the 10 sample years. This indicated that in these non-disclosure years, I-MNCs did not believe it was important to report this information to stakeholders.

Figure 5: Quantity of RES-1a CEDs in 2002 - 2011



Year	P-MNC	I-MNC	IND
2002	16	0	2
2003	5	0	1
2004	17	2	2
2005	16	1	0
2006	15	0	0
2007	28	0	7
2008	34	1	6
2009	23	0	1
2010	25	7	1
2011	27	0	0

Table 21. Total Quantity of RES-1a CEDs in 2002 – 2011

Indian Companies: Quantity of RES-1a Disclosures

The RES-1a quantity data for Indian companies indicated that, like I-MNCs, there was an overall lack of reporting of this sub-category. Overall, the quantity of RES-1a CEDs decreased from 2 sentences in 2002 to 0 sentences in 2011 (Table 21). Similarly to I-MNCs, the peak quantity of RES-1a is 7 sentences. However, unlike I-MNCs, Indian companies disclosure information from this category in more sample years, with measurements of non disclosure in only 3 out of the 10 sample years. The percentage

that RES-1a disclosures occupied of the total disclosures, was very low and decrease over the 10-year sample period decreases slightly from 0.72 percent in 2002 to 0 percent in 2011.

Comparison of Data using One-tail Two Sample T-tests:

The null hypotheses used for these statistical tests were as follows:

- a) $H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were as follows:

- a) $H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$
- b) $H_{aDI}: \mu_{DOM} > \mu_{I-MNC}$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.1601	0.1955
2003	0.1955	0.1955
2004	0.1128	0.5000
2005	0.1040	0.1955
2006	0.1220	Identical data, no disclosure
2007	*0.0834	0.15505
2008	*0.0922	0.187047
2009	*0.0887	0.195501
2010	0.1305	0.228125
2011	**0.0198	Identical data, no disclosure

Table 22. P-Values for Mean Quantity of RES-1a CEDs in 2002 - 2011

*Significant at 0.1; **Significant at 0.05

This data indicated that for dataset a) P-MNC and I-MNC, the null hypothesis can be rejected at a 95 percent confidence level in 2011 and at a 90 percent confidence level in 2007-2009. Therefore, as seen in earlier sub-category analysis, these data indicated that there are significant differences in the average quantity of RES-1a CEDs between P-MNCs and I-MNCs. In fact, in 2006-2009 and 2011, the alternative hypothesis, that the quantity of P-MNCs' RES-1a disclosures are higher than I-MNCs, may be true.

In contrast there was no statistically significant difference between the average quantity of Indian companies RES-1a CEDs and the average quantity of I-MNCs RES-1a CEDs in 2002-2011 (at a 90 percent confidence). In fact, in 2006 and 2011, I-MNCs and Indian companies' RES-1a data are identical. During these years, each sample group had no disclosures of RES-1a information. Again, these calculations supported Hypothesis H1b and indicated that I-MNCs RES-1a disclosures are more similar to domestic Indian companies than their parent companies. This means that I-MNCs RES-1a reporting practices were localized to the Indian context.

Discussion

These results indicated that at some point throughout the 10-year sample period P-MNCs disclose significantly more information highlighting top management's support than I-MNCs. In fact, for P-MNCs, disclosure of this information increased in the 10-year sample period. In contrast, I-MNCs RES-1a disclosures remained incredibly infrequent and Indian companies' disclosures decrease in the sample period. Research indicates that the only way for institutionalization of environmental practices to succeed, there has to be top management commitment (Jose & Lee, 2007), therefore, disclosure of this information by P-MNCs indicates that environmental practices may be institutionalized within their operating environment. RES-1a disclosure often takes the form of a statement for the environmental report from the CEO or other members of top management (Jose & Lee, 2007).

Jose and Lee (2007) indicate that discussion of top-management commitment to environmental programs is usually included in separate sustainability reports. Therefore, because I-MNCs and Indian companies do not often produce separate reports, this may explain why their quantities of RES-1a disclosures are lower than P-MNCs' RES-1a disclosures. Therefore, although it has become increasingly important for corporate transparency that top management commit to codes of conduct and for Corporate Boards to supervise or oversee sustainability activities (Kolk, 2008), reporting of this information is important for P-MNCs but not as so for I-MNCs or Indian

companies. Again, these data support the localization theory for I-MNCs CED reporting practices.

POLL: Total Pollution Disclosure

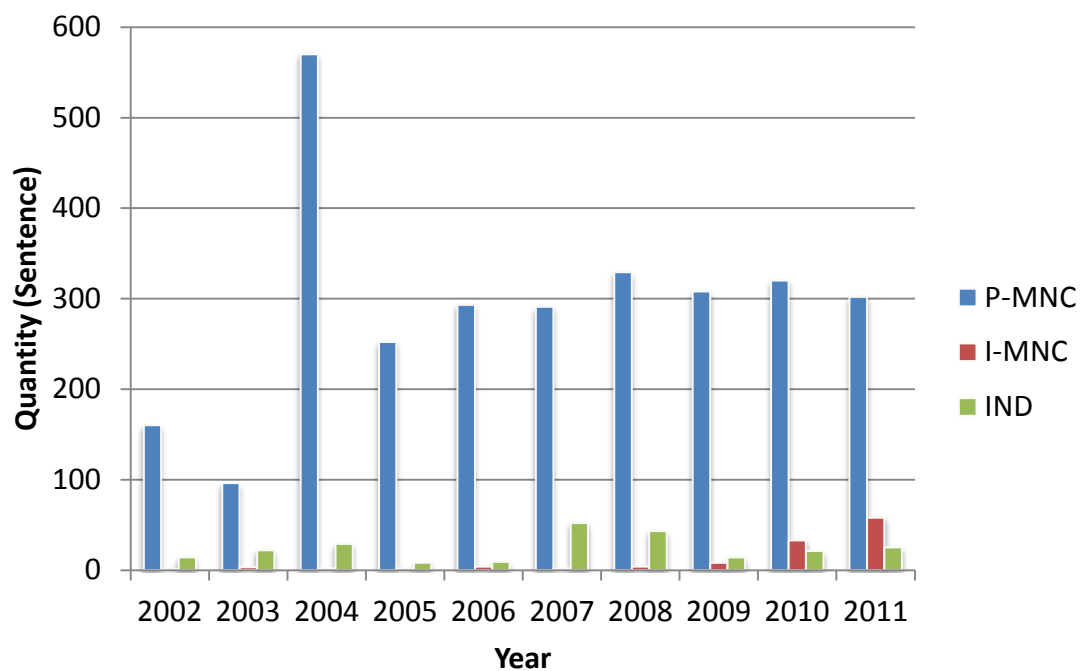
The disclosures related to pollution are a significant indicator of the importance a company places on its environmental activities, as it requires monitoring of outputs and disclosure of pollution reduction goals (Araya, 2006b). Additionally, research (KPMG, 2011) has determined that in order to adequately manage emissions, specifically greenhouse gas emissions, it is necessary for companies to measure emissions. This is directly in line with KPMG's (2011) statement that states: "what gets measured gets managed." Araya (2006b) states that a large component of environmental disclosures focuses on emissions data, management of greenhouse gas emissions, and emission trading schemes. Nearly 70 percent of the 250 Global Fortune companies offer data on GHG emissions (KPMG, 2005). The POLL-Total data includes disclosures related to air emissions, water emissions, land emissions, waste, product pollution and goals. This information allows for stakeholders to determine if companies are quantifying their pollution emissions and setting targets that they strive to reach in the subsequent years. In fact, research indicates that 53.9 percent of report users like to see information related to avoiding pollution, specifically avoidance of soil, water and air contamination (Pleon, 2005). Figure 6 and Table 23 show the quantity of POLL-TOTAL CEDs for all sample groups over the 10-year sample period.

P-MNCs: Quantity of POLL-Total Disclosures

The POLL-TOTAL quantity data for P-MNCs indicated that there has been a substantial increase in the number CEDs, from 160 sentences in 2002 to 302 sentences in 2011. This growth represented an overall increase of approximately 36 sentences for each of the four sample P-MNCs. The percentage that POLL disclosures occupied of the total disclosures in the 10-year sample period was quite substantial with a range of 11.57

percent in 2010 to 32.09 percent in 2004. The peak of disclosures observed in 2004 was due to BayerCropscience's publication of both a sustainability report and an environmental, health and safety report to accompany their annual report. This indicated that POLL CEDs represented a large proportion of the total CEDs and was indicative of the P-MNCs desire to disclose this information to end-users and stakeholders.

Figure 6. Quantity of POLL-TOTAL CEDs in 2002- 2011



Year	P-MNC	I-MNC	IND
2002	160	1	14
2003	96	3	22
2004	570	2	29
2005	252	2	8
2006	293	4	9
2007	291	2	52
2008	329	4	43
2009	308	8	14
2010	320	33	21
2011	302	58	25

Table 23. Average Quantity of POLL-TOTAL CEDs in 2002 – 2011

I-MNCs: Quantity of POLL Disclosures

I-MNC's POLL CED quantity was much lower than those of P-MNCs. Although there is a noticeable increase in the quantity of data, from 1 sentence in 2002 to 58 sentences in 2011, the quantity of disclosures remained low until 2010 – ranging from just 1 sentence to 8 sentences. This indicated that it was not until recently that I-MNCs reported this information to their stakeholders. As seen in Table 23, the percentage that POLL disclosures occupy of the total disclosures 10-year sample period increases considerably in the last two sample years with an increase from 0.5 percent in 2002 to 14.36 percent in 2011. These data may indicate that it was only recently that I-MNCs realized the importance of disclosing pollution information. This indicated that POLL CEDs are indeed, in recent years, becoming a more important component of CED reporting for I-MNCs.

Indian Companies: Quantity of POLL disclosures

The POLL quantity data for Indian companies showed that there was inconsistency in their POLL CED reporting practices. In years, 2004, 2007, 2008 there were noteworthy amounts of CEDs but this fluctuated frequently. Overall, there was an increase in the number of POLL CEDs from 14 sentences in 2002 to 25 sentences in 2011. The percentage that POLL disclosures occupied of the total disclosures in the 10-year sample period increased from 5.04 percent in 2002 to 7.42 percent in 2011. This is a category wherein I-MNC CED practices did not appear noticeably similar to Indian companies. In fact, I-MNC companies show a gradual increase over time, while Indian companies' CEDs were volatile.

Comparison of Data using One-tailed Two Sample T-tests:

The null hypotheses used for these statistical tests were as follows:

- a) $H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were as follows:

- a) $H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$
b) $H_{aPI}: \mu_{DOM} > \mu_{I-MNC}$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.1155	*0.0541
2003	0.1164	*0.0667
2004	0.1409	*0.0829
2005	*0.0740	*0.0816
2006	*0.0567	0.2529
2007	**0.0411	0.1702
2008	*0.0586	0.1888
2009	**0.0474	0.1745
2010	*0.0726	0.3115
2011	*0.0862	0.2822

Table 24. P-Values for Mean Quantity of POLL CEDs in 2002-2011

*Significant at 0.1; **Significant at 0.05

This data indicated that for dataset a) P-MNC and I-MNC, the null hypothesis can be rejected at a 95 percent confidence level in 2007 and 2009 and at a 90 percent confidence level in 2005, 2006, 2008, 2010 and 2011. Therefore, there were significant differences in P-MNCs' and I-MNCs' average quantity of POLL-TOTAL CEDs. In fact, in 2005-2011, the alternative hypothesis, that the average quantity of P-MNCs' POLL-TOTAL disclosures are higher than I-MNCs, may be true.

Upon evaluation of dataset b), it became evident, in years' 2002-2005, there were statistically significant differences in the average quantity of I-MNCs' and Indian companies' POLL-TOTAL. Therefore, the null hypothesis could be rejected, during these sample years, and the alternative hypothesis, that Indian companies' quantities were higher, was supported. These data also indicated that over time, the differences between I-MNCs' and Indian companies' CED quantities became less significant. This provided evidence that the average quantity of I-MNCs and Indian companies' became more similar over time. These data partially supports Hypothesis H1b and indicated that

I-MNCs POLL-TOTAL disclosures became more similar, i.e. localized, to domestic Indian companies' disclosures.

Discussion

Overall, P-MNCs' quantity of disclosures for POLL-TOTAL considerably exceeded the disclosures of both I-MNCs and Indian companies. The minimum volume of disclosures for P-MNCs throughout the 10-year period was 96 sentences, which was still higher than the maximum volume of disclosures for I-MNC and Indian companies at 58 sentences and 52 sentences, respectively. This indicates that in the 10-year sample period, the MNCs reported more information related to pollution to their shareholders and stakeholders. This is similar to Rizk et al.'s (2008) research, which found that companies operating in LDCs are less likely to provide emissions or pollution information to their stakeholders.

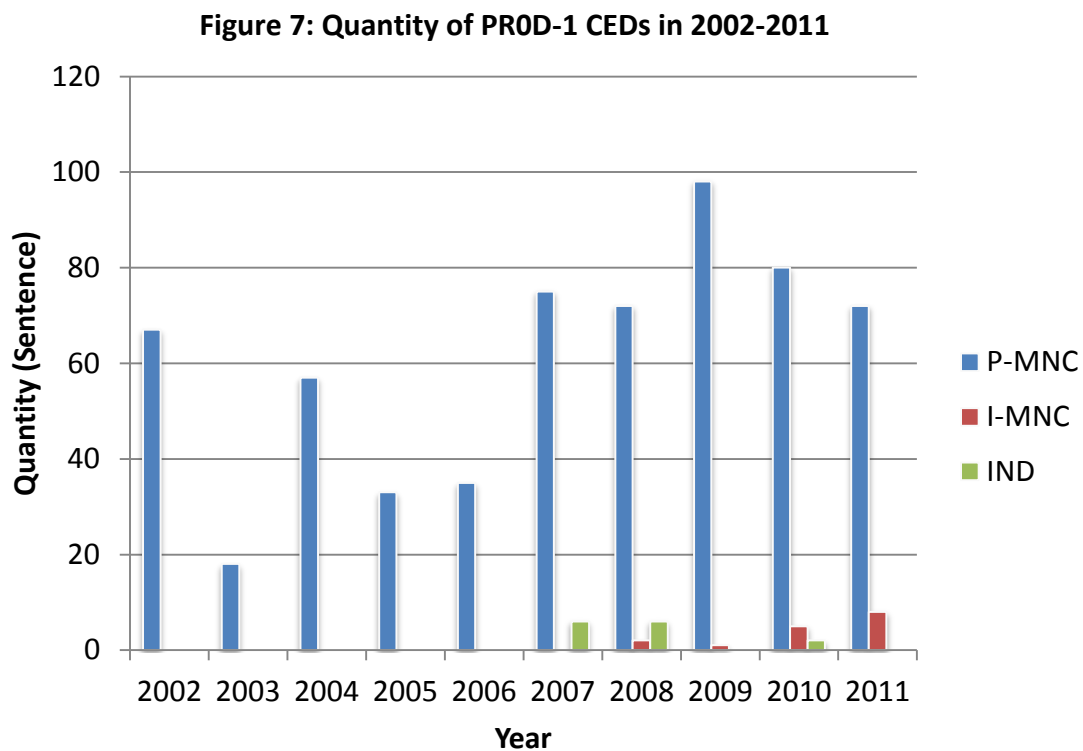
The increased use of environmental information, particularly greenhouse gas emissions, in investment decisions may impact larger and more visible companies' CED practices more highly in developed economies (Araya, 2006b; KPMG, 2011). Unlike India, companies operating in developed economies with mandatory pollution release inventories are forced to measure their pollution data and disclose them to the public. Therefore, these companies must disclose a high volume of this information in order to remain transparent and maintain legitimacy. In addition, because P-MNCs disclosed more information related to both disclosure guidelines and environmental management systems, which outline requirements for the disclosure of pollution information, these companies are more equipped to disclose POLL information than I-MNCs and Indian companies. Research indicates that large global MNCs tend to identify issues related to emissions trading and GHG emission reduction because these companies are more likely to recognize the Kyoto Protocol (Kolk & Pinkse, 2008) and this therefore encourages them to create strategies that reduce emissions.

Indian companies (I-MNCs and domestic) had a lower quantity of POLL CEDs than P-MNCs. As mentioned earlier (Section 2.2.1), India's government does not mandate or

suggest that companies report emission information to shareholders and stakeholders (Chatterjee & Mir, 2008). However, the recent addition of the GREENEX initiative at the BSE to measure the performance of companies based on their energy efficiency data and carbon emissions may increase POLL CEDs for Indian companies and I-MNCs in the future. In fact, GIZ (2012) does indicate that the disclosure of GHG emission data is an emerging trend for Indian companies.

PROD-1: LCA & Product Stewardship Disclosure

The use of LCA and Product Stewardship programs has become increasingly popular for companies, especially for companies from environmentally sensitive industries (Molina-Murillo & Smith, 2009). Upon examining this sub-category in more detail, it was apparent that P-MNCs had a much higher quantity of PROD-1 CEDs throughout the 10-year sample period than I-MNCs or Indian companies. The results and importance of this sub-category are explained in this section. Figure 7 and Table 25 show the quantity of PROD-1 CEDs for all sample groups over the 10-year sample period.



	P-MNC	I-MNC	IND
2002	67	0	0
2003	18	0	0
2004	57	0	0
2005	33	0	0
2006	35	0	0
2007	75	0	6
2008	72	2	6
2009	98	1	0
2010	80	5	2
2011	72	8	0

Table 25. Total Quantity of PROD-1 CEDs in 2002 – 2011

P-MNC: Quantity of PROD-1 Disclosures:

The PROD-1 quantity data for P-MNCs indicated that between 2002 and 2011 there was a slight increase in quantity of PROD-1 CEDs from 67 sentences and 72 sentences, respectively. Additionally, the percentage that PROD-1 disclosures occupied of the total disclosures decreased from 7.27 percent in 2002 to 3.13% in 2011. This indicated that although the overall quantity of PROD-1 CEDs was increasing, these companies were not necessarily devoting a larger proportion of their disclosures to this issue (Table 25). While P-MNCs' quantity of disclosures were high, this contrast with disclosure data from I-MNCs and domestic Indian companies who had low quantities of disclosure. In fact, even at P-MNCs' minimal disclosure quantity of 18 sentences in 2003, the quantity was still higher than the maximum quantity values for both I-MNCs and Indian companies.

I-MNC: Quantity of PROD-1 Disclosures

The PROD-1 CED quantity data for I-MNCs was lower than P-MNCs. I-MNCs disclosed no information related to PROD-1 until 2008 and even at this point, the quantity of these disclosures was very low, ranging from 1 to 8 sentences. Overall, the quantity of PROD-1 CEDs increased from 0 sentences in 2002 to 8 sentences in 2011. This slight increase in quantity led to an increase in percentage of total disclosures from 0 percent in 2002 to

1.98% in 2011. This indicated that was a growing amount of reporting focused on product impacts, product stewardship and LCA, over the 10-year period.

Indian Companies: Quantity & Percentage of PROD-1 Disclosures

The PROD-1 CED quantity data for Indian companies were similar to I-MNCs. Indian companies disclosed no information related to PROD-1 until 2007 and even then, the quantity of these disclosures did not increase over time. In fact in both 2002 and 2011, there were no sentences disclosed from this sub-category. Instead there were fluctuations in the data, which was indicative of a lack of consistent PROD-1 reporting activities. The percentage that PROD-1 disclosures occupied of the total disclosures during the 10-year sample period stayed the same at 0 percent, but peaked in 2007 and 2008 at 1.33 percent.

Comparison of Data using One-tailed Two Sample T-tests:

The null hypotheses used for these statistical tests were:

- a) $H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were:

- a) $H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$
- b) $H_{aDI}: \mu_{DOM} > \mu_{I-MNC}$

Table 26 shows these data indicated that for dataset a) P-MNC and I-MNC, the null hypothesis can be rejected at a confidence level of 90 percent for all sample years but 2003. This demonstrates that there were significant differences between P-MNCs' and I-MNCs' average quantity of PROD-1 disclosures.

In contrast, there were no significant differences in the average quantities of PROD-1 disclosures for I-MNCs and Indian companies. In fact, in years' 2002-2006, both sample groups did not disclose any information from this category. This meant that the null hypothesis could not be rejected. These data also provided support for Hypothesis

H1b, by indicating that I-MNCs average quantities of PROD-1 disclosures were more similar to I-MNCs' than P-MNCs.

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	*0.0951	Identical data, no disclosure
2003	0.1076	Identical data, no disclosure
2004	*0.0982	Identical data, no disclosure
2005	*0.0604	Identical data, no disclosure
2006	**0.0324	Identical data, no disclosure
2007	*0.0608	0.1955
2008	*0.0565	0.2782
2009	**0.0359	0.1955
2010	**0.0427	0.2025
2011	*0.0869	0.1601

Table 26. P-Values for PROD-1 CEDs in 2002 - 2011

*Significant at 0.1; **Significant at 0.05

Discussion

Similar to previously examined categories, P-MNCs report significantly more information related to product stewardship and LCA issues than the I-MNCs. For P-MNCs, disclosure of PROD-1 ranged from discussion of ecological testing of products (BASF Annual Report, 2011) and product stewardship (Syngenta Corporate Responsibility Report 2004) to Life Cycle Assessment (Syngenta Corporate Responsibility Report, 2006), the precautionary principle (Bayer Annual Report, 2009) and a proprietary Sustainability Check Life Cycle Analysis Process (Bayer Annual Report, 2010). Some examples of P-MNCs PROD-1 CEDs were:

The comprehensive assessment of risks to health and the environment along the entire value chain of a product – from research and development through production, marketing and use by consumers to disposal – is a cornerstone of our sustainability strategy (Bayercropscience Sustainable Development Report, 2011, p. 40)

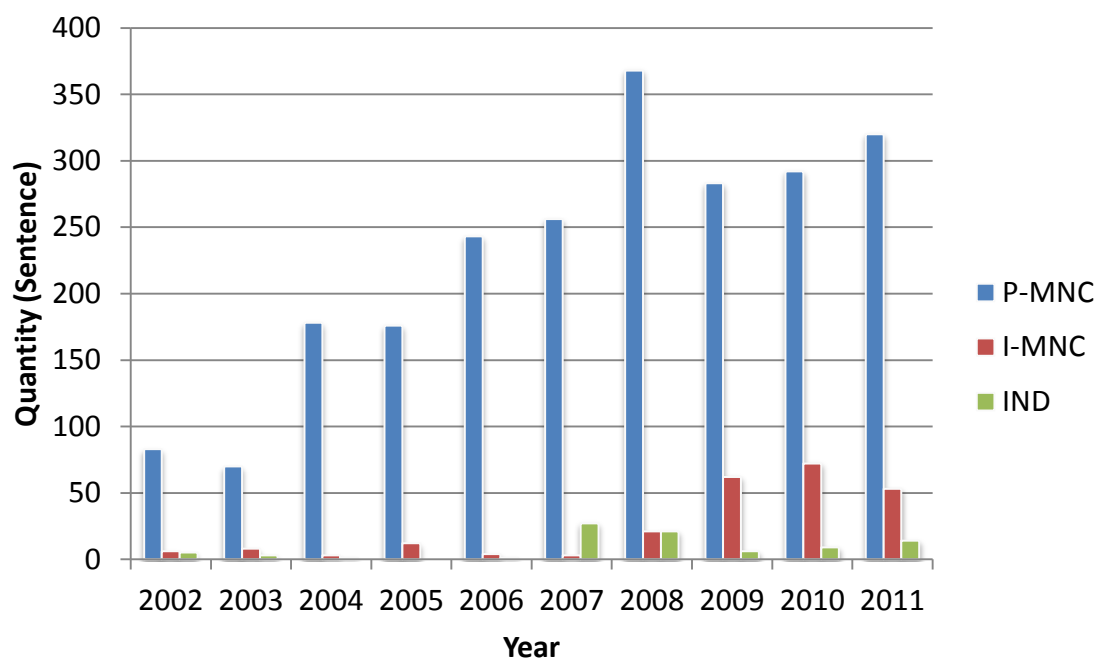
Here the development, production and use of Syngenta products is traced, showing how the company strives to create products with the highest benefits and lowest possible risks to people and the environment (Syngenta CSR Report, 2006, p. 11)

The PROD-1 disclosure practices of I-MNCs and Indian companies were similar to each other with both sample groups only recently reporting information from this sub-category. This mirrors the results found in Araya's (2006b) study, which indicates that companies operating an emerging economy (Latin America) did not disclose information related to product stewardship. This sub-category data provide further evidence that I-MNCs do not follow CED practices of their parent companies but instead use a CED reporting strategy that is similar to domestic Indian companies. This also indicates that the importance and relevance of LCA may be related to the national operating environment. Berkhout and Howes (1997) indicate that market and regulatory pressures impact the pattern of LCA adoption. Additionally, they indicate that in Europe the LCA process is established and therefore companies will likely disclose information related to PROD-1 to address demands from investors, customers and stakeholders and shareholders. This aligns with the results found in this research.

SUST-TOTAL: Sustainability Disclosures

The total quantity of sustainability disclosures are an important representation of environmental practices because it includes sub-categories related to disclosures of general sustainability issues, involvement or commitment to sustainability programs, environmental conservation and biodiversity, and climate change. Research indicates that high visible, as determined by market capitalization or revenue, companies are likely to report sustainability information to their stakeholders (Rimmel & Gunner, 2013). This is because, companies with high environmental impacts will general disclose more information in their sustainability reports, which as the name suggests, include SUST disclosures (Branco & Rodriquez, 2006). Figure 8 and Table 27 show the quantity of SUST-TOTAL CEDs for all sample groups over the 10-year sample period.

Figure 8. Quantity of SUST-TOTAL CEDs in 2002-2011



Year	P-MNC	I-MNC	IND
2002	83	6	5
2003	70	8	3
2004	178	3	1
2005	176	12	0
2006	243	4	1
2007	256	3	27
2008	368	21	21
2009	283	62	6
2010	292	72	9
2011	320	53	14

Table 27. Total Quantity of SUST-TOTAL CEDs in 2002 - 2011

P-MNC: Quantity of SUST-TOTAL disclosures

P-MNCs' SUST-TOTAL CEDs exhibited a dramatic increase over the 10-year sample period with quantities increasing from 83 sentences in 2002 to 320 sentences in 2011. This represented an increase of approximately 59 sentences for each of the 4 sample P-MNCs. The increase in SUST-TOTAL disclosures is substantial and indicates a growing

commitment to external sustainability reporting. Rimmel and Gunner (2013) indicate that companies are more likely to report sustainability information in response to growing stakeholder pressure and increased popularity of sustainability programs, desire to conserve resources, knowledge of biodiversity and attempts to mitigate climate change. The percentage that SUST-TOTAL disclosures occupied of the total CEDs in the 10-year sample period was substantial and increased from 9.00 percent in 2002 to 13.93 percent in 2011. This indicated that, over time, reporting sustainability issues became increasingly important for P-MNCs. In order to delve into the category in more detail, the SUST-4 (climate change) disclosures are discussed in more detail in the next analyses.

I-MNCs: Quantity of SUST-Total disclosures

Like P-MNCs, I-MNCs' SUST-TOTAL disclosures exhibited a strong increase in quantity over the 10-year sample period with values increasing from just 6 sentences in 2002 to 53 sentences in 2011. Even though there was an increase in disclosure quantity, I-MNCs quantity remained much lower than P-MNCs' CED quantity. The percentage that SUST-TOTAL disclosures occupied of the total CEDs increased in 2002-2011 from just 3.00 percent in 2002 to 13.12 percent in 2011. This indicated that I-MNCs' placed a higher level of importance on reporting SUST-TOTAL issues over time. During 2009, 2010 and 2011 the percentage of SUST-TOTAL disclosure was very similar to P-MNCs' data.

Indian companies: Quantity of SUST-TOTAL disclosures

The quantity of Indian companies' SUST-TOTAL disclosures increased over time from 5 sentences in 2002 to 14 sentences in 2011. Like P-MNCs and I-MNCs, the percentage that SUST-TOTAL disclosures occupy of the total CEDs increases over the 10-year sample period from 1.80 percent in 2002 to 4.15 percent in 2011. However, Indian companies' quantity remains lower than P-MNCs throughout the 10-year sample period. The increase in SUST-TOTAL does represent an increase in concern for reporting sustainability issues.

Comparison of Data using One-tailed T-tests:

The null hypotheses used for these statistical tests were:

$$a) H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$$

$$b) H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$$

The alternative hypotheses used for these statistical tests were:

$$a) H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$$

$$b) H_{aDI}: \mu_{DOM} > \mu_{I-MNC}$$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.1494	0.4448
2003	0.1160	0.1985
2004	*0.0675	0.2006
2005	*0.0899	**0.0346
2006	*0.0642	0.1489
2007	*0.0514	0.1374
2008	*0.0866	0.5000
2009	0.1077	0.1837
2010	*0.0966	**0.0318
2011	*0.0541	*0.0646

Table 28. P-Values for Mean Quantity of SUST CEDs in 2002 - 2011

*Significant at 0.1 **Significant at 0.05

These data indicated that for dataset a) P-MNC and I-MNC, the null hypothesis can be rejected at a confidence level of 90 percent in 2004-2007 and 2010 and 2011. In 7 of the 10 sample years, there is a significant difference in these data and therefore, in these years, the alternative hypothesis may be true. Therefore, at a 90 percent confidence level for the identified years, P-MNCs' average quantities of SUST-TOTAL disclosures were significantly higher than I-MNCs' average quantity of SUST-TOTAL disclosures.

For dataset b), there are significant differences in less years than in dataset a). In fact, at a 90 percent confidence level, the null hypothesis could be rejected in 2005, 2010 and 2011. This indicated that in the majority of the sample years, 2002-2004 and 2006-2009, the null hypothesis could not be rejected. In the years where the null

hypothesis could not be rejected, there were no statistically significant differences in the average quantity of Indian companies' SUST-TOTAL disclosures and I-MNCs' average quantity of these same disclosures. These data provided support for Hypothesis H1b, by indicating that when examining the 10-year dataset as a whole, the I-MNCs average quantity of SUST-TOTAL disclosures were more similar to I-MNCs' than P-MNCs.

Discussion

The strong increase in quantity of SUST-TOTAL disclosure for P-MNCs and I-MNCs is indicative of growing institutional pressures, which demand that information related to sustainability be disclosed (Kolk, 2003). Kolk (2003) found that MNCs in developed countries continue to lead, globally, with regards to sustainability reporting. Also, the bulk of past research on sustainability reporting focuses primarily on developed countries. This may indicate that there is a lack of reporting on this subject in LDCs (Kolk, 2003). Further statistical analysis revealed that although I-MNCs SUST-TOTAL disclosure quantity increases substantially, the quantity of disclosures was still more similar to Indian companies than their parent companies. This supported the reporting localization theory, which states that subsidiaries of MNCs are more likely to report the same quantity of environmental information as local Indian companies than their associated parent company. The increase in SUST-TOTAL disclosures by both I-MNCs and Indian companies is supported by GIZ's (2012) study, which found that sustainability reporting is emerging, albeit slowly, in India.

P-MNCs showed a large number of SUST-TOTAL disclosures related to international organizations and programs, like the Dow Jones Sustainability Index. This index appeals to MNCs because companies listed on this index are considered to be leaders in sustainability; and as a result, it creates reputational benefits while also encouraging socially responsible investment (Knoepfel, 2001). Additionally, three out of the four P-MNCs, explicitly disclosed their support for external sustainability programs such as the Kyoto Protocol (BASF Annual Report, 2010), Dow Jones Sustainability Index (BASF Annual Report 2009), FTSE4GOOD (Bayercropscience Annual Report 2009), UNEP

(Syngenta Annual Report, 2008), World Business Council for Sustainable Development (Syngenta Annual Report, 2010), Carbon Disclosure Project (BASF Annual Report, 2010) and Global Compact (BASF Annual Report, 2009). However, the high quantities of disclosures related to commitment to external sustainability programs by P-MNCs, were not observed in I-MNCs' in 2002-2009. The growth in SUST-TOTAL disclosure for I-MNCs and Indian companies, provides evidence indicating that these sample group found it increasingly necessary to report sustainability information. The popularity of SUST-TOTAL disclosures amongst P-MNCs in all 10 years and I-MNCs in recent years indicated that these companies reported their awareness of sustainability issues like, biodiversity, sustainable development and climate change.

Examples of P-MNC's and I-MNC's SUST-TOTAL disclosures include:

Farmers can help protect biodiversity by practicing conservation agriculture and providing national habitats for wildlife on their farms (Syngenta CSR Report, 2006, p.7)

Since 2005: Annual inclusion in the Climate Disclosure Leadership Index of the Carbon Disclosure Project; named 'company worldwide' in 2009. Since 1999: Uninterrupted annual inclusion in the global Dow Jones Sustainability Index (DJSI) (Bayer Sustainable Development Report, 2009, p. 29)

As a global innovation and market leader in its industry, Bayer Cropscience believes that its technological and commercial expertise entails a duty to contribute to Sustainable Development (Bayer Cropscience India Annual Report, 2010, p. 11)

We are excited and extremely passionate about the potential to improve yields, conserve resources and improve farmers' lives (Monsanto India Annual Report, 2011, p. 15)

However, I-MNCs tend not to report on SUST-2 issues because many of them have not committed to external sustainability programs and rating agencies. Overall, the quantity of CEDs for Indian companies increased over the 10-year period but still remained relatively low. This indicated that although there is an overall increase in awareness of

reporting for sustainability issues, this awareness was not as high as I-MNCs or P-MNCs. This confirms GIZ's (2012) study of sustainability reporting practices, which indicated that Indian disclosures related to conservation and biodiversity lag behind developed economies. However, these Indian companies do mention international environmental treaties, like the Montreal Protocol. An example of a SUST-TOTAL disclosure made by the Indian company Coromandel is:

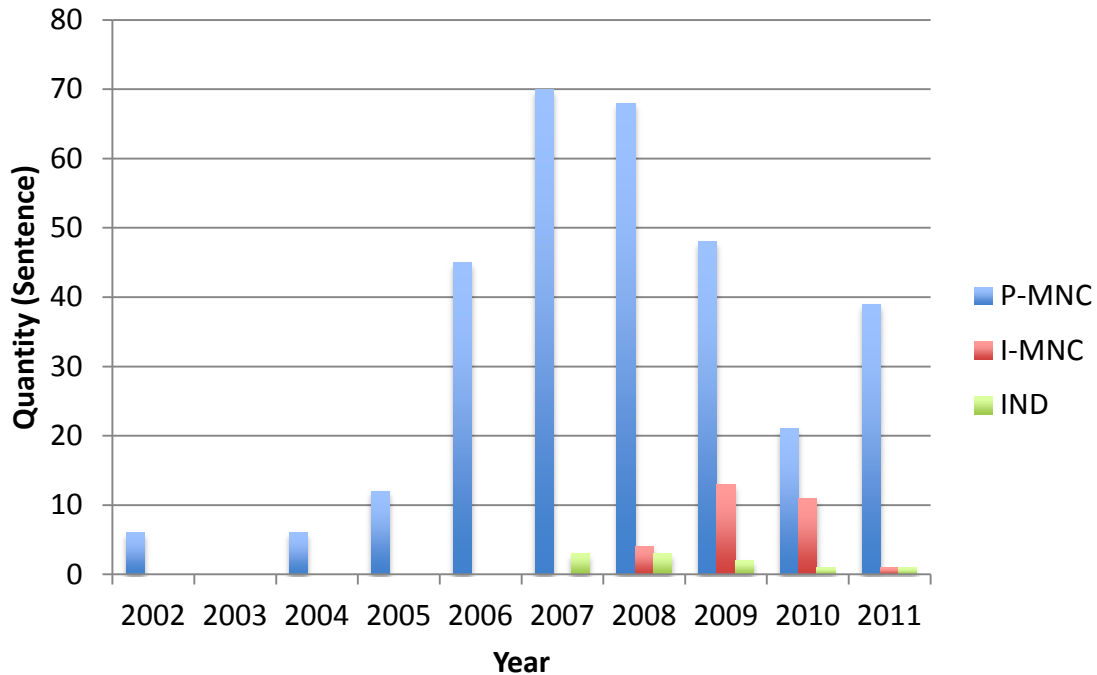
During the year, the Company has received a grant of Rs 99.29 lacs from the United Nations Industrial Development Organisation towards the implementation of the Montreal Protocol for eliminating ozone depleting substances (Coromandel Annual Report, 2007, p. 53)

SUST-4: Mention of Climate Change

Climate change issues are becoming increasingly important for companies. Nearly 85 percent of the top 250 Global Fortune companies address climate change in their annual and/or environmental reports (Araya, 2006b). Global initiatives that pressure companies to voluntarily measure GHG emissions and climate change include the Carbon Disclosure Project and the GHG Protocol.

The Carbon Disclosure Project (CDP) is a voluntary initiative that launched in 2000 and works to inform both managers and investors about the risks of climate change (Stanny & Ely, 2008). Companies can become signatories of the program and by doing so, must disclose information related to their emissions and climate change impacts. A recent trend in India is that investors have begun to examine ESG data in order to identify climate change related risks and opportunities for Indian companies (GIZ, 2012). As described by Kolk and Pinkse (2007) MNCs that operate in foreign economies can influence and or prevent climate change regulation by self-regulating their business practices and reducing carbon emissions. Therefore, these data provide some insight into the SUST-4 disclosure practices of P-MNCs, I-MNCs and Indian companies. Figure 9 and Table 29 show the quantity of SUST-4 CEDs for all sample groups over the 10 year sample period.

Figure 9. Quantity of SUST-4 CEDs in 2002-2011



Year	P-MNC	I-MNC	IND
2002	6	0	0
2003	0	0	0
2004	6	0	0
2005	12	0	0
2006	45	0	0
2007	70	0	3
2008	68	4	3
2009	48	13	2
2010	21	11	1
2011	39	1	1

Table 29. Total Quantity of SUST-4 CEDs in 2002-2011

P-MNC: Quantity of SUST-4 Disclosures

The quantity of SUST-4 disclosures increased over the 10-year sample period with a change from 6 sentences in 2002 to 39 sentences in 2011. This represented an overall increase of approximately 8 sentences for each of the four P-MNCs. The percentage that SUST-4 disclosures occupied of the total CEDs in the 10-year sample period increased from 0.65 percent in 2002 to 1.70 percent in 2011. This indicated that although the quantity of disclosures are still relatively low, reporting of climate change became

increasingly important for P-MNCs. Climate change is linked to emissions, particularly GHG emissions (Stern, 2007), and therefore, this category should be examined in concert with the previously analyzed, POLL-TOTAL disclosure data. POLL-TOTAL disclosures also increased, albeit much more than SUST-4 disclosures at 142 sentences, over the 10-year period. This indicated that as P-MNCs increased their reporting of measurement and mitigation of emissions, they might have also reported on issues related to their awareness and prevention of climate change.

I-MNC: Quantity of SUST-4 Disclosures

It is evident that disclosures related to climate change were not important for I-MNCs between 2002 and 2007. This is shown by their non-disclosure in these sample years. However, reporting of SUST-4 did emerge in 2008-2011, with the quantity peaking in 2009 at 14 sentences and dropping again to 1 sentence in 2011. The relative large disclosure quantities in 2009 and 2010 are explained by disclosures made by Monsanto India. In 2009 and 2010, the company had separate sections of the report focused solely on climate change. However, in 2011, this section was not present in the company's annual report. Being that only one company contributed to the heightened amount of disclosures observed in 2009 and 2010, it was evident that reporting of SUST-4 by I-MNCs was not common throughout the 10-year sample period. Monsanto India's sharp increase in SUST-4 disclosures provided evidence that this company was aware of climate change issues and found it important in 2009 and 2010 to dedicate a relatively large quantity of disclosures to the subject.

Indian Companies: Quantity of SUST-4 Disclosures

For Indian companies, the reporting of SUST-4 disclosures emerged in recent years, starting in 2007. Overall, the quantity of disclosures increased from 0 sentences in 2002 to 1 sentence in 2011. However, the quantity of these disclosures remained very low. In fact, similarly to I-MNCs, one company, Rallis, contributed to the majority of the SUST-4 disclosures in 2007-2011. This indicated that reporting of SUST-4 disclosures was still in

its nascent stage in India, with some companies reporting information related to the category while others did not disclose any information. The percentage that SUST-4 disclosures occupy of the total CEDs increased from 0 percent in 2002 to 0.3 percent in 2010. This increase in percentage represented a growing reporting of climate change issues in India. However, disclosure remained much lower than P-MNCs, indicating that in India, reporting of climate change awareness not popular (GIZ, 2012).

Comparison of Data using One-tailed Two Sample T-tests:

The null hypotheses used for these statistical tests were:

- a) $H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were:

- a) $H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$
- b) $H_{aPI}: \mu_{DOM} > \mu_{I-MNC}$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.1955	Identical data, no disclosure
2003	Identical Data, no disclosures	Identical Data, no disclosure
2004	*0.0514	Identical Data, no disclosures
2005	0.1261	Identical Data, no disclosure
2006	0.1220	Identical Data, no disclosure
2007	*0.0549	0.1076
2008	0.1441	0.4243
2009	*0.0797	0.2309
2010	0.2509	0.1598
2011	*0.0908	0.5000

Table 30. P-Values for Mean Quantity of SUST-4 CEDs in 2002 - 2011

*Significant at 0.1; **Significant at 0.05

These data indicated that for dataset a), the null hypothesis can be rejected at a confidence level of 90 percent in 2004, 2007, 2009 and 2011. In these years, there was a significant difference between the average quantities of SUST-4 disclosures, and therefore the alternate hypothesis may be accepted. At a 90 percent confidence level

for the identified years, P-MNCs' average quantities of SUST-4 disclosures were higher than I-MNCs' average quantity of SUST-4 disclosures.

These data contrast with dataset b), which indicated that there are no significant differences in the average quantities of I-MNCs' and Indian companies' SUST-4 disclosures. In fact, in years 2002-2006 there was no difference between the average SUST-4 quantities. This means that for each year, at a 90 percent confidence level, the null hypothesis could not be rejected. These data provided support for Hypothesis H1b, by indicating that overall, there were significant differences between P-MNCs and I-MNCs average quantity, but these differences do not exist between I-MNCs and Indian companies. Therefore, for this sub-category, I-MNCs disclosures are more similar to Indian companies and therefore, this sample group may have adopted a localized reporting strategy.

Discussion

These data support Davis and Searcy's (2010) review, which indicates that for large companies, climate change is a reoccurring theme in sustainability reports. As evidenced by these data, P-MNCs have identified that climate change is a relevant and important aspect of sustainability disclosures. However, these data have yet to occupy a major proportion of their environmental disclosures. Kolk (2005) also indicates that European MNCs in environmentally sensitive industries, like agrochemicals, are more likely to report information related to the threat of climate change than companies operating in other regions. Adoption of the Carbon Disclosure Project is popular amongst the MNCs in this research, and this may have encouraged the companies to disclose information related to climate change. In fact, all four P-MNC companies follow the CDP's guidelines and therefore, they have sections dedicated to discussing climate change. For example, Syngenta has a section titled "Climate change and our business" in their 2007 Corporate Responsibility Report. Examples of P-MNC's SUST-4 disclosures include:

The latest report from the Intergovernmental Panel on Climate Change (IPCC) suggest growing seasons, water availability and crop productivity will be affected by climate change (Syngenta Corporate Responsibility Report, 2007, p. 10)

Markets and prices are more unpredictable than ever, new technologies are opening up new possibilities, regulations are increasing in complexity, and normal weather fluctuations are being exacerbated by the extreme effects of climate change (Bayer Annual Report, 2011, p. 21)

In contrast, although climate change is recognized by both I-MNCs and Indian companies (as evidenced from the recent emergence of SUST-4 disclosures), it is evident that SUST-4 related reporting is still in its nascent stages in India (Kandlikar & Sagar, 1999). The SUST-4 disclosure practices of I-MNCs more closely resemble Indian companies CED practices than P-MNCs, thus providing further evidence that I-MNCs' CEDs are adapted to their local country of operation. Examples of SUST-4 disclosures from I-MNCs and Indian companies include:

Not just insufficient land, scarcity of water and energy are expected to impact food production in the coming decades, and then there are environmental changes such as global warming which is leading to a warmer climate, leading to the risk of crop failure (Syngenta India Annual Report, 2010, p. 3)

Addressing climate change is directly related to the company's global competitiveness and perseverance of its long-term license to operate (Rallis Corporate Sustainability Report, 2008, p. 7).

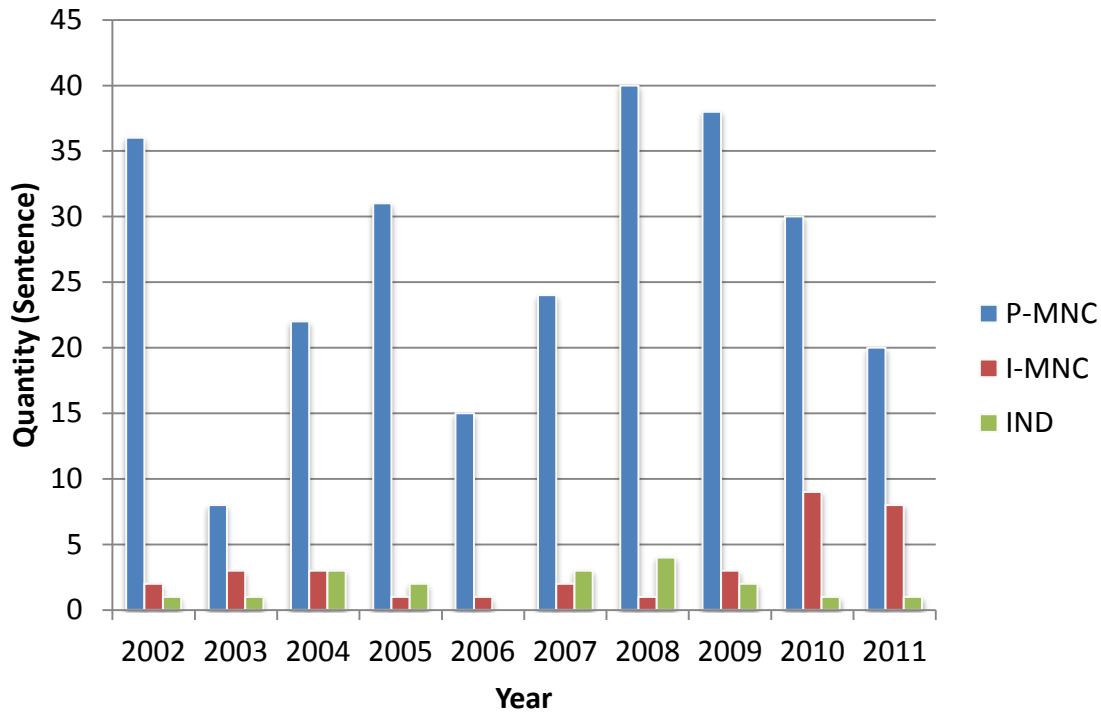
The lack of climate change awareness and regulations are two important institutional factors that shape the SUST-4 disclosure practices of agrochemical companies operating in India. Gallup's (2010) survey results show that the majority of Indians are not aware of climate change. In a climate change awareness survey that included Brazilians, South Africans, Chinese, American and Indian citizens (in their home countries), India scored the lowest on climate change awareness with only 32 percent of respondents identifying themselves as strongly aware of climate change (Gallup, 2010). The slight increase in disclosure of SUST-4 by I-MNCs (in recent years and over domestic

companies) may be indicative of a strategy to influence local governments. Kolk and Pinkse (2007) describe this phenomenon in more detail in their research, which provides an overview of the climate change focused political activities of MNCs in emerging and developing economies. The results indicate that MNCs may either disclose high levels of information (information strategy), or self-regulate their environmental activities in order to dissuade governments from creating strict environmental regulations (Kolk & Pinkse, 2007) or reduce the costs of non-compliance with current environmental regulations (Anton et al., 2004).

RC: Responsible Care Disclosure

This sub-category is analyzed in more detail due to its relevance to the agrochemical industry. The Responsible Care® standard is the chemical industry's foremost voluntary environmental standard and adoption of Responsible Care® and its accompanying management system signifies self-regulation of environmental activities (King & Lenox, 2000). In fact Gunningham (2008) indicates that Responsible Care® is a "sophisticated self-regulatory scheme intended to reduce chemical accidents and pollution, to build industry credibility through improved performance and increased communication, and to involve the community in decision-making" (p. 57). Successful implementation of RC may lead to improved efficiency, lower environmental, health and safety costs and increased credibility from the government (Prakash, 1999). Additionally, certain studies have indicated that Responsible Care® implementation decreases negative environmental impacts of products (Druckery, 1998). Being that Responsible Care® is a beyond compliance program, RC disclosures will indicate which sample groups adopt this "beyond compliance" mentality and self-regulate environmental activities under a code that is more stringent than environmental regulations (Prakash, 2000). Figure 10 and Table 31 show the quantity of RC CEDs for all sample groups over the 10-year sample period.

Figure 10. Quantity of RC CEDs in 2002-2011



Year	P-MNC	I-MNC	IND
2002	36	2	1
2003	8	3	1
2004	22	3	3
2005	31	1	2
2006	15	1	0
2007	24	2	3
2008	40	1	4
2009	38	3	2
2010	30	9	1
2011	20	8	1

Table 31. Total Quantity of RC Disclosures in 2002-2011

P-MNC: Quantity of RC Disclosures

P-MNCs' quantity of RC disclosures decreased over the 10-year sample period with a change from 36 sentences in 2002 to 20 sentences in 2011. The percentage that RC disclosures occupy of the total CEDs in the 10-year sample period decreases from 3.90 percent in 2002 to 0.87 percent in 2011. This decrease in quantity and percentage is indicative of a decrease in the level of importance of reporting RC disclosures for P-

MNCs. The quantities of P-MNCs' RC disclosures were much higher than I-MNCs' or Indian companies' indicating that even though there was a decrease in quantity of RC disclosures over time, the importance of reporting RC information was higher for P-MNCs than I-MNCs or Indian companies.

I-MNC: Quantity & Percentage of RC Disclosures

The quantity of RC disclosures increased slightly the 10-year sample period with a change from 2 sentences in 2002 to 8 sentences in 2011. The percentage that RC disclosures occupy of the total CEDs in the 10-year sample period increased slightly from 1.00 percent in 2002 to 1.98 percent in 2011. Interestingly, although the quantity of RC disclosures was lower in I-MNCs than P-MNCs, the percentage of total disclosure was higher in 2011. This indicated that I-MNCs dedicated a larger proportion of their total disclosures to reporting information related to RC. This increase in quantity and percentage showed that although RC disclosures are infrequent for I-MNCs, there was increased disclosure over the past 10 years.

Indian Companies: Quantity of RC Disclosures

The quantity of RC disclosures for Indian companies did not change overall during the 10-year sample period, staying the same 1 sentence in both 2002 and 2011. Like I-MNCs, the quantity of RC disclosures remained low throughout the 10-year sample period, peaking at only 4 sentences in 2008. The percentage that RC disclosures occupied of the total CEDs in the 10-year sample period decreased slightly from 0.36 percent in 2002 to 0.30 percent in 2011. Overall, the quantity of RC disclosures were similar for both I-MNCs and Indian companies for the majority of the sample period but diverged slightly in 2010 and 2011 when I-MNCs began to include more information related to RC in their annual reports.

Comparison of Data using One-tailed Two Sample T-tests:

The null hypotheses used for these statistical tests were:

$$a) H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$$

$$b) H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$$

The alternative hypotheses used for these statistical tests were:

$$a) H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$$

$$b) H_{aPI}: \mu_{DOM} > \mu_{I-MNC}$$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.1838	0.269
2003	0.2600	0.201
2004	0.1611	0.500
2005	0.1474	0.269
2006	0.1029	0.196
2007	0.1065	0.386
2008	0.1247	0.189
2009	0.1119	0.396
2010	0.1614	0.157
2011	0.2126	0.188

Table 32. P-Values for Mean Quantity of RC CEDs in 2002 - 2011

*Significant at 0.1; **Significant at 0.05

These data indicated that for both dataset a) and dataset b), the null hypotheses could not be rejected at a 90 percent confidence level. This indicated that there was no statistically significant difference between P-MNCs' and I-MNCs' or I-MNCs and Indian companies' average quantity of RC disclosures. Therefore, there was no statistical evidence to support H1b for this sub-category.

Discussion

For P-MNCs, Monsanto and Syngenta lag behind BASF and Bayercropscience in this disclosure sub-category and barely mention RC throughout the 10-year period. Being that Syngenta has not committed to RC, it comes by no surprise that the company does not disclose information related to the standard. However, it is surprising to know that

although Monsanto has committed to RC the company fails to provide detailed information on their RC program or audits. In fact, over the 10-year period, Monsanto mentions RC only once in its 2006 CSR report. This provided evidence that although a company may be internally addressing an environmental issue, they may not report this information extensively via their annual or stand-alone sustainability reports. An example of Monsanto's disclosure of RC is:

Monsanto subscribes to the principles of the American Chemistry Council Responsible Care Program, the Responsible Care Global Charter, and the Food and Agriculture Organization of the United Nations International Code of Conduct on the Distribution and Use of Pesticides (p. 43).

In contrast, Bayercropscience and BASF discuss RC in detail (Bayercropscience Sustainable Development Report, 2009) including the description of RC Management Systems and RC Audits (BASF Annual Report, 2011). Examples of RC disclosures made by BASF and Bayercropscience include:

Since 1994 we have been committed to the voluntary Responsible Care initiative of the chemical industry, which was globalized in 2006 with the Responsible Care Global Charter (Bayer Sustainable Development Report, 2011, p. 40)

Our Responsible Care Management System (RCMS) sets the framework for environmental protection, safety and security at BASF (BASF Annual Report, 2010, p. 101)

Although India's Chemical Council promotes the use of Responsible Care, there is still minimum commitment to the industry standards in this national context (ICC, 2012). This highlighted by data, which show that of the 104 companies committed to RC, only 18 have passed the audit process, which allows them to use the RC logo (ICC, 2012). For Indian companies, there is little fluctuation in RC disclosure quantities over the 10-year sample period. Coromandel and Zuari do not disclose any information related to RC because they have not committed to the RC standard during the sample period. Rallis Chemicals and United Phosphorus have both adopted the voluntary standard but report

much less information than P-MNCs. This may indicate that stakeholders do not demand that companies have this standard in order to maintain their “license to operate.”

Araya (2006b) does indicate that although still in its nascent stages, voluntary codes like RC are gaining traction in emerging and developing economies. As discussed in previous sub-category analyses, much of the I-MNCs’ CED quantities are more statistically similar to Indian companies than P-MNCs. BASF India and Bayercropscience are the only I-MNCs that have disclosed information about RC, indicating that they are the only I-MNCs that place importance on the reporting of RC adoption. In recent years, it appears that these companies may have leaned towards RC adoption disclosure being that the standard is gaining a foothold in India. Examples of I-MNC and Indian company RC disclosures include:

Benchmarking against global best practices, continuous improvement programmes and Responsible Care initiatives have ensured safe operations at all our sites (BASF Annual Report, 2007, p. 2)

Being a Responsible Card Signatory, your Company continued to provide support for the e-communication centre at the Collector’s office (Bayer Cropscience Indian Annual Report, 2010, p. 10)

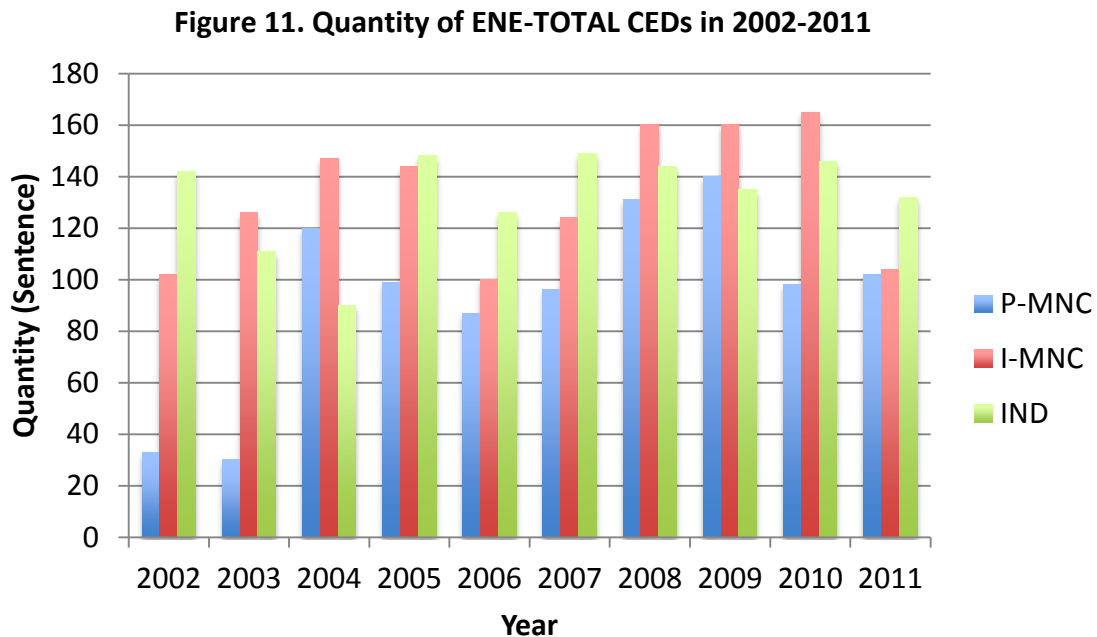
The company is a signatory to or endorses or honours the Responsible Care Initiative of Indian Chemical Manufacturers Association – the Codes of which cover the safety, environmental and stakeholder engagement approaches (Rallis Chemicals CSR Report, 2007, p. 22)

An article published recently in an Indian newspaper, The Economic Times, discusses the recent emergence of Responsible Care in India. Interviews with managers of Indian chemical companies indicate that some Indian companies see the value in RC as it is a “differentiator of doing business with global companies whose systems and procedures are aligned across the globe” (Kashelkar, 2012). United Phosphorus’ Vice President of Environment indicates that adoption of RC is justifiable because, “With stringent standards, the cost of compliance will be increasing. [RC will assist with] the improved performance of the industries and better living standards of the community” (Kashelkar, 2012). This provides evidence of the growing popularity of RC, and RC reporting, in India

and also highlights some of the challenges of implementing the standard in emerging economies.

ENE-TOTAL: Energy Disclosure

This category is important to analyze because it provides insight into the impact that India's mandatory disclosure requirement, the Companies Act's Energy Conservation Disclosure (1998), had on ENE-TOTAL disclosures during the sample period. India's Companies Act (2002) requires all companies to disclose information related to their energy usage and energy conservation (Singh, 2007). In fact, reporting of information related to energy use and conservation is not uncommon in LDCs (Momin, 2006). Belal (2000) and Rizk et al. (2008) both find that ENE disclosure practices are mature in developing and emerging economies. For all three-sample groups, ENE disclosure quantity is high. This represents the importance of energy issues like conservation, usage of energy and use of alternative technologies to the studied agrochemical companies' environmental reporting activities. Figure 11 and Table 33 show the quantity of ENE-TOTAL CEDs for all sample groups over the 10-year sample period.



Year	P-MNC	I-MNC	IND
2002	33	102	142
2003	30	126	111
2004	120	147	90
2005	99	144	148
2006	87	100	126
2007	96	124	149
2008	131	160	144
2009	140	160	135
2010	98	165	146
2011	102	104	132

Table 33. Total Quantity of ENE-TOTAL Disclosures in 2002 - 2011

P-MNC: Quantity of ENE-TOTAL Disclosures

The quantity of ENE-Total disclosures increased over the 10-year sample period growing from 33 sentences in 2002 to 102 sentences in 2011. These data were indicative of an overall increase of approximately 17 ENE-TOTAL sentences for each of the 4 sample P-MNCs. The percentage that ENE disclosures occupy of the total CEDs in the 10-year sample period increased slightly from 3.58 percent in 2002 to 4.44 percent in 2011. The increase in both quantity and percentage was indicative of an increase in the level of importance of ENE disclosures reporting for P-MNCs. However, these data differ from previously analyzed subcategories because P-MNCs' quantity of ENE-TOTAL disclosures were initially lower than I-MNCs' and Indian companies' disclosures.

I-MNC: Quantity of ENE Disclosures

I-MNCs' quantity of CEDs increased slightly between 2002 and 2011 from 102 sentences to 104 sentences respectively. ENE-TOTAL disclosures occupied a substantial proportion of the total CED disclosures; decreasing from 51 percent in 2002 to 25.74 percent in 2011. Although, there was an overall decrease in this percentage, it was evident that ENE-TOTAL reporting was deemed important by I-MNCs because they made up one quarter to one half of the total environmental disclosures. This information was important because it was the only subcategory, for I-MNCs, where disclosures occupied

a substantial proportion of the total data. This provided evidence that the mandatory government disclosure requirements may play a role in increasing environmental reporting (Frost, 2007). I-MNCs' data varied from those of P-MNCs, which were not subject to the same mandatory requirement.

Indian Companies: Quantity of ENE Disclosures

Similar to I-MNCs, the quantity of ENE disclosures was very high for Indian companies. Although there was a slight decrease in quantity from 142 sentences to 132 sentences in 2011, the R^2 (coefficient of determination) is 0.143, indicating that ENE quantity increases slightly over time. Like I-MNCs, the percentage that ENE disclosures occupy of the total CEDs is substantial and decreases slightly from 51.1 percent in 2002 to 39.2 percent in 2011. In fact, these percentage figures are very similar between I-MNCs and Indian companies.

Comparison of Data using One-tailed Two Sample T-tests:

The null hypotheses used for these statistical tests were:

- a) $H_{0PI} = \mu_{I-MNC} = \mu_{IPMNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were:

- a) $H_{aPI}: \mu_{I-MNC} > \mu_{P-MNC}$
- b) $H_{aPI}: \mu_{DOM} > \mu_{I-MNC}$

These data indicated (Table 34) that for dataset a) P-MNC and I-MNC, the null hypothesis can be rejected and the alternative hypothesis may be true at a confidence level of 95 percent in 2002-2003. These data varied from previously analyzed subcategories, because the average quantities of I-MNCs' ENE-TOTAL disclosures were higher than the average quantity of P-MNCs' ENE-TOTAL disclosures. Of all the subcategories analyzed, this was the only category where I-MNCs' CED quantity were significantly higher than those of P-MNCs.

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	**0.0403	0.2464
2003	**0.0099	0.3527
2004	0.3658	0.1472
2005	0.2286	0.4703
2006	0.4137	0.2831
2007	0.3311	0.3364
2008	0.3726	0.3925
2009	0.4102	0.3294
2010	0.2131	0.3933
2011	0.4887	0.2905

Table 34. P-Values for Mean Quantity of ENE CEDs in 2002 - 2011

*Significant at 0.1 **Significant at 0.05

For dataset b), there were no significant differences between the average quantities of I-MNCs' and Indian companies' ENE-TOTAL disclosures. Therefore, over the 10-year sample period, the null hypothesis could not be rejected. This contrast supported Hypothesis H1b and indicated that throughout the 10-year process, the I-MNCs average quantity of ENE-TOTAL disclosures were more similar to I-MNCs' average quantity than P-MNCs'.

Discussion

The large quantity of disclosures seen by both Indian companies and I-MNCs may be a direct impact of the energy conservation reporting requirements under Section 217(1)(e) of the Companies Act 1956 with the Companies Rules, 1988 (Sahay, 2004). Each of the annual reports published by Indian and I-MNC companies had a separate section outlining their energy conservation goals and energy usage and this was not always present in P-MNCs annual reports. The inclusion of a separate energy conservation section led to an overall high quantity of ENE-TOTAL disclosures. Being that the Act mandates that each Indian company disclose a minimum quantity of sentences focused on energy information, such as the use of alternative energy sources, it is not surprising that there was little fluctuation seen in the overall quantity of I-MNCs'

and Indian companies' ENE-TOTAL disclosures. It was observed that these companies' did not often go beyond reporting requirements by disclosing significantly more information than the Act required. Sen et al.'s (2011) study supports I-MNCs' and Indian companies' ENE-TOTAL quantity data by indicating that "adoption of environmentally friendly technology" (which falls into the ENE category) is disclosed quite frequently in the annual reports of Indian companies. That being said, it is apparent that I-MNCs have once again, adopted a localized strategy with regards to ENE disclosures.

However, it should be noted that for both I-MNCs and Indian companies, the percentage of ENE disclosures decreased over time (although total quantity values stayed roughly the same). This means that over time, I-MNCs and Indian companies reported a higher quantity of voluntary CEDs in their annual and stand-alone sustainability reports. These data illustrated the power that mandatory reporting requirements can have on the CED reporting process in India and provides evidence for that heightened reporting regulations may increase the quantity of disclosures. Examples of ENE disclosures found in I-MNCs and Indian companies annual and stand-alone environmental reports include:

An energy conservation measure taken was the conversion of boilers and VAM machines from furnace oil to nature gas (United Phosphorus Annual Report, 2009, p. 15)

The company has rolled out many initiatives as energy conservation measures across all the units identified through Total Productive Maintenance (TPM), DISHA (an internal enterprise value creation programme) and LASER (Learn, Apply, Share, Enjoy & Reflect). (Rallis CSR Report, 2009, p. 34)

The conservation of energy measures taken include the installation of a new co-generation plant with high electrical efficiency at Ankleshwar (Bayer Cropscience India Annual Report, 2009, p. 13)

The company takes all possible steps to conserve energy (Monsanto India Annual Report, 2004, p. 50)

Even though the percentage of ENE-TOTAL disclosure of total CEDs is lower for P-MNCs than I-MNC, this sample group still shows an increasing quantity and percentage of ENE disclosures. This growth was indicative of the growing importance of that P-MNCs' have placed on reporting energy issues to stakeholders. Examples of ENE disclosures by P-MNCs include:

"We have set a quantitative goal for improving energy efficiency for the first time in 2008, and intend to achieve this goal by implementing numerous measures" (BASF Annual Report, 2007, p. 102)

"Apart from this, Bayer plans to achieve a 10 percent increase in energy efficiency at its production facilities by 2013 compared to 2008" (Bayer Annual Report, 2009, p.41"

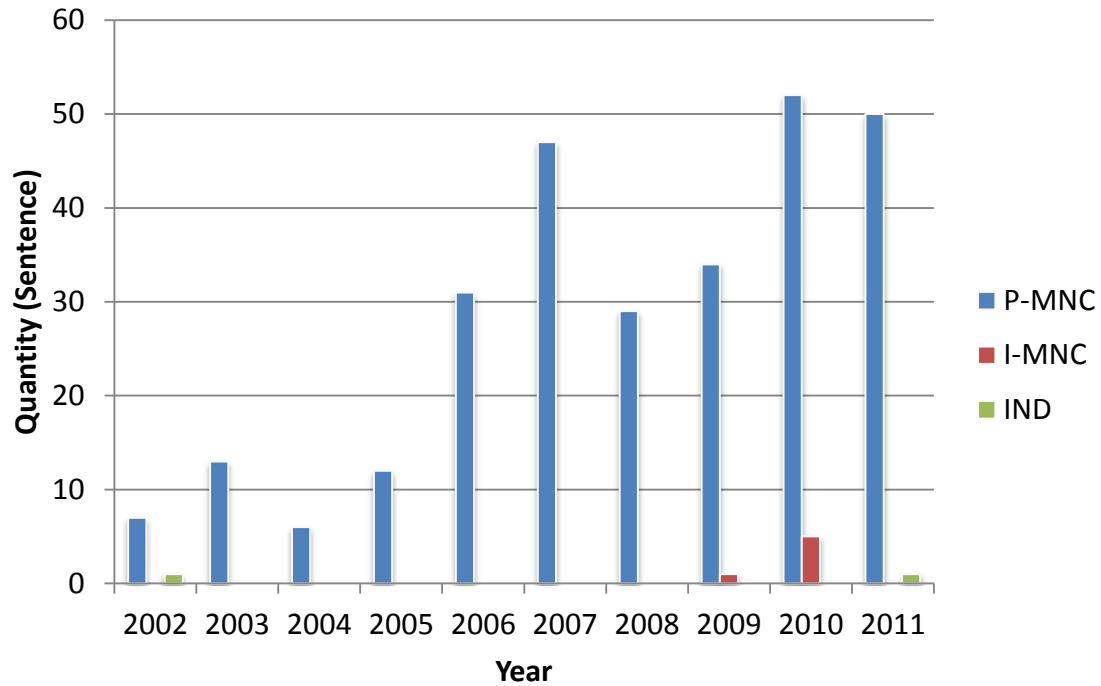
Overall, ENE-TOTAL disclosures are an important component of the CEDs of all sample groups and this is supported by past studies that have found that disclosures related to energy and energy conservation accounted for a large and increasing portion of total environmental disclosures (Guthrie & Abeysekera, 2006; Hackston & Milne, 1996; Ng, 2000).

SUPP: Sustainable Supply Chain Disclosures

This category was added to the content analysis categories based on a literature review of CED research and stand-alone environmental reports. Tate et al. (2010) finds that CED disclosed focused on sustainable supply chain issues, including suppliers' use of EMS, are becoming increasingly popular. In fact, even the CDP guidelines highlight the importance that supply chain issues can play in a company's environmental impact (Carbon Disclosure Project, 2011). Therefore, many companies are disclosing more environmental information related to environmental certifications of suppliers and sustainable supply chains. In fact, in 2010, The Harvard Business Review published a comprehensive overview on this topic and indicated that sustainable supply chain issues are of growing importance for all companies (Senge & Prokesch, 2010). Figure 12 and

Table 35 show the quantity of SUPP CEDs for all sample groups over the 10-year sample period.

Figure 12: Quantity of SUPP CEDs in 2002-2011



Year	P-MNC	I-MNC	IND
2002	7	0	1
2003	13	0	0
2004	6	0	0
2005	12	0	0
2006	31	0	0
2007	47	0	0
2008	29	0	0
2009	34	1	0
2010	52	5	0
2011	50	0	1

Table 35. Total Quantity of SUPP CEDS in 2002-2011

P-MNC: Quantity of SUPP Disclosures

P-MNCs' quantity of SUPP disclosures increased over the 10-year sample period growing from 7 sentences in 2002 to 50 sentences in 2011. This represented an overall increase of approximately 11 sentences for each of the 4 sample P-MNCs. The percentage that SUPP disclosures occupied of the total CEDs in the 10-year sample period increased over time from 0.76 percent in 2002 to 2.18 percent in 2011. The fact that P-MNCs dedicated an increasing portion of their CEDs to SUPP disclosures, illustrates the relative reporting importance of reporting information from this category. Being that P-MNCs have large supplier networks and global operations (Tate et al., 2010) they may report more SUPP information in order to ensure that their reputation is not negatively impacted by their suppliers' environmental activities and/or performance (Tate et al., 2010). The recent emergence of supply chain issues as an important factor for CED practices (Davis & Searcy, 2010), may have influenced the increased reporting of disclosures from the SUPP category.

I-MNC: Quantity of SUPP Disclosures

The quantity of SUPP disclosures for I-MNCs was very low with no disclosure observed in most years, i.e. 2002-2007 and 2011. This varied from P-MNCs, which had a growing number of SUPP disclosures.

Indian Companies: Quantity of SUPP Disclosures

Like I-MNCs, the quantity of SUPP disclosures for Indian companies were low, occurring only in 2002 and 2011 with a value of only 1 sentence. The non-disclosure strategy taken by both I-MNCs and Indian companies indicated that sustainable supply chain issues were not perceived to be an important environmental issue to report to their stakeholders. This may also indicate that use of global supply chains is not a popular occurrence in India.

Comparison of Data using One-tailed Two Sample T-tests:

The null hypotheses used for these statistical tests were:

- a) $H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were:

- a) $H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$
- b) $H_{aPI}: \mu_{DOM} > \mu_{I-MNC}$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.1551	0.1955
2003	*0.0918	Identical data, no disclosure
2004	0.1076	Identical data, no disclosure
2005	**0.0459	Identical data, no disclosure
2006	**0.0436	Identical data, no disclosure
2007	*0.0856	Identical data, no disclosure
2008	**0.0389	Identical data, no disclosure
2009	*0.0672	0.1955
2010	*0.0972	0.1955
2011	0.1091	0.1955

Table 36. P-Values for Mean Quantity of SUPP CEDs in 2002 - 2011

*Significant at 0.1; **Significant at 0.05

These data indicated that for dataset a), the null hypothesis can be rejected at a confidence level of 90 percent in 2003, 2007 and 2009-2010. The null hypothesis can also be rejected at a confidence level of 95 percent in 2005-2006 and 2008. In these same years, the alternative hypothesis, that P-MNCs average quantity of SUPP disclosures are higher than I-MNCs average quantity of SUPP disclosures may be true. In 7 of the 10 sample years, there was significant differences between the quantity data of P-MNCs and I-MNCs.

For dataset b), there were no significant differences in the average quantities of SUPP disclosures between I-MNCs and Indian companies (at a 90 percent confidence interval). In fact, in 2003-2008 the quantity data were identical because both sample groups did not report any SUPP information. The statistically significant difference

between P-MNCs' and I-MNCs' average SUPP quantities and the absence of such significant between I-MNCs and Indian companies' average quantity provide further support for Hypothesis H1b. Analysis of this subcategory indicated that I-MNCs may adopt a localized reporting strategy for SUPP disclosures.

Discussion

It is apparent from these data that reporting of sustainable supply chain issues is not an established practice for I-MNCs or Indian companies. Again, I-MNCs appear to have adopted the localized strategy for reporting SUPP CEDs. However, it is evident that for P-MNCs, reporting of sustainable supply chain and supplier environmental standards increased in quantity, and therefore importance, in the 10-year period. This is supported by KPMG's (2005) study, which indicates that 80 percent of top 250 Global Fortune companies include information related to sustainable supply chain issues. However, KPMG also notes that in these disclosures, the level of specificity remains low with little information provided on environmental performance of suppliers. P-MNCs disclose information about sustainable supply chains (BASF Annual Report, 2011), suppliers' environmental requirements (BASF Annual Report, 2011), Responsible Care® guidelines for suppliers (BASF Annual Report, 2011), supplier codes of conduct (Bayer Sustainable Development Report, 2011) and sustainability audits (Bayer Sustainable Development Report, 2011). Examples of P-MNC SUPP disclosures include:

Syngenta takes HSE considerations into account during the selection of contractors, toll manufacturers and suppliers to ensure that competent partners are selected. The company conducts audits of its major suppliers to ensure they meet its HSE standards (Syngenta Corporate Responsibility Report, 2006, p. 14)

Sustainability-based supplier management is strategically important for Bayer's success as a company...This consideration is based on our Supplier Code of Conduct, in which we document our sustainability principles and requirements (Bayer Sustainable Development Report, 2011, p. 35)

Discussion of Subcategory Quantity Analysis:

Table 37 outlines the CED reporting practices and strategies of I-MNCs and indicates whether their reporting practices are more similar, i.e. standardized, with their P-MNCs or whether their practices more similar, i.e. localized, to reporting practices of domestic Indian companies.

Category	Sample Group that reporting is more similar to	Reporting Strategy
GEN-3	Domestic Indian Companies	Localized
GEN-4	Domestic Indian Companies	Localized
RES-1a	Domestic Indian Companies	Localized
POLL-Total	Domestic Indian Companies	Localized
PROD-1	Domestic Indian Companies	Localized
SUST-Total	Domestic Indian Companies	Localized
SUST-4	Domestic Indian Companies	Localized
RC	Undetermined	Undetermined
ENE-Total	Domestic Indian Companies	Localized
SUPP	Domestic Indian Companies	Localized
Overall	Domestic Indian Companies	Localized

Table 37. Description of Reporting Strategy taken by I-MNCs for Subcategories

Statistical analyses of ten categories and sub-categories indicated that there were more statistically significant differences between the average quantities of P-MNCs CEDs and I-MNCs' CEDs than between the average quantities of Indian companies' CEDs and I-MNCs' CEDs. As shown in Table 37, this was the case for 9 of the 10 categories, providing strong statistical evidence in support of Hypothesis H1b, which states that the quantity of I-MNCs CEDs are more similar to domestic Indian companies than their parent companies. This indicates that I-MNCs have a localized reporting approach for their CEDs.

5.3 Analyses of CEDs' Information Quality

Beck et al. (2010) indicates that, "caution should be exercised in claiming that any content analysis method is capable of measuring 'quality' per se because fitness for purpose can only be assessed by considering supporting evidence from information users" (p. 210). Therefore, this study used the CONI method's measure of quality to test for information quality of the data. The CONI quality scale ranks disclosures on a scale of 1 to 5 in order to, "describe the level of information detail contained in each coded piece of information" (Beck et al., 2010, p. 210). This research will examine the information quality of the CEDs as a whole and therefore, the data will be examined in terms of percentages of total CEDs. This removes the element of quantity, which has already been analyzed (Section 5.2). Instead, the data will be analyzed with the following kept in mind: a high percentage of type 1-2 disclosures indicates an overall low level of information quality, high percentage of type 3 disclosures indicates a moderate level of information quality and a high percentage of type 4 and type 5 disclosures indicates an overall high level of information quality.

There are five types of quality, Type 0 to Type 5, for which each sentence was coded. Type 5 represents the highest level of quality, while type 1 is given to sentences of the lowest quality. In order to compare each sample group's quality over time, the number of sentences coded by quality type were summed for each year i.e. the quantity of P-MNCs' sentences coded as Type 5 in 2001 were summed to provide a total quantity count for quality, and then the data was divided by the total CED quantity for that given year. For example, in 2002 P-MNCs' had a total of 921 CEDs, of these, 362 were Type 1 CEDs. Therefore, the CED reporting in 2001 was composed of 39% Type 1 disclosures. Using this analysis, any change in percentage data represents a shift in quality of CEDs. As described by Beck et al. (2010), the quality of reporting is deemed as superior if there is a higher quantity of Type 5 disclosures versus Type 1 disclosures

The description of each quality Type is provided again in Table 38 for reference:

Type	Description
1	Purely narrative CEDs with no detail related to content sub-categories
2	Provides reader with more narrative information on sub-category
3	Purely numerical way, with no narrative
4	Numerical while also containing detail, qualitative descriptions
5	Numerical with qualitative descriptions and contextualization via comparison

Table 38. Short Description of CONI Quality Types

Data were then analyzed by grouping the disclosure types into low quality, moderate quality and high quality categories. The change in the percentages that these categories made up of the total CEDs were measured in order to evaluate whether the quality of CEDs increased or decreased over time.

Low quality information were those disclosures coded as Type 1 or Type 2. These two quality types are deemed to be of low quality because, as described by Toms (2002), they are solely descriptive in nature and therefore, less credible. Type 3 were classified as moderate in quality because they did not provide a descriptive element. Lang and Lundhom (1993) indicate that high quality disclosures are those that contain both narrative and number information. Therefore, in this study, Type 4 and Type 5 disclosures were classified as High Quality Disclosures. Note that for all quality results and subsequent discussion, the use of the word “percentage” represents the percentage of disclosures per total CEDs in a given year. This percentage is the measure used in this research to analyze quality.

Analysis and Results

The quality analysis and results will be organized according to the study's hypotheses. Hypothesis H2c will be examined first, in order to determine if there was an increase in the quality of CEDs, within all sample groups, over the 10-year period. The analysis will then focus on Hypothesis H3c to verify if the quality of I-MNCs' and domestic Indian companies' CEDs were indeed lower than P-MNCs' CED quality. Finally, the analysis will turn to Hypothesis H1c to evaluate whether I-MNCs have adapted their CED practice to local conditions.

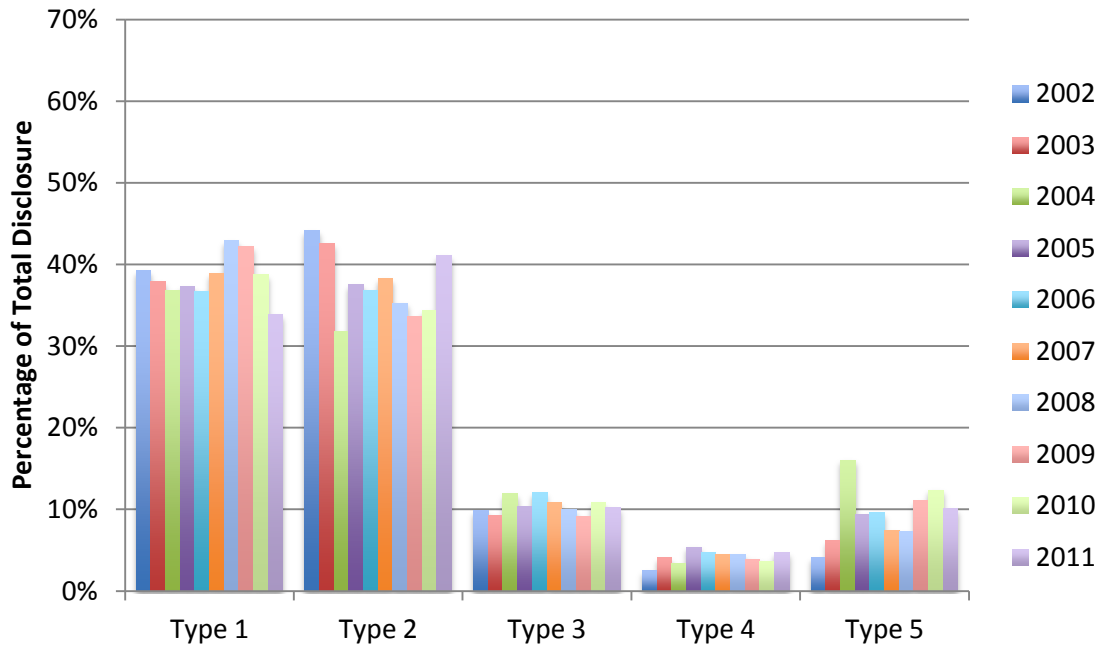
H2c: Over the 10-year sample period, there has been an increase in the quality of corporate environmental disclosures for all sample groups (P-MNCs, I-MNCs and Indian domestic companies).

P-MNCs: Quality of CEDs

As seen in Figure 13 and Table 39, Type 1 and Type 2 disclosures occupied the majority of P-MNCs' CEDs in all sample years. However, the overall percentage of low information quality, as measured by percentage of total CEDs, decreased from 80 percent in 2002 to 75 percent in 2011. The proportion of moderate quality disclosures stayed the same overall, at 10%. However, the proportion of high quality disclosures, Type 4 and Type 5, increased from 6 percent to 15 percent. This indicated that the information quality of P-MNCs' data had improved over the 10-year sample period, shifting from low quality narrative disclosures to higher quality quantitative disclosures. The 7 percent growth in proportion of Type 5 disclosures between 2002 and 2011 indicated that P-MNCs provided a larger proportion of high quality, quantitative and comparable information. The content analysis data indicated that a large proportion of this increase was due to increased Type 5 disclosures for POLL-TOTAL data. For example, Syngenta did not have any Type 5 disclosures in 2002 but by 2011, the company had 28 Type 5 disclosures. Of these 28 Type 5 disclosures, 22 were from the POLL-TOTAL

category. POLL-TOTAL disclosures increased during the sample period and this increase was mainly in high quality, comparable information.

Figure 13. Quality of P-MNCs' CEDs as Measured by Percentage of Total Disclosures



Year	Low Quality (Type 1 & 2)	Moderate Quality (Type 3)	High Quality (Type 4 & 5)
2002	83%	10%	6%
2003	81%	9%	10%
2004	69%	12%	19%
2005	75%	10%	14%
2006	74%	12%	15%
2007	77%	11%	11%
2008	78%	10%	11%
2009	76%	9%	15%
2010	73%	11%	16%
2011	75%	10%	15%

Table 39. Percentage of P-MNCs' High, Moderate and Low Quality CEDs in 2002 - 2011

I-MNC: Quality of CEDs

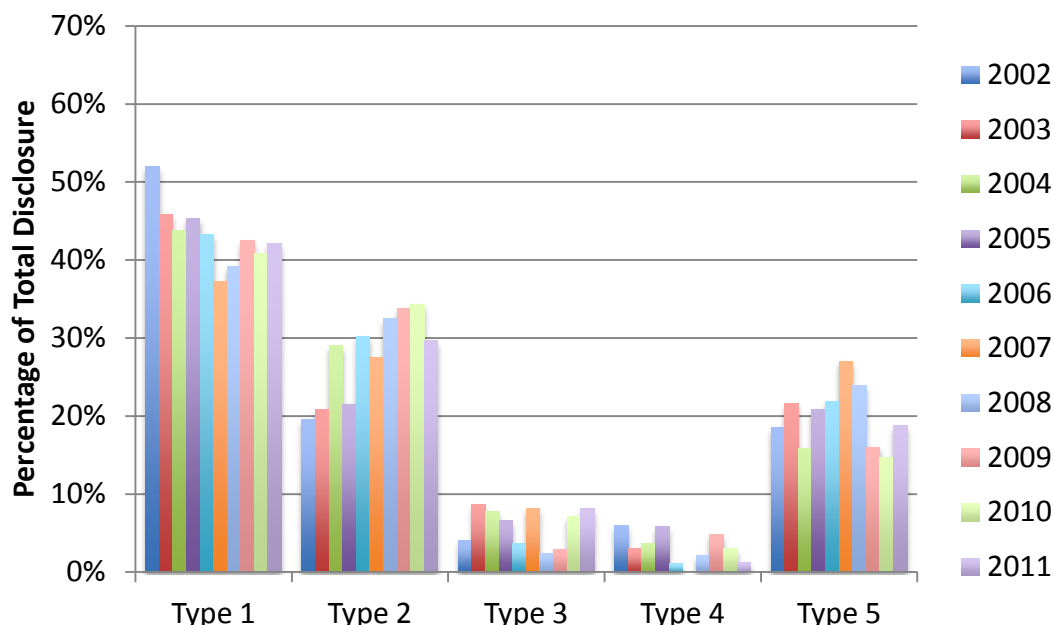
These I-MNC quality data indicated that, like P-MNCs, Type 1 and Type 2 disclosures occupied the majority of disclosures in all sample years (Table 14). In fact, as seen in Table 40, there was no decrease in the percentage of low quality disclosures over the 10-year period. The low quality CEDs occupied a 72 percent portion of the CEDs in both 2002 and 2011. However, as seen in Table 40, the percentage of Type 1 disclosures decreased while Type 2 increased indicating that I-MNCs shifted disclosures from mere mentions of an environmental category to detailed qualitative descriptions about sub-categories from 2002 to 2011.

Over the 10-year period, the percentage of moderate quality CEDs increased from 4 percent in 2002 to 8 percent in 2011. This increase was thanks to a decrease in the percent of high quality disclosures, from 24 percent in 2002 to 20 percent in 2011. This indicates that over the 10-year sample period, the overall quality of I-MNCs' CEDs decreased, reducing the percentage of high quality disclosures and increasing the percentage of moderate quality disclosures. Remember that this does not mean that there were a lower quantity of Type 5 disclosures in 2011 versus 2001, but only that these disclosures made up a smaller percentage of the CEDs as a whole. Therefore, the CEDs as a whole decreased in quality, while increasing in quantity.

Year	Low Quality (Type 1 & 2)	Moderate Quality (Type 3)	High Quality (Type 4 & 5)
2002	72%	4%	24%
2003	67%	9%	25%
2004	73%	8%	20%
2005	67%	7%	27%
2006	73%	4%	23%
2007	65%	8%	27%
2008	72%	2%	26%
2009	76%	3%	21%
2010	75%	7%	18%
2011	72%	8%	20%

Table 40. Percentage of I-MNCs' High, Moderate and Low Quality CEDs in 2002 -2011

Figure 14. Quality of I-MNCs' CEDs as Measured by Percentage of Total Disclosure



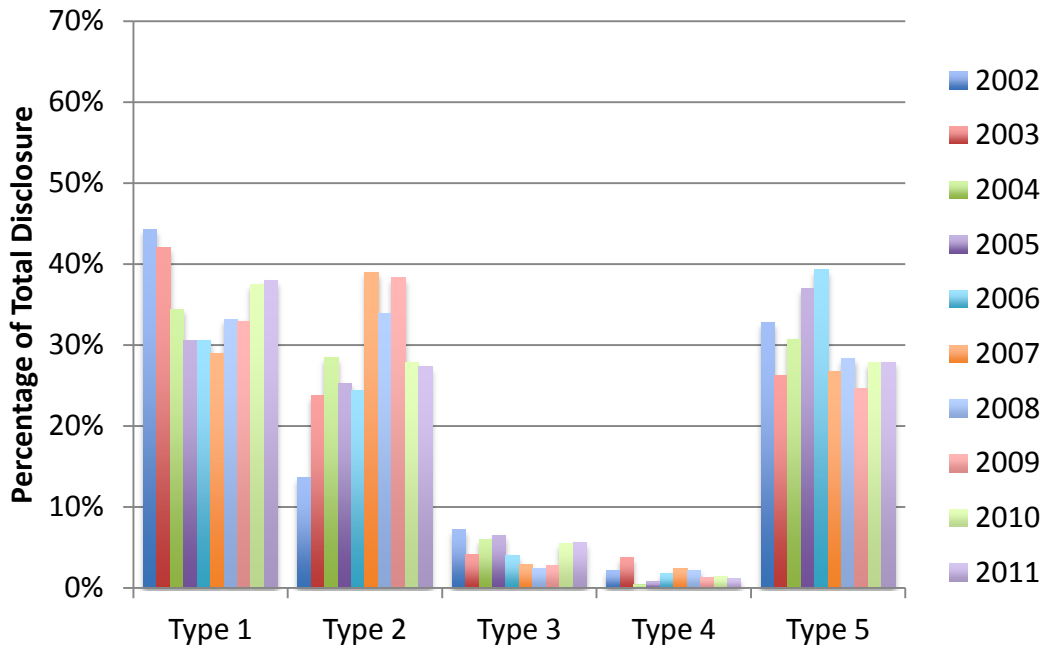
Domestic Indian Companies: Quality of CEDs

Similar to I-MNCs and P-MNCs quality data, domestic Indian companies' Type 1 and Type 2 disclosures occupied the majority of CEDs in all sample years, increasing from 58 percent in 2002 to 65 percent in 2011 (Figure 15/ Table 41). This indicated that the majority of the CEDs, in all sample years, were of solely qualitative in nature. As the percentage of low quality disclosures increased, the moderate and high quality CEDs decreased from 2002 to 2011. Between 2002 and 2011, the moderate quality disclosures decreased from 7 percent to 6 percent and the high quality disclosures decreased from 35 percent to 29 percent.

This indicated that the overall quality of Indian companies' CEDs decreased in the 10-year sample period. However, the overall quality of Indian companies' CEDs were higher than the overall quality of P-MNCs, even though P-MNCs had a higher quantity of CEDs. This was seen observed best in 2011 when P-MNCs had a total quantity of 233 Type 5 CEDs and Indian companies only had 94 Type 5 CEDs. However, being that quality is measured by the percentage of total CEDs in a given year, a higher quantity of Type 5

disclosures does not necessarily mean that the overall quality of the total CEDs will be higher.

Figure 15: Quality of Indian Companies' CEDs as Measured by Percentage of Total Disclosures



Year	Low Quality (Type 1 & 2)	Moderate Quality (Type 3)	High Quality (Type 4 & 5)
2002	58%	7%	35%
2003	66%	4%	30%
2004	62%	6%	31%
2005	56%	6%	38%
2006	55%	4%	41%
2007	68%	3%	29%
2008	67%	2%	30%
2009	71%	3%	26%
2010	65%	6%	29%
2011	65%	6%	29%

Table 41. Percentage of Indian Companies' High, Moderate and Low Quality CEDs in 2002 - 2011

Analysis of Hypothesis H3c: CED practices of companies operating in India, I-MNCs and Indian companies, are of lower quality than companies operating in developed economies (P-MNCs).

In order to examine the relative quality between each sample groups' CEDs, the percentage quality disclosure data was compared between each sample group, for each year and for each quality group, as classified by low, moderate and high. Using Table 39, 40 and 41 it was determined, for each year, if P-MNCs had higher quality data than I-MNCs and Indian companies. The results of this analysis indicate that P-MNCs' overall CED quality was not higher than I-MNCs' or Indian companies' CEDs in any year throughout the sample period. These data were further analyzed by calculating the 10 year quality average for each sample group. These averaged data can be found in Table 42 and indicate, when considering all 10-years together, that I-MNCs' quality of CEDs were more similar to Indian companies than P-MNCs.

	Low Quality (Type 1 & 2)	Moderate Quality (Type 3)	High Quality (Type 4 & 5)
P-MNC	76%	10%	13%
I-MNC	71%	6%	23%
Indian Companies	63%	5%	32%

Table 42. Average Quality of CEDs in 10-year Content Analysis Study

These data do not support Hypothesis H3c because both overall, and for each sample year, the quality of P-MNCs disclosures are lower in percentage than I-MNCs and domestic Indian companies. These results parallel KPMG's (2011) study, which found that although companies operating in India were unlikely to report environmental information, when they do, the information is often of high quality and follows the guidelines of an international reporting standards, like GRI.

Analysis of Hypothesis H1c:

H1c states that foreign subsidiaries (I-MNCs) have adapted corporate environmental disclosure practices to local conditions and consequently, the quality of I-MNC's corporate environment disclosures is more similar to the quality of domestic companies than parent companies. This section analyzes the data in order to test this hypothesis.

It has been determined that H3c is not supported by the quality data, and that P-MNCs have an overall lower quality of CEDs than I-MNCs and Indian companies. Therefore, this section will analyze the CED percentage quality data using one-tailed non-paired t-tests to determine whether I-MNCs' quality of CEDs is more similar to P-MNCs or Indian companies.

Type 1: Comparison of Quality Data using One-tailed Two Sample T-tests:

The null hypotheses used for these statistical tests were:

$$a) H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$$

$$b) H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$$

The alternative hypotheses used for these statistical tests were:

$$a) H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$$

$$b) H_{aDI}: \mu_{DOM} > \mu_{I-MNC}$$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	*0.0820	0.3906
2003	0.1715	0.3164
2004	*0.0512	0.0639
2005	0.0284	0.0262
2006	0.4352	0.4072
2007	0.2496	0.4896
2008	0.4510	0.1881
2009	0.3850	0.1122
2010	0.2616	0.2330
2011	**0.0352	0.1050

Table 43. P-Values for P-MNC and I-MNC and I-MNC and Indian companies

*Significant at 0.1; **Significant at 0.05

These data indicated that for dataset a) P-MNC and I-MNC, the null hypothesis can be rejected at a confidence level of 90 percent in 2002 and 2004, and at a confidence level of 95 percent in 2011. Therefore, the alternative hypothesis may be true in 2002, 2004 and 2011 because, during these years, there are significant differences between the average percentage of P-MNCs Type 1 CEDs and I-MNCs' Type 1 CEDs.

For dataset b), there were no significant differences in the average percentages of Type 1 CEDs between I-MNCs and Indian companies. This showed that the average percent quality for Type 1 CEDs was more similar between I-MNCs and Indian companies than between P-MNCs and I-MNCs. Being that there were statistical differences in dataset a) but no statistical differences found for dataset b), this analysis supported Hypothesis H1c by indicating that overall, I-MNCs average percent of Type 1 disclosures were more similar to Indian companies than to P-MNCs. This also provided evidence for the localization of reporting, whereby I-MNCs reporting quality has been adapted to their local operating context, India.

Type 2: Comparison of Quality Data using One-tailed Two Sample T-tests

The null hypotheses used for these statistical tests were:

- a) $H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were:

- a) $H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$
- b) $H_{aPI}: \mu_{DOM} > \mu_{I-MNC}$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	**0.0387	0.3209
2003	0.2425	0.2886
2004	0.4273	0.4184
2005	0.2518	0.3497
2006	*0.0518	0.3493
2007	*0.0866	0.4784
2008	**0.0081	0.2858
2009	0.1149	0.4321
2010	**0.0210	0.3525
2011	**0.0030	0.2668

Table 44. P-Values for P-MNC and I-MNC and I-MNC and Indian companies

*Significant at 0.1; **Significant at 0.05

Like Type 1 quality datas' statistical analyses, there were statistical differences in 6 of the 10 sample years for Type 2 CED quality's dataset a). Therefore, the null hypothesis can be rejected at a confidence level of 90 percent in 2006-2007, and at a confidence level of 95 percent in 2002, 2008 and 2010-2011. Thus, the alternative hypothesis may be true in these years because, there were significant difference between the average percentage of P-MNCs Type 2 CEDs and I-MNCs' Type 1 CEDs.

In contrast, in dataset b), there were no statistically significant differences between the average percentage of Type 2 CEDs. Therefore, the null hypothesis could not be rejected. The significant differences seen between P-MNCs' and I-MNCs' Type 2 CEDs over the 10-year sample period coupled with the lack of such differences between I-MNCs and Indian companies further supports Hypothesis 1c. I-MNCs follow a local strategy with regards to the quality of their Type 2 CEDs, meaning that the percentage that Type 2 CEDs made up of the entire CEDs are similar for I-MNCs and Indian companies.

Type 3: Comparison of Quality Data using One-tailed Two Sample T-tests

The null hypotheses used for these statistical tests were:

$$a) H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$$

$$b) H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$$

The alternative hypotheses used for these statistical tests were:

$$a) H_{aPI}: \mu_{P-MNC} > \mu_{I-MNC}$$

$$b) H_{aPI}: \mu_{DOM} > \mu_{I-MNC}$$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.4548	0.1644
2003	0.3813	0.1633
2004	**0.0441	0.2548
2005	**0.0337	0.4279
2006	*0.0794	0.3058
2007	**0.0033	0.3961
2008	*0.0563	0.4504
2009	0.2738	0.4573
2010	0.3758	0.2617
2011	0.1115	0.2925

Table 45. P-Values for Type 3 P-MNC and I-MNC and I-MNC and Indian Companies

*Significant at 0.1; **Significant at 0.05

Again, these statistical analyses provided support for Hypothesis H1c, by showing that there were statistically significant differences between P-MNCs' and I-MNCs' average percentage of Type 3 CEDs. The null hypothesis can be rejected between 2004 and 2008 at a confidence level of 95 percent in years 2004-2005 and 2007, and at a confidence level of 90 percent in 2006 and 2008. Therefore, the alternative hypothesis, that P-MNCs' average percentage of Type 3 disclosures is higher than I-MNCs may be true.

These results contrasted with dataset b), where there were no statistically significant differences detected in the data. This means that the null hypothesis cannot be rejected and further supports Hypothesis H1c. Combined, dataset a) and b) indicated that throughout the 10-year sample period, I-MNCs' average percentage of Type 3 disclosures were more similar to Indian companies than their parent companies.

Type 4: Comparison of Quality Data using One-tailed T-tests

The null hypotheses used for these statistical tests were:

- a) $H_{0PI} = \mu_{P-MNC} = \mu_{I-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were:

- a) $H_{aPI}: \mu_{I-MNC} > \mu_{P-MNC}$
- b) $H_{aDI}: \mu_{DOM} > \mu_{I-MNC}$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	**0.0043	0.2940
2003	0.4400	**0.0259
2004	0.4040	*0.0695
2005	*0.0546	0.2272
2006	**0.0102	0.1272
2007	**0.0042	0.1702
2008	0.3515	*0.0349
2009	0.2790	0.1264
2010	0.4187	0.4086
2011	0.1425	0.1448

Table 46. P-Values for Type 4 P-MNC vs. I-MNC and I-MNC and Indian companies

*Significant at 0.1; **Significant at 0.05

Analyses of dataset a) once again revealed that the null hypothesis a) can be rejected at a 95 percent confidence level in 2002 and 2006-2007. Additionally, the null hypothesis can also be rejected at a 90 percent confidence level in 2005. Therefore, the alternative hypothesis may be true in each of these years. This indicated that P-MNCs' average percentage of Type 4 disclosures differed significantly from I-MNCs' Type 4 CEDs, with I-MNCs' average percentage higher in those years.

Analyses of dataset b) indicated that the null hypothesis b) can also be rejected at a 95 percent confidence level in 2003 and at a 90 percent confidence level in 2004 and 2005. Therefore, in these years, the alternative hypothesis may be true. There were only statistically significant differences in 3 of the 10 sample years for dataset b), while

significant differences arose in 4 of the 10 sample years for dataset a). This indicated that when examining the 10-year sample period as a whole, Hypothesis H1c is supported. There were a lower number of significant difference occurrences between I-MNCs and Indian companies than between P-MNCs and I-MNCs, lending further support to the theory that argues that I-MNCs localize the quality of their CEDs.

Type 5: Comparison of Quality Data using One-tailed Two Sample T-tests

The null hypotheses vary from previous quality statistical testing being that it was found that I-MNCs and Indian companies' percentage of quality Type 5 were higher than P-MNCs' percentage. Therefore, the null hypotheses were:

- a) $H_{0PI} = \mu_{I-MNC} = \mu_{P-MNC}$
- b) $H_{0DI} = \mu_{DOM} = \mu_{I-MNC}$

The alternative hypotheses used for these statistical tests were:

- a) $H_{aPI}: \mu_{I-MNC} > \mu_{P-MNC}$
- b) $H_{aDI}: \mu_{DOM} > \mu_{I-MNC}$

Year	a) P-Value: P-MNC & I-MNC	b) P-Value: Indian Company & I-MNC
2002	0.3038	0.1947
2003	0.4213	*0.0519
2004	0.3047	*0.0806
2005	**0.0199	0.1247
2006	0.1085	0.1395
2007	0.1525	**0.0426
2008	**0.0151	**0.0481
2009	*0.0972	0.1068
2010	**0.0064	0.2979
2011	**0.0285	0.2370

Table 47. P-Values for Type 5 P-MNC vs. I-MNC and I-MNC and Indian companies

*Significant at 0.1; **Significant at 0.05

Again, these statistical analyses provided support for Hypothesis H1c, by showing that in dataset a), there were statistically significant differences between P-MNCs and I-MNCs' average percentage of Type 5 CEDs in 5 out of the 10 sample years. Therefore, the null

hypothesis can be rejected in 2009 at a confidence level of 90 percent and in 2005, 2008, 2010 and 2011 at a confidence level of 95 percent. This indicated that the alternative hypothesis, which stated that I-MNCs have a higher average percentage for Type 5 than P-MNCs may be true.

For dataset b), there were statistically significant differences between the average percentage of Type 5 CEDs in 4 out of the 10 years. The number statistically significant occurrences were less for dataset b) than for dataset a). The null hypothesis can be rejected in 2003-2004 at a confidence level of 90 percent and in 2007-2008 at a confidence level of 95 percent. This indicated that within those years, the alternative hypothesis may be true. These results provided support for Hypothesis H1c by indicating that, throughout the 10-year period, there were more statistically significant differences between P-MNCs' and I-MNCs' average percentage of Type 5 CEDs than between I-MNCs' and Indian companies'. These analyses lended support to the theory that I-MNCs are locally responsive with regards to the quality of their CEDs.

Overall Discussion for Quality of CED Results:

The percentage data provides insights into both the change in quality of CEDs over the 10-year sample period and the difference in CED quality between each one of the sample groups. With regards to the longitudinal analyses, a decrease in percentage represented a shift of disclosures to a different quality type and an increase in percentage represented an overall shift towards that quality type in the annual reports and stand-alone environmental reports. Results of the longitudinal analyses indicated that the quality of disclosures, as determined by percentage of total CEDS, increased for P-MNCs but decreased for both I-MNCs and Indian companies. Additionally, P-MNCs' overall increase in CED quality stemmed primarily from an increase in quantitative and comparable POLL-TOTAL data.

However, in contrast to P-MNCs change in overall quality, the quality of I-MNCs' and Indian companies' disclosures decreased over time. For both of these sample

groups, the majority of their high quality disclosures were from the ENE-TOTAL category. This parallels Momin's (2006) findings, which show that for Bangladeshi companies, ENE disclosures tended to be of high quality, while other disclosures remain in quantity and quality. As the total quantity of disclosures increased throughout the 10-year sample period, I-MNCs and Indian companies chose to disclose more low quality information in categories like SUST, ACT and PROD. The increased quantity of low quality disclosures diluted the overall quality of the environmental reporting, therefore reducing the percentage of high quality CEDs.

For all sample groups, low quality CEDs, Type 1 and Type 2, represented the majority, as determined by percentage, of total CEDs throughout the 10-year period. This was observed in all sample years, with P-MNCs' low CED quality percentage ranging from 69 percent to 75 percent, I-MNCs' from 65 percent to 76 percent and Indian companies' from 55 percent to 71 percent. As discussed by Beck et al. (2010), "high levels of [low quality disclosures] might indicate an approach aimed at satisfying binary content expectations. (i.e. there should be *something* on a given subject in the annual report" (p. 216).

It was observed that for P-MNCs', I-MNCs' and Indian companies' GEN, RES, PROD and SUST disclosures were often coded as Type 1 or Type 2 disclosures. Throughout the 10-year sample period, these often detailed general environmental concerns, top-management commitment, product information and sustainability information with qualitative disclosures. Examples of these low quality disclosures include disclosures like Syngenta's statement, "we believe business, social and environmental performance are dependent" (Syngenta Corporate Responsibility Report, 2005, p. 2). This disclosure was coded as a GEN-1 disclosure and given a quality score of 1. Additionally, BASF discusses their commitment to GRI in their 2006 Annual Report by simply stating the following Type 1 disclosure, "our reporting is based on G2 recommendations of the Global Reporting Initiative (GRI)" (BASF Annual Report, 2006, p.6).

Disclosures related to top-management commitment were also mainly qualitative. These qualitative disclosures were observed best when the sample groups, listed the members of sustainability or environmental councils and provided details about these councils' activities. An example of this is found in Bayer's 2011 Sustainable Development Report with the company's statement, "The committee's tasks include identifying and evaluating sustainability-relevant opportunities and risks for the company, as well as establishing objectives initiatives and suitable Group management regulations and monitoring their implementation" (Bayer Sustainable Development Report, 2011, p. 16). Low quality of SUST disclosures was seen in all sample groups. An example of such a disclosure was Coromandel's 2011 disclosure, "sustainable development cannot be achieved unless rural people are a part of the solution" (Coromandel Annual Report, 2011, p. 21). These types of sustainability disclosures were seen across sample groups. Additionally, PROD disclosures tended to be qualitative across the sample groups. These data indicate that in all three sample groups, low quality information disclosures were generally from similar coding categories.

A difference observed between the quality levels of disclosures between P-MNCs and companies operating in India, was that I-MNCs and Indian companies tended to disclose a low quality of POLL-TOTAL information. This differs starkly from P-MNCs who tended to disclose very high quality POLL-TOTAL information. I-MNCs and Indian companies did not commonly provide quantifiable pollution information but tended to disclose qualitative, descriptive information about emissions, pollution goals and results of these goals. An example of a POLL disclosure that most accurately resembles the quality of most of the I-MNC and Indian companies' POLL disclosures is, "treated effluents from manufacturing units at Ankleshwar, Jhagadia and Vapi are sent to the Common Treatment Facilities for further treatment and disposal" (United Phosphorus Annual Report, 2010, p. 11). The low quality level of I-MNCs' and Indian companies' POLL disclosures align with Roberts (1991) and Wiseman's (1982) research, which indicate that quantitative emissions disclosures are infrequent occurrences in companies' from environmentally sensitive industries.

The percentage of moderate quality disclosures, Type 3, occupied a relatively low percentage of total CEDs for all sample groups. P-MNCs percentage of moderate quality disclosures ranged from 9 percent to 10 percent over the 10-year sample period while I-MNCs' ranged between 2 percent and 9 percent and Indian companies' from 2 percent to 7 percent. Another similarity seen between the sample groups was that moderate quality disclosures were found frequently in ENE and ACT categories. The percentage of moderate quality disclosures remained low throughout the 10-year sample period indicating that all sample groups tended to disclose low quality or high quality information, but did not often provide quantitative information without some qualitative discussion surrounding these disclosures.

As described earlier, P-MNCs' high quality disclosures were concentrated mainly in POLL-TOTAL categories. P-MNCs' generally discussed their emissions data and pollution goals by comparing quantitative information to prior annual results. An example of P-MNCs' high quality POLL-TOTAL disclosure was found in BASF's 2011 Annual Report, "Emissions of ozone-depleting substances as defined by the Montreal Protocol totaled 62 metric tons in 2011 (2010: 93 metric tons), while emissions of heavy metals totaled 3 metric tons (2010: 4 metric tons)" (BASF Annual Report, 2011, p. 105). This Type 5 disclosure is an example of what was commonly seen in the annual and stand-alone environmental reports of P-MNCs. This was especially true for the most recent, 2009-2011, annual and sustainability reports.

In contrast to P-MNCs' high quality CEDs, Indian companies and I-MNCs did not generally disclose high quality POLL-TOTAL information. Instead, these sample groups' high quality CEDs were primarily due to disclosures from the ENE category. This parallels Momin's (2006) research, which indicates that companies in LDC tend to report high quality energy consumption information. The presence of high quality ENE information may be related to the presence of the Companies Act in India, which requires companies of a certain size to publicly disclose their energy usage and conservation measures (Sahay, 2004). Sahay (2004) also indicates that due to the provisions of India's Company

Act, disclosures related to conservation of energy are commonly found in the annual reports of companies operating in India.

These analyses indicated that when measured by percentage of total disclosure, I-MNCs and Indian companies had a higher quality of total CEDs than P-MNCs. This does not mean that I-MNCs and Indian companies had a higher quantity of high quality disclosures, but that high quality disclosures made up a larger percentage of the total disclosures. Overall, the overall quality of disclosures was shown to decrease for I-MNCs and Indian companies, but increased for P-MNCs. As mentioned by Toms (2002), a higher quality of environmental disclosures is indicative of increased number of environmental activities and increased presence of EMS. An increase in the percentage of Type 5 disclosures increases credibility by allowing users of annual and stand-alone environmental reports to compare data with previous years and track reporting performance of these companies (Hasseldine et al., 2005). An increase in quantifiable and comparable disclosures are also strongly valued by external assurance and reporting groups, like KPMG, who rank companies with quantifiable information as superior environmental reporters (Morhardt et al., 2002). Therefore, P-MNCs growth in overall disclosure quality may represent a desire to improve their reputation or gain credibility from their reporting activities (Toms, 2002).

With regards to the discussion of the reporting strategy used by I-MNCs, Table 48 provides an overview of whether there were increases or decreases in each quality type over the 10 year sample period. The information in Table 48 coupled with the t-test calculations point to a localized reporting strategy for I-MNCs. These results indicated that for each Type of disclosure, there were more statistically significant differences in the average quality of disclosures between P-MNCs and I-MNCs than there were between I-MNCs and Indian companies.

These results are in line with Momin's (2006) similar study, which found that the quality of foreign subsidiaries were statistically different from their parent companies. Therefore, when taking into account the 10-year period as a whole, the quality of I-MNCs' CEDs are more similar to Indian companies than their parent companies. During

this period, the I-MNCs appeared to have localized the quality of their reporting to the national Indian context. Overall, these analyses have provided support for Hypothesis H1a and H1b, while also further illustrating that I-MNCs CEDs are more similar to Indian companies CEDs than their parent companies

	P-MNCs	I-MNCs	Indian companies
Low Quality	Decrease	No Change	Increase
Moderate Quality	Increase	Increase	Decrease
High Quality	Increase	Decrease	Decrease

Table 48. Overall Change in the Quality of CEDs for P-MNCs, I-MNCs and Indian companies between 2002 and 2011

6.0 Discussion & Significance of Results

6.1 Overview

The principal aim of this research has been to evaluate and compare the corporate environmental reporting practices of multinational agrochemical companies' Indian subsidiaries. The study was undertaken in order to determine whether the quantity, quality and diversity of the subsidiaries' disclosures were more similar to their parent companies or domestic Indian companies. Additionally, the research examined the changes in quantity, quality and diversity of disclosures over the 10-year sample period in order to determine if Indian subsidiaries' changes in quantity, quality and diversity of disclosures were more similar to their parent companies or domestic companies. Finally, this study analyzed whether, overall, parent companies, which operate in developed countries, had higher levels of quantity, quality and diversity of corporate environmental disclosures than companies who operate in India.

The narrative of this research was shaped by international business literature, which indicated that foreign subsidiaries' corporate environmental disclosures were often more strongly influenced by their country-of-operation than their country-of-origin (Joshi & Gao, 2009). In fact, research has indicated that when large institutional differences exist between host, and home countries, CED practices of subsidiaries are more likely to be different from their parent companies (Joshi & Gao, 2009). This has been explained by the linked institutional and legitimacy theories (Kostova & Roth, 2002), which describe a company's desire to maintain legitimacy within the society that it operates. These theories played an important role in this study by assisting with the understanding of why observed similarities and differences exist between the corporate environmental disclosure practices of parent companies and their subsidiaries.

This research used a combined mechanistic and interpretive content analysis tool, m-CONI, to code for quantity, quality and diversity of environmental disclosures present in the available annual and sustainability reports of P-MNCs, I-MNCs and Indian companies between 2002 and 2011. The main findings of this research can be

summarized in relation to existing literature, in particular that of Momin (2006). In fact, the results focused on the quantity and quality of CEDs parallel Momin's (2006) results, which indicated that MNCs' subsidiaries disclose more information in line with Bangladeshi national companies than to their parent companies. In this study, it was found that, overall, the Indian subsidiaries' quantity, quality and diversity of CEDs were more similar to domestic Indian companies than their parent companies. The research conducted here sought to provide insights into the hypotheses presented here:

Hypotheses H1a,b,c: Foreign subsidiaries (I-MNCs) have adapted their corporate environmental disclosure practices to their host country and consequently, the diversity, quantity and quality will be more similar to the domestic Indian companies than parent companies.

Hypothesis H2a,b,c: Over the 10-year period, there has been an increase in the diversity, quantity and quality of corporate environmental disclosures for all sample groups (P-MNCs, I-MNCs and Indian domestic companies).

Hypothesis H3a,b,c: CED practices of companies operating in India, I-MNCs and Indian companies, are of lower diversity, quantity and quality than companies operating in developed economies (P-MNCs).

Diversity:

H2a: Results showed that the diversity index increased for all sample companies during the 10-year sample period. This information indicates that all companies reported environmental information from more categories in 2011 than in 2002. Research indicates that the increase in information content, i.e. diversity, may be indicative of a growing environmental awareness, availability of reporting guidelines and/or the desire to legitimize business activities internationally (Araya, 2006a; Kolk et al., 2008).

H3a: Throughout the 10-year period, both I-MNCs' and Indian companies' diversity index remained lower than P-MNCs diversity index. This showed that companies' who operate in developed countries, P-MNCs, have higher information content than companies operating in India.

H1a: Results indicated that the increase in diversity score was more similar between I-MNCs and Indian companies than between I-MNCs and P-MNCs. This was illustrated best by data which showed that throughout the 10-year period, there was a noticeable lack of information about pollution, products or responsibility provided by I-MNCs and Indian companies. These results were in line with Rizk et al.'s (2009) research, which indicates that companies operating in LDCs tend not to disclose information about emissions. Overall, the increase in diversity scores was very similar between I-MNCs and Indian companies and most of this growth was concentrated in inclusion of information from similar categories, like SUST-TOTAL.

This contrasted with P-MNCs diversity data, which showed that by 2011 almost all of the content categories were disclosed. Additionally, P-MNCs disclosed environmental information about pollution, products and responsibility frequently throughout the 10-year sample period. This growth in diversity shows that P-MNCs are reporting on a larger variety of environmental information. The growth in P-MNC's CED diversity is linked closely to the increase in information related to supply chain, inputs and products (SUPP, INP and PROD). In contrast, even by 2011, I-MNCs and Indian companies did not commonly report issues related to SUPP, INP or PROD categories. Therefore, they have overall lower diversity scores.

These results are supported by Pruess and Barkemeyer (2011) who found that distinct differences exist in the content of environmental disclosures between companies operating in LDCs and those who operate in developed countries. These data provide support to the hypotheses, while also highlighting that country-of-operation has a larger impact on diversity of CEDs. These results are of significance because it provides insight into the rarely analyzed, diversity component of CEDs. They also provide insight

into the categories that companies operating in India commonly fail to disclose information from, i.e. emissions and pollution. This shows that companies in developed economies may have a wider range of CEDs in their annual reports and sustainability reports.

Quantity:

H2b and H3b: Overall, the quantity of P-MNCs' CEDs are significantly higher than I-MNCs' and Indian companies' quantity. However, I-MNCs and Indian companies disclosed similar quantities of environmental information. This is similar to data seen by Momin (2006) which found that companies in LDCs tend to have lower quantities of CEDs. Relatively low CED quantities in LDCs have been explained by many different theories including the institutional theory, which highlights contributing factors for observed differences. These factors may include a lack of environmental technology, greater importance of social issues like corruption and weaker systems for environmental reporting implementation (Christmann & Taylor, 2001; Muller & Kolk, 2009; Singh & Zammit, 2004). Pruess and Barkemeyer (2011) found that there is a clear North-South divide with regards to the quantity of CEDs, with companies in developed countries disclosing more information than emerging economies.

Results also showed that over the 10-year period, the quantity of CEDs increased for all sample companies. These results were similar to longitudinal research, which indicated that the quantity of CEDs increased over time for companies operating in both developed (Gray et al., 1991) and lesser developed countries (Rizk et al., 2008). The recent growth in CED quantity for companies operating in LDCs may be explained by research conducted by Kolk et al., (2001). This research found that growth in CED reporting practices in LDCs was partially attributed to increased government support, media attention and availability of disclosure guidelines in local languages (Kolk et al., 2001). These reasons differed from research focused on companies in developed economies, which found that increased disclosures may often be a result of increased stakeholder pressure, reputational benefits, growth of voluntary standards and

competitor imitation (Christmann, 2004; DiMaggio & Powell, 1983). These results are of significance because they highlight the different institutional pressures that have helped to shape CEDs in developed economies and lesser developed economies.

H2c: The quantity of CEDs was analyzed and compared to total CED figures, as well as for a selection of categories and sub-categories. The total quantity data provided strong evidence that I-MNCs have adopted a localized CED strategy instead of standardizing their practices to P-MNCs. This was illustrated best in the subcategory analysis, which showed that in all categories besides RC, the quantity of I-MNCs disclosures were more similar to Indian companies than their parent companies.

Strong evidence supporting the localization of CEDs emerged when the quantities of energy and pollution disclosures were compared. I-MNCs and Indian companies had a high quantity of energy disclosures, while P-MNCs did not. This seemed to be a product of strong institutional factors, like India's Companies Act, which requires all companies operating in India to disclose environmental information related to their energy conservation efforts and energy usage (Sahay, 2004). Additionally, the high quantities of pollution and sustainability disclosures measured in P-MNCs' annual and separate sustainability reports, were not observed for I-MNCs.

Research has indicated that the high quantities of pollution and sustainability disclosures are often found in separate environmental and sustainability reports (Langer, 2006). Research also indicates that visible companies, like MNCs in developed countries, are under increased stakeholder scrutiny and will often produce sustainability reports (Branco & Rodrigues, 2006). However, the I-MNCs and Indian companies did not commonly produce separate environmental reports. This is in line with research from Baxi and Ray (2008), which indicates that Indian companies do not typically have stand alone reports. Therefore, this lack of stand-alone report may have limited their quantity of pollution and sustainability disclosures. This indicates that different institutional pressures may lead to localization of CEDs.

This results of this study parallel Momin's (2006) research, and supports the theory that I-MNCs adapt CED practices to the local Indian context due to institutional duality. The results are also supported by Araya's (2006b) research, which found that foreign subsidiaries of companies' headquartered in Europe or the U.S. disclosed a lower quantity of environmental information in emerging economies. Past research notes that institutional factors in emerging economies vary from those in developed economies and therefore, CEDs in these two environments will often vary (Lin, 2008). These results are of significance between they provide ample evidence that I-MNCs have adapted their CEDs to the local Indian context. This therefore, adds to the body of researchers, who indicate that overall, the quantity of CEDs is influenced by country-of-operation and not by country-of-origin (Aguilera-Caracual et al., 2012; Peng & Lin, 2008; Rudd, 2002).

Overall, the results indicate that I-MNCs' and Indian companies' quantity of CEDs are lower than P-MNCs' quantity of CEDs. This information is of significance because it illustrates that unique social and political pressures may indeed lead to varying levels of CEDs. The results parallel Hunter and Bansal's (2007), which finds that foreign subsidiaries face institutional duality and are more responsive in the quantity of their CEDs, to the local environment than their head offices. Additionally, these data support results provided by Sen et al. (2011), Mukherjee et al. (2009) and Baxi and Ray (2008) also indicate that there are still many improvements to be made in the area in India's CED practices.

Quality:

H3b: Overall, I-MNCs and Indian companies' had a higher level of quality of CEDs than, P-MNCs. In fact, the quality of CEDs was more similar between I-MNCs and Indian companies than P-MNCs and I-MNCs. This is because, the quality was determined not by quantity of disclosures, but by percentage that each Type of disclosure made up of all CEDs (Rizk et al., 2008). The higher quality of disclosures may be explained by the high percentage of quantifiable and comparable information disclosed on the subject of

energy conservation and usage. This disclosure is mandatory in nature, illustrating the power that environmental reporting requirements may be able to have on increasing the overall quality of CEDs. This research is supported by KPMG's (2011) survey on global CED practices, which indicated that although Indian companies do not commonly disclose environmental information, when they do, it tends to be of high quality.

H3c and H3a: Over the 10-year sample period, the quality of I-MNCs' and Indian companies' disclosures has decreased, and therefore, these data did not support Hypothesis H3c. In contrast, P-MNCs quality of CEDs increases over time, specifically due to the inclusion of quantitative, descriptive and comparative pollution information. This was expected because voluntary reporting frameworks, like the GRI, are more commonly (and recently) used by large MNCs and these frameworks require the inclusion of quantitative, comparable environmental data (KPMG, 2011). In fact, all four of the P-MNC companies subscribe the Carbon Disclosure Project, which requires companies to voluntarily measure GHG emissions (Araya, 2006b). However, being that environmental reporting is still at a nascent stage in India (Kandlikar & Sagar, 1999), use of these standards is not as common and this lack of adoption may be responsible for the reduction in quality over time. Additionally, the quality of I-MNCs' CEDs were more similar to the quality of Indian companies' CEDs, indicating that subsidiaries appear to have adapted their reporting practices to local conditions.

Overall, the results of this study show that I-MNCs' diversity, quantity and quality were adapted to the local Indian context. This supports research conducted by Monteiro and Aibar-Guzmán (2010), Moneva and Llena (2000), Darus et al. (2009), Momin (2006) and Hossain et al. (2006), which indicate that country-of-operation pressures are the main determinants of a companies' environmental disclosure practices. Aguilera-Caracual et al.'s (2012) research on institutional distance, indicates that MNCs with low institutional distance between subsidiaries and parent companies are more likely to adopt the environmental standardization strategy. Therefore, being that the results of this study point to localization, the institutional distance between host and home

country may have been large. Rozenzweigh and Singh (1991) indicate that local responsiveness is an important factor for company's who wish to maintain legitimacy in host countries. Therefore, it may be that I-MNCs wish to maintain legitimacy and therefore, adapt their CED practices to those commonly used by domestic Indian companies. This research is of significance because it indicates that country-of-operation has a stronger impact on CED practices than country-of-origin, and this adds to the growing CED research focused on international business practices.

6.2 Theoretical Explanation: Institutional Duality & External Legitimacy

The results found in this study indicate that I-MNCs' CED practices are adapted to the local Indian context. These results are supported by theories of both institutional duality and legitimacy, which have been previously discussed in the literature review section. Hillman and Wan (2005) indicate that, "a central tenet of institutional theory is that organizations need to achieve and maintain environmental legitimacy" (p. 324). Therefore, institutional theory and legitimacy theory are intrinsically connected. In terms of legitimacy theory, foreign subsidiaries are subject to pressures for isomorphism within the host country (external legitimacy) and with the corporation (internal legitimacy) (Hillman & Wan, 2005).

Being that I-MNCs have CED practices that are more in line with domestic Indian companies than P-MNCs, external legitimacy may drive I-MNCs' CED practices. In fact, the results indicate that I-MNCs wish to reduce their "liability of foreignness" and therefore adapt to external legitimacy pressures. They do this by disclosing similar environmental information as domestic Indian companies. For example, high quantities of energy disclosures are observed for both subsidiaries and domestic Indian companies. The operational environment has a unique set of cultural, socio-economic and political characteristics and in order to survive (maintain legitimacy), companies must adapt to these unique pressures. As a result, companies that operate in the same context will tend to choose the same practices and strategies (DiMaggio & Powell, 1983). In other words, as Hillman and Wan (2005) state, to maintain external legitimacy "conformity

among firm practices within countries is due to the overall pressure to conform to the institutional norms within the environment” (p. 324).

Kostova and Roth (2002) also identify the presence of another factor, “institutional duality”, for MNC subsidiaries. This theory explains the need for subsidiaries to conform to both host-country pressures and parent company pressures. Many P-MNC’s preach that their environmental practices are amongst the best in the industry. However, the results found by this research indicate that the pressure for standardization of these “best” environmental practices is not strong and I-MNCs adopt weaker CED practices that are a result of India’s weak environmental pressures. This aligns with Muller’s (2006) suggestion, which states that, “when a local context is a country with lower environmental standards, there is a risk that localization will lead subsidiaries to target those lower standards rather than the higher standards expected in their home country” (p. 189). The results show that P-MNCs do not bring their best CED practices into India but instead save resources (money, time, employees’ time) by adapting to India’s local and weaker environmental pressures.

As a host country, India has relaxed environmental regulations, a reduced level environmental awareness amongst stakeholders, low level of CED practices by companies and a lack of mandatory environmental disclosure requirements (Chatterjee & Mir, 2007; Jalan et al., 2009; Sen et al., 2011; Singh, 2007). This differs from developed economies where stakeholders demand environmental disclosures, requirements exist for CEDs, competitors have a high quantity and quality of CEDs and more stringent environmental regulations are present (Harvard’s Institute For Responsible Investment, 2012; Kolk et al., 2008). Salomon and Wu (2012) indicate that large differences in institutional pressures between host and home countries even further motivates foreign subsidiaries to adopt localized practices. Therefore, in developed economies there is a demand for higher quantity, quality and diversity of standardized and comparable environmental information. This type of information is required in order to maintain a positive reputation and legitimacy. In contrast, companies operating in India can disclose a relatively low amount of low quality

environmental disclosures to maintain societal legitimacy. Unfortunately, it does not appear that the Bhopal accident motivated I-MNCs to standardize all environmental practices. Instead, these companies take advantage of lower institutional pressures and disclose a lower quantity, quality and diversity than their P-MNCs.

6.3 Significance of the Research & Recommendations

This research adds to the body of literature that examines CED practices of companies in emerging economies and CED practices in India. It shows that CEDs are in their nascent stage in India and that much work remains in order to increase the quantity, quality and diversity of information to the level of developed nations. In addition, this research makes a contribution to the CED literature because, as mentioned earlier, some scholars have suggested that CED practices differ between parent companies and their foreign subsidiaries (Darus et al., 2009; Hossain et al., 2006; Momin; 2006; Moneva & Llana, 2000). The CED relationship between parent companies and their foreign subsidiaries has not been widely studied.

This research provides some insight into the strategies for environmental reporting P-MNCs take when expanding to foreign markets. In fact, as far as is known, this is the first study that examines the differences and similarities of CED quantity, quality and diversity between P-MNCs and their subsidiaries in India. In fact, this research is one of the first (see Momin, 2006) to use content analysis to compare the CED practices of subsidiaries and parent companies in the hopes of providing insight into the nature of CEDs produced by single corporations in different national contexts. This research demonstrates that weak institutional pressures for environmental disclosure exist in the Indian market and, therefore, both domestic and foreign subsidiaries do not have a high quality or quantity of disclosures. However, this appears to be changing as both the quantity and diversity of CEDs have slowly increased for the two sample groups over the past 10 years. In this period of time, the quantity and diversity of CEDs have not increased as quickly for I-MNCs and Indian companies as it

has for P-MNCs. This indicates that these companies may be falling behind with regards to their environmental reporting activities. Additionally, this research compares the CED practices of foreign subsidiaries and domestic companies to show that overall, foreign association does not necessarily improve CED practices.

This research provides insight into whether MNCs bring their best environmental reporting practices to LDCs. It finds that agrochemical multinationals do not bring or transfer their “best” CED reporting practices to their Indian subsidiaries. It may also indicate that MNCs do not set best reporting practices for the agrochemical industry in India. However, India’s agrochemical industry appears to slowly be improving the quantity and diversity of their corporate environmental reporting practices, by disclosing information about sustainability, pollution and responsibility.

The use of CONI as a research methodology is significant because it is a relatively novel technique that analyzes CEDs in more detail than previous content analysis methods employed for similar studies. The research demonstrated that CONI is a thorough research tool that can provide detailed information about CED quality, quantity and diversity. These three perspectives provide more information than basic quantitative studies.

This research also gains its significance because it focuses on the agrochemical industry in particular. The agrochemical industry is of interest due to its growing importance for food production, food safety and food security. Additionally, the industry’s history of environmental negligence has been central to the development of global environmental standards and voluntary programs, like Responsible Care®. The results indicate that MNCs operating in developed economies have a higher quantity, quality and diversity of environmental information than companies operating in India, an emerging economy.

Additionally, this research identifies that mandatory environmental disclosures requirements have the ability to increase the quantity and quality of CEDs in numerous national contexts. The presence of the Companies’ Act Conservation of Energy requirement has greatly contributed to the development of India’s CED reporting

practices (in quantity and quality). Voluntary environmental reporting standards used commonly by Western companies may increase the CEDs by P-MNCs related to POLL and SUST-4 categories (Araya, 2006b). Additionally, the SEC requirements for companies operating in the U.S. may have led to an increase in the amount of information disclosed related to environmental liabilities (LIAB) and non-compliance (COMP-3) by P-MNCs (Wiseman, 1982). Therefore, being that strong institutional pressures for environmental reporting do not currently exist in India, it is suggested the Indian government create more stringent environmental reporting requirements on public companies.

It is also recommended that MNCs be required to standardize their environmental practices across national borders. This requirement could come from international organizations, like the GRI, who can to encourage companies to report on all operations by adding additional reporting guidelines for MNCs. This could also take the form of an improved report rating for MNCs who decide to standardize environmental disclosure practices across global operations. As seen in this research, adoption of GRI and the CDP tends to improve the quantity, quality and diversity of CEDs, and therefore, it seems that voluntary measures do have measureable positive impacts. Such a measure would ensure that foreign subsidiaries are operating using the parent companies best reporting practices and would deter companies from minimizing the quantity, quality and diversity of the CEDs when operating in an emerging economy.

As suggested by Momin (2006) this research also supports the development of GRI guidelines for subsidiaries operating in emerging and developing countries. These guidelines could include standards for CED practices at both subsidiary and parent company levels while also recognizing individual socio-political and culturally diverse components of emerging/developing economies. International business must reexamine their international environmental guidelines, policies and codes of conduct. They should work to include guidelines and codes that must be followed by managers of subsidiaries. Additionally, it is suggested that EMS certification extend to include foreign subsidiaries and require that MNCs adopt, audit and certify EMS at all global locations.

6.4 Limitations

This study is limited to the use of content analysis over a period of 10-years to analyze the quantity, quality and diversity of CEDs. The limitation of content analysis is the method's overall focus on quantity over quality. Even in measurements of quality, quantitative data that represents quality were collected and analyzed (Section 3.3.3: Limitations of Content Analysis). Beck et al (2010) states that, "Content analysis has intrinsic limitations insofar as it seeks to capture meaning from narrative in a coded 'numerical' form" (p. 218). Therefore, there is a debate focused on whether content analysis is able to provide reliable and valid results. However, CED researchers have illustrated the usefulness of the method when seeking details about information quantity, quality and diversity (Beck et al., 2010). Many researchers have promoted the use of content analysis and a qualitative method, like surveys or interviews in order to provide a complete picture of a company's environmental activities.

The use of the CONI content analysis tool is another limitation being that CED scholars have not used it extensively. An added limitation about CONI is that it was originally developed for the Western European and North American context and, therefore, it may not be suitable for capturing all environmental contents reported by Indian companies. This is why the instrument was modified slightly following the initial examination of the research sample's annual reports and stand-alone environmental reports. In order to ensure reliability, this modified CONI instrument was pre-tested (Section 3.3.2: Reliability of Content Analysis) before being used on the final sample of annual and stand-alone environmental reports.

Another limitation is this research's small sample size. Being that this research used a relatively small sample of companies, the results must be interpreted with caution. As with other studies, the results of these data may not be representative of the entire population of multinational agrochemical companies but do act as a pilot

study to provide insight into both international environmental business strategies and CED practices in India.

This research did not control for internal firm-specific factors like, size, leverage, profit and therefore, the differences between I-MNCs and P-MNC's CED practices may be indicative of pressure from internal firm-specific differences between the sample groups. For example, I-MNCs lower quantity of CEDs may be due to the company's internal factors, like profit, in contrast to external institutional factors. There are numerous CED studies that compare the impact of internal firm factors on the quantity and quality of CEDs (Section 2.1.9.3).

Another limitation of this research that the results offer information about the similarities and differences of CED's quantity, quality and diversity for three sample groups over a 10-year period, but do not explicitly state why these similarities and differences exist. The researcher did not conduct interviews with representatives from each company. Therefore, the reasons for why I-MNCs chose to localize CED practices cannot be determined. Instead, institutional theory was used to explain why I-MNCs adopt localized practices in India. Future research may employ the use of interviews or surveys to gain insight into the factors that influence CED practices.

A further limitation is that it was impossible to examine the relationship between environmental performance and CEDs. Being that environmental performance data is not made publicly available for companies operating in India, it was not possible to determine whether lower CED quantities were indicative of lower environmental performance. However, past research has failed to conclusively determine if this relationship exists (Section 2.1.9.4)

6.5 Future Research

Due to the lack of CED research in the context of emerging economies, in general, and in India in particular, there are many potential opportunities for future research. One such opportunity may involve using a larger sample size of companies to examine whether foreign subsidiaries and domestic companies operating in India tend to have similar CED

practices. This same line of research could also be conducted using companies from various industries. This could provide insight into the impacts that country-of-operation, country-of-origin and industry associations have on CED practices in India. Even further, research should specifically examine the impact that factors highlighted by Araya's CED study (2006b), such as degree of internationalization and ownership structure, have on Indian company's CED practices. This has not been examined thoroughly in the Indian context and would be a valuable study to undertake. Additionally future CED research focused on India could highlight the institutional factors that shape environmental practices of companies operating in this national context.

This research, as far as is known, is one of the few studies focused on CED in India and even further is one of the only studies that examines CED practices of MNCs and their subsidiaries in the Indian context. This study therefore calls for future research in the area of CED practices of international business, particularly MNC versus subsidiary CED practices. Further international business CED research could examine the environmental practices of MNCs in emerging economies to determine whether they propagate best reporting practices seen in home countries. This research could be conducted on lesser developed countries to see if there is any consistency in MNCs' environmental reporting practices or whether it is country-specific and dependent on institutional factors.

Additionally, this research can seek to determine whether MNCs adopt standardized or localized strategies with regards to their CED practices. Another interesting avenue of international business research and CEDs would be the examination of whether foreign subsidiaries environmental activities and/or CED practices influence domestic company's practices. Such studies could contribute further to the understanding of CED practices from an international business perspective.

Future studies could also use a difference analytical tool, such as case study methods, interviews and/or surveys. The use of these methods could complement content analysis research nicely, by providing further perspective into the motivations for disclosing environmental information.

A final recommendation for future research is the use of CONI as a content analysis instrument in further studies. This instrument allows for researchers to gain insight into three elements; the quantity, quality and diversity of environmental information. This instrument also provides detailed information about a variety of CED characteristics and, therefore, allows for researchers to “interrogate the narrative” and draw inferences from the data. CONI is a good instrument to use in comparative and longitudinal studies and therefore, future research should examine CED practices of companies in a differing industries and countries using this instrument. Use of large sample sizes will then allow researchers to conduct statistical analysis and draw conclusions about various populations of companies.

7.0 Conclusion

In an effort to contribute to both CED and international business literature, this study aimed to determine whether I-MNCs' quantity, quality and diversity of CEDs were more similar to domestic Indian companies or to their parent companies. Additionally, this research examined whether the quantity, quality and diversity of CEDs increased over the 10-year sample period for all sample companies. Finally, this research evaluated whether the quantity, quality and diversity of CEDs were higher for companies operating in developed or emerging economies. By evaluating and comparing the CED practices of parent companies, Indian subsidiaries and domestic Indian companies, this research also provided insight into the state of corporate environmental reporting in India.

A novel and slightly modified content analysis instrument, m-CONI, was used to determine that the quantity, quality and diversity of CEDs were higher for P-MNCs than I-MNCs or Indian companies. In fact, over the 10-year sample period, the quantity, quality and diversity of I-MNC's CEDs more closely resembled the CEDs of Indian companies. For P-MNCs, the quantity, quality and diversity of CEDs increased substantially over the 10-year period. In contrast, although the quantity and diversity of CEDs increased for I-MNCs and Indian companies over time, the quality of this information did not. Overall, these results provide evidence that I-MNCs may have been more strongly impacted by their country-of-operation and respond to local pressures by adapting their CEDs to the Indian context.

At the heart of this research, was a desire to gain insight into the CED reporting practices of multinational agrochemical companies in India. The results of this research (localization of CED practices) suggest and support the institutional theory. However one should be cautious in assuming that it is just one theory that explains the differences in CED practices between P-MNCs and I-MNCs.

The reduced environmental awareness, lax environmental regulations and the lack of mandatory CED requirements in India have shaped the CED practices of both I-MNCs and Indian companies. Under pressure from differing institutional factors, I-MNCs

adapt their CED practices to local pressures. Unfortunately, these results indicate that multinationals may have not brought their best environmental reporting practices to India. However, highly diverse, high quantities of environmental reporting continue to grow in India due to an increasing level of awareness about environmental issues. This in itself seems like a step in the right direction for the overall state of environmental reporting practices in emerging economies.

8.0 Appendices

Appendix 1: Direct and Indirect Environmental Impacts of Agrochemicals

	Direct and Indirect Environmental Impacts
Resource acquisition	<ul style="list-style-type: none"> • Mining of resource inputs for pesticide production <ul style="list-style-type: none"> ○ Emissions of toxic chemicals to water, air and land ○ Environmental degradation of area surrounding mine
Production & Transportation	<ul style="list-style-type: none"> • Ammonia Production: <ul style="list-style-type: none"> ○ Requires energy i.e. natural gas: European average energy consumption is 35.2 GJ per ton ammonia (Yara, 2012) ○ Nitric acid production is required and production releases N₂O into air ○ Nitrogen production requires solidification which needs energy (European average: 0.5 GJ per ton of product) (Yara, 2012) • Conversion of forest and wetlands into farmland: Farmers convert carbon sinks into croplands and this land use change accounts for 20% of manmade CO₂ emissions • Transportation by ship, barge, road or rail releases GHG emissions
Application, Use & Disposal	<ul style="list-style-type: none"> • Pesticide runoff to groundwater (Hellweg, 2003) and surface water (Muller et al., 2002) <ul style="list-style-type: none"> ○ Pesticide runoff from farmer applications and emissions from waste water treatment plants (point and non-point contamination) • Emissions to Air: Direct via evaporation, wind drift and degradation (Margni et al., 2002) <ul style="list-style-type: none"> ○ CO₂ released by farming machinery ○ Release of N₂O and VOCs into the air with application • Soil contamination: <ul style="list-style-type: none"> ○ Decreases soil biodiversity (Levitan et al., 1995) ○ Pesticide persistence via sorption and/or degradation • Negative impacts to plants and organisms <ul style="list-style-type: none"> ○ Muller et al (2002) examined the fate and adverse effects of pesticides on representative organisms (e.g. algae, fish, earthworms) ○ Pesticide persistence = bioaccumulation e.g. DDT • Landfill waste of pesticide remnants and containers

Note: This is by no means a thorough examination of all environmental impacts of agrochemicals but provides a brief overview of impacts to illustrate that the industry has a high degree of environmental aspects.


Appendix 2: Multinational Company Sample Selection Process


Company	Revenue (US\$ Millions)	Location of Headquarters	Primary Business	Language of Reports	Public Subsidiaries in India	Result
Total SA	\$237,530.0	France	Oil & Gas	Eliminated based on “Primary Business”		
BASF	\$102,399.1	Germany	Agrochemicals	Germany	Yes	Include
Archer Daniels Midland	\$89,038.0	USA	Commodities	Eliminated based on “Primary Business”		
Sinochem	\$71,119.4	China	Eliminated based on “Location of Headquarters”			
Dow Chemical	\$59,985.0	USA	Agrochemicals	English	No	Eliminated
Bayer AG	\$50,862.5	Germany	Agrochemicals	English	Yes	Include
Bunge Ltd	\$58,743.0	USA	Commodities	Eliminated based on “Primary Business”		
Saudi Basic Industries	\$50,607.9	Saudi Arabia	Eliminated based on “Location of Headquarters”			
E.I Dupont	\$37,961.0	USA	Agrochemicals	English	No	Eliminated
Sumitomo	\$23,194.5	Japan	Petrochemicals	Eliminated based on “Primary Business”		
Mitsui Chemicals	\$18,466.1	Japan	Eliminated based on “Location of Headquarters”			
Agrium	\$15,470.0	Canada	Agrochemicals	English	No	Eliminated
Yara International ASA	\$13,893.0	Norway	Agrochemicals	English	No	Eliminated
Syngenta AG	\$13,268.0	Switzerland	Agrochemicals	English	Yes	Include
ConAgra Foods	\$12,303.1	USA	Commodities	Eliminated based on “Primary Business”		
Monsanto	\$11,822.0	USA	Agrochemicals	English	Yes	Include
Israel Corporation Ltd	\$11,608.0	Israel	Eliminated based on “Location of Headquarters”			
Transammonia Group	\$11,300.0	USA	Petrochemicals	Eliminated based on “Primary Business”		
The Mosaic Company	\$9,937.0	USA	Agrochemicals	English	No	Eliminated

	Included in Sample
	Eliminated from Sample

Appendix 3: Domestic Indian Sample Company Selection Process

	Company	Revenue (US\$ Millions)	Primary Business	Publicly Traded (BSE)
1	Aditya Birla Nuvo	\$2,960.6	Agrochemicals	Yes
2	Tata Chemicals	\$2,879.9	Agrochemicals	Yes
3	EID Parry	\$2,604.7	Agrochemicals	Yes
4	Coromandel	\$2,081.7	Agrochemicals	Yes
5	United Phosphorus	\$1,596.8	Agrochemicals	Yes
6	National Fertilizers	\$1,523.9	Agrochemicals	Yes
7	Rashtriya Chemicals and Fertilisers Ltd	\$1,342.1	Agrochemicals	Yes
8	Gujarat State Fertilizers & Chemicals Ltd	\$1,106.0	Agrochemicals	Yes
9	Gujarat Narmada Valley Fertilizers &	\$805.6	Agrochemicals	Yes
10	Mangalore Chemicals & Fertilizers	\$773.3	Agrochemicals	Yes
11	Zuari Agro Chemicals	\$272.8	Agrochemicals	Yes
12	Meghmani Organic Ltd	\$201.5	Agrochemicals	Yes
13	Rallis Chemicals	\$199.5	Agrochemicals	Yes
14	PI Industries Ltd	\$158.0	Agrochemicals	Yes
15	Excel Crop Care Ltd	\$145.0	Agrochemicals	Yes
16	Khaitan Chemicals & Fertilizers Ltd	\$134.0	Agrochemicals	Yes
17	Nagarjuna Agrichem Ltd	\$134.1	Agrochemicals	Yes
18	Dhanuka Agritech Ltd	\$110.4	Agrochemicals	Yes
19	Insecticides India Ltd	\$108.8	Agrochemicals	Yes
20	Excel Industries Ltd	\$65.8	Agrochemicals	Yes
21	Basant Agro Tech Ltd	\$57.7	Agrochemicals	Yes
22	Aimco Pesticides	\$23.8	Agrochemicals	Yes
23	Shiva Global Agro Industries	\$23.2	Agrochemicals	Yes
24	Bharat Rasayan Ltd	\$20.6	Agrochemicals	Yes
25	Bhagiradha Chemicals	\$14.3	Agrochemicals	Yes
26	Phyto Chem India Ltd	\$5.6	Agrochemicals	Yes

 Included in Sample

 Eliminated from Sample

Appendix 4: Test-Retest and Krippendorff Alpha Calculations

FILENAME	Dow Chemical Content Analysis for Reliability Test.csv							
filesize	28006 bytes							
n columns	130							
n variables	65							
n coders per var	2							
	Percent Agreement	Scott's Pi	Cohen's Kappa	Krippendorff's Alpha	N Agreements	N Disagreements	N Cases	N Decisions
Variable 1 (cols 1 & 2)	97.12	0.89	0.89	0.89	101	3	104	208
Variable 2 (cols 3 & 4)	98.08	0.79	0.79	0.79	102	2	104	208
Variable 3 (cols 5 & 6)	100	1	1	1	104	0	104	208
Variable 4 (cols 7 & 8)	98.08	0.49	0.49	0.49	102	2	104	208
Variable 5 (cols 9 & 10)	100	1	1	1	104	0	104	208
Variable 6 (cols 11 & 12)	99.04	0.85	0.85	0.85	103	1	104	208
Variable 7 (cols 13 & 14)	100	1	1	1	104	0	104	208
Variable 8 (cols 15 & 16)	100	1	1	1	104	0	104	208
Variable 9 (cols 17 & 18)	100	1	1	1	104	0	104	208
Variable 10 (cols 19 & 20)	100	1	1	1	104	0	104	208
Variable 11 (cols 21 & 22)	100	1	1	1	104	0	104	208
Variable 12 (cols 23 & 24)	99.04	0.95	0.95	0.95	103	1	104	208
Variable 13 (cols 25 & 26)	98.08	0.85	0.85	0.85	102	2	104	208

26)								
Variable 14 (cols 27 & 28)	100	1	1	1	104	0	104	208
Variable 15 (cols 29 & 30)	100	1	1	1	104	0	104	208
Variable 16 (cols 31 & 32)	100	1	1	1	104	0	104	208
Variable 17 (cols 33 & 34)	99.04	0.80	0.80	0.80	103	1	104	208
Variable 18 (cols 35 & 36)	100	1	1	1	104	0	104	208
Variable 19 (cols 37 & 38)	100	1	1	1	104	0	104	208
Variable 20 (cols 39 & 40)	100	1	1	1	104	0	104	208
Variable 21 (cols 41 & 42)	100	1	1	1	104	0	104	208
Variable 22 (cols 43 & 44)	100	1	1	1	104	0	104	208
Variable 23 (cols 45 & 46)	100	1	1	1	104	0	104	208
Variable 24 (cols 47 & 48)	100	1	1	1	104	0	104	208
Variable 25 (cols 49 & 50)	99.04	0.85	0.85	0.85	103	1	104	208
Variable 26 (cols 51 & 52)	100	1	1	1	104	0	104	208
Variable 27 (cols 53 & 54)	100	1	1	1	104	0	104	208
Variable 28 (cols 55 & 56)	100	1	1	1	104	0	104	208

56)								
Variable 29 (cols 57 & 58)	100	1	1	1	104	0	104	208
Variable 30 (cols 59 & 60)	100	1	1	1	104	0	104	208
Variable 31 (cols 61 & 62)	96.15	0.31	0.32	0.32	100	4	104	208
Variable 32 (cols 63 & 64)	100	1	1	1	104	0	104	208
Variable 33 (cols 65 & 66)	97.12	-0.01	0.00	-0.01	101	3	104	208
Variable 34 (cols 67 & 68)	97.12	0.56	0.56	0.56	101	3	104	208
Variable 35 (cols 69 & 70)	100	1	1	1	104	0	104	208
Variable 36 (cols 71 & 72)	99.04	0.00	0.00	0.00	103	1	104	208
Variable 37 (cols 73 & 74)	98.08	0.85	0.85	0.85	102	2	104	208
Variable 38 (cols 75 & 76)	100	1	1	1	104	0	104	208
Variable 39 (cols 77 & 78)	100	1	1	1	104	0	104	208
Variable 40 (cols 79 & 80)	100	1	1	1	104	0	104	208
Variable 41 (cols 81 & 82)	100	1	1	1	104	0	104	208
Variable 42 (cols 83 & 84)	98.08	0.96	0.96	0.96	102	2	104	208
Variable 43 (cols 85 & 86)	99.04	0.00	0.00	0	103	1	104	208

86)								
Variable 44 (cols 87 & 88)	100	1	1	1	104	0	104	208
Variable 45 (cols 89 & 90)	100	1	1	1	104	0	104	208
Variable 46 (cols 91 & 92)	100	1	1	1	104	0	104	208
Variable 47 (cols 93 & 94)	100	1	1	1	104	0	104	208
Variable 48 (cols 95 & 96)	100	1	1	1	104	0	104	208
Variable 49 (cols 97 & 98)	100	1	1	1	104	0	104	208
Variable 50 (cols 99 & 100)	100	1	1	1	104	0	104	208
Variable 51 (cols 101 & 102)	99.04	0.92	0.92	0.92	103	1	104	208
Variable 52 (cols 103 & 104)	99.04	0.88	0.88	0.88	103	1	104	208
Variable 53 (cols 105 & 106)	99.04	0.80	0.80	0.80	103	1	104	208
Variable 54 (cols 107 & 108)	99.04	0.00	0.00	0	103	1	104	208
Variable 55 (cols 109 & 110)	100	1	1	1	104	0	104	208
Variable 56 (cols 111 & 112)	100	1	1	1	104	0	104	208
Variable 57 (cols 113 & 114)	100	1	1	1	104	0	104	208
Variable 58 (cols 115	100	1	1	1	104	0	104	208

& 116)								
Variable 59 (cols 117 & 118)	100	1	1	1	104	0	104	208
Variable 60 (cols 119 & 120)	99.04	0.88	0.88	0.88	103	1	104	208
Variable 61 (cols 121 & 122)	100	1	1	1	104	0	104	208
Variable 62 (cols 123 & 124)	98.08	0.96	0.96	0.96	102	2	104	208
Variable 63 (cols 125 & 126)	100	1	1	1	104	0	104	208
Variable 64 (cols 127 & 128)	99.04	0.80	0.80	0.80	103	1	104	208
Variable 65 (cols 129 & 130)	99.04	0.85	0.85	0.85	103	1	104	208
* * *		Krippendorff's alpha		0.8805				

Note: Researcher used the following online calculator to import coding data and calculate the average alpha value: <http://dfreelon.org/utis/recalfront/>

Appendix 5: Coding Manual

This coding manual and disambiguation rules were used to ensure reliability and reproducibility of coding results. The coder explains each coding category and sub-category and then provides examples of content that fits into each of these categories.

*Note: when more than one category is mentioned in a sentence, the coder examined the sentence to see what the overall meaning of the sentence was, and if this meaning put the content in one category over the others then it was placed in that category/sub-category. If not, the coder placed the content into the category that was mentioned first in the sentence.

CATEGORY & DEFINITION	SUB-CATEGORIES	Examples:
GEN: General Environmental related disclosures: any mention dealing with environmental policy and concern for the environment	1: Any General Mention (e.g. use of words environment, ecological, nature etc)	“Innovations based on chemistry will play a key role in three areas in particular, resources environment and climate; food and nutrition; quality of life” (BASF Annual Report, 2011, p. 28)
	2: Aims: Any mention of short-term environmental aims, goals, strategy and/or commitments	“In this endeavor, we are committed to responsibly managing the resources of our investors, our employees, the communities in which our sites are located, and nature” (Bayer Sustainable Development Report, 2011, p. 27)
	3: Management Systems & Processes	“The Centre is ISO 9000 and 1400 certified and undertakes research in several areas” (BASF India Annual Report, 2011, p. 11)
	4: (Disclosure) guidelines such as the ACCA guidelines adopted (GRI)	“Our reporting is aligned to the G3.1 guidelines of the Global Reporting Initiative (GRI) and the 10 principles of the UN Global Compact (UNGC). (Bayer Sustainable Development Report, 2011, p. 2)
	5: Environmental Initiatives (besides Responsible Care) e.g. REACH, FSC,	“In some cases, animal studies are stipulated by REACH and other national

	International Chemical Environmental Initiative etc	legislation outside of the European Union" (BASF Annual Report, 2011, p. 115)
	6: Results e.g. ,Environmental audit results, Results from the policy, strategies, env audit results or environmental incidents	"12 objectives (26%) could be partly achieved (attainment level 2 and 3)" (Bayer Sustainable Development Report, 2010, p. 16)
	7: Long-term: Any mention of a long environmental policy, strategies and/or goals	"Our Corporate Responsibility Policy formalizes the principles that guide Syngenta in all its business activities (Syngenta CSR Report, 2006, p. 5)
	* 8: Improvements to be made (Continuous Improvement)	"We will continue to develop guidelines for environmental and safety management in the next few years" (BASF Annual Report, 2008, p. 102)
RES: Who is responsible for the implementation and the environmental behaviour?	1. Top-management – top management or board a. Committee/audit/department – any committee or group b. Membership (Names of Top Management) c. Aims and objectives	1a. "Our globally responsible Sustainability Council ensures that the BASF Group acts in accordance with the principles of sustainable development" (BASF Annual Report, 2008, p. 30) 1b. "Margret Suckale is Industrial Relations Director, 55, with BASF for 3 years: environment, health and safety" (BASF Annual Report, 2011, p. 20) 1c. "It also issues globally valid Group directives and is the central decision-making body for all relevant sustainability topics" (BASF Annual Report, 2009, p. 30)
	2. Results	"For example, in 2009, it advised on the establishment of the social business BASF

POLL	Pollution related disclosures		Grameen Ltd. in Bangladesh, and defined criteria for environmental protection and social responsibility in the innovation process” (BASF Annual Report, 2009, p. 30)
		3. Anybody working with the organisation e.g. reference to each employee	“Line managers are responsible for implementing the Health, Safety and Environment (HSE) policy. Everyone at Syngenta is accountable for health, safety and environment!” (Syngenta CSR Report, 2006, p. 13)
		1. Air a. Emissions (Actual and Results) b. Actions/Targets undertaken	1a: “Emissions of ozone-depleting substances (ODS emissions) fell by around 21.5 percent to 16.3 metric tons in 2011” (Bayer Sustainable Development Report, 2011, p. 57) 1b: “Completion of the first building phase at the end of 2012 is expected to lead to a significant fall in VOC and ODS emissions” (Bayer Sustainable Development Report, 2011, p. 58)
		2. Water a. Emissions (Actual & Results) b. Actions/Targets	2a. (Chart Format): “Waste Water discharge (million tonnes): 2006: 118,878, 2005: 184,600, 2004 189, 400” (Syngenta CSR Report, 2006, p. 24) b. “Our water protection concepts aim to ensure that no unforeseen emissions are able to enter natural water reservoirs.” (BASF Annual Report, 2008, p. 101)
		3. Waste	3a: “In parallel to waste generated, the

		<ul style="list-style-type: none"> a. Situation (Actual & Results) b. Control/Reduction (Actions/Targets) c. Recycling (must use the word recycle/recycling) 	<p>total volume of waste disposed also rose; in this case by 19 percent to 966,000 metric tons.” (Bayer Sustainable Development Report, 2011, p. 65)</p> <p>3b: 4b: “In order to minimize material use and waste volumes, Bayer strives wherever technically feasible and justifiable in terms of cost to reuse materials or divert them to other processes” (Bayer Sustainable Development Report, 2011, p. 64)</p> <p>3c: “We are constantly searching for new opportunities for extensive recycling within the framework of legal regulations” (Bayer Sustainable Development Report, 2011, p. 65)</p>
		<ul style="list-style-type: none"> 4. Land <ul style="list-style-type: none"> a. Emissions (Actual & Results) b. Actions/Targets 	<p>4a. (Chart format) “Hazardous waste landfilled (million metric tons per year): 2011: 51.63, 2010: 50.10” (Bayer Sustainable Development Report, 2011, p. 4)</p> <p>4b. N/A</p>
		<ul style="list-style-type: none"> 5. Emissions/Pollution related to Products 	N/A
PROD	Disclosures related to products	<ul style="list-style-type: none"> 1. Life Cycle Analysis/Product Stewardship/Eco- 	“Syngenta is committed to responsible practices throughout the lifecycle of its

		labelling/Packaging	products – from research and development to use in the field” (Syngenta CSR Report, 2006, p. 11)
		2. Environmentally friendly product development/production: Any mention of green products or environmentally friendly applications of products	“It also helps in preventing soil erosion, conserves water and carbon dioxide and is safer to soil microbes (as compared to other herbicides) in conservation (reduced or zero) tillage practices” (Monsanto India Annual Report, 2010, p. 26)
SUST	Disclosures related to sustainability	1. Any mention of sustainability	“We document our economic performance and provide specific examples to show how sustainability contributes to the success of the company” (BASF Annual Report, 2009, p. 6)
		2. Involvement/commitment to UNCED, Brundtland, Rio, Kyoto, WBCSD, External Environmental Rating (DJSI, FTSE4GOOD, CDLI) etc	“Bayer is explicitly committed to the goals of the Convention on Biological Diversity (CBD), which was adopted as the international standard at the UN Earth Summit in Rio de Janeiro in 1992” (Bayer Sustainable Development Report, 2010, p. 65)
		3. Conservation of natural habitat/species (biodiversity)	“In order to preserve and foster biodiversity in agriculture, we participate in initiatives for the protection and conservation of ecosystems” (BASF Annual Report, 2011, p. 115)
		4. Any mention of climate change	“AS a result of climate change, experts expect that drought will occur more frequently and last longer in the future” (BASF Annual Report, 2009, p. 37)
LIAB	Environmental	1. Financial Disclosure	“Current estimates indicate that total

	liabilities		companywide capital expenditures for environmental compliance will be about \$17 million in fiscal year 2008 and \$25 million in fiscal year 2009.” (Monsanto Annual Report, 2007, p. 34)
		2. Disclosure on balance sheet	(Chart format): “Water Charges 2011: 13,470, 2010: 13,755” (Syngenta India Annual Report, 2011, p. 37
		3. Justification for no disclosure	N/A
ACT	Environment-related activities	1. Training of staff	“In 2011, we provided compliance training to our employees in procurement on topics including sustainability” (BASF Annual Report, 2011, p. 104)
		2. Project Involvement (Corporate Foundations but with no mention of partnerships)	“Tree plantation at Bijghar village taluka Khed provided 100 nos. coconut plants and 100 nos. chikku plants” (Rallis Chemicals Corporate Sustainability Report, 2008, p. 31)
		3. Awards	“BASF China Co. Ltd received the Best Corporate Citizen Award for the fifth time. The prize recognizes achievements in categories such as education and environmental protection and is awarded by the business magazine 21 st Century Business Herald” (BASF Annual Report, 2009, p. 223)
		4. Sponsoring	“Centre Educacional de Tecnologia – Brazil: Grant to support an environmental education program in nine schools, serving as many as 10,000 children in the communities of Camacari and Dias D’Avila

			in Bahia State: \$38,000" (Monsanto CSR Report, 2007, p. 21)
		5. Partnerships w/ environmental organizations (must mention the word partner or partnership)	"Syngenta is partnering with wetland conservation charity Ducks Unlimited to maintain and restore waterfowl habitats across North America" (Syngenta CSR Report, 2006, p. 9)
BRR	Business related risk	1. Specific environmental risks related to the business	"Despite these measures, a business that depends on weather patterns and on our ability to forecast the weather, does carry some risk – but then these are the very same risks that scores of Indian farmers take every year" (Monsanto India Annual Report, 2010, p. 16)
		2. Attempts to reduce/manage these risks	"To address changing weather patterns and to mitigate environmental risks on seed production, we have diversified our maize production areas" (Monsanto India Annual Report, 2010, p. 16)
		3. Costs involved	N/A
PRESS	Pressure Groups	1. Shareholders/Investors	"Investors are showing an increasing interest in how companies integrate ecological and social aspects into their strategies and business activities" (Bayer Annual Report, 2010, p. 30)
		2. Other Stakeholders	"We foster an ongoing exchange with our stakeholders" (BASF Annual Report, 2011, p. 37)
		3. Government	"In 2011, Bayer's political lobbying is focusing on the acceptance of products and technology, fostering and recognizing

			innovation, sustainable health care systems, chemicals management, and energy policy and climate protection.” (Bayer Sustainable Development Report, 2010, p. 34)
SER	Separate Environmental Report	1. Reference within annual report	“Simultaneously with the publication of this report, more sustainability information will be made available online, such as information about the topics stakeholder dialogue and water” (BASF Annual Report, 2009, p. 7)
		2 . Contact details	“The 2009 online report with additional service features can be found at basf.com/report” (BASF Annual Report, 2009, p. 7)
RC	Any mention of Responsible Care		“As a signatory of Responsible Care, BASF is dedicated to the fundamental tenets of safeguarding people’s health, protecting the environment, reducing risk and supporting sustainable growth” (BASF India CSR Report, 2010, p. 22)
ENE	Energy Related Disclosures	1. Conservation/saving attempts (Goals & Results)	“The plant also has a terminal for handling molten sulphur, which is environmentally-friendly, conserves energy and minimizes pollution” (Coromandel Annual Report, 2004, p. 11)
		2. Use, development, exploration of alternative energy sources	“This strategy involves looking at value-adding chains, such as wind energy” (BASF Annual Report, 2011, p. 91)

		3. Energy Usage (Goals & Results)	"Reduced total energy use by 6.6 percent from 2005" (Syngenta CSR Report, 2006, p. 23)
INP	Resource Input Disclosures	1. Water input (usage/source/goals)	"In 2011, we set ourselves two new goals for 2020; We want to reduce the use of drinking water in production processes by half compared with 2010 and establish sustainable water management at all sites in areas of water stress" (BASF Annual Report, 2011, p. 112)
		2. Resource Inputs: Toxic, Renewable, Non-renewable (usage/source)	"In 2011 more than 3% of the raw materials we purchased worldwide were from renewable sources" (BASF Annual Report, 2011, p. 111)
SUPP	Supplier related disclosures: Mention of sustainable supply chain, environmental requirements and compliance of suppliers		"Syngenta takes HSE considerations into account during the selection of contractors, toll manufacturers and suppliers to ensure that competent partners are selected" (Syngenta CSR Report, 2006, p. 14)
COMP	Compliance disclosure	1. Legal Compliance w/ environmental laws/regulations and voluntary initiatives (beyond compliance) e.g. EU emissions trading scheme requirements, EPA regulations	"Emissions trading has remained an important issue for Bayer during the second trading period from 2008 to 2012: the allocation rules that are currently in force take into account the environmentally friendly energy generation at our combined heat and power plants" (Bayer Annual Report, 2010, p. 60)
		2. Mention of non-compliance, fines, fees, spills and environmental legal	"In certain areas involving manual handling of materials in containers, there

		action	could have been instances of mild spills” (Rallis Corporate Sustainability Report, 2008, p. 26)
IRP	Information retrieval process to obtain feedback from stakeholders		“Social media is one way in which we are expanding our direct dialog with our stakeholders” (BASF Annual Report, 2011, p. 37)
OTHER	Any other environmental disclosure not fitting the categories above e.g. disclosures regarding transportation, accountability, transparency etc		“The Company’s philosophy on Corporate Governance envisages the attainment of the highest level of transparency and accountability” (Zuari Annual Report, 2011, p. 12)
ECE	External Environmental Factors: Any mention of weather related information (droughts, rainfall etc) but not mentioning the risks of these factors		“Despite a good monsoon, the fertilizer consumption grew only marginally” (Coromandel Annual Report, 2004, p. 6)

*N/A = no mention in any annual or stand-alone environmental reports included in this study

Appendix 6: Coding Manual for Quality

Quality Type	Description	Examples
1	Disclosure addresses issues related to category using simple, basic descriptions or mentions (qualitative data only)	<p>“We will continue to develop guidelines for environmental and safety management in the next few years” (BASF Annual Report, 2008, p. 102)</p> <p>“We document our economic performance and provide specific examples to show how sustainability contributes to the success of the company” (BASF Annual Report, 2009, p. 6)</p> <p>“We will integrate sustainability more closely than ever into our business” (BASF Annual Report, 2011)</p>
2	Disclosure addresses issues related to category with more detailed narrative and description (qualitative data only)	<p>“As a signatory of Responsible Care, BASF is dedicated to the fundamental tenets of safeguarding people’s health, protecting the environment, reducing risk and supporting sustainable growth” (BASF India CSR Report, 2010, p. 22)</p> <p>“Syngenta takes HSE considerations into account during the selection of contractors, toll manufacturers and suppliers to ensure that competent partners are selected” (Syngenta CSR Report, 2006, p. 14)</p> <p>“Emissions trading has remained an important issue for Bayer during the second trading period from 2008 to 2012: the allocation rules that are currently in force take into account the environmentally friendly energy generation at our combined heat and power plants” (Bayer Annual Report, 2010, p. 60)</p>
3	Disclosure addresses issue in a purely quantitative way, minimal qualitative component and no	<p>“In 2011 more than 3% of the raw materials we purchased worldwide were from renewable sources” (BASF Annual Report, 2011, p. 111)</p>

	comparison of data.	<p>“In 2011, 97 environmental, safety and security audits were carried out in the BASF Group at 66 sites” (BASF Annual Report, 2011, p. 102)</p> <p>“However, we paid Rs. 2.98 lakhs as a contribution to provide drinking water to the pollution affected people of Medak District in Andhra Pradesh” (Rallis CSR Report, 2009, p. 36)</p>
4	Disclosure addresses issue relating to category in quantitative way with qualitative component (description), no comparison of data.	<p>“Emissions trading has remained an important issue for Bayer during the second trading period from 2008 to 2012: the allocation rules that are currently in force take into account the environmentally friendly energy generation at our combined heat and power plants” (Bayer Annual Report, 2010, p. 60)</p> <p>“Across 1,100 villages in Andhra Pradesh, Maharashtra and Rajasthan, the project aims at making farming a beneficial proposition and improving socio economic conditions of 10,000 small and marginal farmers” (Monsanto India Annual Report, 2010, p. 42)</p> <p>“The related ProTerra research project, led by Syngenta, piloted the use of cover crops between rows of vines and olive trees in France, Portugal and Spain to improve soil structure and water absorption during the rainy season and reducing soil erosion by up to 90 percent” (Syngenta CSR Report, 2006, p. 7)</p>
5	Quantitative data with comparison component (this data can have qualitative component but does not have to)	<p>“Worldwide, 179 BASF production sites are certified in accordance with ISO 14001 (2010: 153); this increase results mainly from the integration of the former Cognis sites” (BASF Annual Report, 2011, p. 102)</p> <p>“In 2010, BASF in India used 719,141 cubic meters (2009: 637,008 cubic meters) of water” (BASF India CSR Report, 2010, p. 25)</p> <p>“Accordingly emission for the reporting year is 344.0 M Tons of CO₂ against previous year’s figure of 497.0 M Tons of CO₂ equivalent” (Rallis CSR Report, 2009, p. 35)</p>

Adapted from Beck et al. (2010)

Appendix 7: Beck et al.'s original CONI Categories

CATEGORY	SUB-CATEGORIES
GEN	1: Any General Mention
	2: Aims
	3: Management Systems & Processes
	4: (Disclosure) guidelines such as the ACCA guidelines adopted (GRI)
	5: Initiatives (e.g. Responsible Care)
	6: Results
	7: Long-term – any mention of a long term policy
RES	<ul style="list-style-type: none"> 4. Top-management – top management or board d. Committee/audit/committee or group e. Membership f. Aims and objectives
	5. Results
	6. Anybody working with the organisation, e.g. reference to each employee
POLL	<ul style="list-style-type: none"> 6. Air c. Emissions d. Actions/Targets undertaken
	<ul style="list-style-type: none"> 7. Water c. Emissions d. Actions/Targets
	<ul style="list-style-type: none"> 8. Waste d. Situation e. Control/Reduction f. Recycling
	<ul style="list-style-type: none"> 9. Land c. Emissions d. Actions/Targets/Results
	10. Results
	<ul style="list-style-type: none"> 11. Products a. Product Related Disclosures b. Product Development
SUSTAIN	4. Any mention of sustainability

	5. Involvement/commitment to UNCED, Brundtland, etc.
	6. Conservation of natural habitat/species
LIAB	4. Financial Disclosure
	5. Balance sheet within voluntary section
	6. Justification for no disclosure
ACT	5. Training of staff
	6. Project Involvement
	7. Awards
	8. Sponsoring
BRR	4. Specific environmental risks related to the business
	5. Attempts to reduce/manage these risks
	6. Costs involved
PRESS	4. Shareholders
	5. Other Stakeholders
	6. Government
SER	7. Available
	8. Reference within annual report
	9. Contact details
ENE	3. Conservation/saving attempts
	4. Use, development, exploration of alternative energy sources
IRP	
OTHER	

Appendix 8: Sample Excel Spreadsheet Used for Coding (Coding Sheet for Year)

	1	2	3	4	5	TOTAL
SUM_GEN1	4	0	0	0	0	4
SUM_GEN2	4	1	0	0	0	5
SUM_GEN3	5	2	1	0	0	8
SUM_GEN4	1	0	0	0	0	1
SUM_GEN5	1	2	0	0	0	3
SUM_GEN6	1	0	0	0	0	1
SUM_GEN7	0	0	0	0	0	0
SUM_GEN8	1	1	0	0	0	2
SUM_GEN	17	6	1	0	0	24
SUM_RES1A	2	3	1	0	0	6
SUM_RES1B	2	2	1	0	0	5
SUM_RES1C	1	5	0	0	0	6
SUM_RES2	0	0	0	0	0	0
SUM_RES3	0	1	0	0	0	1
SUM_RES	5	11	2	0	0	18
SUM_POLL1A	0	0	0	0	0	0
SUM_POLL1B	0	0	0	0	0	0
SUM_POLL2A	0	0	0	0	0	0
SUM_POLL2B	0	0	0	0	0	0
SUM_POLL3A	0	0	0	0	0	0
SUM_POLL3B	0	1	0	0	0	1
SUM_POLL3C	0	0	0	0	0	0
SUM_POLL4A	0	0	0	0	0	0
SUM_POLL4B	0	0	0	0	0	0
SUM_POLL5	0	0	0	0	0	1
SUM_POLL	1	1	0	0	0	2
SUM_PROD1	1	2	0	0	0	3
SUM_PROD2	0	2	0	0	0	2
SUM_PROD	1	4	0	0	0	5
SUM_SUSTAIN1	15	1	0	0	0	16
SUM_SUSTAIN2	4	7	2	1	0	14
SUM_SUSTAIN3	0	0	0	0	0	0
SUM_SUSTAIN4	0	0	0	0	0	0
SUM_SUSTAIN	19	8	2	1	0	30
SUM_LIAB1	0	11	2	0	2	15
SUM_LIAB2	0	0	0	0	2	2
SUM_LIAB3	0	0	0	0	0	0
SUM_LIAB	0	11	2	0	4	17
SUM_ACT1	0	1	0	0	0	1
SUM_ACT2	0	3	0	0	0	3

SUM_ACT3	0	0	0	0	0	0
SUM_ACT4	0	0	0	0	0	0
SUM_ACT5	0	0	0	0	0	0
SUM_ACT	0	4	0	0	0	4
SUM_BRR1	2	4	1	0	0	7
SUM_BRR2	0	1	0	0	0	1
SUM_BRR3	0	0	0	0	0	0
SUM_BRR	2	5	1	0	0	8
SUM_PRESS1	0	0	0	0	0	0
SUM_PRESS2	1	0	0	0	0	1
SUM_PRESS3	0	0	0	0	0	0
SUM_PRESS	1	0	0	0	0	1
SUM_SER1	0	0	0	0	0	0
SUM_SER2	4	1	0	0	0	5
SUM_SER3	4	0	0	0	0	4
SUM_SER	8	1	0	0	0	9
SUM_RC	3	5	0	0	0	8
SUM_ENE1	0	0	0	0	0	0
SUM_ENE2	0	0	0	0	0	0
SUM_ENE3	0	0	0	0	0	0
SUM_ENE	0	0	0	0	0	0
SUM_INP1	0	0	0	0	0	0
SUM_INP2	0	0	0	0	0	0
SUM_INP	0	0	0	0	0	0
SUM_SUPP	0	0	0	0	0	0
SUM_COMP1	1	3	1	0	0	5
SUM_COMP2	0	0	0	0	0	0
SUM_COMP3	0	0	0	0	0	0
SUM_COMP	1	3	1	0	0	5
SUM_IRP	0	2	0	0	0	2
SUM_OTHER	0	0	0	0	0	0
SUM_ECE	2	0	0	0	0	2
TOTAL	60	61	9	1	4	135

Appendix 9: Detailed CED Diversity Data

P-MNCs

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Syngenta	14	13	10	14	15	15	12	14	14	13
BASF	17	16	15	17	16	16	17	18	17	17
Bayer Cropscience	6	7	16	15	16	17	18	16	17	17
Monsanto	7	9	10	15	14	11	15	14	14	15
Average	11.0	11.3	12.8	15.3	15.3	14.8	15.5	15.5	15.5	15.5
% Diversity	61.1	62.5	70.8	84.7	84.7	81.9	86.1	86.1	86.1	86.1

I-MNCs

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Syngenta India	9	8	11	8	0	0	9	11	9	10
BASF India	11	11	10	12	10	10	9	10	15	16
Bayer Cropscience	6	11	12	12	11	12	0	13	14	12
Monsanto India	11	12	12	11	8	8	10	11	13	8
Average	9.3	10.5	11.3	10.8	9.7	10.0	9.3	11.3	12.8	11.5
% Diversity	51.4	58.3	62.5	59.7	53.7	55.6	51.9	62.5	70.8	63.9

Appendix 9: CED Diversity Data Tables

Indian Companies

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Coromandel	12	12	12	7	8	8	7	9	12	11
Rallis	12	10	10	10	10	16	16	16	11	12
Zuari	7	7	6	6	6	6	7	8	8	9
United Phosphorus	9	10	12	11	11	11	13	10	13	12
Average	10	9.75	10	8.5	8.75	10.25	10.75	10.75	11	11
% Diversity	55.6	54.2	55.6	47.2	48.6	56.9	59.7	59.7	61.1	61.1

Appendix 10: Detailed Quantity of Corporate Environmental Disclosure Data

P-MNCs

	P-Monsanto	P-Syngenta	P-Bayercropscience	P-BASF	Total	Average
2002	29	150	43	135	357	89.3
2003	76	24	40	299	439	109.8
2004	106	15	133	364	618	154.5
2005	141	29	149	393	712	178.0
2006	127	44	171	463	805	201.3
2007	111	46	191	433	781	195.3
2008	91	258	219	503	1071	267.8
2009	97	273	198	575	1143	285.8
2010	98	277	262	552	1189	297.3
2011	121	258	228	535	1142	285.5

Table a. Quantity of CEDs 2002-2011: P-MNC's Annual Reports

	P-Monsanto	P-Syngenta	P-Bayercropscience	P-BASF	Total	Average
2002	∅	110	∅	454	565	282.5
2003	∅	123	∅	∅	123	123.0
2004	∅	150	1008	∅	1158	579.0
2005	141	185	594	∅	920	306.7
2006	191	214	564	∅	969	323.0
2007	287	293	666	∅	1246	415.3
2008	∅	∅	827	135	962	481.0
2009	279	∅	705	∅	984	492.0
2010	300	∅	638	∅	938	469.0
2011	486	∅	669	∅	1155	577.5

Table b. Quantity of CEDs 2002-2011: P-MNC's Stand-Alone Environmental Reports

	P-Monsanto	P-Syngenta	P-Bayercropscience	P-BASF	Total	Average
2002	29	260	43	589	921	230.5
2003	76	147	40	299	562	140.5
2004	106	165	1141	364	1776	444.0
2005	282	214	743	393	1632	408.0
2006	318	258	735	463	1774	443.5
2007	398	339	857	433	2027	506.8
2008	91	258	1046	638	2033	508.3
2009	376	273	903	575	2127	531.8
2010	398	277	900	552	2127	531.8
2011	607	258	897	535	2297	574.3
Total	2681	2450	7305	4841	17277	--

Table c. Quantity of CEDs 2002-2011: P-MNC's Total

I-MNCs:

	I-Monsanto	I-Syngenta	I-Bayercropscience	I-BASF	Total	Average
2002	54	38	48	60	200	50.0
2003	67	38	53	73	231	57.8
2004	73	38	93	68	272	68.0
2005	63	33	106	72	274	68.5
2006	53	Ø	75	64	192	48.0
2007	44	Ø	79	73	196	49.0
2008	65	34	94	96	289	72.3
2009	179	45	91	97	412	103.0
2010	129	42	100	103	374	93.3
2011	71	50	85	64	270	67.5

Table a. Quantity of CEDs 2002-2011: I-MNC's Annual Reports

	I-Monsanto	I-Syngenta	I-Bayercropscience	I-BASF	Total	Average
2002	Ø	Ø	Ø	Ø	0	0
2003	Ø	Ø	Ø	Ø	0	0
2004	Ø	Ø	Ø	Ø	0	0
2005	Ø	Ø	Ø	Ø	0	0
2006	Ø	Ø	Ø	Ø	0	0
2007	Ø	Ø	Ø	Ø	0	0
2008	Ø	Ø	Ø	Ø	0	0
2009	Ø	Ø	Ø	Ø	0	0
2010	Ø	Ø	Ø	157	0	157
2011	Ø	Ø	Ø	134	0	134

Table b. Quantity of CEDs 2002-2011: I-MNC's Stand-Alone Environmental Reports

	I-Monsanto	I-Syngenta	I-Bayercropscience	I-BASF	Total	Average
2002	54	38	48	60	200	50.0
2003	67	38	53	73	231	57.8
2004	73	38	93	68	272	68.0
2005	63	33	106	72	274	68.5
2006	53	Ø	75	64	192	64.0
2007	44	Ø	79	73	196	65.3
2008	65	34	94	96	289	72.3
2009	179	45	91	97	412	103.0
2010	129	42	100	260	531	132.8
2011	71	50	85	198	404	101.0

Table c. Quantity of CEDs 2002-2011: I-MNC's Total

“Ø” = No disclosure (no annual or sustainability report available)

Domestic Indian Companies:

	Coromandel	Rallis	United Phosphorus	Zuari	Total	Average
2002	101	89	22	66	278	69.5
2003	106	61	60	63	290	72.5
2004	88	58	67	54	267	66.8
2005	48	55	74	72	249	62.3
2006	40	54	83	49	226	56.5
2007	46	63	78	53	240	60.0
2008	56	73	80	52	261	65.3
2009	60	86	80	56	282	70.5
2010	101	89	106	67	363	90.8
2011	90	94	95	58	337	84.3

Table a. Quantity of CEDs 2002-2011: Domestic Indian Companies' Annual Reports

	Coromandel	Rallis	United Phosphorus	Zuari	Total	Average
2002	Ø	Ø	Ø	Ø	0	0
2003	Ø	Ø	Ø	Ø	0	0
2004	Ø	Ø	Ø	Ø	0	0
2005	Ø	Ø	Ø	Ø	0	0
2006	Ø	Ø	Ø	Ø	0	0
2007	Ø	212	Ø	Ø	212	212
2008	Ø	191	Ø	Ø	191	191
2009	Ø	258	Ø	Ø	258	258
2010	Ø	Ø	Ø	Ø	0	0
2011	Ø	Ø	Ø	Ø	0	0

Table b. Quantity of CEDs 2002-2011: Domestic Indian Companies' Stand-Alone Environmental Reports

	Coromandel	Rallis	United Phosphorus	Zuari	Total	Average
2002	101	89	22	66	278	69.5
2003	106	61	60	63	290	72.5
2004	88	58	67	54	267	66.8
2005	48	55	74	72	249	62.3
2006	40	54	83	49	226	56.5
2007	46	275	78	53	452	113.0
2008	56	264	80	52	452	113.0
2009	60	344	80	56	540	135.0
2010	101	89	106	67	363	90.8
2011	90	94	95	58	337	84.3

Table c. Quantity of CEDs 2002-2011: Domestic Indian Companies' Total

“Ø” = No disclosure (no annual or sustainability report available)

Total Quantity:

	P-MNC	I-MNC	Indian
2002	921	200	278
2003	562	231	290
2004	1776	272	267
2005	1632	274	249
2006	1774	192	226
2007	2027	196	452
2008	2033	289	452
2009	2127	412	540
2010	2127	531	363
2011	2297	404	337

Table a. Total Quantity of CEDs 2002-2011**Average Quantity:**

	P-MNC	I-MNC	Indian
2002	230.3	50.0	69.5
2003	140.5	57.8	72.5
2004	444.0	68.0	66.8
2005	408.0	68.5	62.3
2006	443.5	64.0	56.5
2007	506.8	65.3	113.0
2008	508.3	72.3	113.0
2009	531.8	103.0	135.0
2010	531.8	132.8	90.8
2011	574.3	101.0	84.3

Table b. Total Quantity of CEDs 2002-2011

Appendix 11: Quantity of CEDs in Select Categories and Subcategories

Gen-3: Quantity & Percentage of Disclosures

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	36	16	34	38	34	39	69	69	63	44
I-MNC	7	6	7	6	8	5	5	5	9	6
IND	11	17	9	7	5	14	12	5	8	7

Table a. Quantity of GEN-3 CEDs: 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	3.90%	2.85%	1.91%	2.33%	1.92%	1.92%	3.64%	3.24%	2.28%	1.92%
I-MNC	3.50%	2.60%	2.57%	2.19%	4.17%	2.55%	1.73%	1.21%	1.70%	1.49%
IND	3.96%	5.86%	3.37%	2.81%	2.21%	3.10%	2.65%	0.93%	2.20%	2.08%

Table b. GEN-3 Percentage of Total CEDs: 2002-2011

Gen-4: Quantity & Percentage of Disclosures

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	37	18	87	64	65	58	81	100	125	116
I-MNC	4	4	5	5	5	5	5	4	6	2
IND	5	6	6	5	5	21	21	3	3	2

Table a. Quantity of GEN-4 CEDs: 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	4.01%	3.20%	4.90%	3.92%	3.66%	2.86%	4.27%	4.70%	4.52%	5.05%
I-MNC	2.00%	1.73%	1.84%	1.82%	2.60%	2.55%	1.73%	0.97%	1.13%	0.50%
IND	1.80%	2.07%	2.25%	2.01%	2.21%	4.65%	4.65%	0.56%	0.83%	0.59%

Table b. GEN-4 Percentage of Total CEDs: 2002-2011

Res-1A: Quantity & Percentage of Disclosures

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	16	5	17	16	15	28	34	23	25	27
I-MNC	0	0	2	1	0	0	1	0	7	0
IND	2	1	2	0	0	7	6	1	1	0

Table a. Quantity of RES-1a CEDs: 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	1.74%	0.89%	0.96%	0.98%	0.85%	1.38%	1.79%	1.08%	0.90%	1.18%
I-MNC	0.00%	0.00%	0.74%	0.36%	0.00%	0.00%	0.35%	0.00%	1.32%	0.00%
IND	0.72%	0.34%	0.75%	0.00%	0.00%	1.55%	1.33%	0.19%	0.28%	0.00%

Table b. RES-1a Percentage of Total CEDs: 2002-2011**POLL-Total: Quantity & Percentage of Disclosures**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	160	96	570	252	293	291	329	308	320	302
I-MNC	1	3	2	2	4	2	4	8	33	58
IND	14	22	29	8	9	52	43	14	21	25

Table a. Quantity of POLL-Total CEDs: 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	17.35%	17.08%	32.09%	15.43%	16.51%	14.35%	17.33%	14.48%	11.57%	13.15%
I-MNC	0.50%	1.30%	0.74%	0.73%	2.08%	1.02%	1.38%	1.94%	6.23%	14.36%
IND	5.04%	7.59%	10.86%	3.21%	3.98%	11.50%	9.51%	2.59%	5.79%	7.42%

Table b. POLL-Total Percentage of Total CEDs: 2002-2011

PROD-1: Total Quantity & Percentage of Disclosures

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	67	18	57	33	35	75	72	98	80	72
I-MNC	0	0	0	0	0	0	2	1	5	8
IND	0	0	0	0	0	6	6	0	2	0

Table a. Quantity of CEDs 2002-2011: PROD-1 (Life Cycle Analysis & Product Stewardship)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	7.27%	3.20%	3.21%	2.02%	1.97%	3.70%	3.79%	4.61%	2.89%	3.13%
I-MNC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.69%	0.24%	0.94%	1.98%
IND	0.00%	0.00%	0.00%	0.00%	0.00%	1.33%	1.33%	0.00%	0.55%	0.00%

Table b. PROD-1 Percentage of Total CEDs: 2002-2011**SUST-Total: Quantity & Percentage of Disclosures**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	83	70	178	176	243	256	368	283	292	320
I-MNC	6	8	3	12	4	3	21	62	72	53
IND	5	3	1	0	1	27	21	6	9	14

Table a. Quantity of SUST-Total CEDs: 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	9.00%	12.46%	10.02%	10.78%	13.69%	12.62%	19.39%	13.31%	10.56%	13.93%
I-MNC	3.00%	3.46%	1.10%	4.38%	2.08%	1.53%	7.27%	15.05%	13.58%	13.12%
IND	1.80%	1.03%	0.37%	0.00%	0.44%	5.97%	4.65%	1.11%	2.48%	4.15%

Table b. SUST-Total Percentage of Total CEDs: 2002-2011

SUST-4: Quantity & Percentage of Disclosures

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	6	0	6	12	45	70	68	48	21	39
I-MNC	0	0	0	0	0	0	4	13	11	1
IND	0	0	0	0	0	3	3	2	1	1

Table a. Quantity of SUST-4 CEDs: 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	0.65%	0.00%	0.34%	0.73%	2.54%	3.45%	3.58%	2.26%	0.76%	1.70%
I-MNC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.38%	3.16%	2.08%	0.25%
IND	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	0.66%	0.37%	0.28%	0.30%

Table b. SUST-4 Percentage of Total CEDs: 2002-2011

RC: Quantity & Percentage of Disclosures

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	36	8	22	31	15	24	40	38	30	20
I-MNC	2	3	3	1	1	2	1	3	9	8
IND	1	1	3	2	0	3	4	2	1	1

Table a. Quantity of RC CEDs: 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	3.90%	1.42%	1.24%	1.90%	0.85%	1.18%	2.11%	1.79%	1.08%	0.87%
I-MNC	1.00%	1.30%	1.10%	0.36%	0.52%	1.02%	0.35%	0.73%	1.70%	1.98%
IND	0.36%	0.34%	1.12%	0.80%	0.00%	0.66%	0.88%	0.37%	0.28%	0.30%

Table b. RC Percentage of Total CEDs: 2002-2011

ENE-Total: Quantity & Percentage of Disclosures

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	33	30	120	99	87	96	131	140	98	102
I-MNC	102	126	147	144	100	124	160	160	165	104
IND	142	111	90	148	126	149	144	135	146	132

Table a. Quantity of ENE-Total CEDs: 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	3.58%	5.34%	6.76%	6.06%	4.90%	4.73%	6.90%	6.58%	3.54%	4.44%
I-MNC	51.00%	54.55%	54.04%	52.55%	52.08%	63.27%	55.36%	38.83%	31.13%	25.74%
IND	51.08%	38.28%	33.71%	59.44%	55.75%	32.96%	31.86%	25.00%	40.22%	39.17%

Table b. ENE-Total Percentage of Total CEDs: 2002-2011

SUPP-Total: Quantity & Percentage of Disclosures

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	7	13	6	12	31	47	29	34	52	50
I-MNC	0	0	0	0	0	0	0	1	5	0
IND	1	0	0	0	0	0	0	0	0	1

Table a. Quantity of SUPP-Total CEDs: 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
P-MNC	0.76%	2.31%	0.34%	0.73%	1.75%	2.32%	1.53%	1.60%	1.88%	2.18%
I-MNC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.24%	0.94%	0.00%
IND	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.30%

Table b. SUPP-Total Percentage of Total CEDs: 2002-2011

Appendix 12: Detailed Quality of Corporate Environmental Disclosure Data

P-MNCs

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Type 1	350	213	614	571	588	685	873	814	721	639
Type 2	394	239	517	559	584	686	717	615	640	730
Type 3	87	52	206	151	194	171	204	167	199	158
Type 4	23	23	53	84	77	85	90	73	66	93
Type 5	38	35	280	126	140	113	149	179	201	191

Table a. P-MNCs Quality of CEDs 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Type 1	39.3%	37.9%	36.8%	37.3%	36.8%	38.9%	42.9%	42.2%	38.8%	33.8%
Type 2	44.2%	42.5%	31.8%	37.6%	36.9%	38.3%	35.3%	33.7%	34.4%	41.1%
Type 3	9.9%	9.3%	11.9%	10.4%	12.1%	10.9%	10.0%	9.2%	10.8%	10.2%
Type 4	2.5%	4.1%	3.4%	5.4%	4.7%	4.4%	4.4%	3.9%	3.7%	4.7%
Type 5	4.1%	6.2%	16.0%	9.4%	9.6%	7.4%	7.3%	11.0%	12.4%	10.1%

Table b. P-MNCs Quality of CEDs 2002-2011 (Percentage)

I-MNCs

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Type 1	104	106	119	124	83	73	113	175	217	170
Type 2	39	48	79	59	58	54	94	139	182	120
Type 3	8	20	21	18	7	16	7	12	38	33
Type 4	12	7	10	16	2	0	6	20	16	5
Type 5	91	76	82	92	89	121	128	133	101	94

Table a. I-MNCs Quality of CEDs 2002-2011

Appendix 13: Quality of Corporate Environmental Disclosures

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Type 1	52.0%	45.9%	43.8%	45.3%	43.2%	37.2%	39.1%	42.5%	40.9%	42.1%
Type 2	19.5%	20.8%	29.0%	21.5%	30.2%	27.6%	32.5%	33.7%	34.3%	29.7%
Type 3	4.0%	8.7%	7.7%	6.6%	3.6%	8.2%	2.4%	2.9%	7.2%	8.2%
Type 4	6.0%	3.0%	3.7%	5.8%	1.0%	0.0%	2.1%	4.9%	3.0%	1.2%
Type 5	18.5%	21.6%	15.8%	20.8%	21.9%	27.0%	23.9%	16.0%	14.7%	18.8%

Table b. I-MNCs Quality of CEDs 2002-2011 (Percentage)

Indian Companies:

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Type 1	123	122	92	76	69	131	150	178	136	128
Type 2	38	69	76	63	55	176	153	207	101	92
Type 3	20	12	16	16	9	13	11	15	20	19
Type 4	6	11	1	2	4	11	10	7	5	4
Type 5	91	76	82	92	89	121	128	133	101	94

Table a. Indian Quality of CEDs 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Type 1	44.2%	42.1%	34.5%	30.5%	30.5%	29.0%	33.2%	33.0%	37.5%	38.0%
Type 2	13.7%	23.8%	28.5%	25.3%	24.3%	38.9%	33.8%	38.3%	27.8%	27.3%
Type 3	7.2%	4.1%	6.0%	6.4%	4.0%	2.9%	2.4%	2.8%	5.5%	5.6%
Type 4	2.2%	3.8%	0.4%	0.8%	1.8%	2.4%	2.2%	1.3%	1.4%	1.2%
Type 5	32.7%	26.2%	30.7%	36.9%	39.4%	26.8%	28.3%	24.6%	27.8%	27.9%

Table b. Indian Quality of CEDs 2002-2011 (Percentage)

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10.0 Glossary

BMI: Business Monitor International

BRICS: Brazil, Russia, India, China and South Africa (Emerging Economies)

CED: Corporate Environmental Disclosure

CER: Corporate Environmental Reporting

CERES: Coalition for Environmentally Responsible Economies

CERES-ACCA: Coalition for Environmentally Responsible Economies and Association of Chartered Certified Accountants Awards

CDP: Carbon Disclosure Project

CONI: Consolidated Narrative Interrogation

CSR: Corporate Social Responsibility

DDT: Dichlorodiphenyltrichloroethane

EMS: Environmental Management System

EMAS: Environmental Management and Audit Scheme

EPA: Environmental Protection Agency

EU: European Union

GIZ: Gesellschaft für Internationale Zusammenarbeit

GRI: Global Reporting Initiative

ICAI: Institute of Chartered Accountants of India

I-MNC: Indian Subsidiary of Multinational Corporation

LCA: Life Cycle Analysis

LDC: Lesser Developed Country

MNC: Multinational Corporation

OECD: Organisation for Economic Co-operation and Development

P-MNC: Parent Company of Multinational Corporation

SEBI: Securities and Exchange Board of India

SEC: Securities Exchange Commission

TRI: Toxics Release Inventory

UK: United Kingdom

UNEP: United National Environment Programme

U.S.: United States of America

Coding Categories

GEN: General Environmental Related Disclosures

RES: Responsibility for Implementation and Environmental Behaviour

POLL: Pollution Related Disclosures

PROD: Product Related Disclosures

SUST: Sustainability Disclosures

ACT: Environment-related Activity Disclosures

BRR: Business Related Risk Disclosures

PRESS: Pressure Group Disclosures

SER: Separate Environmental Report Disclosures

RC: Responsible Care Disclosures

ENE: Energy Related Disclosures

INP: Research Input Disclosures

SUPP: Supplier Related Disclosures

COMP: Compliance Disclosures

IRP: Information Retrieval Process Disclosures

OTHER: Other Disclosures

ECE: External Environmental Disclosures