

Environmental Disclosure Trend Among Malaysian Plantation Companies

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ABSTRACT

Motivated by the growing concern for environmental, social, and governance (ESG) performance and behaviours among corporations, this study descriptively explores the voluntary environmental disclosures among public-listed plantation companies in Malaysia. As one of the most polluting industries, the plantation offers an interesting setting for a study on corporate environmental disclosure practices. Using a content analysis of the audited annual reports of these plantation companies, we categorized the plantation firms' environmental disclosure into fourteen categories, with each category having distinct pre-identified items. We then employed binary coding for each disclosure item, assigning a score of 1 if the item is disclosed and 0 otherwise. Overall, this study documents an upward trend of environmental disclosure over the sample years (i.e., 2015 – 2019). *Environmental Policy* appears to be the most prevalent type of disclosure among the fourteen categories, while the least disclosed environmental category is *Financial Data*. Further analysis of our data according to the 'hard' and 'soft' classifications reveals that the environmental reporting among listed plantation firms in Malaysia is still very much dominated by soft information. Hard disclosure items (i.e., governance structure and management systems related to environmental protection, the credibility of the environmental disclosure, environmental performance indicators, and environmental spending) are difficult to be mimicked by the poor environmental performing firms. They hence are usually disclosed only by good environmental performers. On the other hand, soft items cover vision and environmental strategy claims, environmental profiles, and environmental initiatives. Our results suggest that most of the listed plantation firms in Malaysia are still at the early stage of their strategic move toward environmental protection.

Keywords: ESG; Plantation Companies; Environmental Disclosure

1. INTRODUCTION

For decades business organizations' activities have caused significant environmental impacts such as global warming, climate change, pollution, and natural disaster. The recent dramatic increase in climate change risk has forced corporations to aggressively align their behaviours towards becoming more environmentally friendly. With countries' net zero carbon emission commitments at the 26th United Nations climate change conference (COP26) in November 2021, corporations are on a boiling platform to demonstrate their seriousness about addressing climate change. These pressing climate-related concerns draw stakeholders' attention towards organizations' engagement in ESG practices with an increased emphasis on environmental performance and reporting (Cucari, Esposito De Falco, & Orlando, 2017). This latter trend is also evident in Malaysia. For example, Employees Provident Fund (EPF),

one of the country's largest and most influential institutional investors, has taken initiatives to discuss the climate change impact on the palm oil industry.¹ It has engaged plantation companies in developing sustainable practices and integrating ESG considerations into their operations and investments.

Environmental reporting is a corporate exercise of disseminating environmental information to wide users (Gray, Owen, & Adams, 1996). Particularly in Malaysia, Bursa Malaysia requires that environmental reporting (as part of the Sustainability Statement) contain 'balanced, comparable, and meaningful information' encompassing 'material environmental risks and opportunities' (Bursa Malaysia, 2015). Given the increased focus on firms' environmental performance by crucial stakeholders, environmental reporting plays a vital role in shaping a firm's information environment. Regrettably, prior studies in the Malaysian setting report low environmental disclosure by firms across industries (see, for example, Mojilis, 2013; Zainal, Zulkifli & Saleh, 2013; Abd Mutalib, Jamil & Wan-Hussin, 2014; Sheikh Abu Bakar, Ghazali & Ahmad, 2019).

However, prior studies (e.g., Patten, 1992; Joshi & Al-Modhahki, 2003) find that companies in environmentally sensitive industries provide a higher level of environmental disclosure. This trend is likely due to higher stakeholders' interests in and expectations for these firms in regard to their environmental performance. There are four sectors that are classified as environmentally sensitive, which are plantation, consumer products, industrial products, and constructions (Manaf, Atan & Mohamed, 2006). This study focuses on Malaysian listed plantation companies for two key reasons. Firstly, plantation activities initiated direct and significant adverse environmental impacts such as soil erosion and freshwater pollution. Hence, these companies must mitigate these harmful impacts and provide sufficient disclosure of these activities. Secondly, Malaysia is the world's third-largest palm oil producer after Indonesia and Thailand. The palm oil plantations and mills in this country have undergone significant development and perhaps have a greater adverse impact on the environment. For example, in Sarawak, the increasing trend of newly planted areas has increased air, water and land pollution (Siman, Ismail, Aziz & Mohd Zam, 2018).² This situation arguably creates intense pressure on the plantation companies to be more socially and environmentally responsible. As a result, these companies are expected to respond to the pressure and strategize their business activities to be less harmful to the environment.

This study seeks to examine the current level, trend, and types of environmental disclosure among listed plantation companies in Malaysia. To this end, environmental disclosure data were hand collected from the annual reports of 44 plantation companies listed in the main board of Bursa Malaysia from 2015-2019 and analysed accordingly. This study extends prior literature by providing empirical findings on the level of environmental disclosure before and after mandatory sustainability reporting. It further contributes to the literature by shedding light on the types of environmental disclosure. Simply put, this study is not only investigating *how much* has been disclosed but, more importantly, *what* has been disclosed regarding environmental activities and performance.

2. LITERATURE REVIEW

2.1. Environmental Reporting in Malaysia

Effective 31 December 2016 (firms with market capitalization of MYR2 billion and above)

¹ EPF is the sole pension fund manager in Malaysia. It owned equity in over 24 financial institutions in this country with total assets under management of MYR925 billion as of year-end 2019.

² Sarawak is currently the second largest crude palm oil producing state in Malaysia, but is forecasted to be first in 2024 (Ong, 2021).

and 2017 (other firms), companies listed in Bursa Malaysia must disclose a ‘Sustainability Statement’ containing material ESG-related activities, risks, and opportunities.³ To help companies comply with this mandate, Bursa Malaysia issued a Sustainability Reporting Guide in 2015.

Prior to the mandatory sustainability reporting, environmental disclosures among Malaysian companies were reported to be low. For example, early research in Malaysia by Nik Ahmad and Sulaiman (2002a) look at the social and environmental disclosures of companies in the construction and industrial products industries. In line with what Tilt (2000) finds in a previous study, their results show that most corporate environmental disclosures are qualitative. Furthermore, the Operations Review and the Chairman's Statement found most corporate environmental disclosures. In a follow-up study, Nik Ahmad and Sulaiman (2002b) look into corporate environmental disclosures for eight industrial sectors: consumer goods, industrial goods, construction, trading/services, finance, infrastructure project companies, properties, and plantations. They discovered that, while plantation sector companies provided some form of environmental disclosure, voluntary environmental disclosures remained low. Another study by Nik Ahmad and Abdul Rahim (2003) concludes that corporate social reporting in Malaysia has not progressed very far. A later study by Yusoff, Mohd Nasir, and Yatim (2005) revealed that the majority of companies were transitioning from a state of non-disclosure to a state of more qualitative disclosure. They even began quantifying certain environmental items, such as environmental management and product ecology data. Another study by Othman and Ameer (2010) regarding environmental disclosures of Malaysian palm oil plantation companies also documents very low disclosures. Nik Azman et al. (2019) recently documented similar findings for Malaysian listed plantation companies for 2016 and 2017. Furthermore, Mojilis (2013) argues that compared to other countries, the environmental disclosures practices by Malaysian firms lack proper explanation due to cultural, governmental, political, and economic differences.

2.2. Determinants of Environmental Reporting Practices

In a voluntary disclosure setting, companies likely engage in environmental reporting if they are concerned about how shareholders and other stakeholders perceive the environmental and societal impacts of their business activities. In a mandatory reporting setting, companies have no option but to comply with the requirement. However, the level and quality of disclosure may still vary. That is, companies are given discretion to determine what information to disclose, how to admit it, and what specific items to disclose (Gray, 2001). As proposed by the economics voluntary disclosure theory, companies will be keen to disclose more and ‘better quality’ information if they believe they have taken necessary steps to reduce the adverse impacts of their business. By better quality, we mean “objective environmental performance indicators, which are difficult to mimic” (Clarkson, Li, Richardson & Vasvari, 2008, p.2). Consistent with this notion, prior research documents that superior environmental performers report more and the information reported is of ‘better quality’ (Clarkson et al., 2008). According to the legitimacy theory, even under-performers may be willing to disclose more information voluntarily if they face social legitimacy threats (Clarkson, Li, Richardson & Vasvari, 2008, 2011; Gray, Kouhy & Lavers, 1995; Lindblom, 1994). However, these companies may not be able to disclose as much ‘better quality’ environmental information as the high-performing companies and may instead resort to boilerplate disclosure. Therefore, while companies may appear to report similar amounts of information, the quality of that information may vary depending on their environmental performance.

³ This requirement is pursuant to paragraphs 9.45(2) and (29), Part A of Appendix 9C of the Main Market Listing Requirements supplemented by Practice Note 9, and also, paragraph (30) of Appendix 9C of the ACE Market Listing Requirements, supplemented by Guidance Note 11.

In addition to the environmental performance of the firms, managers' decisions on environmental reporting are potentially influenced by several other factors since it involves a complex system of different players, systems, and interests (Rosa et al., 2012). Managers have to be aware of the demands and mandates for environmental reporting. They also need to understand that the environment is a non-renewable resource, and hence it is their professional responsibilities to report the environmental impacts of their business truthfully. In light of this complexity, corporate environmental reporting practices are highly likely endogenous. Some firm-specific factors have been studied in the extant literature and found to significantly explain environmental disclosure, such firm size, leverage, profitability, and board attributes (Othman & Ameer, 2010; Nik Azman et al., 2019).

3. RESEARCH DESIGN

The sample of this study is plantation companies listed on the Bursa Malaysia from 2015 to 2019, as exhibited in Table 1 below. There are five categories of products within the plantation, mainly crude palm oil, rubber, fresh fruit bunches, palm kernel, and integrated farming. We focus on the plantation industry as it is one of the most polluting industries (Manaf et al., 2006). Hence, it is interesting to investigate their environmental disclosure practices.

Table 1. Number of Public Listed Plantation Companies Over the Sample Years and their Platform of Environmental-related Disclosure

Year	Number of companies			
	Total	Annual report only	Combined annual and sustainability reports	Stand-alone annual and sustainability reports
2015	41	40	1	0
2016	42	31	10	1
2017	43	22	20	1
2018	44	13	29	2
2019	44	7	32	5

* As for the annual report, environmental-related information is mainly disclosed in the Chairman's Statement, CEO's Review of Operation, Management Discussion and Analysis, Sustainability Statement, Corporate Social Responsibility (CSR), Risk Management Statement, and Corporate Governance Statement. Only one of the sample companies prepared its annual reports in accordance with the International Integrated Reporting Framework issued by the International Integrated Reporting Council (IIRC) and Global Reporting Initiatives (GRI).

To construct the data for this study, we began by employing content analysis on the corporate reports (as depicted in Table 1) of the sample companies. Consistent with Bakhtiar (2005) and Buniamin (2010), the environmental disclosure was categorized into fourteen categories with each category having distinct pre-identified items as depicted in Table 2. We employed the categorisation proposed by Bakhtiar (2005) and Buniamin (2010) mainly because it is exclusively developed for environmental disclosure. The other frameworks such as the International Integrated Reporting Framework and Global Reporting Initiatives (GRI) are meant for integrated reports encompassing the environmental, social, and governance disclosure. Hence these latter frameworks are less appropriate for our study. For each item of the disclosure, we used binary coding where a score of 1 was given if the item was disclosed and 0 otherwise.⁴ Within these fourteen categories, there are 82 items altogether. Thus, the maximum score for a company that discloses all items would be 82. On the other hand, the score would be zero if there is no disclosure at all.

⁴ We assessed the disclosure quality using the type of information disclosed (i.e., hard and soft categorisation) instead of the level of disclosure. This quality measure is meant to capture *what* is being disclosed rather than *how much* is being disclosed. Therefore, a finer-grained disclosure level scoring is not deemed necessary for our study.

We further analyzed our data according to the ‘hard’ and ‘soft’ classifications as proposed by Clarkson et al. (2008). Hard disclosure items include the governance structure and management systems related to environmental protection, the credibility of the environmental disclosure, environmental performance indicators, and environmental spending. They are difficult to be mimicked by the poor environmental performing firms and hence are usually disclosed only by good environmental performers. Soft items, on the other hand, cover vision and environmental strategy claims, environmental profiles, and environmental initiatives. We mapped each of the 82 sub-items of the fourteen categories of disclosure carefully to the hard and soft groups based on the descriptions of these two groups in the ‘Hard Disclosure Items’ and ‘Soft Disclosure Items’ sections as well as Table 1 in Clarkson et al. (2008).⁵

The lack of representativeness of the sample poses a threat to the validity of our analysis. However, as we employed a convenience sample of companies operating in the plantation sector, the results may not be generalizable to firms operating in other sectors. The content analysis was carried out by two independent coders. The reliability of the coding was assessed by comparing the coding of the coders. In the very few cases where there was no agreement between coders as to the presence of disclosure items, the items were coded as ‘0’.

⁵ Refer to Table 7 in the Appendices for the mapping of the 82 items to the hard and soft types of disclosure.

Table 2. Environmental Disclosure Categories and Items

No	Category	Items
1	Corporate context	<ol style="list-style-type: none"> 1. Graphical description of products and/or services 2. Identification of the boundary of the report: <ol style="list-style-type: none"> a. Environmental information is provided for each major business operations b. Environmental performance of other related parties is included
2	Corporate commitment	<ol style="list-style-type: none"> 1. Vision and mission: <ol style="list-style-type: none"> a. The vision statement of the organization mentions anything on the environment b. The mission statement of the organization mentions anything on the environment 2. Chairman/CEO Statement: <ol style="list-style-type: none"> a. Environmental issues are mentioned in the statement b. Highlights the commitment by the organization's leadership to environmental issues and objectives c. Highlights the achievement in the current period -include both success and failure d. Identifies issues and challenges facing the organization e. Future environmental strategy
3	Environmental policy	<ol style="list-style-type: none"> 1. The company adopts internally developed environmental policy or indication that any publicly established charter is being subscribed by the company 2. There is a set of environmental goals and objectives 3. The environmental goals and objectives should, at a minimum, state a commitment to: <ol style="list-style-type: none"> a. Materials, water, and energy conservation b. Waste, emissions, and discharges management c. Continuous process improvement and monitoring d. Supplier chain and/or product stewardship e. Compliance with environmental laws and regulations f. Biodiversity maintenance and conservation g. Stakeholders relation management h. Environmental performance reporting i. Recognition of the improved performance
4	Targets and achievements	<ol style="list-style-type: none"> 1. There are specific environmental targets to be achieved 2. The target has covered major environmental issues 3. Achievement (or progress) against targets are indicated 4. Reasons for any non-achievement of those targets 5. Associated remedial or preventive actions

5	Environmental management systems	<ol style="list-style-type: none"> 1. The organization has an environmental management system, or planning (and status) of implementation 2. There are members of the board, division, or department responsible for environmental management 3. The division/department is responsible for the whole environmental issues in the company 4. Identification of the key managerial responsibilities for various aspects of the system which includes: <ol style="list-style-type: none"> a. Contingency planning and risk management b. Internal audit and review c. Environmental impact assessment d. The environmental management system is externally certified or planned (and expected date) to be certified 5. Clear identification of the process/facilities involved in the certification 6. Training program and related educational activities for staff and other related parties i.e. contractors, suppliers, etc.
6	Environmental impacts	<ol style="list-style-type: none"> 1. Identification of the significant environmental impacts on the organization's activities, products, and services 2. The implication should the impacts are not mitigated 3. The hiring of environmental specialists or external auditors to facilitate the identification of environmental impacts
7	Performance data	<ol style="list-style-type: none"> 1. Energy - absolute (joules); normalized; trends over time; comparative data within a sector 2. Materials - absolute (tones, volume, or kilograms); normalized; trends over time; comparative data within a sector 3. Water - absolute (litres or cubic meters); normalized; trends over time; comparative data within a sector 4. Emissions, effluents, and waste - absolute (tones or kilograms); normalized; trends over time; comparative data within a sector
8	Research and development	<ol style="list-style-type: none"> 1. There are research and development initiatives undertaken on environmental improvements 2. Environmental objectives for the improvements are clearly set out 3. Actual and forecasted capital expenditures, liabilities 4. Financial qualification benefits
9	Third-party verification	<ol style="list-style-type: none"> 1. There is a statement by an external party to verify the information 2. The statement clearly states: <ol style="list-style-type: none"> a. Remit and scope b. Indication of site visits and site-specific testing c. Interpretation of data/performance reported d. Indication of any data /information omitted that could/should have been included e. Independent comment on corporate targets set and impacts identified f. Shortcomings and recommendations
10	Compliance or non-compliance	<ol style="list-style-type: none"> 1. Statement indicates that the organization is in compliance with such laws and regulations 2. List of number of sites or departments that have received complaints or have been prosecuted 3. Statements to indicate whether any environmental accidents have occurred 4. Total number of fines paid or volume of fines/complaints 5. Procedures that have been put in place to prevent such incidents/non-compliance to recur 6. Comparison of the data over time

		7. Comparison of the data within a sector
11	Financial data	<ol style="list-style-type: none"> 1. There is an environmental financial statement 2. The environmental information is integrated within the conventional financial statement 3. The company practices environmental full cost accounting 4. Conventional financial data <ol style="list-style-type: none"> a. Environmental investment /liabilities b. Environmental savings/ expenses c. Any specific accounting policies adopted 5. Investment appraisal consideration
12	Stakeholder engagement and other initiatives	<ol style="list-style-type: none"> 1. Stakeholder engagement: <ol style="list-style-type: none"> a. Indication of the stakeholder engagement in practice b. Approaches to stakeholder consultation c. Discussion on the outcome of the engagement 2. Community outreach program: <ol style="list-style-type: none"> a. Indication that an organization has conducted a community outreach program b. Details such as date, place and participation 3. Supporting any environmental campaigns/ initiatives by other parties 4. Charitable contributions to or partnership with environmental organizations
13	Awards	<ol style="list-style-type: none"> 1. Any environmental reporting awards received by an organization 2. Other awards
14	Report design	<ol style="list-style-type: none"> 1. Indication of any relevant reporting guidelines followed 2. Innovative approach in reporting 3. Appropriate graphics 4. Communication and feedback mechanism <ol style="list-style-type: none"> a. Name of the person or department responsible with preparing the reports b. Telephone number or email address 5. Separate environmental section is devoted in the annual report

4. RESULTS AND DISCUSSION

4.1. Overall and Across-Category Disclosure Trend

Table 3 presents the summary statistics of the overall environmental disclosure among the Malaysian listed plantation firms from 2015 to 2019. Table 4 augments these statistics by providing the analyses of the mean scores for each of the fourteen categories of environmental disclosure (listed in Table 2). Finally, Table 5 presents the independent samples T-test of Mean Scores.

Table 3. Overall Disclosure

Year	N	Mean	Median	Min	Max	SD
2015	41	11.805	12	0	42	8.738
2016	42	14.952	12.5	0	50	11.191
2017	43	19.791	19	0	54	13.407
2018	44	26.318	28	0	56	12.942
2019	44	30.251	31	9	57	12.027
Increase (2019-2015)		18.446	19	9	15	3.289

Overall, the environmental disclosure saw an upward trend over the sample years with an increase in the mean score of 18.45 points, as exhibited in Tables 3 and 4. The highest increase in the mean score of the disclosure took place in 2018, with 6.53 points higher than the preceding year. A similar hike is observed consistently across all fourteen disclosure categories, as denoted in Table 4. This latter trend is likely caused by the mandatory Sustainability Statement disclosure requirement by Bursa Malaysia effective 30 December 2016 (for listed firms with a market capitalization of MYR2 billion or more) and 30 December 2017 (the remainder of the listed firms). The statistics suggest a lagged effect on mandatory disclosure.

Environmental Policy appears to be the most prevalent type of disclosure among the fourteen environmental disclosure categories, with 2.780 and 6.932 points in 2015 and 2019, respectively (as reported in Panel A of Table 4). These points represent 25.28% and 63.02% of the maximum scores for the 11 items under *Environmental Policy*, respectively. In absolute terms, *Environmental Policy* also records the highest increase of 4.151 points over the sample years, followed by *Environmental Management Systems* of 3.691 points. However, regarding coverage (i.e., percentage of the mean score relative to the total possible score), *Environmental Management Systems* records the highest increase of 41% over the years.

As can be seen from Table 4, the least disclosed environmental category is *Financial Data*, with only a 0.114 mean score in 2019, which is 1.62% of the potential maximum score. Table 4 also shows that not a single plantation firm disclosed the *Financial Data* in 2015. Summary statistics for each of the fourteen disclosure categories are presented in Table 6 and attached in the Appendix.

4.2. Hard and Soft Disclosures Trend

As a result of our mapping procedures, all sub-items of the fourteen categories of environmental disclosures turn out to belong consistently to either the hard or soft category except for the *Environmental Management Systems*, *Research and Development*, and *Compliance/Non-compliance*. We colour-code the fourteen categories of disclosures in Table 4 based on their hard and soft classes. The shaded columns in Table 4 signify the hard categories, while unshaded columns denote the soft groups. The *Environmental Management Systems*, *Research and Development*, and *Compliance/Non-compliance* columns are shaded lightly since they have a mixture of hard and soft items.

As can be seen from Table 4, the top five most disclosed categories are dominated by soft disclosures (based on both the mean score and percentage of mean score). Based on the percentage of the mean

score, the hard disclosures only took 8th place onwards in 2015. However, there is an increase in rank for the hard disclosures in 2019, with the best-ranked category, *Performance Data*, at the 5th place. However, hard disclosures are still at the three bottom ranks in 2019.

4.3 Independent Samples T-Test Results

To assess whether the yearly mean scores for overall and each of the fourteen categories of environmental disclosure are statistically different between years, we performed the independent samples T-test. Table 5 contains the results. The mean difference is expected to be significantly different between 2018 and 2017 due to the mandatory sustainability reporting by 31 December 2017. Sadly, our results suggest that the significant differences are only observed for soft disclosure. Furthermore, as shown in Panel B of Table 5, all categories report strongly significant increases in terms of coverage (i.e., percentage of the mean score relative to the total possible score) over the observed four years (2019 – 2015), with the exception of three hard disclosure categories: Third-party Verification, Financial Data, and Awards. These three items are highly credible and useful information that will help investors and other stakeholders distinguish between poor and superior environmental performers.

Overall, statistics and results in Tables 4 and 5 suggest the environmental reporting among listed plantation firms in Malaysia is still very much dominated by soft information. The highest mean score on the *Environmental Policy* may also suggest that most of the listed plantation firms in Malaysia are still at the early stage of their strategic move towards environmental protection.

Table 4. Comparison of Mean Scores and Percentage of Mean Scores over Sample Years and Across Fourteen Categories of Environmental Disclosure

	Overall	Environmental Disclosure Categories														
		CCN	CCM	EP	T&A	EMS	EI	PD	R&D	TPV	CNC	FD	SEOI	AW	RD	
Max score	82	3	7	11	5	9	3	4	4	7	7	7	7	2	6	
Panel A: Mean score																
Year																
2015	11.805	0.585	1.561	2.780	0.463	1.537	0.171	0.244	0.073	0.415	0.805	0.000	1.585	0.146	1.439	
2016	14.952	0.690	1.476	3.405	0.786	2.262	0.286	0.429	0.310	0.429	1.024	0.048	1.952	0.214	1.643	
2017	19.791	0.837	1.814	4.465	1.140	3.302	0.535	0.791	0.442	0.442	1.233	0.047	2.372	0.256	2.116	
2018	26.318	1.068	1.841	6.182	1.523	4.659	0.750	1.205	0.568	0.477	1.523	0.114	3.500	0.250	2.659	
2019	30.251	1.136	2.000	6.932	1.864	5.227	0.818	1.568	0.750	0.477	1.773	0.114	4.250	0.341	3.000	
Mean score rank (2015)		7	3	1	8	4	11	10	13	9	6	14	2	12	5	
Mean score rank (2019)		9	5	1	6	2	10	8	11	12	7	14	3	13	4	
Panel B: Percentage of mean score (Mean score / Max score)																
Year	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
2015	14.40	19.51	22.30	25.28	9.27	17.07	5.69	6.10	1.83	5.92	11.50	0.00	22.65	7.32	23.98	
2016	18.23	23.02	21.09	30.95	15.71	25.13	9.52	10.71	7.74	6.12	14.63	0.68	27.89	10.71	27.38	
2017	24.13	27.91	25.91	40.59	22.79	36.69	17.83	19.77	11.05	6.31	17.61	0.66	33.89	12.79	35.27	
2018	32.10	35.60	26.30	56.20	30.45	42.35	25.00	30.11	14.20	6.82	21.75	1.62	50.00	12.50	44.32	
2019	36.89	37.88	28.57	63.02	37.27	47.52	27.27	39.20	18.75	6.82	25.32	1.62	60.71	17.05	50.00	
Percentage rank (in 2015)		5	4	1	8	6	12	10	13	11	7	14	3	9	2	
Percentage rank (in 2019)		6	8	1	7	3	9	5	11	13	10	14	2	12	4	

Environmental disclosure categories: CCN = Corporate Context; CCM = Corporate Commitment; EP = Environment Policy; T&A = Targets and Achievements; EMS = Environmental Management Systems; EI = Environmental Impacts; PD = Performance Data; R&D = Research and Development; TPV = Third-party Verification; CNC = Compliance/Non-compliance; FD = Financial Data; SEOI = Stakeholder Engagement and Other Initiatives; AW = Awards; RD = Report Design.

Column shading: Shaded columns = hard disclosure categories; lightly shaded columns = combinations of both hard and soft disclosure items; unshaded columns = soft disclosure categories

Table 5. Independent Samples T-test of Mean Scores and Percentage of Mean Scores over Sample Years and Across Fourteen Categories of Environmental Disclosure

		Overall	Environmental Disclosure Categories													
			CCN	CCM	EP	T&A	EMS	EI	PD	R&D	TPV	CNC	FD	SEOI	AW	RD
Max score		82	3	7	11	5	9	3	4	4	7	7	7	7	2	6
Panel A: Mean score																
Years																
2016 - 2015	Mean Diff.	3.148	0.105	-0.085	0.624	0.322	0.725	0.115	0.185	0.236	0.014	0.219	0.048	0.367	0.068	0.204
	t-value	1.409 (0.163)	0.775 (0.441)	-0.259 (0.797)	0.926 (0.357)	1.635 (0.106)	1.733* (0.087)	0.955 (0.343)	1.072 (0.287)	1.988** (0.050)	0.127 (0.899)	1.303 (0.219)	0.988 (0.326)	0.960 (0.340)	0.692 (0.491)	0.751 (0.455)
2017 - 2016	Mean Diff.	4.838	0.147	0.338	1.060	0.354	1.040	0.249	0.362	0.132	0.013	0.209	-0.001	0.420	0.042	0.473
	t-value	1.783* (0.078)	1.075 (0.285)	1.049 (0.297)	1.443 (0.153)	1.547 (0.126)	2.026** (0.046)	1.629 (0.107)	1.627 (0.108)	0.774 (0.441)	0.122 (0.903)	1.058 (0.293)	-0.017 (0.987)	0.942 (0.349)	0.378 (0.706)	1.516 (0.133)
2018 - 2017	Mean Diff.	6.527	0.231	0.027	1.717	0.383	1.357	0.215	0.414	0.126	0.035	0.290	0.067	1.128	-0.006	0.543
	t-value	2.244** (0.027)	1.640 (0.105)	0.079 (0.937)	2.437*** (0.017)	1.503 (0.137)	2.412*** (0.018)	1.205 (0.215)	1.559 (0.123)	0.652 (0.516)	0.328 (0.744)	1.296 (0.198)	0.898 (0.372)	2.465** (0.016)	-0.049 (0.961)	1.594 (0.115)
2019 - 2018	Mean Diff.	3.932	0.068	0.159	0.750	0.314	0.568	0.068	0.367	0.182	0.000	0.250	0.000	0.750	0.091	0.341
	t-value	1.429 (0.157)	0.481 (0.632)	0.447 (0.656)	1.255 (0.213)	1.310 (0.194)	1.070 (0.288)	0.380 (0.705)	1.283 (0.203)	0.858 (0.394)	0.000 (1.000)	1.043 (0.300)	0.000 (1.000)	1.726* (0.088)	0.720 (0.473)	1.033 (0.304)
2019 - 2015	Mean Diff.	18.445	0.551	0.439	4.151	1.400	3.691	0.647	1.324	0.677	0.063	0.968	0.114	2.665	0.192	1.561
	t-value	7.923*** (<0.001)	3.902*** (<0.001)	1.220 (0.226)	7.010*** (<0.001)	6.436*** (<0.001)	8.660*** (<0.001)	4.388*** (<0.001)	5.604*** (<0.001)	4.057*** (<0.001)	0.575 (0.578)	4.595*** (<0.001)	1.881*** (0.064)	7.128*** (<0.001)	1.702 (0.092)	5.244*** (<0.001)
Panel B: Percentage of mean score (Mean score / Max score)																
Years		(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
2016 - 2015	Mean Diff.	0.038	0.350	-0.012	0.057	0.0645	0.081	0.038	0.046	0.059	0.002	0.031	0.007	0.055	0.034	0.034
	t-value	1.409 (0.163)	0.775 (0.441)	-0.259 (0.797)	0.926 (0.357)	1.635 (0.106)	1.733* (0.087)	0.955 (0.343)	1.072 (0.287)	1.988** (0.050)	0.127 (0.899)	1.303 (0.196)	0.988 (0.326)	0.960 (0.340)	0.692 (0.491)	0.751 (0.455)
2017 - 2016	Mean Diff.	0.059	0.049	0.048	0.096	0.071	0.116	0.083	0.091	0.033	0.002	0.029	-0.001	0.060	0.021	0.079

	t-value	1.783* (0.078)	1.075 (0.285)	1.049 (0.297)	1.443 (0.153)	1.547 (0.126)	2.026** (0.046)	1.629 (0.107)	1.627 (0.108)	0.774 (0.441)	0.122 (0.903)	1.058 (0.293)	-0.017 (0.987)	0.942 (0.349)	0.378 (0.706)	1.516 (0.133)
2018 - 2017	Mean Diff.	0.079	0.077	0.004	0.156	0.077	0.151	0.072	0.103	0.032	0.005	0.041	0.009	0.161	-0.003	0.057
	t-value	2.244** (0.024)	1.640 (0.105)	0.079 (0.937)	2.437** (0.017)	1.503 (0.137)	2.412** (0.018)	1.205 (0.232)	1.559 (0.123)	0.652 (0.516)	0.328 (0.744)	1.296 (0.198)	0.898 (0.372)	2.465** (0.016)	-0.049 (0.961)	1.594 (0.115)
2019 - 2018	Mean Diff.	0.048	0.227	0.227	0.068	0.068	0.063	0.227	0.091	0.045	0.000	0.036	0.000	0.107	0.045	0.057
	t-value	1.429 (0.157)	0.481 (0.632)	0.447 (0.656)	1.255 (0.213)	1.310 (0.194)	1.070 (0.288)	0.380 (0.705)	1.283 (0.203)	0.858 (0.394)	0.000 (1.000)	1.043 (0.300)	0.000 (1.000)	1.726* (0.088)	0.720 (0.473)	1.033 (0.304)
2019 - 2015	Mean Diff.	0.224	0.184	0.063	0.374	0.280	0.410	0.216	0.331	0.169	0.009	0.138	0.016	0.381	0.097	0.260
	t-value	7.923*** (<0.001)	3.902*** (<0.001)	1.220*** (<0.001)	7.010*** (<0.001)	6.436*** (<0.001)	8.660*** (<0.001)	4.388*** (<0.001)	5.604*** (<0.001)	4.057*** (<0.001)	0.575 (0.567)	4.595*** (<0.001)	1.881 (0.064)	7.128*** (<0.001)	1.702 (0.092)	5.244*** (<0.001)

Environmental disclosure categories: CCN = Corporate Context; CCM = Corporate Commitment; EP = Environment Policy; T&A = Targets and Achievements; EMS = Environmental Management Systems; EI = Environmental Impacts; PD = Performance Data; R&D = Research and Development; TPV = Third-party Verification; CNC = Compliance/Non-compliance; FD = Financial Data; SEOI = Stakeholder Engagement and Other Initiatives; AW = Awards; RD = Report Design.

Column shading: Shaded columns = hard disclosure categories; lightly shaded columns = combinations of both hard and soft disclosure items; unshaded columns = soft disclosure categories

***, **, and * represents significance at 1%, 5%, and 10%, respectively with p-values in parentheses.

5. CONCLUSION

Motivated by the significant and direct impacts of plantation activities on climate, this study investigates the environmental reporting behaviour of listed plantation firms in Malaysia. We document that environmental disclosure practices among these firms see an encouraging trend. Our findings suggest the introduction of mandatory sustainability reporting in 2016 and 2017 by Bursa Malaysia resulted in a considerable improvement in the extent of environmental disclosure. However, further analysis reveals that companies predominantly disclosed more 'soft' information relative to 'hard' information. This behaviour implies that plantation companies are yet to achieve the expected corporate environmental accountability. The slow progress of 'hard' information that only appears in lower ranks also poses a key question on whether companies' engagement in the current reporting practices is effective. Hence, future research may address the need to better understand the motivations behind corporate environmental reporting practices.

ACKNOWLEDGEMENT

This paper has benefited from the constructive comments from an anonymous reviewer and participants of the 7th International Conference of Governance and Accountability, South Africa.

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APPENDICES

Table 6. Descriptive Statistics of Each of the Fourteen Environmental Disclosure Categories

Year	N	Mean	Median	Min	Max	SD
Corporate Context Disclosure (Max score = 3)						
2015	41	0.585	1	0	2	0.624
2016	42	0.690	1	0	2	0.597
2017	43	0.837	1	0	2	0.644
2018	43	1.047	1	0	2	0.645
2019	44	1.163	1	0	2	0.644
Corporate Commitment Disclosure (Max score = 7)						
2015	41	1.561	2	0	5	1.562
2016	42	1.476	2	0	4	1.384
2017	43	1.814	2	0	5	1.544
2018	43	1.791	2	0	5	1.578
2019	44	2.047	2	0	6	1.698
Environmental Policy Disclosure (Max score = 11)						
2015	41	2.780	3	0	10	2.859
2016	42	3.405	3.5	0	10	3.193
2017	43	4.465	5	0	10	3.493
2018	43	6.140	7	0	11	3.031
2019	44	6.977	8	0	11	2.601
Targets and Achievements Disclosure (Max score = 5)						
2015	41	0.463	0	0	3	0.768
2016	42	0.786	0	0	3	0.989
2017	43	1.140	1	0	3	1.091
2018	43	1.465	2	0	4	1.208
2019	44	1.907	2	0	4	1.137
Environmental Management Systems Disclosure (Max score = 9)						
2015	41	1.537	1	0	7	1.563
2016	42	2.262	2	0	7	2.150
2017	43	3.302	3	0	9	2.511
2018	43	4.558	5	0	9	2.617
2019	44	5.279	5	0	9	2.234
Environmental Impacts Disclosure (Max score = 3)						
2015	41	0.171	0	0	2	0.489
2016	42	0.286	0	0	2	0.589
2017	43	0.535	0	0	2	0.788
2018	43	0.744	0	0	2	0.865
2019	44	0.837	1	0	2	0.805

(continued on next page)

Table 6. Descriptive Statistics of Each of the Fourteen Environmental Disclosure Categories (continued)

Year	N	Mean	Median	Min	Max	SD
Performance Data Disclosure (Max score = 4)						
2015	41	0.244	0	0	4	0.691
2016	42	0.524	0	0	4	0.849
2017	43	1.186	0	0	4	1.153
2018	43	1.651	1	0	4	1.299
2019	44	2.023	1	0	4	1.332
Research and Development Disclosure (Max score = 4)						
2015	41	0.073	0	0	1	0.260
2016	42	0.310	0	0	2	0.707
2017	43	0.442	0	0	3	0.844
2018	43	0.512	0	0	3	0.873
2019	44	0.767	0	0	3	1.031
Third-party Verification Disclosure (Max score = 7)						
2015	41	0.415	0	0	1	0.493
2016	42	0.429	0	0	1	0.495
2017	43	0.442	0	0	1	0.497
2018	43	0.465	0	0	1	0.499
2019	44	0.465	0	0	1	0.499
Compliance/Non-compliance Disclosure (Max score = 7)						
2015	41	0.805	1	0	4	0.706
2016	42	1.024	1	0	3	0.801
2017	43	1.233	1	0	4	0.984
2018	43	1.465	1	0	4	1.020
2019	44	1.767	1	1	5	1.158
Financial Data Disclosure (Max score = 7)						
2015	41	0.000	0	0	0	0.000
2016	42	0.048	0	0	2	0.305
2017	43	0.047	0	0	2	0.301
2018	43	0.093	0	0	2	0.362
2019	44	0.116	0	0	2	0.386
Stakeholder Engagement and Other Initiatives Disclosure (Max score = 7)						
2015	41	1.585	2	0	6	1.448
2016	42	1.952	2	0	7	1.951
2017	43	2.372	2	0	7	2.102
2018	43	3.442	3	0	7	2.105
2019	44	4.279	5	0	7	1.921
Awards Disclosure (Max score = 2)						
2015	41	0.146	0	0	2	0.417
2016	42	0.214	0	0	2	0.465
2017	43	0.256	0	0	2	0.532
2018	43	0.209	0	0	2	0.508
2019	44	0.349	0	0	2	0.606

**Table 6. Descriptive Statistics of Each of the Fourteen Environmental Disclosure Categories
(continued)**

Year	N	Mean	Median	Min	Max	SD
Report Design (Max score = 6)						
2015	41	1.439	1	0	4	1.190
2016	42	1.643	2	0	4	1.250
2017	43	2.116	2	0	6	1.573
2018	43	2.605	2	0	6	1.542
2019	44	3.047	3	0	6	1.478

Table 7. Environmental Disclosure Categories and Items

No	Category	Items	Map to Clarkson et al. (2008) (A1-A4 = Hard; A5-A7 = Soft) ⁶
1	Corporate context	<ol style="list-style-type: none"> 1. Graphical description of products and/or services 2. Identification of the boundary of the report: <ol style="list-style-type: none"> a. Environmental information is provided for each major business operations b. Environmental performance of other related parties is included 	<ol style="list-style-type: none"> 1. Soft but no specific item 2. a-b A5
2	Corporate commitment	<ol style="list-style-type: none"> 1. Vision and mission: <ol style="list-style-type: none"> a. The vision statement of the organization mentions anything on the environment b. The mission statement of the organization mentions anything on the environment 2. Chairman/CEO Statement: <ol style="list-style-type: none"> a. Environmental issues are mentioned in the statement b. Highlights the commitment by the organization's leadership to environmental issues and objectives c. Highlights the achievement in the current period -include both success and failure d. Identifies issues and challenges facing the organization e. Future environmental strategy 	<ol style="list-style-type: none"> 1. a-b A5 2. a-e A5
3	Environmental policy	<ol style="list-style-type: none"> 1. The company adopts internally developed environmental policy or indication that any publicly established charter is being subscribed by the company 2. There is a set of environmental goals and objectives 3. The environmental goals and objectives should, at a minimum, state a commitment to: <ol style="list-style-type: none"> a. Materials, water, and energy conservation b. Waste, emissions, and discharges management c. Continuous process improvement and monitoring d. Supplier chain and/or product stewardship e. Compliance with environmental laws and regulations f. Biodiversity maintenance and conservation g. Stakeholders relation management h. Environmental performance reporting i. Recognition of the improved performance 	<ol style="list-style-type: none"> 1. A5 2. A5 3. a – e A5
4	Targets and achievements	<ol style="list-style-type: none"> 1. There are specific environmental targets to be achieved 2. The target has covered major environmental issues 	<ol style="list-style-type: none"> 1. A3 2. A3

⁶ Items A1-A4 (A5-A7) represent the hard (soft) disclosures in Table 1 of Clarkson et al. (2008).

		<ol style="list-style-type: none"> 3. Achievement (or progress) against targets are indicated 4. Reasons for any non-achievement of those targets 5. Associated remedial or preventive actions 	<ol style="list-style-type: none"> 3. A3 4. A3
5	Environmental management systems	<ol style="list-style-type: none"> 1. The organization has an environmental management system, or planning (and status) of implementation 2. There are members of the board, division, or department responsible for environmental management 3. The division/department is responsible for the whole environmental issues in the company 4. Identification of the key managerial responsibilities for various aspects of the system which includes: <ol style="list-style-type: none"> a. Contingency planning and risk management b. Internal audit and review c. Environmental impact assessment d. The environmental management system is externally certified or planned (and expected date) to be certified 5. Clear identification of the process/facilities involved in the certification 6. Training program and related educational activities for staff and other related parties i.e. contractors, suppliers, etc. 	<ol style="list-style-type: none"> 1. A1 2. A1 3. A1 4. a-c A1 d A2 5. A2 6. A7
6	Environmental impacts	<ol style="list-style-type: none"> 1. Identification of the significant environmental impacts on the organization's activities, products, and services 2. The implication should the impacts are not mitigated 3. The hiring of environmental specialists or external auditors to facilitate the identification of environmental impacts 	<ol style="list-style-type: none"> 1. A1 2. A3 3. A2
7	Performance data	<ol style="list-style-type: none"> 1. Energy - absolute (joules); normalized; trends over time; comparative data within a sector 2. Materials - absolute (tones, volume, or kilograms); normalized; trends over time; comparative data within a sector 3. Water - absolute (litres or cubic meters); normalized; trends over time; comparative data within a sector 4. Emissions, effluents, and waste - absolute (tones or kilograms); normalized; trends over time; comparative data within a sector 	<ol style="list-style-type: none"> 1. A3 2. A3 3. A3 4. A3
8	Research and development	<ol style="list-style-type: none"> 1. There are research and development initiatives undertaken on environmental improvements 2. Environmental objectives for the improvements are clearly set out 3. Actual and forecasted capital expenditures, liabilities 4. Financial qualification benefits 	<ol style="list-style-type: none"> 1. A5 2. A5 3. A4 4. A4
9	Third-party verification	<ol style="list-style-type: none"> 1. There is a statement by an external party to verify the information 2. The statement clearly states: <ol style="list-style-type: none"> a. Remit and scope b. Indication of site visits and site-specific testing c. Interpretation of data/performance reported d. Indication of any data /information omitted that could/should have been included e. Independent comment on corporate targets set and impacts identified f. Shortcomings and recommendations 	<ol style="list-style-type: none"> 1. A2 2. a-f A2

10	Compliance or non-compliance	<ol style="list-style-type: none"> 1. Statement indicates that the organization is in compliance with such laws and regulations 2. List of number of sites or departments that have received complaints or have been prosecuted 3. Statements to indicate whether any environmental accidents have occurred 4. Total number of fines paid or volume of fines/complaints 5. Procedures that have been put in place to prevent such incidents/non-compliance to recur 6. Comparison of the data over time 7. Comparison of the data within a sector 	<ol style="list-style-type: none"> 1. A6 2. A3 3. A3 4. A4 / A3 5. A7 6. A3 7. A3
11	Financial data	<ol style="list-style-type: none"> 1. There is an environmental financial statement 2. The environmental information is integrated within the conventional financial statement 3. The company practices environmental full cost accounting 4. Conventional financial data <ol style="list-style-type: none"> a. Environmental investment /liabilities b. Environmental savings/ expenses c. Any specific accounting policies adopted 5. Investment appraisal consideration 	<ol style="list-style-type: none"> 1. A1 2. A1 3. A4 4. a-b A4 5. A4 <p>c A1</p>
12	Stakeholder engagement and other initiatives	<ol style="list-style-type: none"> 1. Stakeholder engagement: <ol style="list-style-type: none"> a. Indication of the stakeholder engagement in practice b. Approaches to stakeholder consultation c. Discussion on the outcome of the engagement 2. Community outreach program: <ol style="list-style-type: none"> a. Indication that an organization has conducted a community outreach program b. Details such as date, place and participation 3. Supporting any environmental campaigns/ initiatives by other parties 4. Charitable contributions to or partnership with environmental organizations 	<ol style="list-style-type: none"> 1. a-c A7 2. a-b A7 3. A7 4. A7
13	Awards	<ol style="list-style-type: none"> 1. Any environmental reporting awards received by an organization 2. Other awards 	<ol style="list-style-type: none"> 1. A2 2. A2
14	Report design	<ol style="list-style-type: none"> 1. Indication of any relevant reporting guidelines followed 2. Innovative approach in reporting 3. Appropriate graphics 4. Communication and feedback mechanism <ol style="list-style-type: none"> a. Name of the person or department responsible with preparing the reports b. Telephone number or email address 5. Separate environmental section is devoted in the annual report 	<ol style="list-style-type: none"> 1. A5 2. Soft but no specific item 3. Soft but no specific item 4. a-b A7 5. A7