Accounting For Ecology and Reporting In Developing Countries – A Bangladesh Perspective

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Abstract: The STAR¹ magazine reported 'environmental degradation in the river water from untreated domestic and industrial effluent has reached such an alarming level that it posses a significant threat to public health, ecosystem and economic growth of surrounding areas.' This is one of the many examples of water pollution threaten public lives and economic growth in the country. As the indiscriminate dumping of industrial effluents continues, the once vibrant river is on the brink of untimely death. Mushrooming of modern buildings for supermarkets, industrial set up, business houses and residents killed the canal and ponds already. Country's economic growth is emerging at heavy cost for the society and environment as well. Essentially, therefore, industrial and business houses should take initiatives for a sustainable environmental conservation. Environmental accounting and reporting of business houses can be one of such initiatives that indirectly play a vital role to check pollution resulted from industrial effluents. This study thus purposively investigates the existing laws for environmental accounting and their implications while industrial and corporate houses prepare annual reports. We found a little implication and the business houses disclose a meager amount of environmental information voluntarily as part of their publicity.

Prelude

There is an age-old saying, "Everybody talks about environment, but nobody does anything about it" -which most possibly is not valid utterly today. Our activities might have some impact on the ecology, which is not all positive or negative for the atmosphere in the short run but may be harmful for the distant future although we are not aware of it. With the growing trade, commerce and industry no doubt our lives and surroundings get an access to new advanced world where ones have alternative choices and means to satisfy that choices. Nevertheless, for satisfying the present needs, our activities in many cases are destroying the future of our genre. Industrial activities expressly are viewed more progressively today as being accountable for their social and environmental impact. It is generally accepted that the environmental impacts from these sectors are significant, so for economic valuation, accounting and reporting are carrying huge weight for sustainable development (Shil and Iqbal, 2005; Bose, 2006).

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The age of Bangladesh and the age of modern international environmentalism are almost the same. Bangladesh achieved its independence in 1971 while the era of modern international environmentalism began in 1972 from the UN's Stockholm Conference on Human Environment. This country inherited a good number of sectoral legislation from the colonial² legal system. Together with a few legislations, these promulgated during the post independence form the core ecological jurisprudence of Bangladesh. There are about 185 statues in Bangladesh which deal with environmental issues directly, indirectly or casually but lack of consciousness among the executing agencies and the common people about the very existence and scope of these laws has rendered them ineffective functionally (Hasan, 2000). The only hope is the awakening pressure group and donor agencies who become concerned about environmental degradation due to increased industrial activities in the recent decades. In addition, in true sense, the promulgation of the Bangladesh Environmental Protection Act 1995 was a result of such apprehension of the pressure groups and donor agencies.

Resources from the ecology are extracted and used in factories who manufacture new goods/commodities that satisfy our needs. Most of these resources explored from the nature are not renewable and cause ecology decaying day by day. This ecological depletion benefits the society and helps society to advance more and more at the cost of environment. Similarly, factories of different industries produce products using natural resources and emitting gases and wastes that cause air, water and soil toxic. Every living element in the ecology has to bear these uncountable costs. Accounting for ecology is typically non-financial nature and counts this uncountable cost at micro and macro level. Disclosing such social costs and benefits in the form of financial accounting information, corporate business entities may report publicly as part of their social responsibility.

Accounting for, ecology has been emerged during the last two decades in response to the business houses activities that exert stress over the environmental makeup. In Norway, during 1970s environmental accounting first put up and since then disclosure of environmental information in the corporate financial report began that expanded sharply in the 1990s (Kukobu, *et. al.*, 2002). However, most environmental reporting studies have spotlighted on developed countries and only a handful number of studies are available on the developing countries (Belal, 2000). Because of a lack of empirical studies in the context of developing countries, we still know very little about the environmental accounting practices there. Against this background, this study attempts to bridge the gap paying attention to the environmental accounting practices of Industrial sectors in Bangladesh. This initiative expects that it would help understanding the environmental accounting disclosures made by the business entities in South Asian developing countries in general and Bangladesh in particular.

²This land comprising Bangladesh, India and Pakistan was a British ruled colony for about 200 years till 1947.

Rationale of the Study

Although there is wide scope to study the other segments of social accounting, this study shall remain limited to environmental issues only. Environment reporting practices in South Asia are far behind from Europe and in Bangladesh the status is considerably in lowest ebb. Therefore, taking Bangladesh perspective as sample study from the abundant purview of other South Asian countries it tries to meet a prime demand of the time.

In terms of waste-load generation, the principal polluting industries are paper and pulp, textile (dying and printing) and the tanneries. Besides, sugar, food, fish, and distilleries are also considerable for waste-load. Over the last two decades, the country has witnessed a sharp growth in the textile industry-a major polluting industry. Wastes from industrial activities include liquid wastewater or effluent, gaseous emissions and solid wastes. Industrial effluents contain a wide range of pollutants broadly categorized into: (i) biodegradable organic compounds (biochemical oxygen demand or BOD), (ii) nonbiodegradable or persistent organic chemicals (chemical oxygen demand or COD) (iii) heavy metal [e.g., mercury (Hg), chromium (Cr), cadmium (Cd), lead (Pb), Copper (Cu)] and (iv) a wide range of other dissolved substances as well as suspended solids. Effluents, mostly untreated, primarily discharge into rivers and streams. The surrounding communities use these water bodies largely for drinking, washing, cooking, bathing, as well as, for irrigation and fisheries that resulted in pollution of the natural water bodies from industrial discharges is having the most damaging effect on the environment. Besides river and streams, heavily discharging industrial effluents go into low-lying lands causing soil pollution and adding to people's sufferings. There are also incidents of water logging. We guess most companies do not realize the true costs of waste and other causes of poor environmental performance. Neither the common people, nor the laws enforcing agencies are concerned about it.

By largely expended resources are in a way that is giving little of value to the environment, to the companies themselves, or to the communities they operate in (Watson and Mackay, 2003). Environmental Accounting has an instrumental role in disclosing environmental factors irrespective of industrial types and nature of operations, commercial or non-commercial activities at all levels whether *micro*, *meso* and *macro*. Reduction or elimination of many environmental costs of business activities decisions ranging from operational and house keeping changes is possible if the investment decisions go in cleaner production and reengineering processes friendly to environment. In accounting, on the other hand, overhead cost may obscure environmental factor to offset by generating revenues through sale of waste by products for example.

Exclusive Legal Status Reviews

With support of UNDP, this country first stepped for National Environment Management Action Plan in 1995 that resulted in enactment of Bangladesh Environmental Conservation Act 1995. In effect, the industrial initiatives must have environmental

clearance certificate for establishing industries prone to environmental pollution from the Department of Environment and they may need to disclose environmental cost factors apart from social responsibility when required. Checking and studying, how far these laws/rules confer country's environment accounting and reporting publicly is a prime object of this initiative.

Table -2 Legal Status of Environmental Reporting

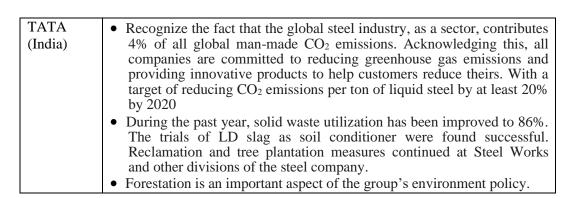
Ministry of Forest and Environment				
Department of Forest	Department of Environment			
Planning Commission				
National Environment Policy,1992				
National Environment Management Action Plan, 1995				
Environmental Conservation Act, 1995				
Environmental Conservation Rules, 1997				
Environmental Court Act, 2000				
Ozone Depleting Substances Rules, 2004				
Companies Act 1994	IAS guidelines			
Securities and Exchanges Rules, 1987	IFRS guidelines			
Tax Ordinances BAS guidelines				

Compliance Literature Reviews

Efforts have been taken to study compliance the legal status relevant to environmental accounting with the IAS- environmental accounting prescription. As part of compliance analysis, a study has been taken for the prominent industries groups in Asia (table 3) to develop environmental accounting items and to justify their applicability on companies' reporting in Bangladesh.

Table -3: An observation of Environmental reporting by prominent industry groups in Asia

Companies	How they consider environmental issues in accounting?				
Hyundai (Korea)	 Past and current expenditure for pollution control equipment and facilities are the items to be reported frequently; Solid waste disposal information are to be reported; 				
	Policies for environmental factors or company concern for the environment should be reported.				
Mabuchi	Developing and producing environment- friendly products.				
Group	Prohibiting use of hazardous substances				
(Japan)	• Reducing emission of CO ₂ (saving energy)				
	Reducing landfill solid wastes				



Objectives of this study

This study is an attempt to examine present status of environmental accounting and its reporting practices in the industrial sector corporations of Bangladesh. Thus the crucial objectives of this study are:

- To examine the present legal status for environmental protection or conservation of resources in Bangladesh;
- To substantiate the accounting for ecology as liability of the industrial sector corporations;
- To discern what extent industrial houses furnish accounting information for ecology in their annual reports.
- To justify how far involved management/staffs are concerned for environmental liability and costs that companies in Bangladesh incur day by day.

Methodology

The nature of research paper tends to be typically descriptive. Although there are a number of ways in which environmental accounting information disclosure can be measured, this study followed the approach applied by Adams *et al.*, (1995), Gray *et al.*, (1995) in their studies. Environmental disclosure can typically be thought of as comprising information relating to a corporation activities, aspirations, and public image with regard to ecology and surroundings. In the first hurdle of the research, existing laws/standards have been segregated (see *table-2*) to examine how far these laws ably define accounting for ecology as obligatory to the industrial sectors and also how far the laws are able/compatible to confer disclosing ecological information in the CFR. On the second hurdle, non-financial information relating to environmental accounting (see *table-3 and 5*) are defined and then studied intensively to check whether the defined items are disclosed complying the country's laws, rules and standards. In fine, the attainment fourth objective made possible by conducting questionnaires survey among the management or staffs of companies and the govt. concerned with environment accounting and reporting.

Population and Sample size

Irrespective of their nature of production and trade, all companies more or less have impacts over the environment but this study has selected those industries that pollute seriously environment by their typical nature of production, uses of energy, types of raw material used and disposal of wastages etc. These are typically textile, cement and

ceramic, steel engineering, food-allied, fuel, and power, tannery, pharmaceutical and chemicals, fuel etc. Joint stock companies and firms registrar authority in Bangladesh has enlisted a total number about one hundred and ten thousands companies³ so far. All believe to have environmental impact, and therefore have been counted for spatial population analysis. However, in the population, except public limited companies listed to country's stock exchanges, all other companies and firms have reportedly required no disclosure publicly. Thus, this study has taken a standard sample of 140 companies from DSE enlistment by applying judgment-sampling method⁴. With this sample size, it tries to articulate an overall real picture of environmental accounting by the companies in Bangladesh.

Firms' Group **Population** Sample/Population (%) Sample Engineering 16 08 50.00 Food and Allied 29 15 51.72 Fuel and Power 04 04 100.00 04 03 Inte 75.00 Pharma &Chemical 23 13 56.52 05 03 Paper and Printing 60.00 Real Estate 02 02 100.00 Textile 28 15 53.57 Miscellaneous 29 11 37.93

74

52.85

Table-1: Comparative Distribution of the Firms in Sample/ Population

140

Sample data /literatures Sources

Total

Environmental disclosure may take place through different media. Whilst most research into such disclosure tends to focus on data contained within the corporation's annual report, a wide range of other media may be employed: advertising, focus group, booklets, employees' councils and so forth (Zegal and Ahmed, 1990). It involves reporting of the quantities of environmental resources (water, energy, raw materials and hazardous chemical particles) consumed and of pollution and other effects of the company on the environment (Glautier and Underdown, 1994). However, this paper, in keeping with prior research considered, is restricted to annual reports disclosures.

Scoring the Disclosure Items

Planning to have an analysis of companies' financial statements, this study checked how far the environmental accounting and reporting practices taken place and disclosed publicly. The trait of interest is the level and extent of voluntary disclosure. This disclosure is treated as a dichotomous variable— whether an item is disclosed or not disclosed. In this context the disclosure score for a company is additive: $D = \sum_{i=1}^{n} a_{i}$ Where,

a = 1 if the item is disclosed; 0 if the item is not disclosed. That is indexing of the disclosure is based on the presence or absence of the degree of specificity of each of the information items.

³Statistics counted till December 2008, office of the registrar of the joint stock companies and firms.

⁴Lind, et. al., 2005 formulates: The sample size for estimating the population mean(annual turnover10 million dollar), $n = (ZS/E)^2$ Where: n is the size of the sample

Z is the normal value corresponding to the desired level of confidence

S is an estimate of the population standard deviation

E is the maximum allowable error

The method assigned a score of three to an item if it is present in the disclosure and is described in monetary or quantitative terms. A score of two is assigned to an item if it is present in the disclosure with company specific information, but in non-quantitative terms. A score of one is assigned to items mentioned only in general terms. A score of zero is assigned if the item is not present in the disclosure. The scores of individual items in each category are added for three category (table 2) scores (EF, PA and GI), which in turn are added to yield the total score for each firm. The index of disclosure is the measure by which the level of non-financial reporting of one company is compared with another. It refers to the relative level of disclosure by a company and the ratio of actual scores awarded to a company for the contents of its CFR and the scores, which that company is expected to earn. However, it may be argued that adding scores across all possible kinds of disclosure items may obscure different degrees of importance.

Table-2: A list of the 16 items category⁵ measured environmental factors

Economic Factors (EF)

- 1. Past and current expenditures for pollution control equipments
- 2. Past and current operating costs for pollution control equipments and facilities.
- 3. Future estimates of expenditures for pollution control equipments and facilities.
- 4. Future estimates of operating expense for pollution control equipments and facilities.
- 5. Financing for pollution control equipments or facilities

Pollution abatement (PA)

- 6. air emission information
- 7. water discharge information
- 8. solid waste disposal information
- 9. control, reinstallation, facilities or processes described
- 10. compliance of facilities

Other general information

- 11. discussion of regulations and requirements
- 12. environmental policies or company concern for the environment
- 13. conservation of natural resources
- 14. awards for environmental protections
- 15. recycling
- 16. departments or offices for pollution control

In addition, as an alternative measure of the degree of sufficiency of disclosure, an ordinal scale is developed. Based on the quantification, specification and the amount of disclosure, a score between zero and three is assigned to an individual firm as an overall measure for the evaluation of disclosure (table 3).

⁵Wiseman (1982) first used 18 items and in later Choi (1999) used 16 items in another study conducted on Korean companies.

Table-3: Specific definitions of the content categories used for indexing

Table 5. Specific definitions of the content categories used for indexing				
Typical item	Rank	Disclosure pattern		
Monetary	3	a disclosure expressing information concerning a firm's environmental activities expressed in monetary terms		
Quantitative	2	a disclosure expressing information concerning a firm's environmental activities expressed in quantitative terms		
Qualitative	1	a disclosure expressing information concerning a firm's environmental activities expressed in qualitative terms		
Declarative	0	a disclosure of opinion or unsupported declaration concerning a firm's environmental activities		

Scoring questionnaire survey outcomes

Using stratified random design⁶, a sample of one hundred staff/managers (preferably environment management) from the proposed selected companies, fifty from public accountants and twenty from regulatory authority of civil administration of the GOB are counted. In addition, UNDP, DSE, SEC officials (see *table 4*) have been considered for perception judgments.

Table-4: Respondents Sample distribution

Respondents	Total
CEO/Staff/ managers /accounts administrator	50
Chartered Accountants Professionals (Public Accountants)	25
NGO/UNDP/World Bank	05
Dhaka Stock Exchange/ Chittagong Stock Exchange (DSE/CSE)	05
Bangladesh Chambers of Commerce and Industries (BCCI)	15
Total numbers	100

The model of environmental reporting adopted for the development of the standardized environmental report used in this study came from the framework that has emerged from long-standing European practice (Kreander, N. 2000) (See table 5).

Table –5: Environmental reporting framework A European practice

- Organization profile
- Board level commitment
- Policy statement
- Target and achievements
- Performance and compliance
- Site level data
- Independent verifications

⁶By using stratified sampling the population is divided into relatively homogeneous groups, called strata. Here stratified sampling is considered appropriate because the population is already divided into groups of sizes such as accounting professionals, company staff/managers, and law regulatory authorities of the department of environment.

The required data are non–countable (perceptual) in nature. The questionnaire⁷ containing several segments queries have been mailed and served for response (see table 5). Participants are asked to indicate the level of use by choosing one of five possible responses. Likert scale has been used for measuring the perceptions differences among the users. Using weighted average method, ΣXi Pi.... where Xi denotes ranking orders and Pi proportionate response belonging to respective ranking order, the mean perception value will be determined.

Result Analyses

General Observations on Legal /Voluntary Requirements

Environmental accounting information disclosure is still voluntary for companies in Bangladesh. This country has promulgated various laws/ rules because of protecting environment and combating pollution and measuring safety for health. Nevertheless, in fact none of the laws requires disclosure environmental issues as part of annual report of the companies. Section 16 (1) of Environmental Conversation Act 1995 provides that-

"where a company violates any provision of this Act or fails to perform its duties in accordance with a notice issued under this Act or the rules or fails to comply with an order or direction, then the owner, director, manager, secretary or any other officer or agent of the company, shall be deemed to have violated such provision or have failed to perform the duties in accordance with the notice or failed to comply with the order or direction --"

Neither the Companies Act 1994, nor the SER 1987 keeps any provision for environmental issues. However, these Act/rules require that total amount spent on energy usage be disclosed as a separate note to the financial statement. This is only mandatory requirement for disclosing expenditures on energy uses. It is now demand of time to go for reshuffling the laws and making them compatible for change of people and environment. Country's taxation rules made provisions for taxing bonded, hazardous and threat to health and safety products and productions but hardly made any such provision for environmental accounting. Albeit IAS/BAS is not new in Bangladesh, companies find these standards as matter of formalities, and thus have little effects on environmental accounting and reporting. IFRS is in designing stage and companies in Bangladesh with a few exceptions know the standards.

Reporting Disclosure Observations:

Table-6 presents the expressive results of the various measures defined in the methodology apart from describing typical industries⁸. The columns labeled 'Mean' show individual category scores (EF, PA, and GI), the total environmental disclosure index scores (SCORE). The column labeled RANK shows the frequency of reporting occurred. A number of clarifications are in call for deliberation from Table 6. *First*, there appears a logical rapport between the type of industry and companies environmental disclosure: the values of various measures of environmental disclosure are concurrently higher in chemicals (paper-pulp, pharmaceuticals), tannery, fuel & power. This is consistent with common belief that some industries considerably feel greater pressured from government

⁷To ensure validity and reliability of the questions, the instrument is pre-tested by using a small group of accounting faculty at IBAIS University, Dhaka. As the result of this pre-testing, several questions will be added or modified prior to mass mailing.

⁸The industry classification used for this study is based on the DSE industry classifications.

to provide information in certain areas of social responsibility and thus are more likely to disclose in those areas to avoid awareness and examination. Similarly, industries whose businesses have direct bearings upon environment such as textiles, paper-pulp etc. considered more likely to disclose environmentally relevant information.

Table -6: Environmental Disclosure Index Scores by Industry Type

Industry	Proportion	EF	PA	GI	Scores	Rank			
	of disclosure	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	3	2	1	0
Engineering	2/8	0.0	0.0	2.0	2.0	1	0	1	1
		(n. a)	(n. a)	(n. a)	(n. a)				
Food & allied	3/15	2.0	0.0	0.0	2.0	1	3	0	1
		(n. a)	(n. a)	(n. a)	(n. a)				
Fuel &Power	2/4	1.0	2.0	0.0	3.0	1	0	1	2
		(n. a)	(.54)	(n. a)	(1.5)				
Jute	0/3	0.0	0.0	0.0	0.0	0	0	0	0
		(n. a)	(n. a)	(n. a)	(n. a)				
Pharmaceuticals	3/13	1.0	0.0	2.0	3.0	0	0	1	2
		(n. a)	(n. a)	(n. a)	(1.3)				
Paper & Pulp	2/3	1.0	3.0	1.0	5.0	1	0	1	0
		(n. a)	(1. 6)	(n. a)	(n. a)				
Real estate	0/2	0.0	0.0	0.0	0.0	0	0	0	0
		(n. a)	(n. a)	(n. a)	(n. a)				
Textile	3/15	2.0	1.0	1.0	4.0	1	0	1	1
		(n. a)	(n. a)	(n. a)	(n. a)				
Tannery/shoe	1/5	3.0	0.0	1.0	4.0	0	2	1	3
		(n. a)	(n. a)	(n. a)	(n. a)				
Cement	2/6	0.0	2.0	0.0	2.0	1	1	1	0
/ceramics/glass		(n. a)	(n. a)	(n. a)	(n. a)				
Total	19/74	0.75	1.25	1.5	3.5	6	6	8	10
		(n. a)	(0.5)	(1.0)	(0.95)				

Second, there is a distinct lack of specificity in disclosed information. This is reflected not only in the low frequency found in excellent (LEVEL=3) and good (LEVEL=2) categories but also in the extremely low mean scores observed across the board. Since the highest score assigned to each of the 16 items used for indexing is three, the maximum possible scores for the index categories of EF, PA, and GI are 15, 15, and 18 respectively, and the maximum possible total score is 48 for SCORE. The mean values of SCORE hardly exceed 5, with the highest score of 5 found in paper & pulp industry.

This observation found the shortest disclosure in cement/ceramic and engineering, food/allied industries; where the total index scores are also relatively lower (average 2). Noticeably, the Jute and Real estate industries have reportedly disclosed nothing for environment factor. This pattern of the index score of disclosure is consistent for firms in other industries as well.

General Observations on Perceptions survey

Of the respondents, 15 (23%) either currently issue a separate environmental report, or plan to issue one in the next few years. The survey results show that report issuers believe local communities, authorities and other regulators perceived to have Environmental reports of most use. Yet, questioning chamber authorities and NGOs, independent verification considered as equally important as the specification of targets and achievements. Perceivably, these groups largely admitted that environmental reports create an image gaining public credibility. They think pre-empt tougher environmental regulations may gain efficiency and competitive advantage. A very few of them observed such reports as evidence of genuine commitment to care for the environment. Given these findings, some companies may desirably reconsider their positions on independent verification. Table 7 summarizes the scores means and standard deviation given on a Likert⁹ scale for usefulness to various stakeholder groups.

Mean SD Managers/staff 3.59 1.01 Chartered accountants 3.92 1.02 NGO/world bank 4.64 0.50 Chambers of commerce and industries 4.21 1.06 General public 1.14 3.50 Dhaka Stock Exchange 3.13 0.92

Table -7: Usefulness of report to stakeholders

The investigated results showed that environmental policies, corporate profile, and site level data would be of most interest to the stakeholders. They seemingly admitted that targets and achievements would be considerably more important.

Table-8: Importance of	Report Sections to Stakeholder	s – Respondents
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	Mean	SD
Corporate Profile	3.87	0.97
CEO Statement	4.04	0.81
Policy Statement	4.17	0.82
Targets & Achievements	4.54	0.59
Prosecutions & Complaints	4.29	0.86
Physical Data	4.08	0.88
Financial Data	3.65	1.07
Management Systems	3.58	1.10
Verification Statement	3.83	0.96
Site Level Reporting	3.88	0.90

⁹The scale measures score five, four, three, two and one for seemingly most useful, generous useful, useful some times, useful not necessarily and not useful at all.

Concluding remarks

Environmental accounting and reporting in Bangladesh appears to be developing often as part of a combined report along with health and safety matters. Separate environmental and non-financial reports appear to be the emerging trend in Bangladesh, albeit a few observations to date ably could produce separate sections for this purpose. Accounting for ecology and reporting are emerging as 'buzz' words and disclosing company authorities are little aware of or careless about the changing environments worldwide.

- Comparison to the world leading corporate groups (detail of disclosure level, completeness, and the extent to which fully integrate environmental, and financial reporting performance) Bangladeshi corporate groups observed very dull.
- For DSE listed companies, with a few exception, the level of detail and completeness found in the reports, especially regarding environmental performance targets and achievements and the scale of resources used from or substances applied to the environment, does not match the Japanese group, Korean (Hyundai group) and not even Indian (TATA) practice. Leading practice should now up-and-coming to include stakeholders in setting and determining the targets.
- Global parent reports of Bangladesh-based subsidiaries provide insufficient reference
 to the Bangladesh subsidiaries' performance. In most cases, they seldom include sitelevel, and hence subsidiary reporting failed to disclose an essential addition of
 environmental report that considerably desirable to the local community of
 Bangladesh.
- For companies in the mining, fuel and power sector, the level of detail and completeness is quite dreary; with most reports include nothing about targets, achievements, and verification statements.
- Other industry sectors like pharmaceuticals and chemicals, food and allied, and textile however, environmental reports are existent as meager amount of information in policy statement and additional notes format.

In an endpoint, this study concludes that environmental accounting information should be in clear and specific items format as part of financial reporting made by the companies. The enactment of this specification should first come to effect in the company regulatory laws in Bangladesh. An integration of the environmental regulatory authority to the companies' regulatory authorities may possibly be a progressive step to yield expected results. The chamber bodies, donor agencies, civil society, and other social pressure groups are necessarily key role players in this regard.

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Further study

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