



# Areas of Corporate Environmental Accounting and its Practice in Manufacturing Industries: A Study on Some Selected Manufacturing Industries in Bangladesh

- Mohammed Ali Arshad Chowdhury
- Khaza Md. Ochi Uddin

**Abstract:** *Environmental accounting is a new dimension in financial and management accounting. As an inseparable part of society, business firms are also involved in protecting the environment in many ways. The accumulation of such environment protection activities in physical and monetary forms is known as corporate environmental accounting. As an emerging economy, Bangladesh is trying to control the industrial pollution by enacting new laws and regulations. In addition, firms are forced to take these measures by the main stakeholders such as foreign buyers. This paper investigates the existence of environmental accounting at the micro level. The authors follow case study and observation method to find out the real picture of the firms' environmental accounting systems. Five top-polluted industries, tannery, paper, fertilizer, textile and paint are examined. Results show that no sample company maintains environmental accounting systems separately. However, all the companies deal with pollution preventive activities and therein lies a degree of environmental accounting. The study proposes a framework of environmental accounting to consider their environmental performance.*

**Keywords:** Environmental accounting, corporate environmental accounting, Emerging economy, Bangladesh.

## Introduction

An increasing recognition of the impact of humans on the environment has led to a radical examination of traditional economic, ethical and accounting assumptions. In the 1990s, the concern turned more specifically to environmental issues - climate change, global warming, environmental degradation, change in the ozone layer, bio-diversity etc. (Jones, 2010). These issues show the necessity of environmental accounting at a macro and micro level. Adoption of environmental accounting (accounting for environmental factors) can help save the planet from environmental risk. Industry as a part of society cannot avoid the responsibility for environmental hazards. Accordingly, developed countries have put an emphasis on the reduction of environmental hazards while developing countries are still in a primary stage. Evidence found by Jahamani (2003) demonstrated that developed countries such as the USA and the UK have achieved significant improvements in both theory and practice regarding environmental protection. Moreover, Hossain, Islam and Andrew, (2006)

highlight that the majority of research on environmental performance and reporting of corporations is concentrated on developed countries (e.g. Europe, South Africa and USA) and very few studies focus on developing countries like Indonesia, India, Bangladesh ( N.B. Bangladesh is now counted as a developing state as per several economic indicators plus she is a member state of Developing-8). But the issue has become universally important as the global economy has grown rapidly. Although the economic growth of Bangladesh has not been as rapid as some, a large number of industries have been established in a short time and there is demand for cleaner production (Hossain *et al* 2006). In addition, the Government of Bangladesh (GOB) seemed to be committed to save environment by enacting Environment Act, 1995 and Clearance Certificate for newly established industry (Belal, 2001). Salman (2009) mentioned that the production of specific products necessitates technology or chemicals that have a damaging effect on the environment and identified the Tannery industry as a good example in this regard. In fact, the Department of Environment (DOE), Bangladesh identified industrial pollution as one of the most dangerous and serious environmental hazards for Bangladesh as a study conducted by DOE in 1986 detected a list of 903 polluting industries, which was later increased to 1317 (Belal, 2001). A recent study revealed that managers and companies feel the need to deal with the sustainability accounting processes and the resulting sustainability reporting because of diverse pressures (Burritt and Schattegger; 2010). In addition, the Ministry of Finance (2010), Internal Resources Division, GOB has recently issued a SRO, 270, dated 1st July 2010 in respect of the CSR (including Economic, Environment, Social development) and granting incentives for corporations through tax waivers on the amount spent for specified fields (Wahab,2011). Hossain, Mazumder and Alam, (2010) conducted a survey on how CMA and CA worked in different sectors in Bangladesh and identified 'Environment' as the/a top Corporate Social Responsibility area for companies. This paper investigates the accounting practice of manufacturing firms in respect to environmental performance in Bangladesh.

## Objectives

The main objective of this study is to understand the nature of the practice of environmental accounting in manufacturing firms of an emerging economy. The other objectives of the study are:

- a. To identify the areas of corporate environmental accounting
- b. To show the area-wise accounting scope and practice
- c. To suggest a framework of environmental accounting

## Rationale of the study

Businesses cannot operate in a vacuum. They require resources to manufacture products or render services; they operate in an environment in which they draw their resources and workforces and that environment and community may be affected by their activities. Corporate environmental accounting is one of the tools that can be used by businesses to address these challenges. The traditional accounting system puts no emphasis on the environmental cost of an organization's operation. An assessment of the relative importance of environment related costs and cost drivers of different processes and product lines can help an organization to determine whether or not the cost allocation bases being used are

appropriate for those costs (Sulaiman & Ahmad, 2006). Thus, integrating environmental accounting into mainstream corporate accounting is essential. Though it's a common phenomenon for first world countries to include environmental cost into traditional accounting and reporting, Bangladeshi companies still far behind in the adoption of environmental accounting. On the other hand, the Bangladesh Government enacted the "Bangladesh Environmental Protection Act, 1995" and ETP establishment for waste water management is a mandatory legal requirement. Apart from this, under schedule XI, part II of the Companies Act, 1994 and part II of Securities and Exchange Rules 1987, it is mandatory to maintain separate records of the amount spent on the use of energy. However, a recent study has shown that the 'Environment' has been identified as the top CSR area for Bangladeshi corporations (Hossain *et al* ; 2010). At the same time organisations are facing pressures from different stakeholders to protect the environment (Medley, 1997). Finally, the Department of the Environment, Bangladesh requires companies to prevent pollution and adopt environmental regulations by regular monitoring their activities. A recent survey conducted on 132 heavy weight industries in Chittagong, found 35 industries classified as 'red' listed\* and 107 as 'orange'\*\* (The Protom Alo, 26, May, 2011). Geographically, Bangladesh is one of the most vulnerable countries to impact of climate change. Therefore, the author examines the current status of the adoption of corporate environmental accounting by companies.

## Methodology

This is an exploratory type research. In this research, primary data is collected through case study and observation. A semi-structured questionnaire was prepared in order to assess the current practice and perceptions of managers or owners. A mainly observational method is followed to conclude the research. In Bangladesh, the corporate culture is very conservative and companies are reluctant to disclose any negative information because of the fear of legal action. The authors visited the sample companies several times from February 2013 to May 2013. The authors talked to different levels of workers/employees to assess the real situation. In addition, the authors examined the equipment used for pollution control or prevention in these companies to assess their effectiveness.

Sample selection has been done purposively. The experts of the World Bank (Nishat, 2001, p.113) have identified the top-ten most environment polluting industries of Bangladesh through the Industrial Pollution Projection approach. These are: tannery industry (21%), pulp & paper industry (15%), pharmaceutical industry (13%), fertilizer industry (12%), industrial chemicals (9%), textile industry (6%), food industry (6%), metal industry (5%), cement industry (4%), petroleum industry (3%), and others (6%). According to this, five sample companies were selected. These are from the following industries: tannery, paper, fertilizer, chemicals (paints) & textile (Appendix-1).

The data have been analyzed and presented in a tabular form in order to understand the nature of accounting practices and to identify the areas where environmental accounting is used and a body of literature was also reviewed.

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\* Red listed means most polluted industries.

\*\* Orange means less polluted industries.

## Literature review

Greening of industries is the most contemporary issue of the world. Many researchers have undertaken this particular issue in their own research subjects. But most of the studies have been conducted on the basis of developed countries while a few researches have been taken place on developing countries. Some of the remarkable Environmental accounting research contributions have been presented below in brief.

Ullmann (1976) proposed a concept of Corporate Environmental Accounting System (CEAS) based on input-output analysis of a corporation. It measures annual environmental effects connected with regular business operations such as materials & energy consumption, the generation of solid waste, air emissions, and water and soil pollution. Accordingly, Environmental Accounting has got an importance in business arena due to its ever increasing impacts on 'doing business'. Wally and Whitehead (1994) emphasize on the possibility of increasing a company's efficiency and profitability by adopting various measures relating to environmental improvement of firms. It has been argued that although it is not easy to be green, but a business can achieve competitive advantages in different ways by practicing environment-friendly business policies. Gallarotti (1995) provides an analysis of managerial incentive structure and environmentally sound strategy. In this study, the author discusses several incentives under six categories for environmental improvement of an organization. The study argues that there are also many opportunities for managers to earn profit from environmentally sound strategies that are free from public pressure. On the other hand, Birkin and Woodward (1997) proposed an eco-balance account which can be used for the purpose of internal management and control and also for external reporting. The authors also pointed out that an eco-balance can be constructed from the existing source documents within the corporation such as materials receipts, invoices, waybills, stock records and sales dispatches. Again, environmental issues were considered as an important tool for business decisions by Deegan and Rankin (1997). The results showed that 67% out of 114 Australian respondents from different stakeholders believed that environmental issues regarding decisions are important. In addition, 72.4% of shareholders (8) and 83% of a group of reviewers (12) were also affirmative about the matter. The authors concluded this paper by highlighting the development of environmental accounting and disclosure standards. Thus environmental issues are not only important but also influential for ensuring quality performance of businesses. Dunk (2002) suggested that a firms' prime interest is to enhance product quality in order to gain a competitive advantage. An investigation into Australian manufacturing companies revealed that the extent to which product quality is stressed and the implementation of environmental accounting positively influences quality performance. Moreover, Environmental Accounting contributes in process innovation of businesses. Ferreira, Moulang and Hendro (2010) stated that the use of Environmental Management Accounting (EMA) helps organizations to recognize the environmental effect of their operational activities. EMA use does not affect product innovation rather it has an effect on process innovation. More specifically the authors identified that Research & Development effort is positively associated with process innovation.

A few research studies have been conducted considering developing and underdeveloped countries' perspective. Setthasakko (2010) stated that manufacturing industry has negative impacts on natural resources and the environment that include extending the greenhouse

effect, human toxicity, ecological toxicity, acidification, waste water, solid wastes, energy and water usage, non-renewable fuels for electricity production, impact on human health and quality of life. In addition he identified some additional barriers to environmental accounting in developing countries like Thailand such as lack of building organizational learning (insufficient knowledge and skill), narrow focus on economic performance, absence of guidance on environmental management accounting etc. On the contrary, most of the study based on Bangladeshi corporations focused only on external reporting. Bose (2006) analyzed 11 Petrobagla companies for examining their environmental status. The nature of information was qualitative and descriptive, and they did not provide quantitative information on waste generation, conservation of energy etc. Rahman and Muttakin (2005) showed only 4% of 125 companies disclosed environmental information in a descriptive way scattered in their annual reports. They also mentioned that there was not any standard framework for environmental reporting and evaluation. In the same way Shil & Iqbal (2005), Bala & Yusuf (2003, p.36), Hossain (2002), Belal (2001), Imam (1999) stated that Bangladeshi corporations were very little concerned with environmental costs quantification and information disclosure.

From the above literatures, it is observed that most of the study based on Bangladeshi corporations focused only external reporting. No research has been undertaken to explore the practice of Environmental Accounting in Bangladeshi companies. The research gap motivates the researchers to undertake this study.

## Findings

**1. Areas of Industrial green management:** A rigorous literature has been reviewed to know the areas of industrial green management. Table-1 pointed out 16 different areas of green management of any industry. Similarly, these are the potential investment areas for organizations.

**Table-1:** Areas of green management of industry

Name of the areas	Reference
1. Raw materials management (including packaging material)/Control of raw material cost	Khanna (2001) Mukesh (2005)
1.1 Basic materials	
1.2 Auxiliary materials	
1.3 Operating materials	
1.4 Packaging materials	
1.5 Merchandise	
2. Energy (Electrical & thermal)/Depletion of non-renewable natural resources	Khanna (2001) Mukesh (2005) Choi & Meek (2009)
3. Water usage / Pure water management	Khanna (2001) Wahab (2011)
4. Waste management/ Cleaning up of pollution/Disposing of hazardous materials/Waste & Recycling measures/Chemical substances measures	Khanna (2001) Mukesh (2005) MOJ (2005) Wahab (2011)

Name of the areas	Reference
5. Environmental services	Khanna (2001)
6. Social costs	Khanna (2001)
7. Environmental asset management	Mukesh (2005)
8. Environment friendly operation process/Eco-efficient technology & production systems	Mukesh (2005) Negash (2012)
9. Potential liability/Less tangible costs	Mukesh (2005). Jasch (2006)
10. Pollution	Mukesh (2005) Negash (2012)
10.1 Land pollution/Soil erosion	MOJ (2005)
10.2 Water pollution	MOJ (2005)
10.3 Air pollution/Global warming measures/Ozone layer protection measures/Air quality measures/Greenhouse effect/Carbon emissions/sea water level	Choi & Meek (2009) Wahab (2011)
10.4 Noise pollution & Vibration measures/Voice pollution	
10.5 Coastal & Marine pollution	
11. Loss of bio-diversity/ Natural environment conservation measures	Mukesh (2005) Negash (2012), MOJ (2005)
12. Deforestation & Land usage	Mukesh (2005)
13. Environment related Research & development	Jasch (2006)
14. Incidents & Accidents	Choi & Meek (2009)
15. Ecological balance	Wahab (2011)
16. Forestry/City beautification	Wahab (2011) Negash (2012)

Source: Literature

Mukesh (2005) pointed out that industrial greening has two parts, internal and external. Internal parts include investment in environment saving equipment or devices, cleaning up of pollution, disposing of hazardous materials, environment friendly operation process, control over increases in costs for raw materials, waste management, and potential liability while external parts include degradation and destruction like soil erosion, loss of bio-diversity, air pollution, water pollution, voice pollution, problems of solid waste, coastal and marine pollution, depletion of non-renewable natural resources, deforestation and land uses etc.

Accordingly, authors of this paper emphasize the internal part of green management and left the external part because it is done from retained profit as social responsibility.

**2. Practice of corporate environmental accounting:** According to above identified areas of environmental accounting, the practices of sample companies are discussed below.



**Table 2:** Industry-wise material management

Name of the industry	Name of material used	Existing compliance	Scope of accounting	Remarks
Textile	a. Yarn (count) b. Starch (kg) c. Zinc Chloride d. PVA	a. Have physical and monetary data of purchase, production and stock of each material. b. Information is not utilized for waste and emissions control.	a. Keep classified records of basic, auxiliary and operating materials. b. Maintain red, blue, green category of materials.	a. Administrative difficulties and legal enactment are the main reasons of ignoring environmental issues. b. Existing resources have the ability to cope with the new situation.
Fertilizer	a. Gas (NM3) b. water (M ton) c. Catalysts d. Solution	a. Have available information. b. main element gas supply is controlled by govt.	a. Catalysts and solutions are dangerous for environment. b. Investment in green technology	a. Lack in resources (manpower) b. Technological factor is responsible for pollution.
Paper	a. Pulp (M ton) b. waste paper c. Filler materials d. Sizing chemicals	a. Data on individual materials are not available. b. Green technology is used. c. Environmental issues are not considered.	a. Categorized materials record can estimate wastes and emissions. b. Training and operation of sustainable system can be adopted.	a. Used imported pulp and waste papers which saves environment. b. Calculate and disclose the saved trees required for produced papers.
Tannery	a. Skins of animals b. Syntax powder c. Fat liquid d. Dye powder e. Resin f. solvent	a. Not sufficient information on different materials. b. Use materials to reduce pollution.	a. Classified materials management can help pollution control. b. Investment in R & D to remove air pollution.	a. Lack in efficient manpower and cost over benefits are main difficulties for environmental awareness.
Paint	a. Calcium carbonet b. Tetenium di-oxide c. Kerosine d. Pigments e. Disperser f. Lubricant oil	a. Have available information on individual element. b. Produce lead free paints.	a. Classified materials as green, blue & red. b. Quantity & costs of using materials to produce lead free paints.	a. As MNC, its employees are qualified and sincere to cope with environment related activities.



- Basic materials are completely attached with finished products and waste can occur due to normal loss, expiry of materials, defective outputs etc.
- Auxiliary materials are partially involved with finished products; thus the unused portion creates wastages or emissions.
- Operating materials are not a part of finished products; therefore the full used materials are converted to wastages or emissions.
- Red category: Dangerous for environment and which is not recyclable.
- Blue category: recyclable.
- Red category: the elements which are not harmful for environment.

**Table 3:** Industry-wise energy management

Name of the industry	Sources of used energy	Existing compliance and future policy	Scope of accounting	Remarks
Textile	a. Gas b. Electricity internally produced c. Electricity from outside	a. Have available information. b. Started to use solar energy.	a. Keep source-wise physical and monetary information of energy. b. Comparative cost of electricity produced and from other sources. c. Capital and operating costs of solar energy for required power.	a. Weakness in monitoring system of govt. wing in establishing sustainable energy. b. High costs and corruption in PDB.
Fertilizer	a. Gas b. Fuel oil c. Heat d. Electricity internally produced	a. Data available of energy used. b. No targets for future utilization of energy.	a. Costs per unit electricity internally produced. b. Gas and water required for internal electricity production.	a. Gas supply depends on govt. decision. Maximum utilization electricity production is not possible.
Paper	a. Gas b. Ferns oil c. Water d. Electricity from outside	a. Available information due to legal act. b. No policy to use of sustainable energy.	a. Electricity from outside is not continuous and flawless. System loss can be calculated and its impact on cost of production.	a. Irregularity of power supply can cause much time consuming. Normally 700 kw is required per ton while it needs 950 kw in irregularity.





Name of the industry	Sources of used energy	Existing compliance and future policy	Scope of accounting	Remarks
Tannery	a. Gas b. Electricity from outside c. Generator	a. Monetary information is available but not quantitative information. b. No policy for energy efficiency.	a. Usage of energy and time of requirement of power. b. Maintain SS system for low rate from outside.	a. Govt. forces to shift the industry to a special zone at Savar, Dhaka by 2016.
Paint	a. Gas b. Diesel c. Electricity from outside	a. Monetary information is available. b. No policy for renewable energy.	a. Quantity of source-wise energy and set future target to minimize the use of energy.	a. Irregularity in power supply hampers production. b. Ability to use renewable energy.

**Table 4:** Industry-wise water management

Name of industry	Sources	Existing compliance and future policy	Accounting scope	Remarks
Textile	a. Ground water	a. No information of total usage in production, electricity production and other purposes. (approximately 800 MT per day)	a. Water usage in separate areas can reduce the misuse of water. b. Comparative study of cost of collection between surface and ground water.	a. Not conscious about water limitation. b. Technological cost for collection of surface water is not feasible.
Fertilizer	a. Surface water (Karnafully River)	a. Information is available. b. No plan for reusing polluted water.	a. Cost of refining water and its impact on production can be determined.	b. Water is a core element of production but due to gas shortage, production may interrupt. c. But for internal electricity production, water is required. Maximum utilization of water is not possible.
Paper	Surface water	Water is only used for production. Normally it takes 10-25 ton per ton of paper.	This is approximate information. Actual usage can lead to water efficiency.	Collect certificate from DoE for maintaining COD and BOD level of water.

Name of industry	Sources	Existing compliance and future policy	Accounting scope	Remarks
Tannery	Ground water	Mainly used for production. (Minimum 1.5 lac liters per day) No policy for water utilization.	Actual usage and required water can reduce the misuse of water and decrease the waste water.	No such system is available for calculating used water and discharged water.
Paint	Ground water	No records of water utilization in production and other than production. No policy for using surface water.	Cost of ground water consumption. Quantity in production and total used.	Absence of technology in quantity recording of water consumption. Administrations are not concern about water consumption.

**Table 5:** Industry-Wise waste management

Name of industry	Types of waste	Existing compliance	Accounting scope	Remarks
Textile	a. Waste water b. Recycled c. Solid waste	a. Have information of different types of wastes. b. Cost of waste management is not available.	a. Cost of waste water control b. Cost and quantity of solid and recycled waste.	a. Waste water not reused. b. Sale value of solid waste is insignificant.
Fertilizer	a. Municipal waste b. Recycled waste c. Waste water	a. Available information of hazardous and non-hazardous waste. b. Monetary value of waste management is not available.	a. Separate cost and quantity records can minimize the cost of production by increasing efficiency.	a. No separate waste management department is available.
Paper	a. Recycled	a. Automatic machine is used to recycle waste. b. Machine efficiency determines the quantity of wastages.	a. Measuring efficiency of machine and cost thereof can explore a reduction policy.	a. Unsold defective papers may produce huge wastage and it is dangerous as flammable.
Tannery	a. Recycled b. Water	a. Cost of recycled is calculated and sale value is significant. b. Waste water is not completely purified but used lagoon for pollution reduction.	a. Cost of required land for water pollution control. b. Cost of chemicals used to reduce pollution.	a. ETP is costly comparing to total investment.

Name of industry	Types of waste	Existing compliance	Accounting scope	Remarks
Paint	a. Municipal b. water	a. Available information of monetary value of wastes and sale proceeds. b. Have ETP to control water pollution.	a. Quantity of municipal wastes and waste water. b. Costs of management of wastages.	a. Very systematic workforces and work environment.

**Table 6:** Industry-wise pollution control methods and accounting system

Name of industry	Pollution control methods	Environmental issues addressed	Accounting system applied	Remarks
Textile	a. Chemical waste water treatment plant b. Solid waste disposal method	a. environmental requirements imposed by buyers and suppliers b. Pollution c. prevention plan	a. No specific system is followed.	a. Available environmental issues and functions are adopted. Separate accounts can easily be produced.
Fertilizer	a. Physical waste water treatment b. Air pollution control c. Solid waste disposal	a. Training program b. Set environmental targets for each year	a. All costs are treated as overhead costs.	a. Pollution control costs and other environment related costs can be kept separately.
Paper	a. Physical waste treatment b. Biological treatment	a. Investment in R & D for clean technologies.	a. No separate accounting method is applied.	a. Capital investment and operating costs can be separately maintained.
Tannery	a. No direct pollution control method is applied. b. Use chemicals for reducing pollution.	a. Compliance of environmental regulations by taking certificates from DoE.	a. Such costs are added with total costs.	a. Regulatory compliance costs and materials costs used for environmental purpose should be separated from other costs.

Name of industry	Pollution control methods	Environmental issues addressed	Accounting system applied	Remarks
Paint	a. Sedimentation b. Filtration c. Flotation d. Aerobic organisms e. Coagulation-flocculation f. Mechanical means g. Cloth filter h. Incineration	a. Special training on environmental management b. Newsletter for environmental information c. Sponsor of environmental debate in Ctg. University.	a. No specific accounting system is followed.	a. They are very much aware of environmental activities.

**3. Framework of environmental accounting:** From the above discussion, it is clear that Bangladeshi manufacturing companies are quite reluctant to maintain books of accounts and to their disclosure. However, they have to perform many environmental activities because of legal requirements and stakeholders' pressure. However companies often cannot provide all sorts of environmental information because of the absence of an appropriate accounting method. To overcome the drawback of environmental accounting, a framework has been proposed.

### Framework of corporate environmental accounting

- a. Identify the useful areas of environmental accounting with respect to nature of industry.
  - Classify the areas into following groups:
    - i. Resource management for efficiency or minimizing wastages and emissions.  
For example, material management, water or energy management.
    - ii. Pollution control activities.
    - iii. Administrative activities for environmental compliances.
    - iv. Environment saving performances social responsibility.
  - b. Maintain books of accounts in the above four areas.
    - i. Table 2 requires both physical and monetary information. Physical information is mandatory.
    - ii. Table 3 requires physical and monetary information. But monetary information is mandatory. Capital investment and operating costs should be recorded.
    - iii. Table 4 requires physical as well as monetary information. Number of compliance certificates from DoE per year, Times to attend DoE, Number of accidents, Number of fines and penalties etc. and their related costs.
    - iv. Table 5 requires physical and monetary information. Frequency of environment saving investment, Number of projects, Years of project continuation etc. and their costs.
  - c. In addition
    - i. Prepare a statement showing physical information of companies regarding environment with previous year/base year figures.
    - ii. Prepare a statement showing environmental costs of companies regarding environment with previous year/base year amounts.

- d. Prepare a performance evaluation statement showing the improvement in each area with base/last year.
- e. Disclose the company performance through annual report.
- f. Measure the productivity and profitability comparing environmental costs.

## Conclusion

Industrial greening is a burning issue all over the world. The developed countries' concentration on this issue has been continuous over the last three decades. But in the last fifteen years, the developing countries have also increased their attention to this issue. Bangladesh started its journey by enacting several laws such as the Environment Protection Act, 1995. Moreover, the cost of energy has to be disclosed in financial statements to comply with the Company Act, 1994. Most of the previous research has been conducted on disclosure issue. It is a matter of concern that defining the areas of environmental accounting and its practices has not received enough attention.

This study shows that important areas of environmental accounting are not recognized by the industry in Bangladesh. In addition, the existing area based environmental accounting performance has not been done perfectly. Some of the issues are addressed because of legal requirements and stakeholders' pressure. But, in many cases the sample companies did not follow any systematic format. There is a lot of scope of environmental accounting for companies in Bangladesh since they incorporate some environmental issues like ETP use, Green technology etc. This paper also suggests that companies should concentrate more on efficient use of limited resources like water, energy etc. as an environmental issue.

To overcome the existing problems, the Bangladesh government needs to enforce law making agencies and companies to establish new guidelines for industrial greening. Monitoring system as well as special packages from government should be developed. In the national budget, a provision should be made for industrial greening.

Another important issue is the training of sufficient people to carry out this task. Universities as well as professional institutions need to offer appropriate educational resources to meet this requirement.

Companies should organize training programs for the development of existing employees as part of their CPD provision. They should allocate sufficient resources to develop cleaner technologies and ongoing research and development.

Further research can be done to explore the economic viability of maintaining environmental accounting for different level of industry.

## Limitations

This paper considers only manufacturing industries located in Chittagong, a commercial city of Bangladesh. The study has considered only manufacturing industries. Moreover, it did not consider the size, ownership pattern of the firms. The observations and opinions of this study have been collected from February, 2013 to May, 2013.

\* Khaza Md. Ochi Uddin, *Faculty of Business Administration BGC Trust University, Bangladesh, E-mail: khazauchi@hotmail.com*

\* Mohammed Ali Arshad Chowdhury, *Department of Accounting & Information Systems, University of Chittagong, Bangladesh, E-mail: arshad@cu.ac.bd*

## References

- Bala, S. K., & Yusuf, M.A. (2003). Corporate environmental reporting in Bangladesh: A study of listed public companies. *Dhaka University Journal of Business Studies*, 24(1), 31-45.
- Bangladesh Gazette Extraordinary. (1995). *Environmental protection Act*. Retrieved from <http://www.commonlii.org>
- Bebbington, J. (1997). A review essay on environmental accounting. *Accounting, Auditing and Accountability Journal*, 10(3), 365-376.
- Belal, A.R. (2001). Environmental reporting in developing countries: Empirical evidence from Bangladesh. *Eco-Management and Auditing*, 7(3), 114-121.
- Birkin, F., & Woodward, D. (1997). Accounting for the sustainable corporation. *Environmental Management & Health*, 8(2), 67-72.
- Bose, S. (2006). Environmental accounting and reporting in fossil fuel sector- A study on Bangladesh oil, gas and mineral corporation (Petrobangla). *The Cost and Management*, 34(2), 53-67.
- Burritt, R. L., & Schaltegger, S. (2001). Eco-efficiency in corporate budgeting. *Environmental Management & Health*, 12(2), 158-174.
- Burritt, R. L., & Schaltegger, S. (2010). Sustainability accounting and reporting: Fad or trend?. *Accounting, Auditing & Accountability Journal*, 23(7), 829-846.
- Cho, C. H., Freedman, M., & Patten, D. M. (2012). Corporate disclosure of environmental capital expenditures: A test of alternative theories. *Accounting, Auditing & Accountability Journal*, 25(3), 486-507.
- Choi, F. D. S., & Meek, G. K. (2009). *International accounting* (5th ed.). Kindersley, India: Dorling.
- Deegan, C., & Rankin, M. (1997). The materiality of environmental information to users of annual reports. *Accounting, Auditing & Accountability Journal*, 10(4), 562-583.
- Dunk, A. S. (2002). Product quality, environmental accounting and quality performance. *Accounting, Auditing & Accountability Journal*, 15(5), 719-732.
- Ferreira, A., Moulang, C., & Hendro, B. (2010). Environmental management accounting and innovation: an exploratory analysis. *Accounting, Auditing & Accountability Journal*, 23(7), 920-948.
- Gallarotti, G. M. (1995). The managerial incentive structure and environmentally sound strategies. *Columbia Journal of World Business*, 30(4), 383-432.
- Hossain, D. M, Mazumder, M. M. M., & Alam, M. S. (2010). Corporate social responsibility practices in Bangladesh: A survey on the perceptions of the people working in the corporate sector. *The Bangladesh Accountant*, July-Dec, 98-101.
- Hossain, M. (2002). Corporate environmental disclosure in developing countries: Evidence from Bangladesh. *Bangladesh Environment*, 1(12), 1077-1089.
- Hossain, M., Islam, K., & Andrew, J. (2006). Corporate social and environmental disclosure in developing countries: Evidence from Bangladesh. Retrieved from <http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1194&context=commpapers>

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- IFAC. (1998). *Environmental Management in organization-The role of Management Accounting*. New York: International Federation of Accountants.
- Imam, S. (1999). Environmental reporting in Bangladesh. *Social and Environmental Accounting, 19*(2), 12-13.
- Jahamani, Y. F. (2003). Green accounting in developing countries: the case of UAE and Jordan. *Managerial Finance, 29*(8), 37-45.
- Jasch, C. (2006). *The IFAC Guidance document on EMA*. Retrieved from [http://www.nachhaltigwirtschaften.at/nw\\_pdf/060427\\_emanc\\_proceedings.pdf](http://www.nachhaltigwirtschaften.at/nw_pdf/060427_emanc_proceedings.pdf)
- Jones, M. J. (2010). Accounting for the environment: Towards a theoretical perspective for environmental accounting and reporting. *Accounting Forum, 34*, 123-138.
- Khanna, P. (2001). *Delineation and dissemination of corporate green accounting procedures: With case studies in medium sized textile, pharmaceutical and chemical industries*. Mumbai, India: IIEM.
- Kokubu, K., & Nashioka, E. (2006). Environmental management accounting practices in Japanese Manufacturing sites. Retrieved from [http://www.nachhaltigwirtschaften.at/nw\\_pdf/060427\\_emanc\\_proceedings.pdf](http://www.nachhaltigwirtschaften.at/nw_pdf/060427_emanc_proceedings.pdf)
- Ministry of finance. (1987). *Securities and exchange rules*. Retrieved from <http://www.secbd.org>
- Ministry of Finance. (1994). *The companies act*. Retrieved from [www.bankbangladesh.com](http://www.bankbangladesh.com).
- MOJ. (2005). *Environmental accounting guidelines*. Japan: Ministry of the Environment.
- Mukesh, C. (2005). Concept of environmental Accounting and Practice in India. *The Chartered Accountant, Nov*, 720-726.
- Negash, M. (2012). IFRS and environmental accounting. *Management Research Review, 35*(7), 577-601.
- Nishat, A. (2001). *Industrial pollution-Bangladesh Environment out-look 2001*. Dhaka, Bangladesh: Centre for Sustainable Development.
- Rahman, M.A., & Muttakin, M. B. (2005). Corporate environmental practices in Bangladesh- A study of some selected companies. *The Cost and Management, 33*(4), 13-21.
- Salman, A. (2009). Bangladesh's economy: Surrounded by deadly threats. *International Journal of Social Economics, 36*(1), 138-181.
- Schaltegger, S. (1997). Information costs, quality of information and stakeholders involvement-The necessity of International standards of Ecological Accounting. *Eco-Management and Auditing, 4*(3), 87-97.
- Setthasakko, W. (2010). Barriers to the development of environmental management accounting: an exploratory study of pulp and paper companies in Thailand. *EuroMed Journal of Business, 5*(3), 315-331.
- Shil, N.C., & Iqbal, M. (2005). Environmental disclosure- A Bangladesh perspective. *The Cost and Management, 33*(4), 85-93.
- Sulaiman, M., & Ahmad, N. (2006). *Environment management accounting: Towards a sustainable future*. Malaysia: International Islamic University.
- Ullmann, A. A. (1976). The corporate environmental accounting system: A management tool for fighting environmental degradation. *Accounting, Organizations and Society, 1*(1), 71-79.





- Wahab, A. (2011). Corporate social responsibility (CSR). *The Bangladesh Accountant*, XI(01), 59-63.
- Wally, N., & Whitehead, B. (1994). It's not easy being green. *Harvard Business Review*, 72(3), 46-52
- Wilshurst, T.D., & Frost, G. R. (2000). Corporate environmental reporting: A test of legitimacy theory. *Accounting, Auditing & Accountability Journal*, 13(1), 10-26.

Appendix-1:

Name of the sample companies

Madina tannery limited

Berger paints Bangladesh limited

Saad Musa Textiles limited

T. K. Paper industries ltd

Chittagong Urea Fertilizer limited.