

Carbon Accounting and Climate Disclosure Practices: Evidence from Carbon-Intensive Industries in Bangladesh

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Keywords:

*carbon accounting,
carbon-intensive
industries, climate
disclosure,
sustainability reporting,
Bangladesh*

ABSTRACT: Bangladeshi textile and ready-made garments (RGM), cement, brick manufacturing, and power generation industries face pressure in adopting carbon accounting and climate disclosure policies effectively. This paper examines comprehensively secondary data from 180 scholarly sources that focus on the current practices, regulatory frameworks, and implementation gaps. Findings indicated by a mean of only 3.02 out of 28 in the climate change disclosure index reveal poor climate disclosure levels. Disclosures in most cases are qualitative rather than quantitative. Minimal adoption is shown by the textile and ready-made garments in international frameworks such as GRI, TCFD, and CDP, which annually contribute only 6,043 Gg CO₂eq. Regulatory gaps, lack of mandatory reporting requirements, and low technological capacity cause hampering in the development toward global standards. This report recommends enhancing carbon accounting infrastructure that aligns disclosure practices in Bangladesh with international sustainability frameworks to assist climate action and long-term economic competitiveness.

1. Introduction

Global climate change is considered one of the most pressing issues of the current century, and GHG emissions caused by industrial activity are regarded as the leading contributors to the planet's temperature rise (Ge et al., 2020). Carbon accounting and climate disclosure are some of the key instruments to measure, report, and manage a company's carbon footprint. Through the use of these practices, environmental performance can be evaluated and improved through proper management decisions and stakeholder pressure towards sustainable development. For countries like Bangladesh, where economic growth depends on highly carbon-intensive industries, carbon accounting is not only an environmental issue but an important economic aspect that is crucial for future development and sustainability of the country.

The economy of Bangladesh is heavily dependent on four major carbon-intensive industries: the textile and ready-made garment (RMG) sector, cement production,

brick production, and power generation. The textile and RMG industry accounts for 85% of all exports and provides employment for more than 4 million people (Biswas et al., 2024). While being crucial for poverty reduction and economic development in Bangladesh, this industry generates enormous amounts of greenhouse gas emissions. Recent studies have shown that in 2022, the textile and RMG industries of Bangladesh released 6,043.5 Gg CO₂eq, where 67.8% belong to textiles and 32.2% to RMGs (Biswas et al., 2024). Scope 1 emissions caused by fuel combustion prevail (85%), and according to the projections made at the present moment, the industry will release 26,000 Gg CO₂eq by 2030 (330% compared to 2022) (Biswas et al., 2024).

Another significant contributor to greenhouse gas emissions is the cement industry. Several studies have shown positive correlations between the size of a company and return on assets and the level of carbon emissions (Hasan, 2025). Board size also correlates positively with emissions, while board gender diversity and the existence of the environmental committee are negatively related to them (Hasan, 2025). In turn, the power generation industry, which consumes fossil fuels, significantly contributes to the carbon footprint of Bangladesh, as well as to the increased emissions of those sectors which depend on grid electricity (S. M. T. Rahman et al., 2024). Finally, the brick manufacturing industry, although being relatively less researched, remains a problem due to its reliance on inefficient technologies and emission of large amounts of particulate matter and greenhouse gases.

Although significant emissions originate from these industries, carbon accounting and climate disclosure in Bangladesh are relatively new and primarily voluntary. The empirical studies show that listed companies in Bangladesh provide poor climate change disclosure as the average Climate Change Disclosure Index (CCDI) score of the sample companies is 3.02 (out of 28) (Masum et al., 2019). Companies belonging to highly polluted industries have significantly low CCDI scores compared to those from the non-polluted industries, with 11% of the sample companies failing to include any climate change-related disclosures in the annual report (Masum et al., 2019). Fuel and power, paper and printing, engineering, tannery, and textiles industries have particularly low CCDI scores indicating poor reporting of their environmental impacts (Masum et al., 2019). In the GHG Accounting category, there is only one disclosure, while apart from the energy consumption data compared with previous years, there were no disclosures for all other items in energy consumption accounting (Masum et al., 2019).

It can be seen that the voluntary climate disclosure practices in Bangladesh contrast sharply with the growing trends towards mandatory reporting and international frameworks for carbon accounting and disclosure. Some of the prominent frameworks for carbon accounting and disclosure are GRI, TCFD, and CDP, which provide a standardized methodology used by countries globally. However, the use of these frameworks in Bangladesh is limited for various reasons, including the lack of mandatory regulations, low technical expertise, poor awareness among company management, weak regulatory enforcement mechanisms, and financial restrictions, particularly affecting small and medium-sized enterprises (SMEs) (Uddin et al., 2025).

The regulatory framework of environmental reporting in Bangladesh includes the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), in which the national priorities for climate adaptation and mitigation are presented in terms of six different themes. The guidelines on environmental disclosure issued by the SEC encourage environmental reporting in the annual reports; however, these guidelines do not mandate it (Begum et al., 2022). Thus, the existence of such a regulatory gap results in minimal repercussions from non-disclosure, leading to poor and irregular reporting practices that hinder accountability and limit the stakeholders' ability to evaluate the environmental performance of firms.

Consequences of inadequate carbon accounting go beyond the environment and are associated with competitiveness and market access. Sustainability is becoming an ever-greater concern for global markets and, as such, Bangladeshi exporters are under growing pressure to show environmental responsibility through climate reporting. The implementation of EU's Carbon Border Adjustment Mechanism (CBAM) and other similar climate policies associated with trade would further burden carbon-intensive exports from countries with weak disclosure system (M. Rahman & Kabir, 2025). Besides, access to green finance and investments is becoming more and more dependent on adequate climate reporting, which, in turn, may hinder capital inflow for those companies that do not meet international requirements.

This paper addresses this important problem by considering the issue of carbon accounting and climate reporting in carbon-intensive industries of Bangladesh. By using a review methodology, it provides a critical analysis of relevant empirical data obtained from 180 sources. This paper evaluates the current state of carbon accounting and climate reporting in Bangladesh; highlights potential barriers in the implementation of carbon accounting; reviews the relevant legislative framework; compares Bangladesh's performance to global standards and best practices.

2. Literature Review

2.1 Carbon Accounting Frameworks and International Standards

Carbon accounting refers to the system of measuring, recording and reporting greenhouse gas (GHG) emissions associated with business operations. The evolution of the practice has taken place since the 1990s, owing to international climate agreements, the expectations of stakeholders and growing climate-related risks. Modern carbon accounting is based on the GHG Protocol Corporate Standard, which distinguishes between Scope 1 (direct GHG emissions from sources owned or controlled by an organization), Scope 2 (indirect GHG emissions from purchased electricity and heat) and Scope 3 (other indirect GHG emissions along the value chain) (Rasheduzzaman et al., 2025).

The Global Reporting Initiative (GRI) is a provider of the sustainability disclosure guidelines, and GRI 305 sets rules for emission disclosure in terms of the quantification of Scope 1, 2 and 3 GHG emissions, following the principle of materiality and inclusive stakeholder engagement (Begum et al., 2022). The Task Force on Climate-related Financial Disclosures (TCFD) contributes to the GRI standards by establishing a structure of climate-related financial risk disclosure in terms of governance, strategy, risk management and metrics and targets, particularly focusing on scenario analysis (Ding et al., 2022). The Carbon Disclosure Project (CDP) implements such disclosure requirements through standardized questionnaires, which assess companies' carbon footprints, reduction goals, and climate risk governance (Dominish& Sharpe, 2021).

It has been demonstrated that the adoption of the frameworks mentioned is uneven among different regions due to high levels of compliance among developed countries under the impact of mandatory disclosure requirements and the presence of well-functioning regulation, while developing countries face constraints owing to their inability to implement the frameworks (Cordova et al., 2021; Crocco et al., 2024). Studies of carbon disclosure in emerging markets revealed the effects of regulatory environment, stakeholder pressures and corporate governance on such disclosure.

2.2 Carbon Disclosure Practices in Developing Countries

Carbon disclosures in developing nations are notably different from those in developed nations due to differences in terms of regulatory regimes, limited institutional capacity, and varying stakeholder arrangements. Disclosure through voluntary systems always leads to low quality and incomplete disclosures compared to mandatory disclosure systems, whereby firms with poor enforcement mechanisms

end up giving only qualitative discourses in place of quantitative emission figures (Cordova et al., 2021; Uddin et al., 2025). Some firm-related factors affect carbon disclosure – large firms and profitable ones disclose more because of better resources and visibility of reputation, but SMEs lack financial resources that prevent them from reporting (Akbaş&Canikli, 2019; Chowdhury et al., 2020). Corporate governance affects carbon disclosure as well, whereby board gender diversity and educational heterogeneity positively correlate with high-quality disclosure, and tenure heterogeneity correlates negatively with it, implying that fresh board ideas help in environmental governance (Dhar et al., 2024). Other issues like institutional and legitimacy concerns also explain carbon disclosure decisions – despite the lack of mandatory regulations, regulatory pressure can induce voluntary disclosures by means of signaling and legitimacy motives (Akhter et al., 2022). Other motivations from international stakeholders come from foreign buyers and investors that increase motivation to disclose information, but disclosures remain largely superficial without verification needs (Darus et al., 2018; Guenther et al., 2016).

2.3 Carbon Accounting in Bangladesh's Context

Empirical research in Bangladesh verifies a pattern of disclosure characteristic for a developing country but at especially low levels. One study conducted among 82 listed firms found that the mean index of Climate Change Disclosure (CCD) was only 3.02 out of 28, meaning that less than 11% of the information was disclosed, although industries that contribute significantly to pollution had worse results than non-polluting industries (Masum et al., 2019). Only one item was included in GHG Accounting, and almost all items from Energy Consumption Accounting were left undisclosed (Masum et al., 2019). The five-year analysis for 2015-2019 of the cement and pharmaceutical industries showed an increase in average disclosure from 16.4% to 25%, with multinational companies showing better performance than local Bangladeshi firms by 94-110%, depending on the industry (Alam et al., 2021). These gaps have been driven by the overwhelming influence of the standards of parent companies and buyer demands, as well as the fact that local firms do not get enough external pressure and thus no incentive to disclose.

The most striking contradiction can be found in the textile and ready-made garment (RMG) industry, which released 6,043.5 Gg CO₂eq in 2022 and is expected to release as much as 26,000 Gg CO₂eq by 2030, according to business-as-usual estimates and shows the minimum systematic carbon accounting. Although a few firms are engaged in climate change disclosure due to lack of regulation, there is still virtually no carbon accounting in the industry (Biswas et al., 2024; Uddin et al.,

2025). It should be noted that the average emission intensity of textile dyeing mills is 1.64 kg-CO₂ per kg of dyed fabric, while dyeing processes themselves contribute 47-49% of the total GHG emissions in factories; however, measuring emissions with this precision is rarely done (Khan et al., 2025; Mamun et al., 2022). Research into tannery and cement industries has shown that only 67% and 50% of firms, respectively, had published climate disclosures (Begum et al., 2022). Despite such alarming emission rates and the presence of methodological frameworks like GRI 305 and IPCC recommendations, there is still a lack of both technical ability and incentives to measure and report carbon emissions in most of the companies operating in Bangladesh (Samaduzzaman et al., 2013; Uddin et al., 2025).

2.4 Regulatory Framework and Policy Context

The Bangladesh climate change policy framework has been designed considering the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) developed last in 2018, and which covers six thematic priorities, including mitigation and low carbon development. However, the BCCSAP does not include mandatory corporate carbon accounting and focuses more on adaptation measures than accountability at the corporate level with regard to mitigation (Samaduzzaman et al., 2013). The Corporate Governance Guidelines issued by the Securities and Exchange Commission encourage companies to disclose information on environmental issues; however, the lack of penalties for violation makes the guidelines more of recommendation than requirement (Begum et al., 2022; Uddin et al., 2025). Under the Nationally Determined Contributions (NDCs) of Bangladesh agreed upon the Paris Agreement, a target has been set for 2030 that Bangladesh will reduce its GHG emissions by 21.85% compared to business-as-usual levels, but does not have any MRV mechanism to monitor corporate level progress towards this target.

2.5 Challenges and Barriers to Carbon Accounting Adoption

Various interconnected obstacles prevent the use of carbon accounting in carbon-intensive industries of Bangladesh. First of all, capacity limitations are apparent. There are only a few professionals in the country holding a certificate on GHG accounting, and businesses do not have the capacity for setting up and implementing multiple scope measuring frameworks or producing disclosure reports conforming to those frameworks (Uddin et al., 2025). Limited finances are a problem as well, particularly for small and medium businesses, as the expenses associated with building the measuring infrastructure, using special software, undergoing training and verifying the results are relatively high compared to the benefits seen in the near future. Moreover, data quality problems arise because the grid emission factor for

Scope 2 calculations can be off by $\pm 10\text{--}12\%$ and there are no industrial emission factors for Bangladesh, which forces companies to use default IPCC factors (Biswas et al., 2024). Institutionally, there is no body regulating corporate carbon accounting in Bangladesh. The lack of coordination between the Department of Environment, SEC and regulators of various industries means that businesses do not have any obligatory requirements and are not held accountable (Uddin et al., 2025).

3. Research Objectives

This study aims to comprehensively examine carbon accounting and climate disclosure practices in Bangladesh's carbon-intensive industries. The specific research objectives are:

1. To access carbon accounting and climate disclosure practices in Bangladesh's carbon-intensive industries.
2. To identify the major technical, financial, institutional, and regulatory barriers.
3. To evaluate Bangladesh's regulatory framework against international best practices.
4. To compare emission profiles and disclosure quality across textile/RMG, cement, bricks, and power sectors.
5. To recommend measures for improving carbon accounting and disclosure quality and sustainable industrial development.

4. Methodology

The proposed methodology uses systematic literature review to study carbon accounting and climate disclosure practices among carbon-intensive industries of Bangladesh. This method is based on the analysis of secondary data collected from academic journals, industry reports, and policy papers, thereby allowing conducting a comprehensive evidence-based study of the topic in question.

Data Collection: For this study, two scholarly literature searches have been made on academic databases (SciSpace, Google Scholar, and Zotero). First, the search has been carried out for "carbon accounting and climate disclosure practices in carbon-intensive industries Bangladesh" and resulted in 90 unique papers. Second, the search for "voluntary carbon disclosure GHG emissions reporting developing countries sustainability reporting frameworks TCFD GRI" produced 91 unique papers. In total, approximately 180 sources have been analyzed, which constitute the basis for the study in question. They encompass a variety of disciplines, including accounting, environmental science, business management, and others.

Selection Criteria: Peer-reviewed journal articles, conference papers, and authoritative industry reports published between 2005 and 2026 have been selected, giving preference to recently published papers (2019-2026) to reflect current trends. Papers, which covered carbon accounting, climate disclosure, GHG emissions, and sustainability reporting in Bangladesh or other developing countries, have been included. Moreover, special attention has been paid to the papers discussing empirical studies of carbon accounting, climate disclosure practices in Bangladesh's textile/RMG, cement, brick, and power generation industries, as well as the studies comparing experiences in carbon accounting and climate disclosure internationally.

Data Analysis: In order to analyze collected data, a set of content analysis and thematic synthesis techniques has been used. Key themes identified through data analysis include disclosure practices, emission level measurement approaches, regulatory framework, implementation challenges, adoption of international frameworks, and comparative analysis. Quantitative data on emission levels, indices of disclosure, and compliance have been systematized to present the evidence of current performance. The qualitative information on the barriers, enablers, and perspectives of stakeholders has been categorized and analyzed to detect existing patterns and gaps in practices.

Limitations: A number of limitations exist for the proposed methodology. The use of secondary data makes it impossible to conduct analysis based on the information that has not been published, for example, regarding some company's practices. The voluntary character of disclosure in Bangladesh means that collected data may not correspond to the actual levels of emissions and accounting. The variation in the geographic location and time frame of the data sources used should be taken into account while making conclusions about current practices.

5. Discussion

5.1 Current State of Carbon Accounting Practices

The practices of carbon accounting in Bangladesh are at its emerging stage, voluntary and essentially non-systemic. The analysis of 154 corporations from 11 sectors, listed on the Dhaka Stock Exchange reveals that the great majority of companies do not use Corporate Carbon Accounting (CCA) system, with the main reason being the absence of compulsory regulatory requirements and the lack of any supervisory body overseeing emission accounting of corporations (Uddin et al., 2025). There is notable variance among the four industries analyzed. The Textile & Ready-Made Garments (RMG) industry, which releases annually 6,043.5 Gg CO₂e,

shows a poor level of systematic accounting of emissions; only a small number of top corporations follow IPCC guidelines for conducting emission inventories in an isolated manner, demonstrating the best practice examples without being common in the industry (Biswas et al., 2024). Under business-as-usual scenarios, it is estimated that emissions from this industry will rise to 26,000 Gg CO₂e by 2030, marking a 330% increase, which highlights the need to develop carbon accounting systems before it becomes too late (Biswas et al., 2024). In comparison, the cement industry shows better results, with six top corporations monitored between 2014 and 2023 having somewhat accounted for the emissions, although CCA systems are rare (Hasan, 2025). The power generation industry faces the difficulty of varied grid emission factors of $\pm 10\text{--}12\%$, while brick manufacturing is the least researched industry and probably the one with the worst-developed carbon accounting systems (Biswas et al., 2024). The carbon accounting methods vary greatly, from relatively simple fuel-based accounting to activity-based one, as there are no common national standards for accounting nor sectorial guidelines (Mamun et al., 2022).

5.2 Climate Disclosure Quality and Practices

The quality of climate change disclosures in Bangladesh is far behind the international standards. The average CCDI for 82 listed companies is 3.02/28, which shows that the disclosure ratio is less than 11% and only one item is mentioned in GHG Accounting category (Masum et al., 2019). The average disclosure rate has increased from 16.4% to 25% over the 5-year period (2015–2019), but at around 2% per year, this progress is insufficient to meet the average level of disclosure of other countries in the world within any reasonable timeframe (Alam et al., 2021). Qualitative analysis shows that there is a qualitative bias in the statements made by companies: general statements on energy-efficiency commitments and waste reduction initiatives are made but without corresponding quantitative scope 1, 2, or 3 data (Akter, 2024). Energy saving, waste management, and water management dominate with little attention given to GHG quantification, carbon intensity measurement, and future reduction targets (Akter, 2024). The average number of sentences used to report is less than 10, with most disclosing companies reporting less than that, demonstrating that the disclosures are not in-depth but rather superficial (Dey et al., 2017).

This sectoral difference in disclosure quality is a result of different amounts of external scrutiny and regulatory pressure. Pharmaceutical companies, which also have to comply with international disclosure requirements under international licensing, report a higher base disclosure rate than the RMG manufacturers or the

brick producers where the disclosure is mainly under domestic regulations (Alam et al., 2021). Cement companies fall somewhere in the middle, reporting energy usage but not quantifying emissions, and this is only partial compliance. This is in line with the legitimacy theory, which suggests that companies report selectively to guard the perceptions of their stakeholders and ensure their social licenses to operate and not to be held accountable substantively (Akhter et al., 2022). When disclosed, the majority of emissions are expressed qualitatively in a narrative rather than quantifiable, reflecting that voluntary disclosure, without the enforcement mechanisms, is primarily a legitimization exercise (Akhter et al., 2022; Akter, 2024).

Multinational firms significantly outperform local companies such as 110% disclosure in cement and 94% disclosure in pharmaceuticals, showing that disclosure quality is more influenced by parent-company standards and international buyers' expectations, rather than by local companies being shielded from such external scrutiny with limited incentives to invest in disclosure infrastructure (Alam et al., 2021). The EU Carbon Border Adjustment Mechanism (CBAM) marks a paradigm change in the disclosure accounting of export industries in Bangladesh. Financial exposure of the RMG exporters arises due to the lack of a trade-driven impetus for disclosure reform because existing emission measurement and disclosure systems are not yet verified under EU requirements (M. Rahman & Kabir, 2025). Initial estimates suggest that the cost of compliance for CBAM could have a material impact on the revenues of the apparel sector exports, underscoring the need for a sector-wide carbon accounting system and harmonization of national disclosures with internationally recognized verification standards (M. Rahman & Kabir, 2025).

5.3 Adoption of International Frameworks

International framework adoption is limited and selective in Bangladesh's carbon-intensive industries, and often symbolic. A minority of companies reference GRI 305 indicators, but there is partial compliance; for example, energy-efficiency indicators are reported but quantitative GHG indicators, such as GRI 305-1/305-2/305-3, are generally not reported (Begum et al., 2022). Companies cherry-pick their data - taking the good ones, skipping the bad ones – because there is no penalty for selective compliance, and no verification. The presence of TCFD adoption is almost nonexistent for each of the four sectors studied. The scenario analysis and forward-looking financial risk quantification needs in the framework are beyond current organizational capacity, and there is evidence to suggest that systematic TCFD implementation is lacking in the carbon-intensive industries in Bangladesh (Ding et al., 2022). The message here is of direct financial relevance: TCFD is

moving toward becoming a mandatory part of major capital markets, and investors around the world are starting to incorporate the risk of climate governance into capital allocation. There is also limited participation in the CDP; the technical scope of the detailed multi-scope quantification needed to complete the CDP questionnaires has not yet been reached by many companies, and the Bangladeshi regulatory context is largely local, meaning the business case for participation has yet to be made (Dominish& Sharpe, 2021). The biggest market driver which could prompt the adoption of frameworks in the textile and RMG sector is international pressure from buyers, especially European fashion brands and retailers that are conducting CDP-based supplier assessments.

5.4. Effectiveness of the Regulatory Framework

The whole regulatory framework of corporate carbon disclosure in Bangladesh is structurally inadequate. The BCCSAP gives a direction at the national climate policy level but it lacks any corporate level mandatory emission reporting, and it is mainly focused on adaptation (Samaduzzaman et al., 2013). The SEC Corporate Governance Guidelines are non-binding, meaning that companies that do not comply with them are not subject to any legal punishments, thus removing the basic motivation for compliance (Begum et al., 2022; Uddin et al., 2025). This is in contrast to regional comparators: Singapore, Malaysia and Thailand have introduced mandatory sustainability reporting for listed companies, which shows how feasible the reporting is in similar development environments. Similarly, the emission reduction target of 21.85% set by the NDC of the Government of the People's Republic of Bangladesh by 2030 is not linked with any MRV system at the enterprise level and the government has no mechanism to monitor the implementation of the emission reduction target set by the NDC. At the institutional level, there is a lack of an authority to account for carbon, as the Department of Environment handles project-level assessments of impacts, and the SEC is not knowledgeable about environmental matters, creating a governance gap where companies are given conflicting advice and held to little account (Uddin et al., 2025). That said, if there is no clarity, accountability and institutional leadership, then the current practices are not likely to improve in a material sense through a voluntary market process alone.

6. Findings

6.1 Disclosure Performance Metrics

The empirical findings show that there is very poor level of carbon disclosure performance in carbon-intensive industries of Bangladesh. The average Climate Change Disclosure Index (CCDI) score of 3.02 out of 28 is revealing: Companies disclose only 10.8% of the recommended climate-related information (Masum et al.,

2019) much lower than the 70%+ of leading companies in developed markets. Heavy polluters are paradoxically the worst of all industries when it comes to disclosure, which is contrary to the notion of high-impact industries leading by example in transparency (Masum et al., 2019). A longitudinal analysis of the last 5 years (2015-2019) reveals that the disclosure rate increased from 16.4% to 25% which is only ~2% per year (Alam et al., 2021). This is at a pace that would only close the gap with international benchmarks in decades, and therefore demonstrates the need for regulatory intervention and that voluntary measures are not enough. The results show that multinational companies, compared to local companies, have a high disclosure quality gap such as the case of multinationals pharmaceutical companies disclose 30.5% of climate issues while local Bangladeshi companies disclose 15.7% (a 94% difference) and in the cement sector, the disclosure quality gap is enlarged to 51.4% for multinationals and 24.5% for local Bangladeshi companies (a 110% difference) (Alam et al., 2021). This is a sign of the ongoing differences: Local companies, which are not under pressure from international stakeholders, have little incentive to invest in disclosure infrastructure.

6.2 Emission Profile Characteristics

In 2022, total emissions from the textile and RMG sectors in Bangladesh were 6,043.5 Gg CO₂eq, of which 67.8% were from textile and 32.2% were from the RMG sector (Biswas et al., 2024). Scope 1 (onsite fuel combustion) emissions are the primary source accounting for 85% of total emissions, with a BAU projection of 26,000 Gg CO₂eq by 2030, representing a 330% increase, that poses a significant challenge to the national climate commitments (Biswas et al., 2024). On average, a textile dyeing mill releases 1.64 kg-CO₂ per kg of dyed fabric, while the dyeing process accounts for 47–49% of the total factory-level GHG emissions and fuel combustion contributes 93–98% of the total emission (Khan et al., 2025). This indicates that fuel switching and energy efficiency improvement in dyeing should be the most priority action to mitigate the emissions, which are concentrated in these fuel-consuming processes. Return on assets and firm size are positively linked to carbon emissions in the cement industry, whereas board gender diversity and environmental committee are linked to reduced carbon emissions (Hasan, 2025), which suggests that corporate governance structures have a tangible impact on environmental performance.

6.3 Framework Adoption Gaps

Climate disclosure-related information is only provided by 67% of cement companies and 50% of tannery companies against GRI 300 standards (Begum et al., 2022). Even with disclosing companies, there is selectivity in reporting: General

energy-efficiency messages preferred to GRI 305-1/305-2/305-3 emission metrics). Adoption of TCFD is nearly non-existent: none of the carbon-intensive industries in Bangladesh have evidence of systematic adoption of TCFD's four core elements—governance, strategy, risk management, metrics and targets. CDP participation is also very limited: The technical requirements for Scope 1, 2 and 3 quantification are beyond the current capabilities of many companies. Widespread uptake of any international framework in carbon intensive sectors is unlikely to happen without requirements or increased market-based drivers that make it clear that it makes good business sense to invest in reporting infrastructure.

6.4 Regulatory and Institutional Gaps

The Securities and Exchange Commission's guidelines concerning environmental disclosures in Bangladesh are advisory and do not require any measurement or reporting of emissions (Begum et al., 2022). The coordination and institutional governance of corporate carbon accounting is weak, and the guidance is not consistent as there is no government agency with clear responsibility for corporate carbon accounting oversight. The Department of Environment has been more concerned about conducting impact assessments at project level and not enterprise-level emission monitoring, while the SEC is not technically equipped for carbon accounting. These uncertainties are compounded by the lack of Bangladesh-specific emission factors; companies use IPCC default values which, due to the different fuel quality and production technology in the country, result in less accurate and credible calculations if made.

7. Recommendations

7.1 Regulatory and Policy Reforms

There is a need to move towards compulsory carbon disclosure for listed companies in carbon intensive industries in Bangladesh. The Securities and Exchange Commission (SEC) should revise its Corporate Governance Guidelines to mandate disclosure of GHG emissions, both Scope 1 and Scope 2, with a schedule as follows: Large companies (market capitalization of more than BDT 5 billion) to be done within 2 years; medium companies (BDT 1-5 billion) to be done within 3 years; and smaller listed companies to be done within 5 years. At the same time, an independent Carbon Accounting and Disclosure Authority (CADA) must be set up under the joint supervision of the Ministry of Environment, Forest and Climate Change and the SEC, that can create emission factors for Bangladesh, come up with standardized disclosure templates based on GRI 305 and TCFD and establish compliance procedures with graduated penalty for non-disclosure. The updated Nationally Determined Contribution (NDC) of Bangladesh should include quantitative company-level monitoring, reporting and verification (MRV) targets.

7.2 Capacity Building and Technical Support

Keeping the current climate reality of the acute scarcity of professionals with skills in GHG measurement, reporting and verification, a National Carbon Accounting Training Program should be established. Certification should be provided to accountants, environmental managers and auditors using methodologies that are consistent with the GHG protocol and ISO 14064 standards. The carbon accounting modules should be incorporated into the curriculum of accounting and environmental sciences at universities. Sector-specific carbon accounting guides with ready-to-use calculation tools, local emission factor databases, and disclosure templates should be developed by industry associations such as textile/RMG, cement, brick and power generation to eliminate the need of hiring expensive external consultants. Co-funding subsidized technical assistance programs (for SMEs) should be introduced by international development partners by building on successful models in Thailand and Vietnam.

7.3 Market-Based Incentives and International Alignment

Bangladesh Bank could make carbon disclosure a precondition for preferential green credit facilities which can be made available to companies with transparent carbon emission reporting and credible carbon emission reduction plans with reduced interest rates. Financial incentives can be complemented by reputational motivation, such as with a National Carbon Disclosure Excellence Award, which can be especially significant in industries where brand reputation is important, such as exports. Internationally, GRI Standards should be formally adopted as a national framework for sustainability reporting and GRI 305 indicators should be mandatory for carbon-intensive industries. The export promotion agencies need to actively help textile and RMG exporters to comply with the EU's Carbon Border Adjustment Mechanism (CBAM) and international buyer's CDP and help them to view the compliance pressure as a competition advantage (Rahman & Kabir, 2025). Active involvement in regional level carbon accounting initiatives in ASEAN and SAARC should be encouraged to create an opportunity for knowledge sharing, methodological harmonization and cost saving of implementation at per-company level.

8. Conclusion

This study reveals that there is a wide gap between the existing carbon accounting and climate disclosure practices in Bangladesh's carbon-intensive industries and international standard frameworks. The average CCDI score of 3.02 out of 28 indicates that only 10.8% of the recommended disclosure is being provided, and projections show that the RMG industry, which is the economic backbone of

Bangladesh, could emit up to 26,000 Gg CO₂eq by 2030 under the business-as-usual scenario (Biswas et al., 2024). Other industries, such as cement, brick and power generation, are no better, with very little TCFD adoption and GRI reporting, if completed at all. These findings show that a voluntary disclosure system, without institutional capacity and regulatory enforcement, is by itself structurally inadequate to bring about any real improvements.

The potential drivers are systemic, including the absence of a legally binding framework, weak institutional oversight, limited technical capacity, and a lack of Bangladesh-specific emission factors, which together reduce the motivation and capacity to measure, monitor and disclose carbon emissions (Uddin et al., 2025). At the same time, the rising external pressure from the EU's Carbon Border Adjustment Mechanism (M. Rahman & Kabir, 2025) and international buyers' sustainability criteria means the risk of continued inaction is increasing economically for export-oriented industries.

Coordinated, sequenced intervention is possible for improvement. Mandatory disclosure for listed companies, a Carbon Accounting and Disclosure Authority, integrating carbon reporting in the GRI and TCFD standards, and incorporating carbon reporting in green financing mechanisms could change the face of climate disclosure in Bangladesh. Technical and financial barriers can be overcome by regional cooperation and capacity building programmes, especially for SMEs. In sum, solid carbon accounting is not only an environmental responsibility, but a must-have to keep Bangladesh competitive in a world where climate transparency is becoming the norm.

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