

# Development of a Model to analyse the inter-relationship of different parameters of Green Accounting as per Green Reporting Standards

Sangeeta Jha<sup>1</sup>, Dr. Payal Khandelwal<sup>2</sup>

<sup>1</sup> *PhD Researcher, Janardan Rai Nagar Vidyapeeth University, Udaipur*

<sup>2</sup> *Assistant Professor, Manikya Lal Verma Shramjeevi College, Janardan Rai Nagar Rajasthan Vidyapeeth University, Udaipur*

*doi.org/10.64643/IJIRTV12I4-184544-237*

**Abstract-** This article tries to understand the inter-relationship of all the eight parameters of GRI 300 which signifies environmental disclosures. In this attempt, we have tried to develop a model which showcases the inter-relationship of eight parameters of Green Accounting. The model gives an equation which analyses the input and output relationship of various parameters. It also highlights the direct and indirect relationships of green parameters.

**Key words:** Green Accounting, GRI Standards, TCFD, Foundational relationship, Mitigation of impact, OEL.

## INTRODUCTION

Due to continuous depletion of natural resources by various industries, this concept has emerged which tries to maintain a balance between an economic activity and our environment. Many countries have adopted Green Accounting as a part of accounting to keep a check on any loss or damage occurred due to an economic activity carried on by them. Environmental degradation and pollution act as two major disadvantages of development. Therefore, there is a need to make Green Accounting compulsory. Various standards have been developed to keep a check on environmental degradation. One of them is Global Reporting Initiative Standards. It is an independent international organisation which helps businesses and different governments in reporting the impacts of economic activity on environment.

The urge to protect the environment has given birth to green accounting. It tries to incorporate environmental cost and benefit with financial assessment of an organisation. The leading frameworks like Green Reporting Initiatives standards, TCFD (Task Force on Climate related Financial Disclosures) supports an organisation in

presenting a holistic view of financial as well as environmental activities. GRI standards gives a comprehensive set of guiding principles which helps in sustainability reporting. These standards gives a series (GRI 300) for environmental topics. These topics helps in determining the total impact of financial activities of different organisations. These standards are designed in such a way that it is applicable to all types of organisations.

To help an organisation to give a transparent view of all economic activities, a model has been proposed which analyses the inter -relationship of all the parameters of green accounting as per GRI standards.

## The Evolution of Green Accounting in India

The evolution of green accounting in India is the increasing awareness of the necessity to factor environmental considerations into economic planning as well as into corporate reports. The following is a general summary of how it evolved into four stages:

### 1. Initial Awareness Phase (Pre-2000s)

Environmental issues were mostly ignored in national accounting during this time. GDP growth was the main concern. Though discussions regarding protection of environment started but it was in its nascent stage at that time.

### 2. Increasing Interest and International Influence (2000–2010)

This decade saw a change in Indian policy which was the result of global movements. The UN System of Environmental-Economic Accounting (SEEA) framework started gaining popularity among Indian policymakers and researchers. Thus, many laws were framed to protect the environment.

### 3. Policy Integration and Framework Development (2010–2020)

This decade saw considerable policy integration and institutional growth. The 12th Five-Year Plan (2012–2017) proposed the innovative idea of "Green National Accounts" to quantify the deterioration of natural capital systematically.

The Central Statistical Office (CSO) started adopting Environmental Economic Accounting practices, issuing detailed reports on:

1. Water accounting frameworks
2. Forest wealth estimation
3. Mineral resource assessment

In this stage, India emerged as an active player in the SEEA framework advocated by the United Nations, reaffirming its adherence to global environmental accounting standards.

### 4. Recent Development and Institutional Progress (2020–Present)

The present stage is the most inclusive strategy towards green accounting ever adopted in India. The Ministry of Statistics and Programme Implementation released pilot green accounts for key sectors such as land, water, forests, and minerals. This time frame also witnessed a greater focus on ESG (Environmental, Social, Governance) disclosures within the corporate landscape, well-supported by SEBI regulations. Adoption of green accounting principles in business reporting by means of Business Responsibility and Sustainability Reporting (BRSR) standards is the latest development in Green Accounting in India.

## REVIEW OF LITERATURE

Lako A. (2018) opined that still the perspective of green accounting is diverse and vague. Some claimed that green accounting is the part of social accounting or some states that it is a spirit so that accounting can be done in a more environmentally friendly way. He further stated that greening of Financial Accounting Standards and entities accounting practices are very important because it will help in dismissing allegations of inaccurate and misleading information to various parties. Many researchers state that green accounting is similar to the sustainability accounting. It integrates financial, social and environmental accounting in order to produce complete and reliable accounting information to various parties.

Zamil, G.M. Shahariar & Hasan Z. (2019) suggested that reduction in nominated variables such as greenhouse emissions, water consumption have a significant impact on profitability of companies. A firm should opt for environment friendly resources to grab the attention of stakeholders as well as to save the natural resources. The organizations should involve in various sustainability activities so that they can create a positive image which will ultimately result in increase of profitability. Annual reports should represent reliable information related to natural resources. Creation of a positive image helps in escalation of number of profits. Awareness should be spread globally to adopt environmental accounting so that an attempt can be made to protect our environment.

Ikram M. & et.al. (2019) assessed whether adoption of environmental management helps in improving corporate sustainability program of company. Findings suggested that Environmental Management System adopters have a significant impact on environment protection, fair contribution to society whereas non-adopters exert a substantial impact on employee satisfaction and economic contribution. In recent times, there is a need of combining both the objectives. However, this number is gradually increasing as many corporations are moving towards the adoption of environmental accounting so that they can benefit business as well as society and environment. Due to this initiative of companies, a developing country can transform them into a better place for living and conducting business and thus sustainable development can be achieved.

Hazizadeh P. (2019) concluded that environmental accounting and reporting in Indian companies are advancing very slowly. Qualitative reporting is practiced more than quantitative. The environmental reporting is more a part of the charity or CSR activities. Various countries have made green reporting compulsory in their annual reports through Environment Management Accounting. As there are no standardized rules for green reporting, it struggles with discontinuity in disclosure of environmental information in annual reports. Companies have to accept green accounting as a strategic management tool. Environment management with environmental accounting would prevent environmental exploitation and degradation.

Kasperzak R. & et. al. (2022) stated that reporting of Green House Gas (GHG) emissions is of great

importance nowadays because it is directly related to sustainable development of economy. Current GHG reporting is not consistent with environmental sustainability. They further evaluated that recent policy and regulation that go beyond financial reporting concepts, are more or less focused on giving a true picture of the firm to various stakeholders. Due to lack of further GHG protocols, it is suggested that there is a need of investigation of how current GHG reporting could be approved. On the basis of results of the study, policy makers and standards setter should critically evaluate how GHG reporting will contribute in achieving sustainable development. They concluded that the aim of the study was to stimulate a discussion on the sufficiency of current GHG reporting practices in achieving the global sustainable development.

Sidarta A. L. et al (2023) investigated the influence of green accounting on company's financial performance. Environmental performance exerts a positive effect on company profitability. so they concluded that the businesses must create a green background to have a positive effect on the environment. The study was conducted due to negative effects of business operations which are hazardous to environment such as pollution which can affect organisms in the surrounding area. Environmental accounting practices by the company are an attempt to fulfil the needs of stakeholders as they are not only concerned about the financial profitability but also the environmental aspects of the business operations.

Momin Anis G. (2020), in his research stated that integration of green accounting with conventional accounting has become crucial in today's era. Companies are recognizing the importance of incorporating environmental considerations into their operations. Green accounting serves as a valuable tool for organizations to assess resource utilizations and associated costs and hence help in sustainable decision-making. He further explored the concept of green accounting which involves both the cost incurred and benefit derived from the ecosystem by a business entity. By shedding light on the state of green accounting practices among companies, the author has tried to enhance the knowledge regarding incorporation of environmental factors into the financial reporting and decision-making process.

Rathod D. M. and Rupareliya R.S. (2020) opined that adoption of green accounting presents a

significant shift in how business entities have started perceiving economic activities by giving emphasis on accounting for environmental cost and benefit. The systematic recording of the natural resources helps businesses to understand the true impact of their operations on environment. The support of Government is crucial in making green accounting mandatory for companies. This regulatory push can ensure that the corporate have started taking sustainable measures during their operations and understanding the effects of their activities on environment. The Joint effort of the Government and corporate can accelerate the growth of India towards becoming a developed country.

Nandini E.S. and et. al. (2020) argued that though environment accounting is related to the firm's profitability very significantly but companies mention their environment related information qualitatively not quantitatively in their annual reports. They further stated that since the natural resources disclosures are voluntary, diversity can be seen in reporting practices. Large-scale companies tend to report more about environment-related information than medium scale businesses. The study focused on the relationship of environmental accounting and profitability of the companies. As incorporation of environmental accounting increases the profitability, corporate organizations on their part should ensure that they comply with the rules and regulations laid for environmental protection so that long-term profit can be achieved. By carrying out environmental conservation activities, a company can accurately identify and measure their investments and cost of conservation activities and can analyse this data for a rational decision making.

Dutta T. K. & et.al. (2020) attempted to develop a conceptual framework of green accounting based on existing literature. Green accounting is a new and developing field. It deals with the environmental accounting and its management. They further stated that green accounting being a part of corporate social responsibility should fill the gap that prevails between corporate profitability and environmental issues. It also fosters social interest and contributes to global environment protection and commitment to and protection for sustainable environment. Therefore, the experts in this field should be supported with a budgeted plan and good decisions of policy-makers. As it is still in its nascent stage, it

is very difficult to have a good expert opinion on the subject matter.

#### A Model for Inter-relationship Analysis: The Green Parameter Web

The proposed model tries to visualize the eight green reporting parameters as an interconnected web. It emphasizes that if there is a change any of green parameters, it will impact others also to a considerable extent. This model gives a powerful tool for strategic planning, risk management, and identifying opportunities for sustainable innovation.

The parameters that need to be disclosed as per green reporting standards are as follows:

1. GRI 301: Materials: This standard indicates the total quantity of raw materials used for production. It also contains the information regarding to what extent natural resources have been replenished.
2. GRI 302: Energy: This standard gives information regarding total energy consumption within the organization. It can be divided into renewable and non-renewables and gives energy intensity ratios as well.
3. GRI 303: Water and Effluents: This standard covers withdrawal of water by source, its consumption and water discharge which can pollute the environment.
4. GRI 304: Biodiversity: It requires information related to sites where operational activities of a business is carried on or operational sites near protected areas. It also contains the nature of significant impacts on biodiversity, as well as that of species in affected areas.
5. GRI 305: Emissions: This is a critical standard that reports on Scope 1, Scope 2 and Scope 3 emissions. These emissions are the results of all the direct and indirect activities of business operations.
6. GRI 306: Waste: This standard gives the detail regarding the total weight of waste generated from operational activities. Information regarding various type of waste and its proper disposal, is disclosed by this standard. It also includes data related how much waste is treated.
7. GRI 307: Environmental Compliance: This standard discloses whether the company is liable to pay any fine for non-compliance of environmental laws and regulations.
8. GRI 308: Supplier Environmental Assessment: This standard focuses on the environmental performance of new suppliers.

With the help of environmental criteria, it assesses the environmental impact of existing suppliers as well.

#### Direct and Foundational Relationships between Parameters

**Energy and Emissions:** These two parameters have a direct relationship. Energy (GRI 302) which gives the detail of various types of energy and its total amount used in the organisation, directly determines the level GHG Emissions (GRI 305). Thermal energy, electromagnetic energy, electrical energy are some of the examples which is used by different business houses for production. Therefore, it can be said that energy is the input and emission is the output.

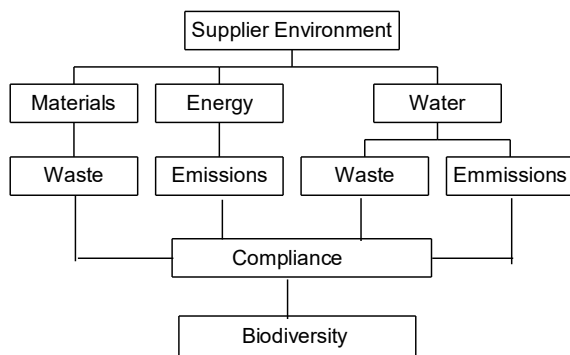
- **Materials and Waste:** GRI 301 signifies the total quantity of materials and its different types. Materials which are used in business activities are a primary source of Waste generation (GRI 306). Many organisations have started recycling of waste materials which directly help in reduction of waste. Disclosure of materials used, also requires reporting regarding recycling of materials because it minimises the effect of waste generation. Thus, it can be said that Materials and Waste also have direct relationship.
- **Water and Waste/Emissions:** Water (GRI 303) used in business can lead to contaminated water which contains various Pollutants (GRI 306) like Methane, CO<sub>2</sub> etc. Therefore, water and waste or emissions also has a direct relationship. If attempts to recycle water are made, it needs energy. The energy which is used to recycle water contributes to Emissions (GRI 305). The direct relationship between water and waste or emissions signifies that the more use of water results in more waste or emissions whereas recycling of water needs energy which ultimately results in emissions.
- **Supplier Environment and All Other Parameters:** Supplier Environment (GRI 308) has a direct relationship with other parameters. Water and energy consumption as well as waste management practices of a supplier contribute to a great extent to the reporting company's waste and emissions and overall environmental impact. Screening of suppliers plays an important role in improving the sustainability practices of organisation and thus helps in

protection of environment by adherence of rules and regulations made by Government.

- **Materials, Energy, and Water and Biodiversity:** Materials, energy and water acts as the input in an organisation which ultimately results in emissions and waste which affect the environment adversely. The extraction of raw materials and its processing and the land associated with it, Energy consumption and water bodies that supply water are the main reasons for Biodiversity loss.

Performance and Risk Inter-linkages:

- **Compliance (GRI 307)** as an Outcome: Adherence to all the rules and regulations related to green parameters plays an important role in protecting the environment. If a company fails in managing all the other parameters of green accounting, he is charged with the fines.
- **Biodiversity:** A protected Biodiversity (GRI 304), as a result of company's efforts to mitigate the impact of business operations can be a powerful indicator of the cumulative impact of all the activities across the organisation.



Flowchart related to inter-relationship of all green parameters

A Conceptual Framework Equation for Overall Environmental Impact

If all the green parameters are reported in ESG Report or Sustainability report, it gives a fair view of all the business activities of the business and the attempts to protect the environment. Therefore, there is a need to understand the inter-relationship of different parameters. In the following equation an effort has been made to understand the inter-relationship of different parameters.

The equation can be expressed as below:

$$OEI = f \{ [(M * wM) + (W * wW) + (E * wE)] * [(\Sigma E_m * wEm) + (\Sigma Wa * wWa)] \} / [(B * wB) * (C * wC) * (S * wS)]$$

OEI stands for Overall Environmental Impact. This equation gives a ratio of all the inputs and the outputs causing pollution and product of biodiversity, compliance and supplier environment. Therefore, this equation tries to find out the overall environmental impact of all the business activities by taking all inputs and its subsequent pollution causing output and its impact on Biodiversity and Supplier's Environment by adhering to all rules and regulations which comes under Compliance.

A breakdown of each component is as follows:

**Numerator:** It represents Resource Consumption & Negative Outputs

The elements of numerator represent the main factors of negative environmental impact – the various resources which is consumed by the organisation and the pollution and emission it creates.

#### 1. Inputs (Resource Consumption):

- **M (Materials):** Total quantity of raw materials used and recycling of waste materials (GRI 301).
- **E (Energy):** Total energy used from all the available sources like electricity consumption (GRI 302).
- **W (Water):** Total volume of water withdrawn from nature and consumed (GRI 303).

#### 2. Outputs (Pollution & Waste):

- **ΣEm (Sum of Emissions):** This represents the total sum of all harmful gas emissions (GRI 305).
- **ΣWa (Sum of Waste):** This is the sum of all waste that has been generated by the organisation. (GRI 306).

#### 3. (Weighting Factors):

Each parameter is assigned a weighting factor such as (wM, wW, wE, etc.). These weights are important as it determines the specific impact of business activities with the help of some methodologies like Life Cycle Assessment (LCA) as it quantifies the relative environmental harm of each unit.

**Denominator:** Mitigation & Management Systems

The denominator consists of all those efforts of the company and regulatory systems in that particular place to minimise the negative impacts of economic operations and thus helps in enhancing company's positive contributions. These factors reduce the overall environmental impact.

- B (Biodiversity Performance): GRI 304 signifies Biodiversity performance. This is a composite index. With the help of this index all the impacts of a company whether it's positive or negative is measured. Restoration of land, protection of natural habitat are some of the examples of biodiversity performance. If biodiversity is managed properly, it balances the overall impact. A higher 'B' value shows better biodiversity management.
- C (Compliance Score): GRI 307 gives compliance score. This is a measure which indicates a company's adherence to rules and regulations. It is calculated on the basis of some scores. A higher score ensures greater degree of compliance.
- S (Supplier's Environment): S is a composite score which measures the extent to which a company manages the environmental performance of its supply chain. It is represented by GRI 308.

By adopting such model that determines the inter-relationships between green parameters, organizations can go beyond compliance with reporting standards.

Advantages of studying inter-relationship of green parameters

Various advantages of studying inter-relationship of green parameters are as follows:

1. Identify risk and opportunities: It helps in determining how a decision in one area may have an effect on others. It helps in making more robust risk management and thus helps in finding new solutions.
2. Increase in resource efficiency: A company can develop more efficient strategies to use all the resources effectively and efficiently with the help of this relationship.
3. Investor relations: Those companies which adheres to all environmental rules and discloses all the details regarding green parameters, attracts more investors and thus ultimately end up with higher profitability.
4. Sustainable innovation: This helps in development of new products which is in

sustainable nature. Biodegradable products made with new sustainable technologies will help in a decrease of pollution.

Due to global warming focus on sustainability is increasing day by day, an understanding of the intricate web of environmental impacts is not a choice but it has become a necessity for success. This model provides an actionable framework for achieving that understanding.

## CONCLUSION

Green Accounting is a method which gives an information regarding a company's business activity and its impact on environment. For this, it is necessary to understand the inter-relationship of all green parameters so that effective measures can be taken to minimise the environmental impact of all the business activities. Therefore, we have tried to develop a model which analyses the inter-relationship of all the green parameters. In India, as the Government is taking necessary steps to make the environmental disclosures compulsory, the study of inter-relationship of all parameters will help in formulating effective strategies for protection of environment.

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