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## Green Accounting, Environmental Accounting, and Carbon Accounting: Is It the Same?

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### **Abstract**

*Green accounting is a concept that has yet to be widely applied in Indonesia. With pressure from stakeholders, companies are now implementing green accounting concepts. research on green accounting has been thoroughly investigated. However, the terminology of green accounting is expanding into terms such as environmental accounting and carbon accounting. The primary objective of this research is to examine the distinctions between terminology for each notion in an effort to clarify these ideas. In various literature, these three terms are used in different contexts. This type of research is a systematic literature review (SLR) conducted using qualitative methods, collecting journal articles from Elsevier and Emerald with period until June 2023. The results of this study show that, by definition, green accounting and environmental accounting refer to the same thing; therefore, this terminology can be used interchangeably. However, carbon accounting is different from green and environmental accounting. The results of this study are expected to contribute to researchers and businesses, governments, and policymakers by providing accurate terminology to ensure consistency with the concept.*

**Keywords:** Environmental Accounting, Green Accounting, Carbon Accounting, Terminology

### **Introduction**

Currently, climate change has become a major global concern. According to United States Environmental Protection Agency (EPA), the climate change phenomenon can be seen in the shifting of snow and rainfall patterns, extreme climate events and the rising global temperatures. Human actions have led to a number of environmental challenges, such as the overuse of natural resources that drives climate change (Weng, Chen and Chen, 2015). The scientific data shows that the concerns posed by climate change must be addressed by business, industry, and society (Linnenluecke, Birt and Griffiths, 2015).

Therefore, governments must participate in reducing the effects of climate change by passing laws, such as the Paris Agreement of 2016, which puts pressure on countries to fully execute the global reforms that have been agreed upon (Wade and Griffiths, 2020). By integrating environmentally friendly practices throughout the manufacturing process, maximizing production efficiency, and revealing greenhouse gas emissions, accounting, as a social science, may benefit society and the environment (Hopper, 2019). The concept of green accounting was introduced in the 1990s, but this research is underdeveloped due to a lack of academic interest and the tendency of businesses to disregard it (Gray and Laughlin, 2012).

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As a result, people use a variety of terms associated with green accounting, which can lead to confusion. Green accounting, environmental accounting, and carbon accounting are frequently used interchangeably, although it is unclear whether they refer to the same concept. Therefore, it is important to define each term (Akman, Cairns, Comar, & Hrozencik, 2014).

Environmental accounting is a substantial area in the field of accounting science (Rounaghi, 2019). In his research, Rounaghi (2019) interchanges the terms green accounting and environmental economics. This statement raises the question of why Rounaghi (2019) used the term environmental economics rather than environmental accounting, because, in contrast, Gray & Laughlin (2012) define green accounting as environmental accounting. Similarly, Dalmazzone & La Notte (2013) use the term of environmental accounting and green accounting to refer the same thing. To make it more complicated, Stechemesser & Guenther (2012) said that carbon accounting is a subset of environmental accounting but Ascui & Lovell (2011) state that the definition of carbon accounting is difficult to comprehend and problematic (Miller & Amos, 2017).

This study's objective is to explain the concepts of green accounting, environmental accounting, and carbon accounting by defining the terminology associated with each variable. This research employs a Qualitative Systematic Literature Review (SLR) methodology, and it is expected to contribute to the provision of benefits not only for researchers, but also for businesses, the government, and policymakers, by providing the appropriate terminology to ensure their actions are consistent with the concept.

## **Literature Review**

In many works of literature, researchers are using green accounting and environmental accounting interchangeably, for example: Gray and Laughlin (2012) and Deegan (2013).

Gray and Laughlin (2012) state in their article "... "green accounting" or "accounting for the environment" drew heavily from the longer and more substantial social accounting literature and practice." The authors consider that green accounting and environmental accounting refer to the similar thing. In addition, Stanojević, Vranes and Gökalp (2010) provide a new perspective that differentiates between green accounting from a business-level perspective and green accounting from a national-level perspective. However, they still refer to green accounting as environmental accounting. While Deegan (2013) added that environmental and green accounting can be seen as oxymorons. In addition, some author, such as Solomon and Thomson (2009) and Lockhart and M.R., (2015) equates environmental accounting with social accounting. In the meantime, according to Ascui and Lovell (2011), carbon accounting means different things to different people. Ascui and Lovell (2011) argue that there are five frames of carbon accounting, and one of those frame is social/environmental carbon accounting (Messinis & Vosniakos, 2020).

## **Methods**

The SLR method has demonstrated that all available information will be systematically located and collated on an effect (Davis et al., 2014). This study refers to Stechemesser & Guenther (2012) systematic literature review-based research. The only information sources used for this study were journal articles, and there were no restrictions on geography or subject matter as long as the articles were available in English that available on Scopus, Proquest, and Google Scholar databases (Giraldi, Corrêa, Schuelter-Trevisol, & Gonçalves, 2019).

In the same manner as Stechemesser & Guenther (2012), this study will employ four stages, including

the selection of research questions through an article database, the determination of relevant article criteria, the application and development of review criteria methods, and the synthesis and identification of research results.

The steps are divided into four stages and organized as follows:

1. Choosing a research question
2. Determination of relevant article criteria
3. Application and development of review criteria methods
4. Synthesis and identification of research results

## Result and Discussions

The organization of this section follows the review methodology described above. We describe the shorting process first, and then, finally, we concentrate on and characterize the focus and content of explicit definitions of green accounting, environmental accounting, and carbon accounting (Wu, W & Li, N 2022).

### Choosing a research question

To meet the goal of this study, we only look at how green accounting, environmental accounting, and carbon accounting are defined explicitly.

### Determination of relevant article criteria

This study analysed related articles that were published until June 2023. Several keywords closely relevant to the research question are employed to identify academic articles that are significant and pertinent to the research questions outlined for this study. We set the maximum number of results to 1,000 articles into the Publish or Perish software and uses the following title keywords to find relevant literature:

- a) "Green accounting" definition
- b) "Environmental accounting" definition
- c) "Carbon accounting" definition

The software then creates a list that can be saved into excel. The list contains the description of the number of citations, the author, title, publisher, related website, and Digital Object Identifier (DOI) of the article. After that, we select relevant articles by using the filter feature in excel, selecting Emerald and Elsevier as publishers. The shorting process can be seen in table 1.

**Table 1:** The Shorting Process of Research Journals

No.	Variables	Number of articles generate by software	Number of articles that published by Emerald and Elsevier
1	Green accounting	230	21
2	Environmental accounting	981	108
3	Carbon accounting	980	62

### Application and development of review criteria methods

This step is also referred to as quality assessment. After the classification process observed in stage 2, we locate the articles and read them individually to identify the definition of each variable. Only those publications that explicitly define each variable were used in the analysis.

**Table 2:** Relevant Journals Research

No.	Variables	Number of articles that published by Emerald and Elsevier	Number of articles use for analysis
1	Green accounting	21	6
2	Environmental accounting	108	8
3	Carbon accounting	62	4

We also identify the most cited journals in this research. The result can be seen in table 3.

**Table 3:** Results of Data Extraction

No	Topic	Author and Year	Title	Number of Citations	Journal
1.	Green accounting	(Owen, Gray and Bebbington, 1997)	Green accounting: cosmetic irrelevance or radical agenda for change?	288	Asia-Pacific Journal of Accounting
		(Halberg, Verschuur and Goodlass, 2005)	Farm level environmental indicators; are they useful?: an overview of green accounting systems for European farms	220	Agriculture, Ecosystems and Environment
		(Gray and Laughlin, 2012)	It was 20 years ago today: Sgt Pepper, accounting, auditing & accountability journal, green accounting and the blue meanies	188	Accounting, Auditing & Accountability Journal
2.	Environmental Accounting	(Boyd and Banzhaf, 2007)	What are ecosystem services? The need for standardized environmental accoun	3202	Ecological economics
		(Mathews, 1997)	Twenty-five Years of Social and Environmental Accounting Research: Is There A Silver Jubilee to Celebrate?	1239	Accounting, Auditing & Accountability Journal
		(Lohmann, 2009)	Toward a different debate in environmental accounting: The cases of carbon and cost and benefit	487	Accounting, organizations and society
3.	Carbon Accounting	(Schaltegger and Csutora, 2012)	Carbon accounting for sustainability and management. Status quo and challenges	333	Journal of Cleaner Production
		(Stechemesser and Guenther, 2012)	Carbon accounting: a systematic literature review	293	Journal of Cleaner Production
		(Unkovich, Baldock and Forbes, 2010)	Variability in harvest index of grain crops and potential significance for carbon accounting: examples from Australian agriculture	222	Advances in agronomy

## Synthesis and Identification of Research Results

### Green Accounting and Environmental Accounting

We will start by defining green accounting (table 4) and environmental accounting (table 5) using the term from the journal we chose based on the abovementioned criteria.

**Table 4:** Explicit Definitions of Green Accounting

Author	Explicit Definitions of Green Accounting	Notes
(Rubenstein, 1992)	“The essence of green accounting is accounting for the air we breathe, the water we drink.”	
(Stanojević, Vranes and Gökalp, 2010)	“Green or environmental accounting describes an effort to incorporate environmental benefits and costs into economic decision making”	The definition is cited from Gernot Wagner
(Ying <i>et al.</i> , 2011)	“Green accounting is a significant approach to establish a scientific perspective on how to manage the issues pertaining to environment protection and forest resource utilization and restoration.”	
(Gray and Laughlin, 2012)	“The term, “green accounting” does continue in the environmental economics field however but for no reason we can discern. The move away from the term “green accounting” echoed a wider (but by no means universal) move away from labelling environmental concerns as simply “green” – a move, we assume, which reflected an attempt to distinguish between a populist if restricted notion and a more substantive and serious consideration of mankind’s relationship with natural ecology”	
(Rounaghi, 2019)	“Green accounting is a type of accounting that attempts to factor environmental costs into the financial results of operations.”	
(Maama and Appiah, 2019)	“Green accounting is, therefore, viewed as an important tool for gaining an understanding of the roles of business enterprises within an economy towards the safety of the environment and welfare of the citizens.”	

**Table 5:** Explicit Definitions of Environmental Accounting

Author	Explicit Definitions of Environmental Accounting	Notes
(Lehman, 1996)	“Environmental accountants define the environmental issue in terms of the divergence between full social costs created by economic agents and the actual costs incurred by that entity”.	
(Solomon and Thomson, 2009)	“Social and environmental accounting is defined as systems that provide information on the inflows, outflows and pools of natural, economic, cultural, ethical and social resources for different entities measuring their eco-efficiency, eco-effectiveness, social-efficiency or social-effectiveness.”	
(Protogeris <i>et al.</i> , 2011)	“Environmental accounting is an important tool for understanding the role played by the natural environment in the economy. Environmental accounts may provide data which highlight both the contribution of natural resources to economic wellbeing and the costs imposed by pollution or resource degradation”.	
(Stechemesser and Guenther, 2012)	“Environmental accounting as a subset of accounting that addresses “activities, methods and systems [as well as] recording, analysis and reporting of environmentally induced financial impacts and ecological impacts of a defined economic system (e.g. firm, plant, region, nation, etc.)”	The definition is cited from Schaltegger and Burritt (2000)
(Lockhart and M.R., 2015)	“We define environmental accounting as “accounting for the environment”, which is therefore part of the broader corporate social reporting”.	
(Rounaghi, 2019)	“Environmental accounting includes production, analysis and the use of information related to financial matters in the environment regarding the economic and environmental performances of a company.”	
(Marrone <i>et al.</i> , 2020)	“Environmental accounting research examines how firms account for and discloses their environmental impacts as well as investigates the impact of environmental performance on firms’ performance.”	
(Ghosh and Wolf, 2021)	“Environmental Accounting is a means to strengthen procedural accountability, transparency, and improve returns and lower risks attached to conservation investments”	The definition is cited from (Smith <i>et al.</i> , 2019)

Based on the definition in Table 4, all the given definitions of green accounting refer to environmental

accounting. Meanwhile, the environmental accounting definition in Table 5 focuses primarily on the environmental cost, environmental performance, or any data that businesses reveal to disclose their environmental impacts. Therefore, if the author wants to emphasize the connection between corporate operations and the natural environment, the researcher may utilize the concept of green accounting. On the other hand, the author can utilize environmental accounting to emphasize businesses' efforts connected to environmental performance, including disclosing their environmental costs and impacts. However, it is acceptable for researchers to interchange the terms environmental accounting and green accounting (ARUNACHALAM, CHINNARAJA, & MAYDEN, 2016).

### Carbon Accounting

As with green accounting and environmental accounting, we will start with each author's carbon accounting definition. The definition can be seen in the table 6 below:

**Table 6:** Explicit Definitions of Carbon Accounting

Author	Explicit Definitions of Carbon Accounting								
(Schmidt, 2009)	"...we frequently hear talk of CO2 balancing or carbon accounting. What we mean in this case is the balancing of CO2 equivalents." (p. 20)								
(Asci and Lovell, 2011)	<table border="1"> <tr> <td>estimation calculation measurement monitoring reporting validation verification auditing</td> <td>of carbon carbon dioxide greenhouse gas</td> <td>emissions to the atmosphere removals from the atmosphere emission rights emission obligations emission reductions  legal or financial instruments linked to the above trades/transactions of any of the above  impacts on climate change impacts from climate change</td> <td>at global national sub-national regional civic organisational corporate project installation event product supply chain</td> <td>level, for</td> <td>mandatory voluntary</td> <td>research compliance reporting disclosure benchmarking auditing information marketing or other</td> <td>purposes</td> </tr> </table>	estimation calculation measurement monitoring reporting validation verification auditing	of carbon carbon dioxide greenhouse gas	emissions to the atmosphere removals from the atmosphere emission rights emission obligations emission reductions  legal or financial instruments linked to the above trades/transactions of any of the above  impacts on climate change impacts from climate change	at global national sub-national regional civic organisational corporate project installation event product supply chain	level, for	mandatory voluntary	research compliance reporting disclosure benchmarking auditing information marketing or other	purposes
estimation calculation measurement monitoring reporting validation verification auditing	of carbon carbon dioxide greenhouse gas	emissions to the atmosphere removals from the atmosphere emission rights emission obligations emission reductions  legal or financial instruments linked to the above trades/transactions of any of the above  impacts on climate change impacts from climate change	at global national sub-national regional civic organisational corporate project installation event product supply chain	level, for	mandatory voluntary	research compliance reporting disclosure benchmarking auditing information marketing or other	purposes		
(Bowen and Wittneben, 2011)	"We define carbon accounting as the measurement of carbon emissions, the collation of this data and the communication thereof, both within and between firms" (p. 1025)								
(Stechemesser and Guenther, 2012)	"carbon accounting comprises the recognition, the non-monetary and monetary evaluation and the monitoring of greenhouse gas emissions on all levels of the value chain and the recognition, evaluation and monitoring of the effects of these emissions on the carbon cycle of ecosystems." (p.36)								

According to the definition in Table 6, carbon accounting refers to the measurement and or the recognition related to carbon emission. These definitions are different from green accounting and environmental accounting. Therefore, if the author would like to focus on companies' efforts in disclosing their carbon emission or the cost of carbon emissions, we suggest the author use the terminology of carbon accounting rather than green or environmental accounting.

### Conclusion

Most of the article published does not start their article with definition. Some articles cite definitions from sources other than journals, such as books and websites. The results of this study show that, by definition, green accounting and environmental accounting refer to the same thing; therefore, this terminology can be used interchangeably.

However, carbon accounting is different from green and environmental accounting. The results of this study are expected to contribute to researchers and businesses, governments, and policymakers by providing accurate terminology to ensure consistency with the concept.



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