

Innovations

Carbon Accounting in Nigeria: A Critical Review

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Abstract

Global warming resulting from depletion of ozone layer as a following gaseous emissions attract international attention due its health and economic implications. Environmental destruction from carbon discharge is of serious concern to many nations. In view of the aforesaid, this work critically reviews carbon accounting in Nigeria starting from government policy/ legal requirement, accounting methods adopted by various organisations, in reporting carbon emissions. Descriptive research design in which works were reviewed and impressions made includes amongst orders that Carbon discharges were detrimental to the nation's economy. Recommendation is that national policy on carbon emissions and control be reviewed and punishment of imprisonment without option of fine for principal officers of companies/ organisations found guilty of discharging large carbon without adequate measures to clean the environment amongst others.

Keywords: Carbon Accounting, Carbon Emission, Environment, Social, Governance and Nigeria

1.0 Introduction

Carbon which are asset like fossil fuel and soil carbon; carbon related ecosystem services comprising stock like store in soil, water and biomass; and sequestration removable from the atmosphere and carbon as a characteristic of ecosystem asset condition (condition account) like biomass accumulation which is an indicator of productive ecosystem (UN Statistical Division).

Carbon accounting also referred to as Green House Gas (GHG) Accounting is concerned with discharge of predominately carbon dioxide and other carbon discharges. Analyst and management apply the technique to ascertain the extent of carbon discharges (directly or indirectly) by an organisation (Kyle, 2022). However, despite the fact the two terms (carbon accounting and GHG accounting are interchangeably used, carbon accounting refers to carbon dioxide discharges only while GHG accounting refers to all greenhouse gases. GHG are gasses which trap heat in the atmosphere, thus increases warming on earth generally referred to as global warming

The essence of carbon accounting is to quantify the amount of GHG produced by private and public organisations to ascertain the amount of carbon they emit. This enables the organisation to disclose their climate impact; report their Environmental, Social and Corporate Governance (ESG) strategy and facilitate informed decision making as the world races to net zero (Persefoni team, 2022). Climate impact report is now required from both large and small firms. To attain net zero, every organistaion must

measure its carbon footprint to make a global impact. Also, in business proposal, one is requested to incorporate environmental impact assessment of the proposed business.

Carbon accounting became imperative because of increasing atmospheric carbon which causes climatic alterations like rising temperature, alteration in rainfall and rise in sea level. While studying carbon stock and flows one would assess the effect of alteration in land, cover and land use on carbon stocks and carbon sequestration; evaluate the effect of different policies on industries and sectors as could be seen in mandated reduction in the quantity of discharges from fossil fuels on mining, manufacturing and agricultural industries and information compilers to improve coherence between data sources and systematically address gaps and deficiencies in primary information sources (United Nations Statistics Division, n.d)

In compliance with the United Nations Framework Convention on Climate Change (UNFCCC) and other treaties aimed at stabilising GHG emissions (Kyoto protocol and Paris Agreement), Nigeria participated actively in 2021 UN Climate Change Conference (COP26) in Glasgow between October and November, 2021.

November, 2021 in Glasgow, the targets of COP26 were for countries to renew their devotion to securing net-zero targets by mid-century and to maintain the 1.5 degrees target within reach; defend communities and natural habitats; mobilise finance to carry on the first two goals; and to work jointly to deliver on various goals. As follow up to the objectives of the conference, just a week after the conference, President Mohammed Buhari signed the Climate Change Act, 2021 passed into law by the national assembly in October, 2021.

1.1 Statement of Problem

Carbon dioxide is a gas which animals' breath out while they breath in oxygen. However, plants take in carbon dioxide during photosynthesis and give out oxygen, thus providing animals with the much-needed oxygen. This makes life comfortable going by the mutual relationship from the above gaseous exchanges. However, there are carbon discharges not from animals in excess of what plants require as a result of human activities. These discharges from industries in very large volumes constitute danger to the ecosystem which it disrupts the mutual relationship due to its effect on the gas equilibrium. The disruption of the ecosystem manifesting in the form global warming, alteration in water level (sea level rise) and changes in time and alteration in rainfall (United Nations Statistical Division). These alterations have negative effect on the lives in the ecosystem (human, animals, fishes and plants).

Economic consequences of these alterations on the nation are high and cannot be accurately quantified. These economic effect results from loss of man hours following ill health from alteration in temperature, air pollution and weather, poor crop yield resulting from seasonal variation.

Against these backdrops, that the study examines the carbon accounting in Nigeria with specific interest on the policies\laws guiding such, methods adopted by organisations to account for their carbon emissions.

1.2 Objectives of the Study

The main objective of this study is to critically examine carbon accounting in Nigeria. In specific terms, the study wants to:

1. Ascertain the laws/ policies in place with regards to carbon accounting in Nigeria.
2. Evaluate the methods adopted for carbon accounting in Nigeria.

1.3 Research Questions

1. What are the Nigeria laws/policies with regards to carbon accounting?
2. What are the methods of carbon accounting in Nigeria?

2.0 Review of Related literatures

This section is approached through conceptual review, theoretical review, empirical review and impression

2.1 Conceptual Review

Brief concept of carbon accounting, legal/ national policies on carbon emissions and methods of carbon accounting by organisations in Nigeria were explored.

2.1 .1 Carbon Accounting

Carbon accounting is calculating, analysing, measurement, and reporting organisation's GHG discharges in auditable manner (Persefoni Team, 2022). Other terms for carbon accounting includes: carbon auditing, carbon inventory, greenhouse gas inventory or GHG accounting. It quantifies the amount of GHGs produced by both private and public organisations, thus ascertain the quantity of carbon emitted. Similarly, Tang (2017) defines carbon accounting as the use of accounting procedures and methods in recording, collecting and performing the essential analysis of climate changes, validate the information and report on the basic elements that have a relationship (revenues, expenses, assets and liabilities).

Schaltegger and Custora (2012) research reveals a fast improvement in carbon accounting which is an important aspect in the development of sustainability management due primarily to the needs of climate alteration, which seeks for current methods and mechanisms and its development through scientific research. In their own view, Hartmann et al., (2013) opines that expansion of programs for reduction of carbon discharge following demands for institutions to develop carbon accounting to meet ecological changes usable in preparation of reports and decision making which contributes in crating values for the institution. Thus, carbon accounting practices prevails on management to take stock of carbon discharges and adopt measures towards decrease of such in line with UNFCCC which Nigeria participates in her conventions.

The total carbon discharges from a firm is referred to as the organisation's GHG emissions footprint. The GHG emissions footprint is made of three scopes viz: scope 1, 2 and 3. Scope 1 is direct emissions from owned (or controlled) sources like manufacturing facilities, company vehicles, i.e combustion etc. Thus, it incorporates direct emissions created on-site from an organisation's operation. Scope 2 (electricity) encompasses not direct emissions from the generation of purchase electricity, steam, heating, and cooling etc as such it encompasses discharges from purchased energy, while scope 3 comprise wide class which includes all other not direct discharges such as business travels, investments, end -of- life treatment of solid products and purchased goods and services, waste disposal. It includes all not direct emissions in an organisation's value chain (kyle, 2022; Persefoni team, 2022 and Anass, n.d). In most cases, reports are required for scope 1 and 2 while scope 3 is voluntary as it is extremely difficult to calculate and mitigate. The federal government and other governing entities requires carbon accounting and reporting.

There are a number of protocols used by corporations in carbon accounting. some commonly applied ones are;

1. The Greenhouse Gas Protocol (GHGP), developed in 1997 and is the first international treaty for GHG reductions. It came out of joint effort of World Resource Institute (WRI) and World Business Council for Sustainable Development (WBCSD). It contains guidelines and standards for organisations to develop inventory for GHG reductions in such areas as data collection, improved consistency and provides the tools to report and manage emissions.
2. International Organisation for Standardization (ISO): This came into being in 1946 to create international standards and in 2006, the developed standards for GHG management. This is designed as complementary to GHGP. It has:
 - i. ISO 14064-1: This provides at organisational level guidance for quantifying and reporting GHG discharges and removals

- ii. ISO 14064-2: At project level, it offers guidance for quantifying, monitoring and reporting GHG emissions and removals.
 - iii. ISO 14064-3: It has guidance for verifying and validating GHG reports
- Others are ISO 14067 which deals with quantifying a product's carbon footprint, ISO 14068 being developed to provide guidance on carbon neutrality and ISO 14069 providing guidance on applying ISO 14064-1.
3. The Paris Climate Agreement: This is 2015 agreement which is a catalyst in furthering carbon accounting regulations, policies, and reporting standards to align with financial regulations precipitating into many searching for means of reducing GHG emissions.
 4. Partnership for Carbon Accounting Financials (PCAF). This is a 2019 global initiative which is set to support financial institutions with a standardized methodology for measurement and reporting investing- and lending-related GHG scope 3 category 15 emissions often referred to as financed emissions.

2.1.2: Legal/ National Policies on Carbon Emissions

Nigeria enacted the Nigerian Climate Change Act 2021, which provides a framework for mainstreaming of Climate Change actions, provide for a system of carbon budgeting and the establishment of the National Council on Climate Change (NCCC) which is vested with power to make policies and decisions on all matters concerning climate change in Nigeria. Part 1 of the act provides for the objective of the Act geared towards achievement of low

GHG discharges, inclusive green growth and sustainable economic development by -

- (a) ensuring that Nigeria develops programme for actualising its lasting goals on climate change mitigation and adaptation;
- (b) facilitating the coordination of climate change action required to accomplish long-term climate objectives;
- (c) mainstreaming climate change actions in line with national development priorities;
- (d) facilitating the mobilisation of finance, and other resources essential to guarantee effective exploit on climate change;
- (e) ensuring that climate change policies and actions are integrated with other related policies for promoting socio-economic development and environmental integrity;
- (f) setting a target for year 2050 - 2070 for the attainment of a net-zero GHG emission, in line with Nigeria's international climate change obligations;
- (g) identifying risks and vulnerabilities, building resilience and strengthening existing adaptive capacities to the impacts of climate change;
- (h) implementing mitigation measures that promote low carbon economy and sustainable livelihood; and
- (i) ensuring that private and public entities comply with stated climate change strategies, targets and National Climate Change Action Plan,

Part V of the Act provides for national carbon budget and national climate change action plan. The carbon budget and National action plan are expected to be produced within 12 months from the commencement of the Act.

The components of the Action Plan include-

- (a) an articulated carbon budget for the five-year cycle;
- (b) an articulated yearly carbon budget for each of the years that make up the five-year cycle;
- (c) past, current and projected GHG emission profile of GHG emission sectors of the economy;
- (d) details of past, current and proposed climate mitigation and adaptation actions across the sectors of the economy including the rationale, costs, funding source and benefit of such action;
- (e) details on the level of compliance with international climate commitments; and
- (t) proposed incentives for private and public entities, which achieve GHG emission reduction.

To ensure effective implementation of the action plan, Ministries, Departments and Agencies (MDAs) shall put in place a climate change desk to be supervised by an officer not below the director cadre, who shall be responsible, amongst other things, for ensuring inclusion of climate change activities into their core mandate (Climate Change Act, 2021).

In terms of policy, the National Climate Change Policy for Nigeria 2021-2030 document was issued by Federal Ministry of Environment, Department of Climate Change. Policy goals includes amongst others, reduced green gas emissions while the strategic goals also includes i. Implementing adaptation and mitigation measures that promote low-carbon development;

ii. Strengthening capacities and synergies at local, sub-national and national levels and at individual and institutional levels to implement climate change response;

The mitigation area with their policy were in areas of Agriculture, forests and other land use, energy, health, industry, oil and gas, transport, waste and water (NCCP, 2021).

2.1.4: Methods of Carbon Accounting

Approached to measuring carbon emission are mainly through

- i. Spend-based data. This is obtained using cost of purchased good or service and multiply it by emission factor. The methods seem not accurate as it only provide estimate of the emission. This method is usually preferred because it is not easy to access data along all supply chain. However, technology has reduced the gap between data needed and data accounted for. Data precision issues arise during price fluctuation or large regions have a broad generalization of economic standard for an emission factor or products are grouped into large generalizations.
- ii. Activity-based data: This targets collection of data along the supply chain at granular level. From organisation's activities, raw data that are quantified into emission data are recorded. The larger the data collected the more accurate the accounting because most emissions in the supply chain falls into scope 3 which are difficult to quantify. It is more precise because it is based on actual unit of carbon emitted as against value given by certain region. e.g using kilometres travel and type of vehicle used.
- iii. Hybrid methodology: This is highly recommended by GHGP as such, the most commonly used method carbon measurement. It entails recording as much data based on activity as obtainable from the supply chain. What is left over is estimated using the spend-based approach.

2.2 Theoretical Review

Stakeholders' Theory: Freeman in 1984 propounded the stakeholders' theory of organisational management and business ethics which addresses morals and values in organisational management. The research is anchored on stakeholders' theory which is a correction of deficiency in shareholders theory. The theory postulates that firms exist for the interest of the stake holders which comprise customers, employees, suppliers, communities, investors, government and society at large. The organisations management must take note of and account for all their stakeholders; that is, those constituencies that affect its operation and are affected by its operation.

Thus, carbon discharges from organisations affect the environment and are also affected by what goes on around the organisation. In effect the pressure exerted on organisation by the environment and the effect of its operations on the environment.

2.3 Empirical Review

Saddam et al. (2022) reviewed past, present and future of carbon accounting from scholarly research. Carbon accounting literatures between 1994 and July, 2022 were utilised. The work discussed the scales, the methodological choices and major themes of carbon accounting research, including the most influential articles, and top contributing countries, journals, theories and institution. The literatures were

retrieved from the Web of Science (WoS) and Scopus databases, in which 137 articles were obtained from 62 high quality journals in accounting, environment, and economics. There has been a significant increase in recent years in the number of studies, with the majority taking place in the United Kingdom, Australia, and China, as compared to the United States. However, results indicate that traditional theories, such as the legitimacy, organization, and stakeholders theories have been evaluated previously. Although, a firm's characteristics and consumer behavior play an important role in improving carbon efficiency, economic and behavioral theories have been underrepresented in the existing literature. In addition, the study revealed that carbon accounting research provides a mechanism through which carbon discharges can be measured and quantified. In effect, the emissions status of companies could be ascertained and used in making essential strategic decisions to actualise mitigation.

Similarly, Muhammadu et al. (2016) evaluated the effect of carbondioxide (CO₂) discharges on economic growth: Evidence from selected higher CO₂ emission economies, Panel data on environmental degradation (CO₂ emissions per capita, energy use, trade and human capita) and economic growth collected from China, USA, India and Japan from 1971 to 2013 were subjected to Panel Fully Modified Ordinary Least Square (FMOLS) method of analysis. The variables reveals non cointegration, which is suggestive that all variables actively influence economic growth of the countries. CO₂ emissions and energy use shows negative significant effect on economic growth, while trade and human capital shows significant positive effect on economic growth for China, Japan and USA, however, in the case of India it reveals negative effect.

Jayanthi and Merith (2022) assessed the effect of economic growth on carbon emissions in selected Sub-Saharan African countries. The effect of energy consumption, tourism and population on CO₂ emissions from 2000 to 2020 were evaluated using pooled OLS. After diagnostic tests, robust fixed model used in data analysis established significant relationship between economic growth, energy consumption, population, and tourism sector on CO₂.

Ojeaburu (2021) studied carbon emission accounting and economic growth in Nigeria spanning from 1981 to 2018 using CO₂ as proxy for carbon emission and Gross Domestic Product (GDP) for economic growth. Causal research design was adopted for the study. After preliminary tests, dynamic ordinary least square and bivariate granger causality tests were used for data analysis which showed evidence of inverse relationship between carbon emission and GDP. Bivariate granger causality test confirms non causality running between the variables. A conclusion of negative insignificant relationship between carbon emission and GDP was reach. Also, emissions not connected with the production of industrial and consumer goods should be taxed and avoided as much as possible.

In another study, Egbunike and Emudainohwo (2017), examined the role of carbon accountant in corporate carbon management system: a holistic approach using descriptive survey and ex-post- facto research design and T-test and OLS regression for data analysis. Result of the analysis was that there is statistically significant relationship between carbon accounting and corporate performance of selected quoted manufacturing companies. Beredugo and Mefor (2012) explored the impact of environmental accounting and reporting on sustainable development in Nigeria. Pearson correlation and OLS used for data analysis revealed a significant relationship between environmental accounting and reporting and sustainable development It was recommended that acceptable standard (like ISAR) and graphical indicators be adopted, illustrating to users on timely basis whether the organisation is performing, above, below or in- line with the targets so that corrective measures ca be taken as required to achieve sustainable initiatives.

Furthermore, Ezenwafor (2021) verified the impact of carbon management accounting on the performance of publicly traded consumer manufacturing enterprises in Nigeria. Multiple regression result indicated that environmental management committee has a moderate significant effect on GHG emissions disclosure on Tobin's Q of manufacturing firms. It was recommended that environmental management sub- committee should be established and the presence of a sustainable manger is a practice

among global firms in developed countries to provide strategic information to the board of directors in order to drive the company's sustainable performance.

Iyabo et al. (n.d) reviewed carbon emission and economic growth in Nigeria by testing the Environmental Kuznet Curve (EKC) hypothesis to find the evidence of an inverted-U relationship between carbon emissions and economic growth in Nigeria between 1980 to 2016. There is inverted 'U' relationship or a turning point is reached when EKC hypothesis is accepted. EKC is accepted if there is a positive relationship between GDP and CO₂ on the short run and a negative relationship between GDP and CO₂ on the long run. The result suggests that Nigeria has not reached a turning point in its carbon emission as economic growth increases. The study recommended that policies that would broaden the use of renewable energy like solar and wind in meeting the energy need of Nigerians

Ezenwa (2016) investigated the effect of environmental accounting on sustainable development in Nigeria. The study adopted content analysis research design. Literatures reviewed were suggestive that environmental accounting has positive impact on sustainable development in Nigeria. The study recommended that standard should be developed by regulatory bodies to guide the practice of environmental accounting.

2.0 Methodology

The study adopted descriptive research design. Published works were reviewed intensively and extensively in order to get full picture of the topic and the position as at moment. Materials reviewed were articles, corporate authored publications and journals. From the study, impression was made and conclusion drawn.

4.0 Impressions and Discussions

Nigeria has robust law and policies on carbon accounting but it is just signed into law in 2021. The implication of the above is that Nigeria has been playing on the gallery at the international meetings and conventions without actually taking the message/ warning serious. A policy that is not up to five years may not have appreciable noticeable impact on the economy. This can be evidenced from the gas flaring that has been on going in Nigeria since mining of oil in Nigeria. The environmental degradation highly noticeable in the Niger Delta which has triggered series of agitations with loss of human lives and great economic set back in the zone. The poor attention by the companies to gas flaring was captured clearly by Aminu, and Reza (3013) thus, change in the level of CO₂ emission due to gas flaring is not an important factor considered by NNPC in deciding how much gas-flaring-related information to disclose. The deteriorating environment due to GHG emissions in Nigeria especially in the Niger delta area has negative implications to the ecosystem, the land and sea as well as the health of the citizens, yet Nigerian government main interest is on revenue accruable from the operations of the multinational companies who prefers paying fines than tackling the environmental issues arising from their operations.

The Spend-based method of data collection/ accounting for GHG is what has been adopted by firms as the attitude of the government and it agent highly favours such. Other emissions on the distribution change attract little or no attention. This implies that lots of GHGs emissions are unaccounted for in Nigeria and are not capture in our carbon footprint.

4.1 Recommendations

Federal Ministry of environment should double their effort towards reducing GHGs emissions. The national law/policy on carbon emissions and control should be reviewed and with punishment in terms of imprisonment without option of fine for principal officers of companies/ organisations found guilty of emission of large carbon without adequate measures to clean the environment.

Secondly, Activity-based method of data collection should be made a mandatory method of accounting for GHG emissions so that organisations carbon footprint could be relatively accurate. This would help in determination of appropriate quantity of GHGs and measures towards it reduction put in place.

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