
ORIGINAL ARTICLE

Accounting for Natural Resources: The Nigerian Experience

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Abstract: Nigeria is a country immensely blessed with various natural resources some of which have been and are being explored; some others have not yet been explored. However, the potential benefits of those resources to the nation and citizenry are far from realized for the larger part of the population. In this light, the study was designed to examine how natural resources accounting can be used to benefit Nigeria as a nation, and its citizenry. Two (2) research questions which equally reflect the two key variables in the hypotheses were formulated to guide the study. Relevant literature to buttress and illuminate the work was reviewed. The comparative advantage theory was adopted side-by-side to explain, analyze and possibly predict the outcome of the study. The survey method, a form of descriptive design was deployed as the main methodological tool to navigate the study. Both primary and secondary sources of data were considered relevant for material sourcing. The Pearson Correlation Coefficient analysis was considered as method for measuring, testing and analyzing the key hypothetical variables in the study. The findings reveal that natural resources accounting could significantly impact upon nation's development. Based on the findings of the study, recommendations were made.

Keywords: Natural, Resource, Accounting.

INTRODUCTION

Natural resources could be classified into two (2) categories, namely: Mineral and Environmental (Natural) resources. Mineral resources usually exist in the earth's crust and are usually mined through industrial processes which are often referred to as the extractive industry. These mineral resources (otherwise referred to as minerals) include Limestone, Iron ore, Tin, Columbite, Coal, Bitumen, Natural gas, to mention but a few. Environmental resources are nature's elements which support biological life. These elements include Rivers, forests, fertile (arable) land, Sunlight, mountains, to mention but a few. Nigeria as a nation is hugely blessed both in mineral and environmental resources. The need to make the best use of Nigeria's mineral and environmental resources has given rise to such a study as this.

Natural resource accounting is an accounting system that deals with stocks and stock changes of natural assets, comprising biota (produced or wild), subsoil assets

(proved reserves), water and land with their aquatic and terrestrial ecosystems (United Nations, 1997). It is frequently used in the sense of physical accounting as distinguished from monetary (environmental) accounting. Some nations of the developed economies have made some remarkable progress in Natural resources accounting. One of such nations is Norway. From observation of some of those nations, there is the need to improve the management of natural resources within a national context. In addition, there is the use as planning tools, highlighting the linkages between economic development, natural resource use and environmental concerns. The integration secures consistency between economic analysis and analysis of important environmental and resource issues such as air pollution and energy use. It is important to organize the natural resource accounts in a manner that facilitates its usefulness for analytical purposes. This will enhance the probability that the linkages between economic, natural resource, and environmental issues are brought to the attention of the decision makers suggested proposal of "correcting" GDP or other aggregates of the national accounts (Alfsen, 1994).

Alfsen (1994) explains the Norwegian model. Natural resource accounting in Norway is not considered as a goal in itself, but rather as a way of providing systematised data for analytical purposes. Thus, information based on the energy accounts and the associated emission inventories have been integrated into more comprehensive analytical tools by expanding the macroeconomic planning models. By integrating the resource and environmental data with economic models, several aims are achieved. First, consistency between economic planning, expected growth in energy use and the resulting emission to air is secured in the model based forecasts.

Second, by providing output tables covering economic, energy and environmental variables, the linkage between these policy areas is brought to the attention of the policy makers. Finally, by making a single modelling tool available to both the Ministry of Finance and the Ministry of the Environment (among others), communication and collaboration toward an integrated development model among the different branches of the government is enhanced and ensured. Given the several similarities between Nigeria and Norway in terms of mineral and environmental resources, and by virtue of the developmental progress Norway as a nation has made by taking advantages of these resources, it may be right for Nigeria to adopt some of the strategies Norway has used successfully.

STATEMENT OF THE PROBLEM

Nigeria is a country immensely blessed with various mineral and natural resources some of which have been and are being explored; some others have not yet been explored. It is well known that the country is a major producer of crude, a commodity that is of huge importance to the world economy. Apart from crude, the country is home to other mineral and natural resources such as Limestone, Iron ore, Tin, Columbite, Coal, Bitumen, Natural gas, to mention but a few. These minerals have the

capacity and potentials to increase the Gross Domestic Product (GDP) of the nation (and its people), industrialize the economy, lift the huge numbers among the citizenry out of poverty, and be of other immense benefits to the nation and citizenry. However, the potential benefits of those resources to the nation and citizenry are far from realized for the larger part of the population. Larger parts of the population languish in poverty and this continues from generation to generation. Some have described the experience of the nation as ‘Suffering in the midst of plenty’. This is a problem to Nigeria as a nation (and its citizenry). This has informed the carrying out of such a study as this to investigate how natural resources accounting can be used to make the natural resources of the country be of more benefit to the citizenry, and to help fulfil the potentials of the nation (and its people).

OBJECTIVE OF THE STUDY

The main objective of this study is to investigate the impact natural resources accounting can have in improving the lives of the people of the nation by taking advantage of the country’s natural resources. However, specifically, the study aims to examine:

1. How mineral resources accounting can be used to improve the livelihood and living standards of Nigerians
2. How environmental resources accounting can be used to improve the livelihood and living standards of Nigerians

RESEARCH QUESTION

The following research questions are formulated to guide the study:

1. To what extent can natural resources accounting of mineral resources be used to improve the livelihood and living standards of Nigerians?
2. To what extent can natural resources accounting of environmental resources be used to improve the livelihood and living standards of Nigerians?

RESEARCH HYPOTHESES

The following hypotheses tested in the study are hereby stated in null form:

1. Natural resources accounting of mineral resources would not significantly improve the livelihood and living standards of Nigerians
2. Natural resources accounting of environmental resources would not significantly improve the livelihood and living standards of Nigerians

LITERATURE REVIEW

The Concept of Natural Resources Accounting

Natural resource accounting is the compilation, within an accounting framework, of data relating to natural resources which are organised in terms of stocks

and flows. The term also covers the interpretation of data and reporting. Natural resources accounts may involve both physical units and monetary values. The resources in question may include both those which contribute to marketable forms of production as well as non-commercial or environmental resources such as air, water and biological life. Natural resource accounting may be applied not only at a macro-economic level (for example, in the compilation of national accounts), but also at a micro-economic level. Generally speaking, natural resource accounts are regarded as a means of creating linkages between the environment and the economy. One of the particularly thorny problems relating to natural resource accounting is the valuation of resources in monetary terms. There is now widespread international support for the concept and practice of natural resource accounting (Stuivelin, 1998).

The aim of natural resource accounting is to provide information on the state of natural resources and the changes affecting them. As such, it is therefore an important link in the chain of sustainable development. The term 'sustainable development' is taken to mean a form of development which is capable of meeting the needs of the present generation without jeopardising the ability of future generations to meet their own needs. Natural resource accounting is one of the tools which may be used to support environmental policy in ways that consistent with the ideals of sustainable development (Hamilton and Lutz, 1996). Generally speaking, natural resource accounting is seen as a means of demonstrating linkages between the environment and the economy. Natural resource accounts may contain either physical units or monetary values. Physical quantities are always a first, necessary step. Their inherent value lies in the fact that they provide a means for direct monitoring and for the evaluation of stocks and flows relating to the state of the environment (Stuivelin, 1998).

THEORETICAL FRAMEWORK

Comparative Advantage Theory

This theory was developed by a classical economist – David Ricardo in 1817 in his book on “The Principle of Political Economy and Taxation” in an example involving England and Portugal. However, England was relatively better at producing cloth, therefore, it made sense for England to export cloth and import wine from Portugal. The applicability of this theory to Nigeria is germane; by their very nature, these natural resources give a country that possesses them some advantage in their extraction and use over others (countries) that do not have them; the country has to make concrete, bold and sprinted efforts in addressing their needs, and discovering areas of comparative advantage. Viability of any states and ability to reduce poverty, create employment and contribute meaningfully to the centre depends largely on comparative advantage factor.

In the Nigeria context, the country is endowed with mineral resources such as petroleum, natural gas, limestone, to mention but a few. Petroleum and natural gas could serve as raw materials for the energy sector. Nigeria is therefore supposed to be able to

produce/generate energy at lower costs compared to other nations who do not have these mineral resources. Nigeria could thus be said to have a comparative cost advantage in the energy sector by virtue of these mineral resources. In the same way, limestone, for example, is raw material for the cement, building and construction industry. Nigeria has limestone in abundance. Nigeria should thus be able to produce these products at comparative cost advantage compared to others nation who have to import these resources.

This also applies to environmental resources of the nation. Fertile land gives comparative advantage for the cultivation of arable crops. Rivers give comparative advantage for the generation of hydro-electric power, production and harvesting of water-based sources of animal protein. Vast forests give comparative advantage for the cultivation and harvesting of timber, wild game reserves. Bright sunlight potentially gives comparative advantage for renewable energy generation. Nigeria has a lot to gain by taking of its potential comparative cost advantage in several sectors by virtue of its endowments in natural (mineral and environmental) resources.

RESEARCH METHODOLOGY

Research design

The research design adopted for this study is the survey method which is a form of a descriptive design entailing the structuring of investigation with a view to identifying variables and their relationship to one another. In other words, it represents the blueprint for the collection, measurement and analysis of research sample and data (Asika, 2002; Ndiyo, 2010; Kathori and Garg, 2014). The reason for this choice is that, as a systematic testing method, it offers the researcher the opportunity of synthesizing, integrating and interpreting, data and point to implications and interrelationship. Justifiably also, as posited by Asika (2002: 10) is the fact that “ the researcher is but interested in observing what is happening to sample subjects or variables without attempt to manipulate or control them” .

Sample/Sampling Procedure

To achieve the objective of this study, the multi-stage sampling technique involving both the stratified and simple random sampling techniques were deployed. First, two (2) strata are identified—Practitioners in finance/accounting, and practitioners in environmental management. In each stratum, fifty (50) persons (practitioners) are randomly selected for interview. The essence of further using the random sampling here is to give every member of the drawn population equal opportunity of being selected without biases whatsoever (Isangedighi, Joshua, Asim and Ekuri, 2004). This helped in attaining a sample size of 100 for the purpose of the study.

Sources of Data

The study depends largely on the two major sources of data collection—Primary and Secondary. The primary sources here include personal interview of experts in the fields of accounting and environmental management with the administration of structured questionnaire. These persons (interviewees) served as respondents for data collection for the study. Secondary sources was drawn from library works (books, journals, academic articles, conference papers, thesis, etc), periodicals—Magazines, Newspapers, Bulletins, etc.

Instrumentation and Data Collection Technique

The questionnaire was divided into two (2) major sections – ‘ A’ and ‘ B’ . The Section A contained the bio-data or status of respondents (e.g. sex, academic qualification, profession, etc.) while the Section B dealt with the situational variables being measured. Using the Likert scale of measurement, the Section B measured variables thus:

Strongly Agree (SA)	- 4 points
Agree (A)	- 3 points
Disagree (D)	- 2 points
Strongly Disagree (SD)	- 1 points

(A copy of the research instrument (i.e. the questionnaire) is attached as Appendix I to this document)

METHOD OF DATA ANALYSIS

The data shall be coded in a frequency percentage table but analyzed using the Pearson Product Moment Correlation. The method shall be used to test the variables and relationships contained in the two formulated hypotheses.

Correlation coefficient $r = (\sum xy - (\sum x \sum y)/n) / \sqrt{[(\sum x^2 - (\sum x)^2/n)(\sum y^2 - (\sum y)^2/n)]}$, where

X = Observation on Variable X,

Y = Observation on Variable Y,

n = number of observations.

RESULTS

Tests of hypotheses

Hypothesis One

Ho: Natural resources accounting of mineral resources would not significantly improve the livelihood and living standards of Nigerians

Hi: Natural resources accounting of mineral resources would significantly improve the livelihood and living standards of Nigerians.

Table 1 shows that the correlation coefficient R between Mineral Resources Accounting and Living Standards is 0.74 (74 percent), and the P-value is 0.047. Since P-value (0.047) is less than α (0.05), we do have enough to reject Ho, which states that Natural resources accounting of mineral resources would not significantly improve the livelihood and living standards of Nigerians. We therefore accept H1, and conclude that Natural resources accounting of mineral resources would significantly improve the livelihood and living standards of Nigerians. Further test shows that r (0.74) is greater than tabulated (critical) $R_{0.05}$ (0.16), we therefore reject H_0 and accept H_1 . Summary of response on the variables is attached as Appendix II to this document

HYPOTHESIS TWO

Ho: Natural resources accounting of environmental resources would not significantly improve the livelihood and living standards of Nigerians

H1: Natural resources accounting of environmental resources would significantly improve the livelihood and living standards of Nigerians

From the Table 2, it is shown that the correlation coefficient R between Environmental Resources Accounting and Living standards is 0.69 (69 percent), and the P-value is 0.041. Since P-value (0.041) is less than α (0.05), we do have enough evidence to reject Ho, which states that Natural resources accounting of environmental resources would not significantly improve the livelihood and living standards of Nigerians. We therefore accept, H1, and conclude that Natural resources accounting of environmental resources would significantly improve the livelihood and living standards of Nigerians. Further test shows that r (0.69) is greater than tabulated (critical) $R_{0.05}$ (0.16), we therefore

reject H_0 and accept H_1 . Summary of response on the variables is attached as Appendix II to this document.

Table 1: Correlation Analysis for Mineral Resource Accounting and Educational Development

		Min. Res. Accounting	Living standards
	Pearson Correlation	1	.74
Min. Res. Accounting	Sig.(2-tailed)		.047
	N	100	100
Living standards	Pearson Correlation	.74	1
	Sig. (2-tailed)	.047	
	N	190	100

Source: Field Work 2019

Decision rule: Reject null hypothesis if p-value of correlation coefficient < 0.05 . Use statistical tables to check whether the correlation coefficient (r) is significant at $P = 0.05$. If $r < r$ -value at $P=0.05$, fail to reject the null hypothesis and stop. Otherwise, reject null.

Table 2: Correlation Analysis for Environmental Resource Accounting and Educational Development

		Min. Res. Accounting	Living standards
	Pearson Correlation	1	.74

Min. Accounting	Res.	Sig.(2-tailed)		.047
		N	100	100
Living standards		Pearson Correlation	.74	1
		Sig. (2-tailed)	.047	
		N	190	100

Source: Field Work 2019

Decision rule: Reject null hypothesis if p-value of correlation coefficient < 0.05 . Use statistical tables to check whether the correlation coefficient (r) is significant at $P = 0.05$. If $r < r$ -value at $P = 0.05$, fail to reject the null hypothesis and stop. Otherwise, reject null.

CONCLUSION

Based on the findings of the study, the following conclusions are made:

1. Natural resources accounting of mineral resources would significantly improve the livelihood and living standards of Nigerians
2. Natural resources accounting of environmental resources would significantly improve the livelihood and living standards of Nigerians

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

1. Natural resources accounting should be judiciously carried out by the government using qualified personnel for the purpose of appropriately quantifying the value of the resources and their economic relevance
2. Natural resources accounting when (if) done in Nigeria should be made publicly available to the citizenry
3. Natural resources accounting when (if) done is not an end in itself, it is supposed to be used for economic and development planning. Economic and development plans should be drawn based on the findings of natural resources accounting in ways that make the best use of those resources not just for the short-term but essentially for the long term too.

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