Environmental Accounting and Modern Financial Reporting of National Environmental Development in Nigeria

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Abstract: **The study examines the relevance of environmental accounting to national development services in Nigeria especially the multinational oil operations. The production activities of the oil multinationals which have their impacts on the ecosystem and natural resources. This work was borne out of the expectation of the gap that exists between the multinationals companies operating in Nigeria and their host communities; years of neglect, environmental degradation, pollution and massive outcry for redress which resulted to arm struggle with attendant consequences. To this situation, environmental accounting applies to modern reporting and showcases the environmental liabilities and costs, which in turn massively threatening the subsistence economy and causes negative effects on the lives of people. A survey carried out from the oil companies operating areas in Nigeria that is the Niger Delta region. To this premise the findings showed that the practice of environmental accounting will help to bringing about an improved environmental sustainability and effective environmental management system in the Niger Delta region of Nigeria. The paper really concludes that the application of prudent environmental financial accounting will bring out environmental liabilities and costs of the oil producing areas to have proper sustainable measures. It is strongly recommended that the national oil and gas sector should adopt physical and monetary approaches as well as the petroleum/manufacturing sector to employ environmental accounting to properly access the costs.**

Keywords**: Environmental Accounting, environmental Financial, Accounting, Environmental Management Accounting, Ecological Accounting, Natural Resources Accounting**

I. INTRODUCTION

The relevance of environmental accounting to modern financial reporting and showcasing the interest of environmental accounting in quantifying the costs associated with oil multinational companies production activities and its impact on the ecosystem and natural resources especially the Niger Delta region of Nigeria.

In the last two decades, there has been an increasing awareness of environmental costs in implementation of production activities of the real sector and the extractive and exploiting oil companies especially the oil and gas sector. Environmental costs are those costs incurred in compliance with or prevention of breach of environmental laws, regulations and company policy (www.ecomail.2009). Environmental accounting has to do with issues of natural assets, environmental liabilities natural resources damages as well as environmental financial accounting, environmental cost accounting, ecological accounting and natural resource accounting (Farhgally, 1997).

Industries operations worldwide especially oil and gas sector, cause significant environmental liabilities with its associated financial effects. Oil industries are therefore becoming progressively more aware of the social and environmental liabilities pertaining to their operations and products (Environmental Protection Agency, 2000). These liabilities include impacts on the natural environment, conveyed through the three principal media; air, water and soil. Financial effects are lately more often portrayed in corporate images and reporting (Goodstein, 2002). However, some companies mostly in the developing countries still find it difficult to relate environmental liabilities to financial effects (Carter, Perruso and Lee, 2001).

Environmental accounting is an issue that has since the early 1970s gradually taken the centre-stage in international discussion. The movement for environmental accounting and conservation of natural resources began in the advanced countries. In 1992, the United Nations Framework Convention on Climate Change was signed by most countries to consider steps to reduce global warming and palliate climate change. In 1997, a treaty known as the Kyoto Protocol was signed, setting binding targets for 37 industrialized countries and the European community to reduce their greenhouse gas (GHG) emissions. It should be noted that environmental accounting and reporting awareness only began to feature prominently in the scheme of things in most developing countries in the decades of the 1980s and 1990s. This is not surprising. Third World countries confront more urgent problems of how to satisfy the immediate basic needs of the populace and are preoccupied with the attempt to generate faster rate of economic growth. The concern for the environment was thus considered premature by some analysts. It was indeed reasoned that Third World countries could ill-afford the luxury of being concerned with the environment at the expense of the attempt to break off the shackles of poverty and underdevelopment. Interestingly, most developing nations have today experienced serious effects of environmental

degradation. Environmental accounting can be used to demonstrate the potential for environmentally beneficial investments to yield significant financial pay-offs, through the avoidance of environmental liabilities (Hayden, 1989). While environmental accounting now forms part of industrial decision in first world countries, there is a dearth of similar commitment to the environment in the developing countries especially Nigeria as companies are still far behind in understanding and applying environmental accounting.

II. REVIEW OF RELATED LITERATURE

Conceptual Discourse

Environmental accounting has been described as these guidelines, aims at achieving sustainable development, maintaining favourable relationship with the community; and pursuing effective and efficient, environmental conservation activities. These accounting procedures allow a company to identify the cost of environmental conservation during the normal course of business, identify benefit gained from such activities, provide the best possible means of quantitative measurement (in monetary value or physical units) and support the communication of the results (Dixon et al, 1994, World Bank, 2000). Herein, environmental conservation is defined as the prevention, reduction and/or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster and other activities (Pearce and Turner, 1990).

According to International Federation of Accountants (1998) Environmental accounting is seen as the management of environmental and economic performance through the development and implementation of appropriate environmental related accounting systems and practices. This may include reporting and auditing in some companies, environmental accounting typically involves life cycle costing, full-cost accounting, benefits assessment and strategic planning for environmental management. A complementary definition given by Steele and Powell (2002) viewed environmental accounting as the identification, allocation and analysis of material streams and their related money flows by using environmental accounting systems to provide insight in environmental impacts and associated financial effects. Green (environmental) accounting involves the measuring of the environmental performance of an organization, including government bodies and manufacturers, in economic terms. Green accounting can be used to determine less tangible and external, cost for projects and activities such as bio-diversity, human health and aesthetic values.

According to FEE (1995): Environmental Accounting concerns the treatment of environmental issues within the financial statements and within environmental evaluations. Environmental reporting goes usually beyond financial reporting and might take place in a separate report or in separate sections of the glossy brochure (out-side the financial statements).The term Environment Accounting has been defined variously by different authors. Kelly (1981) is of the view that Environmental Accounting involves the provision of financial and Non-financial information relating to the environment and other items. Corner (2006:7) on his own defines Environmental Accounting as any form of accounting involving the collection, recording and reporting of internal and external information about the financial and nonfinancial impact of organizational activities upon individuals, society and the physical environment. Yakhou and Dorweiler (2004:65) however gave an all embracing definition. They defined Environmental Accounting as an inclusive field of accounting that provides reports for both internal use, generating environmental information to help make management decisions on pricing, controlling overhead and capital budgeting and disclosing environmental information of interest to the public and to the financial community. From the contributions of the above authors, it can be inferred that Environmental Accounting is an extension of the conventional financial accounting. The development of Environmental Accounting was as a result of the limitation of conventional accounting to measure and account for resources that don‘t only affect the financial stakeholders but also the non-financial stakeholders such as the society and environment. A good accounting system that indicates economic performance must .reflect sustainable income. Environmental Accounting - the entire domain of accounting for the environment including: financial accounting, reporting and auditing and environmental management accounting.

Environmental accounting as defined in these guidelines, aims at achieving sustainable development maintaining favorable relationship with the community, and pursuing effective and efficient environmental conservation activities.These accounting procedures allow a company to identify the cost of environmental conservation during the normal course of business, identify benefit gained from such activities, provide the possible means of quantitative measurement (in monetary value or physical units) and support the communication of its results (Dixon et al 1994 and World Bank 2000). Herein, environmental conservation is defined as the prevention, reduction, and/or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster, and other activities (Pearce and Turner, 1990). The environmental impacts are the burden on the environment from business operations or to other human activities and potential obstacles which may hinder the preservation of a favorable environment (www.epa.com 1995).

Environmental management can be defined as the process of allocating natural resources so as to make optimum use of the environment in satisfying basic human needs, if possible, for an indefinite period and with minimal adverse effects to the environment (barrow, 1997). However, the earth’s ecosystem cannot sustain current levels of economic activity and material consumption; therefore effective sustainability initiatives are required as basis of corporate environmental management frameworks to relieve pressure on ecological and social integrity (Wackernagel and Rees, 1996). Environmental

accounting is an innovative sustainability initiative. Coupled with the various standardized procedures and practices for effective environmental management, for example, ISo 14000 and Integrated Environmental Management Systems (EMS), defines the environmental management frameworks that exist at present that can assist companies in managing, measuring and improving the environmental aspects of their operations and within which industries must operate today (Grace, Perez, Maywah, 1999).

According to International Federation of Accounting (1998:2), "Environmental accounting is seen as the management of environmental and economic performance through the development and implementation of appropriate environment-related accounting systems and practices". While this may include reporting and auditing in some companies, environmental accounting typically involves life cycle costing, full-cost accounting, benefits assessment, and strategic planning for environmental management. A complementary definition given by Steele and Powell (2002) viewed environmental accounting as the identification, allocation and analysis of material streams and their related money flows by using environmental accounting systems to provide insight in environmental impacts and associated financial effects. Green (environmental) accounting involves the measuring of the environmental performance of an organization, including government bodies and manufactures, in economic term. It is a type of cost benefit analysis which relates to the monetary and physical assessment of environmental cost associated with the development and operational activities and the economic benefits of good environmental management and other actions (such as implementation of pollution prevention technology). Green accounting can be used to determine less tangible and external cost for projects and activities such as bio-diversity, human health and aesthetic values. It is also aimed at broader issues such as implementing sustainable business practice to conserve natural resources for future generations. It generally serve as a management tool which can be used for a variety of purposes such as improving environmental performance, controlling costs, investing in cleaner technologies, developing "greener" processes and products and informing decisions related to product mix, product retention and product pricing.

Basically, the objective of environmental accounting is to measure the effects of the actions of the organization upon the environment and to report upon those effects (Crowther, 2002). In other words the objective is to incorporate the effect of the activities of the firms upon externalities and to view the firms as a network which extends beyond just the internal environment to include the whole environment. In this view of the organization, the accounting for the firm does not stop at the organizational boundary but extends to include not just the business environment in which it operates but also the whole social environment. Environmental accounting therefore adds new dimensions to the role of accounting for an organization because of its emphasis upon accounting for external effects of the organization's activities. In doing so this provides recognition that the organization is an integral part of the society, rather than a self contained entity which has only an indirect relationship with society at large. This self-containment has been the traditional view taken by an organization as far as their relationship with society at large is concerned, with interaction being only by means of resource acquisition and sales of finished products or services. Recognition of this closely intertwined relationship of mutual interdependency between the organization and society at large, when reflected in the accounting of the organization, can help bring about a closer and possibly more harmonious relationship between the organization and the host community.

Theoretical Review

There are two main theories including physical approach and monetary theory that will be examined in the course of this discourse.

Physical approach/theory

This approach is concerned with physical auditing of the natural resources available to the nation per community and updates are kept on the usage but no monetary term is attached. This is considered necessary to know what the contingent liabilities the companies should make provision for in the short and long terms. This approach was propounded in the United States (UN. 1994).

Monetary Approach/Theory

Leed (1997) opine that there should be monetary value attached to each of the natural resource and the effect on production activities so as to help organization determine on the long run their assets and liabilities.

Figure 1: Approaches and Classification of Environmental Accounting

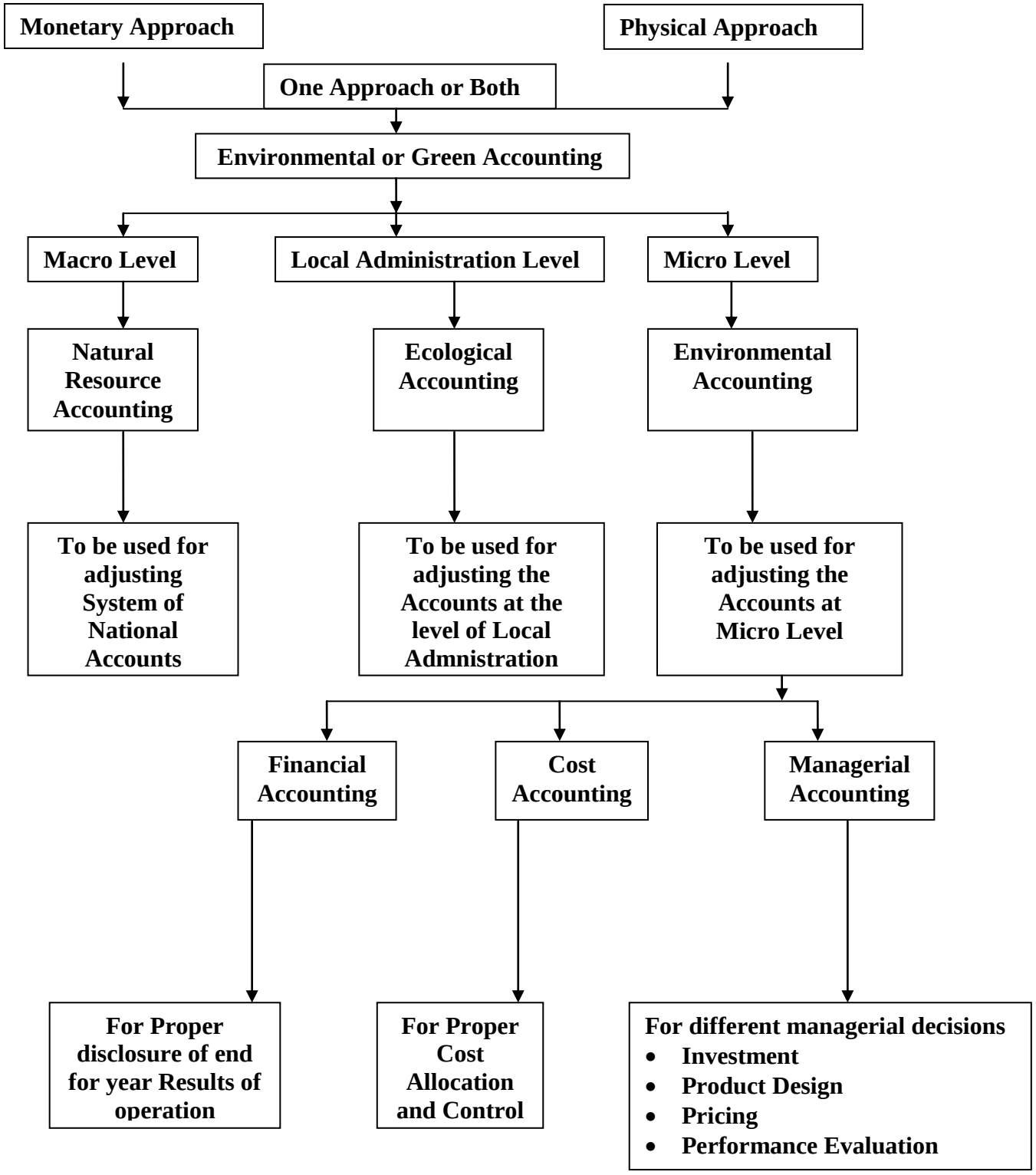

Table 1: Oil Operations and Their Impacts on the Environment

S/N	Activity Event	Actual And Potential Impact On The Environment
1.	Exploration-including geological surveys and geophysical investigations	Destruction of forest land, vegetation and farm land/human settlement. None pollution and vibration from seismic shooting. Effects on animals and nearby settlers (on shore and on fisheries (near/offshore). Disturbances of flora and fauna habitats. Dislocation of economic activity. Tension on the social environment due to compensation disagreements
2.	Drilling	Accumulation of toxic materials from drilling materials, oil pollution of the sea, beaches or land. Destruction of fisheries production. Destruction of breeding ground for some marine fisheries. Alteration of the taste of fish. Killing of bottom dwellers. Pollution of underground water (waste pots). Adverse health effect on humans, social tension arising from compensation disagreements from accidental spills from locations
3.	Product/ process (1) Plat forms and tank forms (2) Gas flaring	Water pollution from long term cumulative effects of produced water (with high salinity). Air pollution from gas and processing evaporation and flaring. Production of heat kills vegetation around the heat area. Suppresses the growth and flowering of some plants. Reduces agricultural productivity and wild life concentration in area.
4.	Refining Petroleum	Air pollution and waste water impacting negatively on human health and ecosystem.
5.	Oil spillage	Destruction of farmland, fishery and aquatic resources and mangrove ecosystem. Water pollution, Creates social tension due to compensation disagreements.
6.	Tanker loading location	Water pollution from ballast and tank washing. Deck drainage, spillage during loading operation.
7.	Storage depot	Land pollution from effluent water and solid waste of chemical cans and drums. Destruction of farmland for the establishment of storage depots, water pollution from effluent water. Air pollution from gaseous fumes during loading.
8.	Transportation	Disruption of the sea-bed by dredging for pipeline installation. Sedimentation along pipeline routes. Water pollution from consequences of leaks from fracturing or breaking of pipe caused by metal fatigue, trawlers and dredges or sea floor failures, and sabotage. Air pollution by transport tankers. Destruction of environmentally sensitive area e.g. lowland, where estuaries, wet lands and sand dune fields exist. Erosion and flooding of the area drastically affected.
9.	Marketing	Pollution of immediate environments from retail outlets. High hazard potential where located near residential buildings

Adapted from Orubu et al, (2002)

A careful analysis of Table 1 as observed by Orubu et al, (2002) shows that every aspect of oil operations, though in varying degrees, has significant negative implications for the environment. The second, and closely related to the first, is that in most cases all the facets of what constitute the environment are affected in one single operational line and thirdly, the effects of these various aspects of oil operations on the environment are not mutually exclusive, but rather reinforcing. Fourthly, is the fact that environmental consequences impose economic effects on the people, and finally, social tension tends to result from compensation disagreements arising from environmental damage claims by host communities.

In light of the problems identified above, accountants are of the opinion that the basic premise of environmental disclosure practice is that conventional accounting practices and existing operational and financial management within organizations obscure environmental information. By clarifying inputs, outputs, and impacts, the integration of environmental accounting can help companies and organizations develop an innovative solution that is targeted to achieving environmental sustainability in this region (Owolabi, 2000).

The Principles Of Environmental Accounting

There are three basic principles to environmental accounting as identified by Schaltegger, Muller, Hendrickson, (1996).

Sustainability

Sustainability is concerned with the effect which action taken in the present has upon the options available in the future. If the resources are utilized in the present then they are no longer available for use in the future and this is of particular concern if the resources are finite in quantity. This can be defined in terms of the carrying capacity of the ecosystem and described with input- output models of resource consumption (Hawken, 1993).

Accountability

Accountability is concerned with an organization recognizing that its actions affect the external environment and therefore assuming responsibility for the effects of its actions. This concept therefore implies a quantification of the effects of actions taken both internal to the organization and externally. More specifically the concept implies a reporting of those quantifications of all parties affected by those actions. This concept therefore implies recognition that organization is part of a wider societal network and has responsibilities to that entire network rather than just to the owners of the organization

Transparency

Transparency as a principle means that the external impact of the actions of the organization can be ascertained from that organization's reporting and pertinent facts are not disguised within that reporting. Thus all the effects of the actions of the organization; including external impacts should be apparent to all from using the information provided by the organization's reporting mechanisms. Transparency therefore can be seen to follow from the other two principles and equally can be seen to be a part of the process of recognition of responsibility on the part of the organization for the external effects of its

actions and equally part of the process of transferring power to external stakeholders.

Benefits of Environmental Accounting

The application of Environmental (Green) accounting derived the following benefit including;

- Environment Accounting is generally serve as a management tool which can be used for a variety of purposes such as improving environmental performance, controlling costs, investing in cleaner technologies, developing "greener" processes and products and informing decisions related to product mix, product retention and product pricing.
- The environmental accounting is to measure the effects of the actions of the organization upon the environment and to report those effects (Crowther, 2002).
- The integration of an environmental accounting system by organization will enhance the maximization of environmental resources, reduce waste and minimize environmental liabilities.
- An improved corporate image for the organizations which will translate into increased confidence of stakeholders, investors, insurers and financial institutions.
- Greater control of environmental performance. Environmental reporting allows organizations to present information on their environmental performance and also ensures that the host communities are aware of the measures being taken by organization to bring about environmental sustainability.

Functions and Roles of Environmental Accounting

The functions of environmental accounting are divided into internal and external functions.

(1) Internal Functions

One step of a company's environmental information system, internal functions makes it possible to manage environmental conservation cost and analyze the cost of environmental conservation activities versus the benefit obtained and promotes effective and efficient environmental conservation activities through suitable decision-making. It is desirable for environmental accounting to function as a business management tool for use by managers and related business units (Energy Planning Authority, EPA, 2000).

(2) External Functions

By disclosing the quantitatively measured result of its environmental conservation activities, external functions allow a company to influence the decision-making of stakeholders, such as consumers, business partners, investors, local residents and administrators. It is hoped that the publication of environmental accounting results will function both as a means for companies to fulfill their responsibility for accountability to stakeholders and simultaneously as a means for appropriate evaluation of environmental conservation.

Environmental Liabilities in Petroleum Sector

If the necessary measures to protect the environment are not applied there will be a severe environmental hazards and as a consequence a potential environmental liabilities for the entity sector (Pearce, 1994). Air pollution is one of the serious environmental problems in Nigeria generally which may have different economic impacts as follows:

Direct impacts that include:

- Health impacts (including treatment costs and death)
- Results in manmade asset deterioration and destruction and thus more expenditure for maintenance and replacement
- Less productivity, more absence from work and manpower turnover
- Deterioration for the surrounding areas and especially corps and agricultural land

Other Branches of Environmental Accounting

At micro level it means the entire domain of accenting for the environment including: financial accounting, auditing and environmental management accounting. [Environmental Protection Agency (EPA) 1995]

- *Environmental Financial Accounting*

This aims at the true disclosure in the financial statements at the end of the period. That is, it include environmental dimension in the published sheets of operations.

- *Environmental Management Accounting:*

This means the management of environmental and economic performance through the development and implementation of appropriate environment related accounting systems and practices. While this may include reporting and auditing in some companies, environmental management accounting typically involves life-cycle costing, benefits assessment and strategic planning for environmental management

- *Environmental Cost Accounting*

This deals with environmental costs in order to reach the full cost accounting i.e. the identification, evaluation and allocation of conventional costs, environmental costs and social costs to processes, products activities or budgets.

According to the Polluter Pays Principle (PPP) [Pearce, David, 1994] each polluter has to pay for the costs for dealing with the pollution resulting from his operation. Failure to beater these costs by the polluter will mean that some other party (a third party) will have to shoulder them – external environmental costs. The term environmental cost has at least two major dimensions: It can solely to costs that directly impact "Private Costs", It also can include the costs to

individuals, society and the environment for which a company is not accountable "Social Costs"

- *Ecological Accounting*

In many cases, the term Ecological Accounting is used to refer to the preparation of accounts according to physical data only. In addition, Ecological accounting is the type of Environmental Accounting (a dedicated type for Natural Resource Accounting at local administration level).

In this respect, Ecological Accounting is mainly used to prepare an asset management plans at local administration level (Osborn 2002)

III. METHODOLOGY

A basic survey was carried out from the oil companies operating areas of Nigeria (i.e. Niger Delta Region) mostly from the core areas that is Bayelsa, Rivers, Delta, Edo and Akwa Ibom States. The total population was one hundred respondents were administered with questionnaires but eighty copies was actually retrieved for analysis. The study employed both primary and secondary sources in generating the relevant data. The collected data were analyzed using simple percentage and frequencies as statistical tools. This is justifiable because to determine the practice of environmental accounting will bring and enhance improved environmental sustainability and proper environmental management be carried effectively and efficiently to bring about environmental liabilities, costs etc.

Study Data Analysis Table

S/No	Questions items	Yes	%	No	%
1.	Is it true that environmental accounting brings about environmental costs, liabilities to oil producing areas?	78	97.5	2	2.5
2.	Does environmental accounting needed to be kept by oil companies for environmental sustainability?	76	95	4	5

IV. RESULTS AND DISCUSSION OF FINDINGS

From the above table, it clearly shows that environmental accounting brings about environment costs, liabilities to oil producing areas in the Niger Delta region. Going by the analysis, 78 (97.5%) out of eighty respondents agreed to the above assertion. This is in line with Goodstein (2002) finding that the application of environmental accounting brings about environmental costs and liabilities.

Other result such that environmental accounting needed to be kept and maintained by any of the oil multinationals to determine such environmental costs, liabilities etc. By the researchers analysis, 76 (95%) are of the opinion that environmental accounting ought to operating on the application environmental accounting to ascertain and ensure environmental sustainability. This is in conformity with the findings of Steele and Powell (2002).

V. CONCLUSION AND RECOMMENDATIONS

In conclusion, environmental accounting needs to be operated by all oil companies, as a management tool to identify and control environmental costs and damages. Its practice is also used as to ensure environmental sustainability to the areas under study.

In order to effectively and efficiently manage environmental damages and degradation in such areas, then the following recommendations are proffered as remedies. They are as follows: include; national oil and gas sector should adopt physical and monetary approaches in their production activities. The petroleum and manufacturing companies are strongly advised to keep environmental accounting, environmental management accounting and rest of others. Finally, environmental Accounting and related matters should not be left to large firms only as even small entrepreneurs, community and all other stakeholders should be encourage to imbibe environmental accounting practices as well disclosure of Environmental impact/related activities in their annual reports and accounts. It is believed that the above recommendations if effected will return the assurance of the ordinary citizen in the government and the companies. It will also bring about a lasting peace in some troubled regions of Niger Delta area of Nigeria.

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