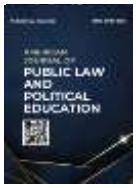

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Ecological Sustainability of Petroleum Resources Utilisation in Nigeria

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Abstract

Humans will continue to depend on their environmental resources for sustenance, sciences and development. The sustainability of the environment and ecological integrity has to be emphasised if the present development in technology and sciences would leave natural capital to the future generations. It is in the context of ecological integrity, restoration of the human environment and human health that discussions on sustainability are anchored. The context of sustainability is taken to be the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generation while maintaining its potential to meet the needs and aspiration of future generations. This article focuses on ecological sustainability of petroleum resources utilisation in Nigeria. The question sought to be answered is whether the Nigerian ecosystems can be said to be sustainable with the current methods of petroleum resources utilisation in Nigeria? This article adopts doctrinal methodology with data drawn from laws relating to sustainability and ecology as well as articles relevant to this discourse. It was found that the management of petroleum resources in Nigeria is not indicative of a planned sustainable ecosystem worthy to be bequeathed to the future generation. The article recommends urgent ecological and environmental management actions suitable for a biosphere which meet needs of present generation and not impair the potential for uses of same ecological resources by future generations.

Keywords: Ecological; Sustainability; Petroleum; Resources, Utilisation.

Introduction

Sustainability of the environment and by extension the ecosystem and restoration of human health in polluted areas often focused on activities of the polluter and government inability to make laws and enforce same against deleterious activities which damages the ecological systems. However, little attention have been paid to environmental management which actually organises activities and operations which may lead to the pollution and over use of environmental resources and dumping of waste on the ecosystem beyond that which it can accommodate.

This article argues that ecological sustainability in the Nigerian petroleum sector as it concerns petroleum resources utilisation in Nigeria concerns management: humans who make the plans and policies responsible for the utilisation of petroleum resources in a manner beyond the biological, chemical and environmental sustainability of the ecosystem should multidisciplinary approach to addressing petroleum utilisation for ecological sustainability. The burden of deleterious activities placed on the ecosystem arises from decisions of humans who control those directly involved in the operations which reduce natural resistance to pollution. These human decisions and control methods are responsible for the ecological concerns that the ecosystem will not be able to provide same potential of resources to the future generations if nothing is done to the management systems which control operations that affect the ecological systems.

Literature Review

Ecological Sustainability

Ecological systems enhance human existence and development. Most of the things human needs like food, materials for shelter, places of recreation, source of fuel are all made available in the ecological system (Daily, 1997b).[1] Ecological sustainability implements sustainable development in the ecosystems. Because of the composition, structure and function of the ecosystem, it might be over exploited by human activities leaving future generation at the mercy of not enjoying the same services provided by ecosystem to the present generation (Johnson, 1993).[2] Ecological sustainability is the practical approaches to ensuring sustainable ecological systems in places of productivities around the world. Everywhere human activities are likely to affect the ecosystem, ecological conservation and sustainability is then called to the fore (Dale, et al. 2000).[3]

The sustainability envisaged in this article are the ones proposed by the UNEP and others in 1980 when it said that sustainable development is the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations (Crabbe, et al. 2000).[4] Given several other definitions, the one given by the World Conservation Strategy, is apt when it said that sustainable development is "improving the quality of human life while living within the carrying capacity of supporting ecosystem" (Crabbe, et al. 2000:191).[5] The quality of human life sought to be improved by science and technology and development should be within the carrying capacity of the ecosystems to absorb damage done to it as well reinvent and retain the potential of same resources for future generations. Will the potentials of the resources utilised by available to future generations by the manner of usages the present generation have deployed so far? It is argued that sustainability has to do with the use of the vital functions (possible uses) of our biophysical surrounding in such a way that they remain indefinitely available. Can the management put in place for petroleum activities guarantee indefinite availability of these petroleum resources in years to come in their potential forms? Crabbe et al quoted the definition of ecological sustainability proffered by Groot, to mean "the natural limits set by the carrying capacity of the natural environment (physically, chemically and biologically), so that human use does not irreversibly

impair the integrity and proper functioning of its natural processes and components" (Crabbe, et al. 2000:192).[6]

Petroleum Resources Utilisation

Petroleum Resources Utilisation concerns all the uses to which petroleum can or is being put from exploration, exploitation and production as well as transportation and distribution. Every stage on the way of petroleum resources utilisation account for some level of ecological concerns; there is the need for environmentally friendly exploration and exploitation; ecologically friendly production and transportation systems; human health friendly refining and distribution of all that comes from or related to petroleum operations or activities in Nigeria; especially at the midstream and downstream sectors. Management of these whole process and activities for ecologically friendly environment, restoration of violated environment and implementation for ecological integrity are reasons to call for ecological stakeholders' involvement in decision making process which may affect their environment.

Natural Capital

Capital would mean, in the economics sense, land, labour and man. It extends to stock of real goods which has capacity to produce other goods. It includes the three factors of production from which wealth and welfare are derived by human beings. Therefore, capital has capacity to provide flows of goods and service in human society. Natural capital would then mean the stock of natural/environmental resources which flows goods and services in human society in the now or future (Crabbe, et al. 2000:192).[7]There are two major roles of natural capital: source and sink. It provides materials for exploitation and exploration; it as well absorbs the wastes resulting from the utilisation of the materials it gave to human kind for development (Kahn, 1995).[8] The maintenance of the natural capital is essential for sustainable utilisation of petroleum resources in Nigeria.

Methodology

Data are mainly sourced from books and articles on related topics and themes. Therefore, the doctrinal method is adopted in this article paving way for documentary evidence on points for discourse and proffering recommendation which will require policy action for ecologically sustainable utilisation of petroleum resources in Nigeria.

Research Analysis and Result

Ecological Sustainability of Petroleum Resources Utilisation in Nigeria

Ecological sustainability discusses concerns of capacity of the ecological system in absorbing the pollution done in it by petroleum resources utilisation (Ogolo and Anih and Onyekonwu, 2022)[9] in this context. The natural gas, crude oil, petroleum (Cherepovitsyn and Rutenko and Solovyova, 2021)[10] and other hydrocarbon related resources exploited for energy and national income; how are the uses to which they are put affecting the ecosystem and what is the possibility that the health of the ecosystem can be conserved for potential uses by future generation. This article does not negate socio-economical sustainability of national income to facilitate development in the country. But to what extent is national income reinvested in cleaning up and restoring the ecosystem integrity for future generations? The land (mangroves inclusive), the water bodies, air and atmosphere, human health, animal survival and specie protection and

preservation are all concerns in calculating the damage done to the ecosystem by the manner of exploration and production of petroleum resources particularly at the midstream and downstream sector as well as onshore (Siddharth, 2021).[11] There are evidences of lungs diseases caused by air pollution, yet the Agencies of government still grant flare permits.

Sciences have shown several endangered sea-creatures in the Niger-Delta area, oil-destroyed mangroves attest to this (Heim and Vigneau and Kalyuzhnova, 2021).[12] Loss of farm lands and fishing ponds due to exploration and production activities of the oil and gas international companies; all these account for how much the ecosystem and human health and survival have suffered in the course of petroleum resources utilisation in the country. Management systems engaged for ecological survival of the environment has to be formed, given policy strength and legal foundation with individual rights to take action for such agency where it has notice to act and fails or neglects to do so. There should be ecological governance systems which recognise the rights of the individuals who live at sites where petroleum utilisation activities take place (Bansard and Schroder, 2021)[13] are able to seek redress or remediation where they can prove threat to ecological health in their area or community.

Petroleum resources are generally utilised in the Nigeria sense through exporting for foreign earnings and deployment as fuel for engines and machineries or for electric power generation. The concentration to generate more foreign earnings heightens the neglect for ecological impact and methods/technologies deployed in petroleum exploration and production activities. Nigeria tends to consider budget proposals actualisation than preservation of the ecosystems which its future generations may benefit from. Both laws and policies tend to permit deleterious activities (sections 104&107 PIA, 2021)[14] so far as it generate income and boost gross domestic production which is a determinant in foreign loan acquisition by the natural resource blessed nation.

The petroleum resources of Nigeria are not viewed as an exhaustible fixed stock which diminishes with continued exploitation and exploration (Ola, 2019).[15] There is the argument that petroleum resources are not properly utilised. For example, natural gas; this is said be capable of generating electricity which the country currently needs for industrialisation. Natural gas can be converted into fuel for cooking and powering plants and industries. Yet this natural endowment known to be exhaustible is being flared for merely being mixed or associated with water or other fluid which has technological solution to. Technologies have improved for separation of association for less amount of financial commitment as is required for flaring or venting. Flaring or venting of natural gas is scientifically proven to be harmful to human health, environmental integrity and ecological sustainability in the country where it is carried out and the globe. Flaring and venting increases heat and encourages climate change, global warming and flood as well as lose of means of livelihood (Iremiren, 1992).[16]

The powers and functions of the institutions charged with petroleum resources utilisation in Nigeria besides their enabling Act, has to conform to the groundnum. The Constitution of Nigeria under section 20 envisages that policies and actions of government and its agencies will be to "protect and improve the environment and safeguard the water, air and land forest and wild life of Nigeria."[17]Though this provision is not actionable in Court; however, water, air and land are basic to the right of life and dignity of Nigerians as protected under sections 33 and 34 of the Nigerian Constitution. It follows therefore, that the reducing of water quality, impairment of air health value and pollution of land consists in violation of the actionable right to life and dignity (Gbemre v SPDC, 2005).[18]The position of this article is that functions assigned to the Nigerian Upstream Petroleum Regulatory Commission and the Nigerian Midstream and Downstream Regulatory Authority under sections 7 and 32 of the Petroleum Industry Act 2021 should be exercised

in conformity with Nigerians right to life which includes right to unpolluted air by authorisation to flare gas as well as their dignity of economic sustenance (Vasquez, 2016).[19]

Those who direct the operations in utilisation of petroleum resources must collaborate and synergise with those who control means of production and distribution to attain not just ecological sustainability but eco-social sustainability which holds sustainable development at all levels that may affect the environment particularly the ecosystems. It is not only the proper control and enforcement by NUPRC and NMDPRA that should put in place methods of control for petroleum resources utilisation but all who operate in the value chain of petroleum resources and the Agencies or institutions charged with their regulation must synergise to ensure natural capital are not deprived of its ability or capacity to perform the sink or absorb functions to the ecological systems (NUPRC, 204).[20] Sister-agencies in the main-stream economy and commercial sectors are to be educated on the requirement for coordinated joint activities and actions for sustainable development which places priority on all round enjoyment of nature's gift to the present generation while not jeopardizing or impairing the capacity of the future generation's enjoyment of same potentials. It was argued that the overlap among economic, social and environmental sustainability, particularly the strong linkage between economic sustainability and environmental sustainability are vital in realising ecological sustainability.

The Petroleum Industry Act 2021 in sections 104 and 107 allow appropriate petroleum regulatory institutions to permit gas flaring for venting, start-up and as it is deemed practice for safety of operations.[21] This normal practice in the course of petroleum utilisation creates heat in the case of gas flaring which causes disturbances to species of creatures in the land, mangrove or water bodies where such gas flaring take place. At a certain heat levels, these creatures or biodiversity is moved or moves to near extinction from their or its habitat. The identifiable natural creatures or biodiversities can be managed by enabling an artificial environment or creating reserves for them if future generations will enjoy certain potential which the present generations enjoy (United States Department of Energy, 2020).[22]

The characterisation of ecological sustainability in petroleum resources utilisation sought in this paper is in the pattern of petroleum resources utilisation which has particular effects on human health, environmental health, natural capital and ecological integrity discourse (Chijioke-Churuba, 2023).[23] Are there no combinations of sciences and technology that can improve petroleum utilisation without depleting the ecological systems in Nigeria? (Holland, et al. 2016)[24] What the cost to the government and companies involved in petroleum resources utilisation that is so much to be compared to bequeathing a natural capital worthy of same potentials as those the present generation enjoy. Sustainable management of petroleum resources utilisation programmes will enhance preservation of biodiversity and other ecological heritage biological, chemical and physical. It will moderate the purpose for petroleum resources utilisation and reinvestment from proceeds of petroleum activities (Bemberger, et a. 2012).[25]

A sustainable ecological system structure and processes is possible if it is situated in management strategies of planning, designing and implementation (Okeke, 2021).[26] Planning on how to utilise petroleum resource should accommodate planned actions for effects and remedies of such actions or activities on the ecosystems (Eweje and Pery, 2011).[27] These points to the fundamentals of environment assessment – putting into consideration at the planning stage the consequences of an activity intended to be initiated. A design will contain patterns of how to prevent or mitigate any possible impairment on the ecosystem from planned activity (Niesenbaum, 2019).[28] Ecosystems sustainability is not attainable in isolation of ecological diversity and plant sphere diversity as well as animal diversity in their

community (New South Wales, 2019).[29] Ecological sustainability is attained with ecosystem composition, structure and processes yielding consistent value at every generation in air quality, land resourcefulness, water purity, biodiversity retaining its character and natural habitat etcetera (Imoobe and Tanshi, 2009).[30]

Ecological management will require those saddled with the responsibility of petroleum utilisation to ensure restoration of damaged environmental health – predetermined or to be determined by set patterns environmental indicators or occurrence of activities in the particular area or community (Orji, 2018).[31] Environmental integrity should be maintained, human health should be studied and treatment served, preventives to biodiversity extinction and mitigation against threats to human, animal and plant life should rank top in the watch list.

Recommendation

There should be set up a management group for ecological health monitoring and enforcement in communities which will ensure urgent ecological and environmental management actions suitable for a biosphere which meet needs of present generation and not impair the potential for uses of same ecological resources by future generations.

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