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Women and the environment pollution in Nigeria: the experience of rural women of the Niger delta

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Article Info

Abstract

The study examined Women and the environment in Nigeria:The experience of rural women of the Niger Delta. The study employed the survey research design. The population of this study consists of all the eight Local Government Areas. they are Ekeremor, Kolokuma/Opokuma, Yenagoa, Nembe, Obio/Akpor, Ikwerre,Ahoada West, and Ahoada East local government councils in Bayelsa State, Nigeria The sample size therefore was determined by using the Taro-Yamen's formula and the sample size was 200. The statistical analysis of data in this study involved the following frequency tables, percentages, Pearson's Product Moment Correlation Coefficient, (r) with the use of statistical package for social science (SPSS) version 21.0. Thus our interpretation of r and the level of statistical significance was strictly based on the SPSS output. Thus, the study used both descriptive and inferential analyses. Descriptive analysis was used to determine the extent of relationship between internal audit and audit report quality, while the inferential analyses (Pearson's r) was used to test the hypotheses. There is a positive and a strong relationship between financial audit and faithful representation, there is a significant relationship between environmental pollution and rural women access to water supply for drinking and cooking in the Niger Delta. there is a significant relationship between environmental pollution and shortages of food, fish/seafood and fuel wood for rural women in the Niger Delta. there is a significant relationship between environmental pollution and reproductive health of rural women in the Niger Delta. In view of the findings of this study therefore, the following recommendations are made the management of oil companies in the Niger delta should put in place measures that will make their operations environmentally friendly to guard against further environmental pollution, make provision for sustainable source of water supply for their host communities, carry out empowerment scheme to enable the rural women have alternative source of income since they can no longer depend on the mangrove ecosystem and farmland which hitherto was their major means of livelihood also built and equip cottage hospitals in the host communities to carter for those already affected and potential victims of reproductive health challenge.

Keywords: pollution, environment, Women, health

Introduction

Women and children are vulnerable to the effects of environmental degradation because of their close link with nature. This reasoning is hinged on ecofeminism, a theory which states that the oppression of women is fundamentally linked to the wanton destruction of nature by human activities. The close link is derived from the woman's primary role in the family through fetching water, gathering foods and providing fuel for the use of the family and the community at large.

The effects of environmental degradation affect the lives of men, women and children, but the impact is more on the female gender in Nigeria, especially in the Niger Delta area in the South-South region of Nigeria. A brief history of Nigeria is imperative for a better understanding of the effect of environmental degradation on the lives of the people.

In the Niger Delta rural communities in Nigeria and the developing world, there exist different types of economies and two principal ones are the traditional agricultural economy and the emerging modern industrial economy. These different types of economy have different type of relations with the natural environment, thus while the traditional agricultural economy depends largely on the environment for its productive activities, the modern industrial economy on the other hand uses the environment as its disposal web, discharging waste, emissions, hazardous substances and hydrocarbon spills into it, thereby causing damages and losses in value to environmental capital (resources). This environmental capital includes fresh water swamp, rain water, farm land, forest, mangrove vegetation, wetlands/creeks etc. As contained in the European communities interim report on the Economics of Ecosystem and Biodiversity ''Humanity receives countless benefits from the natural environment in the form of goods and services such as food, wood, clean water, energy, protection from floods, and soil erosion. Natural ecosystem is also, the source of many lives saving drugs as well as providing sink for our wastes, including carbon''. It is imperative to note that, in the Niger Delta Rural communities, the local population including women depends on the environment primarily for livelihood source including farming, fishing, water supply, fuel wood, food supplies, forest resources/medicinal herbs. For instance, rural women in the region depend on streams /river, well/borehole and rain water (which are located in the environment) for drinking, cooking and washing.

The Niger Delta is the delta of the Niger River sitting directly on the Gulf of Guinea on the Atlantic Ocean in Nigeria (Isumonah , 2013) [5]. It is typically considered to be located within nine coastal southern Nigerian states, which include: all six states from the south south geopolitical zone. (Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers). However, of all the states that the region covers, only Cross River is not an oil-producing state presently due largely to the green tree agreement which annexed the bakassi peninsula to Cameroun republic.

The Niger Delta is a very densely populated region sometimes called the Oil Rivers because it was once a major producer of palm oil. The area was the British Oil Rivers Protectorate from 1885 until 1893, when it was expanded and became the Niger Coast Protectorate. The delta is a petroleum-rich region and has been the centre of international controversy over pollution.

The Niger Delta region occupies about 70,000 km2 (27,000 sq. mi) and makes up 7.5% of Nigeria's land mass. Historically and cartographically, it consists of present-day Bayelsa, Delta, and Rivers States. In 2000, however, Obasanjo's regime included Abia, Akwa-Ibom, Cross River State, Edo, Imo and Ondo States in the region.River, Delta, and Rivers.

The Niger Delta and the South-South geopolitical zone (which contains six of the states in Niger Delta) are two different entities. The Niger Delta separates the Bight of Benin from the Bight of Bonny within the larger Gulf of Guinea.

The region has an approximate population of forty five million, seven hundred and fifteen thousand (45,715,000) people (National Population Commission 2020) of about more than 40 ethnic groups including the Bini, Itsekiri, Efik, Esan, Ibibio, Annang, Yoruba, Oron, Ijaw, Ogba, Ikwerre, EtcheAbua/Odual, Isoko, Urhobo, Ukwuani, Kalahari, Okrika, Ogoni, EpieAtissa people and Obolo people, are among the inhabitants of the political Niger Delta, speaking about 300 different dialects. The major language groups spoken in the Niger Delta include the Ijaw languages, Itsekiri language, Ogoni language, Annang language, Ibibio language and Central Delta languages etc.

In most rural communities in the developing world, there exist different types of economies and two principal ones are the traditional agricultural economy and the emerging modern industrial economy. These different types of economy have different type of relations with the natural environment, thus while the traditional agricultural economy depends largely on the environment for its productive activities, the modern industrial economy on the other hand uses the environment as its disposal web, discharging waste, emissions, hazardous substances and hydrocarbon spills into it, thereby causing damages and losses in value to environmental capital (resources). This environmental capital includes fresh water swamp, rain water, farm land, forest, mangrove vegetation, wetlands/creeks etc. As contained in the European communities (Albert, *et al*. (2018) [1] interim report on the Economics of Ecosystem and Biodiversity ''Humanity receives countless benefits from the natural environment in the form of goods and services such as food, wood, clean water, energy, protection from floods, and soil erosion. Natural ecosystem is also, the source of many lives saving drugs as well as providing sink for our wastes, including carbon''. It is imperative to note that, in the Niger Delta Rural communities, the local population including women depends on the environment primarily for livelihood source including farming, fishing, water supply, fuel wood, food supplies, forest resources/medicinal herbs. For instance, rural women in the region depend on streams /river, well/borehole and rain water (which are located in the environment) for drinking, cooking and washing.

Statement of Problems
In most rural communities in the developing world, there exist different types of economies and two principal ones are the traditional agricultural economy and the emerging modern industrial economy. These different types of economy have different type of relations with the natural environment, thus while the traditional agricultural economy depends largely on the environment for its productive activities, the modern industrial economy on the other hand uses the environment as its disposal web, discharging waste, emissions, hazardous substances and hydrocarbon spills into it, thereby causing damages and losses in value to environmental capital (resources). This environmental capital includes fresh water swamp, rain water, farm land, forest, mangrove vegetation, wetlands/creeks etc. As contained in the European communities (Ayanalde, Proske (2015) [2] interim report on the Economics of Ecosystem and Biodiversity ''Humanity receives countless benefits from the natural environment in the form of goods and services such as food, wood, clean water, energy, protection from floods, and soil erosion. Natural ecosystem is also, the source of many lives saving drugs as well as providing sink for our

wastes, including carbon''. It is imperative to note that, in the Niger Delta Rural communities, the local population including women depends on the environment primarily for livelihood source including farming, fishing, water supply, fuel wood, food supplies, forest resources/medicinal herbs. For instance, rural women in the region depend on streams /river, well/borehole and rain water (which are located in the environment) for drinking, cooking and washing.

It is against this background that this study is aimed at investigating Women and the environment in Nigeria: The experience of rural women of the Niger Delta.

Aim and objectives of the study
The major objectives of the study is to examine Women and the environment in Nigeria: The experience of rural women of the Niger Delta. Other specific objectives are to;
1. Determine the impact of environmental pollution on rural women access to sources of water supply for drinking and cooking in the Niger Delta.
2. Ascertain the impact of environmental pollution on farm produce, fish/seafood and fuel wood availability for rural women accessibility in the Niger Delta.
3. Investigate the impact of environmental pollution on reproductive health of rural women in the Niger Delta.

Research Questions
1. To what extent has environmental pollution affected Niger Delta rural women access to sources of water supply for drinking and cooking?
2. In what way has environmental pollution affected farm produce, fish/seafood and fuel wood availability for rural women in the Niger Delta?
3. To what extent has environmental pollution affected reproductive health of rural women in the Niger Delta?

Hypotheses
The following null hypotheses were stated for the study:
Ho_1: There is no significant relationship between environmental pollution and rural women access to water supply for drinking and cooking in the Niger Delta.
Ho_2: There is no significant relationship between environmental pollution and shortages of food, fish/seafood and fuel wood for rural women in the Niger Delta
Ho_3: There is no significant relationship between environmental pollution and reproductive healthof rural women in the Niger Delta.

Conceptual Review
Concept of Women
A woman is an adult female human Albert, *et al*., (2018) [1]. Prior to adulthood, a female human is referred to as a girl (a female child or adolescent). The plural *women* is sometimes used in certain phrases such as "women's rights" to denote female humans regardless of age.

Typically, women inherit a pair of X chromosomes from their parents, and are capable of pregnancy and giving birth from puberty until menopause The Economics of Ecosystem and Biodiversity (2008). More generally, sex differentiation of the female fetus is governed by the lack of a present, or functioning, SRY-gene on either one of the respective sex chromosomes Ayanalde, Proske

(2015) [2]. Female anatomy is distinguished from male anatomy by the female reproductive system, which includes the ovaries, fallopian tubes, uterus, vagina, and vulva. The adult female pelvis is wider, the hips broader, and the breasts larger than that of adult males Efe & Mogborakor (2008) [3]. Women have significantly less facial and other body hair, have a higher body fat composition, and are on average shorter and less muscular than men.

Concept of Environment
The natural environment or natural world encompasses all living and non-living things occurring naturally, meaning in this case not artificial. The term is most often applied to the Earth or some parts of Earth. environment, the complex of physical, chemical, and biotic factors that act upon an organism or an ecological community and ultimately determine its form and survival. Environmental geography is the branch of geography that describes the spatial aspects of interactions between humans and the natural world.

Concept of Environmental Pollution
Environmental pollution is defined as "the contamination of the physical and biological components of the earth/atmosphere system to such an extent that normal environmental processes are adversely affected. Environmental pollution is increasing gradually and causing a serious impact on living organisms including humans Isumonah, (2013) [5]. It can be reduced by microorganisms or plants that have biosynthetic pathways for the degradation or accumulation of environmental pollutants from soil and water Nwilo, & Badejo (2011) [8]. Lack of genetic components in natural microorganisms or plants lessens their ability to degrade or accumulate pollutants and hence is currently released at high rates.

Environmental pollution is not a new phenomenon, yet it remains the world's greatest problem facing humanity, and the leading environmental causes of morbidity and mortality. Man's activities through urbanization, industrialization, mining, and exploration are at the forefront of global environmental pollution Nwilo & Badejo (2008) [7]. Both developed and developing nations share this burden together, though awareness and stricter laws in developed countries have contributed to a larger extent in protecting their environment Oku, (2014) [9]. Despite the global attention towards pollution, the impact is still being felt due to its severe long-term consequences.

Environmental pollution is unwarranted disposal of mass or energy into earth's natural resource pool such as water, land, or air that results in long- or short-term detriment to the atmosphere and its ecological health to negatively impact the living beings and their life both quantitatively and qualitatively (Hussain, 1998). Environmental pollution reflects a measurement of contamination of the living and nonliving (physical and biological) constituents of the earth, in a manner and to an extent, to adversely affect the normal optimum environmental processes (Kemp, 1998). The pollutants may yield primary or secondary damages, of which the primary damage can be quantified and its impact monitored Schwartz, Woodruff, (2016) [10]. The secondary damage, on the other hand, occurs as a marginal disturbance to the delicately poised biological food web pyramid balance and can be noticed only over prolonged durations (Gheorghe & Ion, 2011).

Environmental Pollution in the Niger Delta

The key environmental issues in the Niger Delta of Nigeria relate to its petroleum industry. Sadly, the advent of oil production has also negatively impacted the Niger Delta region due to unprecedented oil spillage which has been on-going for the past 5 decades making the region one of the most polluted in the world. It is estimated that while European Union experienced 10 incidence of oil spills in 40 years, Nigeria recorded 9,343 cases within 10 years. The carelessness of the oil industry has also precipitated this situation, which can perhaps be best encapsulated by a 1983 report issued by the NNPC, long before popular unrest surfaced: (Albert, et al 2018) [1]

We witnessed the slow poisoning of the waters of this country and the destruction of vegetation and agricultural land and good water source by oil spills which occur during petroleum operations. But since the inception of the oil industry in Nigeria, more than sixty years ago, there has been no concerned and effective effort on the part of the government, let alone the oil operators, to control environmental problems associated with the industry' (Vidal, John 2010)

The resultant environmental degradation from gas flaring, dredging of larger rivers, oil spillage and reclamation of land due to oil and gas extraction across the Niger Delta region costs about US$758 million every year (Ayanlade, P.,2015).

In a related development, aUNDP report has it that there have been a total of 6,817 oil spills between 1976 and 2001, which account for a loss of three million barrels of oil, of which more than 70% was not recovered (Niger Delta Human Development Report 2011). 69% of these spills occurred off-shore, a quarter was in swamps and 6% spilled on land.

The Nigerian National Petroleum Corporation places the quantity of petroleum jettisoned into the environment yearly at 2,300 cubic metres with an average of 300 individual spills annually (The Price of Oil Human Rights Watch 2009) However, because this amount does not take into account "minor" spills, the World Bank argues that the true quantity of petroleum spilled into the environment could be as much as ten times the officially claimed amount (Moffat and Linden1995). The largest individual spills include the blowout of a Texaco offshore station which in 1980 dumped an estimated 400,000 barrels (64,000 m3) of crude oil into the Gulf of Guinea and Royal Dutch Shell's Forcados Terminal tank failure which produced a spillage estimated at 580,000 barrels (92,000 m3).(Nwilo and Badejo 2004).

In this study environmental pollution refers to industrial waste disposal, seismic operations, hazardous substance, gaseous emission/flare and oil spill. However, gas flare and oil spill constitute the major source of environmental pollution in the region. These pollutants diminish property value and health of the people of the oil bearing communities. In our cases firms including international oil companies (IOCs) released pollution (e.g flare and spill) into the environment which degrade environmental resources of water bodies, farmland and mangrove ecosystem. Toxicity of spill cause injury to ecosystem stability, resulting mortal damages to marine fish and fisheries, threaten and destroying biodiversity habitat.

Again, environmental pollution such as seismic operation, gas flare and oil spill has become intensive and regular thereby causing severe damageto farmland, leading to destruction of crops, infertility of the farmland, resulting in poor harvest of farm produce.

Oil spill leak and infiltrate underground water current, well/borehole and discharge into fresh water swamp such as streams, rivers, rendering such water bodies unsafe and not unclean for usage by the host communities (Isumonah, 2013) [5].

Sources of Water supply

According to National Bureau of statistics (2007) [6], ''the major sources of water supply for household in the Niger Delta region are streams, rivers and rain water''. These freshwater bodies are located in the environment and constitute a resource to the local population of the Niger Delta. They depend on it for their drinking and cooking as well as other domestic usage. Before the incessant and intensive environmental pollution of seismic operations, gas flare and oil spill, fresh water bodies of the streams, river, well, borehole were in abundance and in safe state in the Niger Delta environment for drinking, cooking, washing, bathing and domestic needs of the local people especially women. Thus, the percentage of the rural women without access to source of water supply was low.

The narrative have change, freshwater bodies in some instances are no more due to pollution while existing ones are contaminated and are no longer clean and safe for use, hence access to source of water supply has become a key issue causing severe deprivation and poverty Nwilo & Badejo (2008) [7].

Mangrove/Wetland Ecosystem and farmland

Kathiresan et al. (2001) opined that, ''mangrove are woody plants that grow at the interface of between land and sea in tropical and sub-tropical latitudes where there exist in conditions of high salinity, extreme tides, strong winds, high temperature and muddy anaerobic soil''. Key characteristics of mangrove is that they grow along tidal estuaries in salt marshes and on muddy coast with roots, trunks, leaves and branches which play host to other group of organisms such as crabs species , oyster shrimps, mub lobsters live among the roots, the trunk or even forage in the canopy. Insects, reptiles, amphibians, seabirds and mammals thrive in the habitat and contribute to its uniqueness.

Wetland is also an area or mass of marshes covered with saline water (salt water) which are tidal. Thus wetland buffer stormy seas, slow shorelines erosion, provide vital food and habitat for crabs, juvenile fish, as well as offering shelter and resting sites for several species of migratory water fowl.

Creeks is a coastal or marine inlet and surrounded by wetland (tidal marshes) and mangrove in which water flow in and out base on tidal cycle. Some creeks are quite shallow and due to tidal current, there exists instances of inter-tidal mudflats. Creeks are rich areas for aquatic life and support complex food webs, serve as nursery for fishery breeding, providing food and habitat to numerous species of fish and seafood. Creeks also serve as fish hunting ground for the locals.

Farmland Women Reproductive Health

The Association of Reproductive Health Professionals (ARHP) in the 2016 edition of their journal clearly establishes the link between environmental pollution and reproductive health. This added to the increasing body of evidences that environmental contamination in the Niger Delta adversely impact on health particularly women's reproductive health (ARHP 2016). According to (Schwartz, and Woodriff 2008) women's exposure to environmental pollution contributes to a variety of adverse effects on

reproductive health. These effects causes various forms of reproductive health challenges including early/delayed puberty, irregular menstrual cycles, abnormal foetal development/disorder, pregnancy loss, infertility, subfertility, low birth weight, premature birth and structural (e.g. cardiac defect) or functional (e.g. learning disability) birth defects (Schwartz *et al.* 2016) [10].

There are multiple pathways of exposure to pollution in the region, at home, on the farm and in the creeks. Environment here refers to everything (living and non-living) that affects the survival of organism; including man (Schwartz *et al.* 2016) [10] these include air, water, soil, food, temperature etc. From the foregoing, knowledge of health implication of pollution is essential in the Niger Delta.

Expert opinion sought from the health facilities in the region mostly attended by women affected by pollution suggests that different aspects of the Niger Delta environment such as physical, biological, cultural and technological tend to affect the health status of the rural dwellers especially women. The opinion asserts that toxic chemicals inherent in oil pollution can cause serious health issues such as cancer, lung diseases, miscarriages and pregnancy complications (UNEP Report 2011).

The researchers also visited the Otuesega cottage hospital in Bayelsa state where the women of the community and their neighbouring communities seek medical attention. One of the senior medical Doctors we interacted with at the facility confirms that oil pollution has actually ravaged the lives of women in the community. He reported that women in the Niger Delta and particularly Otuesega are exposed to environmental toxins daily in the homes, farmland and in the creeks. He further said because the environment is toxic, women are exposed to various harmful environmental contaminants which act as endocrine disrupters in their bodies. He further disclosed that when pollution gains access to the body of the women, it interfere with reproduction, release, transport metabolism and other action performed by the body's hormone leading to hormonal disorder, reduced by infertility and uterine cancer later in life. Sometimes it distortsfoetus formation, leading to complication during child birth. This usually led to infant and maternal mortality Nwilo and Badejo (2008) [7].

Theoretical Review
The theories highlighted in this work include the following:

Environmental Kuznets Curve theory
The Environmental Kuznets Curve theory argues an inverted-U relationship between environmental degradation and GDP per capita. Thus relating the Environmental Kuznets Curve theory to poverty as argued in this present study, as environment quality deteriorates due to factors as carbon dioxide emissions, unclean water, poor sanitation, fossil fuels use and so on, poverty results on account of both the effect of the environmental quality factors on health as well as the costs involved in improving environment quality, and GDP per capita is consequently low. Therefore poverty may be viewed as a channel of transmission of poor environment quality to low GDP per capita in line with the arguments of the Environmental Kuznets Curve theory.

Data employed in this study is secondary data sourced from World Bank World Development Indicators (WDI). Data is annual data covering the period of 1990 to 2015. Poverty (POV) is obtained by using GDP per capita as a proxy in the absence of traditional poverty indicators as the multidimensional poverty index, total poverty gap or head count index for which data for Nigeria is unavailable. Higher values of GDP per capita reflect lower poverty and vice verse. However in order for easy interpretation of results, the GDP per capita variable is multiplied by "-1" to obtain the poverty indicator so that higher values of the poverty indicator reflect high poverty and vice versa. Data on carbon dioxide emission is in metric tons per capita I.e, carbon dioxide emissions in metric tonnes divided by population. Fossil fuels consumption (FOSF) is measured as a percentage of total energy consumption. Oil, products of natural gas, coal and petroleum together constitute fossil fuel. Access to Electricity (ATE) is the percentage of the total population with access to electricity. Access to Sanitation (ATS) is the percentage of the total population using basic sanitation services. Primary School Enrollment (PSE) refers to the number of individuals that have been registered to undertake education at primary school level, as a percentage of the population of individuals in the age category of those that are officially recognized as primary school students.

Empirical Review
Impact of Environmental Pollution on Rural Women in the Niger Delta
Environmental pollution impacts both men and women in the Niger Delta dispassionately. Given their divers' roles and responsibilities in the household and in the society, the rural women in the Niger Delta region are more impacted during oil spills (pollution). Women of the region had long healthy relationship with their environment. Women connection with the environment is demonstrated in their heavy reliance on the environment for their survival and the vital role they play in environment management.

Prior to the oil production, the Niger Delta women depended on the rich mangrove and rain forest resources to meet their needs. As construed by Omeire, Edward, Uche (2014) women of the Niger Delta region were the primary users of the forest and it associated resources through their inputs in food production such as fishing, wood collection for fuel, for arts and design etc. Consequently, the loss of biodiversity (supportive species and habitat) due to oil exploration activities impacted on women and regrettably, the oil producing economies in general have.

It is obvious that women have lost their means of livelihood as a result of oil extraction and consequently should have been the most beneficial to any form of remediation and compensation. Unfortunately, the activities of the oil companies neither promote the integration of women into the formal labour force nor provide any structured training for skill acquisition. It should be noted that no action has been conceived either by the government through its agency or the private sector to involve women of the region in alternative means of livelihood to which such involvement should not have been negotiable. Thus a typical Niger Delta woman whose means of livelihood is dependent on the farming or fishing is plunged into deeper lack and consequently abject poverty.

Impact of Environmental Pollution on Rural Women Access to Sources of Water Supply in the Niger Delta
United Nations Development Programme (UNDP) on measurement of poverty had introduced Human poverty Index (HPI) with three (3) key deprivations as measurement

criterion of poverty. The third deprivation is measured by the percentage of people without access to safe drinking water, plus percentage of children who are underweight for their age. The HPI identified clean and safe water sources as an economic resources and maintain that non- access to clean and safe drinking as a deprivation.

Oku (2014) [9] identified water as a major natural resources of the Niger Delta, he posit that the first settlers have been slummed by the volume of its availability''. Rural women in the region depend on natural water supplies including streams, rivers, rain water for their water heads and these water heads are located in the environment.

Water is life, and water contamination due to pollution deprives rural women access to this basic needs. The findings of Efe *et al.* (field work 1997-2007) on the effect of oil pollution on sources of water supply in Niger Delta shows that, predominant water sources in the Niger Delta region include streams, rivers, rainfall and borehole/well and these water sources are primarily contaminated through oil spillage discharge, toxicity and disposition and acidity of rain water.

Impact of Environmental Pollution on Farm Produce, Fish/Seafood and Fuel Wood Availability for Rural Women in the Niger Delta.

The Niger Delta landscape is dominated by rich soil ecosystem and vast mangrove/wetland which has invariably made farming and fishing the most common occupation and livelihood sources of its dwellers especially women. ''Oil production in the Niger Delta region has been intensive with frequent and often under reported'' (Steiner 2008) [9]. These frequent incidences of oil spill have severe consequences on farmland, fertility and mangrove/wetland sustained habitat for fish/fisheries. Zabbey (2005) assert that, persistence spillage has deleterious effects on the ecosystem stability and local biodiversity which the people's livelihood depends on.

Research finding reveals that, extensive mangrove in the delta region has been converted for use of oil industry infrastructure. Again, mangrove clearance or destruction amounts to loss of fishing ground, aquatic breeding ground/habitat and loss of energy source (fuel wood) to the rural women. World Bank survey report (2005) on mangrove conversion in Rivers and Bayelsa states of Nigeria by SPDC alone for purposes of oil and gas activities attest for the above claim. See table below.

Table 1: impact of SPDC operation on ecosystem in the Niger delta

S/N	Activity	Area Covered
1	Seismic lines	66, 0000 km
2	Drilling	349 sites
3.	Flow lines	700 km
4.	Pipelines	400 km
5.	Flow station	22 sites
6.	Terminal	1 site

Source: Nwilo and Badejo (2008) [7]

It is pertinent to emphasize, that rural women of the Niger Delta depends largely on the mangrove ecosystem for eco-services of food, fuel wood, provision of seafood, shelter/construction and pharmaceutical herbs and earn income from the aforementioned economic activities. These productive activities which the women engaged in, lessen their dependency on their spouses/partner and enable them to meet household basic needs, accord them dignity in the society and improve their wellbeing.

Some species of fisheries (seafood) that are common in Niger delta creeks which the rural women harvest includes; bloody cockle, oyster, clam, periwinkle, crab, prawns etc. Nwilo and Badejo (2008) [7] contends that ''oil spill in Bakessi Peninsula cause destruction to farmland, mangrove forest and fishing grounds and decimation of fish, crabs, mollusc, periwinkles etc. Nwilo and Badejo (2004) summarized the serious effects of oil spill pollution in the Niger delta as follows

''The mangrove was once a source of both fuel wood for the indigenous people and a habitat for the area biodiversity, but now unable to survive the oil toxicity of its habitat. The oil spill also had an adverse effect on the marine life, which has become contaminated and in turn having negative consequences for human health from consumption of contaminated seafood, oil spill has also destroyed farmland''. United Nations Environmental Programme (2006) also collaborate the above assertion, it reveals that, potential impacts of oil spills include among others; i. High mortality of aquatic animals ii. Contamination of human lathered iii. Impairment of human health iv. Loss of biodiversity in breeding grounds v. Vegetation destruction and other ecological hazards vi. Loss of portable and industrial water resources vii. Reduction in fishing activities viii. Poverty, rural underdevelopment and bitterness.

Methodology
Research Design
The study employed the survey research design. This method was considered appropriate as it is useful for the study of non-observable events such as opinions, attitudes, preferences or dispositions (Soyombo, 2002). The study is a correlation, non-contrived and cross-sectional survey having individuals (officials of the local government) as unit of analysis. The design will be such as to discover vital predictive relationship and degrees of association among variables.

The population of this study consists of all the eight Local Government Areas. They are Ekeremor, Kolokuma/ Opokuma, Yenagoa, Nembe Local Government Councils from Bayelsa State and Obio/Akpor. Ikwerre, Ahoada West, Ahoada East Local Government Councils from Rivers State, Nigeria. But for the purpose of accessibility therefore, eight (8) local government councils with four hundred (400) respondents were used as the accessible population. It is expected therefore that the findings of the study will have equal applicability to other local government councils in Bayelsa State.

Table 1: The Bayelsa and Rivers State Local Government Used As Population

S/NO	Local Government Councils	Dwellers
1	Ekeremor,	50
2	Kolokuma/Opokuma,	50
3	Yenagoa,	50
4	Nembe,	50
5	Obio/Akpor.	50
6	Ikwerre	50
7	Ahoada West	50
8	Ahoada East	50
Total		400

Source: Field Study (2022)

The sample size therefore was determined by using the Taro-Yamen's formula as was adopted by Baridam (2001) and shown below

$$N = \frac{N}{1+N\,(e)^2}$$

Where   n = sample size sought for
E = level of significance
N = population

Hence;

$$n = \frac{N}{1+N(e)^2}$$

N = 400

e = level of significant of 0.05

$$n = \frac{400}{1+400(0.05)^2} = \frac{400}{1+1} = \frac{400}{} $$

n = 200

The statistical analysis of data in this study involved the following frequency tables, percentages, Pearson's Product Moment Correlation Coefficient, (r) with the use of statistical package for social science (SPSS) version 21.0. Thus our interpretation of r and the level of statistical significance was strictly based on the SPSS output. Thus, the study used both descriptive and inferential analyses. Descriptive analysis was used to determine the extent of relationship between internal audit and audit report quality while the inferential analyses (Pearson's r) was used to test the hypotheses.

Presentation of Results or findings

Table 2: Questionnaire Distribution

Numbers	Questionnaire	Percentage (%)
No. Sent out	200	100%
No. Returned	170	85%
No. Not Returned	30	15%

Source: Field Study (2022)

Table 4.1 shows the distribution and collection of questionnaire sent to the respondents. It was shown that 200 copies of questionnaires were distributed to the respondents representing 100%. 170 copies of questionnaires representing 85% were correctly filled and successfully collected from the respondents; however, 30 copies of the questionnaires representing 15% were not collected. However, the researcher used the 170 copies of questionnaires correctly filled to represent 100% as the basis for the analysis.

Data Analysis
Bivariate Analysis
It is important to test the hypotheses having completed the univariate analyses. Thus this section of the study is concerned with the testing of the formulated hypotheses in 1-5. To carry out the testing of the hypotheses, Everitt and Dunn (2001) was adopted as a guide to determine the r value and the extent of the relationship between the variables.

Table 3: Range of Relationship and Descriptive Level of Association of Relationship

Range of r values	Descriptive level of association of r
±0.80 – 1.00	Very strong
±0.60 – 0.79	Strong
±0.40 – 0.59	Moderate
±0.20 – 0.39	Weak
±0.00 – 0.19	Very weak

Source: Field Study (2022)

Table 4: Correlation Analysis on the Extent environmental pollution has affected Niger Delta rural women access to sources of water supply for drinking and cooking.

		Environmental pollution	Rural Women
Environmental Pollution	Pearson Correlation	1	.672**
	Sig. (2-tailed)		.000
	N	200	200
Rural Women	Pearson Correlation	.672**	1
	Sig. (2-tailed)	.000	
	N	200	200

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Field Study (2022)

Table 4.12 shows the correlation analysis on the extent and direction of the effect of environmental pollution on rural women access to sources of water supply for drinking and cooking. It showed the correlation coefficient of r = 0.672** with the significant/probability value = 0.00 less than 0.05 level of significant. From the classification in table 4.10, the value is strong indicating a positive effect of environmental pollution on rural women access to sources of water supply for drinking and cooking. Thus the researcher concludes that there is a significant relationship between environmental pollution and rural women access to water supply for drinking and cooking in the Niger Delta.

Table 5: Correlation Analysis on the Extent and ways environmental pollution has affected farm produce, fish/seafood and fuel wood availability for rural women in the Niger Delta

Correlations			
		Environmental Pollution	Farm Produce
Environmental Pollution	Pearson Correlation	1	.640**
	Sig. (2-tailed)		.000
	N	200	200
Farm Produce	Pearson Correlation	.640**	1
	Sig. (2-tailed)	.000	
	N	200	200

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Field Study (2022)

Table 4.13 shows the correlation analysis on the extent and direction on the effect of environmental pollution on farm produce, fish/seafood and fuel wood availability for rural women in the Niger Delta. The table showed a correlation coefficient of r = 0.852** with a correspondent significant/probability value of 0.000, from the classification of r value in table 4.10, the value is strong. Also the correlation coefficient is positive which indicate the effect of environmental pollution on farm produce, fish/seafood and

fuel wood availability for rural women in the Niger Delta. Thus the analysis from table 4.13 shows; there is a significant relationship between environmental pollution and shortages of food, fish/seafood and fuel wood for rural women in the Niger Delta.

Table 6: Correlation Analysis on the Extent and environmental pollution has affected reproductive health of rural women in the Niger Delta

Correlations		Environmental Pollution	Reproductive Health
Environmental Pollution	Pearson Correlation	1	.852**
	Sig. (2-tailed)		.000
	N	200	200
Reproductive Health	Pearson Correlation	.852**	1
	Sig. (2-tailed)	.000	
	N	200	200

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Field Study (2022)

Table 4.14 shows the correlation analysis on the extent and direction of the effect of environmental pollution has affected reproductive health of rural women in the Niger Delta. The table showed a correlation coefficient of r = 0.852** with a correspondent significant/probability value of 0.000, from the classification of r value in table 4.11, the value is very strong. Also the correlation coefficient is positive which indicate that the effect of environmental pollution has affected reproductive health of rural women in the Niger Delta. Thus the analysis from table 4.14 shows that there is no significant relationship between environmental pollution and reproductive health of rural women in the Niger Delta.

Discussion of Finding
This research has examined women and the environment in Nigeria: The experience of rural women of the Niger Delta. The results revealed the following findings.
1. There is a significant relationship between environmental pollution and rural women access to water supply for drinking and cooking in the Niger Delta.
2. There is a significant relationship between environmental pollution and shortages of food, fish/seafood and fuel wood for rural women in the Niger Delta.
3. There is no significant relationship between environmental pollution and reproductive health of rural women in the Niger Delta.

Conclusions
This article examine women and the environment in Nigeria: the experience of rural women of the Niger Delta. The study therefore concludes that environmental pollution affect Niger delta rural women negatively leading to their lack of access to sources of water supply, shortage in fish/fisheries, fuel wood and farm produce as well as reproductive health imbalance.
the management of oil companies in the Niger delta should put in place measures that will make their operations environmentally friendly to guard against further environmental pollution, make provision for sustainable source of water supply for their host communities, carry out

empowerment scheme to enable the rural women have alternative source of income since they can no longer depend on the mangrove ecosystem and farmland which hitherto was their major means of livelihood and also built and equip cottage hospitals in the host communities to carter for those already affected and potential victims of reproductive health challenge.
Several other findings were made by the researcher which is summarized below-
1. There is a significant relationship between environmental pollution and rural women access to water supply for drinking and cooking in the Niger Delta.
2. There is a significant relationship between environmental pollution and shortages of food, fish/seafood and fuel wood for rural women in the Niger Delta.
3. There is no significant relationship between environmental pollution and reproductive health of rural women in the Niger Delta.

Recommendations
In view of the findings of this study therefore, the following recommendations are made
1. The management of oil companies in the Niger delta should put in place measures that will make their operations environmentally friendly to guard against further environmental pollution,
2. Make provision for sustainable source of water supply for their host communities,
3. carry out empowerment scheme to enable the rural women have alternative source of income since they can no longer depend on the mangrove ecosystem and farmland which hitherto was their major means of livelihood
4. Also built and equip cottage hospitals in the host communities to carter for those already affected and potential victims of reproductive health challenge.

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