Print ISSN: 2056-7537(print),

Online ISSN: 2056-7545(online)

Effect of Environmental Pollution on Rural Women in the Niger Delta

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ABSTRACT: United Nations Development Program – Niger Delta Human Development Report (2006) assert that 'the environment is very important for the Niger Delta people where 60% of the population depends on the Natural environment living and non-living for livelihood' In sum, the environment is the independent web of sources of livelihoods for rural women in the Niger Delta. However, the continuous viability and sustainability of the environment to render this eco-services and remain primarily the source of water supply, energy, food/protein supply, material for housing and pharmaceutical supply in this part of the unequal world remain a dilemma, following the continuous environmental pollution of the region due to various activities of man in his quest to explore the earth for crude oil and gas reserve for wealth accumulation. This has led to high negative impact on the inhabitants of the Niger delta region particularly rural women. This study therefore was carried out to investigate the attendant effect of environmental pollution on rural women in the Niger delta. Survey design was used for the study focusing on rural women. Secondary and primary data were obtained and used forthe study. Non parametric analytic tool and descriptive statistics were employed to analyse the data. The results of the analyzed data show a strong negative relationship between environmental pollution and rural women. 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, fuelwood and farm produce as well as reproductive health imbalance. The study recommends that 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.

KEYWORDS: environmental pollution, sources of water supply, mangrove/wetland ecosystem, women reproductive health.

Print ISSN: 2056-7537(print),

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INTRODUCTION

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 (2008 pg 12) 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. Again, these women source their energy from harvesting of mangrove and gathering of forest sticks which serve as fuel wood and charcoal which is used to cooking and roasting of food.

Apparently, most Niger Delta rural women are engaged in farming activities or fishing including picking of sea food or trade in farm product/fish and sea food as their legitimate occupation in which they earn their living. These occupations earn these women income, dignity/self-esteem in the society and enable them to contribute to the wellbeing of their families and also reduce their dependence on their male partners/spouse. The rich food and fish/sea food sourced from the farm and the creeks/wetland ecosystem help to improve the fertility, reproductive potency and general well-being of the rural women of the Niger Delta. United Nations Development Program – Niger Delta Human Development Report (2006) assert that 'the environment is very important for the Niger Delta people where 60% of the population depends on the Natural environment living and non-living for livelihood'

In sum, the environment is the independent web of sources of livelihoods for rural women in the Niger Delta. However, the continuous viability and sustainability of the environment to render this eco-services and remain primarily the source of water supply, energy, food/protein supply, material for housing and pharmaceutical supplyin this part of the unequal world remain a dilemma, following the continuous pollution of the region due to various activities of man and particularly the hydrocarbon sub-sector of the modern industrial economy that co-exist with the traditional agricultural economy. This hitherto provides massive employment opportunities to rural women of the region. Common pollution in the Niger Delta region

Print ISSN: 2056-7537(print),

Online ISSN: 2056-7545(online)

include but not limited to industrial waste water and fumes, gaseous emissions, hazardous pollutants degrade the environment and threatened the sustainability of environmental resourcessuch as farm land, fresh water swamp, rain water, mangrove forest, wetlands/creeks upon which the rural women depends for their livelihood. Income, drinking and cooking water, food and protein supplies, fuelwood, medicinal herbs inter-alia.

Statement of Problem.

The environment on one hand, constitute an economy on its own, on the other hand, the environment is an economy on which the Niger Delta rural economy depend largely on. The Niger Delta environment is blessed with fresh water swamp which serves as source of water supply for rural communities. The region is also noted for rich soil ecosystem that support farming and also mangrove/wetlands ecosystem that is rich in fish and seafood, which the rural women depend largely on for occupations of farming, fishing and fuel wood among other things.

However, the Niger Delta environment is under threat, arising from increase in discharge of industrial waste water and plastics into the environment due to upsurge in industrialisation and urbanisation in the region. Besides, and more importantly is the extensive and frequent incidences of oil spill and uncessation of gas flaring which have collectively pollute fresh water swamp, destroy farm lands and mangrove forest and pollute wetlands and creeks, killing fish and fisheries (seafood).

Available records in Nigeria National Petroleum Corporation (NNPC) annual statistical bulletin (2019) indicate that crude oil loss via PPMC pipeline between 2010-2019 is 1,576,903 barrels. In the same vein, gas flare has remained a re-occurring incident. Records on gas flare shows that percentage of gas flare in respect to gas produced ranges from 10% to 75.7% from 1977 to 2019.

Again, there are no deliberate efforts on the part of government and the Niger Delta rural communities and her local population to reduce environmental pollution cum degradation either through conservational designation of selected habitat as "protected areas" or institutionalization of the polluter pay principle nor the introduction of fiscal regimes such as waste tax, gas flare tax, spill tax etc. in order to tame environmental pollution on one hand and on the other hand preserve and sustain freshwater bodies, soil ecosystem and the biodiversity which the rural woman of the region exploit to meet basic needs, tackle poverty and ensure survival.

Nigerian government in her response to environmental pollution of the Niger Delta region takes the form of regulation including the mineral oil (Safety) regulations of 1962 and the environmental guidelines and standards for petroleum industry in Nigeria (EGASPIN) 2002 revised. However, the enforcement of compliance to the provisions of this regulation by the relevant regulatory authorities has not been forthcoming. As a result the pollution has remained unabated, and its effects on rural women have deepened which tend to indicate a persistent decline in human development indices of these segments of the rural population

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Objectives the study

The broad objective of this study is to examine the effects of environmental pollution on rural women in the Niger Delta region of Nigeria. The specific objectives of the study are to;

- i. Determine the impact of environmental pollution on rural women access to sources of water supply for drinking and cooking in the Niger Delta.
- ii. Ascertain the impact of environmental pollution on farm produce, fish/seafood and fuel wood availability for rural women accessibility in the Niger Delta.
- iii. Investigate the impact of environmental pollution on reproductive health of rural women in the Niger Delta.

Research Questions

This study will be guided by the following research questions:

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

Research Hypothesis

For the purpose of this study, the following hypothesis has been formulated;

- i. There is no significant relationship between environmental pollution and rural women access to water supply for drinking and cooking in the Niger Delta.
- ii. There is no significant relationship between environmental pollution and shortages of food, fish/seafood and fuel wood for rural women in the Niger Delta
- iii. There is no significant relationship between environmental pollution and reproductive healthof rural women in the Niger Delta.

REVIEW OF RELATED LITERATURE.

Brief History of the Niger Delta

The Niger Delta is the delta of the Niger River sitting directly on the Gulf of Guinea on the Atlantic Ocean in Nigeria (*Isumonah*, *V. A. 2013*). It is typically considered to be located within nine coastal southern Nigerian states, which include: all six states from the South South geopolitical zone, one state (Ondo) from South West geopolitical zone and two states (Abia and Imo) from South East geopolitical zone. 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.

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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, Edo 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, Epie-Atissa people and Obolo people, are among the inhabitants of the political Niger Delta, speaking about 250 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.

Conceptual Framework

It is important to have the conceptual understanding of the key concepts that are central to our study. They include; environmental pollution, sources of water supply, farmland, mangrove/wetland ecosystem and women reproductive health.

Environmental Pollution in the Niger Delta

The key environmental issues in the Niger Delta of Nigeria relate to its petroleumindustry (*Albert, O N.; Amaratunga, D. H., Richard P.2018*). 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 (Albert, O.N et al 2017) 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:

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 fifty 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).

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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.

Sources of Water supply

According to National Bureau of statistics (2007), "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.

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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.





Figure 1: Polluted sources of water

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.

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Figure 2: Poor yield of farm products and fishing instruments due to pollution

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, J. M and Woodriff J.J 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).

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) 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).

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Figure 3: Skin cancer on women caused by pollution

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 complicationduring child birth. This usually led to infant and maternal mortality.

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

Print ISSN: 2056-7537(print),

Online ISSN: 2056-7545(online)

poor records of incorporating women into the oil sector economy/labour force (Ross, M.L 2008).

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) 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). 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.

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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: Impactof 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: World Bank Report 2005.

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) 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

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- 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.

DESIGN AND METHODOLOGY

This study examined the effect of environmental pollution on rural women in the Niger Delta region using Rivers and Bayelsa states as representation case studies. It highlights the pattern of effect on rural women access to sources of water supply and access to food/seafood, fuel wood supply as well as reproductive health of rural women in the Niger Delta region. The study makes use of secondary and primary data and adopts the survey design.

The primary data were obtained through questionnaires, focus group discussions (FGDs), key informant interviews (KIIs) and visits to specific polluted sites.

The research instrument is a self-structured questionnaire title "Environmental Pollution on Rural Women Questionnaire (EPRWQ)" with questionnaire items on a modified validated four point rating scales response. The structure questionnaire were administered to and completed by respondents in the fields. The structured instrument was backed by the Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) and report of field work by other researchers. However, a total of 10 FGDs were carried out in ratified study sites whereas 2 FGDs were conducted in each of the six communities selected for the study in Rivers and Bayelsa states. Twenty (20) participants attended each of the FGDs. Also, a total of 5 KII were conducted in each of the selected communities with focus on key personnel within the selected communities such as Paramount Rulers, Women Leaders, CDC Members, Youth Leaders and other relevant leaders and other persons who are influential in the selected communities. Visits were also made to farms, Mangrove and Ecosystem, Fresh and Swamp water bodies, Streams, Rivers, Polluted Creeks as well as Health Facilities were expert opinions on the effect of environmental pollution on women were sought.

In Rivers state the sampled communities include Bodo, Gbe, Ebubu and Ogu while in Bayelsa state the sampled communities are Otuesega and Okordia. The testimonies of the women of these communities serve as a representative samples and accounted for the plight and severe deprivation of rural women with regard to effect of environmental pollution in the Niger Delta. In view of the above this study adopts non-parametric analytic tool and descriptive statistics including percentages and chart to analyse the data for the study.

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Data Presentation and Analysis

Presented below are the data obtained from the field

Sample size of 250 selected from the population was tabulated below

S/N	Respondents Group	Total
1	Traditional Rulers and Members of Council of Chief	50
2.	Community Development Council (CDC) Members	75
3.	Youth Leaders/Youth Group & Women Leaders/ Women Group	90
4.	Key Informant Interview/Focus Discussion Group	35
	Total	250

Source: Field Survey 2022

Four hundred copies of questionnaires were judgmentally administered by the researchers to the various respondent groups as shown above. Two hundred and fifty (250) copies were successfully retrieved from respondents. This represents 63% of the number of questionnaires administered

Table 4.1: Number of persons/percentage distribution of household by major source of water for drinking and cooking in the Niger Delta States of Nigeria.

States	Total	No of	Pipe	No of persons	Well/bore	No of persons	Streams/r	No of	Other
	household	persons use	borne	use	hole %	use	ivers/rain	persons use	source
		pipe borne	water %	well/borehole		streams/river	water %	other	%
		water				s/rain water		sources	
Akwa-	953,822	30,522	3.2	324,299	34	537,956	56.4	61,945	6.4
Ibom									
Bayelsa	394,296	37,952	9.6	71,762	18.2	276,401	70.1	1,577	0.4
Cross	636,336	80,174	12.6	172,447	27.1	383,711	60.3	Nil	Nil
River									
Delta	1,264,935	89,910	7.1	730,584	62.5	361,771	28.6	21,504	1.7
Edo	838,107	25,143	3.0	357,972	42.7	374,534	44.7	80,458	9.6
Rivers	960,259	78,741	8.2	742,280	77.3	109,470	11.4	29,808	3.0
Total	5,047, 755	342,442	43.70%	2,399,344	261.8%	2,943,843	271.5%	195,292	21.1%

Source: Nation Bureau of Statistics (29907.pp.28-29)

From table 4.1 above, we observed that Niger Delta states of Akwa-Ibom have a total household of 953,822, out of which 537,956 representing 56.4% depends on streams, river and rain water as their source of water supplyfor drinking and cooking. Bayelsa state have a total of household of 394,296 out of which 276,401 persons accounting for 70.1% of the entire household of the state depends on streams, river and rain water for drinking and cooking. Cross-River state on the other hand have a total household of 636,336 out of which 383,711 representing 60.3% depends on streams, river and rain water for drinking and cooking. Table 4.1 again indicates that 361,771 persons out 1, 264,435 household in Delta state uses streams, rivers and rain water as their source of water for cooking and drinking. From table 4.1 we also observed that out of a total household of 838,107 in Edo state, 374,534 representing 44.7% depends on streams, rivers and rain as their source of water supply for drinking and cooking. Furthermore, table 4.1 indicates that out of 960,259 household in Rivers stat, 109,470 persons depends on streams, rivers and rain water for drinking and cooking.

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Table 4.2: Oil exploration and exploitation activities and the level of pollution on drinking and cooking water sources in the Niger Deltas of Nigeria

Predominant source	Causes of water	Effects on clean and safe	Frequency of	After effect on safety
of water for drinking	problem/contamination	water	regularity of	availability for usage
and cooking			occurrence	
Streams and fresh	Seismic operation and oil spill	Oil spillage discharge,	Regular and	Water no more clean
water swamp (rivers)	pollution	toxicity and acid	acute	and safe for usage
		deposition		
Well and boreholes	Oil spill pollution	Oil leak	Intensive and	Same as above
		infiltration/underground	acute	
		water current		
Rain water	Gas flaring and	Acidity of rain water	Regular and	Same as above
	gaseous/chemical emission		acute during	
			rainy season	

Source: Nabie and Kornom-Gbaraba (Field Survey) 2022.

As indicate in table 2 above, we observe that predominant sources of water for drinking and cooking in the Niger delta states of Nigeria are streams, Freshwater swamps,(e.g river), well and boreholes and rain water. Again, table 2 reveals that oil industry activities of seismic operations, oil spill pollution and gas flare and emissions are the major causes of water pollution and contamination in the region. These pollutants are discharge/leak into environment including the streams and rivers and the spill causes toxicity and acidity of streams and rivers rendering them unclean and unsafe for usage either for drinking, cooking bathing, washing and other domestic uses. Again, table 2 shows that seismic operations, gas flare and spill pollution incidences and recurrences of these pollution on the sources of water supply such as streams, river and rain water,. The later (i.e water supply sources in the region), the safety, cleanliness and availability for usage cannot be guaranteed.

Table 4.3 Impact of oil spill pollution on fish and fisheries species, mangrove and depletion of farm yields

S/n	Statements	Very High Impact Freq%	High Impact Freq%	Low Impact Freq%	Very Low Impact Freq%	Mean	Rank
1.	To what extent did oil spill pollution of Niger Delta creeks resulted to decline in tonnage of fish catch within the creeks?	150 60%	80 48%	15 6%	5 2%	3	нЕ
2.	To what extent did oil pollution resulted to mortal damage to sea food e.g periwinkle, bloody cockle, clamp, oysters', crab, prawns in the Niger Delta?	165 66%	70 56%	7 3%	8 3%	3	нЕ
3.	To what extent did oil pollution of Niger Delta environment resulted to destruction of mangrove forest within the creeks?	152 61%	88 55%	6 2%	4 2%	3	НЕ
4.	To what extent did oil spill pollution in Niger Delta farmland resulted to low yields?	145 58%	90 36%	11 4%	4 2%	3	нЕ

Source: kornom-Gbaraba and Nabie (Field Survey) 2022.

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From table 4.3, we observed that 150 respondents representing 60% of the total respondents with a mean of response of 3 agreed that spill pollution is responsible for decline in tonnage of fish catch within the creeks in the region. Another 165 respondent accounting for 66% of the total respondents having a mean response of 3 indicates that spill pollution resulted to mortal damage to seafood including periwinkle, bloody cockle, clam, oyster, crabs, prawns etc. within the Niger delta creeks. Also, table 4.3 shows a mean response of 3 out of the 250 respondents, 152, 88, 6 and 4 representing 61%, 35%, 2% and 2% respectively responded that oil spill pollution destroyed mangrove forest within the creeks of Niger delta.

Again, 145 respondents representing 58% of the total respondents, 90 respondents representing 36% of the whole respondents and 11 respondents representing 4% and 4 respondents representing 2% of the total respondents agreed that oil spill pollution of their lands, resulted to low yield i.e poor farm produce (harvest). Results from table 3 shows a grand mean of 3 which attest to a high negative impact of oil spill pollution on fish and fishery availability. Table 4.3 further revealed that oil spill pollution has a high negative impact on mortal damage and disappearance (extinction) of fish and fisheries species including mullet, tilapia,,bongaetc. and periwinkle, clam., bloody cockle, oyster, crab, prawn etc within the Niger delta creeks. Table 4.3 still indicate a very high negative impact of oil spill pollution on farm land fertility, productivity/output.

Table 4.4 Impact of oil spill pollution on Reproductive Health of Rural Women in the Niger Delta.

S/N	Statements	Very High Impact Freq %	High Impact Freq %	Low Impact Freq %	Very Low Impact Freq %	Mean	Rank
1	Does incidences of occurrence emissions causes rashes/cancer of the skin in your community?	165 66%	70 56%	7 3%	8 3%	3	HE
2.	Does incidences of occurrence of oil spill and gaseous emission responsible for reported cases of miscarriage/still birth in your community?	145 58%	90 36%	11 4%	4 2%	3	не
3.	Does incidences of occurrence of oil spill and gaseous emissions causes' pungent smell that irritates and result in pregnant women and other women of reproductive age to throw up in your community?	150 60%	80 48%	15 6%	5 2%	3	нЕ
4.	Does an incidence of oil spill and gaseous emissions result to reported cases of maternal mortality in your community?	152 61%	88 35%	6 2%	4 2%	3	НЕ

Source: Kornom-Gbaraba and Nabie (Field Survey 2022)

Print ISSN: 2056-7537(print),

Online ISSN: 2056-7545(online)

Result from table 4.4 on oil spill pollution on reproductive health of rural women indicates that 165 respondents representing 66%, 70 respondents representing 56%, 7 respondents representing 3% and 8 respondents representing 3% of the total respondent with a mean of 3 agreed that incidences of oil spill in their community is responsible for rashes on human body and skin cancer. Also, 145 respondents, 90 respondents, 11 respondents and 4 respondents having 58%, 36%, 4% and 4% respectively agreed that incidences of occurrence of oil spill lead to cases of miscarriage/still birth in oil impacted communities in the region.

Further result in table 4 shows that 60%, 48%, 6% and 2% responded that oil spill pollution and gaseous emissions cause pungent smell that irritates pregnant women and resulted in irritation and emotional discomfort and unwarranted vomiting in pregnant women and other women of reproductive age in oil spill impacted communities of the Niger delta. A mean response of 3 attest to the very high extent of negative impact of oil spill pollution and gaseous emissions on reproductive health of rural women in oil spill impacted communities of the delta region.

Again, result in table reveal that 152 respondents representing 61%, 88 respondents representing 35%, 6 respondents representing 2% and 4 respondents representing 25 agreed that incidences of oil spill pollution and gaseous emission account for reported cases of maternal mortality common in the oil spill impacted communities of Niger delta region.

Test of Hypothesis

Hypothesis one

There is no significant relationship between environmental pollution and rural women access to water supply for drinking and cooking in the Niger Delta

Interpretation and Decision

From the result of our analysis in table 4.1 it is observed that the percentage of rural women depending on streams, rivers and rain water is very high. Akwa-Ibom, 56.4%, Bayelsa 70.1%, Cross-River 60.3%, Delta 28.6%, Edo 44.7% and Rivers 11.4% giving a total of 271.5%. There is greater dependence on streams, river and rain water sources in the Niger delta with Bayelsa accounting for the highest percentage of 70.1% and Rivers with the lowest percentage of 11.4%.

Again, table 4.2 reveal the major causes of water pollution in the Niger delta to include seismic operations and oil spill pollution, oil pollution and gas flaring and gaseous chemical emissions with their attendant effects ranging from acute to intensive acute with a regular occurrence year in year out. This therefore indicates that there is a strong positive and significant relationship between environmental pollution and rural women access to water supply for drinking and cooking in the Niger delta. Based on this we reject the null hypothesis and accept the alternate that there is significant relationship between environmental pollution and rural women access to water supply for drinking and cooking in the Niger delta. Thus environmental pollution is negative and has significant negative impact on rural women access to water supply for drinking and cooking in the Niger Delta.

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Hypothesis two

Interpretation and Decision

There is no significant relationship between environmental pollution and shortages of food, fish/seafood and fuel wood for rural women in the Niger Delta

From table 4.3, we observe that 150 respondents representing 60% of the total respondents with a mean response of 3 agreed that spill pollution is responsible for decline in low tonnage of fish fisheries within the creeks in the region. Another 165 respondent accounting for 66% of the total respondents and having a mean response of 3 indicates that spill pollution resulted to mortal damage to seafood including periwinkle, bloody cockle, clam, oyster, crabs, prawns etc within the Niger delta creeks. Also, table 4.3 shows a mean response of 3 out of the total respondents 152 representing 61% attesting to the fact that oil spill pollution destroyed mangrove forest within the creeks of Niger delta.

Again, 145 respondents representing 58% agreed that oil spill pollution of their lands, resulted to low yield i.e. poor farm produce (harvest). These analyses indicate a negative impact of environmental pollution on fish/seafood and fuel wood in rural women in the Niger delta. In view of this analyzed result, we reject the null hypothesis and accept the alternate that there is strong and significant relationship between environmental pollution and shortages of food, fish/seafood/ and fuel wood for rural women in the Niger delta. Thus environmental pollution is positive and have significant negative impact on shortage of food, fish/seafood and fuel wood in the Niger delta.

Hypothesis three

There is no significant relationship between environmental pollution and reproductive health rural women in the Niger Delta.

Interpretation and Decision

Table 4.4 reveal that 165 respondents representing 66%, 70 respondents representing 56%, 7 respondents representing 3% and 8 respondents representing 3% of the total respondent with a mean of 3 agreed that incidences of oil spill in their community is responsible for skin cancer. Another 145 respondents, 90 respondents, 11 respondents and 4 respondents having 58%, 36%, 4% and 4% respectively agreed that incidences of occurrence of oil spill lead to cases of miscarriage/still birth in their community.

Further respondents of 150 with a mean of 3 and representing 60% of the total respondents opined that incidence of occurrence of oil spill and gaseous emissions causes' pungent smell that irritates and result in pregnant women and other women of reproductive age. Other respondents ranging between 80, 15 and 5 having 48%, 65 and 2% respectively of the total respondents believed that incidences of occurrence of oil spill and gaseous emissions is responsible for irritation resulting in throw up among pregnant women and other women in their community.

Again 152 respondents, 88 respondents 6 respondents and 4 respondents representing 61%, 35%, 2% and 2% of the total respondents with mean of 3 agreed that incidences of oil spill and

Print ISSN: 2056-7537(print),

Online ISSN: 2056-7545(online)

gaseous emissions result in reported cases of maternal mortality in their community. These analysed results from table 4.4 shows that there is a relationship between environmental pollution and reproductive health of rural women in the Niger delta. We therefore reject the null hypothesis and accept the alternate that there is strong relationship between environmental pollution and reproductive health of rural women in the Niger delta. Therefore, environmental pollution is positive and has significant negative effect of reproductive health of rural women in the Niger delta.

CONCLUSION AND RECOMMENDATION

This study was carried out to examine the effect of environmental pollution on rural women in the Niger Delta region. In carrying out the study secondary and primary data were used. The secondary data was sourced from National bureau of statistics (NBS) while the primary data were obtained through the administration of open ended structured questionnaire, interview with key stakeholders in the communities such as the paramount ruler, community development (CDC) members, youth leaders and youth groups, women leaders and women groups. In addition, key informant interviews were also carried out among key personalities within the communities as well as expert opinion with the staff of the health facilities in the various communities. The study employed non-parametric analytical tool and descriptive statistics to analyse the data used in the study. The result of the analysed data revealed that there is strong and significant relationship between environment pollution and rural women access to sources of water supply, shortages of food, fish/seafood and fuel wood for rural women and reproductive health of rural women in the Niger Delta region. The study therefore concludes that environmental pollution has a strong and significant negative effect on rural women in the Niger delta region. The study recommends that the management of oil companies in the Niger delta should put in place measures that make their operations friendly to the environment to guard against 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 cannot depend on the mangrove 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.

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