Impact of Oil Spillage on Economic Development of Niger Delta-Nigeria

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Abstract

The aim of this research is to investigate the effect of oil spillage on the socio-economic livelihood of the Niger Delta in Nigeria. The study utilized questionnaire techniques as the method of primary data collection, sampling the opinions of the oil-bearing communities. A random sampling technique was used to select a sample of 100 respondents for the research. The simple percentage method was used to critically analyze the questionnaires. Both the primary data and research findings were presented. The majority of the respondents agreed that oil spillage in the investigated communities occurred as a result of pipeline corrosion, resulting in land degradation, unproductive soil for agricultural production, and death or reduction of aquatic animals, especially fish. It was concluded that oil-related environmental problems, such as oil spillage, have socio-economic impacts on the livelihood of the host communities. It is recommended that adequate regulatory measures, such as technology-based monitoring devices, be installed to monitor the pipelines against sabotage and vandalism. Secondly, pipeline replacement should be done every 15 to 20 years to prevent corrosion and leakages.

Introduction

Nigeria is one of the leading oil producers in the world. It ranks sixth in global oil production at the global level, first in Africa, and exports about 1.8 million barrels of oil are being exported (Nigeria Bureau of Statistics NBS, 2021). Exploration activities for oil in Nigeria are mostly concentrated in the Niger Delta, which contains the world's largest wetland, it also has extensive fresh water swamp, and rich biological diversity. The area is crisscrossed with creeks and pockets of islands, leaving the remaining land as a rainforest zone (UNDP, 2006).

The population of Nigeria as of today is approximately 212 million people in an area of 923,768 km^2 (356,669 sq mi) (Akinyemi *et al.).,* 2014). Nigeria is the country with the largest population in Africa and the seventh-largest population in the world (world fact book, 2020). This places great demand on the energy sector, which provides job opportunities for the survival of many people and, more importantly, serves as a major source of foreign exchange and internally generated revenue for the government. The revenue accounts for more than 90% of foreign exchange earnings and about 80% of internally generated revenue of the government (NDDC, 2006). The overall oil sector's contribution to the development of the national economy grew from an insignificant 0%.1% in 1950 to 87% in 1976 (Achi 2003). Between 2000 and 2004, 79.5% was accounted as the total revenue generated by the government was from oil, and about 97% of foreign exchange earnings (UNDP 2006).

However, despite the huge financial gains, there are numerous problems associated as a result of oil exploration. Adetular (1996) stated that the huge revenue generated from the oil industry

has not translated into socio-economic development, and that environmental pollution as a result from oil prospecting, spillage, and seepage is on the increase. This undermines the ecological basis of a hitherto self-sustaining means of life in oil-producing communities.

The advent of multinational companies in Nigeria for oil exploration has led to unquantifiable environmental pollution, especially oil spillage. For instance, since the Bomu oil spillage that took place on July 9th,1970, which was the first-ever oil spillage in Nigeria, several other incidents have occurred in different parts of the Niger Delta region (Mobil Producing Nigeria 1998). Between 1976 and 1980, more than 784 oil spillage occurred, resulting in which about 1.3 million barrels of oil (Ogbogbo, 2004). Available data indicate that between 1976 and 2002, there were about 4625 major oil spillage reported cases involving the release of more than 3 million barrels of oil (NDDC 2006). Oil spills have occurred repeatedly for several decades in the Niger Delta, and almost all the land and wetlands have been adversely affected by them. Due to high tides and, at times, floods in connection with rains, oil spilled on land is rapidly distributed over large areas and remobilized with rising tides. The oil spillages originate from leaking pipelines, wellheads, flow stations, spills from transportation, mostly stolen oil, as a result of.

illegal tapping from the well; and primitive methods of oil refining. Due to oil contamination in mangroves, wetlands, and on land. The penetration of oil into the soils
several meters below the earth's surface has affected groundwater over large areas. Water wells in the affected areas have also been contaminated. These, in particular, are of great concern in terms of human health perspective (Moffat and Linden 2003; Ana et al.). 2009; Mmom and Arokoyu 2010; UNEP 2011).

Oil spills have adverse impacts on vegetation and wildlife, such as seabirds. Impacts are mostly due to the physical characteristics of the oil, including decreased mobility and dissolution of natural fats and waxes on body surfaces, feathers, etc.,as a result of the adhesive properties of the oil (NRC 2003; ITOPF 2011a). Petroleum of certain aromatic hydrocarbons in petroleum may also have direct toxic impacts due to penetration or ingestion through body surfaces such as feathers (NRC 2003; Jenssen 1996; Heubeck et al.). 2003). Some of these toxic and non-toxic hydrocarbons evaporate and are degraded by microorganisms quickly (NRC 2003; ITOPF 2011b). This may have long-term adverse effects under particular conditions (Peterson et al. 2003). About 2 million tons of oil are released into the environment annually as a result of human and natural processes (NRC 2003). However, natural seepage of oil accounts for about half of the release into the sea and coastal environments from oil deposits on the continental shelf (NRC 2003). It is often difficult to remove oil contamination in wetlands such as marshes and mangroves without causing further damage to these environments (NOAA 1994, 2002; NRC 2003; Chan and Bab 2009). During high tides, oil makes incursions onto the land and is deposited on vegetation, causing plant asphyxiation. If angrove vegetation dies, several animals and plants that live within this ecosystem will also suffer due to the nature of mangrove vegetation. The mangrove and freshwater swamp forest of the Niger Delta are the largest in Africa and the third largest in the world, covering about 70,000km^2. Over the years, many places, including the forests, have been extensively affected by waterlogging, and agriculture has encroached into the wetlands (Moffat and Linden 2003; Mmom and Arokoyu 2010). During the rainy season, the high discharge of the river, caused by heavy rainfall, combined with the low, flat terrain and poorly drained soils, leads to frequent and widespread floods and erosion. More than 80% of the delta is affected by seasonal floods, which stretch from the Benin River in the west to the Bonny River in the east (Moffat and Linden 1995). The Port Harcourt tidal range is, on average, 1.8m.

The Niger Delta has often been the scene of a long series of conflicts, the most serious ones being the Biafra War from 1967 – 1970 and the Ogoni unrest in the 1990s. The violence was centered around the cities of Warri in Delta State and Port Harcourt in River State (Human Rights Watch 2005; Idemudia 2009; UNEP 2011). All oil companies found it difficult to carry out oil production in some parts of the Niger Delta due to conflicts. One such area is Ogoniland, which is immediately east of Port Harcourt.

Where this research study was carried out, there have been many incidents of oil spills over the years. For instance, between 1981 and 2007, there were 14 cases of oil spillage, whereas between 1996 and 2006, the total volume of oil spills was 124,377 barrels (NDDC 2006). These oil spills have affected the livelihoods, socio-economic activities, and environment of the people. For example, fishing, being the predominant occupation and means of livelihood of the people, no much benefit any longer. Also, the spills have impacted negatively on both the pH value of the soil and the hydrocarbon content of the water. Consequent upon this, people have migrated to other

towns in search of greener pastures. Fishing grounds were lost and the means of livelihood for the people disappeared.

To this end, the research examines the socio-economic characteristics of the people, determines the quality of oil spillage, and assesses the effects of oil on the people and the environment, including the level of compensation for the affected communities. The economic effects of these exercises have been a worry to government administrative offices and farmers within the oil-rich region of the country, especially the Ogoni community (Chukuezi, 2006). Aside from the national government income assignment recipe, which is for the most part relevant, the Oil Mineral Producing Area Development Commission (OMPADEC) was set up in 1992, and the Nigerian government launched a billion-dollar fund for the cleaning of Ogoni land through the implementation of the 2011 United Nations Environmental Programme (UNEP) to explicitly address the needs of the oil communities with the view of fostering a good relationship between the host communities and multinational oil companies. The need to extensively re-evaluate the current extent of natural debasement and financial imbalance resulting from oil spillage in the Ogoni communities to have firsthand information on the extent of damage and mode of compensation. Although some research has been carried out in relation to oil spillage in Ogoni land, no effort has been made to determine the depth of the consequences of the spillage on agricultural produce or to provide appropriate means of compensating the victims of this menace.

1.3 STATEMENT OF THE PROBLEM

Due to the increasing activities of multinational companies in the exploration and transportation of hydrocarbons in the Niger Delta region, and Ogoniland in particular, many communities have abandoned their lands and relocated to neighboring towns as a result of oil spillage. These have impact on the socio-economic activities of Ogoniland in terms of health, agriculture, groundwater, soil, etc. Increase in concern and man's desire for development has driven his pursuit to explore his environment in order to harness its vast but inadequate resources over the past centuries (Raimi *et al*., 2019; Raimi *et al*., 2019; Okoyen *et al*., 2020). The pressure on the environment has grown with an intensified release of waste (Raimi *et al*., 2020; Samson *et al*., 2020; Raimi and Raimi, 2020; Morufu *et al*., 2021; Raimi *et al*., 2021; Morufu *et al*., 2021). Unfortunately, little consideration was given to the environmental impact of the methods carried out (Raimi et al., 2019; Omidiji and Raimi, 2019; Raimi et al., 2019; Raimi *et al*., 2020; Olalekan et al., 2020; Adedoyin *et al*., 2020; Olalekan *et al*., 2020; Ajayi *et*

al., 2020).Crude oil can be found on almost all continents of the globe. With its discovery, petroleum and its connected products have become the key source of energy that sustains the economy of industrialized and developing nations (Premoboere and Raimi, 2018; Ebuete et al., 2019; Suieiman et al.).).). , 2019).

Nevertheless, their examination and exploitation have been associated with a disturbing degree of environmental degradation, thus putting the health and well-being of people and other vital environmental resources under threat or risk (Raimi et al.)., 2019; Olalekan et al.).)., 2019; Raimi et al., 2019; Okoyen et al., 2020). According to Olalekan et al. (2020), crude oil and gas have certainly contributed enormously to societal development. However, their exploration, exploitation, and trade have contributed their own quota to the environmental challenges globally. Sanchez, Knapp, Olalekan, and Nanalok (2021) reported that before the 1960s, little attention was paid to the effects of crude oil spillages.

In the Nigerian perspective, oil was discovered in the Niger Delta Region (NDR) in 1956. This led several multinational oil companies (MNOCs) to settle in the region with prospects for petroleum and natural gas. Sanchez, Knapp, Olalekan, and Nanalok (2021) confirmed that the oil boom of the 1970s, inconsistent exploitation of the region's environmental resources.

Assertions by these companies suggest that most spillages in the NDR are a result of vandalization/sabotage. Still, there have been counter-indictments by the public, blaming spill accidents on corroded pipelines, negligence, and poor maintenance by the MNOCs (Ibid, 2021).

Ogoniland in the Niger Delta region is not immune to the problem of oil spillage. The 2011 United Nations Environmental Pollution (UNEP) assessment of oil spills and gas flaring in Ogoniland in the Niger Delta states that since the discovery of crude oil in the region, approximately 600 million gallons of crude oil have been spilled, which have been either ignored or poorly managed by the oil companies (Sanchez, Knapp, Olalekan, and Nanalok, 2021). The spills have polluted vast areas of land, damaging farmlands, affecting fisheries, and causing food scarcity and suffering for the people. Reports also indicate that, hydrocarbon contamination levels are over 1000 times higher than the country's standard for drinking water, and benzene contamination is about 900 times higher than the World Health Organisation level guideline (Osuji et al., 2006; UNEP, 2011; Olalekan et al., 2020)., 2018; Olalekan et al.). , 2020).

According to Sanchez, Knapp, Olalekan, and Nanalok (2021), these have given rise to environmental research and the embracing of several control practices, such as the Oil Pollution Act of 1990, both at the national and international settings. Regardless of these measures and efforts to revive the environment, Albers (2002) and Premoboere and Raimi (2018) stressed that environmental hazards, specifically petroleum contamination, remain a prevalent issue.

THE SIGNIFICANCE OF THE STUDY

This research work will examine the socio-economic characteristics of the people to determine the level of oil spillage and assess its effect on the livelihood of the people of Ogoniland and the environment in general. It will also make appropriate recommendations for onward delivery to the government and multinational oil companies to understand the extent of damages caused as a result of oil spillage in Ogoniland and proffer solutions on how to ameliorate the sufferings of the people of Ogoni through various kinds of compensation. This research will provide appropriate advice on the need for strict adherence to the rules guiding hydrocarbon exploration in terms of environmental legislation in Nigeria and global

environmental practice in reducing the effects of oil spillage on the host communities and the country at large.

1.6: RESEARCH HYPOTHESES

Among the hypotheses to be assessed include:

(i) Oil spillage has no significant effect on the socio-economic well-being of the host community.

(iii) Socio-economic factors alone are not sufficient determinants of the people of Ogoniland's willingness to accept or not to accept compensation from oil companies to tolerate negative impacts of oil spillage in the community resulting from the companies' activities.

1.7: HISTORICAL BACKGROUND OF THE STUDY

The Ogoni, a native group in Nigeria, live on 404 square miles of beachfront plain patios in the northeast of the Niger Delta. Its supposed limits are the Aba-Port Harcourt highway to the north and east, respectively, and the waterfront area occupied by the Adonis towards the south. Ogoni has more than 500,000 rural populations as of 1980 (loolo. G. N 1980). The 2006 National Census placed

Ogoniland at a population close to 832,000, consisting mainly of Ogoni people. The region is divided administratively into four local government areas. These comprise Eleme, Gokana, Khana, and Tai. However, Ogoniland was formed by six kingdoms: Babbe, Eleme, Gokana, Khana, Nyo-Khana, and Tai. In the outside world, the communities in Ogoniland may appear similar; however, they have distinctive differences, both in traditional institutional structures, languages, and cultural features. Khana is located in the eastern and northern parts of Ogoniland. Ken-khana, which has its political settlement at Bean. Nyo-Khana has the largest land area with dense timberland. The entire Ogoniland is dedicated to rural activities, including crop cultivation, fishing, tapping and refining of palm wine into local brand dry gin, boat building, metalworking, tangle, and ceramics making. Individuals, including government workers and merchants, earn money through agricultural produce. The majority of individuals are traditional worshippers. They worship a deity called BARI, which means the maker of heaven and earth. The population of Christians is fewer compared to non-Christians.

1.8: IMPACTS OF OIL EXPLORATION AND PRODUCTION

Oil exploration in the Niger Delta began in the 1950s, and after three decades of exploration, extensive production facilities were established (Table 1). Shell Petroleum Development Company (Nigeria) Ltd (SPDC), a joint venture between the Nigeria National Petroleum Company (NNPC), Shell International, Elf, and Agip. There may have been impacts from oil exploration and production projects long before any oil was actually produced. Most of these projects are complex, multi-faceted projects that have many different phases. This includes; land survey, land clearance for seismic lines, establishment of seismic and drilling camps, site preparation, infrastructure construction, drilling for oil, and development of transportation infrastructure. As the facilities begin operation, some issues like oil spills caused during oil production, disposal of salty water that is usually saline, and flaring of gas generated alongside oil. The effects of these activities have a negative impact on the environment.

Table 1: Oilfield facilities in Ogoniland at the cessation of oil production, 1993.

SPDC facilities	Number
Oilfields	12
Wells drilled	116
Wells completed	89
Flow stations	5
Flow station capacity (barrels per day)	185,000

Ogoni LandLand is contaminated.

Farmlands contaminated with pollution.

Streams contaminated with pollutants.

HISTORICAL CONTEXT OF OIL SPILLAGE IN OGONILAND

Oil spillage in Ogoniland began in the late 1950s when oil was discovered in Ogoni land. Oil companies, such as Total of France and Royal Dutch Shell (now operating as Shell Petroleum Development Company of Nigeria) of the Netherlands, officially launched their oil business in Ogoni land (Subi and Amodu, 2016). According to Amodu (2015), this period marked the beginning of Nigeria's oil-driven economy. The oil industry has been reported as a major contributor to the economic development of countries such as Dubai, Iraq, Kuwait, Saudi Arabia, Libya, Britain, and Singapore, among others. In a similar development, petroleum and its associated products have become the major source of energy that drives the economy of industrialized and developing nations (Premoboere and Raimi, 2018; Ebuete *et al*., 2019; Suieiman *et al*.). ,2019).

However Nigeria, as a country, has correspondingly benefited from the industry, but the communities from which the oil is drilled have nothing to reflect on their welfare (Subi and Amodu, 2016). Ideally, Ogoniland as a host community of an oil company should enjoy benefits like infrastructural development, economic advancement, and the protection of the environment, while the companies enjoy security, peaceful co-existence, and support from the communities (Ibid, 2016).

However, following inadequate development and environmental degradation, predominantly through oil spillage, the relationship between Ogoni and Shell Petroleum Development Company has degenerated.

According to Amnesty International (2009), the oil spills have killed plants and destroyed agricultural lands in the coastal environment, resulting in social deprivation and abject poverty as over 60% of the people depend on their natural environment for their livelihood.

In the study by Subi and Amodu (2016), the Ogoni community was exposed to oil spillage in 2014, which appeared to be the highest experience of oil spillage in recent times. This indicates that Ogoniland is still facing a continuous problem of oil spillage. Furthermore, experience has shown that the pollution of water resulting from the disaster caused by oil spill, thus causing

the community to inadequate drinkable water, a shortage of agricultural produce, and vulnerability to various health risks. The study by Subi and Amodu (2016), also reveals that several farmers were affected by the oil spill incidents, which disrupted their livelihoods and the community's economy of the community. This is an indication that there is a shortage of agricultural produce in the community under study as a result of oil spillage. Sanchez, Knapp, Olalekan, and Nanalok (2021) confirm that the oil spillage has contaminated vast areas of land, damaging farmlands, affecting fisheries, and causing food scarcity and suffering for the people.

2.1 Environmental Setting in Ogoniland

Ogoniland is typically deltaic, characterized by uneven terrain, numerous creeks, shallow brackish water bodies, and various types of vegetation, including swamp forests.

2.2 Geology of the Area.

The Niger Delta is the product of both fluvial and marine sediment that was built up during the upper Cretaceous period, some 50 million years ago. About 12,000 meters of shallow marine sediments and deltaic sediments were accumulated over time, mainly contributed by the Niger River and its tributaries. The main upper geological layers consist of the Benin Formation, Agbada formation, and Akata formation. The Benin Formation is made up of multiple layers of clay, sand, conglomerate, peat, and lignite with variable thickness and texture, which are covered by overburden soil. Clay bodies are discontinuous, and groundwater is present as localized aquifers as well as hydraulically interconnected aquifers. The characteristic of the ground is that of deltaic environments, where erosion and deposition of sediments constantly shift the courses of channels, tributaries, and creeks. (UNEP 2006)

2.3.

The entire population of Ogoniland depends on underground aquifer water as their source of drinking water supply. Therefore, the need to protect these aquifers is vital. Ogoniland has very shallow aquifers, with the top-most groundwater levels occurring anywhere between close to the surface and a depth of 10 meters. To tap the aquifers, they typically construct about a 60 cm diameter open, hand-dug well, which is operated either manually or with pumps. Wells can also be up to 50 meters deep in some areas that were affected by localized pollution of water closer to the surface. In such areas, immersible pumps are used to draw water. The level of water in the aquifers of these areas is highly seasonal. Fresh groundwater can also be found in the shallow, sandy, and unconfined aquifers of the coastal beach ridges, river bars, and islands in the mangrove belt, which are at varying depths in confined aquifers. A large number of wells drilled in the coastal area produce brackish (salty) water that is not fit for drinking. These brackish groundwater in some areas can be found at a depth of more than 200 meters below ground level. (UNEP 2006)

2.4. SURFACE WATER.

This region is drained by Bonny and New Calabar river systems, including many other associated creeks and streams. Ogoniland, in particular, is bounded to the east by Imo River and to the west by numerous creeks (map 3). There is freshwater inflow during the rainy season

into Imo River, which is also affected by tidal variations. As the water flows down, the freshwater creeks increase both in width and velocity to form meandering or braided channels in the delta (UNEP 2006).

Destruction Of Surface Water By Oil Spillage. Source: UNEP 2006

2.5. VEGETATION.

The coastal area consists of three vegetation zones, these include beach ridge zone, saltwater zone, and freshwater zone. The beach zone is characterized by mangroves on the tidal flats and swamp trees, palms, and shrubs on the sandy ridges. The saltwater zone comprises red mangroves (Rhizophora mangle). While the coastal plain and freshwater zone are vegetated by forest tree species and oil palm. The floodplains are covered by rainforest trees, oil palm, raffia palms, shrubs, lianas, ferns, and floating grasses and reeds. The communities enjoy numerous ecosystem services and products in the mangrove areas, this includes fishing grounds, timber for housing, and firewood. Most of the rainforest that once covered Ogoniland has been cleared for farming due to an agriculture-based economy and an increasing population. Other non-timber forest products that are important, especially for poorer households, include grass cutters, bamboo for staking yams, medicinal plants, vegetables, fruits, and snails. (UNEP 2006)

Ogoniland also has a small-sized sacred forest (shrine) that is less than 1 ha and remains in a relatively undisturbed state, although most of the remaining vegetation is highly degraded.

Destruction of vegetation by Oil Spillage. Source: UNEP 2006

CAUSES OF OIL SPILLAGE

The main causes of oil spillage have been identified to be one or a combination of the following, which includes pipeline breakage or damage, oil pipeline leakage, oil tank overflow, rupture or failure of loading, floating or under busy hose, broken flange connections, or flowlines (Mobil Producing Nigeria 1998). Oil spillage mostly occurs during the transportation of crude through pipelines or tankers from one location to another (Ogbogbo 2004). Incessant spillage involving a few gallons are caused by cleaning operations, malfunction of sea valves, carelessness during connecting and disconnecting of hoses and most at times, non adherence to rules. These incidents could happen anywhere within the port, which is restricted to operations at terminals or specifically to oil tankers.

About 5 tons of oil spillage occur frequently. This may result to damage or mechanical failure, which mostly takes place during loading or discharging operations within the terminal. The most serious and catastrophic spillage, as a result of tanker collision, grounding, or other damage to the vessel, is rare compared to the above, which may occur anywhere along tanker routes (Baker 1981).

Yet, regardless of this exertion, it was revealed that about 30 to half of oil spillage that occurs either straightforwardly or by implication was done out of human error, and 20-40% was as a result of gear breakdown (Michel, n.d.) The fundamental cause of oil spillage in Nigeria was diagrammed by (Awabajo 1991), including the Streamline (pipeline spills) Damage to good headline, and fundamental folds. Overpressure/disappointment.

EFFECT OF OIL SPILLAGE ON THE ENVIRONMENT

Research findings show that oil spillage has an effect on the environment. In the study of marine toxicology, there have been many studies related to questions on the degree of biological danger from oil spill, these questions range from the report of the absence of harmful effects in water with an oil concentration of approximately several ppm or mg/l to other studies that show damage to the vitality of sea animals or organisms, even in the presence of small amounts of dissolved petroleum oils in the hundredth and thousands ppm or m/l (Isyban and Izrael, 1988; GESAMP 1993).

Alexander (2007) stated that concentrated toxic substances from spills cause destruction of organisms or damage vitally important functions for caviar (embryos), larvae, and fingerlings of marine animals that cannot be reversed, which reaches the minimum values of 0.01 to 0.1 mg/l of dissolved petroleum hydrocarbon, which is usually much lower in concentration than that of adults. He noted, however, that there is a wide range of toxic and threshold concentrations. It was estimated that about 5 – 10% of the Nigeria mangrove ecosystem has been destroyed by oil spillage (Wikipedia, 2006). Akankali (1998) stated that the environmental impact of oil spillage can be highly harmful, with numerous aquatic, terrestrial,and socio-economic impacts. These impacts involve the loss of fish and crustaceans, eutrophication of water bodies, abandonment of fishing grounds and associated livelihood pursuits, degradation of aquatic resources, and ecological damage. Oil spillage, in terms of wildlife, results in the death of numerous birds and animals. Oil-coated birds suffer from hypothermia, dehydration, drowning, and starvation (Kerley et al., 1987; Etkin, 1997).

Effect of Oil Spillage on the Environment. Source: UNEP 2006

EFFECTS OF OIL SPILLS ON AGRICULTURE

Niger Delta is highly dominated by rural communities that rely solely on the natural environment for the sustainability of their livelihoods (UNDP report, 2006). Environmental degradation is of paramount concern to communities in Ogoniland as it is a major cause of productivity losses (Opukri and Ibaba, 2008). This has been the main reason why crude oil exploration's impact on Ogoniland has consequences for a decrease in productivity of the area, which their main means of livelihood is predominantly on fisheries and other agricultural activities such as farming and timber businesses. The advent of oil production has deeply worsened the environmental disaster in the area (Owugah, 2000).

According to FOS (1995), almost 50 percent of the active labour forces engaged in one form of agricultural activity or another, with cassava, plantain, cocoyam, yam, and vegetables as the predominant food crops in the area. However, because of the nature of the area in terms of hydrographic condition, only a small fraction of the land size is cultivated with crops. Their cropping patterns are mostly sole cropping, mixed cropping, and intercropping. Their farming practices are traditional, in which they make use of crude implements such as hoes and cutlasses. Agricultural practice is on a small scale and subsistence, with small farm holdings. Mechanized agriculture in this area is on a very low scale, and the use of modern farming equipment such as tractors, fertilizers, and pesticides is quite limited because farmers hardly gain access to those farming implements, as they are distributed nationwide by the federal government.

Effect of Oil Spillage on Farmland. Source: UNEP 2006

EFFECT OF SPILLAGE ON MAN

The impact of oil spillage on man cannot be overemphasized. This is because man relies upon the land for the development of food crops. Since petrol hydrocarbon through oil spills infiltrate or penetrate into the ground and affect the groundwater, they make the drinking water unfit for drinking. This negatively impacts both the pH value of the soil and the hydrocarbon content of the water. Ogbogbo (2004) stated that the effects of oil spills cause massive pollution of land, rivers, and streams in Niger Delta areas. He explained that the aquatic environment and the ecology of the area, which constitute major resources for the people, are badly damaged. In such situations, the effect is that the land becomes unsuitable for agricultural practices, and therefore, the livelihood of the inhabitants of the area is in danger. Fishing, timber, and cropping, which are the most predominant occupations and means of livelihood of the people in the area, do not yield much benefit anymore. The great consequence is that people move away from their homes in search of greener pastures elsewhere.

The intake, dermal contact, and inhalation of the other constituents of spilled crude oil also have some acute and long-term health implications. However, the acute manifestations of the exposures are often mild and transient. Severe exposures, as reported in the 2-year-old child, could result in acute renal failure (Otaigbe and Adesina, 2005), or even hepatoxicity (Eyong et al., 2004) and hemotoxicity (Sunmonu and Oloyede, 2007), as reported in animal studies. The types of chemicals present in both refined and crude oils, which are released into the air during combustion, may lead to short-term respiratory problems, irritation of the eyes and skin as a result of high chemical concentration. Skin exposure may lead to redness of the skin, dermatitis, oedema, rashes, and blisters; red, watery, and itchy eyes, coughing, shortness of breath, throat irritation, headache can occur due to inhalation exposure and hydrocarbon ingestion can lead to nausea and diarrhea (Aguilera et al., watery, and itchy eyes, 2009). Stress among members of affected communities, as a result of environmental contamination associated with oil spillage, adversely affects the health and general quality of life in those communities (Encyclopedia, 2008 and Rajagopalan, 2010).

EFFECT OF OIL SPILLAGE ON SOCIO-ECONOMIC ACTIVITIES

The majority of the people in the Niger Delta are predominantly fishermen, which implies that their means of livelihood is fishing. They utilize the rivers and creeks. They also engage in fish processing, marketing of fish, and other agricultural practices; which include local gin and palm wine production. They also engage in palm oil production as an industrial business. Boat or canoe carving, mat making, thatch making (roofing), and net making are promising business ventures in the traditional industry, providing means of livelihood for relatively few people. Contamination of the environment, as a result of oil spillage, would likely throw the affected communities into confusion, as there would be loss of farmlands, low or zero yields, destruction of mangrove and other tropical trees, including marine life such as fishes, crustaceans, tortoise, crabs, etc. Farming, fishing, and forestry account for more than 70% of the total employment in this area. It is established that the means of livelihood of people in the area come mostly from water and land (UNEP 2006). Environmental problems due to oil spillage have a way of affecting the socio-economic life of the people, as it dislodges them from their traditional means of sustaining themselves, as their cultivated lands are being covered with oil. Therefore, unemployment will be the order of the day, followed by famine, poverty, and destruction of the ecosystem. According to Osuagwu and Olaifa (2018), they viewed oil spillage and socio-economic impact as a total displacement of traditional occupation, impact on fish production, and man's inhumanity to man. Several other scholars who wrote on the socio-economic impact of oil spills, including occupational displacement, unemployment, low per capita income, environmental degradation, and poor standards of living.

Ebegbulem (2013) properly analyzed the effect of the effects of oil exploration on poverty in the entire Niger Delta area of Nigeria. His extensive review, drawing his conclusion from empirical findings, revealing the neglect of the region and the adverse effects of oil pollution as the drawback to socio-economic progress. His findings also highlighted environmental degradation with its adverse effects on the livelihood of the people as the greatest negative tendency associated with the activities of oil exploration in the region.

Varying degrees of oil spillage originate from aging, dilapidated, and abandoned facilities and pipelines infrastructure, as from oil spills during transportation and artisanal refining of stolen crude oil in primitive conditions (Linden and Jonas, 2013).

There is a decrease in dietary quality due to the dispersal of plants, creatures, fish, and fauna (Roberts, 1998). Sickness and diseases like phobia, chromatic, delirium, and trance-like states in the individual living framework segments of refined, unrefined, and waste oil are also known to have malignant growth prompting (Soremukun,1995)" individuals likewise endure direct financial matters cost in different improvement area (Aprioku,1999).An explicit understanding of the economic cost can be obtained from the value of resources in the oil activities of Niger Delta.

To these are to be added other "less visible aesthetic, mental, and social impacts of pollution on the charming climate (Hutchful,1985). In 1998, a government official in Bayelsa state advised workers in oil companies who had formed the habit of impregnating young girls and abandoning them as they move on. The counter bigotry data administrations (ARDA) recognized the increasing separation of families (Robert, 2004).

Methodology

This chapter deals with the field studies in the Ogoniland area of River State, Nigeria. Due to the primary objective of this study, it becomes obvious to undergo field studies in order to demonstrate that oil and gas exploration in the Niger Delta region, particularly in Ogonjland, has direct impacts on the physical environment that necessitate socio-economic decline.

In order to ensure reliable information on the socio-economic effects of crude oil contamination in Ogoniland, there is a need to have a comprehensive coverage of the area by collecting relevant information through the use of both primary and secondary methods of data collection. The information gathered through structured questionnaires from research respondents was done with strict adherence to research ethics and considerations. The quality of the information contained in this instrument was gathered from journals, textbooks, and data available on the socio-economic effects/impacts of oil spillage, which constitute the secondary sources of data collection.

Questionnaire was the instrument used in this research work. Vital information relating to the socio-economic lives of the people of Ogoniland was covered in the questionnaire survey technique, designed and distributed through self-administration by the researcher to carefully selected members of different communities in the study area. However, a visual assessment of the area was carried out mainly to have firsthand information on the physical conditions of the vegetation, such as trees, plants, and other economic crops. A close-ended questionnaire was used in this research study to elicit the desired response from the respondents.

3.1 ADMINISTRATION AND RETURN OF DATA COLLECTION INSTRUMENTS

The primary and secondary data collected were the sources of data used in this research work. Primary data collection relied on the administration of 100 questionnaires to inhabitants' of the localities (communities) in Ogoniland who were randomly selected,as well as some of the company's staff. However, only 80 administered questionnaires were retrieved. The basis for selection was majorly based on creeks and rivers around the communities. The questionnaires were then administered using simple random sampling. This was carried out by first selecting households from each quarter or street in some of the communities visited. Identification numbers, written on pieces of paper, which were properly mixed up and put in a box, were assigned to each household. Afterwards, they were drawn one at a time until the sample size was completed. The households whose identification numbers were drawn were those to whom questionnaires were administered and were assigned to fill in the questionnaires. However, assistance was sought during the interpretation of the questions for the informal (illiterates and semi-illiterates) educated respondents. The responses to the questionnaires by the respondents were examined and given anonymously. The findings of the household survey, which employed the use of questionnaires, were arranged in line with four main themes: demographic, socio-economic factors, environmental factors, and compensation.

3.1 **SAMPLE SIZE AND DATA**

The area covered in the course of this research work was the whole of Ogoniland with a total population of 831,726 (census, 2006). However, due to the large population size of the area, 200 questionnaires were produced using published tables by Krejcie & Morgan (1970) and Saunders *et al.* (2016) but only 160 were distributed to members of different communities in Ogoniland.

3.2 TYPES AND SOURCES OF DATA

Primary data was collected using a structured questionnaire administered to the targeted respondents selected from the study area, while the secondary data was obtained through an extensive review of relevant or related literature.

3.3 **METHOD AND TOOLS OF DATA COLLECTION**

It is essential to make references to earlier comparable research studies done by other researchers to establish the necessity by introducing the empirical part of this research study. According to Nwaugo (2005) and Odu (1996) on the impacts of oil-pollutedled degradation in the Niger Delta Region, they stated that all associated impacts of oil spills begin with impacts on the physical environment. This means that impacts on the environment should be treated first before that of socio-economic impacts. because the socio-economic impacts arise from environmental impacts, particularly impacts on fishery and agriculture. This survey was conducted in Ogoniland, Rivers State of Nigeria in February/March 2021. The method used involved a primary research design, which considered conducting a written/formal questionnaire technique to assess the feelings of the affected people about their environment. Their entire well-being, including their economy, is highly important. Field and also by field and personal observation. The latter also supplemented the information gathered through formal techniques. The research tool further enables readers to form opinions on the respondents, where the fell that oil and gas exploration has direct impacts on the socio-economic and livelihood of the Ogoni people, including their health and agricultural practices, such as fishery and crop cultivation, which are their main occupation of Ogoni people.
Questionnaire format was designed in an effort to obtain relevant information from the chosen location. This questionnaire information was obtained from various sources, individuals from various NGOs, oil and gas contractors, interest groups, stakeholders, ordinary individuals from Ogoniland, company staff operating in the communities, and government establishments that are mainly located within the study area. The questionnaire will reveal any changes in opinion on the true situation of the environmental issues regarding the operations of oil and gas exploration in the area. The true situation faced by the communities as a result of the impacts of oil and gas pollution will be revealed through the responses from the respondents, which will form the basis for future management of environmental degradation arising from oil spills in the area. The reliability and validity of the data obtained were secured
MODEL SPECIFICATION AND TECHNIQUE OF DATA ANALYSIS:
   MODEL SPECIFICATION: PROBIT MODEL

To determine whether or not oil contamination/pollution has an effect on the socio-economic life of the Ogoni people, a Probit regression method was used. This model was chosen to consider the probability that oil pollution has a great impact on some localities, which negatively affects the livelihood of the Ogoni people. These areas were identified through
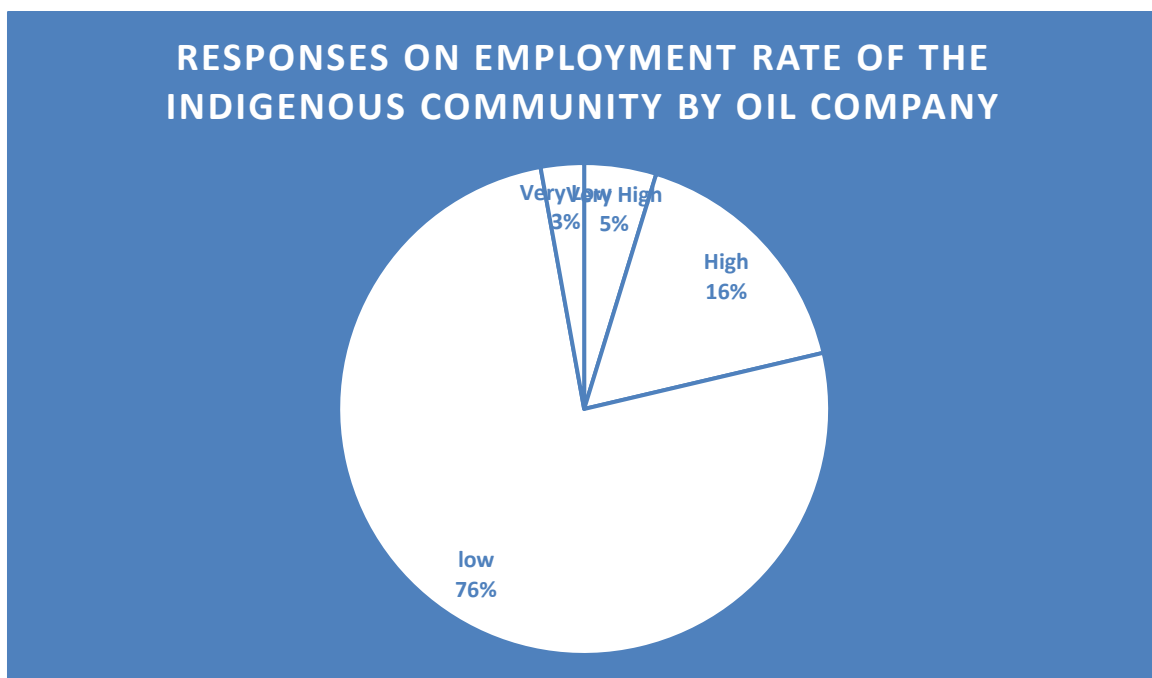
observations and responses from the people within the localities and literature review. The initial areas were about six (6), but after initial testing and evaluation, it was reduced to four (4) due to time constraints.

QUESTIONNAIRE OF SURVEY AND ITS ANALYSIS.

The primary method used in this research work was the questionnaire technique, which showed that the various responses of the respondents that their means of livelihood have been negatively affected by the impacts of oil spillage in the areas.

DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

The breakdown or display of demographic characteristics of the respondents is crucial because it provides insight it gives to the respondent personal information, such as academic qualifications, employment status, and the principal income earner in the household.
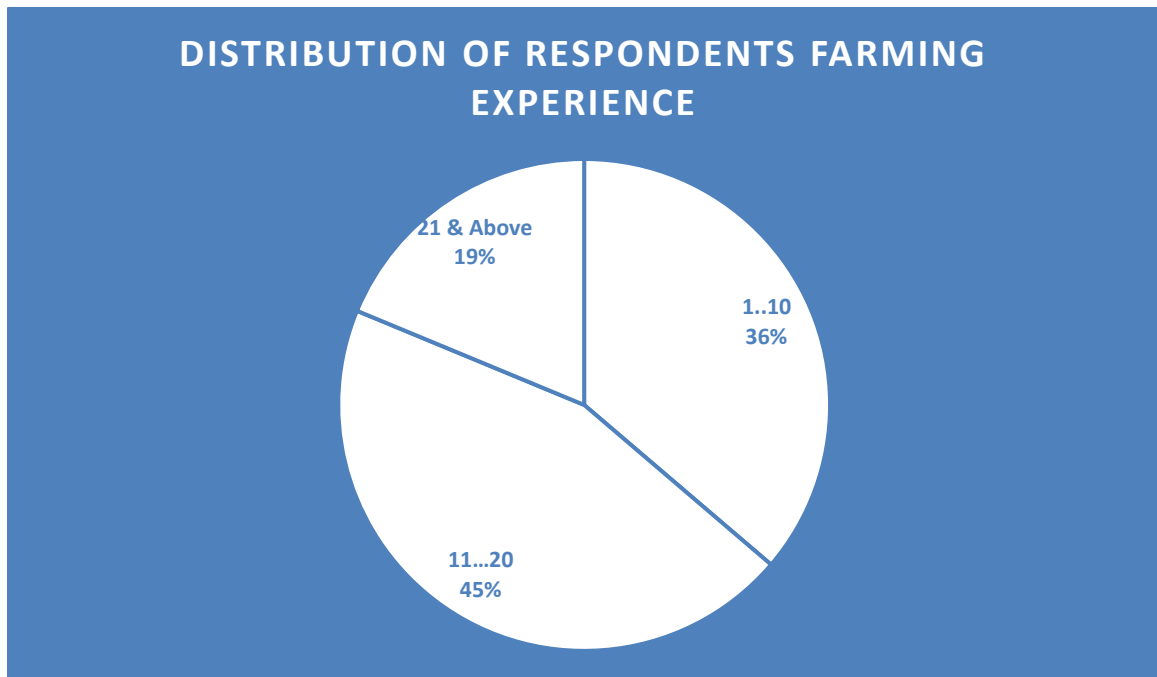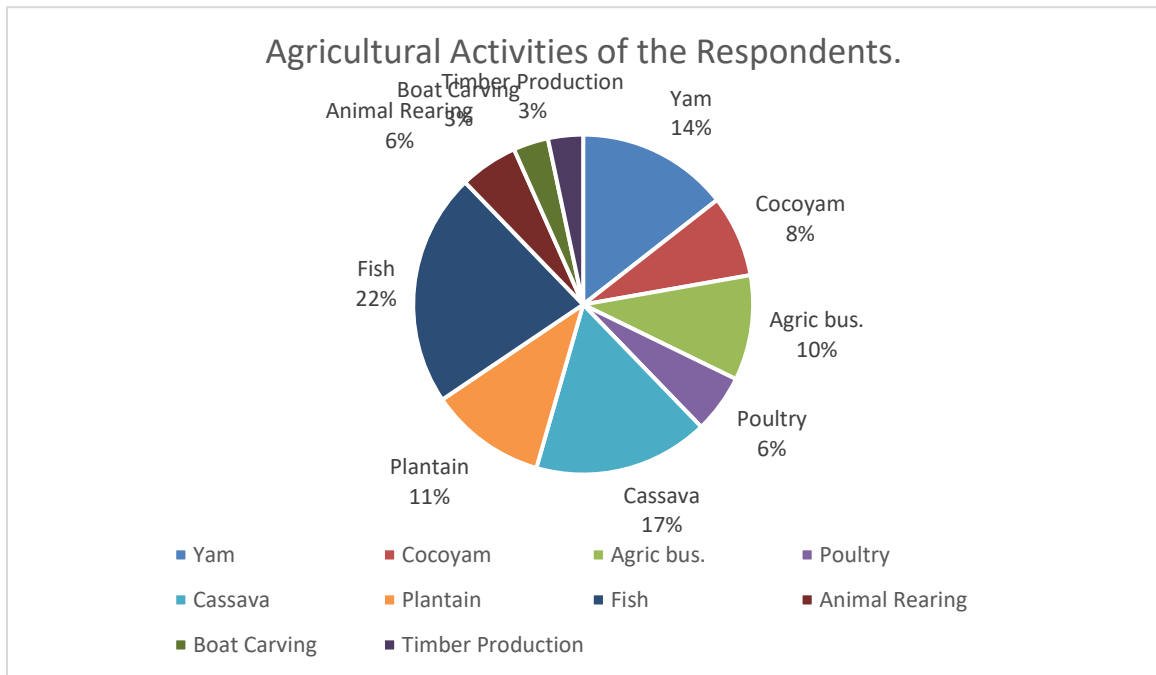

RESPONSES ON EMPLOYMENT RATE OF THE INDIGENOUS COMMUNITY BY OIL COMPANY

Very Low 3% — Very High 5% — High 16% — low 76%

 Source: Author's Survey, 2023.

The above represents the level of employment in the communities where the oil company operates.
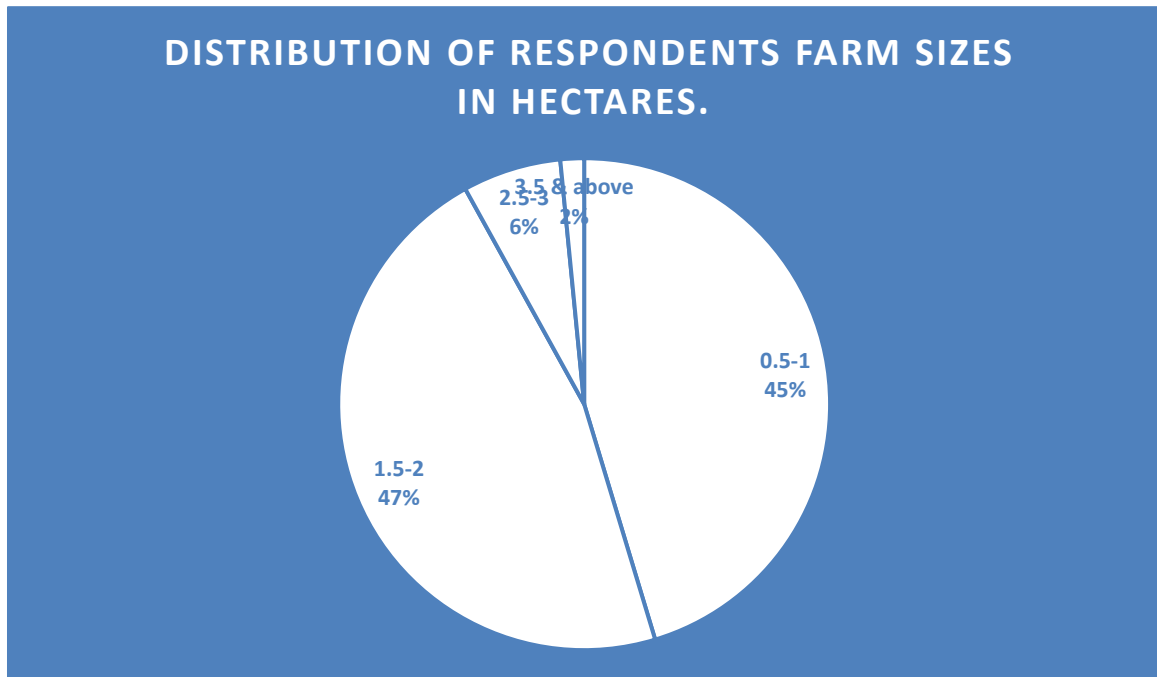
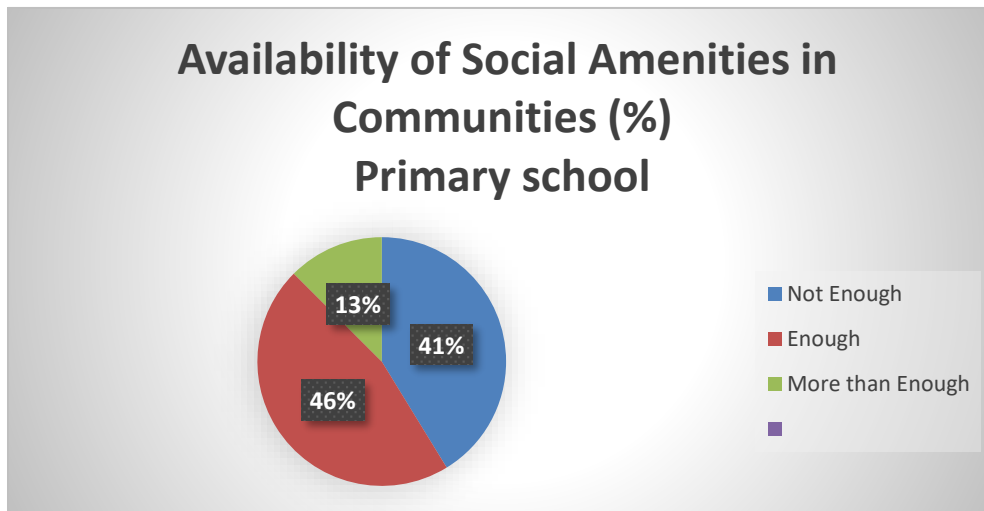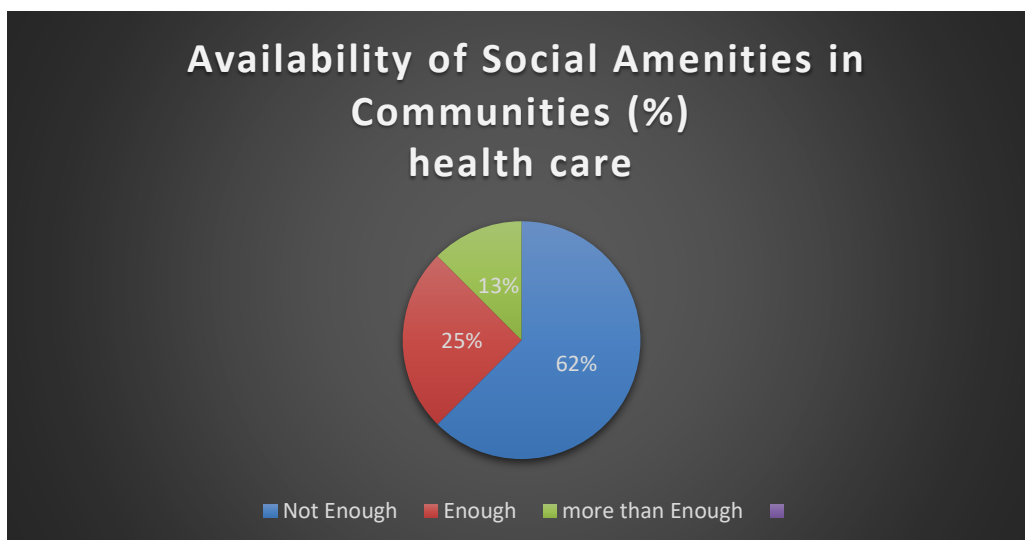DISTRIBUTION OF RESPONDENTS FARM SIZES IN HECTARES.

3.5 & above 2%
2.5-3 6%
0.5-1 45%
1.5-2 47%

Source: Author's Survey, 2023.

DISTRIBUTION OF RESPONDENTS FARMING EXPERIENCE

21 & Above 19%
1..10 36%
11...20 45%

Source: Author's Survey, 2023.

Agricultural Activities of the Respondents.

Source: Author's Survey, 2023

Availability of Social Amenities in Communities (%) Primary school

Availability of Social Amenities in Communities (%) Secondary school

Availability of Social Amenities in Communities (%) health care
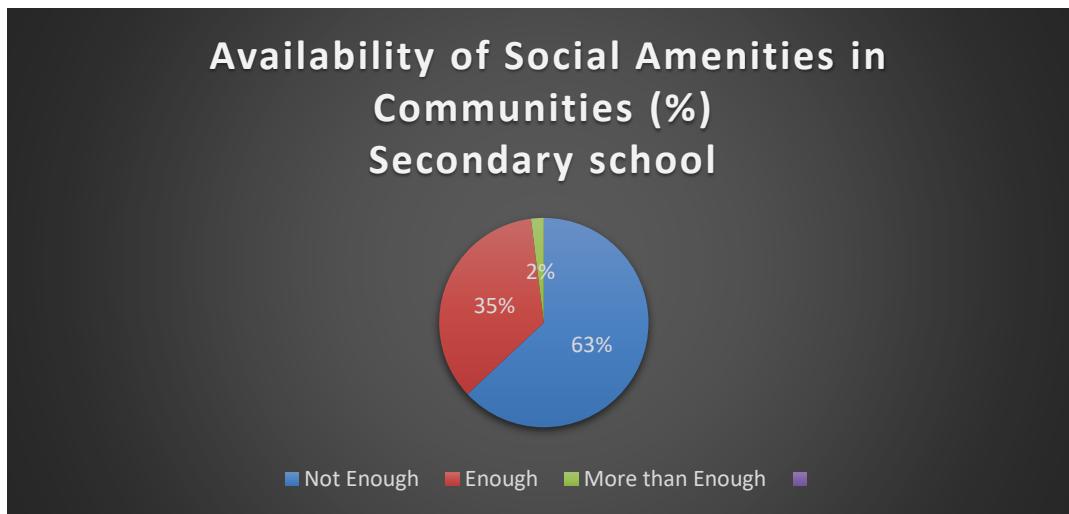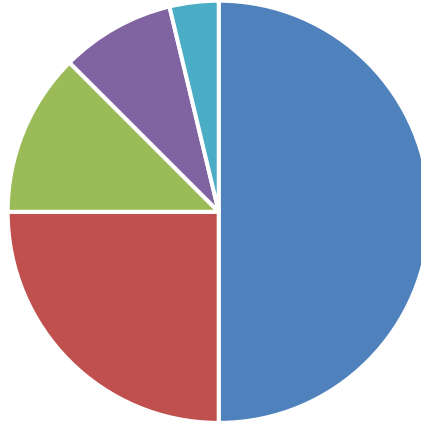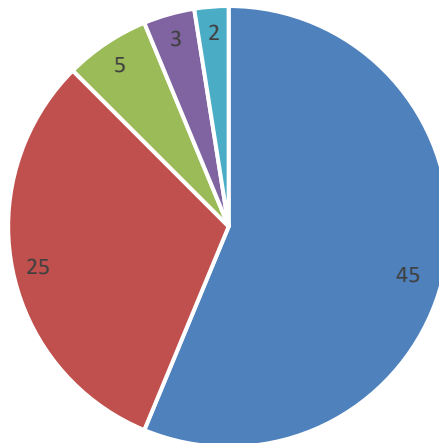
Source: Author's Survey, 2023

Respondents were asked to rate the availability of three social amenities in their communities, and the above response was obtained for the three social amenity which are primary schools, secondary schools, and health care centres .

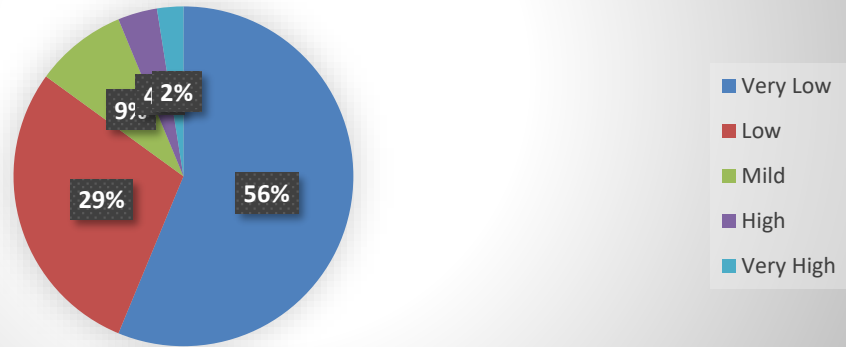Availability of Infrastructure in Communities.
Electricity Supply

Very Low Low Mild High Very High

Availability of Infrastructure in Communities.
Portable Water

Very Low Low Mild High Very High

**Availability of Infrastructure in Communities.
Motorable Road**

Source: Author's Survey, 2021.

The above figures illustrate the responses of respondents with regards to the provision of infrastructure in the communities.

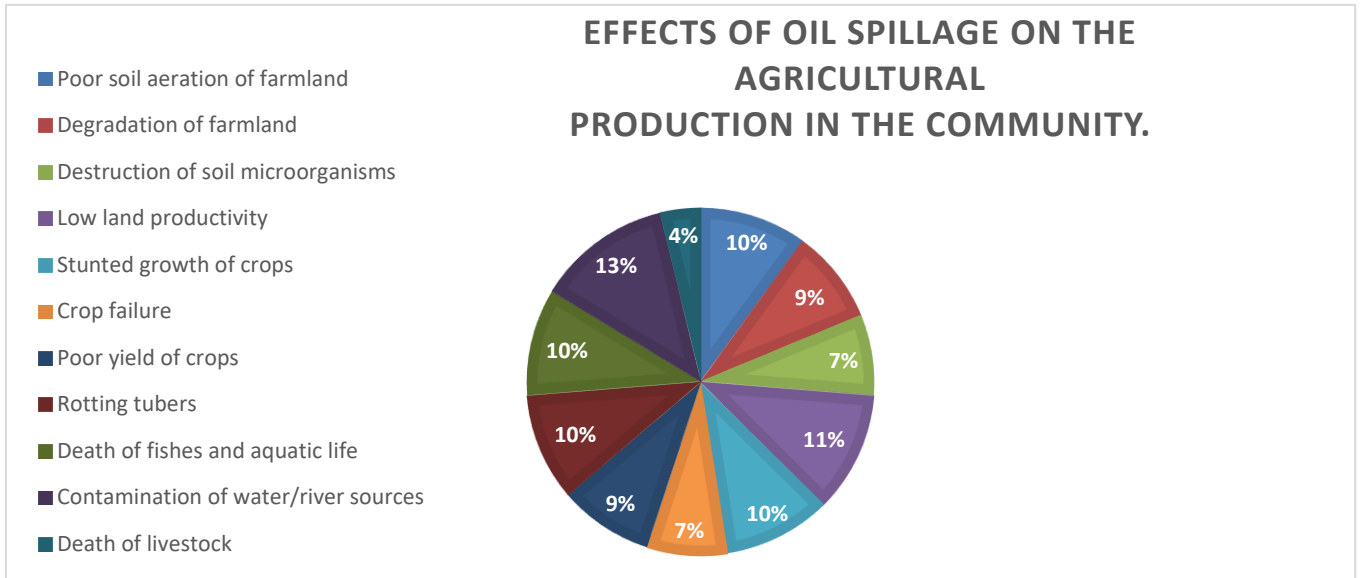**ENVIRONMENTAL CHARACTERISTICS OF THE RESPONDENTS**

The respondents were also asked to rate the problems related to environmental issues in their communities. Their responses are presented below.

Sources of oil spillage/pollution in agricultural production in the community
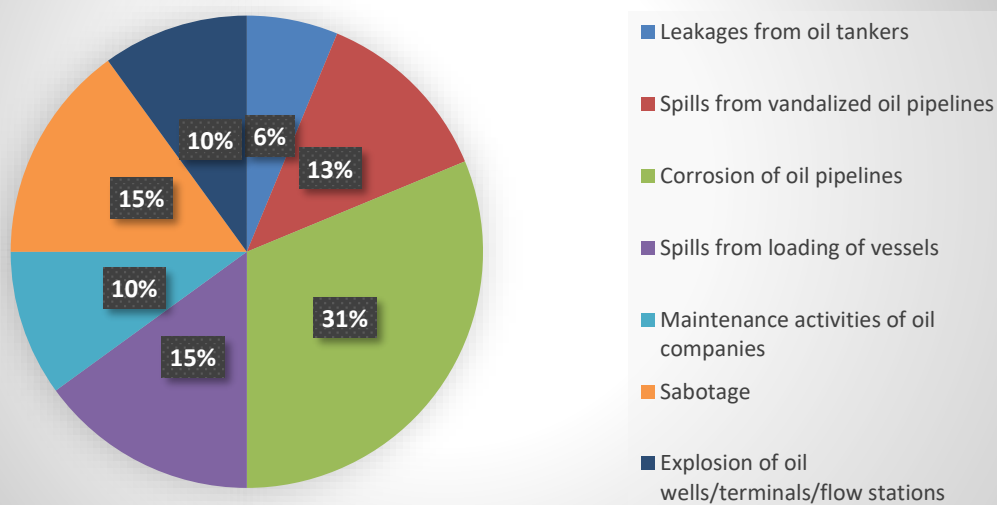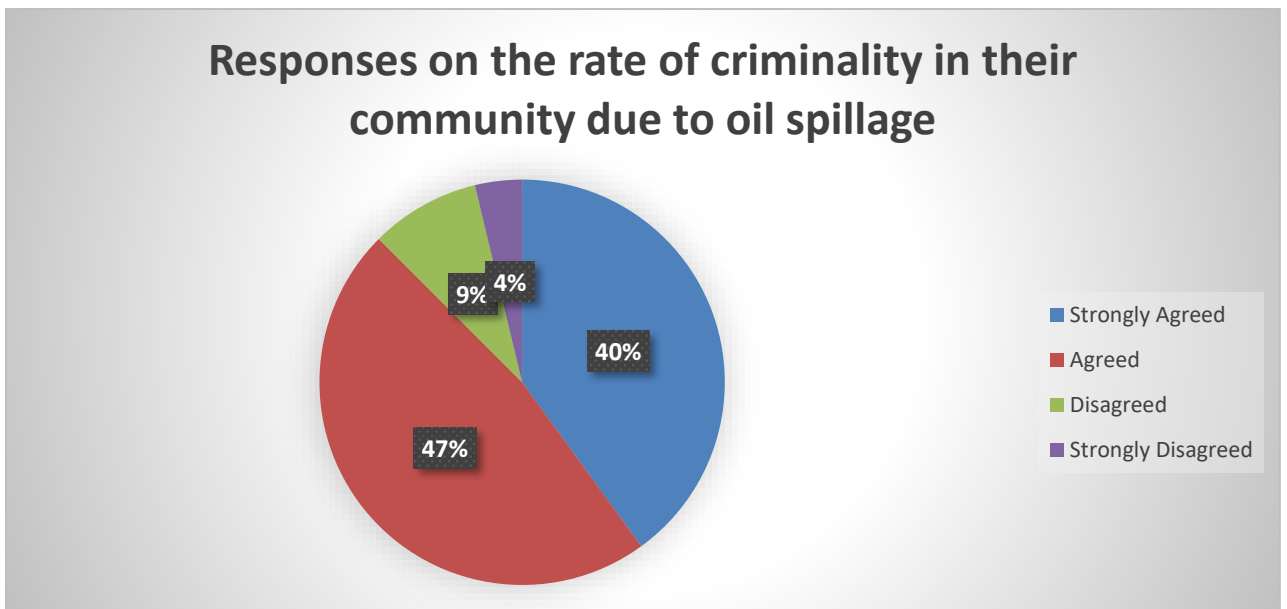
Source: Author's Survey, 2021.

The figure above shows the sources of oil spillage on agricultural production by the respondents.

EFFECTS OF OIL SPILLAGE ON THE AGRICULTURAL PRODUCTION IN THE COMMUNITY.

Legend:
- Poor soil aeration of farmland
- Degradation of farmland
- Destruction of soil microorganisms
- Low land productivity
- Stunted growth of crops
- Crop failure
- Poor yield of crops
- Rotting tubers
- Death of fishes and aquatic life
- Contamination of water/river sources
- Death of livestock

Source: Author's Survey, 2023.`

The table and pie chart above represent the possible effects of oil spillage on agricultural production (pool data) in the community. The table reveals the responses of 160 participants on the effects of oil spillage .

Responses on the rate of criminality in their community due to oil spillage

- Strongly Agreed
- Agreed
- Disagreed
- Strongly Disagreed

Source: Author's Survey, 2023.

The Figure 11 shows the respondents' position on how oil spillage influences criminality in the community.

Reactions on the losses sustained by the community due to activities of oil companies in their area.
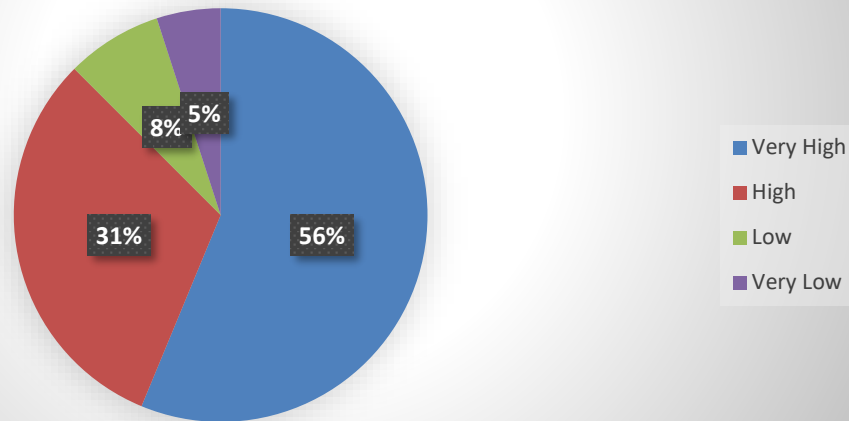
CHATER FIVE
SUMMARY, CONCLUSION, AND RECOMMENDATIONS
5.1 SUMMARY

This research examines the effects of oil spillage on the socio-economic well-being of the Niger Delta people, especially on the agricultural production of Ogoniland. It also analyzed the impact of government and oil company intervention programs in the community.

The main purpose of this research was to assess the socio-economic impact of oil spillage emanating from the activities of oil companies in Ogoniland, with more emphasis on how this spillage has negatively impacted the people. It is also pertinent to note that this research work is about the people of the Niger Delta and their means of livelihood after an oil spill. The research began by identifying the sources of environmental problems due to the operation of the oil companies, beginning with field and questionnaire surveys, interviews, and investigative studies through the administration of questionnaires in the communities where the research was carried out, to sound the real opinion of the communities in respect to environmental injustice, negligence of the environment, political/ economic marginalization, and human rights violations by the government. This research captured various aspects, such as demographic, socio-economic, and environmental factors, as well as compensation due to oil spillage in the affected communities.

The responses of the respondents and findings drawn from various oil host communities are contained in Table 4.1 down to 4.20. The studies revealed that the age structure of the residents shows that more than 60% of the people are within the productive age group of 20 – 60 years. With respect to educational background, more than 70.6% do not have more than a secondary education. Investigation revealed that many of them abandoned their education because their parents' major source of income (farming and fishing) has been badly affected by oil spillage.

In terms of occupation, the traditional industries in the area include canoe carving, mat making, thatch making (roofing), net making or mending, and palm oil processing. Others include gari or starch processing, fish smoking, local gin (wuru) distillation, among others. Presently, the dominant occupation in the study area is farming, which, when combined with fishing and forestry, accounts for more than 70% of the total employment in the area. This could be seen that the livelihood of the Ogoni people mainly comes from land and water.

In terms of income, about 45.6%of the respondents earn less than ₦18,000, whereas 73.7% of the total respondents earn less than ₦50,000 per month. A good amount of this income comes from farming and fishing activities. However, the marketing structure may also be responsible for this income pattern. For example, middlemen buy from the fishermen and sell directly to consumers in cities or urban areas, making more profits. At times, the middlemen buy on credit from the fishermen and remit payment to them after sales to the final consumers. Due to poor storage facilities, the fishermen have no option but to accept this kind of market structure, as their catch would spoil and depreciate in value.

The impact of oil spillage on the socio-economic activities of the people of Ogoniland has been tremendous. For instance, 95% of the respondents agreed that they run at a high and very high loss during and after oil spills. Whereas, whereas 5.0% of the respondents said they make less profit from their major means of livelihood.

Conclusively. It would be deduced that people's means of survival have been badly affected, starvation and hunger becoming the order of the day. Many of their children could no longer continue with their education, aquatic animals including fishes lost their lives due to water contamination. This reduces agricultural production in the area, due to poor aeration of soil, degradation of farmland, increase in soil temperature and toxicity, destruction of soil micro-organisms, low land productivity, stunted growth, crop failure, poor yielding of crops, rotting of both cassava and yam tubers, etc. This renders many of the able young men who were engaged in agricultural practices jobless. It could also be deduced that the failure of oil companies to execute their corporate social responsibilities by providing social amenities, infrastructural development, employment for their host communities, as a means of compensating the community degraded with oil spill, leads to restiveness, civil unrest, sabotage, pipeline vandalization, criminality, and other social vices in the area.

Recommendation
The goal of this research was to investigate issues concerning the implications of oil spillage on socio-economic activities in Ogoni-land, Rivers state-Nigeria. The research involved the survey of people from Ogoni-land to obtain information that would help to understand the satisfaction and perception of the potential beneficiaries (community) of the havoc caused by oil spillage in the study area. In accordance with the research outcome, the following recommendations are hereby presented.

i. The multinational oil companies operating in the study area should collaborate with the governments and people of Ogoniland to prepare and develop a detailed plan for the cleanup of the contaminated soil. Prior to the cleanup exercise, soil samples, as well as excavation of the trial pits, should be carried out to delineate the areas affected by oil spills for proper cleanup. Furthermore, their education and career enhancement should be included in the plan as well.

ii. The stakeholders in the oil and gas industries should conduct a comprehensive review of their assets in Ogoniland, including a detailed test of the integrity of the current oilfield infrastructure. They should also develop an asset integrity management plan for the Niger Delta, including a comprehensive decommissioning plan. For those assets the companies would like to retain, they should specify risk levels, maintenance schedules, and inspection routines should be included in their plan as well and properly communicate them to the people of Ogoniland. These steps will reduce threats to livelihoods and increase in criminalities to the barest minimum.

iii. All relevant stakeholders should be involved in compensation decisions through the adoption of a community-driven approach. The governments (Federal, State, and Local) and all well-meaning Nigerians should provide a relief camp/zone outside the community until proper remediation is carried out, and these policies should not be politicized. These steps, if taken, can restore confidence in the people of the study area, thereby eliminating hostile environments.

iv. Future research efforts should concentrate on educating prospective research respondents or participants on the effects of oil spillage to minimize the conceivable effect of information inappropriateness on the responses. This can be achieved by adopting a mixed methods research approach where two distinct results would be integrated to give full information about the effects of oil spillage and sustainable recommendations in the study area and elsewhere.

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