



Effect of Marine Pollution on Coastal Environment in Nigeria Seaports

Article History

Received: 20.05.2021
Revision: 05.06.2021
Accepted: 13.06.2021
Published: 20.06.2021

Author Details

Dike, Remigius Amarachi and Achoru, Fred Emeka

Authors Affiliations

Institute of Maritime Studies, University of Nigeria, Enugu Campus

Corresponding Author*

Dike, Remigius Amarachi

How to Cite the Article:

Dike, Remigius Amarachi & Achoru, Fred Emeka. (2021); Effect of Marine Pollution on Coastal Environment in Nigeria Seaports. *Int Aca. J Law*; 2(3), 2021: 30-39

Copyright @ 2020: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

Abstract: Marine pollution is problematic and its impacts are having devastating and destructive effects on marine resources and the ecosystems. The main objective of this study is to evaluate the effect of marine pollution on coastal environment in Nigeria Seaports. The specific objectives are to: (i) examine the effect of ocean dumping pollution on marine personnel in Nigeria Seaports, (ii) ascertain the effect of land runoff pollution on aquatic resource in Nigeria Seaports (iii) determine the effect of ocean mining pollution on marine ecosystem in Nigeria Seaports. The research design of the study was descriptive survey research method. The population of the study consists of 3 sea ports in Nigeria. The sample size of 371 respondents was drawn from population of the study which consists of 5,168 life support technicians and marine engineers of the selected sea port; Onne sea port, Calabar sea port and Delta sea port. Research questions were answered using mean score and standard deviation. The hypotheses stated were tested using single regression statistics. The study revealed that there was negative significant effect of ocean dumping pollution on marine personnel in Nigeria Seaports (t -statistics (43.312) > P -value (0.000)), it also revealed that there was negative significant effect of land runoff pollution on aquatic resource in Nigeria Seaports (t -statistics (48.491) > P -value (0.000)), the study also revealed that there was negative significant effect of ocean mining pollution on marine ecosystem in Nigeria Seaports (t -statistics (52.292) > P -value (0.000)). The study recommended that making people aware of the problem is the first step to prevent water pollution. Hence, importance of water and pollution prevention measures should be a part of awareness and education programme by Creating awareness by re-educating the citizen, ship owners, crew of a ship, oil exploring companies, and other corporate bodies, to be concerned and responsible for the respect and protection of the marine environment in Nigeria.

Keywords: Marine Pollution, Coastal Environment and Nigeria Seaports.

BACKGROUND OF THE STUDY

Marine pollution is man-made marvel that has radical impact on worldwide coastal ecosystem, marine faculty and aquatic assets. It was man-made presentation of materials or energy into the marine surroundings (counting estuaries) straightforwardly or by implication. The marine pollutants has genuine unsafe impact to living assets, risk to human wellbeing, obstacle to marine exercises, including fishing, hindrance of value for utilization of sea-water and decrease of conveniences. Marine pollution is classed as point source or non-point source. Point source pollution happens when there is a solitary, recognizable, and limited wellspring of the pollution. The point wellspring of marine pollution signifies any noticeable, bound and discrete movement wellspring of the pollution and not restricted to any line, discard, channel, burrow, conductor, all things considered, discrete gap, holder, moving stock, concentrated creature taking care of activity, or vessel or other coasting make, from which pollutants are or might be dis-charged. For example, point wellspring of contamination includes straightforwardly releasing sewage (for example water-conveyed waste, in arrangement or suspension, which is proposed to be taken out from a local area, otherwise called wastewater) and modem waste inside the ocean (Mitchell and Diane, 2011). Non-point source pollution involved the pollution that comes from badly characterized and diffuse sources. It comes an as consequence of general gathering of human exercises for which the pollutants have no undeniable mark of section into getting watercourses.

Clearly, non-point source pollution could be substantially more hard to quantify, recognize and control as to contrast and point sources. The case of non-point source pollution may incorporate horticultural tempest water releases and return streams from flooded farming, metropolitan runoff (from rooftops, roads, parking areas, etcetera), transportation (streets, rail routes, pipelines, hydro-electric passageways) etcetera Ventures and organizations may release wastes to road canals and tempest channels. Over-burdening and breakdown of septic frameworks lead to surface runoff (International Joint Commission the United States and Canada, 1973).

Irrefutably, marine pollutions are making decimating and damaging impacts aquatic assets, marine faculty and for the most part the whole marine ecosystem (Sindermann, 2005). It is regularly recognized that human feature assumes a significant part in the contamination of the marine and its surroundings. The mainstream of the destructive substances, for example, poisonous flood and synthetics that causes marine pollution are opened to the seas and oceans by various job players especially the business and shipping organizations (Islam & Tanaka, 2004; Grant & Ross, 2002).

Regularly, the wellspring of these piles of garbage and harmful synthetic substances are normally from various human exercises occurred every day like oil slicks, spillages, dumping, and mining (Grant & Ross, 2002). These exercises are destructive in light of the fact that marine life expressions dangers from various perspectives in the oceans like overexploitation, reaping, store of waste, defilement, extraordinary species, soil recuperation, digging and worldwide environmental change (Vikas & Dwarakish, 2015). This demonstration of marine contamination endures with opportunity until the public authority and the administrative specialists faced it by form laws that wipe out marine pollution.

Statement of the Problem

Marine pollution is a worldwide problem and has sum significant worry to everyone (Sheavly and Register, 2007). Regardless of the declaration of administrative structures broadly and universally on the bar of marine pollution, the problem of marine pollution keeps on falling apart consistently everywhere on the universe (Krages, 2000). The greater part of the lawful designs on marine pollution has set out various disciplines for defaulters (Tan, 2005). Notwithstanding, execution and requirement are poor, subsequently, the pollution waits with insusceptibility. It is appropriate to bring up that there might be no legitimization for smart or accidental marine pollution by anyone or substance (Anthony, 2006).

Absence of sufficient waste gathering facilities in non-industrial nations' ports is way that vessels must choose the option to release waste at sea (Carpenter, 2005). Nonetheless, a few administrators like to landfill waste at sea where there is a generally safe of being gotten, as opposed to utilize the gave facilities and pay the necessary client charges (Anstey, 2008). In West and Central African ports, facilities are opening up severally yet stay deficient. Marine ships release waste in the ports. The administration of ocean pollution stays poor (Barns-Dabban, Koppen, and Mol, 2017).

Likewise, this organization is given the duty of observing waste release from vessels by visiting the ports and report back to the power. In the current situation, no autonomous association is set up to review the exercises of pollution control project workers. This study therefore attempts to evaluate the effect of marine pollution on coastal environment in Nigeria Seaports.

Objectives of the Study

The main objective of this study is to evaluate the effect of marine pollution on coastal environment in Nigeria Seaports. The specific objectives are to:

- Examine the effect of ocean dumping pollution on marine personnel in Nigeria Seaports.
- Ascertain the effect of land runoff pollution on aquatic resource in Nigeria Seaports.
- Determine the effect of ocean mining pollution on marine ecosystem in Nigeria Seaports.

Conceptual Framework

Pollution

Pollution is the arrival of undesirable materials into the environment. A poison can be any substance whose nature, area, or amount produces undesired change in the physical, synthetic, or organic characteristics of air, water, or land.

Marine Pollution

Marine pollution involved immediate or aberrant presentation by unsafe materials or energy into the marine environment that impact aquatic assets, dangers to human wellbeing, deterrents to marine exercises including fishing, debilitation of the nature of the sea water and decrease of conveniences (Parranom, 2010).

TYPES AND EFFECT OF MARINE POLLUTION

1. Ocean Dumping

There are a few exercises that pollute the ocean, dumping of trash and other waste materials are first to specify in the rundown. Dumping includes putting every of the waste materials from production lines and businesses, tankers and ships and sewerage waste materials into the seas and oceans. A portion of the materials moved from the modern wastes and sewage wastes contain materials like mercury, cryolite and DDT. Some mechanical wastage likewise incorporates radioactive materials and some limited quantities of

these substances will in general have negative impacts. The scale and the range of the ocean dumping are substantial and also are enormous to the point that the whole humanity could be passing out with the wide heft of indiscreet dumping. The arrival of stabilizer water additionally causes the problem via ocean waste. Weight water will in general copy and move organic entities that weaken the development of fishes in a specific oceanic area.

2. Land Runoff

Numerous examinations have showed that right around 80% pollutants were delivered inside the marine surroundings far upstream from coastlines. The non-point pollution which is an after effect of land runoff brings out numerous wastage materials, for example, the pieces of vehicles and boats inside the sea consistently. In addition, waterways during floods bring out unsafe pollutants including fertilizers, petroleum, and pesticides, among others. Studies have recommended that the existence of fertilizers in the sea could bring about the abrupt blasts of marine green growth. The unexpected blasts of marine green growth results to upset ocean ecosystems and furthermore make of no man's lands in the waters.

3. Oil Spills

Leaking of oil from tankers and offshore rigs in the oceanic area is additionally another illustration of sea pollution. A few of such oil spillage from big hauler ships after mishaps results to profound water Horizon. Bay War oil spillage and Atlantic empress have shown us the degree of the harms the oil spillage can do to the ecosystems. Oil spillages can happen unwittingly where little amount of oil are spilled into the oceans by the big hauler ships or in a gigantic scope where gallons and gallons of oil are spilled into the water surface of the ocean after the accident of vessels or upsetting. The Gulf of Mexico oil spill has made problems birds among the other marine assets whose wings had gotten covered by the smooth and cause them to die in some horrible, nightmarish way.

4. Littering

Sea shores covered with plastic wastes are frequently scene these days. Also, the huge piece of mechanical wastes, the discarding of plastic is another greatest wellspring of pollution as it gradually results to unfavorable impacts to aquatic assets. Materials like plastic are non-degradable which implies they won't be ingested and reused. At the point when oceanic animals and even birds feed on plastic materials inadvertently, the plastic materials stifle the bird that devour on them and result to a consistent decrease in their populace. Activists has demonstrated that dolphins, sharks, turtles, crabs, and sea birds and others are the aquatic creatures that experience the ill effects of the plastic garbage when they are burned-through.

5. Ocean Mining

Mining under the ocean for silver, gold, copper, cobalt, etcetera is another wellspring of ocean pollution. Mines where metals are bored up to a great many meters down arrange wastes inside the ocean and along these lines make sad effects in the marine life on the seabed.

6. Noise Pollution

Notwithstanding these reasons, the aquatic life in the sea is likewise disturbed by a few different factors like noise. Momentum examines have demonstrated that the increment of noise pollution in the sea additionally making dangers to marine assets. Notwithstanding the expanded traffic in the ocean, uproarious sounds from sonar gadgets and oil rigs likewise exacerbating things. Numerous investigations in the past have showed that noise pollution could disturb the movement and propagation examples of warm blooded animals like whales and dolphins.

Empirical Literature

Umo and Nitonye, (2015) led an examination to investigate the effects and solutions of Marine Pollution from Ships in Nigerian Waterways. The investigation embraced expressive review plan. Polls were planned, and research reactions acquired were recorded in tables. After the analysis, 84.7% of the reactions revealed that pollution of the marine surroundings and aquatic lives influences the economy of such local area being polluted and the wellbeing of individuals are influenced negatively. It shows that the answer for the pollution of the aquatic surroundings is for the authorization of the vital laws by Government, such as the IMO guidelines, to guarantee that full submission by operators within the industry in request to save and ensure aquatic resources, give safe seafood to human utilization and secure means of occupation. Reinstructing the resident, ship proprietors, oil exploring companies, team of a ship, and other corporate bodies, to be concerned and answerable for the regard and security of the marine environment would likewise bring about control to the rate at which the marine environment is polluted particularly from the vessels. This will go far in shielding the Nigerian waterways.

Onwuegbuchunam, Ebe, Okoroji, and Essien, (2017) led an investigation to An Analysis of Ship-Source Marine Pollution in Nigeria Seaports. The examination received expressive review plan. The samples were gathered from randomly chose ships at berths in seaport areas. A logical based integrated model is therefore proposed to discourse the managerial problem presented in the regulating of marine pollution in Nigerian ports. They directed a microbiological and physico-synthetic analysis of samples of ships' wastewater to determine the grade of marine pollution in the port environment. The yields from the analysis are then integrated as inputs into an administrative

structure model. The integrated model created is proposed as an option administrative tool for monitoring and controlling pollution in seaports. The arrangement ramifications of the created model are talked about.

Kola, and Bapela, (2017) examined how marine pollution can be effectively contained and curtailed using existing regulatory instruments. The unsafe influence of marine pollution on marine ecosystems and species is a problem that should be tended to as an issue of desperation. It is in contradiction of the setting of this worry that public and international lawful structures have been set up to control, decrease or stop marine pollution. Regardless of this, the issue of marine pollution is as yet widespread and influencing negatively on marine financial products and ventures. It is pertinent to point out that marine pollution possibly gets consideration when it has disastrous impacts. This article examined structures that have been set up to regulate marine pollution by evaluating their capacities. It presents that actions ought to be engaged to guarantee submission of these guidelines and that avoidance of marine pollution ought to be focused on in request to make preparations for the exhibition of dangerous unfriendly effects of hurtful substances.

Nitonye, and Uyi, (2018) led a total audit of the environmental pollution in ports and the tools to assess and minimize such negative environmental impact are analyzed. The apparatus of surveys was utilized and conveyed among two seaports and one wharf; Onne, Okrika and Port Harcourt to gather respondents' opinions on effects, sources and reasons for marine pollution. The chi-square test for independence was utilized with 180 respondents from Onne port, Port Harcourt port and Okrika breakwater. Water test was gathered from Onne seaport and pollution substance such as total petroleum hydrocarbon (TPH), bio-compound oxygen demand (BOD), turbidity, pH and salinity were tried in the laboratory. The outcome shows that Onne water had a salinity level of 20,790 (mg/l) which under the salinity range of water is viewed as saline, a turbidity level of 4.00 (NTU) which was viewed as normal comparing with a 5.00 (NTU) benchmark, BOD5 level of 0.48 (mg/l) which was viewed as pristine because most pristine seawater will have BOD below 1 (mg/l), pH level of 7.77 which falls under the range of sea water being alkaline (7.2 - 8.4), TPH level of 2.98 (mg/l) since all states of sampling and test protections were noticed and the worth is not exactly as far as possible (10 mg/l). It was presumed that the

exercises in Onne port are within as far as possible. It was additionally seen from the survey that a bigger populace of respondents in Onne, Okrika and Port Harcourt ports were aware of the sources and effects of environmental pollution from their separate ports.

Afaf, (2018) directed a to advance the information on the current status of marine plastic pollution in the Gulf of Gabes area of the Mediterranean Sea, by quantifying and qualifying the microplastics in water and biota samples. The outcomes obtained show a high abundance of microplastics in all marine compartments concentrated with a normal abundance of $1.16 \text{ things/m}^3 \pm 0.83 \text{ SD}$ in the water test. This focus is generally high compared to those detailed in other Mediterranean districts. Dominance in number of parts over other states of miniature plastics was accounted for in all locales. Polyethylene was the main plastic polymer for water samples (73% of the things analyzed are Polyethylene). These information underscore that the Gulf of Gabes locale is a focal point for plastic pollution, and this calls earnestly for careful steps. Concerning the ingestion of microplastics by marine organisms, one blue plastic molecule of 0.13 mm is found in 20 tried fishes. Also, ecotoxicological tests were run in request to confirm whether 1-4 and 20-25 μm polyethylene beads are probably going to trigger deadly and sub-deadly reactions in marine planktonic crustaceans and the outcomes show that microplastics were collected in crustaceans, and may influence mortality particularly if no future safety measures are thought of. These outcomes report a more profound understanding of the degree of the threat of microplastics in the marine surroundings to marine species and to humans themselves.

METHODOLOGY

Study Area was Nigeria seaports. The research design of the study was descriptive survey research method. The study used structured questionnaire to obtain data. The choice of location was based on proximity, effective coverage and cost minimization. The population of the study consists of 3 sea ports in Nigeria. The sample size of 371 respondents was drawn from population of the study which consists of 5,168 life support technicians and marine engineers of the selected sea port; Onne sea port, Calabar sea port and Delta sea port. Research questions were answered using mean score and standard deviation. The hypotheses stated were tested using single regression statistics.

Data Presentation and Analysis**Table 1:** Comprehensive demographic distribution of life support technicians of the selected sea port; Onne sea port, Calabar sea port and Delta sea port in Nigeria

TITLE	FREQUENCY	PERCENTAGE
Questionnaire Distribution		
Questionnaires Distributed	371	100%
Returned Questionnaires	358	96%
Not Returned Questionnaires	13	4%
Gender		
Female	213	59.5%
Male	145	40.5%
Age Bracket		
20-30 Years	153	42.7%
31-40 Years	111	31.0%
41-50 Years	66	18.4%
51 Years – above	28	7.8%
Marital Status		
Married	223	62.3%
Single	125	34.9%
Widow/widower	7	1.9%
Divorce	3	0.8%
Educational Qualification		
HND/B.sc	193	53.9%
MBA/M.sc	125	34.9%
Ph.D	40	11.2%
Working Experience		
1- 5 Years	111	31.0%
6-10 Years	153	42.7%
11-20 Years	66	18.4%
21 -35 Years	28	7.8%

Sources: Field Survey, 2021

Three hundred and seventy-one (371) copies of questionnaire were designed and distributed to the respondents. Out of the 371 Questionnaires distributed, 358 (96%) were completed and returned while 13 (4%) were not returned. Therefore, 96 percent respondents

were a good representation. The table showed the respondents profile in frequency and percentage distribution of gender, age bracket, marital status, educational qualification, and working experience.

Data Analysis

Question One: what is the effect of ocean dumping pollution on marine personnel in Nigeria Seaports?

Table 2: Mean rating of responses of respondents on the effect of ocean dumping pollution on marine personnel in Nigeria Seaports

S/N	Question Items	VGE (5)	GE (4)	ME (3)	LE (2)	VLE (1)	Mean	SD
1	The presence of chemicals like fluoride, arsenic, lead, cadmium, mercury, nitrate etc in the ocean from dumping of refuses endangers human health	156	124	58	12	8	4.14	0.0029
2	Presence of fluoride in higher level above 0.5mg/l in the ocean due to ocean dumping pollution causes fluorosis	124	156	48	20	10	4.02	0.0027
3	Releasing of arsenic from wastewater of tanneries, ceramic industry and chemical factories causes respiratory cancer	213	91	42	9	3	4.40	0.0034
4	The release of high rate of mercury from industries into the ocean causes minamata disease due to consumption of fish containing methyl mercury.	197	104	37	12	8	4.31	0.0032
Grand Mean							4.218	0.0031

Source: Field Survey, 2021

This table showed the opinion of respondents on what was the effect of ocean dumping pollution on marine personnel in Nigeria Seaports. The research items 1,2,3,4, have mean score of above 4.0 point respectively and it was rated great extent by respondents. Thereby study revealed that ocean dumping pollution has significant effect on

marine personnel in Nigeria Seaports since releasing of arsenic from wastewater of tanneries, ceramic industry and chemical factories causes respiratory cancer. The respondents are in agreement with all the items. (The grand mean 4.218 was greater than the cutoff point 3).

Question Two: what is the effect of land runoff pollution on aquatic resource in Nigeria Seaports?

Table 3: Mean rating of responses of respondents on the effect of land runoff pollution on aquatic resource in Nigeria Seaports.

S/N	Question Items	VGE (5)	GE (4)	ME (3)	LE (2)	VLE (1)	Mean	SD
1	Decomposition of microorganisms like bacteria and fungi affects the nutrient cycling in the ocean	180	100	48	23	7	4.18	0.0030
2	Chemicals from fertilizers, pesticides etc applied to crops in excess are washed away with rainwater as runoff, and enters the water bodies cause harms to the aquatic organisms	126	158	64	20	10	4.20	0.0030
3	Pesticides, herbicides and insecticides causes change in pH of the water bodies and also reduces photosynthesis rate.	200	101	45	9	3	4.36	0.0033
4	Ammonium from fertilizers is acidic in nature causing acidification of water	190	111	35	12	10	4.28	0.0032
Grand Mean							4.255	0.0031

Source: Field Survey, 2021

This table showed the opinion of respondents on what was the effect of land runoff pollution on aquatic resource in Nigeria Seaports. The research items 1,2,3,4, have mean score of above 4.0 point respectively and it was rated great extent by respondents. Thereby study revealed that land runoff pollution has a significant effect on aquatic resource

in Nigeria Seaports since pesticides, herbicides and insecticides causes change in pH of the water bodies and also reduces photosynthesis rate. The respondents are in agreement with all the items. (The grand me 4.255 was greater than the cutoff point 3).

Question Three: what is the effect of ocean mining pollution on marine ecosystem in Nigeria Seaports?

Table 4: Mean rating of responses of respondents on the effect of ocean mining pollution on marine ecosystem in Nigeria Seaports

S/N	Question Items	VGE (5)	GE (4)	ME (3)	LE (2)	VLE (1)	Mean	SD
1	Ocean mining affects the aquatic organisms in the oceans	126	158	64	20	10	4.20	0.0030
2	It causes death of plants in the ocean	116	158	74	13	17	4.13	0.0029
3	It can cause low rate of photosynthesis in the ocean thereby affecting the green algae and other green plants in the ocean	180	100	48	23	7	4.18	0.0030
4	Reduces the oxygen in the ocean due to the release of toxic thereby causing low respiration to the aquatic animals	197	104	37	12	8	4.31	0.0032
Grand Mean							4.205	0.0030

Source: Field Survey, 2021

This table showed the opinion of respondents on what was the effect of ocean mining pollution on marine ecosystem in Nigeria Seaports. The research items 1,2,3,4, have mean score of above 4.0 point respectively and it was rated great extent by respondents. Thereby study revealed that ocean mining pollution has a significant effect on

marine ecosystem in Nigeria Seaports since reduces the oxygen in the ocean due to the release of toxic thereby causing low respiration to the aquatic animals. The respondents are in agreement with all the items. (The grand me 4.205 was greater than the cutoff point 3).

Test of Hypotheses**Test of Hypothesis One**

1. Ocean dumping pollution has no significant effect on marine personnel in Nigeria Seaports

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.917 ^a	.840	.840	.40781
a. Predictors: (Constant), Ocean dumping pollution				

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	311.992	1	311.992	1875.954	.000 ^b
	Residual	59.207	356	.166		
	Total	371.198	357			

a. Dependent Variable: marine personnel in Nigeria Seaports

b. Predictors: (Constant), Ocean dumping pollution

Coefficients ^a						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.640	.113		5.645	.000
	Ocean dumping pollution	-1.095	.025	.917	43.312	.000

a. Dependent Variable: marine personnel in Nigeria Seaports

In testing this hypothesis, ocean dumping pollution was regressed against marine personnel in Nigeria Seaports. The result of the single-regression analysis showed the model to examine the effect of ocean dumping pollution on marine personnel in Nigeria Seaports.

Marine Personnel in Nigeria Seaports = 0.640 - 1.095 Ocean Dumping Pollution

The empirical result showed that the coefficient of ocean dumping pollution had negative effect on marine personnel in Nigeria Seaports; it means that ocean dumping pollution had negative and direct effect on marine personnel in Nigeria Seaports. The results of the

t – statistics denotes that the coefficient was statistically significance because observed values of t – statistics (43.312) was greater than its P-values (0.000). The results of the F – statistical test showed that the overall regression of the hypothesis one was statistically significance because observed value of the F – statistics (1875.954) was great than its P-value (0.000). Again, our empirical result showed that the Pearson product moment correlation analysis (r) was 0.917. The strength of relationship between the two variables was high. However, we rejected the null hypothesis and concluded that ocean dumping pollution had negative significant effect on marine personnel in Nigeria Seaports.

Test of Hypothesis Two

2. Land runoff pollution has a significant effect on aquatic resource in Nigeria Seaports

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.932 ^a	.869	.868	.37028

a. Predictors: (Constant), Land runoff pollution

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	322.388	1	322.388	2351.338	.000 ^b
	Residual	48.811	356	.137		
	Total	371.198	357			

a. Dependent Variable: aquatic resource in Nigeria Seaports

b. Predictors: (Constant), Land runoff pollution

Coefficients ^a					
---------------------------	--	--	--	--	--

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.650	.102		6.401	.000
	Land runoff pollution	-1.109	.023	.932	48.491	.000

a. Dependent Variable: aquatic resource in Nigeria Seaports

In testing this hypothesis, land runoff pollution was regressed against aquatic resource in Nigeria Seaports. The result of the single-regression analysis showed the model to examine the effect of land runoff pollution on aquatic resource in Nigeria Seaports.

Aquatic Resource in Nigeria Seaports = 0.640 - 1.109 Land Runoff Pollution

The empirical result shows that the coefficient of land runoff pollution has negative effect on aquatic resource in Nigeria Seaports; it means that land runoff pollution had negative and direct effect on aquatic resource in Nigeria Seaports. The results of the t – statistics denotes that the coefficient was statistically

significance because observed values of t – statistics (48.491) was greater than its P-values (0.000). The results of the F – statistical test showed that the overall regression of the hypothesis one was statistically significance because observed value of the F – statistics (2351.338) was great than its P-value (0.000). Again, our empirical result shows that the Pearson product moment correlation analysis (r) was 0.932. The strength of relationship between the two variables was high. However, we rejected the null hypothesis and concluded that land runoff pollution had negative significant effect on aquatic resource in Nigeria Seaports.

Test of Hypothesis Three

3. Ocean mining pollution has a significant effect on marine ecosystem in Nigeria Seaports

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.941 ^a	.885	.884	.34657

a. Predictors: (Constant), Ocean mining pollution

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	328.438	1	328.438	2734.409	.000 ^b
	Residual	42.760	356	.120		
	Total	371.198	357			

a. Dependent Variable: marine ecosystem in Nigeria Seaports

b. Predictors: (Constant), Ocean mining pollution

Coefficients ^a						
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.195	.086		2.275	.024
	Ocean Mining Pollution	-1.015	.019	.941	52.292	.000

a. Dependent Variable: marine ecosystem in Nigeria Seaports

In testing this hypothesis, ocean mining pollution was regressed against marine ecosystem in Nigeria Seaports. The result of the single-regression analysis showed the model to examine the effect of ocean mining pollution on marine ecosystem in Nigeria Seaports.

Marine Ecosystem in Nigeria Seaports = 0.640 - 1.015 Ocean Mining Pollution

The empirical result showed that the coefficient of ocean mining pollution had positive effect on marine ecosystem in Nigeria Seaports; it means that ocean mining pollution had negative and direct effect on marine ecosystem in Nigeria Seaports. The results of

the t – statistics denotes that the coefficient was statistically significance because observed values of t – statistics (52.292) is greater than its P-values (0.000). The results of the F – statistical test showed that the overall regression of the hypothesis one was statistically significance because observed value of the F – statistics (2734.409) was great than its P-value (0.000). Again, our empirical result showed that the Pearson product moment correlation analysis (r) was 0.941. The strength of relationship between the two variables was high. However, we rejected the null hypothesis and concluded that ocean mining pollution had negative significant effect on marine ecosystem in Nigeria Seaports.

Summary of the Findings

The following are the major findings of the study:

1. The study revealed that there was negative significant effect of ocean dumping pollution on marine personnel in Nigeria Seaports (t-statistics (43.312) > P-value (0.000).
2. The study revealed that there was negative significant effect of land runoff pollution on aquatic resource in Nigeria Seaports (t-statistics (48.491) > P-value (0.000).
3. The study revealed that there was negative significant effect of ocean mining pollution on marine ecosystem in Nigeria Seaports (t-statistics (52.292) > P-value (0.000).

CONCLUSION

The study concluded that marine pollution had significant negative effect on coastal environment in Nigeria Seaports. Ocean dumping pollution had significant negative effect on marine personnel in Nigeria Seaports since releasing of arsenic from wastewater of tanneries, ceramic industry and chemical factories causes respiratory cancer. The land runoff pollution had a significant negative effect on aquatic resource in Nigeria Seaports since pesticides, herbicides and insecticides causes change in PH of the water bodies and also reduces photosynthesis rate. The ocean mining pollution had significant negative effect on marine ecosystem in Nigeria Seaports since reduces the oxygen in the ocean due to the release of toxic thereby causing low respiration to the aquatic animals.

RECOMMENDATIONS

The study recommended that:

1. Management of Nigeria Seaports should organize awareness campaign making citizen, ship owners, crew of a ship, oil exploring companies, and other corporate bodies people about the problem of pollution and its effect on aquatic resources.
2. Government of Nigeria should enforce regulations regarding discharge of industrial waste water and limits to extraction of groundwater resources and promote waste water re-use and recycling.
3. Government of Nigeria should formulate policies to control pollution from ships by introducing penalties in terms of levy and restrictions to ships found polluting the marine environment in order to conserve and protect aquatic resources, provide safe sea food for human consumption and protect means of livelihood.

REFERENCES

1. Adetunde, L.A., & Glover, R.L.K. (2010). Bacteriological Quality of Borehole Water Used by Students' of University for Development Studies, Navrongo Campus in Upper-East Region of Ghana. *Current Research Journal of Biological Sciences*. 2(6):361-364.
2. Afaf, Y. (2018). *Microplastics in the marine environment, presence in water and interaction with marine organisms*; Institute for the Anthropic Impacts and Sustainability in Marine Environment
3. Akankli, J.A., & Oronsaye, J.A.O. (2012). *Fundamentals of Water Pollution*. Manuscript as Submitted in 2012 for Publication Assessment to Tertiary Education Fund, Abuja.
4. Anstey, F. (2008). *Ballast Water Management: A Time for Action*. Available online: <http://web.deu.edu.tr/maritime/imla2008/Papers/36.pdf>.
5. Anthony, O. G. (2006). Criminalization of seafarers for accidental discharge of oil: Is there justification in international law for criminal sanction for negligent or accidental pollution of the sea. *Journal of Maritime Law and Commerce*, 37, 219-229.
6. Barns-Dabban, H., Koppen, K.V., & Mol, A. (2017) Environmental Reform of West and Central Africa Ports: The Influence of Colonial Legacies. *Marit. Policy Manag*, 44, 565–583.
7. Carpenter, A. (2005). *The Reduction of Ship-Generated Waste in the North Sea: A Contemporary Analysis*. Unpublished Ph.D. Thesis, University of Leeds, Leeds, UK,
8. CPCB Report. (2013). Status of Water Quality in India, 2011. Monitoring of Indian National Aquatic Resources, Series: MINARS/35/2013-14. Pp. 1-212.
9. Dzombak, D. A., Ghosh, R. S. & Wong-Chong, G. M. (2005). *Cyanide in water and soil: chemistry, risk, and management*. USA, New York: Taylor & Francis.
10. Eckenfelder, W.W., Davis, L.F. & Englands, A.J. (2009) *Industrial Water Quality: Sources and Characteristics of Industrial Waste Water*. McGraw-Hill Press, New York
11. Institute of Geo-Sciences and Space Technology (IGST) (2000) *Assessment of Damage Following Oil Spill Proceedings of an International Seminar on Petroleum and Niger Delta*; FMH and NNPC, PTI Warri, Nigeria
12. International Joint Commission the United States and Canada (1973), *Second Annual Report on Great Lakes Water Qualities*. www.ijc.org
13. International Maritime Organization [Maritime Environment (2014). Retrieved from International Maritime Organization website: <http://www.imo.org/OurWork/Environment>
14. Islam, M.S., Tanaka, M. (2004). Impacts of pollution on coastal and marine ecosystems

- including coastal and marine fisheries and approach for management: a review and synthesis. *Marine pollution bulletin*, 48(7-8), 624-649.
15. Kola O. Odeku and Bapela M. Paulos (2017). Prohibition of pollution of marine environments: challenges and prospects. *Environmental Economics (open-access)*, 8(3), 127-136.
 16. Krages, B. P. (2000). *Total Environmental Compliance: A Practical Guide for Environmental Professionals*. USA, New York: Lewis Publishers
 17. Mitchell, Diane (2011) "Health Effects of Shipping Related Air Pollutants", California Air Resources Board. Presentation to EPA Region 9 Conference on Marine Vessels and Air Quality.
 18. Mohammed, A.S. (2009) *Port Development in Nigeria, International Symposium on Maritime Economy and Transport Services in West and Central Africa Countries*; Available online: <http://www.nigerianports.org/dynamicdata/uploads/MD>
 19. Nitonye, S., & Uyi, O. (2018) Analysis of Marine Pollution of Ports and Jetties in Rivers State, Nigeria. *Open Journal of Marine Science*, 8, 114-135.
 20. Onwuegbuchunam, D. E., Ebe, T. E., Okoroji L. I. and Essien A. E. (2017) An Analysis of Ship-Source Marine Pollution in Nigeria Seaports; *J. Mar. Sci. Eng.*, 5, 39
 21. Parramon, M. (2010). *Theoretical framework pertaining to the regulation of Land Based Marine Pollution*. Retrieved from http://dspace.nwu.ac.za/bitstream/handle/10394/5229/Parramon_M_Chapter2.pdf?sequence=22
 22. Sheavly, S. B., & Register, S. B. (2007). Marine debris & plastics: environmental concerns sources, impacts and solutions. *Journal of Polymers and the Environment*, 15(4), 301-305.
 23. Sindermann, C. J. (2005). *Coastal pollution: effects on living resources and humans*. Retrieved from <https://www.crcpress.com/Coastal-Pollution-Effects-on-Living-Resources-and-Humans>
 24. Singh M.R., & Asha G. (2016) Water Pollution-Sources, Effects and Control; *A Journal of the Human Environment*, 22(1), 122-143.
 25. Steiner, T.S., Samie, A., & Guerrant, R.L. (2006). Infectious diarrhea: new pathogens and new challenges in developed and developing areas. *Clin. Infect. Dis.* 43:408-410.
 26. Tan, A. K. J. (2005). *Vessel-source marine pollution, the law and politics of international regulation*. USA, Cambridge: Cambridge University Press.
 27. Umo I., & Nitonye, S. (2015) Effects and Solutions of Marine Pollution from Ships in Nigerian Waterways; *International Journal of Scientific & Engineering Research*, 6(9), 81-91.
 - Vikas, M. A., & Dwarakishb, G. S (2015). International conference on water resources, coastal and ocean engineering (ICWRCOE 2015). *Coastal Pollution: A Review*, 4, 381-388.