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Farmers Perception on the Effect of Crude Oil Spillage on Agricultural Farmland in Etche Local Government Area, Rivers State

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Abstract

The study investigated 'farmers' perception on the effect of crude oil spillage on agricultural farmland in Etche Local Government Area of Rivers State, Nigeria. Four objectives guided the study. The design of the study was a descriptive survey with a sample size of 100 respondents' selected using random sampling technique. The instrument for data collection was four point rating scale of agreement. The instrument was validated by experts and reliability coefficient of 0.80 was established using test re-test technique. Data collected were analyzed descriptively using percentage and mean, with a criterion mean of 2.5 as the cut-off mark for acceptance. The study found out that oil bunkering, oil siphoning, tanker accident, oil pipe vandalization, illegal dumping amongst others are some of the causes of oil spillage, secondly unavailability of nutrients in the soil, change in soil nutrient, reduction in the firmness of agricultural farmland, stunted growth of crops, reduction in the yield of agricultural farm land, amongst others are the effects of crude oil spillage on crop land. Also release of poisonous (harmful substances) to fishing rivers, pollution of fishing rivers, death of aquatic plants and animals, reduction in availability of oxygen for aquatic organism amongst others are some of the effects of crude oil spillage on fishing rivers and finally introduction of biological agents to the spill to hasten biodegradation, use of dispersants to break up the soil, reduction of activities of militants, oil vandalization, oil bunkering are some of the remedies to oil spillage in agricultural farmland in Etche.

Key words; Farmers perception, crude oil, spillage and agricultural farmland

Introduction

Oil was discovered in Nigeria in 1956 at Olobiri in the Niger Delta after half a century of exploration according Nigerian Oil and Gas Industry Brief (N.O. & G I,B. 2014). The discovery was made by Shell-BP, at the time the sole concessionaire. Nigeria joined the ranks of oil producers in 1958 when its first oil field came on stream producing 5100 bpd (N. O. & I. B.2016). According to Agunobi, Obienus, Onuoha and Okafor (2014) Umuechem in Etche is the second place oil was discovered in Nigeria since the beginning of exploration in the area in 1958. The authors asserted that today Etche has over 250 producing oil wells and a host of flow stations. It is also said to have the largest deposit of natural gas south of Niger River.Egede (2013) note that, Nigeria is one of the leading oil producers in the world; he said that Nigeria is ranked sixth at a global level and first in Africa. He went further to say that Nigeria export about 1.8 million barrels of oil per day. Most of the exploration activities are concentrated in the Niger Delta region of the country where Etcheis located, which contains the world's largest wetland, with extensive freshwater swamp, forest and rich biological diversityaccording to(Babhebo 2000). The sector provides employment opportunities for the survival of many people and serves as a major source of foreign exchange.

Anderson and Banijo (2017) defined crude oil as a naturally occurring unrefined petroleum product composed of hydrocarbon deposits and other organic materials. A type of fossil fuel, crude oil can be refined to produce usable products such as gasoline, diesel and various forms of petrochemicals. It is a **nonrenewable resource**, which means that it can't be replaced naturally at the rate we consume it and is, therefore, a limited resource. Anderson and Banijo (2017) also noted that Crude oil spills during oil operations and transportation to different locations.An oil spill is the release of a liquid petroleum hydrocarbon into the soil. Crude oil spills may be due to release of crude oil from tankers, offshore platforms, drilling rigs and wells, as well as spills of refined products according to.(Anderson and Banijo 2017).

Abii and Nwosu (2009) noted that crude oil spill occurred first in Etche between 2001-2007 within this period about 29 crude oil spill incidents occurred, the volume ofcrude oil spilled cumulated (4,271.5 barrels) and year 2005 having the lowest (0.1 barrel). In past years, major crude oil spills has attracted a global attention and created awareness due to the associated ecological, human health and environmental risks and/ or damages that result from such spillages.The authors went further to say that the main sources of crude oil spills and pollution in the Niger Delta including Etche are equipment failure, oil blowouts from the flow stations, leakages from aged and corroded network of the oil pipelines, operational mishap, sabotage and vandalization of the oil pipelines by the local militants groups. In a country like Nigeria where

there is illegal oil bunkering by militants, crude oil spills occur quite frequently and are a major environmental challenge.

The emergence of the multinational companies in Nigeria for oil exploration has led to unquantifiable environmental pollution, especially oil spillage to Etche communities. For example since the first crude oil spill that took place in Etche in 2001, several other incidents have occurred in different parts of Etche (Mobile Producing Nigeria, 1998). Jike (2013) has argued that although oil companies have made enormous profit in the country, these companies have contributed minimally to the communities' development. In the same vein, communities crude oil spills have posed a major threat to the environment which has led to total annihilation of the ecosystem thus life in these areas is becoming increasingly unbearable due to the effects of crude oil spills (Oyem 2011). He went on to say that Contamination of the marine environment associated with crude oil spills and accidental discharges of petroleum, if not effectively checked can led to degradation of the Etche mangrove, forest, destruction of ecosystems, drastic decline in the fish and agricultural yields that are central to the livelihoods of local communities.

More so Vidal (2010) noted that crude oil spillage has a major impact on the ecosystem into which it is released and may constitute ecocide. Spills in populated areas such as Umueche in Etche often spread out over a wide area, destroying crops and aquaculture through contamination of the groundwater and soils. The consumption of dissolved oxygen by bacteria feeding on the spilled hydrocarbons also contributes to the death of fish. Etche communities a year's supply of food can be destroyed instantaneously because of the careless nature of oil operations inEtche, the environment is growing increasingly uninhabitable according to (Dunnet, Crisp,Conan ;and Bourne, 2011).Apart from crude oil spills overfishing, climate change, habitat loss, and pollution are all added pressures to these important ecosystems. The authors also noted that the bank of the Niger River where Etche is located is a desirable and ideal location for people to settle. The river provides water for drinking, bathing, cleaning, fishing for both the dining table and for trading to make a profit. As Etche people have settled along the shores of the rivers and coasts, marine and terrestrial habitats are being lost and ecosystems are being drastically changed.

With the loss of habitat and the climate getting warmer, ever prevention of temperature increase is necessary to maintain some of the marine environments. Apart from restoring habitat, population can also be reduced. Commenting on the problems encountered Oyemi (2013) said that pesticides from agricultural fields could be reduced if a natural pesticide was used, or the fields were moved farther away from the local waterways. Oil pollution can be lowered as well; if spills were reduced then habitat and environmental impacts could be minimized. Oil contamination affects the fish population and affects the farmers that rely on fishing to support their family. Sill commenting on contamination Amaize (2012) highlighted that by enforcing laws and holding oil companies accountable for their actions the risk of contamination can be greatly reduced. According to Oyedeji (2014) the effect of crude oil contaminated soil on the germination and growth performance of Abelmoschusesculentus, and consequently result in poor crop yield, a widely cultivated vegetable crop in Etche land has been reported. Oyedeji (2014)

went further to say, oil spillage may have far reaching implications on the agricultural productivity ofEtche Local Government Area and its multiplier effects on the socio-economic well-being of the people.

Ononny, Moffat, and Linden (2013) asserted that solving the problem of crude oil spillage starts from reducing all forms of environmental degradation by the oil companies and bunkers: reduction of the incidence of crude oil spill and other environmental activities, the various methods employed in the removal of crude oil from the natural environment are usually referred to as clean-up techniques. Some of the techniques include cleaning with booms and skimmers, use of dispersant, in-site burning, absorption, and other measures.

In Etche Local Government Area where the study took place, these crude oil spills have affected the livelihood and socio-economic activities as well as the environment of the people. For example crop farming and fishing are the predominant occupation and means of livelihood of the people, due to oil spills does not yield much benefit anymore.

Etche is one of the 24 local Government Areas in Rivers State, Nigeria. Etche is located at North-Eastern part of Rivers State, Nigeria. It lies within latitude 4045N – 5017N and longitude 6055E – 7017E and covers about 641. 28KM2 with some communities including Okehi, Ulakwo, Obite, Obibi , Igbo, Igbodo and Afara. Etche Local Government Area was created in October 1990 from the former Ikwerre Local Government Area, and is currently one of the highest oil and gas producing local government in Rivers State, with a population of 600,000 peoples (EtcheLGA Population statistics). In addition to English, the main spoken language isEtche language, Onuoha (2015). Etche is one of the food baskets in Rivers State, with large arable land for farming and rivers for fishing, poverty and destitution appears to be the most social-economic problem bedeviling the inhabitants especially among the rural areas given impetus to oil bunkering and oil spillage all over the land and rivers. The questions are what are the farmers' perception to crude oil spillage on the land and rivers? What could be the consequences of oil spillage on the land and rivers? Since the scenario is poverty induced as believed? The answers to these questions necessitated a study of this nature

Purpose of the Study

The purpose of the study is to examine farmers' perception on the effect of crude oil spillage on agricultural farmland in Etche Local Government Area of Rivers State. Nigeria. Specifically the study sought to:

1. Examine causes of crude oil spillage on agricultural farmland in Etche Local Government Area of Rivers State.

2. Examine effects of crude oil spillage on crop farmland in Etche Local Government Area of Rivers State.

3. Examine effects of crude oil spillage on fishing ponds (rivers) in Etche Local Government Area of Rivers State

4. Determine the remedies to crude oil spillage on agricultural land and rivers in Etche Local Government Area of Rivers State.

Research Questions

1. What are the causes of crude oil spillage on agricultural farmland in Etche Local Government Area of Rivers State?

2. What are the effectsof crude oil spillage on crop farmland in Etche Local Government Area of Rivers State?

3. What are the effects of crude oil spillage on fishing ponds (rivers) in Etche local Government Area of Rivers State?

4. What are the remedies to crude oil spillage on agricultural land and rivers in Etche Local Government Area of Rivers State?

Methodology

The study was conducted in Etche Local Government Area of Rivers state. The design of the study was a descriptive survey. The population is farmers inEtche Local Government Area. Random sampling techniques were used to sample 100 respondents from the Area. The instrument for data collection was four-point rating scale of agreement. The instrument was validated by experts and reliability coefficient of 0.80 established using test- retest techniques. Data collected were analyzed descriptively using frequency, percentage and mean. Decisions was made based on a criterion mean value of 2.50, it showed that mean value equal or more than criterion mean is accepted as positive response, otherwise rejected as negative response.

Results and Discussions

Causes of crude oil spillage on agricultural farmland in EtcheLocal Government Area of Rivers State

Table 1: Distribution of Respondents on Causes of Crude Oil Spillage in EtcheLocal Government Area, Rivers State

S/N	ITEMS	SA	A	D	SD	Mean	Decision
1	Crude oil bunkering	21	52	13	14	2.80	Agreed
		(21.0)	(52.0)	(13.0)	(14.0)		
2	Crude oil siphoning	48	37	8	7	3.26	Agreed
		(48.0)	(37.0)	(8.0)	(7.0)		
3	Tanker accident	33	34	15	18	2.82	Agreed

		(33.0)	(34.0)	(15.0)	(18.0)		
4	Natural disaster	55	34	10	1	3.43	Agreed
		(55.0)	(34.0)	(10.0)	(1.0)		
5	Oil pipe vandalization	63	21	11	5	3.42	Agreed
		(63.0)	(21.0)	(11.0)	(5.0)		
6	Illegal dumping	26	59	12	3	3.08	Agreed
		(21.0)	(52.0)	(13.0)	(14.0)		
7	Offshore drilling	41	26	20	13	2.95	Agreed
		(41.0)	(26.0)	(20.0)	(13.0)		
Field Survey, 2020							

Data in table 1 showed the respondents mean responses to the causes of crude oil spillage in Etche Local Government Area, Rivers State, Nigeria. The findings revealed that crude oil bunkering agreed had 73% while disagreed had 17% with a mean value of 2.80, crude oil siphoning agreed had 85%while disagreed 15% with a mean value of 3.26, tanker accident agreed had 67% while disagreed had 33% with a mean value of 2.82, natural disaster agreed had 89% while disagreed had 11%, with a mean value of 3.43, oil pipe vandalization agreed had 84% while disagreed had 16% with a mean value of 3.42, illegal dumping agreed had 73% while disagreed had 27% with a mean value of 3.08, offshore drilling agreed had 67% while disagreed had 33% with a mean value of 2.95.The findings are in agreement with that of Gellia (2010), in his study titled 'Oil Spillage in Niger Delta Causes, Consequences and the way Forward' he stated that the causes of oil spillage include crude oil bunkering,crude oil siphoning, tanker accidents, illegal drilling, dumping, oil pipe vandalization and natural disaster among others.

Farmers' perceptions on the effect of crude oil spillage on crop farmland

Table 2: Distribution of Respondents on theEffect of Crude Oil Spillage on Crop farmland

S/N	ITEMS	SA	A	D	SD	Mean	Decision
8	Oil spillage leads to Unavailability of nutrients In the soil	53 (53.0)	27 (27.0)	14 (14.0)	6 (6.0)	3.27	Agreed
9	Oil spillage causes change In the soil nutrient	64 (64.0)	30 (30.0)	04 (4.0)	02 (2.0)	3.56	Agreed
10.	It reduces the firmness of agricultural farmland	59 (59.0)	37 (37.0)	04 (4.0)	02 (2.0)	3.55	Agreed
11.	Oil spillage leads to Stunted growth of crops	75 (75.0)	12 (12.0)	07 (7.0)	06 (6.0)	3.56	
12.	Oil spillage reduces the Yield of agricultural	17 (71.0)	11 (11.0)	10 (10.0)	8 (8.0)	3.45	Agreed

	farmland						
13.	Oil spillage infuses Poisonous elements into the soil	50 (50.0)	29 (29.0)	14 (14.0)	07 (7.0)	3.22	Agreed
14.	Oil spillage leads to death of useful micro-organism in agricultural farmland	65 (65.0)	22 (22.0)	08 (8.0)	05 (5.0)	3.47	Agreed

Field Survey, 2020

Data in Table 2 showed the respondents mean responses on farmers' perceptions on the effects of crude oil spillage on crop farmland in Etche local Government Area. The finding revealed thatcrude oil spillage leads to unavailability of nutrients in the soil, agreed had 80%, disagreed 20%, with mean value of 3.27, causes changes in the soil nutrient agreed had 94%, disagreed 6%, mean value of 3.56, reduces firmness of agricultural farmland agreed scored 96%, disagreed 4%, mean value 3.55, leads to stunted growth of crops agreed scored 87%, disagreed 13%, mean value 3.56, reduce the yield of agricultural crops, agreed had 82%, disagreed 18% mean value 3,45, infuses poisonous (elements) substances into the soil agreed had 79%, disagreed 21%, mean value 3.22 leads to death of useful micro-organisms in agricultural farmland, agreed scored 87% while disagreed had 13%, with mean value of 3.47. The findings corroborate that of Icardona, Gundiach, and Hayes (2012), in their work titled 'Effects of crude oil spillage, consequences, implications and remedies in Niger Delta Region, Nigeria. They stated that effects of crude oil spillage on agricultural farmland include; changes in the soil nutrient, leads to stunted growth of crops, infuses poisonous substances into the soil, lead to death of micro-organism in agricultural farmland among others.

Farmers' perceptions on the effect of crude oil spillage on fishing rivers

Table 3: Distribution of Respondents on the effect of crude oil spillage on fishing rivers in Etche Local Government Area, Rivers State

S/N	ITEMS	SA	A	D	SD	Mean	Decision
15.	Crude oil spillage release Poisonous (harmful Substance) to fishing Farmland	42 (42.0)	33 (33.0)	19 (19.0)	6 (6.0)	3.11	Agreed
16	It causes pollution of	63	21	09	07	3.40	Agreed

	Fish pond	(63.0)	(21.0)	(9.0)	(7.0)	
17.	It leads to death of aquatic	84	10	03	03	3.75 Agreed
	Plants and animals	(84.0)	(10.0)	(3.0)	(3.0)	
18.	Crude oil spillage reduces	49	34	11	06	3.26 Agreed
	Availability of oxygen for	(49.0)	(34.0)	(11.0)	(6.0)	
	Aquatic organism					
19.	Crude oil spillage creates	53	20	14	13	3.27 Agreed
	Unconducive environment	(53.0)	(20.0)	(14.0)	(13.0)	
	For fish breeding					
20.	It renders the soil infertile	43	22	22	13	2.95 Agreed
	For fish survival	(43.0)	(22.0)	(22.0)	(13.0)	

Field Survey, 2020

Data in Table 3 showed the respondents responses on farmers' perception on the effect of crude spillage in fishing rivers in Etche Local Government Area. The findings revealed that crude oil spillage release poisonous (harmful substances) into fishing rivers agreed had 75%, disagreed 25%, with mean value of 3.11, causes pollution of fishing rivers agreed scored 84%, disagreed 16% mean value 3.40, cause death of aquatic plants and animals agreed had 94%, disagreed 6%, mean value 3.75, reduces availability of oxygen for aquatic organism agreed had 83%, disagreed 17%, mean value 3.26 create in-conducive environment for fish breeding agreed scored 73%, disagreed 27%, mean value of 3.27, crude oil spillage creates unconducive environment for fish breeding agreed scored 73% while disagreed had 27%, with mean value of 3.27, render the rivers infertile for fish survival agreed had 65%, disagreed 35%, with mean value of 2.95%. The findings are in line with that of Molles (2010) in his study 'Effects oil spillage on fish farming causes, consequences and remedies in Ondo State Nigeria, he noted that crude oil spillage on rivers used for fish farm cause release of poisonous substances into the rivers, pollution of the fish farm, death of aquatic plants and animals, reduces availability of oxygen for aquatic organisms and render the rivers infertile for fish survival among others.

Remedies to oil spillage in agricultural lands and fishing rivers

Table 4: Distribution of Respondents onRemedies to oil spillage on agricultural lands and rivers in EtcheLocal Government Area, Rivers State

S/N	ITEMS	SA	A	D	SD	Mean	Decision
21.	Introduce biological agents to the spill to hasten Biodegradation	43 (43.0)	32 (32.0)	18 (18.0)	7 (7.0)	3.11	Agreed
22.	Use of dispersant to break Up the oil	51 (51.0)	29 (29.0)	11 (11.0)	9 (9.0)	3.22	Agreed
23.	Reduce activities of Militants, oil vandalization And oil bunkers	83 (83.0)	10 (10.0)	07 (7.0)	- -	3.76	Agreed
24.	Leaving the crude oil for Natural disperse.	62 (62.0)	24 (24.0)	08 (8.0)	06 (6.0)	3.42	Agreed
25.	Insitu burning	53 (53.0)	21 (21.0)	15 (15.0)	11 (11.0)	3.16	Agreed

Field Survey, 2020

Data in Table 4 showed the respondents responses on the remedies of crude oil spillage on agricultural farmland in Etche Local Government Area of Rivers State. The finding revealed that introducing biological agents to the spill to hasten biodegradation agreed had 75%, disagreed 25%, mean 3.11, use of dispersant to break up the oil agreed scored 80%, disagreed 20%, mean 3.22, reduce activities of militants, oil vandalization and oil bunkers agreed had 93%, disagreed 7%, mean 3.76, leaving the crude oil for natural disperse, agreed scored 86%, disagreed 14%, mean 3.42, institutional burning agreed had 74%, disagreed 26%, mean 3.16. The findings are consonant with that ofOsuji and Onojake (2006), in their study titled ‘Remedies to oil spillage Impart and implications in Akankpa Local Government Area of Cross River State, Nigeria. They observed that introduction of biological agents to the spill hasten biodegradation, use of dispersants helped to break up the oil, reduction of activities of militants and crude oil bunkers reduce crude oil spillage, among other factors.

Conclusion

From the findings, it was concluded that

Crude oil bunkering, crude oil siphoning, tanker accident, oil pipe vandalization illegal dumping amongst others are some the causes of crude oil spillage, secondly, unavailability of nutrients in

the soil, reduction in the firmness of agricultural farmland, stunted growth of crops, reduction of the yield of agricultural farmland, infusion of poisonous elements into the soil are some of the effects of crude oil spillage on crop farmland. Others are release of harmful substances into fishing rivers, death of aquatic plants and animals, reduction of availability of oxygen for aquatic organism, creation of unconducive environment for fish breeding, rendering the water infertile for fish survival are some of the effect of crude oil spillage on fishing rivers amongst others. Finally introduction of biological agents to the spill to hasten biodegradation, use of dispersants to break up the soil, reduction of activities of militants, crude oil bunkering are some of the remedies of crude oil spillage on agricultural farmland amongst others.

Recommendations

Based on the findings, the following were recommended:

1. Government should strengthen joint security force patrolling round oil installations to ward off crude oil bunkering, crude oil siphoning, oil pipe vandalization, illegal dumping, these will mitigate against crude oil spillage.
2. Government should clean up all crude oil spilled agricultural farmlandeffectively using current techniques this will help to reduce the impact of crude oil spillage on the crop farmland and return the usefulness of the farmland.
3. Appropriate measures should be applied to check crude oil spillage on the rivers used for fish farming this will help to save aquatic life from total destruction.
4. Also the rivers soil should be fertilized for the growth of micro-faun for survival of aquatic lives. Introduction of biological agents to the spill to hasten biodegradation, uses of dispersant to break up the oil are recommended amongst others.

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