

Differential Effects of Oil Spillage on Cassava Farmers' Livelihood in Eleme and Ogoni Land Areas of River State, Nigeria

¹Abah G.O., L. Orisakwe², E.O. Okoroma² and E. Emerhirhi³

¹Department of Agriculture, Ignatius Ajuru University of Education, Nigeria.

²Department of Agricultural Extension, Federal University of Technology, P.M.B. 1526, Owerri, Nigeria

³Department of Agricultural Education, Federal College of Education (Technical), Omoku Rivers State, Nigeria.

Received: 30 Sept. 2020 / Accepted 20 Nov. 2020 / Publication date: 30 Nov. 2020

ABSTRACT

This study analyzed the effects of oil spillage on cassava farmers' livelihood in Eleme and Ogoni Land Areas of Rivers State, Nigeria. The study specifically examined the causes of oil spillage in the study area, examined the livelihood effects of oil spillage and factors influencing the effects of oil spillage on cassava production in the study area. Structured questionnaire was used to collect data from 400 cassava farmers selected through multi-stage sampling procedure. Percentage score, mean and Z-test were used to analyze the data collected. The result revealed that pipeline vandalization was identified as the major cause (88.0%) of oil spillage in the study area. Non-payment of compensation to victims of oil spillage (M = 2.6), lack of access to credit/loan (M = 2.5), lack of access to improved varieties of cassava and weak implementation of environmental laws and policies (M = 2.4) were considered as factors promoting the effects of oil spillage on the livelihood of farmers. The result further showed that the mean effect of polluted farm respondents 2.3968; SD = 0.89, while the mean effect of non-polluted farm respondents on cassava production is 2.5510; SD = 0.5822 with a mean difference of 0.1542, and thus implies the existence of a significant difference. The study concludes that oil spillage had a devastating livelihood effects on cassava farmers in the study area and therefore recommend effective implementation of mitigation measures to oil spillage in the area.

Keywords: Oil spillage, cassava, farmers exploitation, exploration, Eleme, Ogoni, Rivers State

Introduction

Cassava (*Manihot esculenta*) is an economic crop serving both domestic and industrial purposes in Nigeria. As a food crop, it serves as a huge source of calorie supply to the country's population who depend on it for their daily energy consumption. Industrially, it serves as a primary raw material for many agro-industries and agro allied industries. Thus, the cassava enjoys huge economic importance that pitches amongst the country's priority crops. Nweke *et al.* (2010) asserted this by stating that it has been transformed from a minor crop to a major crop and recently to an export or cash crop. In terms of adaptability, International Institute of Tropical Agriculture (IITA) (2017) categorized it among crops that have wide environmental adaptability potentials, as it survives in wide range of edaphic and climatic conditions; growing even in areas considered marginal for other crops, such as areas with low-fertility soils, annual rainfall below 600mm in the semi-arid tropics and areas with more than 1500mm rainfall in the sub humid and humid tropics. Cassava competes favorably with other crops like maize, soybean and vegetables mainly in areas of acid and low fertility soils, and those with low or unpredictable rainfall.

Sadly, though Nigeria is one of the highest producers of cassava in the world, she is also the world's largest consumer, leaving nearly nothing for export. The consciousness to makeup the export deficit has continued to inspire many cassava expansion policies and programmes in the country, such as encapsulated in the Federal Government's National Food Security Programme (NFSP), Seven Point Agenda, Agricultural Transformation Agenda (ATA), Anchor Borrowers Programme (ABP). While these may have made some progresses in narrowing the export deficit margin aggregate efforts of cassava farmers are continually undermined in different forms. The continued depletion of cassava farm

Corresponding Author: Abah, G.O., Department of Agriculture, Ignatius Ajuru University Of Education,
E-mail: godwinaabu@yahoo.com

lands by oil companies in Rivers State through oil spillage is just an instance buttressing the myriad of undermining situations faced by cassava farmers in the country.

Oil spill according to Nwachukwu & Ekanem (2016) is the release of a liquid petroleum hydrocarbon into the environment due to human activities and equipment failure and is a form of pollution. The Ogoni and Gokana areas of Rivers State have suffered the destruction of farmlands and total annihilation of the ecosystem, exacerbating declined cassava production in the area (Oyem, 2013). Available records showed that Nigeria has recorded 6,673 oil spill occurrences which discharged 250,973.96 barrels of oil causing environmental challenges especially in the Niger Delta region between 2009 and 2017 (Department of Petroleum Resources, 2017). Adekema (2009) observed that the meager 3000 hectares of available land for cassava cultivation in Rivers State may have decreased tremendously due to the effect of oil spillage.

In addition to the attendant food insecurity, the oil spillage makes it difficult to realize the premium placed on cassava by Rivers State government in which N65 billion was set aside to promote the production and processing of cassava between 2004 and 2008 (Gbarabe, 2009). The measure did not add significant boost to cassava production in Rivers State as the expected gains were periodically confronted by oil spillage that ravaged cassava fields. Given that oil spillage has continued in perpetuity in the area this study was therefore designed to underscore how the livelihood activities of cassava farmers are being affected by oil.

Objectives of the Study

The study broadly assessed the differential livelihood effects of oil spillage on cassava production in Eleme and Ogoni areas of Rivers State, Nigeria. The specific objectives are to:

- i. Examine the causes of oil spillage in the study area;
- ii. Ascertain factors influencing the effects of oil spillage on cassava production;
- iii. Determine the livelihood effects of oil spillage on cassava production in Polluted and Non-polluted farm areas of the State.

Methodology

The study was carried out in Eleme and Ogoni areas of Rivers State. The State is located between latitudes 4°15' N and 5°45' N and longitudes 6°22'E and 7°35'E. The State is bounded on the south by the Atlantic Ocean, on the North by Imo State and Abia State, the East by Akwa-Ibom State and the West by Bayelsa State and Delta States. Rivers State, which is in the Niger Delta, has topography of flat plains with a network of rivers and tributaries such as New Calabar, Orachi, Bonny, Sombreiro and Bartholomew Rivers (Rivers State Diary, 2014). Rivers State is a humid lowland region characterized by high temperature (25°C- 32°C), high rainfall (about 2000mm per annum) and high insulation (300-500g/cal/cm³/day). Such a climate is adjudged ideal for the production of not only food crops like cassava. Incidences of oil spillage in Rivers State are recorded most in four Local Governments Areas (LGAs), namely Eleme, Khana, Tai and Gokana with a total population of 830,000 (UNEP, 2011). Amnesty international estimates total oil spill in Ogoni and Eleme to be between nine and 13 million barrels, with Shell and ENI, the Italian multinational oil giant, admitting to more than 550 oil spills in 2014 alone. A multi stage random sampling technique was employed in selecting the sample for the study. Firstly, four (4) LGA viz Eleme, Khana Tai and Gokana were purposively selected based on the severity of oil spillage in these areas. In the second stage, one community each where oil spillage is highly pronounced was also selected purposively from the 4 LGAs. In the third stage, 2 villages known for high level of cassava production and predominance of oil spillage were purposely selected to give 8 villages that were used. In the fourth and fifth stages, the cassava farmers were stratified into polluted and non-polluted cassava farm respondents. A random sampling technique was used to select 25 polluted cassava farm respondents and 25 non-polluted cassava farm respondents from each of the 8 villages to give a sample size of 50 cassava farm respondents from each village, 100 cassava farm respondents from each community which are made up of 200 polluted cassava farm respondents and 200 non-polluted cassava farm respondents. The sample frame was the list of local government areas,

communities and villages where oil spillage is severe, and cassava production prominent. The proportion of activities causing oil spillage was achieved using frequency count and percentage. The effects of oil spillage on cassava production was achieved using mean score derived from a 4-point Likert scale of Very Serious = 3, Serious = 2, and Not Serious = 1. The difference in effects of oil spillage on cassava production in Polluted and Non-polluted farm respondents was determined using Z-test. Z-test is expressed mathematically thus:

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

Where:

- Z = the value by which the statistical mean difference was judged
- \bar{X}_1 = mean of polluted farm land
- \bar{X}_2 = mean of non-polluted farm land
- S_1^2 = variance of polluted farm land
- S_2^2 = Variance of non-polluted farm land
- N_1 = Number of polluted farm land
- N_2 = Number of non-polluted farm land

Results and discussion

Causes of oil spillage on cassava production

Table 1 shows the distribution of respondents by causes of oil spillage on cassava. From the result pipeline vandalization was identified by majority (88.0%) of the respondents as the major cause of oil spillage in the study area. This was followed by 80.5% who blamed it on blow-out of poorly maintained oil wells, 59.5% attributed it to poorly maintained pipelines, while release of crude oil from tankers, offshore platforms, drilling rigs was blamed by 52.3%. Nnabuenyi, 2012; Iyagba and Anyanwu (2012) corroborated this result by identifying pipeline vandalization, spillage due to poor state of pipeline, oil spillage due to tanker accident among the causes of oil spillage. With the rate of vandalization of pipelines and other human activities occasioning oil spillage, this result implies that to keep cassava farms safe from oil spillage the issues of security of oil pipelines must be attained or alternatively, cassava farms should be distant from pipelines to prevent oil spilling on the nearby cassava farm. However, the latter practice may not be possible in situations where farmlands are scare and unavailable.

Table 1: Distribution of respondents by causes of oil spillage on cassava production

Causes of oil spillage	Frequency	Percentage
Poorly maintained pipelines	238	59.5
Blow-out of poorly maintained oil wells	322	80.5
Release of crude oil from tankers, offshore platforms, drilling rigs	211	52.3
Pipeline vandalization	352	88.0
Spillages of refined petroleum products such as gasoline, diesel and their by-products	114	28.5
Pipeline and tanker accidents	129	32.3
Inadequate or non-functional production equipment	103	25.8
Corrosion of pipelines	177	44.3

Source: Field survey data, 2019

*Multiple responses recorded

Factors influencing effects of oil spillage on cassava production

Table 2 is on the distribution of respondents by factors influencing effects of oil spillage on cassava production. Using a discriminating index of 2.0 for the Likert-type scale, the results showed that out of 12 statements understudied as factors influencing the effects of oil spillage on cassava production 9 were considered as influencing oil spillage effect on cassava production, namely: non-payment of compensation to victims of oil spillage (M = 2.6), lack of access to credit/loan (M = 2.5), lack of access to improved varieties of cassava and weak implementation of environmental laws and

policies (M = 2.4). This result strongly supports the views of Nnabuenyi (2012) who in his impact assessment of oil exploration and exploitation on the Niger Delta region identified lack of compensation to farmers, non-provision of credit/loan in form of financial assistance, non-technical support by means of access to improved varieties of cassava, ineffective environmental laws and policies among factors influencing the effects of oil spillage on cassava production. This was reechoed by Iyagba and Anyanwu (2012) while analyzing the problems and prospects of cassava production in Oyigbo Local Government area of Rivers State, Nigeria.

Table 2: Distribution of respondents by factors influencing effects of oil spillage on cassava production

Influential Factors	Very serious	Serious	Not serious	Sum	Mean
i. Non-payment of compensation to victims of oil spillage	284	74	42	1042	2.6*
ii. Lack of access to technical support services like extension services	102	241	57	845	2.1*
iii. Inadequate farm size	90	188	122	758	1.9
iv. Weak implementation of environmental laws and policies	212	119	69	943	2.4*
v. Poor knowledge of soil remediation	156	79	165	791	2.0*
vi. Unavailability of family labour for work increases the cost of cassava production	23	154	223	600	1.5
vii. Lack of access to credit/loan	244	103	53	991	2.5*
viii. Non-membership of social organization	34	121	245	589	1.5
ix. Lack of agricultural insurance	190	110	100	890	2.2*
x. Incompatibility of cassava production technologies with social realities of the farmers	99	225	76	823	2.1*
xi. Negative attitude of farmers towards environmental protection	227	24	149	878	2.2*
xii. Lack of access to improved varieties of cassava	231	100	69	962	2.4*

Source: Field survey data, 2019 M ≥ 2.0(* Significant) M < 2.0(Not significant)

Differential livelihood effects of oil spillage on cassava production in polluted areas and Non-polluted areas

The Result in Table 3 is the fisher’s Z-test of significant difference between the effects of oil spillage polluted cassava farm respondents and non-polluted cassava farm respondents in the study area at 0.05 significant levels. The result shows that the mean effect of polluted farm respondents 2.3968; SD = 0.89, while the mean effect of non-polluted farm respondents on cassava production is 2.5510; SD = 0.5822 with a mean difference of 0.1542.

Table 3: Fisher’s Z-test of significant difference between livelihood effects of oil spillage on cassava production in polluted and non-polluted areas at 0.05 significant level

	N	Mean	S.D	Z-cal	Z-tab	Decision
Polluted cassava farm	200	2.3968	0.89	2.693	1.96	Null hypothesis is rejected
Non-polluted cassava farm	200	2.5510	0.5822	4.395		

Source: Fisher’s Z-test result from field survey data, 2019

Given that the Z calculated value of 2.6938 was greater than the Z-tabulated value of 1.96, the null hypothesis which states that there is no significant difference between the effects of oil spillage on cassava production among polluted farm respondents in the study area is therefore rejected. Also at the non-polluted farm respondent’s level, the Z calculated was 4.398, which is greater than Z- tabulated at 1.96, therefore, the null hypothesis is also rejected. In comparison the significant Z- value in non-

polluted was higher than the polluted Z-value, therefore it could be deduced that the farmers preferred their farmland not polluted, because of their perception that oil spillage is detrimental to cassava production.

Conclusion and Recommendations

The study examined the causes of oil spillage in the study area, perceived factors influencing the effects of oil spillage on cassava production in the study area. Pipeline vandalization was identified as the major cause of oil spillage in the study area. Non-payment of compensation to victims of oil spillage, lack of access to credit/loan, lack of access to improved varieties of cassava and weak implementation of environmental laws and policies were considered as factors perceived to influence oil spillage in cassava production in the area. Farmers preferred their farmland not polluted, because of their perception that oil spillage is detrimental to cassava production. This result implies that efforts by government and Non-governmental agencies to protect cassava farms from oil spillage must be implemented through the framework of government policies and responsiveness of oil companies in compensating farmers for losses due to spillage.

It is therefore recommended that:

- i. Government and oil companies should devise effective means of identifying victims of oil spillage with the aim of paying compensation promptly through the adoption of pollute and pays principle as an instrument of environmental protection policy and management. This will enable affected farmers gather the needed finance to venture into other non-farm livelihood activities. Defaulting oil companies should be made to pay demurrage from the date of the incident to when compensation is paid.
- ii. To boost farmers' capital base, oil companies as part of their social corporate responsibilities should provide co-operative education as well as assist farmers register towards teaching and empowering the farmers to overcome their financial limitations through co-operative farming and entrepreneurship.
- iii. There should be a constant environmental monitoring and evaluation to determine the level of damage that is done by oil pollution on the environment.

References

- Adekema, C., 2009. *Paths to sustainable poverty alleviation in Nigeria. A practical approach*. Ibadan: Printmix
- Department of Petroleum Resources, 2017. Paper presentation and workshop on Petroleum Hydrocarbon contaminated Groundwater Remediation using 21st century Technology, Lagos Nigeria.
- Gbarabe, G.D., 2009. *Paths to sustainable poverty alleviation in Nigeria. A practical approach*. International Institute of Tropical Agriculture (IITA) (2017). *The Cassava Monitoring Survey* Ibadan, Nigeria
- Iyagba, A.G., and S.O. Anyanwu, 2012. Problems and prospects of cassava production in Rivers State, Nigeria. A case study of Oyigbo local government area. *Agriculture and biology journal of North America*, 3(7):296-301.
- Nnabuenyi, U.M., 2012. Impact of oil exploration and exploitation on the Niger Delta region. Environment perspective centre for environment and Niger Delta studies, Ibadan.
- Nwachukwu, I., and J. Ekanem, 2016. Oil exploration environment degradation and sustainable agriculture in the Niger Delta. Lambhouse: Umuahia
- Nweke, F.I., Okorji, J.E., Njokwu and D.J. King, 2010. Expenditure elasticity of demand for major food items in south east Nigeria. *Tropical Agriculture*. 71:229-234.
- Oyem, A., 2013. *Christian call for action on Nigeria oil spillage*. Sage Oxford's Christian environment group. Pandey. Chyrl: UK.
- Rivers State Diary, 2014. Volume I
- Shell Petroleum Development Company, 2014. Annual Report.
- UNEP, 2011. *Environmental Assessment of Ogoniland and United Nations Environmental programme technical report*.