International Journal of Development and Sustainability
ISSN: 2186-8662 – www.isdsnet.com/ijds
Volume 7 Number 10 (2018): Pages 2358-2371
ISDS Article ID: IJDS18042801

Comparative analysis of plantain output in crude oil and non-crude oil drilling communities in Delta State, Nigeria

Mercy Ebere Ndubeze-Ogaraku *, Zelda Anne Elum, John Akpovwovwo Edoja

Department of Agricultural Economics & Extension, Faculty of Agriculture, University of PortHarcourt, east-west road, Rivers State, Nigeria

Abstract

The study compared plantain yield and income generated among farmers in crude oil drilling (Kokori) and non-crude oil drilling (Abraka) communities in Ethiope East Local Government Area of Delta State, Nigeria. Specifically, socio economic characteristics of the farmers and level of output were examined. Perceived problems were also identified. 60 farmers (i.e.30 from Kokori community and 30 from Abraka community) were randomly selected. Primary data was collected using structured questionnaire and personal interview. Descriptive statistics, t-test, gross margin analysis and Mann-Whitney U test were the analytic tools used. Results showed that majority of the farmers were males with 80% and 63.3% in the non-crude oil and crude oil-drilling communities respectively and were within the age bracket of 50-60 years with40% and 36.7% respectively in both communities. There was no significant difference in the farm size, quantity of plantain produced in both communities. Gross margin estimated from non-crude oil drilling and crude oil drilling communities were ₦481,360 and ₦321,150 respectively. However, a t-test value of -1.601 showed no significant difference in the gross margin of both communities. There were also no significant differences in the perceived problems of disease infestation, transportation, storage facility, drought among others but significant differences existed in soil fertility, flood incidence, oil spill and gas flaring in both communities in the study area. Farmers are therefore advised to increase use of soil improvement practices to increase plantain yield.

Keywords: Plantain; Output; Crude Oil Drilling; Non-Crude Oil Drilling Communities; Gross Margin

Cite this article as: Ndubeze-Ogaraku, M.E., Elum, Z.A. and Edoja, J.A. (2018), "Comparative analysis of plantain output in crude oil and non-crude oil drilling communities in Delta State, Nigeria", *International Journal of Development and Sustainability*, Vol. 7 No. 10, pp. 2358-2371.

* Corresponding author. *E-mail address:* mercy.onu@uniport.edu.ng

1. Introduction

1.1. Background of the study

Plantain belongs to the family *Musaceae* and the genus *Musa*. It is a perennial herbaceous plant that belongs to a group of shrubs that grow 2 meters to 9 meters tall with underground rhizome or corm. It requires an optimum temperature of 30°C, mean rainfall of 100 mm, pH of 4.5 to 7.5 and sandy loam soils (Oluwatosin, 2003 in Kaine and Okoje, 2014). Plantain is highly starchy when mature and therefore not suitable for consumption in a raw form when it is unripe. But they can be eaten raw when ripe as the starches are converted to sugar in the ripening process. According to Food and Agricultural Organization (FAO, 2006 in Akinyemi et al., 2010) report, Nigeria is one of the largest plantains producing country in the world; it is the highest producer of plantain in West Africa with annual production of about 2.4 million metric tons. Plantain is mainly obtained from the southern states in Nigeria with Edo, Delta, Ogun and Ondo states as the major producers. Research has however shown that plantain cultivation is still largely at the subsistence level within the forest zones of Sub-Sahara Africa.

The Central Bank of Nigeria in 2003 observed that plantain is one of the major staple foods in Nigeria and has had the highest percentage of output during the period 1999 to 2003, implying the existence of market potential of the crop in the country. The continuous availability of plantain has made it possible for the crop to contribute to food security and income for farmers. This is particularly important when seasonal conditions create food shortages periods and certain crops are in short supply. Plantain can be eaten either by boiling, roasting or frying and can be eaten with other foods such as yam, beans, and rice among others. Some of the nutritional and health benefits of plantain as stated by Rudrappa (2009 in Ogidi et al., 2017) include:

- Plantains are rich in calories which are a reliable source of starch and energy.
- Plantains are rich in dietary fiber which helps to regulate bowel movement by reducing constipation problem.
- Plantains are also rich in vitamin A which plays a vital role in the visual cycle, maintaining healthy mucosa and enhancing skin complexion.
- Plantain is rich in potassium which is an important component of cell and body fluid that controls heart rate, blood pressure thereby countering adverse sodium effect.

Crude oil was first discovered in Nigeria's Niger Delta region in 1956 at Olobiri in Bayelsa State. It's exploration in Nigeria has been on the increase since its discovery in 1956 and the bulk of the nation's crude oil production comes from Niger Delta region with Delta State being the second largest producer in Nigeria (Ahmadu and Egbodion, 2013). Crude oil is an economic life wire in Nigeria and represents one of the greatest assets which could possibly provide the necessary capital through its drilling by the oil industry. Virtually all the crude oil and gas deposits in Nigeria are found in the Niger Delta area. According to Odularu (2007), oil is a major source of energy in Nigeria and the world in general. Oil being the mainstay of the Nigerian economy plays a vital role in shaping the economic and political destiny of the country. This implies several ongoing crude oil exploration and exploitation activities in some communities in the region. These activities are assumed to have negative impacts on land meant for agricultural farm activities. In the Niger

Delta region, agriculture is the most dominant economic activity especially among the rural households and in Delta State, located in the Niger Delta region, plantain is one of the most cultivated crops.

According to the United Nations Environmental Programme (UNEP, 2001), communities where high level of crude oil drilling is taking place are facing high level of environmental degradation due to intense exploitation of oil and gas resources than communities where crude oil is not being drilled. This degradation has led to a great decline in agricultural growth in the affected communities including those in Delta State. Farm yield and income affected drastically due to the environmental degradation caused by crude oil drilling activities. Agbonifo (2016) reported that consequences of environmental degradation on socioeconomic activities of the local people with multiplier effects such as economic deprivation, social vices, health hazards, poverty, unemployment, migration, low life expectancy rate and miscarriages. Environmental degradation has heightened the ecosystem of the region given rise to intense land degradation, rapid agricultural decline, fisheries depletion, rampant and toxic water contamination.

Oil spills have degraded most agricultural lands in the state and turned productive areas into wastelands. Consequently, soil infertility due to the destruction of soil micro-organisms has forced farmers to abandon their land and alternative means of livelihood. Inarguably, land is an important resource in crop production including plantain. In 1997, the Food and Agricultural Organization (FAO) mentioned land as the most fundamental productive resource in the rural community and emphasized that land could justifiably be viewed as the most important natural resource for the enhancement of peasant. Land resource is assumed to contain important soil nutrients required for crop production, including other soil mineral like crude oil. (Akpokodje and Salau, 2015)empirical finding demonstrated that, increases in levels of oil spillage and increasing levels of forest loss negatively affect agricultural production or productivity in the Niger Delta, Nigeria.

Furthermore, Eteng (2007 in Ugbomeh and Atubi, 2010) stated that oil exploration over the last 4 decades has impacted drastically in the socio-physical environment of the Niger Delta oil bearing communities, massively threatening the subsistence agricultural economy and hence the livelihood of the people. It is on this background, the study compares plantain production output in crude oil drilling and non-drilling communities of Ethiope East Local Government Area of Delta State. Specifically, the study describes the socio economic characteristics of the farmers in the crude oil drilling and non-drilling communities in Ethiope East Local Government Area of Delta State; estimates plantain yield in crude oil drilling and non-drilling communities in the study area; estimates the profit from sales of plantain in crude oil drilling and non-drilling communities in the study area and compares the perceived constraints to plantain production in crude oil drilling and non-oil drilling communities in Ethiope East Local Government Area of Delta State. The working hypothesis of the study is that there is no significant difference in the plantain yield in crude oil drilling and non-drilling communities.

1.2. Conceptual framework

An oil spill is the release of a liquid petroleum product such as crude oil, refined petroleum such as gasoline, or diesel fuel into the environment. Oil spills could be as a result of human activities or natural causes.

Ekundayo et al. (2001 in Ojimba and Iyagba, 2012) stated in his study of the effect of crude oil spillage on the growth, productivity and nutrient uptake of maize that the germination rate was lower, and the rate of germination was significantly affected by oil pollution. He also observed that the grain yield was significantly reduced at 95% level of probability when compared with the control. In addition, Inoni et al. (2006 in Idumah and Okunmadewa, 2013) reported on the test of differences of means of important production parameters such as crop yield, land productivity and farm income before and after the incidence of spills indicated that oil spill had a statistically significant effect on crop yield, land productivity as well as farm income. Baruwa et al. (2011 in Šilerova Maneva and Hřebejková, 2014) study showed that the mean plant population of plantain was 1960.5 stands per hectare per farmer.

Profit according to (Pandey, 2002) is an excess of revenue over associated expenses for an activity over a period of time. Ekunwe and Ajayi (2010) study on economics of plantain production in Edo state showed that on an average, for a farm size of 1.7 hectare of land, total revenue from the sales of the plantain bunch was ₦233,214. Variable cost incurred was ₦43,416/ha, while total fixed cost incurred was ₦9,420/ ha. Net farm income was ₦203,139. Return per naira invested was 37.7%, implying that for every ₦1 invested, a profit of 38 kobo was made which indicates that plantain production is a very profitable business.

2. Materials and methods

2.1. Study area

The study was carried out in two communities (Kokori and Abraka). Both communities are in Ethiope East Local Government Area of Delta State, Nigeria. Kokori is an oil producing community with many oil wells, flow station, pipelines carrying crude oil to other places and gas flare sites (Agbogidi, 2013). Kokori is located at latitude 5.6371^0N and longitude 6.0297^0E. It is located at 624km north of the equator and 669km east of the prime meridian. According to Akpojotor (2011), Kokori is an hinterland bounded by Eku and Igun on the north; Ughono, Orhomaru, Erhobaro, Orara and Idionvwal villages all in Orogun on the east; Isiokolo and Okpara inland of Agbon clan on the west, and Odorhee in Ughelli on the south. According to the National Population Commission (NPC, 2006), it is estimated to have a population of about 28,897 people. On the other hand, Abraka is a non-oil producing community. It is mostly known as a university town as it has the main campus of the Delta State University located there. Abraka lies within the tropical rain forest at approximately latitude $6^0$30'N and longitude $5^0$00'E of the equator. It has an annual rainfall of 3,097mm and an annual temperature of 30.6^{o}C (Abraka Meteorological Station, 2012).

Abraka is bounded by Orhiowon Local Government area of Edo state on the north, Ukwani Local Government area of Delta state on the east, Ughelli North Local Government area of delta state on the south, and Ika Local Government area of Delta state on the west. According to the National Population Commission (NPC, 2006), it is estimated to have a population of about 201,600 people.

2.2. Sampling technique

A two-stage sampling technique was used. The first stage involved a purposive sampling of two communities from Ethiope East Local Government Areas of Delta State (Kokori and Abraka). These two communities were selected purposely because Kokori has the highest rate of crude oil drilling activity in Ethiope East Local Government Area of Delta state and Abraka has no crude oil drilling activity going on its land. In the second stage, there was a random selection of thirty registered farmers from each of the two communities making a total of sixty (60) respondents out of 954 registered farmers in the Delta State Chapter (Plantain Farmers Association of Nigeria, Delta State Chapter, 2017).

Primary data was collected with the use of structured questionnaire, interview method, and personal observation while secondary source of information include books, journals, publications and internet. Specific tools were employed in achieving the study objectives. Objective one (1) was analyzed using descriptive statistics tools that included frequency, mean and percentages. Objective two (2) was analyzed using inferential statistics tool like the t-test. Objective three (3) was analyzed using gross margin analysis and objective four (4) was analyzed using Man-Whitney U test.

2.2. Models specification

2.2.1. Gross margin analysis

TR = P x Q

Where,

TR = Total revenue derived by plantain farmers in the study area.

P = Price per unit of plantain in naira.

Q = Quantity of plantain harvested in kilogram.

GM = TR – TVC

Where,

GM = Gross margin of plantain farmers in the study area

t – Test Analysis

$$t = \frac{\bar{x}_1 - \bar{x}_2 - \Delta}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

where,

t = t-test

x_1 and $x_2$are the means of the two samples

Δ is the hypothesized difference between the population mean

$S_1$and$S_2$are the standard deviation of the two samples

$n_1$and n_2 are the sizes of the two samples

$(n_1-1)(n_2-1)$ is the degree of freedom

2.2.2. Mann-Whitney U test

Mann-Whitney U is a non-parametric test that can be applied to test the significance of the difference in the ranked perceived problems of plantain production in crude oil drilling and non-crude oil drilling communities. The test is relevant because it is particularly valuable in dealing with non-numerical data such as ranked scores available for this analysis. It is also called U test and is specified as:

$$U_1 = N_1N_2 + \frac{N_1(N_1+1)}{2} - R_1 \quad (1)$$

$$U_2 = N_1N_2 + \frac{N_2(N_2+1)}{2} - R_2 \quad (2)$$

Relationship of U_1andU_2 are further shown by the fact that

$U_1 + U_2 = N_1N_2$ (Mann-Whitney) (3)

$$R_1 + R_2 = \frac{N(N+1)}{2} \quad (4)$$

where $N = N_1 + N_2$

where: U = Man-Whitney U statistics, N_1= Sample size of respondents in non- crude oil drilling communities, N_2 = Sample size of respondents in crude oil drilling communities; R_1 = Sum of ranked scores derived from the 2 points Likert-type scale rating of perceived problems of plantain production in non-crude oil drilling communities; R_2 = Sum of ranked scores derived from the Likert scale rating of perceived problems of plantain production in crude oil drilling communities.

3. Results and discussion

3.1. Socio-economic characteristics of plantain farmers in the study area

Table 1. Socio-economic characteristics of plantain farmers in the study area

Variables	Non-crude oil producing community		Crude oil producing community	
Sex	Frequency	Percent	Frequency	Percent
Male	24	80	19	63.3
Female	6	20	11	36.7
Age in Years				
< 30	0	0	2	6.7
30- 40	3	10	3	10
41- 50	8	26.7	8	26.7
51- 60	12	40	11	36.7
>60	7	23.3	6	20

Marital Status				
Single	2	6.7	3	11
Married	22	73.3	21	70
Separated/ Divorced	4	1.33	1	3.3
Widow/ Widower	2	6.7	5	16.7
Household size (nos)				
1-5	7	23.4	13	43.3
6-10	19	63.3	13	43.3
11-15	3	10	4	13.4
>16	1	3.3	0	0
Educational Level				
No formal education	3	10	5	16.7
Primary	8	26.7	4	13.3
Secondary	12	40	14	46.7
Tertiary	7	23.3	7	23.3
Farming Status				
Full-Time	6	20	5	16.7
Part Time	24	80	25	83.3
Experience in years				
1-10	8	26.7	8	26.7
11-20	19	63.3	9	30
21-30	2	6.7	11	36.7
31 & above	1	3.3	2	6.7
Total	30	100	30	100

Source: Field survey (2017)

Result on Table 1 showed 80% and 20% of sample population of male and female farmers in non-crude oil drilling community while in the crude oil drilling community, 63.3% males and 36.7% females. This indicates that plantain production in the study area was dominated by male farmers. This is possible because plantain production requires strength and men are known to be stronger than women in terms of physical strength. Another interesting reason why men dominated in plantain production business could be the fact that men have more access to land resource than women in the study area. Since plantain production requires more land area for cultivation, it is easier for men to acquire large area of land for farming than females.

The result also shows that majority (40%) farmers in non-crude oil drilling community were within the age range of 51 – 60 years (40%) while (10%) were between 30 – 40 years. In the crude oil drilling community, majority (36.7%) of the farmers were within the age bracket of 51 – 60 years while (10%) were in age bracket of 30 – 40 years. The finding indicated that majority of plantain farmers in the area are middle aged men. This is contrary to finding of Adegboye and Otuagoma (2015) which noted that the age range of farmers majorly engaged in plantain farming are within the age range of 45 to 50 years. The result further showed that majority (73.3%) of the farmers in the non-crude oil drilling community were married and also majority (70%) of the farmers in the crude oil drilling community were also married. This confirms the result of Adegboye and Otuagoma (2015) which noted that majority of the farmers involved in plantain production were married. This would help the farmers have children, which means possibility of having more unpaid labour for farm business.

It was also shown that 63.3% of the farmers in the non-crude oil drilling community had the highest household size of 6 – 10 persons, 23.4% had household size of 1 - 5 persons, 10% have their household size

between 11 - 15 persons and only 3.3% had household size of more than 16 persons whereas in the crude oil drilling community, 43.3% of the respondents had household size between 1 - 5 persons and 6 – 10 persons each while 13.4% had household size between 11-15 persons. This shows that the farmers in non-crude oil drilling community had larger household size and possibly, more family labour is needed in doing farm business activities.

The result on the educational level of the farmers showed that 40% of the farmers in the non-crude oil drilling community attended secondary school and 10%, 26.7% had primary education, 23.3% had tertiary education while 10% had no formal education. In the crude oil drilling community 46.7% attended secondary school, 23.3% had tertiary education, 16.7% had no formal education and 13.3% had primary education. This implies that most of the farmers are literate but the farmers in non-crude oil drilling community were more educated than ones in crude oil drilling community. 80% of the farmers in the non-crude oil drilling community were part-time plantain farmers and 20% of the farmers were full-time plantain farmers while 83.3% of the farmers in the crude oil drilling community were part-time plantain farmers and 16.7% of the farmers were full-time farmers. This shows that a high proportion of plantain farmers in the study had other businesses they do as their main occupation.

The result shows that majority (63.3%) of the farmers in the non-crude oil drilling community had years of farming experience range of 10-20 years, 26.7% had years of experience between 1-10 years while 6.7% had been in plantain production business for 21- 30 years whereas, in the crude oil drilling community, majority (36.7%) had years of experience of 20-30 years, 26.7% have years of experience between 1-10 years, 30% had spent 11- 20 years while 6.7% had been in the plantain production business for more than 31 years. This implies that more farmers in crude oil drilling community have higher years of experience which may be making it easy for them to detect changes on plantain production over the years and adopting strategies that aid them in mitigating the effect of such change.

3.2. Mean estimates of plantain production parameters in the study area.

This section discussed plantain production estimates in plantain crude oil production and non-drilling areas which is presented in Table 2.

Table 2. Mean estimates of plantain production parameters in the study area

Variables	Non-crude oil drilling community			Crude oil drilling community		
	Mean	Standard deviation	Standard error	Mean	Standard deviation	Standard error
Farm size (ha.)	0.34	0.23	.042	0.27	0.24	0.043
Plant Population (nos.)	1020.45	767.00	231.27	1169.70	1295.49	409.67
Mean plantain bunches (nos.)	374.17	673.07	122.89	384.77	915.79	167.11
Total respondents	30			30		

Source: Field survey (2017)

Result in Table 2 showed that mean farm size of plantain farmers in non-crude oil drilling community is 0.34 hectares and the standard deviation is 0.229 whereas the mean farm size in the crude oil drilling community was 0.27 hectares with a standard deviation of 0.235. With small value of standard deviation, it implies that there is very little dispersion/variation in the farm size of the farmers of both communities and therefore the farm size cultivated are slightly evenly distributed. Also the mean plant population in non-crude oil drilling community is 1020.45 plants with a standard deviation of 767.022 while the mean plant population in crude oil drilling community is 1169.70 plants with a standard deviation of 1295.491. The result shows that plant population of plantain is greater in the crude oil drilling community than non-drilling community. The standard deviation is low in crude oil drilling community when compared to the mean, this is an indication that there is little variation in plant population among farmers in this community while the standard deviation of the crude oil drilling community is high, implying that the variation in the plant population among farmers in this community is high.

It is also seen that the mean quantity of plantain bunches produced in numbers in non-crude oil drilling communities is 374.17 bunches with the standard deviation is 673.07, whereas the mean of the quantity of plantain produced in numbers in crude oil drilling communities is 384.77 bunches, with standard deviation of 915.79 indicating that the mean of plantain bunches produced in crude oil drilling communities is slightly greater than that in non-drilling communities. This shows that though there is a difference in the plant population of each farm, there was only a slight difference in the number of plantain bunches produced by both communities in the 2016 planting season. A further test to ascertain whether the differences in the number of plantain bunch harvested is significant or not is presented in Table 3.

3.3. Mean comparison of output

The mean comparison of plantain yield in crude oil and non-oil drilling communities is presented in Table 3

Table 3. Mean comparison of plantain yield in crude oil drilling and non-drilling communities

Assumptions	t-value	df	Sig. (2-tailed)	Mean Difference	Std. Error Diff
Equal variances assumed	-.051	58	.959	-10.600	207.501
Equal variances not assumed	-.051	53.253	.959	-10.600	207.501

Source: Field survey (2017)

Result in Table 3 shows that the values from the t-test (2-tailed) for equal variance assumed and equal variances not assumed are both 0.959 with t-value of -.051 each indicating that the difference in plantain yield in the crude oil drilling and non-drilling communities is insignificant. Therefore, we accept the null hypothesis which states that there is no significant difference in the output of plantain produced in crude oil drilling and non-crude oil drilling communities in the study area.

3.4. Costs and returns of plantain output

The incurred costs and returns on plantain production in non-crude oil drilling and crude oil drilling communities are presented in Table 4.

Table 4. Costs and returns of plantain output in non-crude oil drilling and crude oil drilling communities

Items	Mean values in Non- crude oil drilling communities (₦)	Mean values in crude oil drilling communities (₦)
A. Variable Cost Items		
Land rent	30000	22666.67
Fertilizer (inorganic)	30800	27187.5
Chemical	5666.67	8000
Organic manure	2000	5000
Land clearing	3550	2000
Stumping	2500	
Planting	3416.67	4111.11
First slashing	3152.17	4441.18
Second Slashing	3204.35	4382.35
Third Slashing	3894.74	3250
Fertilizer Application	3500	6687.5
Organic manure application	1500	2500
Harvesting	1375	4500
Transportation	19333.33	27333.33
Total Variable Cost	*33,873.33*	*29,100.00*
B. Revenue Items	Qty. (kg) Unit P (₦)	Qty. (kg) Unit P (₦)
	1691.7 351	1254.6 335
Total Revenue	*594,500*	*420,300.00*
Gross Margin	*481,360.00*	*321,150.00*

Source: Field survey (2017)

Result in Table 4 showed costs and returns of plantain production in non-crude oil drilling and crude oil drilling communities in Ethiope East Local Government Area of Delta state. In the non-crude oil drilling communities, the total variable cost was estimated at thirty-three thousand eight hundred and seventy-three naira and thirty-three kobo (₦33,873.33), the total revenue was five hundred and ninety four thousand, five hundred naira (₦594,500), and the gross margin was estimated as four hundred and eighty one thousand three hundred and sixty naira (₦481,360.00). In the crude oil drilling communities, the result showed that the total variable cost was estimated as twenty nine thousand one hundred naira (₦29, 100.00), the total revenue was four hundred and twenty thousand three hundred naira (₦420,300.00), and the gross margin was estimated as three hundred and twenty one thousand one hundred and fifty naira (₦321,150). This implies that plantain production is profitable.

This confirms the finding of Ekunwe and Ajayi (2010) which showed that on an average, for a farm size of 1.7 hectare of land, the total revenue gotten from the sales of the plantain bunch was ₦233,214. The variable cost incurred was ₦43,416/ha, while the total fixed cost incurred was 9, 420/ ha. The net farm income was ₦203,139. The study also observed that gross margin from the sales of plantain in non-crude oil drilling communities is higher than the gross margin in the crude oil drilling communities. This could be attributed to the smaller sizes of plantain bunches produced in the crude oil drilling communities which were sold at lower prices. A test of significant to ascertain if the difference in gross margin is by chance or otherwise is found in Table 5.

3.5. This section presents and compared gross margin in plantain production in non- crude oil producing communities and crude oil drilling communities.

Table 5. Independent samples test to compare gross margin in plantain production in non-oil drilling and oil drilling communities

	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	-1.601	58	.115	-158203.333	98845.056
Equal variances not assumed	-1.601	54.207	.115	-158203.333	98845.056

Source: Field survey (2017)

Result on Table 5 shows value of t-test (2-tailed) at $\geq$ 0.05 level for equal variance assumed and equal variances not assumed is 0.959 each. The t- value is -1.601 is insignificant value for both equal variance assumption and equal variance non assumption each. Therefore we accept the null hypothesis that there is no significant difference in income generated from plantain farms in crude oil and non-crude oil drilling communities. This means that the differences in income level generated was by chance.

3.6. Factors affecting plantain production

The perceived factors affecting plantain production in the study area is presented in Table 6.

Table 6. Comparative statistics of perceived factors affecting plantain production in crude oil drilling and non-crude oil drilling communities

Farmers perceived problem	Communities	Mean Rank	Mann-Whitney U	Sig. (2-tailed)
Soil fertility	Non-oil drilling community	25.37	296.000	.050
	Oil drilling community	33.04		
Oil spill incidence	Non-oil drilling community	15.50	0.000	.000
	Oil drilling community	44.00		
Disease infestation	Non-oil drilling community	29.65	385.500	.659
	Oil drilling community	28.28		
Storage facility	Non-oil drilling community	28.85	400.500	.921
	Oil drilling community	29.17		

Transportation problems	Non-oil drilling community	28.80	399.000	.888
	Oil drilling community	29.22		
Drought	Non-oil drilling community	28.85	400.500	.892
	Oil drilling community	29.17		
Wind damage	Non-oil drilling community	31.15	340.500	.234
	Oil drilling community	26.61		
Gas flaring	Non-oil drilling community	23.00	225.000	.000
	Oil drilling community	35.67		
Land acquisition	Non-oil drilling community	30.50	360.000	.394
	Oil drilling community	27.33		
Theft	Non-oil drilling community	27.00	345.000	.259
	Oil drilling community	31.22		
Flooding	Non-oil drilling community	24.20	261.000	.006
	Oil drilling community	34.33		

Source: Field survey (2017)

Table 6 showed that soil fertility, oil spill incidence, gas flaring and flood occurrence were perceived as major problems of plantain production in both crude oil drilling and non-crude oil drilling communities in the study area. A test of significance at ≤ 0.05 percent level indicated 0.50, .000, .000 and .006 of (2-tailed) t-test were all significant for the mentioned variables. This implied that a significant difference exit between the two communities that experienced the mentioned problems. Therefore, the null hypothesis was rejected and the alternative accepted that there is significant difference in the perceived problems in plantain production among farmers in both crude oil drilling and non-drilling communities in the study area.

A further explanation shows that while farmers in crude oil drilling community experienced oil spill incidences and gas flaring, the farmers in non-crude oil drilling community did not experience such. The two communities both experienced problems of flood whose variation was significant. In soil fertility, the difference in the problem as perceived by the farmer is slightly significant. The remaining identified problems such as disease infestation, storage facility, transportation problem, drought, wind damage, land acquisition and theft were all insignificant. The mean rank of both communities showed that farmers in crude oil drilling community experienced more problems of soil fertility, oil spillage, storage facility, transportation, gas flaring, theft and flood than farmers in non-crude oil drilling community while farmers in non-crude oil drilling community experienced problems of higher land scarcity, wind damage, and disease infestation than crude oil drilling community.

4. Conclusion

In conclusion, plantain production in the study area (Kokori and Abraka) is dominated by male farmers. There is no significant difference in the output of plantain produced in crude oil drilling and non-crude oil drilling communities in the study area. The gross margin estimated from non-crude oil drilling and crude oil drilling communities was four hundred and eighty one thousand three hundred and sixty naira

(₦481,360.00) and three hundred and twenty one thousand one hundred and fifty naira (₦321,150) respectively. A test of significant value of t- value -1.601 showed a non- significant difference in the gross margin earned across the two communities. The perceived factors affecting plantain production in crude oil drilling and non-crude oil drilling communities were soil fertility, oil spill incidence, gas flaring and flooding of farm land. The study therefore recommends the following.

i. Plantain farmers should form advocacy groups and partner with the local government area authorities to intervene and address the issues of crude oil pollution and spillage through consultation with the crude oil drilling companies.
ii. Government should provide low interest rate loans to farmers to enable them purchase more inputs like fertilizer among others that will increase output, bunch size and income.
iii. Government should consider a review of the land ownership system to enhance women's access to land resource to encourage women participation in plantain production business.

Acknowledgement

Authors are grateful to the Department of Agricultural Economics and Extension, University of Port Harcourt for providing the platform and facilities for the research.

References

Abraka Meteorological Station (2012), "Abrakaweather-accu weather forecast for delta Nigeria'', Available at: https://www.google.com.ng/search?q=Abraka+Meteorological+Station+2012 (accessed 10 April 2018).

Adegboye, M. and Otuagoma, C. (2015), "Climate adaptation strategies used by banana and plantain farmers in Delta State of Nigeria", *Journal of Scientific Research and Reports*, Vol. 7 No. 2, pp. 129-136. Available at: https://doi.org/10.9734/JSRR/2015/8474 (accessed 10 April 2018).

Agbogidi, O.M. (2013). Trace metal profile of some fruits in Kokori and Abraka market in Delta state. *Journal of Bio Innovation,* Vol. 2 No. 6, pp. 229-303.

Agbonifo, P.E. (2016), "Risk management and regulatory failure in the oil and gas industry in Nigeria: reflections on the impact of environmental degradation in the Niger Delta Region", *Journal of Sustainable Development*, Vol. 9 No. 4, pp. 1-10. Available at: https://doi.org/10.5539/jsd.v9n4p1(accessed 12 April 2018).

Ahmadu, J. and Egbodion, J. (2013), "Effect of oil spillage in cassava production in Niger Delta Region of Nigeria", *American Journal of Experimental Agriculture,* Vol.4 No. 3, pp. 914-926**.**

Akinyemi, S.O.S., Aiyelaagbe, I.O.O. and Akyeampong, E. (2010), "Plantain (*Musa spp.*) cultivation in Nigeria: a review of its production, marketing and research in the last two decades'', *Acta Hortic*, Vol. 879 No 19, pp. 211-218. Available at: https://doi.org/10.17660/ActaHortic.2010.879.19 (accessed 12 April 2018).

Akpokodje, J. and Salau, S. (2015), "Oil pollution and agricultural productivity in the Niger Delta of Nigeria", *Environmental Economics*. Vol. 6 No. 4, pp. 68-75.

Ekunwe, P.A. and Ajayi, H.O. (2010), ''Economics of plantain production in Edo State'', *Research Journal of Agriculture and Biological Sciences,* Vol. 6 No. 6, pp. 902-905.

Idumah, F.O. and Okunmadewa, F.Y. (2013), "Oil pollution and technical efficiency of food crop farmers in the Niger Delta region of Nigeria'', J*ournal of Development and Agricultural Economics,* Vol. 5 No. 12, pp. 519–526. Available at: https://doi.org/10.5897/JDAE2013.0503 (accessed 10 April 2018).

Kaine, A.I.N. and Okoje, L.J.D. (2014), ''Estimation of cost and return of plantain production in Orhionwon Local Government Area, Edo State , Nigeria'', *Asian Journal of Agriculture and Rural Development,* Vol. 4 No. 2, pp. 162–168.

National Population Commission (NPC) (2006), *Population Figures in Nigeria*, National Bureau of Statistics. Abuja Federal Capital Territory, Nigeria.

Ogidi, I.A., Wariboko, C. and Alamene, A. (2017), ''Investigation of some nutritional properties of plantain (Musa paradisiaca) cultivars in Bayelsa State'', *European Journal of Food Science and Technology*, Vol. 5 No. 3, pp. 15–35.

Odularu, G.O. (2007), ''Crude oil and the Nigerian economic performance'', *Oil and Gas Business,* 1-29. Available at: http://www.ogbus.ru/eng/authors/odularo/odularo_1.pdf (accssed 24 April 2018).

Ojimba, T.P. and Iyagba, A.G. (2012), ''Effects of crude oil pollution on horticultural crops in Rivers State, Nigeria'', *Global Journal of Science Frontier Research Agriculture & Biology,* Vol. 12 No 4, pp. 36-44. Available at: www.ijastnet.com/journals/Vol_3_No_4_April_2013/4.pdf (accessed 16 July 2018).

Pandey, I.M. (2002), *Financial Management.* Vikas Publishing House Pvt, New Delhi.

Plantain Farmers Association of Nigeria, Delta State (2017), List of Plantain Farmers in Delta State, All Farmers Association of Nigeria Delta State Chapter, Nigeria.

Silerova, E., Maneva, S. and Hřebejková, J. (2014), ''Papers in Economics and Informatics'', *Agris On-Line Papers in Economics and Informatics*, Vol. *6*, pp. 79–86. Available at: http://www.scopus.com/results/results.url?sort=plf (aacssed 14 April, 2018).

United Nations Environmental Programme (UNEP, 2001), Environmental Assessment of Ogoniland. *United Nations Environmental Proramme*. Available at: *https://postconflict.unep.ch/publications/OEA/UNEP_OEA.pdf (accessed 10 April 2018).*

Ugbomeh, B. and Atubi, A. (2010), ''The Role of the oil industry and Nigerian State in defining the future of the niger delta region of Nigeria'', *African Research Review*, Vol. 4 No. 2, pp. 103-112. Available at: https://doi.org/10.4314/afrrev.v4i2.58294 (accessed 18 April 2018).