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Socioeconomic Characteristics of Cassava Farmers and Impacts of Crude Oil Spillage on Farmers Livelihood in Eneka Community, Obio/Akpor Local Government Area of Rivers State, Nigeria

Victor Chiabuotu Kalu[1]*, Godwill Ibim Wilcox[2], and ThankGod Peter Ojimba[3]

[1]Department of Agricultural Economics and Extension at Ignatius Ajuru University of Education, Rumuolumeni, Rivers State, Nigeria.
[2]Department of Agricultural Economics and Extension at Ignatius Ajuru University of Education, Rumuolumeni, Rivers State, Nigeria.
[3]Department of Agricultural Economics and Extension at Ignatius Ajuru University of Education, Rumuolumeni, Rivers State, Nigeria.
*Corresponding Author's email: kaluvictor96@gmail.com

ABSTRACT

The study conducted a comprehensive analysis of the socioeconomic characteristics of cassava farmers in the Eneka Community and the impact of crude oil spills on their livelihoods. The research involved 100 respondents, half of whom were from areas affected by crude oil spills and the other half from non-affected areas. The findings revealed that the majority of respondents were men, with 79% in crude oil spilt farms and 71% in non-oil spilt farms. Additionally, 91% of the respondents were under the age of 60, with an average age of 45 and 47 years in crude and non-crude oil spilt farms, respectively. The study also highlighted that more than three-quarters of the respondents were married, and the majority had received some level of education. The average farm size and farming experience were also documented, along with the impact of crude oil spills on cassava production, revenue, and net income. The study concluded that crude oil spillage had a detrimental effect on cassava farms, including output quality, income, and cropped areas.

Keywords: *Cassava farmers, crude oil spillage, farmers' livelihood, socioeconomic characteristics*

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INTRODUCTION

The business environment is an important consideration in any production activity (Wilcox et al., 2024). This study sought to provide information about cassava farmers' socioeconomic backgrounds, experiences with crude oil spillage, and how it affects their overall livelihood.

The Nigerian economy is heavily reliant on the petroleum industry, which accounts for more than 90% of total foreign exchange revenue. The exploration and exploitation of crude oil has resulted in numerous cases of oil pollution, leading to the depletion of natural

resources. Nigeria, Africa's most populous country, is also one of its most resource-rich (Chikaire et al., 2015). Nnabuenyi (2012) noted the negative effects of oil spills on agriculture, observing that the majority of the destroyed farmlands and polluted rivers contributed to farmer and fishermen's frustration and lack of livelihoods. Improving agricultural productivity in Nigeria is critical to addressing the country's food security, as water and land resources have become increasingly scarce, exacerbated by incessant oil spillage in the country's oil-producing states (Iheke et al., 2019). According to Ojimba (2011), oil spills reduce the amount of farmland available for cropping, resulting in significant economic losses in terms of income and output accruable to crop farmers in Rivers State, Nigeria. According to Abah et al. (2020), oil spills have had a devastating impact on cassava farmers' livelihoods. Cassava (Manihot esculenta) is an economically important crop in Nigeria that is grown both domestically and industrially. As a food, it provides an abundant source of calories for daily energy consumption. Industrially, it is an important source of raw materials for many agro-industries and agro-allied industries. Cassava has been classified as a crop with high environmental adaptability potential because it can grow in a wide range of edaphic and climate conditions, including areas with low fertility soils, annual rainfall below 600mm in the semitropics, and areas with more than 1500mm rainfall in the subhumid and humid tropics (International Institute of Tropical Agriculture (IITA), 2017).

Abii and Nwosu (2009) discovered that spilt crude oil, which is denser than water, reduces and restricts permeability: organic hydrocarbons that fill soil pores expel water and air, depriving the plant roots of much-needed water and air. The Eneka area of Rivers State is suffering from the devastation caused by crude oil pollution, which has destroyed most farmlands and reduced crop yield, affecting crop farmers' livelihoods. Cassava has and will continue to play an important role in Eneka's agricultural development. Unfortunately, oil spills have hampered this, leaving little for consumption and income from sales. This call for concerted efforts to increase cassava production includes addressing the issue of oil spillage on cassava production in crude oil pollution areas of the Eneka. According to Oghifo (2011), farmers frequently face challenges such as insufficient or absent compensation for their land. It is critical to consider not only the value of the crops on the land, but also the other tangible and intangible benefits associated with the affected area. Inadequate consideration of the future income potential of the impacted land during the compensation process for farmers can result in heightened political and social tensions (Ghatak & Mookherjee, 2013). It is essential to take into account the long-term economic prospects of the affected agricultural areas in order to mitigate potential conflicts and ensure a fair resolution for all parties involved. Failure to address this aspect may lead to dissatisfaction and resistance, ultimately impeding the overall effectiveness of the compensation efforts. The Eneka community in Rivers State is suffering from the debilitating effects of crude oil pollution, which has destroyed most farmlands and reduced crop yields. Oyemi (2013) observes that this spill created unsatisfactory conditions for plant growth due to insufficient soil aeration and an increase in the concentration of heavy metals as these pollutants penetrate the pore spaces in the soil following any spill. Soil fertility loss and declining crop yield, among others, are found to be an indirect source of pressure on natural resources and community structure, especially among the rural poor in Eneka (Pyagbara, 2007). In Eneka, oil spills have been seen as a major threat to the environment, leading to the total annihilation of the ecosystem. The study aimed to achieve two objectives: describing the socioeconomic characteristics of cassava farmers in the crude oil spilled area in the Eneka community and determining the impacts of crude oil spillage on cassava farmers

MATERIALS AND METHODS

The research was a survey conducted in the Eneka Community, in the Obio/Akpor Local Government Area of Rivers State, Nigeria. Data was collected through questionnaires and scheduled interviews and then analyzed. The community is characterized by frequent crude oil spillage. Eneka Community is located at latitude 40N 531 5811 and longitude 70E 11 5911. It is a town in the Obio/Akpor Local Government Area of Rivers State, Nigeria. Cropping systems in the Eneka Community mainly consist of sole cropping, mixed cropping, and intercropping, while farming practices are traditional and involve the use of crude implements like hoes and cutlasses. Agricultural production is on a small and subsistence scale with small farm holdings. Most of the farmers in Eneka are small-scale farmers who engage in traditional farming practices and practice sole cropping, mixed cropping and intercropping. Most foods grown are food crops such as cassava, maize, cocoyam, yam, plantain and vegetables. The survey was conducted using a multistage sampling procedure. The community was divided into farming areas as the first stage. In the second stage, the cassava farmers were randomly divided into polluted and non-polluted cassava farm respondents. In the third stage, a simple random sampling technique was used to select 50 oil-polluted cassava farms and 50 non-polluted cassava farms from the community, resulting in a total of 100 respondents.

Budgetary analysis

The net farm income (NFI) was employed in objective III.

It was used to estimate the costs and returns of cassava production. The formula for the net farm income model is stated as follows:

NFI = TR – TC (1)

Where,
NFI = Net farm income (₦).
TR = Total revenue (₦)
TC = Total cost of production (₦); also,

TC=TVC+TFC (2)

Where,
TVC = total variable cost (₦) and
TFC = Total fixed cost (₦
TVC = (Cassava stem, fertilizer, labour and cost of renting land)
TFC = (hoe and cutlass)
Capital = FC and equipment (such as knives, matchets, basins, hoes, shovels, spades, etc).

The fixed inputs are not normally used up in short run in a production cycle. Returns per naira (RNI) were obtained by dividing the gross income (GI) by the total cost (TC)
There,

$$RNI=\frac{GI}{TC} \quad (3)$$

Where

RNI = Returns per naira invested
GI = Gross income and
TC = Total cost

Decision rule:
RNI > I, it implies the enterprise is profitable
RNI = I, it implies that the farmer is operating at a breakeven point and
RNI < 1, the farmer is at a loss.

RESULTS AND DISCUSSION

Socioeconomic characteristics of cassava farmers in Eneka

Gender of the farmers

The results conform to the cultural setting in the study area, where males have more access to land for farming and other activities than females (Ojimba & Iyagba, 2012) This also agrees with Chikaire et al. (2015) that the majority of males the study area are involved in agricultural production than the females because they are the heads of families.

Age of the farmers

Age has a direct bearing on the productivity of farm labour and the case with which improved agricultural practices are adopted. Table 1 shows that in the crude oil spilled farms, about 91% of the farmers were less than 60 years of age with an average age of 47 years. About 92% of the farmers in the non-oil spilled farms were less than 60 years of age with an average age of 46 years respectively. The results on the table showed that the most prominent age group among the farmers was 40 – 49 years.

Educational levels of the farmers

The levels of education attained by farmers have a significant impact on productivity, income-earning opportunities and poverty level. In the crude oil spilled farms category, 41.66% of the farmers were secondary school leavers, while in the non-spilled farms category, secondary school leavers accounted for 45.24% which is higher percentage. Farmers from the non-oil spillage category were more educated (85.71%) than those from the crude oil spilled category (77.08%).

Household size of the farmers

The results revealed that in the crude oil spilled category, 47.93% of the farmers had a household size of 4-6 persons, while in the non-spilled farms, and 47.62% of the respondents had a household size of 4-6 persons. The mean household size of the respondents in the study area was 6 persons.

Farming experience of the farmers

The distribution of farmers based on their farming experience is shown in (Table 1). The majority (56.25%) of the respondents in the oil spilled category had been in the farming business between 11 and 20 years, while in the non-spilled category, 50% of the respondents had been in the farming practice between 11 and 20 years.

Farm size of the farmers

The results indicate that over 83% of the farmers in the Eneka community were small-scale farmers cultivating less than 3.0 hectares of farmland (Table 2). This aligns with the findings of Ojimba (2005). Therefore, any form of crude oil pollution or oil spillage will drastically affect many of them, and this could impoverish the peasant farmers. There is a likelihood of poverty occurrence in households cultivating small farm sizes, worse still if such household farms are affected by oil pollution of any

Table 1: Socioeconomic characteristics of farmers in the study area.

		Crude oil spillage Area			Non-Crude oil		
Variables		**Frequency (Per 100)**	**Percentage**	**Mean**	**Frequency**	**Percentage**	**Mean**
	Male	38	79.17		30	71.43	
Gender	Female	10	20.83		12	28.57	
	Less than 30	1	2.08		3	7.14	
Age (years)	30 – 39	6	12.50		5	11.91	
	40 – 49	22	45.83		18	42.86	
	50 – 59	15	31.25		13	30.95	
	60 – above	4	8.34	47	3	7.14	46
	No formal education	11	22.92		6	14.29	
Educational level	Primary	15	31.25		13	30.95	
	Secondary	20	41.66		19	45.24	
	Tertiary	2	4.17		4	9.52	
	Less than 4 persons	8	16.67		7	16.67	
Household size	4 – 6 persons	23	47.93		20	47.62	
	7 – 9 persons	15	31.25		12	28.57	
	10 person & above	2	4.16	6	3	7.14	6
Farming experience (years)	Less than 11	13	27.08		14	33.33	
	11 – 20 yrs	27	56.25		21	50.00	
	21 yrs & above	8	16.67	14yrs	7	16.67	13yrs

Source: Field survey, 2024.

Table 2: Estimated impacts on farmers' livelihood in crop production, cost and returns in cassava production in both areas.

		Crude oil spilled		non-crude oil spilled	
Variables		**Frequency**	**Percentage**	**Frequency**	**Percentage**
	0-0.9ha	13	27.08	11	26.19
	1.0-1.9ha	16	33.33	15	35.72
Farm size (Ha)	2.0-2.9ha	10	20.83	9	21.42
	3.0-3.9ha	6	12.50	4	8.33
	4.0-4.9ha	2	4.17	2	4.76
	5.0ha above	1	2.08	1	2.38
	Average		1.90ha		1.52ha
	Mean		8.00		7.00
	t-value estimated		2.4155**		
	0 – 29kg	12	25.00	5	11.90
	30 – 59kg	20	41.67	10	23.81
Quantity of cassava	60 – 89kg	7	14.58	7	16.67
produced (kg)	90 – 119kg	5	10.42	12	28.57
	120 and above	4	8.33	8	19.05
	Average		55.13kg		80.21kg
	Mean		9.6		8.4
	t-value estimated		3.681***		
Cost incurred	Less than 50,00	5	10.42	20	47.62
(₦) per annum	N50,000 – 99,000	16	33.33	10	23.81
	N100,000 –149,000	20	41.67	8	19.05
	N150,000-199,000	6	12.50	3	7.14
	N200,000 and above	2	4.17	1	2.38
	Average cost		₦90,541.67		₦69,547.62
	Mean				8.4
	t-value estimated		2.469**		
	Less than 50,000	13	27.08	6	14.29
Income (N)	N60,000-119,00	18	37.50	6	14.29
generated	N120,000-159,000	8	16.67	10	23.81
	N160,000-219,000	6	12.50	16	38.10
	N220,000-above	3	6.25	4	9.52
	Average income		N117,666.67		N142,166.67
	Mean				8.4
	t-value estimated		2.899***		

Source: Field Survey, 2024.

Table 3: Impacts of crude oil spillage on cassava farmers.

	Crude Oil Spilled None			
Variables		**Freq.**	**%**	**Ranking**
Impacts on Cassava output	Complete crop failure	46	95.83	1st
	Poor yield	44	91.67	2nd
	Rotting of tubers	42	87.50	3rd
	Stunted growth	40	83.33	4th
	Yellowing of leaves	38	79.17	5th
Impacts on farmers	Low income	47	97.92	1st
	Destruction of livelihood	46	95.83	2nd
	Poor harvest	45	93.75	3rd
	High level of food shortage	45	93.75	3rd
	Displacement from farm	44	91.67	4th

Source: Filed Survey, 2024.

magnitude.

Quantity of cassava produced among surveyed farmers

The quantity of cassava produced among surveyed farmers indicates that the non-spilled category had higher output in the study area. This means that oil spillage significantly reduces agricultural productivity. Ojimba et al. (2014) said that crude oil pollution on crop farms reduced crop output significantly, hence detrimental to crop production. Ojimba and Iyagba (2012) focused on the effects of crude oil pollution on horticultural crops and observed that the value of output and farm income of fruits, banana, pepper, okra, leafy vegetables, and melon were higher in non-oil polluted farms. This study found that even though the area of farmland planted by cassava farmers was higher in crude oil-spilled areas (1.90ha), the output of cassava was lower (55.13kg) in oil-spilled areas than in non-spilled areas (80.21kg) (Table 2). Hence, crude oil spillage had negative effects on cassava output in the area.

Cost incurred by farmers in cassava production

"The cost of production was higher in the oil-polluted category of farms, which agrees with the results of Iheke et al. (2019). According to the author, there are negative implications on productivity, as farmers' level of productivity would not be optimized, given that funds that would have been used to boost farm production would be spent on land remediation. This will reduce farm profit and productivity, and where such a farmer has no other source of income; they will be incarcerated in the vicious cycle of poverty."

Revenue generated from cassava production

The results indicated that the non-spilled category of cassava farms had higher income generation in the study area. The lower values of cassava farm income in crude oil-spilled farms had been caused by the negative effects of crude oil spilled on cassava outputs (Ojimba, 2012). These results are like and support the findings of Abah et al. (2020). Hence, crude oil spilled affected the revenue generated negatively as compared to the revenue from non-spilled farms. Therefore, crude oil spillage on cassava farms was detrimental to farm size, and revenue derived, and increased the cost of cassava production in the Eneka community (Table 2).

Impact of crude oil spillage on cassava output in study area

The complete crop failure was not unconnected with the accumulating of oil on the crop shoots, which blocked the stomata, thereby inhibiting photosynthesis, transpiration, and respiration (Table 3). The toxic chemical substances from the spilled oil were responsible for the burning of the crops' leaves, inhibition of growth, and untimely reduction of yield. These results agree with the findings of Ojimba and Iyagba (2012). Some of the persons farming on lands affected by oil spillage are compelled to disengage from farming to seek alternative means of livelihood (Ebegbulem et al., 2013). Effiong and Etowa (2012) also observed that the negative impacts on agricultural practices by oil extraction activities have contributed to the abject poverty and conditions in the region.

Farmer's welfare, livelihood and status

The results confirmed that crude oil spillage had detrimental, negative, and degrading impacts on cassava production in Eneka. The results also agreed with the study of Abah et al. (2020), who noted that oil spillage had devastating livelihood effects on cassava farmers. Ojimba (2011) also stated that oil spillage reduces the area of farmland available for cropping, thereby causing

Table 4: Budgetary analysis of cassavaiproductioniinicrude oil-spilled and non-spilleddareasiiniEneka.

Description	Average Amountiin Oil Spilled Farms (₦)	AverageiAmount in non-Spilled farms (₦)
Average revenueigeneratediper cassava farmer	₦117,666.67	₦142,166.67
Average costiincurredibyia cassava farmer	₦90,541.67	₦69,547.62
Net revenue per farmer (NR)	₦27,125.00	₦72,619.05
Benefit/Cost Ratio	1.30	2.04
Profit value	0.30	1.04
Percentage (%) of net profitioniinvestment	30%	104%
Total	48	100

Source: FieldiSurvey, 2024

serious economic losses in the form of income and output for the crop farmers in Rivers State (Table 3).

Budgetary analysis

The benefit/cost ratio results indicated that the value for non-spilled cassava farms was higher at 2.04, compared to 1.30 obtained in crude oil spilled areas (Table 4). The profit value revealed that only N0.30 was received as profit per Naira spent in crude oil spilled cassava farms, as opposed to the higher value of N1.04 received by farmers for every N1.00 spent in non-spilled cassava farms. Consequently, the returns on investment in non-spilled cassava farms (104%) were higher than the returns from crude oil-spilled cassava farms (30%) per annum (Table 4). Therefore, this study concludes that cassava production in crude oil spilled areas in the Eneka community was less cost-effective than production in non-spilled areas. This could be attributed to the detrimental and negative effects of crude oil spillages on cassava farms, as earlier results from this study had shown (Ojimba, 2005; Ojimba, 2011).

Conclusion and Recommendations

The results of this study showed that the average hectares of cassava farms cultivated during the period under survey were higher in crude oil spilled farms as compared to the non-spilled cassava farms. Secondly, the findings of this study also revealed that the average output of cassava in crude oil-polluted farms was significantly lower when compared to the average non-oil spilled output of cassava produced in farms. The study reported that the average cost incurred by cassava farmers was higher in crude oil spilled farms when compared to the valued cost of non-spilled cassava farms. Income realized from cassava produced per farm was significantly lower in oil-spilled cassava farms than in non-oil-polluted farms. The study stated categorically that crude oil pollution had detrimental and negative effects on the area of farmland cultivated; cassava crops produced, and hence farm income. This study suggests that to mitigate the issues and promote cassava production for sustainability, government agencies, private citizens and cooperative bodies should engage in preventive measures, establish a permanent disaster management institution in this area and agencies involved should devise a way of identifying victims to pay them compensation through the adoption of pollute and pay initiative.

Conflict of interest

There is no conflict of interest from any of the authors in this work.

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