

## Farmers' Appraisal of Crude Oil Pollution on Poultry Production in Nembe, Bayelsa State

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### ABSTRACT

*The study examined the effect of crude oil pollution on poultry farming in Nembe Local Government Area, Bayelsa State. Four specific objectives and four research questions were used to guide the study. The population for the study comprised of all poultry farmers in the study area. A sample size of two hundred (200) poultry farmers was drawn through a multi-stage sampling technique. The instrument for data collection was a structured questionnaire validated with a reliability coefficient 0.80, obtained through a test-retest technique. The data collected were summarized and subjected to descriptive statistics (mean and percentage). The findings show that poultry farmers in the study area possess varying socio-economic characteristics, there were more females than males engaged in poultry farming, majority had formal education mostly secondary education and are married. The population engaged were youthful with average age of about 45 years, most kept poultry species such as chicken/fowls in small flock, many people kept less than one hundred birds; their major source of capital was through personal savings and their return on investment was low. The findings also show some causes and sources of crude oil pollution as vandalizing of oil pipelines, corrosion of pipes and spills during loading of tankers/vessels. Crude oil pollution was found to affect poultry farming negatively in terms of providing feeds and feeding materials, low productivity, poor returns on investment and outbreak of pests and diseases. The recommended strategies to enhance poultry farming in crude oil polluted areas include, proper monitoring of facilities, evaluation and impact assessment of oil producing communities, planting of shaded trees in the farms and installation of ventilators in farms and assisting poultry farmers to support their farms through financial assistance.*

**Key words:** Crude oil, Pollution, Poultry farming, Nembe.

### Introduction

Poultry is one of the farm animals that enjoy taboo free and cultural biases in many parts of the world including Nembe a community located in Bayelsa State, Nigeria. Poultry farming in many cultures was dated back to millions of years ago and has been evolving in techniques, management and breeding improvement programmes. Poultry farming involves raising domestic birds for their flesh (meat), eggs, feathers and for other socio-economic purposes (Ukpong, 2019). Poultry birds commonly raised in many cultures include fowls, duck, turkey, geese, swan, guinea fowl, pea fowl, pigeons, pheasants, quail, ostrich, emu and rhea (Ukpong, 2019). Ukpong (2019) asserted that, the poultry farming enterprise is a good source of protein, employment, and income for humans and raw materials for other industries. Furthermore, organic crop production also benefits from its droppings and the litter/bedding materials, which serves as soil amendment materials and manure to crops. The same droppings and litter materials could also be used in formulation of animal feeds and substrate for mushroom production. The poultry industry

constitutes an important source of livelihood for rural urban dwellers through income generation, economic transformation, and gainful employment (Sailu et al., 2009; Onu et al., 2011). Letorn, and Essien (2019) observed that poultry plays an important role in the livelihood of rural communities in developing countries. Poultry production contributes significantly to rural livelihood and overall well-being of the population by providing cash income, satisfying religious and socio-cultural needs, utilizing spare family time and satisfying the family's nutritional needs (Ukpong, 2019).

The Bayelsa State Ministry of Agriculture in her agricultural evaluation in 2020 reported that the few poultry farms that exist in the State are smallholdings and the people are in dire need of poultry products, in the face of sky-rocketing demand for eggs and chicken, which are basic sources of animal protein. At the moment, Rivers and Delta State supply poultry and its products to the open market and catering businesses but the state has a great potential for the development of large-scale poultry farms. The report also added that such business would also have to overcome the challenge of common poultry

diseases like brooder pneumonia, gumboro and fowl typhoid. These diseases and their causal agents are environmentally driven and may have implication from crude oil pollution on the environment.

Crude oil pollution is the degradation or contamination of air, water and land by crude oil and its derivatives. This crude oil pollution is associated with crude oil exploration and exploitation activities which is common in Nembe. Opara (2003) and (Nwankwo et al., 2011) reported that the ecological devastation due to oil exploration had rendered farming and fishing unproductive, while pollution and continuous flaring of gas have created health hazards and rendered fishing and farming activities almost impossible. Katusiime (2009) in her report on Niger Delta posited that leaking pipelines running through villages, farms, creeks and rivers are a major source of pollution. According to Ekpebu et al. (2013), oil spillage has become a great menace to the environment causing land degradation, air and water pollution. All stages of oil exploitation impact negatively on the environment, and the greatest single intractable environmental problem caused by crude oil exploration in the Niger Delta region is oil spillage (Osuagwu et al., 2018). Akpan (2022) asserted that the spilled crude oil from the source, through a plausible transport mechanism and exposure pathway, gets to the receptor soils, vegetation, surfaces and ground water, marine environment, animals and humans and pollutes the environmental media thereby adversely affecting the ecosystem in the Niger Delta. Wokocha et al. (2011) examined the impact of crude oil spillage on the ecosystem, soil properties and food production in Ogba/Egbema/Ndoni area in Rivers State, Nigeria. The results showed that the pH status of the soil was heavily contaminated and moderately contaminated zones varied from acidic (pH 4.0) to neutral (pH 6.0). The chemical properties of the soil indicated that percentage organic matter increased from 1.34 to 2.62, available phosphorus decreased from 15 ppm in control to between 7.34 and 5.42 in soil polluted with high level of crude oil. It is worthy to note that there are researches on crude pollution on human health (Nwafor, 2022); environment (Akpan, 2022; Inoni et al., 2007; Kadafa, 2012) and crop (Worgu, 2000; Inoni et al., 2007), but its effects on poultry farming has not been properly documented.

#### **Statement of the problem**

Nembe people are predominantly farmers who engage in fishing, crop cultivation and small scale livestock farming particularly poultry farming. Nembe has a number of crude oil wells operated by foreign and indigenous oil companies. Nembe is one of the epicenters of crude oil spillage among the eight (8) Local Government Areas of Bayelsa State (Nwafor (2022). The Nembe Local Government Area (LGA) has the highest incident of oil spillage in the last ten years between 2012- 2022 (Nwafor, 2022). Within this period Nembe LGA had a total number of crude oil spill incident of 296 with about 4,303.83 barrels of crude oil split on the environment (Nigerian oil Spill Detection and Response Agency, NOSDRA, 2020). It implies that within the period under review there is no year without 25 to 30 cases of crude spillage in Nembe communities. The volume of spilt on the surroundings contaminated land, water and air causing crude oil pollution, resulting to enormous damages. Emuedo et al. (2014) stated that these pollutants are high in concentration of heavy metals (Cr, Zn, Cu, Cd and Pb) in water samples collected from

Nembe. Nwafor (2022) reported that greenhouse gases are emitted during crude oil spillage which influence temperature and rainfall patterns in Nembe. Nwofor (2022) added further that the problem of oxygen depletion negatively affects aquatic live and habitant.

Despite the constant crude oil pollution in the surroundings of Nembe, little or nothing has been documented in literature about the effect and magnitude of pollution livestock farming has experienced particularly poultry farming, for which Bayelsa State has comparative advantage. Hence the study of farmers' appraisal of effect of crude oil pollution on poultry production in Nembe, Bayelsa State.

#### **Objective of the study**

The broad objective of this study was to investigate farmers' appraisal of the effect of crude oil pollution on poultry farming in Nembe, Bayelsa State. The specific objectives were to:

- i) describe the socio- economic characteristics of poultry farmers in Nembe, Bayelsa State.
- ii) determine common causes and sources of crude oil pollution in Nembe, Bayelsa State.
- iii) appraise the effects of crude oil pollution on poultry farming in Nembe, Bayelsa State.
- iv) Proffer strategies to enhance poultry farming in Nembe, Bayelsa State.

#### **Research Questions**

The following research questions guided the study:

- i) What are the socio-economic characteristics of poultry farmers in Nembe Local Government Area in Bayelsa State?
- ii) What the common causes and sources of crude oil pollution in Nembe Local Government Area in Bayelsa State?
- iii) What are the effects of oil pollution on poultry farming in Nembe Local Government Area in Bayelsa State?
- iv) What are the strategies needed to enhance poultry farming in crude oil polluted areas?

#### **Methodology**

A descriptive survey design was adopted for this study to enhance the collection of information from views and opinion of farmers. The area of the study was Nembe Local Government Area of Bayelsa State. The population of Nembe is about 152,722 persons (National population Census 2006) and some of communities in the L .G .A are Agakabiriyal , [Elepa](#) , [Ewokiri](#) , Igbeta-Ewoama/Fantuo Adukiri, Nembe, Obiama, Odioma, Agada , Amasara, Okoma and many others. The population for the study comprised of all the poultry farmers residing in Nembe LGA. A multi stage sampling

technique was adopted. In the first stage, a simple random sampling technique was used to select ten communities. In stage two, simple random sampling was used to select twenty farmers from each of the selected communities to form a sample size of two hundred (200) respondents as shown in Table 1. Data were collected using questionnaire titled 'Farmers appraisal of the effect of crude oil pollution on poultry farming questionnaire. The instrument had two main parts, part 1 and 2. Part 1 was made of items on farmers' socio-economic characteristics, while part 2 was divided into three

sections, A, B and C. Section A was made of items on sources and causes of crude oil pollution. Section B was made of items on effects of crude oil pollution on poultry production and C made of items on strategies needed to enhance poultry farming in crude oil polluted areas. The questionnaire was face validated and the coefficient of reliability of the instrument was 0.80 using test-retest technique. Five persons were recruited to assist in the administration of the instrument because of the terrain and respondents were educated on how to fill and return copies of the questionnaire.

Table 1: Distribution of respondents in selected communities in Nembe Local Government Area

S/No	Name of Community	Number of respondents
1	Okoma	20
2	Agada	20
3	Nembe	20
4	Fantuo	20
5	Elepa	20
6	Amasara	20
7	Odioma	20
8	Adukiri	20
9	Igbeta	20
10	Agakabiriya	20
	Total	200

A total of two hundred questionnaires were administered and retrieved (100%). The data from the questionnaires were summarized and subjected to descriptive statistics (means and percentages). Decision was taken at 3.00. Any mean < 3 was rejected > 3 was accepted and retained.

### Results and Discussions

Table 1 shows data on the socio-economic characteristics of poultry farmers in Nembe Local Government Area. The Sex indicates male 76 (38%) and female 124 (62%) which implies that there were more females than males in poultry farming, but each of them contributed to poultry farming. This result is in agreement with the work of Adeola et al. (2008), who stated that farmers (men and women) share many responsibilities and engage in different production systems, different needs and constraints relating to their farming activities. The findings on sex are also in line with those of Ukpong (2019), who explained that females are more in poultry farming in Akwa Ibom State Nigeria than their male counterparts. It is also in consonant with Afolabi et al. (2013), who reported that domestic fowl production is less-demanding for space as it can be done in relatively small spaces such as the use of one's backyard and wooden-cages (especially in vertical-tiers) and most woman keep cages at their backyard for birds.

The age bracket of poultry famers indicates 16-20 years, 7 (3.5%); 21-25 years 4 (2%); 26-30 years,6 (3%); 31-35 years ,15(7.5%); 36-40 year 21 (10.5 %); 41-45years, 42 (21%);46-50 years 44 (22%); 51-55 years,33(16.5%); 56-60 years, 20 (10%) and 61-65years,8 (4%) but the mean age for all the respondents was 45 years. This data on age indicates that the

population is youthful and could be harnessed for investment in poultry farming in the study area. The result is in tandem with those of Agwu et al. (2008), who reported that the age bracket of most poultry farmers in Abia and Enugu States falls within 41 -50 years. This age bracket (41 – 50 years) has implication on the level of communication and interaction and sharing of information to create and increase awareness on the availability of modern technology to enhance poultry production. The age also has implication on choice and utilization of modern poultry farming technologies.

The marital status indicates single, 38 (19%); married, 116 (58%) divorce, 20(10%) and separated, 8 (4%). The data on marital status implies that majority of the respondents are married and poultry farming is seen to be the cheapest source of income and protein for their families. Educational status shows non-formal, 48 (24%); primary education, 51(25.5%); secondary education, 86 (43%) and tertiary,15 (7.5%). The implication of education status of the respondents indicated that a greater percentage of them can communicate and interact with learning situation and materials. The results on educational status of this study are in consonant with the studies of Chevula (2014) who asserted that farmers with requisite educational training and experience would help in using the knowledge, skills and attitudes gained for better performance. The poultry species kept indicates chicken/fowl, 138 (69%); duck fowl, 41 (20.5%); turkey, 20(10%); quail, 1(0.5%), Guinea fowl, 0(0%); Ostrich,0(0%) and geese, 0 (0%). The Poultry species commonly kept in the study area in order of priority were chicken/fowl, duck fowl and turkey. The flock size indicates > 100 birds, 123(61.5%); 100-500 birds 48(24%); 501- 1000 birds, 21(10.5%) and <

1000 birds,8(4%). . The implication of the flock size is that poultry farming is at the subsistence and small scale production in the study area. Source of capital indicates personal saving, 92(46%), loan from banks, 8(4%); loan from co-operative, 62 (31%); subsidy/credits from government, 7(3.5%), retirement benefits, 4(2%); and loan /gift from other sources, 27(13.5%). It could be deduced from source of capital that poultry farmers are not exposed or aware of

various government intervention in agriculture in Nigeria. The Returns on investment in thousands was indicated as follows: > ₦200,000.00, 137 (68%), ₦201,000.00-400,000.00, 38 (19%), ₦ 401,000.00-600,000.00, 14 (7%); ₦ 601,000.00-800,000.00, 9(5%) ₦ 801,000.00-1,000,000.00, 2(1%) respectively. The returns on investment corresponded with the scale of production.

**Table 1:** Description of socio-economic characteristics of poultry farmer in Nembe Local Government Area

Variables	Frequency (f)	%	Mean (x)
<b>Sex</b>			
Male	76	38	
Female	124	62	
<b>Age</b>			
16-20 years	7	3.5	45.05 years
21-25 "	4	2	
26-30 "	6	3	
31-35 "	15	7.5	
36-40 "	21	10.5	
41-45 "	42	21	
46-50 "	44	22	
51-55 "	33	16.5	
56-60 "	20	10	
61-65 "	8	4	
<b>Marital status</b>			
Single	38	19	
Married	116	58	
Divorce	20	10	
Separated	26	13	
<b>Educational Status</b>			
Non-formal education	48	24	
Primary education	51	25.5	
Secondary education	86	43	
Tertiary education	15	7.5	
<b>Poultry species kept</b>			
Fowl/chicken	138	69	
Duck fowl	41	20.5	
Turkey	20	10	
Quail	1	0.5	
Guinea fowl	0		
Ostrich	0		
Geese	0		
<b>Flock size</b>			
>100	123	61.5	222 birds
100-500	48	24	
501- 1000	21	10.5	
<1000	8	4	
<b>Source of capital</b>			
Personal saving	92	46	
Loan from banks	8	4	
Loan from co-operative	62	31	
Subsidy/credit from government	7	3.5	
Retirement benefits	4	2	
Loan/gift from others sources	27	13.5	
<b>Returns on investment per annum (₦ in 000,000.00)</b>			
>200			

201- 400	37	68	235.75
401-600	38	19	
601-800	14	7	
801-1,000	9	5	
	2	1	

### Field survey 2022.

Table 2 shows data on causes and sources of crude oil pollution in Nembe LGA. The mean responses indicated vandalizing of oil pipelines (4.14); gas flaring (4.09); corrosion of oil pipes (3.94); faulty facilities (3.91); oil exploration activities (3.87); explosion of wells/terminal stations (3.87); crude oil theft (3.77); loading oil tanks/vessels (3.69); oil facilities maintenance activities (3.55); leakage

from oil tanks and vessels (3.34); and accidents involving oil tanks/vessels (3.33). The grand mean of 3.77 indicates that there were various causes and sources of crude oil pollution in the study area. This result is in consonant with reports of Kadafa (2012) that oil spillage quantities and incidence between 1976-2000, showed decrease in oil spillage quantity and increase in oil spillage incidence.

**Table 2:** Mean responses on common causes and sources of crude oil pollution in Nembe LGA

S/N	Items	SA	A	UND	DA	SD	Weighted Total	Mean (x)	Decision rule
1	Oil exploration activities	81	70	3	34	12	774	3.87	Accepted
2	Vandalizing of oil pipelines	78	102	0	10	10	828	4.14	“
3	Leakages from oil tanks/vessels	68	52	1	38	41	668	3.34	“
4	Explosion of oil wells /terminal stations	71	83	0	41	5	774	3.87	“
5	Faulty facilities	72	61	51	8	8	781	3.91	“
6	Loading oil tanks/vessels	56	71	42	17	14	738	3.69	“
7	Corrosion of oil pipes	61	89	31	15	4	788	3.94	“
8	Accidents involving oil tanks/vessels during transportation	63	56	1	43	37	665	3.33	“
9	Oil facilities maintenance activities	69	34	50	32	15	710	3.55	“
10	Gas flaring	88	77	5	25	5	818	4.09	“
11	Crude oil theft	67	92	0	19	12	753	3.77	“
	<b>Grand mean</b>							<b>3.77</b>	“

**Field survey 2022.SA, A UND SD &D means strongly agreed, agreed, undecided strongly disagreed and disagreed respectively.**

The findings are also in line with Oyem (2011) who asserted that thousands of barrel of oil have been let loose into the environment through corrosion of oil pipeline and explosion of oil wells in the Niger Delta. The result is also in line with Ani et al. (2015) who reported the cause of crude oil pollution to include, pipeline leakages due to lack of maintenance over a very long time, wearing of pipes on surfaces, corrosion, loading and offloading of crude oil. Table 3 shows the mean responses on the effect of crude oil pollution on poultry farming in Nembe LGA. The responses by the respondents posited that, it induces poor returns on investment (4.71); crude oil pollution contaminates birds drinking water (4.39); it causes low feed intake and general low productivity(4.31); it evolves new pest, vectors and predators (4.12); it increases the cost of production (4.04); it impacts strange flavor and taste on meat and eggs (4.01); gas flaring causes noise which affects egg laying (3.97);

crude oil pollution causes thermal stress on the birds (3.93); it causes the development of new strain of diseases that resist treatment (3.89); it contaminates feed stuffs /feeds (3.78); and it causes oxygen depletion that influences blood circulation/ immune system (3.21) . The grand mean (4.03) indicates that oil pollution affects various aspects of poultry farming like nutrition, health, diseases, pest and productivity in the study area. The findings are in tandem with Ani et al. (2015) who reported that crude oil pollution causes toxicity of water available for livestock and deaths of fishes,

Table 4 shows the mean responses on the strategies needed to enhance poultry farming in crude polluted areas. Oil spillage cases should be handled as a matter of urgency not as issues of trading blames (4.39); proper monitoring , evaluation and impact assessment should be done on oil producing communities ( 4.12) ; oil exploring companies should

establish poultry farms in their area of operations(4.11); Poultry farmers should employ the services of more experienced personnel in the routine management of their farms (4.04); Government and oil companies should assist poultry farmers who are victims of crude oil pollution in production areas (3.89); installation of ventilators in pens (3.78); poultry farmers should be trained on information sharing and crude oil pollution alerts (3.55); government and oil companies should provide poultry preservation facilities

like cold room and means of transportation (3.34) ; planting shaded trees around the pens/ farm (3.33); and training poultry farmers on crude pollution control measures in farms. The grand mean (3.78) indicates that even in crude oil polluted environment with application of appropriate strategies it is possible for profitable poultry farming to be carried on. Poultry farming should be an investment asset in crude oil producing communities as the poultry droppings serve as good and cheap bio remediation materials.

**Table 3:** Mean responses on effect of crude oil pollution on poultry farming in Nembe LG A

S/n	Items	SA	A	UND	D	SD	Weighted Total	Mean (x)	Decision Rule
1	Crude oil pollution causes thermal stress on the birds	86	51	43	12	8	785	3.93	accepted
2	Gas flaring causes noise which affects egg laying	72	62	57	5	4	793	3.97	“
3	Crude oil pollution contaminates birds drinking water	115	67	1	15	2	878	4.39	“
4	It contaminates feed stuffs /feeds	57	97	8	20	18	755	3.78	“
5	It impacts strange flavor and taste on meat and eggs	76	69	40	10	5	801	4.01	“
6	It causes oxygen depletion Influence blood circulation/ immune system	53	84	4	9	10	641	3.21	“
7	It causes the development of new strain of diseases that resist treatments	71	68	37	15	9	777	3.89	“
8	It Increase the cost production	61	117	1	10	11	807	4.04	“
9	It evolves new pests ,vectors and predators	83	87	10	10	10	823	4.12	“
10	It causes low feed intake and general low productivity.	82	111	0	1	6	862	4.31	“
11	It induces poor returns on investment in poultry farming	89	120	1	3	7	941	4.71	“
<b>Grand mean</b>								<b>4.03</b>	<b>“</b>

**Field survey 2022. SA, A, UND, SD & D means strongly agreed, agreed, undecided strongly disagreed and disagreed respectively.**

**Table 4:** Mean responses on strategies needed to enhance poultry farming in crude oil polluted areas

S/n	Items	SA	A	UND	D	SD	Weighted Total	Mean (x)	Decision Rule
1	Planting shaded trees around the pens/ farm	63	56	1	43	37	665	3.33	Accepted
2	Installation of ventilators in pens								

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		57	97	8	20	18	755	3.78	“
3	Training poultry farmers on crude pollution control in farm	53	84	4	9	10	641	3.21	“
4	Poultry farmers should be trained on information sharing and crude oil pollution alerts	69	34	50	32	15	710	3.55	“
5	Government and oil companies should assist poultry farmers who are victims of crude oil pollution in production areas	71	68	37	15	9	777	3.89	“
6	Oil exploring companies should establish poultry farms in their area of operations	76	69	40	10	5	801	4.11	“
7	Oil spillage cases should be handled as matter of urgency not issues of trading blames	115	67	1	15	2	878	4.39	“
8	Government and oil companies should provide poultry preservation facilities like cold room and means of transportation	68	52	1	38	41	668	3.34	“
9	Proper monitoring , evaluation and impact assessment should be done on oil producing communities	83	87	10	10	10	823	4.12	“
10	Poultry farmers should employ the services of more experience persons in the routine management of their farms	61	117	1	10	11	807	4.04	“
<b>Grand Mean</b>								<b>3.78</b>	

**Field survey 2022. SA, A, UND, SD & D means strongly agreed, agreed, undecided strongly disagreed and disagreed respectively**

### Conclusion

Crude oil pollution has negative effect on poultry farming in Nembe Local Government Area. They affect feeds and feeding; health,disease and pest; increase cost of production; bring about low productivity and poor returns on investment. In crude oil polluted zones, the farmers need specialized strategies to enhance profitable poultry farming. Among the strategies suggested are regular attention should be given to any oil facility about to induce pollution, regular monitoring and evaluation , assistance of poultry farmers to redeem their farm through financial assistance and planting of trees in the farms.

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