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FACTORS AND VARIABLES OF OIL SPILL IN REMOTE CREEKS OF THE KALABARI ENVIRONMENT IN RIVERS STATE OF NIGERIA

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ABSTRACT: This study investigated the causative factors, variables and effects of oil spill in Remote Creeks of the Kalabari region in Rivers state of Nigeria and to identify the suitable management systems that will control Oil Spill so as to reduce its impacts in the remote creeks. The study adopts a qualitative and quantitative research through interviews, fishermen and the youths to identify oil spill impacts on community socio- economic conditions. The collection of data involves the use of both qualitative and quantitative approaches concurrently. This was possible because the study focused on the effects of oil spill on aquatic lives and property.

Questionnaires were distributed in nine communities affected by the oil spill in the narrow creek region of Kalabari area of Rivers State.

The primary data was analyzed using Statistical Package for Social Sciences (SPSS version 25)

Descriptive statistical tools such as frequency tables, percentages and bar chart were used to present the data. The study concluded that there are high effects of oil spill on aquatic lives and chattels, on the entire communities with different factors that have been responsible for oil spills. The research makes a recommendation to all stakeholders, youths involved in illegal bunkering, Federal Government and State Government within oil related and the oil companies situated to improve their strategies and or contingent planning in tackling oil spill-related issues and adhere to community's plight when appropriate.

KEY WORDS: *Oil Spill, Environment, Aquatic, Creeks, Kalabari*

I. INTRODUCTION

This research work examines the data collected from fieldwork survey and presented a comprehensive analysis of the data collected from both quantitative and qualitative data collection instruments. The purpose of this data analysis is basically to enable the researcher answer the questions and to help achieve the research objectives. It involved reducing the volume of data to manageable summary and displaying the data in a form that will aid drawing of conclusion from it, in order word data analysis is the process of bringing order, structure and meaning to the mass of collected data.

Preliminary Survey Detail The sample size for this study is 189 comprising Periwinkle picking members, Fishermen and youths from nine (9) communities across the three Local Government Area of Kalabari Region. A total of 189 semi structured questionnaires were administered, out of which 138 questionnaires representing 73.02% were retrieved and used for the analysis.

Analysis of Field Data

In order to analysis the results from the field work, the collected data from the field were organized and analyzed. Data was analysed using descriptive statistics. Frequency table were drawn and from these the data was presented in chart bars. The questionnaire were rated on a 5- point Likert scale arrange in ascending order of 1,2,3, 4 and 5 respectively. Strongly agree is rated the highest and assigned a value of 5 while strongly disagree rated the least with a value of .one were made simpler with the application of a computer programme called Statistic Package for Social Science (SPSS Version 25) and Excel software package and closed end-questions.

Table 1 Educational Qualification of Respondents

CATEGORY	Frequency	Percentage
Gender		
Females	63	45.65%
Males	75	54.35%
Duration of Stay in the Region		
10-15	30	21.74%
18-20	62	44.93%
22-30	46	33.33%
Jobs Types		
Fishing farming	43	31.16%
Periwinkle farmers	45	32.61%
Youths	50	36.23%
Educational Background		
Primary	38	27.54%
Secondary	60	43.45%
BSc	40	28.96%

Respondent profile 2020

Distribution of Respondent’s Educational Background

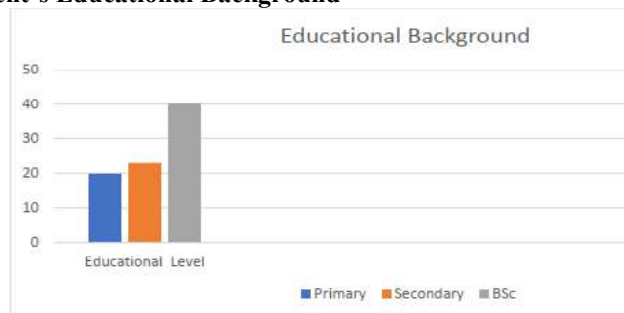


Figure 1

Figure 1 revealed the educational status of respondents that; 60% of the respondents are graduates with both Bsc /OND, while 70% had undergone secondary school, and 59% had primary school completed. This means the respondents are relatively literate. It could be agreed that the rate of unemployment and economic hardship in Kalabari region is the parent reason for this illegal bunkering and petroleum pipeline vandalism by the youths who are aggressive to the government and the Oil producing companies. Olujimi et al,(2011) opined that in the Kalabari region pollution of Rivers through Oil spill have resulted in massive extermination of fishes thereby threatening the social and economic life the communities whose livelihood depends on the contaminated water

Sabotage and theft of Oil are serious problems in some remote creeks. However, international Oil companies are overstating the case in an effort to deflect attention away from the many oil spills that are due to corrosion and equipment failure. Moreover, securing oil infrastructure against such acts is – to a substantial extent – the responsibility of the operator.

Sabotage is another major cause of oil spillage in the country. Some of the citizens of this countries in collaboration with people from other countries engage in oil bunkering. They damage and destroy oil pipelines in their effort to steal Oil from them. SPDC claimed in 1996 that sabotage accounted for more than 60 percent of all oil spilled at its facilities in Nigeria, stating that the percentage has increased over the years both because the number of sabotage incidents has increased and because spills due to corrosion have decreased with programs to replace oil pipelines (SPDC, 1996).

Figure 2: Distribution of Respondent’s Gender

Figure 2. Revealed that 54.35% of the respondents were males, while 45.65% of the respondents were Females. This shows that majority of the respondents were male.



Factors	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Sabotage	127	92.03	11	7.97
Equipment failure	49	35.51	98	71.01
Corrosion	36	26.09	102	73.91
Leakage of pipeline	111	80.43	27	19.57
Maintenance error	17	12.32	121	87.68
Ageing of pipeline	18	13.04	120	86.96
Blowout	104	80.43	34	24.64
Natural causes		11.59	122	88.41

Figure 3: Distribution of Respondent’s Duration of Stay

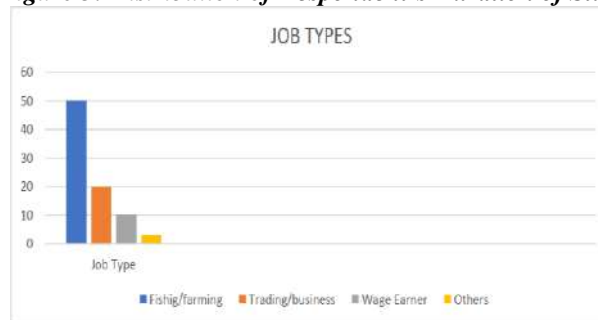


Figure 4: Distribution of Respondent’s Job Type

Figure 4: Reveals that 50% of the population fishing farmer.

Research Objective 1: To investigate the various variables, Factors and effects of oil spills in the remote creeks of Kalabari region?

To investigate the various causes and impacts of Oil spill in the Kalabari region, respondents were asked to state the factors that are majorly responsible are shown in table 2 below:

From the above Table 2 shows the responses of the respondents on the various factors causing oil spill in Kalabari region. On 127 respondents representing 92.03% said yes, while 11 respondents representing 7.97 said No. On Equipment failure 49 respondents representing 35.51% said Yes, while 98 respondents representing 71.01% said No. On corrosion 36 respondent representing 26.09% said Yes and 102 respondents representing 73.91% said No. On leakage of pipeline

Evelyn (2021) Opined that there is need to involve the Communities and youth in leadership activities for proper protection and management Oil Spill.

111 respondents representing 80.43% said yes and 27 respondents representing 19.57 % said No. On maintenance 49 respondents representing 35.51% said Yes and 98 respondents representing 71.01% said No. On Ageing of pipeline 18 respondent representing 13.04 said Yes and 120 respondents representing 86.96% said No. On Blowout 104 respondent representing 80.43% said Yes while 34 respondents representing 24.64 said No. On Natural causes 16 respondents representing 11.59% said Yes while 122 respondents representing 88.41% said No.

Table 3. The impacts of oil spill in Kalabari region.

Rating	Frequency	Percentage
Strongly Disagree	5	3.62
Disagree	5	3.62
Undecided	7	5.07
Agree	50	36.23
Strongly Agree	71	50.72
Total	138	

In the table above show the impacts of oil spill in Kalabari region 71 respondent representing 50.72% Strongly agree that oil spill has huge negative impacts in the Kalabari region,50 respondent representing 36.23% Agree that the oil spills has huge negative impact in the Kalabari region,7 respondents representing 5.075 Undecided that oil spill has negative effects in the region.5 respondent representing 3.62% Disagree that oil spill has negative effects in the Kalabari region and 5 respondent representing 3.62% Strongly disagree that oil spill has huge effect in Kalabari region.

(RESPON2), emphatically express his view thus; the impact has caused lack of trust and transparency between communities and the oil companies and have influence restiveness. We therefore agree the impact of oil spill has affected the host communities negatively.

(RESPON3), we the jobless youths now depend of sabotage since government don't have time to carry out clean up and create jobs.



Factors and Effects of Oil Spill in the Kalabari Region Table 4 of Basic factors responsible for oil spill in the region.

Factors Responsible for Oil Spill	SA	A	U	D	SD
Poverty	75 (54.35%)	44 (31.88%)	11 (07.97%)	5 (3.62%)	3 (02.17%)
Youths Restiveness	53 (38.41)	30 (21.73)	5 (39.85)	5 (39.85)	45 (32.61)
Cultism	20 (14.49)	40 (28.98)	10 (7.24)	15 (10.86)	53 (38.41)
Unemployment	80 (57.97)	17 (12.31)	10 (7.24)	18 (13.04)	23 (16.67)
Negligence by government	70 (50.72)	10 (7.25)	5 (6.62)	9 (6.52)	44 (31.88)

Sources: Researchers' Field Survey 2021

Ekpenyong N.S & Udofia,(2015) avers that Oil spill an environmental disaster that occurs due to release of Liquid Petroleum into the environment which may occur accidentally, intentionally, or resulted from everyday human activities

Nwilo and Badejo (2008) also opined that damages caused by oil spills into the riverine communities have normally been linked with damage to aquatic lives.

Ogbogbo (2004) stated that the consequences of oil spillage are massive pollution of land, rivers and streams in the Niger delta. He argued that the aquatic environment and the ecology of the area, which constitute a major resource for the people, are destroyed

Table 4. Show that 75 respondents representing 54.35% strongly agree that Poverty is a factor responsible for oil spill in the region,44 respondents representing (31.88%) said agree, while 11 respondents representing (07.97%) were unsure, only 5 and 3 respondents representing (3.62%) and (02.17%) disagree and strongly disagree respectively.

On youth restiveness, 53 respondents representing (38.41 strongly agree, 30 respondents representing (21.73) said agree, while 5 respondents representing (39.85) were unsure, only 5 and 45 respondents representing 39.85%) and (32.61%) disagree and strongly disagree respectively.

Similarly, on Cultism, 20 respondents representing (14.49% strongly agree, 40 respondents representing (28.98) said agree, while 10 respondents representing 7.24 were unsure, only 5 and 53 respondents representing (10.86) and 38.41 %) disagree and strongly disagree respectively.

Furthermore, on Unemployment, 80 respondents representing 57.97 strongly agree, 17 respondents representing 12.31 agree, while 10 (respondents representing 7.24 were unsure, only 18 and 23 respondents representing (13.04) and (16.67) disagree and strongly disagree respectively.

Finally, on Negligence by government, 70 respondents representing 50.72 strongly agree, 10 respondents representing (7.25) agree, while 5 respondents representing 6.62 were unsure, only 9 and 44 respondents representing (6.52) and (31.88) disagree and strongly disagree respectively

Okonkwo (2014) in his study stated that social impacts of oil spill covers violence and reduction in tourism activities

Imosemi, Abangwu, and Nwano (2013) also agreed with the findings on violence and reduction in Tourism activities

Onuoha (2007) stated that the weak laws and in adequate compensation to victims of whose properties were damaged can encourage crime..

An informant interviewee (RESP 5) collaborates this result when he said “Unemployment and poverty is responsible for oil spill in the communities and that oil spill would reduce if only government would employ youths”. Another interviewee has this to say “ tell me why oil spill will reduce when the youths do not need long distance travel to spill the oil and make the money unlike this regime that fishermen travels far to catch fish because the nearby waters which provide sustenance has been destroyed by oil spill”. (RESPON 6) A residents in Soku in the Kalabari region in told the researcher that there is likelihood of oil and Gas employees that encourage local youths in the villages to sabotage pipelines in the area and then split funds allocated for the clean-up.

Egbe (2012) Opined that Fishing and farming produce have reduced drastically as oil and gas operations in the region gained ascendancy and almost all the riverine dwellers relocate to another communities or state to seek for alternative means of survival .

Akujuru (2014) in his study Identified the that the impact of oil operations on economic activities to includes:

Loss of arable land, vegetation and forest resources.

Increase in land and water transportation with attendant consequences like aggravation of shore erosion, disturbances between life and fishing activities.

Improper disposal of dredge spoils along water ways, channels causing blockades to bush paths and waterways used for access to fishing farming parts and timber logging areas.

Oil pollution which pollutes drinking water sources destroys fisheries and farms and generally destroys the ecosystem.

“If a cleanup is necessary, these same youths are then hired to perform it. A former Shell security guard, who claimed to have been responsible for sabotaging pipelines in the past, said Shell supervisors and employees “split the money from the cleanup”.

“The recovery department from Shell sabotages the pipelines. If the cleanup will take seven months, they’ll stop after only three months,” he added.

What are the Effects of Oil Spill on property in the region?

Table 5. The effect of oil spill on property in the Narrow creeks of the Kalabari region

	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Reduce property value	100	72.46	38	13.04
Turning productive land into waste	120	86.96	18	42.03
Compels indigene to abandon their land property	95	68.84	43	31.16
Destruction in property	90	65.22	48	34.78
Discolouration of roofs	110	79.71	28	20.29

The data above shows that there are various effects on oil spill on property value in Kalabari region 120 respondent representing 86.96% said yes that oil spill affect property by causing discolouration of roofs while 18 respondent representing 42.03% said No that it does not cause discolouration on roofs. 100 respondents representing 72.46% said yes that oil spill has reduce property value while 38 respondent representing 27.54% No that oil spill does not affects property, 95 respondent representing 68.84% said Yes that oil spill compel indigene to abandon their property ,while 43 respondent representing 31.16% said No. 90 respondent representing 65.22% said Yes that oil spill has effect on destruction on property, while 48 respondent representing 34.78% said No that oil spill has no effect on property value.

Garrity and Leving (1990) avers that .Oil settle on beaches and kills organism that live there, it also settle on oceans floor and kills benthic bottom –dwelling organisms such as crabs and other marine ecosystem.

(RESP3). That oil spill cause discoloration of buildings, and reduces property value and can be easily depreciated before the life span. We therefore agree that many people have moved to nearby communities and state due to the pollution of black spots as it also affects their healths.

(RESP 4). State that has compel both indigene and non-indigene to abandon their lands and relocate to other cities and it has affected the property value on oil spills on properties in Kalabari region.

What are the variables and effects of Oil Spill on aquatic lives

In the above table 6 shows the response of the respondent on the various effects of oil spill on aquatic lives in Kalabari region. On loss of fishes in the creeks of Kalabari Region 138 respondent representing 0% said Yes that oil spill has no effect, while nobody said No that oil spill has caused loss of fishes in the Kalabari region. On destruction of mangrove 128 respondent representing 92.75% said Yes that oil spill has destruction of mangroves, while 10 respondents representing 7.24% said No that oil spill has no destruction of mangroves in Kalabari region. On reduction of tourism 120 respondent representing 86.96% said Yes that oil spill has effect on the reduction on tourism, while 18 respondents representing 13.04% said No that oil spill has no effects on tourism. On kills organism 115 respondent representing 83.33% said yes that oil spill kill organism in the marine, while 23 respondents representing 16.67% said No that oils spill has a no effects on killing of organism. (RESP 4)''one of the fishermen stated that they travel far to other communities to catch fishes and they sometimes uses diamantes to catch plenty fishes that is why it often get pieces when cooking. We therefore agree that government and oil companies within the environment clean up the rivers because the age people that depend on marine ecosystem are suffering as they cannot follow the youths that are involved in sabotage to commit crime

(RESPON 1) Said foreigner no longer visit the communities apart from burial and marriage rite ceremonies. That the fish that attracts them are no longer found in the town.



Effects	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Reduction in tourism	120	86.96	18	13.04
Destruction of mangroves	128	92.75	10	7.24
Loss of fishes	138	100	0	0
Kill organisms	115	83.33	23	16.67

Plate 4.2.2 of the effects of oil spill on aquatic lives

4.9: What are the management systems that can address oil spills challenges in the Kalabari region?

The analysis of the data was done on the degree of agreement and disagreement of the respondents on the basic factors responsible for oil spills in Kalabari Region using Chi Square Test of Association in SPSS 25.

What are the basic factors responsible for the causes of oil spills in remote Creeks of Kalabari region?

Factors Responsible for Oil Spill * Respondents Degree of Agreement Crosstabulation

	Respondents_Degree_Of_Agreement					Total
	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	
Factors_Responsible_Poverty For_Oil_Spill	3	5	11	44	75	138
Youth Restiveness	45	5	5	30	53	138
Cultism	53	16	10	40	20	138
Unemployment	23	18	10	17	70	138
Negligence by Government	44	9	5	10	70	138
Total	188	52	41	141	288	680

Factors_Responsible_For_Oil_Spill * Respondents_Degree_Of_Agreement Crosstabulation

		Respondents_Degree_Of_Agreement					Total
		Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	
Factors_Responsible For_Oil_Spill	Count	3	5	11	44	76	138
	Expected Count	33.0	10.4	8.2	26.2	57.6	138.0
	% within Factors_Responsible For_Oil_Spill	2.2%	3.6%	8.0%	31.9%	54.3%	100.0%
Youth Restiveness	Count	45	5	5	30	53	138
	Expected Count	33.5	10.4	8.2	26.2	57.6	138.0
	% within Factors_Responsible For_Oil_Spill	32.6%	3.6%	3.6%	21.7%	38.4%	100.0%
Oulism	Count	53	16	10	40	20	138
	Expected Count	33.8	10.4	8.2	26.2	57.6	138.0
	% within Factors_Responsible For_Oil_Spill	38.4%	10.9%	7.2%	29.0%	14.5%	100.0%
Unemployment	Count	23	16	10	17	70	138
	Expected Count	33.8	10.4	8.2	26.2	57.6	138.0
	% within Factors_Responsible For_Oil_Spill	16.7%	13.0%	7.2%	12.3%	50.7%	100.0%

On Table 7 The analysis of the data was done on the degree of agreement and disagreement of the respondents on the basic factors responsible for oil spills in Kalabari Region.

Does this observed differences in the factors responsible for oil spill indicate an association between factors causing oil spill and respondent degree of agreement?

We can address this question by the Chi-Square test for independence, i.e. no association.

The **Null hypothesis** state that there is no association between factors responsible for oil spill and the respondent's degree of agreement on these factors.

Chi-Square Tests

Chi-Square Tests

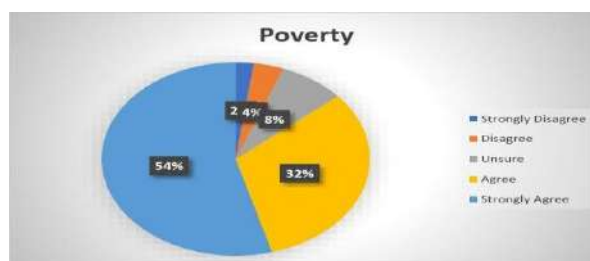
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.20.

From fig 2, the Pearson Chi square test of independence gives an evidence of an association between factors responsible for oil spill and the respondent's degree of agreement on these factors. (p = 0.000).

Decision rule: If p-value is less than 0.05, we reject the null hypothesis

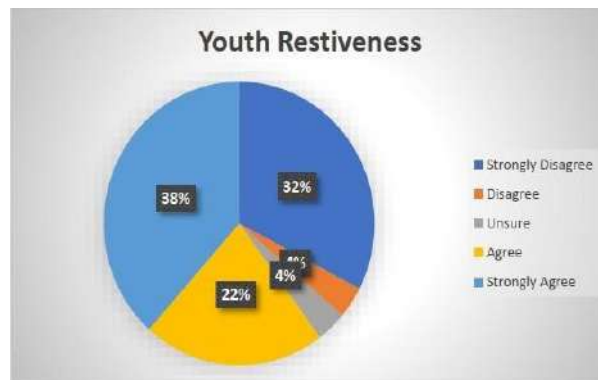
A p-value of 0.000 is less than 0.05 i.e. we reject the null hypothesis of no association between factors responsible for oil spill and the respondent's degree of agreement on these factors.

This means that there is an association between the factors responsible for oil spill and the respondent's degree of agreement on these factors. So, the factors responsible for oil spill cannot be ignored since they determine the degree of agreement. In that case, the data will be analyzed based on the factors responsible for oil spill.



	Value	df	Asymptot Significant (2-sided)
Pearson Chi-Square	132.735 ^a	16	
Likelihood Ratio	160.332	16	
Linear-by-Linear Association	11.612	1	
N of Valid Cases	690		

The row percentages show that 75 persons representing 54.3% of the respondents strongly agreed that **poverty** is the factor responsible for oil spill in Kalabari region. Also agreeing to this position are 44 persons representing 39.1% while 11 persons representing 8% are unsure. However, 5 persons representing 3.6% disagreed and 3 persons representing 2.2% strongly disagreed with this fact.



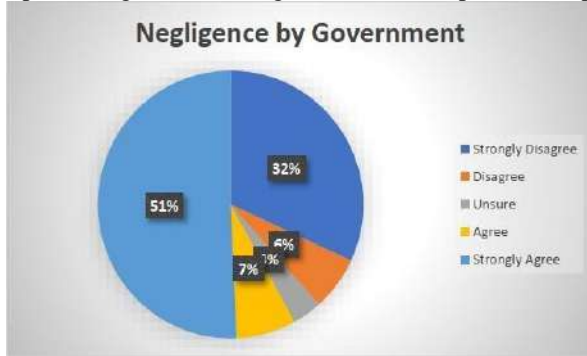
The row percentages show that 53 persons representing 38.4% of the respondents strongly agreed that **youth restiveness** is the factor responsible for oil spill in Kalabari region. Also agreeing to this position are 30 persons representing 21.7% while 5 persons representing 3.6% are unsure. However, 5 persons representing 3.6% disagreed and 45 persons representing 32.6% strongly disagreed with this fact.



The row percentages show that 20 persons representing 14.5% of the respondents strongly agreed that **Cultism** is the factor responsible for oil spill in Kalabari region. Also agreeing to this position are 40 persons representing 29% while 10 persons representing 7.2% are unsure. However, 15 persons representing 10.9% disagreed and 53 persons representing 38.4% strongly disagreed with this fact.

The row percentage show that 70 persons representing 50.7% of the respondents strongly agreed that **Unemployment** is the factor responsible for oil spill in Kalabari region. Also agreeing to this position are 17 persons representing 12.3% while 10 persons representing 7.2% are unsure. However, 18 persons representing 13% disagreed and 23 persons representing 16.7% strongly disagreed with this fact.

The row percentage show that 70 persons representing 50.7% of the respondents strongly agreed that **Negligence by government** is the factor responsible for oil spill in Kalabari region. Also, agreeing to this position are 10 persons representing 7.2% while 5 persons representing 3.6% are unsure. However, 9 persons representing 6.5% disagreed and 44 persons representing 31.9% strongly disagreed with this fact.



Parameter Estimate Ranking Parameter Estimates

Table 8 Ranking the Factors Responsible for Oil Spill in Kalabari region.

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Respondents_Degree_Of_Agreement = 1]	-.1244	.187	55.828	1	.000	-1.571	-.918
	[Respondents_Degree_Of_Agreement = 2]	-.844	.192	27.090	1	.000	-1.161	-.520
	[Respondents_Degree_Of_Agreement = 3]	-.504	.100	12.401	1	.000	-.677	-.250
	[Respondents_Degree_Of_Agreement = 4]	.328	.159	4.244	1	.039	.016	.639
Location	[Factors_Responsibile_For_Oil_Spill=1]	.736	.229	10.347	1	.001	.288	1.185
	[Factors_Responsibile_For_Oil_Spill=2]	-.260	.218	1.311	1	.262	-.678	.178
	[Factors_Responsibile_For_Oil_Spill=3]	-.630	.221	17.788	1	.000	-1.263	-.408
	[Factors_Responsibile_For_Oil_Spill=4]	.250	.221	1.281	1	.258	-.183	.684
	[Factors_Responsibile_For_Oil_Spill=5]	0*	.	.	0	.	.	.

Link function: Logit.

*. This parameter is set to zero because it is redundant.

Factor 5 (Negligence by Government) is taken as the reference factor and is set to zero '0', then the other factors are compared to it.

Poverty (Factor 1): Poverty has an estimate value of 0.736. This value is positive and has a significant P-value of 0.001. This means that based on their level of agreement, the respondents believed that poverty is more responsible for oil spill in Remote creeks of the Kalabari region than negligence by government. The estimated difference between them is statistically significant hence the (Sig) p-value is

less than 0.05.

Youth Restiveness (Factor 2): Youth Restiveness has an estimate value of -0.250. This value is negative (meaning that this factor was not rated higher than negligence by government by the respondents as the factor that is responsible for oil spill) and has an insignificant P-value of 0.252. This means that based on their level of agreement, the respondents believed that negligence by government is more responsible for oil spill in Kalabari region than youth restiveness. Though the estimated difference between them is not statistically significant hence the p-value is greater than 0.05.

Cultism (Factor 3): Cultism has an estimate value of -0.930. This value is negative (meaning that this factor was not rated higher than negligence by government by the respondents as the factor that is responsible for oil spill) and has a significant P-value of 0.000. This means that based on their level of agreement, the respondents believed that negligence by government is more responsible for oil spill in Kalabari region than cultism. And the estimated difference between them is statistically significant hence the p-value is greater than 0.000.

Unemployment (Factor 4): Unemployment has an estimate value of 0.250. This value is positive (meaning that this factor was rated higher than negligence by government by the respondents as the factor that is responsible for oil spill) and has an insignificant P-value of 0.258. This means that based on their level of agreement, the respondents believed that unemployment is more responsible for oil spill in Kalabari region than negligence by government. Though the estimated difference between them is not statistically significant hence the p-value is greater than 0.05.

II. CONCLUSION

In conclusion, the respondent's level of agreement shows that poverty is the highest factor responsible for oil spill in the remote creeks of Kalabari region and is respectively followed by unemployment, negligence by government, youth restiveness and cultism in this order.

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