Available Online at http://www.journalajst.com

ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

ISSN: 0976-3376

Asian Journal of Science and Technology
Vol.06, Issue, 11, pp. 1945-1954, November, 2015

RESEARCH ARTICLE

ASSESSMENT OF SPATIAL VARIATION OF ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACT OF CRUDE OIL SPILL IN THE NIGER DELTA, NIGERIA

***Iloeje, A. F. and Emenike, A. I.**

Faculty of Environmental Sciences, Enugu State University of Science and Technology, Enugu, Nigeria

ARTICLE INFO

Article History:
Received 14th August, 2015
Received in revised form
06th September, 2015
Accepted 30th October, 2015
Published online 30th November, 2015

Key words:

Assessment,
Environment,
Impact,
Oil spill.

ABSTRACT

This paper investigates the environmental and socio-economic impact of crude oil spill on the Niger Delta oil-bearing communities, Nigeria. It went further to ascertain whether the impact is location specific or has a general trend across the communities. Three communities; Mgbede, Kwale and Ekakpamre in the two core Niger Delta States; Rivers and Delta States, were identified for this study, being most densely populated with oil fields with hyper-active oil related activities. Survey research was adopted and with well- structured questionnaire, relevant data were collected on the subject. A null hypothesis was formulated which sought to find out whether there is a significant difference in the impact of crude oil spill on the three locations under study. Hypothesis testing revealed that there is no significant difference in the impact across the three communities, thus indicating that location is not a factor. Therefore the environmental and socio-economic impact of crude oil spill on the communities show a general trend and it is recommended that a holistic approach should be adopted in fashioning out strategies for mitigation and environmental protection in the Niger Delta oil-bearing communities.

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INTRODUCTION

Oil spillage is a phenomenon that has inflicted severe damage on the natural environmental setting of the oil-bearing communities of Niger Delta, Nigeria, giving rise to decline in both social and economic productivity of the affected communities. Opukri and Ibaba (2008), posited that oil-related environmental problems such as oil spillage, gas flaring, among others, have diminished the commercial productivity of the oil-producing communities resulting in occupational and income loses that set in both voluntary and involuntary migration. Crude oil production and its attendant consequences are therefore blamed for declining productivity of their local economies that are predominantly subsistent and based on agriculture and fisheries (Aaron 2006, Salau 1993, Okolo 1998, Ibeanu 2003). The Niger Delta consists of highly diverse ecosystems hosting numerous species of fauna and flora in both the terrestrial and aquatic environments. Crude oil spill has devastated the entire region, polluting their rivers, streams air and forest, leaving the predominantly subsistent families helplessly impoverished. The oil activities, instead of bringing about balanced development and economic growth have turned out to keep the communities socio-economically underdeveloped, restive, jobless and miserable. The youths are therefore forced to migrate to urban centres in search of better living facilities and gainful employment, thus, not only compounding the already existing urban overcrowding, but also leaving their basic occupation of fishing and farming to the old and aged resulting in drastic reduction in farm productivity. The very few young men left behind set up formidable unions and associations and militant groups as organs to press and enforce compliance to their numerous, often frivolous demands with associated threats of total break-down of law and order in event of non-compliance by the oil companies and government agencies alike.

To make good their threats, they engage in kidnapping, abduction and intimidation of the oil workers and any other persons perceived to be in sympathy with their common enemies. They demand ransoms for the release of their victims. Seeing that they make huge sums of money from relations and associates of their victims, some community leaders joined in the game, and more of such groups sprang up. Consequently, education and other useful economic activities became less fashionable. These actions were at first confined to certain very volatile areas of the Niger Delta, but as the days rolled by it began to spread to other parts at a very alarming rate. It therefore became necessary to investigate further to ascertain whether the impact of crude oil spillage on the people is location specific or there is a general trend.This will help fashion out a global strategy to deal with the various issues arising from oil-related environmental problems. Three study locations in two out of the three core Niger Delta States were selected for this study.

****Corresponding author: Iloeje, A. F.,***
Faculty of Environmental Sciences, Enugu State University of Science and Technology, Enugu, Nigeria.

One key research question was postulated as hereunder stated:

To what extent does the impact of crude oil spill differ within the study locations? From this research question, the following objective was derived:

To find out whether the impact of crude oil spill will show a uniform trend within the study locations.

To address this objective, a null hypothesis was formulated to provide a clear focus for the study. *Ho: There is no significant difference in the impact of crude oil spill on the communities under study.*

MATERIALS AND METHODS

Study Area

The states selected were Rivers and Delta States. These are the states geographically characterized, predominantly to an extent, with deltaic features Kimiebi (2010). They have the highest intensity of oil activities and most densely populated with oil fields. These factors informed their choice for this study. Nigeria has four oil refineries with an estimated total refining capacity of 445,000 barrels per day (Onuoha 2008, Anifowose 2008). Rivers State hosts two of these refineries, precisely in Port Harcourt with a capacity of 60,000 to 150,000 barrels per day while Delta State has one in Warri with a refining capacity of 125,000 barrels per day (Odeyemi and Ogunseitan 1985). Furthermore, there are 606 oil fields with 355 onshore and 251 offshore with 5,284 drilled oil wells and 7,000 km of oil and gas pipelines in these states (Anifowose 2008, Onuoha 2008).

The specific communities under study are Kwale in Ndokwa East Local Government Area, (LGA) and Ekakpamre in Ughelli South LGA both in Delta State while Mgbede in Ogba/Egbema/Ndoni LGA is in Rivers State. According to the National Census figures, the Niger Delta has a population of about five million people (National Bureau of Statistics 2006). As at 1991 the National Census estimated that about 25% of the entire Nigerian population live within the Niger Delta Twumasi and Merem (2006), Uyigue and Agho (2007), with an annual growth rate of 3% Ogunlade, Oladele and Ogusola (2009). In line with the National Census figures, Rivers State has an estimated population of 5,185,400 while Delta State's population estimate stood at 4,112,445. With the available climatic data, the study area is classified as a tropical rainforest with ecosystems comprising diverse terrestrial species, Adati (2012). Kuruki (2004) posited that the area is humid with a mean average temperature of $24^oC - 30^oC$ and an average rainfall ranging from 1500m to 4000m at the coastal areas. The Nigerian coastal geology is basically sedimentary and is dominated by the geology of acuate Niger Delta (Nwilo and Badejo 2005). The study area displays the same kind of geological formation of the rest of the Niger Delta areas.

Methodology

Survey research method was adopted in this study. Well-structured questionnaire was distributed to respondents to elicit information. Interviews were also conducted. Information on the personal characteristics of the respondents as well as the challenges posed by crude oil spill on the environment were received.

The extent to which oil spill has deprived the communities of their source of livelihood and the sustainable use of their land resource as well as the cumulative consequences on their social, economic and even spiritual needs were equally captured in the questionnaire. Twelve impact indicators were rated against five impact dimensions of *frequency, magnitude, importance, risk and extent.* The questionnaire was administered on a sample size of 342 derived from a projected population of851,302 for the three LGA's by applying 2.8% growth rate on the 2006 census figure of 682,557. One hundred were distributed in each of the three study locations proportionately to seven groups of respondents based on occupation as shown in Table 1.

Seventy two teachers were interviewed in Ekakpamre. Youth corps members formed about 65% of this number, leaving 25 as full-time staff. Nnodu (2009) quoting Nwana (1981), stated that if a population is a few hundreds, a 40% or more sample will do, if many hundreds, a 20% sample will do, if a few thousands a 10% sample will do; and if several thousands, a 5% or less sample will do. Using this as a basis, the researcher adopted a minimum of 60% to draw a sample from each unit that made up the seven unit.

For the teachers, with fulltime staff of 25, 16 samples were drawn and questionnaires administered to them. This method was adopted to give the sample sizes shown in Table 4.1 for the other six units and the three study locations as follos: Ekakpamre 113, Kwale 115 and Mgbede 114 giving a total sample size of 342. The total number that made up the groups' base population stood at 440 and 77.73% of this figure, that is, 342 were issued the questionnaire for their response. This percentage was adjudged fair enough for this study.

Presentation of Data

Analysis of Total Mean Ratings

The total mean values of the ratings by the respondents were presented in table 2. Under impact dimension A (frequency), the total mean value for the impact indicator "oil spill incidents" is 4.12 calculated from the mean scores of Mgbede 4.19, Kwale 4.07 and Ekakpamre 4.11 from the seven groups of respondents in each study location. In the same way, for impact indicator "loss of productive land", the mean scores were 4.54, 4.57 and 4.52 for Mgbede, Kwale and Ekakpamre respectively, giving a total mean score of 4.54. The table presents the rest of the scores.

Hypothesis Testing

There were groupsof respondents based on location. The hypothesis examines whether there is a significant difference in the impact of crude oil spill in the study locations. To further confirm the results and to test the homogeneity of the subsets, Post-hoc tests were conducted to generate a pair-wise comparison of group means. The methods adopted for this multiple comparison test were the Turkey HSD and Tamhane statistical analysis. Turkey is usually adopted where there exists equality of variances while Tamhane is used where the variances differ. (Appendix B).

Table 1. Population Distribution Based on Occupation for Each Study Location and Study Group

S/N	Occupation	Ekakpamre		Kwale		Mgbede		Total Base pop.	Total samplepop.	Percentage of base pop.
		Base Pop B)	Sample size S)	Base Pop B)	Sample size S)	Base Pop B)	Sample size S)	B+B+B	S+S+S	3s/3b x 100
1	Teachers	25	16	30	25	18	16	68	57	64.0
2	Clergy men	10	5	20	18	10	10	40	33	82.50
3	Youth Leaders	10	10	15	12	10	10	35	32	91.43
4	Traditional Council Members	23	20	20	15	22	30	65	65	100,00
5	Oil/Gas based workers	40	30	10	5	27	18	77	53	69.00
6	Civil Servants	20	12	35	25	20	15	75	52	69.33
7	Farmers	25	20	35	15	26	15	86	50	62.50
	Total	138	113	165	115	137	114	440	342	77.73

Source: Field Work

Table 2. Total Mean Ratingof Impact Indicators against Impact Dimensions

S/N	SOCIO-ECONOMIC INDICATORS	IMPACT DIMENSIONS				
		Frequency	Magnitude	Importance	Risk	Ext.
1	Oil spill incidents	4.12	3.60	3.55	4.47	4.38
2	Loss of productive land	4.54	3.59	4.54	4.47	4.38
3	Reduction in Agricultural yield	4.57	3.60	4.54	4.47	4.38
4	Land despoliation/degradation	4.39	4.29	4.44	4.25	4.19
5	Oil spill fires	4.39	4.30	4.44	4.27	3.97
6	Loss in soil fertility/leaching of soil nutrients	4.70	4.31	4.54	4.26	3.95
7	Reduction in man power available for land cultivation	3.57	4.30	4.49	4.26	3.96
8	Loss of sacred forests	3.57	4.06	4.48	4.30	3.94
9	Loss in income	4.49	4.49	4.53	4.30	4.16
10	Exodus of Youths from the villages	4.49	4.50	4.46	4.19	4.16
11	Insecurity/Youth restiveness	4.49	4.50	4.49	4.20	4.13
12	Loss in ethical values	4.50	4.49	4.34	4.19	4.13

Source : Field Work

Using the five level Likert-Type scale, the test value was calculated based on the impact dimensions rated under the following categories:

Very Low = 1, Minimal = 2, Moderate = 3, High = 4, Very High = 5, giving a test value of 3.0.

This test value is the population mean and was used as the criterion for assessment. The sample mean was then calculated from the mean rating of the respondents on each impact dimension. The idea was to check whether the sample mean is significantly greater or less than the population mean at 5% level of significance.

H_o: $\mu \leq 3.0$
H_1: $\mu > 3.0$

The implication is that if the p-value (probability value) for any of the five impact dimensions is less than 0.05 ($p<0.05$), the null hypothesis is rejected while the alternative, which is the research hypothesis is accepted. A One-Way Analysis of Variance was used for the purpose of testing the hypothesis because three samples were involved. For the impact dimensions, the calculated f-values and the corresponding p-values are shown in tables 3 (a-j). The objective was to test the existence of significant difference among the means of the three samples. From Tables 3 (a and b), the mean values for Mgbede, Kwale and Ekakpamre were 4.2985, 4.2962 and 4.3085 respectively. The ANOVA table (Table 3b) revealed that the calculated F value is 0.117 and the p-value is 0.890. Since the p-value is more than 0.05 (level of significance), the conclusion therefore is that location is not a factor with regards to the responses on impact dimension A.

The researcher went further to perform a multiple comparison test although it is more relevant when there is a significance in the F test. However, the results of the multiple comparison were used for the purpose of further confirmation of the non-significance. Interestingly too, the tests for homogenous subsets further confirmed that the three locations (Ekakpamre, Kwale and Mgbede) belong to the same homogenous group, Appendix B (i-v). The same applies to Tables 3 (c-j). Table 4 presents the summary of these tests for the five impact dimensions. The p-values for the impact dimension of frequency, magnitude, importance, risk and extent were 0.890, 0,125, 0.341, 0.809, and 0.709 respectively.

RESULTS

From table 2, out of the 60 mean ratings recorded, only 9 ratings (15%) fell between 3.0. and 3.99 out of which none was below 3.5. The other 51 ratings (85%) were between 4.1 and 4.57. The 4.1 rating is equivalent to 82%, therefore the impact of oil spill on the soil, and by extension, the socio-economic life of the communities under study, had an overwhelming majority rating, of 85%, and puts the socio-economic damage caused by oil spill at 82%.

This result is consistent with the findings of Ikwuegbu (2007) which put the environmental damages of oil activities in the Niger Delta at 82%. In Opukri and Ibaba (2008), environmental degradation arising from oil spills result in internal displacement of communities, diminished productivity of farming and fishing, mass relocation, occupation and income losses, poverty, induced voluntary and involuntary migration, loss in ancestral homes and familiar surroundings, loss in religious and cultural artefacts, youth restiveness and inter community clashes.

Tables 3 (a-j). Mean Values and Analysis of Variance

a)

Impact Dimension **A**

				95% Confidence Interval for Mean	
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
Mgbede/Surrounding Villages	100	4.2985	.17264	.01726	4.2642	4.3328
Kwale/Beneku	100	4.2962	.19446	.01945	4.2576	4.3348
Ekakpamre/Surrounding Villages	100	4.3085	.20704	.02070	4.2674	4.3496
Total	300	4.3011	.19134	.01105	4.2793	4.3228

b)

ANOVA

Impact Dimension A

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.009	2	.004	.117	.890
Within Groups	10.938	297	.037		
Total	10.947	299			

c)

Impac Dimension t B

				95% Confidence Interval for Mean	
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
Mgbede/Surrounding Villages	100	4.1120	.30073	.03007	4.0523	4.1716
Kwale/Beneku	100	4.1178	.30740	.03074	4.0568	4.1788
Ekakpamre/Surrounding Villages	100	4.0385	.30654	.03065	3.9776	4.0993
Total	300	4.0894	.30603	.01767	4.0546	4.1242

d)

ANOVA

ImpactDimension B

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.391	2	.196	2.104	.124
Within Groups	27.611	297	.093		
Total	28.002	299			

e)

Impact Dimension **C**

				95% Confidence Interval for Mean	
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
Mgbede/Surrounding Villages	100	4.1105	.19080	.01908	4.0726	4.1483
Kwale/Beneku	100	4.0765	.16309	.01631	4.0442	4.1089
Ekakpamre/Surrounding Villages	99	4.0850	.15358	.01544	4.0544	4.1156
Total	299	4.0907	.16999	.00983	4.0713	4.1100

f)

ANOVA

Impact Dimension C

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.062	2	.031	1.078	.341
Within Groups	8.549	296	.029		
Total	8.611	298			

g)

Impact Dimension **D**

				95% Confidence Interval for Mean	
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
Mgbede/Surrounding Villages	100	4.29	.456	.046	4.20	4.38
Kwale/Beneku	100	4.27	.427	.043	4.18	4.35
Ekakpamre/Surrounding Villages	100	4.39	.455	.045	4.30	4.48
Total	300	4.32	.448	.026	4.27	4.37

h)

ANOVA					
Impact Dimension D					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.834	2	.417	2.097	.125
Within Groups	59.085	297	.199		
Total	59.919	299			

i)

Impact Dimension **E**						
					95% Confidence Interval for Mean	
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
Mgbede/Surrounding Villages	100	4.2200	.41633	.04163	4.1374	4.3026
Kwale/Beneku	100	4.1786	.38699	.03870	4.1018	4.2554
Ekakpamre/Surrounding Villages	100	4.2200	.41633	.04163	4.1374	4.3026
Total	300	4.2062	.40589	.02343	4.1601	4.2523

j)

ANOVA					
Impact Dimension E					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.114	2	.057	.345	.709
Within Groups	49.146	297	.165		
Total	49.260	299			

Table 4. Summary of F and p- Values For all Impact Dimensions

S/No	Impact Dimension	f-value	p- value	Remarks
1.	Frequency	0.117	0.890	Not Significant
2.	Magnitude	2.104	0.125	"
3.	Importance	1.078	0.341	"
4.	Risk	0.212	0.809	"
5.	Extent	0.345	0.709	"

All these socio-economic problems associated with oil spill very much agree with the findings of the current study as presented in Table 2. The percentage damage shown in these social indices are quite high judging by the rating results.

The farming population has been reduced and left for only the aged farmers causing low productivity. Rural-urban migration of able-bodied young men and women as well as land resource degradation occasioned by incessant oil spills, were implicated for the relatively old age of the farmers (Inoni *et al*, 2006). The response by the respondents in the current study is consistent with this assertion. Important production parameters, such as crop yield, land productivity and farm income, measured in their study, indicate that oil spill has a statistically significant effect on them. Similar findings were noted in Baker (1970b) Gbadegesin (1997) and Ihejiamaizu (1999).

The negative impact of oil spill on the socio-economic life of the affected communities is further emphasized by the results of the current study probably as a result of the alteration of the soil chemical properties resulting in reduction of soil nutrients and its productive capacity. Finally, the results of the hypothesis testing indicate that there is no significant difference in the spatial variation of the impact of crude oil spill on the environmental and socio-economic life of the communities in the three study locations. The calculated p-value for each impact dimension was greater than 0.05 ($p>0.05$). The research hypothesis is thus rejected while the null is accepted.

Conclusion

The findings indicate that crude oil spill has deleterious effects on the environment and socio-economic life of the communities under study resulting in youth restiveness, forced and voluntary migration and other social vices. These impacts were found to be uniformly distributed in all the three study locations, showing a general trend. It is therefore recommended that:

- Statutory provisions for mandatory EIA must be strictly adhered to by all stakeholders in the oil industry;
- There must be evidence of strategic and effective measures laid out to internalise all externalities emanating from oil activities across the entire oil-bearing communities;
- People-oriented programmes such as provision of basic socio-economic facilities, employment, effective resettlement and rehabilitation plan must be put in place to cater for the victims of oil activities, and uniformly implemented.

Drastic reduction in crude oil spill will not only enhance and improve the environment and socio-economic life of the oil-bearing communities, but also protect and preserve the overall environmental quality and create the desired social equilibrium to ensure sustainable development in its broader perspective.

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APPENDIX A

Questionnaire - Section A: Personal Characteristic of the Respondents

(Please indicate your response by ticking at the appropriate space(s) provided after each question)

- State of Origin

  a) Rivers State [ ] (b) Delta State [ ]

- Local Government of Origin

  a) Ogba/Egbema/Ndoni LGA [ ] (b) Ndokwa

West/East LGA [ ] (c) Ughelli South LGA [ ]

- Place of Domicile

(a) Mgbede [ ] (b) Kwale/Beneku [ ] (c) Ekapamre [ ] (d) Surrounding villages [ ]

- Occupation

(a) Teacher (Primary & Secondary School) [ ] (b) Clergyman [ ] (c) Youth leader [ ] (d) Traditional council member [ ] (e) Oil/Gas based worker [ ] (f) Civil service [ ] (g) Others, Specify [----------]

Section B: Effects of Crude Oil Spill on Soil

Table 1 shows a list of possible impacts of crude oil spill. Please rate as appropriate the severity using the five criteria provided below.

Questionnaire

S/N	Impact Indicators (Key Areas of Impact)	Impact Dimensions				
		Frequency	Magnitude	Significance/ Importance	Risk	Extent
1	Oil spill incidents					
2	Loss of productive land					
3	Reduction in agricultural yield					
4	Land despoliation/degradation					
5	Oil spill fires					
6	Loss in soil fertility/leaching of oil nutrients					
7	Reduction in manpower available for land cultivation					
8	Loss of sacred forests					
9	Loss in income					
10	Exodus of youths from the village(s)					
11	Insecurity /Youth restiveness					
12	Loss in ethical values					

Key: Very low ---------- 1
Minimal ---------- 2
Moderate ---------- 3
High ----------4
Very high ---------- 5

APPENDIX B (i) Multiple Comparison Test H3

Test of Homogeneity of Variances

Impact Dimension A

Levene Statistic	df1	df2	Sig.
4.428	2	297	.013

Multiple Comparisons

Dependent Variable: Impact Indicator A

	(I) Place of Domicile	(J) Place of Domicile	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Mgbede	Kwale	.00233	.02714	.996	-.0616	.0663
		Ekakpamre	-.01000	.02714	.928	-.0739	.0539
	Kwale/Beneku	Mgbede	-.00233	.02714	.996	-.0663	.0616
		Ekakpamre	-.01233	.02714	.892	-.0763	.0516
	Ekakpamre	Mgbede	.01000	.02714	.928	-.0539	.0739
		Kwale	.01233	.02714	.892	-.0516	.0763
Tamhane	Mgbede/Surrounding Villages	Kwale	.00233	.02600	1.000	-.0603	.0650
		Ekakpamre	-.01000	.02696	.976	-.0749	.0549
	Kwale	Mgbede	-.00233	.02600	1.000	-.0650	.0603
		Ekakpamre	-.01233	.02840	.962	-.0807	.0561
	Ekakpamre	Mgbede	.01000	.02696	.976	-.0549	.0749
		Kwale	.01233	.02840	.962	-.0561	.0807

Homogeneous Subsets

Impact Dimension A

	Place of Domicile	N	Subset for alpha = 0.05
			1
Tukey HSD[a]	Kwale	100	4.2962
	Mgbede	100	4.2985
	Ekakpamre	100	4.3085
	Sig.		.892

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 100.000.

APPENDIX B (ii) Test of Homogeneity of Variances

Impact Dimension B

Levene Statistic	df1	df2	Sig.
.304	2	297	.738

Multiple Comparisons

Dependent Variable: Impact Dimension B

	(I) Place of Domicile B	(J) Place of Domicile B	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Mgbede	Kwale	-.00586	.04312	.990	-.1074	.0957
		Ekakpamre	.07350	.04312	.205	-.0281	.1751
	Kwale	Mgbede	.00586	.04312	.990	-.0957	.1074
		Ekakpamre	.07936	.04312	.158	-.0222	.1809
	Ekakpamre	Mgbede	-.07350	.04312	.205	-.1751	.0281
		Kwale	-.07936	.04312	.158	-.1809	.0222
Tamhane	Mgbede	Kwale	-.00586	.04300	.999	-.1094	.0977
		Ekakpamre	.07350	.04294	.243	-.0299	.1769
	Kwale	Mgbede	.00586	.04300	.999	-.0977	.1094
		Ekakpamre	.07936	.04341	.193	-.0252	.1839
	Ekakpamre/	Mgbede	-.07350	.04294	.243	-.1769	.0299
		Kwale	-.07936	.04341	.193	-.1839	.0252

Homogeneous Subsets

	Place of Domicile B	N	1
Tukey HSD[a]	Ekakpamre	100	4.0385
	Mgbede	100	4.1120
	Kwale	100	4.1178
	Sig.		.158

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 100.000.

APPENDIX B (iii) Test of Homogeneity of Variances

Impact Dimension C

Levene Statistic	df1	df2	Sig.
5.202	2	296	

Multiple Comparisons
Dependent Variable: Impact Dimension C

	(I) Place of Domicile C	(J) Place of Domicile C	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Mgbede	Kwale	.03391	.02403	.337	-.0227	.0905
		Ekakpamre	.02547	.02409	.542	-.0313	.0822
	Kwale	Mgbede	-.03391	.02403	.337	-.0905	.0227
		Ekakpamre	-.00844	.02409	.935	-.0652	.0483
	Ekakpamre	Mgbede	-.02547	.02409	.542	-.0822	.0313
		Kwale	.00844	.02409	.935	-.0483	.0652
Tamhane	Mgbede	Kwale/Beneku	.03391	.02510	.445	-.0265	.0944
		Ekakpamre	.02547	.02454	.658	-.0337	.0846
	Kwale	Mgbede	-.03391	.02510	.445	-.0944	.0265
		Ekakpamre	-.00844	.02246	.975	-.0625	.0456
	Ekakpamre	Mgbede	-.02547	.02454	.658	-.0846	.0337
		Kwale	.00844	.02246	.975	-.0456	.0625

Homogeneous Subsets
Impact Dimension C

			Subset for alpha = 0.05
	Place of Domicile C	N	1
Tukey HSD[a]	Kwale	100	4.0765
	Ekakpamre	99	4.0850
	Mgbede	100	4.1105
	Sig.		.338

Means for groups in homogeneous subsets are displayed.

APPENDIX B (iv) Test of Homogeneity of Variances
Impact Dimension D

Levene Statistic	df1	df2	Sig.
2.901	2	297	.057

Multiple Comparisons
Dependent Variable: Impact Dimension D

	(I) Place of Domicile D	(J) Place of Domicile D	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Mgbede	Kwale	.021	.063	.942	-.13	.17
		Ekakpamre	-.100	.063	.253	-.25	.05
	Kwale	Mgbede	-.021	.063	.942	-.17	.13
		Ekakpamre	-.121	.063	.136	-.27	.03
	Ekakpamre	Mgbede	.100	.063	.253	-.05	.25
		Kwale	.121	.063	.136	-.03	.27
Tamhane	Mgbede	Kwale	.021	.062	.982	-.13	.17
		Ekakpamre	-.100	.064	.323	-.26	.06
	Kwale	Mgbede	-.021	.062	.982	-.17	.13
		Ekakpamre	-.121	.062	.154	-.27	.03
	Ekakpamre	Mgbede	.100	.064	.323	-.06	.26
		Kwale	.121	.062	.154	-.03	.27

Homogeneous Subsets
Impact Dimension D

			Subset for alpha = 0.05
	Place of Domicile D	N	1
Tukey HSD[a]	Kwale	100	4.27
	Mgbede	100	4.29
	Ekakpamre	100	4.39
	Sig.		.136

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 100.000.

APPENDIX B (v) Test of Homogeneity of Variances
Impact Dimension E

Levene Statistic	df1	df2	Sig.
1.326	2	297	.267

Multiple Comparisons
Dependent Variable :Impact Dimension E

	(I) Place of Domicile E	(J) Place of Domicile E	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Mgbede	Kwale	.04136	.05753	.752	-.0941	.1769
		Ekakpamre	.00000	.05753	1.000	-.1355	.1355
	Kwale	Mgbede	-.04136	.05753	.752	-.1769	.0941
		Ekakpamre	-.04136	.05753	.752	-.1769	.0941
	Ekakpamre	Mgbede	.00000	.05753	1.000	-.1355	.1355
		Kwale	.04136	.05753	.752	-.0941	.1769
Tamhane	Mgbede	Kwale	.04136	.05684	.849	-.0955	.1782
		Ekakpamre	.00000	.05888	1.000	-.1418	.1418
	Kwale	Mgbede	-.04136	.05684	.849	-.1782	.0955
		Ekakpamre	-.04136	.05684	.849	-.1782	.0955
	Ekakpamre	Mgbede	.00000	.05888	1.000	-.1418	.1418
		Kwale	.04136	.05684	.849	-.0955	.1782

Homogeneous Subsets
Impact Dimension E

			Subset for alpha = 0.05
	Place of Domicile E	N	1
Tukey HSD[a]	Kwale	100	4.1786
	Mgbede	100	4.2200
	Ekakpamre	100	4.2200
	Sig.		.752

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 100.000

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