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OGONI WOMEN FARMERS PARTICIPATION IN AGRICULTURAL PRODUCTION IN THE REMEDIATED OIL SPILL LAND

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Abstract

The extent of Ogoni women farmers' participation in agricultural production in the remediated crude oil spilled land was investigated, using multistage sampling. Results show that most of Ogoni women Farmers were within the age range of 41-50 years. This implies that the Ogoni women farmers were relatively young and active. Also the study findings showed that 34.69, 16.38, 21, 49.21% and 21.43, 7.76, 6.80, 4.76% had a secondary education and tertiary education in Eleme, Gokhana, Khana and Tai, respectively. The results also shows that crude oil spillage posed health hazard and environmental risk, reduced arable farm land, reduced farmer's income due to low crop yields, exposed the area/ecosystem to pollution, destroyed vegetation and aquatic lives, cumulative impact of oil spillage led to low standard of living due to low agricultural yields, causing farmers to abandon or relocation their farm land. The results further accentuated the negative impact of oil spill on crop production as farm income is depressed due to the twin effects of land degradation and poor plant growth. The results also indicate that remediated areas are not adequate enough and suitable for cultivation. Majority of farmers are subsistence farmers. No farmer was involved in Dry and irrigated Farming, mixed farming. Many factors influenced Ogoni women participation in farming operation in the soil remediated, areas. However, Packing, Shipping, Regulations and Insurance and Land Ownership system did not affect farmers in Eleme and Gokhana. This research lead to the recommendation that farmers should not farm in Crude oil spills areas until adequately remediated.

Keywords: Soil remediation Ogoni land, Niger Delta, Crude and Spills

Introduction

Before oil exploration, agriculture was the traditional/ major occupation of the Ogoni people and has become part of their culture, way of life and livelihood. The rich alluvial soil of the Delta, coupled with copious web of fish and salt water bodies provided the necessary incentives for the people who are predominantly farmers and fishers (UNDP, 2006). The environment is very important for the Niger Delta people, where 60% of the population depend on the natural, living and non-living organisms for their livelihood. Regardless of the conditions that tend to limit the socio-economic opportunities available to a large proportion of the population, the people, out of necessity look for means to ensure that their survival needs are met. This notwithstanding, due to carelessness Crude oil are spilled on land. This land must be remedy.

Soil remediation/clean-up, also known as soil washing, is a term that refers to various processes designed to remove contaminants such as hydrocarbons (petroleum and fuel residues), heavy metals, pesticides, cyanides, volatiles, creosote, and semi-volatiles from soil. Soil remediation is needed to clean and maintain high quality standards of soil, water and air that can consequently benefit commercial cultivation, and wide flora and fauna. In view of this, it will now be necessary to study the agricultural activities of the Ogoni women farmers, identify their problems and make recommendations for the remediation programme of the clean-up programme

Therefore the objectives of this study are to:

1) Correlate Socio-Economic Characteristics of Ogoni women farmers,
2) assess Farming Activities of Ogoni women farmers in the study area
3) Determine the Factors Influencing Farming Activities of Farmers in Remediated land.

Area of Study

The study was conducted in Ogoni land in Nigeria. Ogoni is located between longitudes $7^{o}15^{1}$E- $7^{o}32^{1}$E and latitudes$4^{o}32^{1}$-$4^{o}37^{1}$N in the eastern part of the Niger Delta. Ogoni land consists of six kingdoms: Babbe, Eleme, Gokana, Ken-Khana, Nyo-Khana, and Tai, all situated in an area east of Port Harcourt in Rivers State. The area is the nerve centre of crude oil exploration and production with famous oil Companies and their subsidiaries such as Shell Petroleum Development Company(SPDC), Nigeria Agip Oil Company (NAOC), Total E&P Nigeria Limited, Chevron etc. Ogoni land is greatly endowed with abundant natural resources and a weather which supports all-year-round agricultural production. Ogoni is an agricultural and fishing society. Yam and cassava farming are important ways of making a living, although the revenues from these products are not very high. Ogoni is the largest crude oil producing Area in Rivers State. Communities in Ogoni land may appear similar, but they have distinctive differences, including traditional institution structures, languages and cultural features (Ukpong, 1992).

The area experiences two distinct seasons: rainy and dry seasons. The rainy season starts from April and lasts till October with a brief period of dryness (August Break). The rainfall is heavy with estimated annual range which may vary from 2000 to 2680 mm (IITA, 2004). Rainfall pattern is bimodal with peaks in June and September (Ukpong, 1992).

The highest temperature (32°C) is experienced during the months of February through March and coincides with the overhead passage of the sun (Enwezor, Chude and Udo, 1990). Before the advent of colonialism, there was a well established social system and with its rich plateau soil, Ogoni was a blessed land. The fresh water streams and the surrounding seas brimmed with fish, the forests had an abundance of animals and hard wood preserved by the environmentally-conscious Ogoni (Ubong, 2010).

Sample Size

Crude oil exploitation and production activities are carried out in four LGAs in Ogoni land: Gokana, Khana Eleme and Tai. The population of Ogoni land, according to National Population Census (2006) is 831, 726 with 48.1% females (NPC, 2006; Apata and Bayode, 2016; while the minimum size needed for a statistical analysis is 0.05 level.

Table 1: The study area population by local governments

Local Government	Inhabitants
Eleme	190,884,
Gokana	228,828
Khana	294,217
Tai	117,797
Total	**831,726**

Therefore total number of respondents = 4 (Local Governments) x 4 communities from each Local Government x 25 Local Government host communities = 4x4x25=400 respondents. These areas are selected because there are the crude oil spill most affected areas. The study used Yaro Yamane (1967) formula to determine the sample size. The formula is stated in Table 1 below as:

$$n = \frac{N}{1 + N(e)^2}$$

Where:
n = sample size
N = finite population
e = level of significance
1 = unity
n = sample
N = finite women population = 400060
e = 0.05
1 = unity
Therefore:

$$n = \frac{400060}{1 + 400060(0.05)^2}$$

$$n = \frac{400060}{1 + 400060(0.0025)}$$

$$n = \frac{400060}{1 + 1000.15}$$

$$n = \frac{400060}{1001.15}$$

n = 399.60
n = 400

Therefore, the sample size for the study is 400. In addition, 6 members from each community will participate in the Focus Group Discussion. This brought the total sample size for the study to 424.

Probability sampling and non-probability sampling was employed to minimize potential sample bias.

Sampling Technique

The multi stage sampling technique was used in this study because of the complex nature of the population. Multi stage sampling technique allows a researcher to select samples in stages in order to give

every element in the population an equal chance of being selected.

Multi-stage sampling technique was adopted in selecting respondent from Ogoni land. Four (4) core oil spilled areas, namely: Khana, Tai, Gokhana and Eleme in the Rivers State were selected. At the second stage, four (4) communities from each of the four selected local government (oil spilled areas) was purposively selected, giving a total of sixteen (16) communities.

The researchers made use of both primary and secondary data. Primary data was generated through oral interview and questionnaire process. Field observations and Focus Groups Discussion (FGD) was also employed to get useful information from members of host communities, while secondary information was obtained from published reports on oil exploration and agricultural production in Ogoni land.

Data analysis

Table 2: Marital Status of Socio-economics of Respondents

		Sum	Mean	SD	*Fcal*	*Ftab*	*R-P-Value*	R2	*Tcal*	*Ttab*	*T-P-value*	Decisio
Marital Status	Eleme	94	23.5	7.26	6.17	0.243	0.032	0.8606	2.485	-0.6507	0.043	*b Rejec
	Gokana	113	28.25	12.97	29.04	0.116	0.03	0.9667	5.388	-1.959	0.044	*b Rejec
	Khana	143	35.75	22.05	2.87	0.339	0.051	0.7419	1.695	-0.9508	0.033	*b Rej Ho
	Tai	60	15	7.33	216.75	0.043	0.043	0.9954	14.72	-6.6815	0.054	*b Rej Ho

*b-Significant difference at P<0.05, *t-Significant difference at P<0.05, *f-Significant different at P<0.05 using both F and *t tests, t test* and *F test* alone respectively.

Results and Discussions

Table 4

	Eleme	Gokana	Khana	Tai	Decision
Land Quality	4.57	4.82	4.32	4.48	Accept
Land Ownership	3.36	4.33	4.22	4.13	Accept
Land Site	4.4	4.29	4.81	4.21	Accept

Startup Capital	4.34	4.69	4.32	4.43	Accept
Equipment	3.14	4.17	4.12	4.16	Accept
Labour	3.38	4.07	3.53	3.86	Accept
Operating Costs	2.98	3.05	3.67	4.18	Accept
Potential Returns	4.25	3.94	4.3	4.35	Accept
Household size	3.02	3.26	3.43	3.55	Accept
Level of Education	4.51	4.72	4.22	4.37	Accept
Extension contact	2.39	2.48	2.86	3.12	Accept

Cut off mark: Reject if ≤3.00, Accept if ≥3.00

What Factors influencing Women participation in farming operation in the remediated areas are represented in Table 4. The results indicate that all the factors listed affect their participation in farming operation in the remediated area. However, Packing, Shipping, Regulations and Insurance.Land Ownership system did not affect farmers in Eleme and Gokhana.

Table 5. Mean Scores of Perception in Clean up and Remediation Activities of Farmers in the LGA

Remediation Activities	Eleme	Gokana	Khana	Tai	Decision
Land adequately remediated	1.44	1.45	1.46	1.35	Reject
Remediated site are safe for cultivation of consumable	1.55	1.37	1.30	1.26	Reject
Remediated land are adequately fertile	1.00	1.00	1.00	1.00	Reject
Farm produce from the remediated land are susceptible to spoilage in storage	1.19	1.36	1.42	1.06	Reject
Remediated lands are good safe to raise consumable crops	1.00	1.00	1.00	1.00	Reject
No potential pollution expected	1.00	1.00	1.00	1.00	Reject
Provide more adequate arable land	1.45	1.59	1.65	2.01	Accept
Water and land are safe from pollution	1.24	1.21	1.48	1.06	Reject
Remediation activities enough to bring back relocated farmers	1.44	1.45	1.46	1.35	Reject
Adequate enough and suitable for cultivation	1.00	1.00	1.00	1.00	Reject
Reduced contamination mass mobility, toxicity on land and water	1.63	2.12	2.22	2.13	Reject/Accept
Crops grown on land are fit for human consumption	1.19	1.37	1.43	1.06	Reject

Cut off mark: Reject if ≤2.00, Accept if ≥2.00

Perceptions of SPDC clean-up and remediation activities are presented in Table 5.

Soil is the most important component of the farming ecosystem and environmental sustainability largely depends on proper soil maintenance and management. Sustainable use of soil on which agriculture depends is absolutely necessary for an optimal agricultural productivity. Soil pollution by crude oil has posed a great menace to agricultural productivity and thus creates poverty and hunger among the populace. It was observed from this experiment that oil

in agricultural soil affects agricultural productivity. Oil pollution in agricultural soil in whatever form is toxic to both human, plant and soil microenvironments. It has been observed by several researchers (Adenipekun & Kassim, 2006) that crude oil affects agricultural soil and this in turn affect the physiological, ecological and anatomical development of plants grown on such soils and this in consonance with the outcome of the present studies.

Table 5 indicates that remediated areas were not adequate and suitable for cultivation,. Rejection of opinion of remediated land as being adequately fertile implies that Oil spill had negative effects on land productivity. The incidence of oil spill impacted negatively on land productivity because yield will reduce due to the poor fertility of the soil and growth performance of crops. Thus with dwindling yield and constant land area, land productivity is bound to fall. These are very insignificant changes given the dearth of fertile arable land in the region; itself a consequence of environmental degradation.

Summary and Conclusion

The results shows that crude oil spillage posed health hazard and environmental risk, reduce arable farm land, reduced farmer's income due to low crop yields, exposed the area/ecosystem to pollution, destroyed vegetation and aquatic lives,, cumulative impact of oil spillage led to lower standard of living due to low agricultural yields, causing farmers to abandon or relocate their farm lands. These effects were severe causing germination failure, reducing farmer's income due to low crop yields, making farmers to spend too much on food, reduction of children enrolment in schools and less spending on education of children and more spending on cultivation. This means that low crop yield due to oil spill had an effect on farmer's income. This result further accentuated the negative impact of oil spill on crop production as farm income is depressed due to the twin effects of land degradation and poor plant growth.

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Table 3: Correlations of Socio-Economic Characteristics, Age-religion

		Age Eleme	Gokana	Khana	Tai	Marital Status Eleme	Gokana	Khana	Tai	Education Qualification Eleme	Gokana	Khana	Tai	Religion Eleme	Gokana	Khana	Tai
Age-Eleme	Pearson Correlation	1	.988	.995	.987	.993	.302	.902	-.617	.971	-.636	.979	.990	.663	.668	.649	.642
	Sig. (2-tailed)		.099	.064	.103	.074	.805	.284	.577	.153	.561	.131	.089	.539	.534	.550	.556
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Gokana	Pearson Correlation	.988	1	.967	.950	.963	.150	.958	-.732	.996	-.748	.999(*)	1.000(*)	.771	.776	.759	.753
	Sig. (2-tailed)	.099		.163	.202	.174	.904	.185	.478	.054	.462	.032	.011	.439	.435	.451	.457
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Khana	Pearson Correlation	.995	.967	1	.998(*)	1.000(*)	.396	.854	-.535	.942	-.556	.953	.971	.585	.590	.570	.562
	Sig. (2-tailed)	.064	.163		.039	.011	.741	.348	.641	.217	.625	.195	.153	.602	.598	.614	.620
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Tai	Pearson Correlation	.987	.950	.998(*)	1	.999(*)	.452	.821	-.482	.920	-.503	.933	.955	.534	.539	.518	.510
	Sig. (2-tailed)	.103	.202	.039		.029	.702	.387	.680	.256	.664	.234	.192	.642	.637	.653	.659
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Marital Stat Eleme	Pearson Correlation	.993	.963	1.000(	.999(*)	1	.411	.845	-.521	.937	-.542	.948	.967	.571	.577	.556	.548

				*)													
	Sig. (2-tailed)	.074	.174	.011	.029		.730	.359	.651	.228	.636	.206	.163	.613	.609	.625	.631
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Gokana	Pearson Correlation	.302	.150	.396	.452	.411	1	-.139	.564	.066	.543	.100	.167	-.513	-.507	-.529	-.537
	Sig. (2-tailed)	.805	.904	.741	.702	.730		.911	.618	.958	.634	.936	.893	.657	.661	.645	.639
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Khana	Pearson Correlation	.902	.958	.854	.821	.845	-.139	1	-.896	.979	-.907	.971	.953	.921	.924	.914	.910
	Sig. (2-tailed)	.284	.185	.348	.387	.359	.911		.293	.131	.277	.153	.195	.254	.250	.266	.272
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Tai	Pearson Correlation	-.617	-.732	-.535	-.482	-.521	.564	-.896	1	-.787	1.000(*)	-.765	-.720	-.998(*)	-.998(*)	-.999(*)	-.999(*)
	Sig. (2-tailed)	.577	.478	.641	.680	.651	.618	.293		.424	.016	.446	.488	.038	.043	.027	.021
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Education Eleme	Pearson Correlation	.971	.996	.942	.920	.937	.066	.979	-.787	1	-.802	.999(*)	.995	.822	.826	.812	.806
	Sig. (2-tailed)	.153	.054	.217	.256	.228	.958	.131	.424		.408	.022	.065	.385	.381	.397	.403
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Gokana	Pearson Correlation	-.636	-.748	-.556	-.503	-.542	.543	-.907	1.000(*)	-.802	1	-.781	-.737	-.999(*)	-.999(*)	-1.000(*)	-1.000(**)
	Sig. (2-tailed)	.561	.462	.625	.664	.636	.634	.277	.016	.408		.430	.472	.023	.027	.011	.005
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Khana	Pearson Correlation	.979	.999(*)	.953	.933	.948	.100	.971	-.765	.999(*)	-.781	1	.998(*)	.802	.806	.791	.785
	Sig. (2-tailed)	.131	.032	.195	.234	.206	.936	.153	.446	.022	.430		.043	.407	.403	.419	.425
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Tai	Pearson Correlation	.990	1.000(*)	.971	.955	.967	.167	.953	-.720	.995	-.737	.998(*)	1	.761	.765	.748	.742
	Sig. (2-tailed)	.089	.011	.153	.192	.163	.893	.195	.488	.065	.472	.043		.450	.445	.462	.468
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Religion Eleme	Pearson Correlation	.663	.771	.585	.534	.571	-.513	.921	-.998(*)	.822	-.999(*)	.802	.761	1	1.000(**)	1.000(*)	1.000(*)
	Sig. (2-tailed)	.539	.439	.602	.642	.613	.657	.254	.038	.385	.023	.407	.450		.004	.012	.018
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Gokana	Pearson Correlation	.668	.776	.590	.539	.577	-.507	.924	-.998(*)	.826	-.999(*)	.806	.765	1.000(**)	1	1.000(*)	.999(*)
	Sig. (2-tailed)	.534	.435	.598	.637	.609	.661	.250	.043	.381	.027	.403	.445	.004		.016	.022
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Khana	Pearson Correlation	.649	.759	.570	.518	.556	-.529	.914	-.999(*)	.812	-1.000(*)	.791	.748	1.000(*)	1.000(*)	1	1.000(**)

	Sig. (2-tailed)	.550	.451	.614	.653	.625	.645	.266	.027	.397	.011	.419	.462	.012	.016		.006
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Tai	Pearson Correlation	.642	.753	.562	.510	.548	-.537	.910	-.999(*)	.806	-1.000(**)	.785	.742	1.000(*)	.999(*)	1.000(**)	1
	Sig. (2-tailed)	.556	.457	.620	.659	.631	.639	.272	.021	.403	.005	.425	.468	.018	.022	.006	
	N	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).