Perception of Environmental Impact Assessment System and Social Impacts of Developmental Activities: A Case Study of Geregu Power Plant Phase II, Ajaokuta, Kogi State, Nigeria

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Abstract: **The study appraised environmental impact assessment (EIA) system perception and social impacts of developmental activities, using Geregu Power Plant Phase II, Ajaokuta, Kogi State, Nigeria as a case study. The objectives were to appraise the perception of Environmental Impact Assessment and the socio-economic impacts of the gas power plant operation on the project`s host communities. Sample population for interview was purposively selected (4 settlements) within the project area of influence and primary data was collected using questionnaire field survey. Simple random sampling was adopted for the administration of 373 questionnaires to elicit information on socio-economic implications and perception of project`s host communities on the EIA system. The result showed that on the years of experience of involvement in EIA system 17.33% of the respondent had 1-5 years, 16% had 5-10 years, 0.67% had between 11-20 years and 0.33% had greater than 20 years. On the number of EIA project's executed 19% have no experience of executed projects, 20.7% reported less than 5 projects executed, and 1% experienced 16-30 number of EIA projects. Also, on the kind of EIA activity involvement 69.66% have not been involved in any key EIA activities, 27% have been involved as consultants, 1% has been involved at the institutional level and 0.67% at the various intermediaries' level. Concerning the activities of EIA participation in the last three years, 16.67% have participated in EIA review meetings, 9.66% in the reviewing terms of reference and scoping, 1.33% participated in grievance redress, while 65.01% did not respond. Likewise on the key participants in EIA process, 6.67% have knowledge of project proponent, 30.33% have knowledge of project's host community 10.33% responded on stake holder, and 3.67% responded on regulations. On the purpose and objective of the EIA system, 5.3% to 20.3% of the respondents have knowledge of purpose and objective of EIA. On the socio-economic impact on project`s host communities, the likert scale mean value of 1.93 was less than 2.05 meaning that the socio economic issues are on the high side. The socio-economic issues noticeable includes provision of resettlement for displaced persons, increase in volume and type of wastes generation, increase in community unrest and increasing pressure on existing infrastructures. It is therefore recommended that there should be EIA sensitization/awareness programme and the Memorandum of Understanding (MOU) signed for Corporate Social Responsibility (CSR) should be faithfully implemented. Conclusively, there is a need for proposed developmental activities to be conducted in an integrated manner to ensure that they are environmentally, socially sound and sustainable.**

I. INTRODUCTION

Over the last four decades there has been a remarkable growth of interest in environmental sustainability issues and better management of development in harmony with environment (Glasson *et.al* 2012). Associated with this growth of interest has been the introduction a new standard of practice worldwide that uses legislation to examine development activities and the impact they are likely to have on environment and social economics. Accordingly, Environmental Impact Assessment (EIA) and similar methodologies are now required by most multilateral and bilateral development agencies and in several developing countries. The Nigerian EIA Act No. 86 of 1992 makes EIA mandatory for development activities that is likely to have adverse impacts on the environment prior to implementation, since the system has a particular way of examining environmental and social effects of proposed development projects.

The EIA system provides the project proponent with an opportunity to assess the potential social and environmental impact of the proposed development across all sectors of the economy as well as provide the identification of mitigation measures to be put in place to ensure that environmental and social impacts are avoided, minimized or mitigated (NCEA 2014). The purpose of EIA System is to evaluate the environmental and related social implications (negative and positive) of carrying out developmental project of any size such as Geregu Phase II Power Plant before irrevocable decisions are made (NCEA 2014).

Such an evaluation can then be set alongside economic objective of the proposal to make balanced decision. Likewise, to improve decision making process it is imperative to seek public opinion and external knowledge to ensure, maximum degree of fairness and balance in the final decision.

Key to this is the public participation element which forms an integral part of the EIA process. About 4,000 proposed development activities across all sectors of the economy including power have been subjected to EIA process in Nigeria as at 2017 (FMENV EAD National EIA Registry 2019).

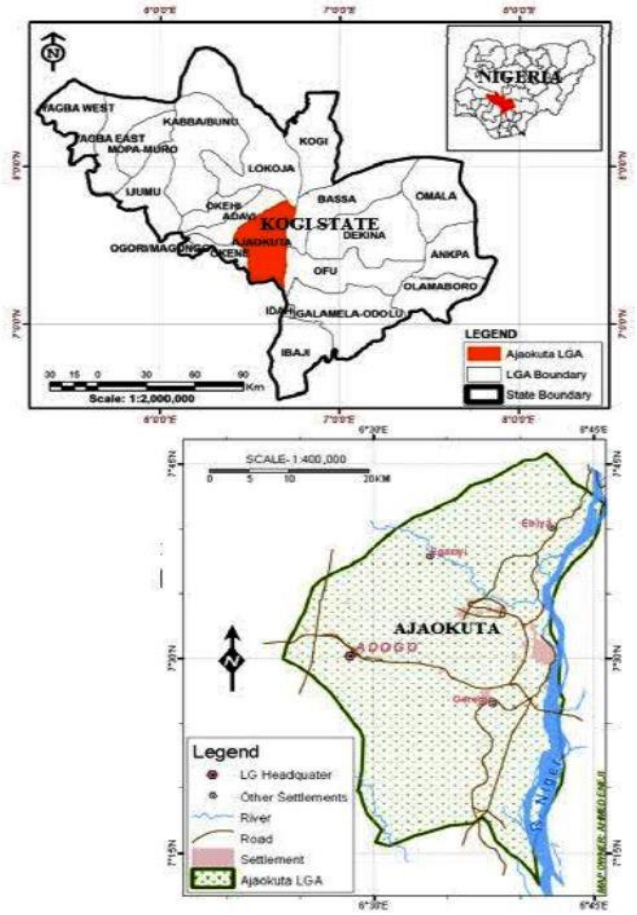
Presently, Nigeria proposed development activities across all sectors of the economy including power sector are being subjected to the provision of EIA Act. Power sector relies solely on renewable energy and natural gas fired turbine for power generation with its attendant local and global effects. The Nigerian power sector is entering, a new phase, as investors seek to expand capacity to cope with the country critical need which now is progressively inadequate (Energy Policy, 2016).The perception of EIA process is one of the key elements for assessing impact significance of the process of Environmental Impact assessment system. A meaningful integration of public input into EIA requires a good understanding, credible analysis and public perception. This becomes even more critical in conducting EIA as EIA requires meaningful analysis, Synthesis and Interpretation of information down from numerous discipline and subjects. The resultant product must be integrated into social values, public expectation and perception of which all EIA stake holders in the EIA system must always be open minded about new ideas and approaches. Adequate public input with high level of perception of EIA System is important for identification of issues relevant to the projects and for subsequent evaluation of their significance in order to gather support for project and thus increase the comfort levels of decision makers.

High level of perception enshrined public participation which requires building partnership among the public, the project proponent, government, project's host community as well as stake holders. Mutual recognition and acceptance of other perceptive interest and aspirations among other key element must be present for their partnership to work. Equally important is that as Environmental impact assessment is designed to identify, predict , interpret and communicate information about impact of an action on human health and wellbeing including the wellbeing of the ecosystem upon which human survival depends. The social and environmental consideration should be explicitly addressed and incorporated into the development decision making process, Thus there is a need to anticipate, avoid, minimize or effect the adverse significant of social and other relevant effect of development proposal'.

Against this background the paper examines Environmental Impact assessment system's perception and social impacts of Geregu Phase II Power Plant Project, Ajaokuta, Nigeria that is, what are the social economic implications of Geregu Phase II Power Plant on the Project's Host Communities as well as their level of perception on the EIA System.

II. PROJECT LOCATION

The 434 Gas Turbine Geregu Power Plant Phase 2 Project is an open cycle Gas Turbine Power Plant located between latitudes 7^0 28^0 00^0 North and $7^028^020^0$ North and between longitudes 60 39^0 20^0 East and 6^0 39^0 45^0 East (NDPHC EAR, 2019). The area of influence of the project consists of the area within a 5km radius of power plant and the area North of this 5km radius within the territory of the Ajaokuta steel company. Limited Boundaries of the project's area of influence are described in the west by longitude 6^0 36^1 East, in the east by River Niger in the south by Latitude 7^0 25^0 North and in the north by latitude 7^0 39^0 North. The location of Geregu Thermal power plant (Phase II) Project in Ajaokuta local Government Area of Kogi State lies in the Guinea Savanna Zone, Kogi State, Nigeria (Table 1) and occupies a total land area of 29, 833 km^2 (11.578 89m). Four Communities located around the project are Ofunene (500m) from projects site, Wimpey Camp (1.5km) from projects site, Ajaokuta village (2km) from project site, Geregu village 9km from project site. The site for Phase II Geregu power plant is located within the fenced area of an existing 412 MW Geregu Phase I Gas Turbine Power Plant. The land take for the project is 24,000m^2. It is operated by Niger Delta Power Holding for Federal Government of Nigeria. A map of the study area is necessary.



Source: Fmenv (Federal ministry of Environment Abuja Nigeria) (2019). Approved Environmental Audit Report of Geregu Power Plant phase II in Ajaokuta Kogi state Nigeria (by Eneche 2018)

III. METHODOLOGY

3.1. Data Collection

A reconnaissance survey was conducted for the study as a prelude to measurement of indicator that constitutes the social economic impacts and the perception of host communities on the EIA process. The research was designed to collect both

qualitative and quantitative data from primary sources. The primary data was collected through questionnaire field survey. The sample population for questionnaire was purposively selected being project's host communities majorly within project area of influence. The population of the purposively selected project's host communities of Ajaokuta village, Geregu Village, Ofunene and Whimpey Camp considered and projected at 3.5% growth rate. The sample size was determined by standard statistic formula by Yemmane (1973) and was proportionally assigned to each of project's host communities.

The simple random sampling was adopted for the administration of 373 questionnaires to elicit information as part of primary data source from project's host communities of Ajaokuta Village 166, Ofunene Village 44, Whimpey Camp 34, while Geregu Village 129 vide proportional allocation (Table 1). The proportional allocation of sample size was majorly informed by the projected population of the project host communities. The questionnaire for the project's host community was in two parts as follows. Part 1 of the questionnaire dealt with personal information about respondents, Part 1B is on the knowledge (Perception) of the respondents in EIA system and the Part 2 is on socio-economic issues. The analysis techniques of the data collected is by percentage of the level of perception on the EIA system were presented in table using frequency distribution, bar chart and Likert scale where applicable for socio-economic implication of the Geregu phase II power plant.

Table 1. Sample size of Project's Host Communities

Settlement	Distance from Project Site	Latitude ^{0}N	Longitude ^{0}E	Estimated Population 2017	Estimated Population 2020	Sample Size	% of Questionnaire Sample
Ajaokuta Village	2Km	7.46157^{0}N	6.69521^{0}E	4500	4,972	166	44.5
Geregu Village	9km	7.5666^{0}N	6.70000^{0}E	3500	3,869	129	34.6
Ofunene Camp	0.5km	7.4661^{0}N	6.66623^{0}E	1200	1,326	44	11.8
Wimpey Camp	1.5km	7.48668^{0}N	6.66739^{0}E	900	995	34	9.1
Total				10,100	11,160	373	100

Source of Population Data: NPHC, Geregu Power Plant Phase II, Environmental Audit Report 2019 (Annual Growth Rate = 3.5%)

IV. FINDINGS AND DISCUSSION

4.1. Interview

Face to face interviews were conducted with key community leaders, the youth opinion leaders in the few selected settlement as well as leaders of the project host communities. The interview was conducted to understand their actual involvement, understanding and knowledge of the Environmental Impact Assessment system as well as, the impact of the Geregu Phase II Power project on the human health and wellbeing. The main finding from the interview, was that the primary focus of Environmental impact assessment as it concerns them, was what the community stand to benefit from the project as well as non-compliant of the company with the terms of agreement on the signed MOU.

4.2. Observation

Field observations were taken to independently access the perception of EIA system and social impact of the Geregu Power Plant within the project area of influence. Field observation of striking features were made at the various project affected community, of which evidence of social impacts abounds as the firsthand knowledge. Evidence of social impacts such as Resettlement of displaced host communities deprived of farm land, resident community liaison official among others were observed

4.3. Focus Group Discussion

Focus group discussion (FGDs) were conducted to supplement the finding from quantitative result. Consultations were held at various levels with stake holders including representatives of host communities. Discussions were carried out on the issue of the Perception of the Environmental Impact Assessment as well as social implications of the Geregu Power Plant Phase II. Though the discussion did not reveal a detailed information and insight on Perception of EIA System and Social Implications of Geregu Power Plant Phase II, but respondent thoughtfully answered questions in their own words and added meanings to their answers. Their responses was primarily on needs of various communities rather than 0n the objectives of study.

4.4. Demographic and socio-economic characteristics of the respondents

The demographic and social economic characteristics of the respondent (Project Host Community) was addressed to give insight, in terms of helping to qualify certain responses for varied opinion on the Perception of Environment Impact Assessment system and Social Impact of developmental activities by project host communities

The result presented here (Table 2) include demographic and socio-economic characteristics of the respondents

4.4.1. Age distribution of respondents

Table 2 on demographic and socio-economic characteristics of respondents (project host's communities) the age structure of respondent shows that 33.51% of the respondent fall within the age range of 20-29(years), 20.38% falls within the age range of 30-39(years), while 13.67% fall within the age range of 40-49(years), 6.70% falls below age of 20years and only 4.02% of the respondent fall above 50 years since all the sampled respondent clearly shows that the area is characterised with active population. Thus, the bulk population falling in active age in the project host's community of Geregu power plant is important as this will contribute immensely to the sustenance of economic development of the project area.

Table 2. Demographic Characteristics of Respondents Project`s Host Communities

	Marital Status					**Occupation Employment Status**							
	Married	**Single**	**Divorced**	**Widow**	**No response**	**Civil Service**	**Farming**	**Trading**	**Private org.**	**Others**	**Yes**	**No**	**Others**
Freq	235	133	1	2	2	34	135	47	29	129	50	68	256
%	63.00	35.67	0.33	0.67	0.33	9.11	36.19	12.67	800	34.33	16.67	22.67	6066

	Age						**Gender**			**Education Status**				
	<20	**20-29**	**30-39**	**40-49**	**≥50**	**No response**	**Male**	**Female**	**No response**	**Primary**	**Secondary**	**Tertiary**	**No formal Educ**	**No response**
Freq	25	125	76	50	15	82	204	154	15	135	61	32	129	16
%	6.70	33.51	20.38	13.40	4.02	21.99	54.69	41.29	4.02	36.19	16.35	8.58	34.58	4.30

	Type of Employment					**Annual Income (N)**					
	Priv. org	**Self-employment**	**NGO**	**Government**	**Others**	**<18,000**	**18,00-54,999**	**55,000-108,999**	**109,000-145,999**	**>146,000**	**others**
Fre`	26	59	26	30	233	41	64	22	3	5	239
%	7.00	15.67	7.00	8.00	62.33	11.00	17.00	6.00	0.67	1.33	63.33

Source: Field Survey, 2020

4.4.2. Educational Level of Respondents

Table 2 shows that only 8.58% of the sampled population had tertiary education, 16.35% of the respondents have secondary school, while no formal education is 34.58 %. Findings revealed that majority of respondents obtained western education ranging from primary school certificate to tertiary education certificate. This finding combated with the report of World Bank (1991) which states that increased investment in education will also affect productivity and growth through several channels. Education also helps to reduce subjectivity uncertainty, and unnecessary anxiety.

4.4.3. Marital and Sex composition of Respondents

The marital status of respondents for the project's host communities on Table 2 shows that 63% are married and 35.67% are single. Table 2 shows that 57.60% are male while 41.30% are females for the project host communities.

4.4.4. Occupational Status of Respondents

The occupational background of the respondents in the study area show that farming remains the major occupation that generates income and employment opportunities, especially in the project's host communities on Table 2 The involvement of project host community members in various entrepreneurial activities clearly shows that they are resourceful which perhaps given opportunities to participate in other sectors of the economy will no doubt enhance their occupational status.

4.4.5. Income Level of Respondents

As revealed on Table 2 on income level of respondents indicates 36.19%, falls within less than 146,000 per annum, 36% falls within 55,000-108,999, while 17% fall within 18,000 – 54,999 per annum. The income distribution as shown above confirmed a substantial proportion of respondents earned below 20,000, thus there is a need to encourage activities in this area that will enhance their income generating activities, thus influencing their standard of living.

4.5 Perception of EIA system and Socio-Economic impacts of the power plant

4.5.1. Perception of the Project`s Host Communities on EIA System

The data presented in table 3 reveals that on the years of experience of involvement in EIA system that 17.33% of the respondent had 1-5 years , 16% had 5-10 years and 0.67% had between 11-20 years and 0.33% had greater than 20 years. On the number of EIA project's executed 65.6% had no experience, 19% have no experience of executed projects, 20.7% reported less than 5 projects executed, 1% of 16-30 number of EIA projects. Also on the kind of EIA activity

involvement,69.66% have not been involved in any key EIA activities, 27%have been involved as consultants, 1% has been involved in the institutional level and 0.67% at the various intermediaries level. Concerning the activities of EIA participation in the last three years, 16.67% have participated in EIA review meetings, 9.66% in the reviewing terms of reference and scoping, 1.33% participated in grievance redress, while 65.01% did not respond. Likewise on the key participants in EIA process, 6.67% have knowledge of project proponent, 30.33 have knowledge of project's host community 10.33% responded on stake holder, 3.67% responded on regulations. On the purpose and objective of the EIA system 5.3% to 20.3% of the respondent have knowledge of purpose and objective of EIA. Thus the level of EIA System Perception of the project host community is low is the level of perception of the projects host. From the demographic data (Table 2) in which case that farming is the main occupation of the respondent, a substantial portion of the respondent earned below N20,000 While 8.58% of the respondent sampled population had tertiary education . These findings may be partly responsible for low perception on EIA System by respondents.

4.5.2. Socio Economic Impact of Project on Host Communities

Table 4 present social economic activities of project's host communities and it can be seen that the criteria are divided into 3 Likert scale A, B and C in order of Yes(A), No (B) and Not aware (C) grading and by the Likert scale. Usin the Likert scale and mean formula to arrive at our decision. Using 3 scales we have 1+2+3=6. Mid- point =6/3=2. Confidence level interval of ±0.05 was used to determine the lower and upper limit. Upper limit was gotten by adding 0.05 and 2 to give 2.05 while lower limit was gotten by subtracting 0.05 from 2 to give 1.95. Mean value greater than 2.05 is assigned to low; mean value less than 1.95 is assigned to high while mean value ranging from 1.95-2.05 is assigned to moderate. From our average mean value of 1.93 gotten which is less than 2.05 it can be deduced that the socio-economic issues are on the high side.

The socio-economic issues noticeable to the project host communities from the likert scale mean value of less than 1,95 is assigned to high socio-economic impacts in which data table 4 reveals the social impacts to include . the provision of resettlement arrangement for the displaced person, increase in road traffic volume and risks of accident/injury as a result of the movement of goods and equipment, increase in community unrest as a result of Geregu power plant activity, pressure on existing infrastructure, continuous engagement between community and Geregu operators, increase in cost of living/inflation, increase rents /scarcity of rentable apartment , increase in social vices change in type and volume of waste generation among others. Likewise, areas of social concern not known to be of concern, as presented in table 4 with likert scale mean value of 2.05 and above include the following: unnoticeable visible warning signs placed on the roads for vehicles, pedestrian friendly road constructed, proper consultation with communities prior to periods of expected peaks noise levels, maintenance of existing infrastructure among others. Despite the noticeable and unnoticeable social concerns as exposed by the project's host communities. There are obvious positive and negative effects which include employment, increase in cost of living, and increase in local population, skill development and enlightenment program in communities, deprivation of farm land as well as increase in community's unrest.

It was also observed from the field, that implementation of mitigation measure for socio economic impacts and awareness within projects host community were poor. According to umar (2010) mitigation efforts can be greatly enhanced if companies practise "prior informed consent" refers to the right of the local community to be informed about power plant operations and EIA systems on full and timely bases.

Table 3: Perception of the Host's communities, Geregu Power Plant and the EIA System

Experience (Yr) involved in EIA System					Knowledge on No. of EIA project executed							Level of involvement in EIA system				
	1-5	5-10	11-20	>20	Lack Experience	Zero Project	<5 Project	5-15 project	16-30 Project	>30 Project	No knowledge	Consul-tation	Institution	Regular	Various intermediaries	Lack of involvement
Freq	65	59	31	1	246	71	77	12	1	12	201	101	4	6	7	260
%	17.33	16	0.67	0.33	65.67	19	20.7	3.33	0.33	3.33	53.31	27	1	1.67	0.67	69.66

	Project familiar within the power sector						Participation in any EIA activity in the last 3years (seminar, Course, meetings/Conf.)					Activities of EIA participate in the last 3 years review			
	Hydro Power	Gas power Plant	Solar	Wind	Gas Pipeline	Transmission line	Others (not familiar)	Yes	No	No idea	IEE	Review meetings	Review of TOR and Scope	Grievance Redress	Others
Freq	7	21	1	0	21	32	292	54	135	184	31	62	36	5	240
%	2	5.67	0.33	0	5.67	8.57	78.1	14.67	36	49.33	8.33	16.67	9.66	1.33	65.01

Sector of employment of EIA System							Key participants in EIA process							Purpose of EIA System				
	EnvtM	Consultant	CSO/NGO	Proponent	Power ministry	Research	Others	Project proponent	Project host community	Stake holder	Regulators	Various intermediar-ies	Others	Aid of development	Aid to decision making	Vehicle for consultation	Instrument for development	Others
Freq	16	47	11	26	11	0	281	24	113	38	14	5	180	28	20	20	75	231
%	4.33	12.67	3	7	3	0	70	6.67	30.33	10.3	3.67	1.33	47.67	7.67	5.3	5.3	20.3	61.33

Source: Field Survey, 2020

Note: EnvtM – Environment Ministries

Table 4: Socio-Economic Impacts of Geregu Power Plants on Project's Host Communities (sample size n=373)

Impacts	Deprived of Farmland	Resettlement of displaced person	Increase in road traffic risk accident	Warning sign of roads	Pedestrian roads construction	Speed breakers installed	Off-peak periods vehicles	Community awareness	Increase in noise nuisance
Yes	119	135	95	34	14	10	6	192	179
No	40	6	37	111	105	123	141	94	90
Not aware	2	16	52	40	54	41	141	2	19
No response	212	216	189	188	203	199	85	85	85
Decision mean (x)	1.46	1.01	1.17	1.21	1.02	1.01	1.47	2.23	2.45

	Impacts	Prohibition of night driving	Contractor activities (10am-4pm)	Increase on community unrest	Company & needs of host community	Community relation officer	Maintenance of roads	Pressure on existing infrastructures	Community existing infrastructures	Functional Infrastructures
	Yes	22	77	216	113	187	56	207	144	60
	No	100	7	62	131	81	128	21	117	200
	Not aware	166	204	10	15	20	104	60	27	28
	No response	85	85	85	114	85	85	85	85	85
	Decision mean (x)	1.44	1.50	2.04	2.25	2.21	1.76	1.79	2.31	2.03

Impacts	Increase in population	Proper consultation	MOU signed with community agreement	Housing plan for contract staff	Employment for indigenes male/female	Increasing Cost of living	skills development and enhancement	Noticeable environmental degradation	Increase on rent/scarcity of rentable apartment
Yes	154	5	160	146	12	242	189	122	189
No	41	198	97	62	131	36	67	157	67
Not aware	93	85	11	80	145	10	32	9	32
No response	85	85	105	85	85	85	85	85	85
Decision mean (x)	1.74	1.65	2.28	2.14	1.48	2.69	2.04	2.30	2.03

Impacts	Electricity load sharing	Enforcement of PPE	Distance in belief between stakeholders	Change in type and volume of waste generation	Water contamination in community	Increase in heat pollution	Implementation of enforcement mitigation measure	Implementation of social economic mitigation measures
Yes	39	117	145	239	171	194	194	151
No	181	65	32	23	56	92	92	132
Not aware	68	106	11	26	61	2	2	5
No response	85	85	185	85	85	85	85	85
Decision mean (x)	1.82	1.78	1.32	2.01	2.03	2.56	2.56	2.41

Source: Field Survey, 2020 Average Value – 1.93

V. RECOMMENDATIONS

Based on findings in the study, the following are the recommendations;

i. Future enhancement of EIA System by government regulatory body could include adopting better strategies to manage the issue of developmental Impacts both social and Environmental through strengthening of EIA process/EIA System.
ii. Geregu Phase II Power Plant Projects Host Communities Perception of EIA System is low. Thus, it is necessary for Government and other relevant authorities to promote awareness and create educative programme on Environmental Impact Assessment System.
iii. There is no doubt the low level of knowledge on environmental impact assessment system awareness could affect individual behavior towards his environment. Poor environmental habit and behavior in Nigeria citizenry calls for Government attention. Therefore, Government should come up with a strategy on environmental campaign to raise public awareness through existing media in Nigeria.
iv. It was found that increase in community unrest, increase in cost of living, inadequate consultation, water contamination, change in type and volume of waste generation; among others are the most recognized Socio-Economic impact, of Geregu power plant Phase II. The company should therefore abide by the agreement signed in the MOU to avoid the re-occurrence of community unrest and as well step up the implementation of the proffered mitigation measures such as rehabilitation of facilities for drinking water and regular evaluation of waste among others.

VI. CONCLUSION

There are noticeable Socio-Economic impacts of Geregu power plants Phase II within its area of influence, especially on the project's host communities. Data from the survey showed that several Socio Economic impacts such as deprivation of farmlands, resettlement of displaced person, increase in volume and type of work generated, pressure on existing infrastructure, and employment of indigenes among others. The socio economic impact which have positive and negative component has had significantly impact the project area of influence, especially the project's host communities, as the Socio Economic impacts mitigation measures were poorly done. Equally important is the low perception of project's host community on the Environmental Impact Assessment system suggesting the inadequate sensitization of project's host community on EIA system as well as little participation in the EIA System activities. There is need to minimize, avoid or enhance social impacts of development activities in order to ensure that they are all socially sound and sustainable.

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