THE ENVIRONMENTAL IMPACT OF THE ALAOJI-ONITSHA TRANSMISSION LINE PROJECT AND RESETTLEMENT ACTION PLAN

Abstract:
Resettlement Action Plan (RAP) is a pivotal part of managing resettlement-related activities, so as to avert dispute and agitation that might emanate in anticipation to disruption to means of livelihood by impacted persons. This study aimed to ascertain the environmental implications of Alaoji-Onitsha Transmission Line (TL) in the context of the Resettlement Action Plan (RAP) for the Project Affected Persons (PAPs). The study adopted standard methodology for physical environment and biodiversity assessment. The finding on the severity of the impact on the physical environment revealed that air quality, soil and geology have minor residual impacts, noise level and surface and groundwater have negligible residual impact while. Although the findings suggest that the project does not have dire consequence on the environment, the resettlement should be carried out in a way that will guarantee continuous survival of PAPs and utmost care be taken to ensure sustainable development.

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Keywords: environmental implications, resettlement,air quality, soil, geology

1. Introduction

Power expansion projects are among the key developmental projects prioritized by the Federal Government of Nigeria (FGN). The FGN through the Transmission Company of Nigeria (TCN) intends to increase the carrying capacity of its network through upgrading / expansion of existing 330 kV SC line with a wheeling capacity of about 2,000 MW to 330 kV DC quad line with a wheeling capacity of about 8,000 MW as a means to enhance the quality and dependability of electricity supply, while striving to make certain the sector remains viable[1].

Involuntary resettlement is a major social aftermath of extensive developmental projects. Several reports have highlighted that if not handled properly, it can result to major socio-economic risk to the affected individuals [2,3]. According to World Bank [4], when forced resettlement is not carefully planned, the impacted individuals are at the peril of pauperization. Individuals are exposed to pauperization when their ways of financial gains and/or resources are forfeited; moving to a new settlement where their capacity may be limited and/or face strong rivalry for accessible resources, social connectivity and institutions impacted while their cultural mark-up and traditional dominance is reduced or lost [2,4].

As a means to tackle the resettlement consequences and extenuate the possibility of displacement-induced impoverishment,many international and non-governmental organizations have developed series of international policies, standards and guiding principles in relation to resettlement and compensation technical aspect [2,4,5). These policies and related standards have distinctively resulted into several compensation patterns,

entitlements, and resettlement action blueprint, in an effort to ensuring reestablishment and restoration of livelihoods. Nevertheless, various publications have claimed dissatisfaction with many of such resettlement programs in tackling impoverishment and obtaining certain level of sustainability of livelihood for the project-affected groups [2,6,7].

The Alaoji-Onitsha Transmission Line Project is a critical project to the development of Southeastern Nigeria. The project cuts across 12 Local Government Areas and 64 communities.The expansion project entails the withdrawal of the active service of the existing 330 kV SC line and subsequent construction of a double circuit quad conductor of 330 kV DC transmission line with a total length of 138 km, between the existing TCN substations at Alaoji, Abia State and the substation at Obosi, Anambra State.

Right of Way (ROW) acquisition is a crucial aspect of implementing developmental projects, in obtaining the land and/or properties and resettlement thereof of Project-affected Persons (PAPs) and their households. For many decades, there has been rising consciousness of the possible negative impacts of development-induced displacement and resettlement [8]. Compensation of any kind must equate to loss of livelihood, which for most rural dwellers, it is loss of farmland. Farmers and forest dwellers suffer the most from developmental projects, as the criteria for selecting individuals for compensation put them at disadvantage [9].

A reconnaissance survey conducted along the existing transmission lineconfirmed that displacement will take place along the transmission linebecause of encroachment on the ROW, and therefore resettlement plan has been developed to guide the project proponent in addressing the issues that may arise at implementation stage. This study aimed to ascertain the environmental implications of Alaoji-Onitsha Transmission Line Project and the apposite RAP for PAPs.

Methodology

2.1 Research Design

This study adopted case study research method. This method allows the opportunity to deeply investigate a certain program, event or phenomenon [10]. A case study research can be for a single event or series of events bounded by time and place. The case study here is the effectiveness of employing technology (special towers and accessories) to reduce resettlement cost and other social impacts of the reconstruction of 138 km Alaoji-Onitsha 330 kV single circuit transmission line to 330 kV double circuit quad conductors.

2.2 Study Area

The study area falls within the southeast region of Nigeria, between latitudes 04°17’ N and 07°06’ N and longitudes 05°23’ E and 09°28’ E, covering the 130km x 50m ROW of the existing Alaoji-Onitsha Transmission Line (TL). The ROW for the proposed power transmission line expansion project transverses the threesoutheastern states of Abia, Anambra and Imo, cutting across 64 communities in 12 Local Government Areas. The southeastern

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regionis the home of the Igbo ethnic stock, and has a population, 16,381,729, as per the census figures of 2006[11].

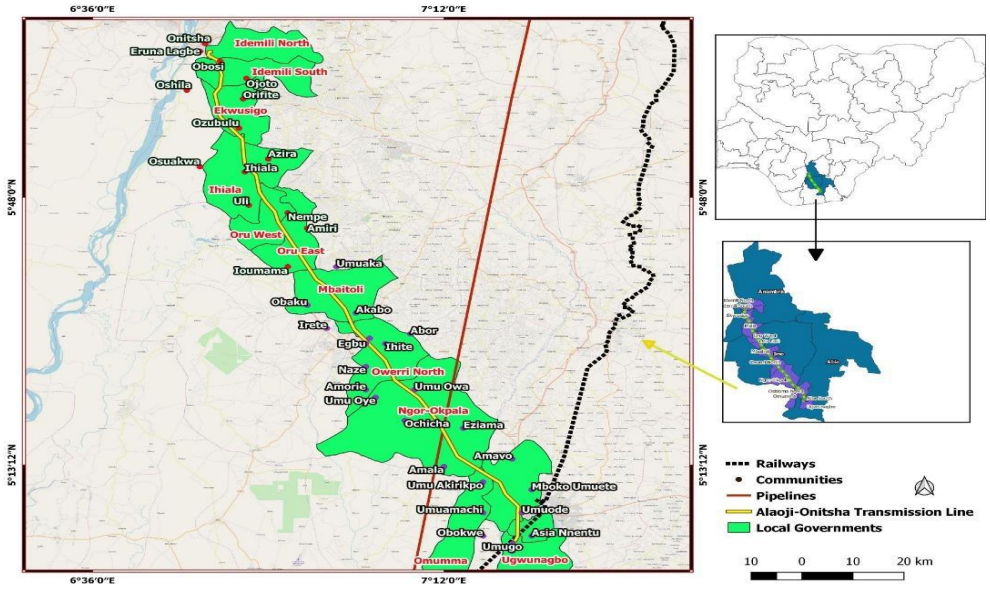

Figure 1: Map of the Transmission Line Route from Alaoji-Onitsha

2.3 Sample Size and Questionnaire Administration

Households within 50 m on both side of the Row were counted to represent the sample size and a total of 500 households were enumerated which cuts across sixty-four (64) communities. The "Household-based Questionnaire" were administered. The questionnaires were self-administered with the support of CSEntry App, electronically.

2.4 Data Collection Instruments

Questionnaire was adopted in extracting information from participants. The questionnaire was designed to gather information about demographic attributes, activities of RAP and other related information concerning the displacement and resettlement process among the affected people at the project location. The RAP-Household Basedwas administered to every home within 25m on either of the ROW of the TL. Focus group discussions were held at the community level on various activities surrounding the TL project and specifically on the RAP of the project.

"Area of influence" with 1km maximum (500 m from both sides of the ROW) from the centre of the transmission line was adopted. The physical environment (such as ambient air, ambient noise level, soil and geology, and surface and ground water) was examined through specific and standard instrument and compared against approved standards such as WHO.

2.5 Data Analysis

The data gathered through questionnaires were sorted, coded and analysed, using descriptive statistics. The study adopted Bill of Quantities (BOQs) in valuation for compensation. The method of valuation used, took into a consideration the Land Use Act, the African Development bank OS 2 and most importantly the statutory replacement cost method which is according to the dictates of the Nigerian Institution of Estate Surveyors and Valuers and whose body is empowered by law to carryout valuation.

3. Results

3.1 Demographic Details of the Respondents

Table 1 revealed that 79.2% of the gender of head of respondents were males while 20.8% of the respondents were females. 24.8% of the respondents were singles, 48.2% married while 20.2% and 6.8% of the respondents were widowed and divorced respectively. 17.8% of the respondents' had no formal education, 36.0% attained primary level education, 20.8% had secondary level education, 13.0% of the respondent attained college and polytechnic education and 12.4% of the respondent attained university level of education. 15.1% of the respondents' annual income is less than 100,000, 19.1% of the respondents earned between 100,000-199,999 annually, 27.0% earned between 200,000-299,999 annually, 21.5% earned between 300,000-399,999 annually while 11.5% and 5.8% earned between 400,000-499,999 and 500,000 and above respectively. 11.3% of the respondents' household size is between 1-2, 72.0% had household size between 3-5, 12.5% household size is between 6-10 while 4.0% and 0.2% of the respondent's household size is between 11-15 and >15 respectively.71.7% of the respondents are of Igbo ethnicity, 9.1% are Anioma, 4.4% are Yoruba, 3.7% are Ikwerre, 3.0% are Tiv and Idoma, 2.3% are Ibibio and Efik, 2.1% are Hausa/Fulani, 1.6% are Edo, Afemai and Ishan, 1.6% are Ijaw and 0.5% of the respondents are of Isoko, Itsekiri and Urhobo ethnicity.

Table 1: Demographic Characteristics of Respondents

	State	Anambra			Abia				Imo				
	LGA	IN	IS	E	I	O	AN	U	OW	OE	M	ON	NO
Sex	Male	29	38	40	35	33	36	47	21	24	29	32	32
	Female	6	9	5	9	7	7	9	8	8	8	7	21
Marital Status	Single	6	9	8	8	12	14	14	13	5	15	14	6
	Married	18	23	24	23	15	24	24	22	21	14	20	13
	Widowed	7	10	9	9	6	6	12	8	12	8	9	5
	Divorced	4	5	3	3	3	2	3	2	-	2	4	3
Educational Status	None	10	9	7	7	7	5	13	7	10	4	5	5
	Primary	11	14	15	11	14	19	15	12	19	15	17	18
	Secondary	12	10	10	8	8	11	9	11	8	7	4	6
	CoE/Poly	4	7	6	4	4	6	6	6	7	6	5	4
	University	5	8	5	5	6	5	4	6	4	5	6	3
Annual Income (Naira)	<100,000	20.2	20.2	18.5	14.2	8.5	9.2	18.3	15.2	13.2	16.3	6.8	20
	100,000-199,999	17.6	17.6	11.1	14.2	10.6	17.6	16.8	27.6	24.8	28.8	19.1	23.2
	200,000-299,999	38.2	38.2	28.3	47.9	10.5	11.2	34.3	19.4	23.7	19.2	27.2	26.2
	300,000-399,999	12.4	12.4	27.4	12.7	36.2	40.5	14.3	18.5	20	22.5	24.2	16.5
	400,000-499,999	9	9	9.7	9.9	21.7	9	9.8	12.8	14.6	9.7	13.2	9.8
Household Size (%)	0-2	15.1	11	8.4	8.6	5.3	20.4	6.8	11.2	15.7	12.5	8.4	11.7
	3-5	69.1	70.3	76	66.1	78.2	63.1	80.2	69.7	70.8	75	75.1	70.9
	6-10	12.3	16.1	13.5	19.2	14.3	13.4	8.9	13.9	8.4	8.4	9.4	12.3
	11-15	3.5	2.6	2.1	3.4	4.1	3.1	4.1	4.2	5.1	4.1	7.1	5.1
	>15	-	-	-	1	-	-	-	1	-	-	-	-
Ethnicity	IBO	29	36	39	30	26	33	41	16	19	12	15	13

ANI	4	5	2	4	5	-	7	1	4	2	2	3
EAI	-	1	-	2	1	1	-	-	1	-	-	1
HF	-	1	1	1	-	1	-	2	-	-	2	1
IJW	-	-	-	1	-	-	-	1	-	2	-	3
IBE	1	1	1	-	-	1	2	1	-	1	-	2
IIU	-	-	1	-	-	-	-	-	-	-	1	-
TVI	1	1	-	2	1	-	-	1	2	3	1	1
IKW	-	0	-	1	2	3	2	2	1	2	2	1
YOR	-	1	1	3	1	4	1	1	1	2	2	2

Key: IN=Idemili North; IS=Idemili SoutH; E=Ekwusigo, I=Ihiala, O=Osisioma; AN=Aba North; U=Ugwunagbo; OW= Oru West; OE=Oru East; M=Mbaitolu; ON=Owerri North, NO=Ngor Okpalla; IBO-Ibo, ANI- Anioma, EAI- Edo, Afemai and Ishan, HF- Hausa/Fulani, IJW-Ijaw, IBE- Ibibio and Efik, IIU-Isoko, Itsekiri and Urhobo, TVI- Tiv and Idoma, IKW-Ikwerre, YOR-Yoruba.

3.2 The Project Affected Persons across the Project Area

The RAP identified various PAPs across the project location. Figure 1 presents the details of vulnerable individuals and categories in the project area. The analysis revealed that elderly (19 individuals), women (13 individuals) and land tenants (26 individuals) as the major vulnerable groups.

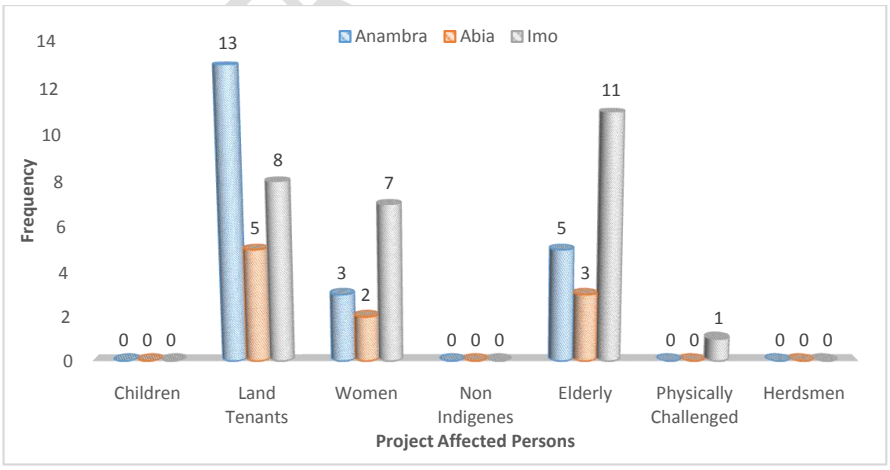

Figure 2: Distribution of project affected persons across the project area

3.3 Severity and Extent of the Impact on the Environment

Table 2 shows the impact prior and post execution of the proposed project. The severity rating was based on long term impact (3), irreversible within a year (2) and reversible within a month or a year (1).

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Table 2: Severity and Extent of Impact on Environment

Indicators	Impact Significance	Residual Impact	Severity Rating
Ambient Air Quality	Medium	Minor	1
Ambient Noise Level	Medium	Negligible	1
Soil and Geology	Medium	Minor	3
Surface and Ground water	Medium	Negligible	2
Vegetation / wildlife	Medium	Medium	3
Land Use	High	Medium	3

3.4Impact Minimisation Alternative for the Proposed Project

Three possible options were considered alongside their impact on the project affected persons, structures, farmland and/or economic tree and the estimated RAP budget as shown in Figure 3.

Alternative 1 entails reclaiming the existing 138 km x 50 m ROW from encroachers by resettling them with all its attendant constraints and costs. Alternative 2 entails abandoning the existing 138 km x 50 m ROW and selecting a greenfield TL ROW which will be a minimum 160 km through a route of uncertain soil properties, given that the area is prone to soil erosion. Alternative 3 entails reclaiming the existing TL but reducing the ROW to 30m at five heavily built up sections at Onitsha axis, Owerri axis, Aba axis, Ifekala axis and Uli axis for a total length of about 31km (Figures 3-7), to reduce the number of PAPs, thereby also minimizing social impact and RAP cost. This line alternative was accepted because it saves time of completion of studies; has engineering solution for reducing the ROW to 30 m; the soil properties are certain, given the existing line and it reduces social impact by reducing the number of PAPs and RAP cost.

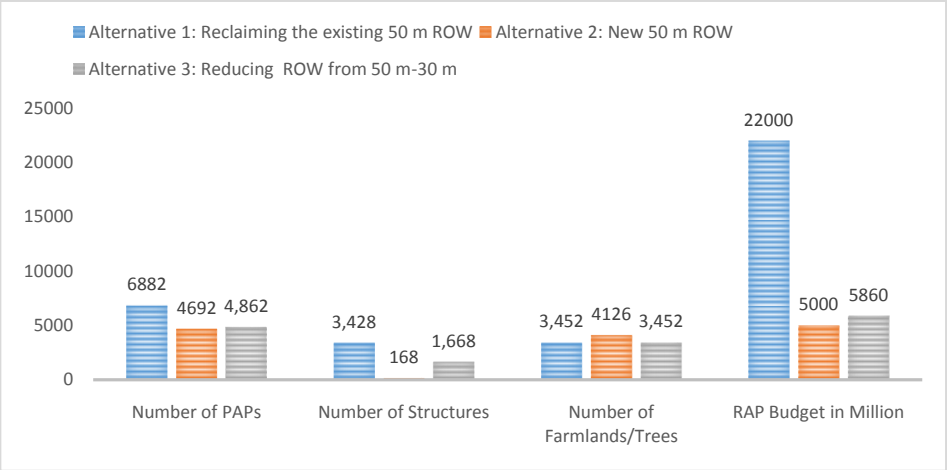

Figure3: Analysis of Alternatives

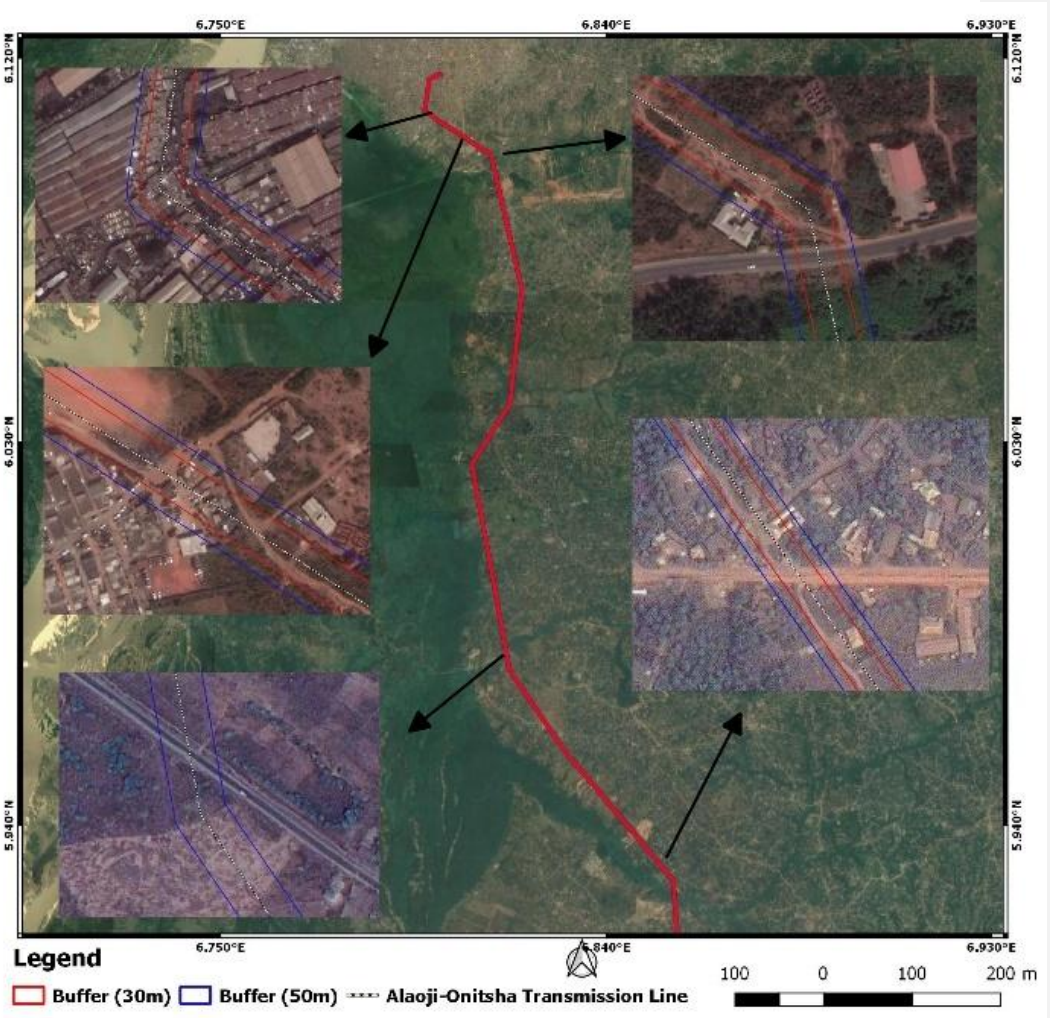

Figure 4: Reduction of ROW from 50 m to 30 m at Obosi (Onitsha) axis

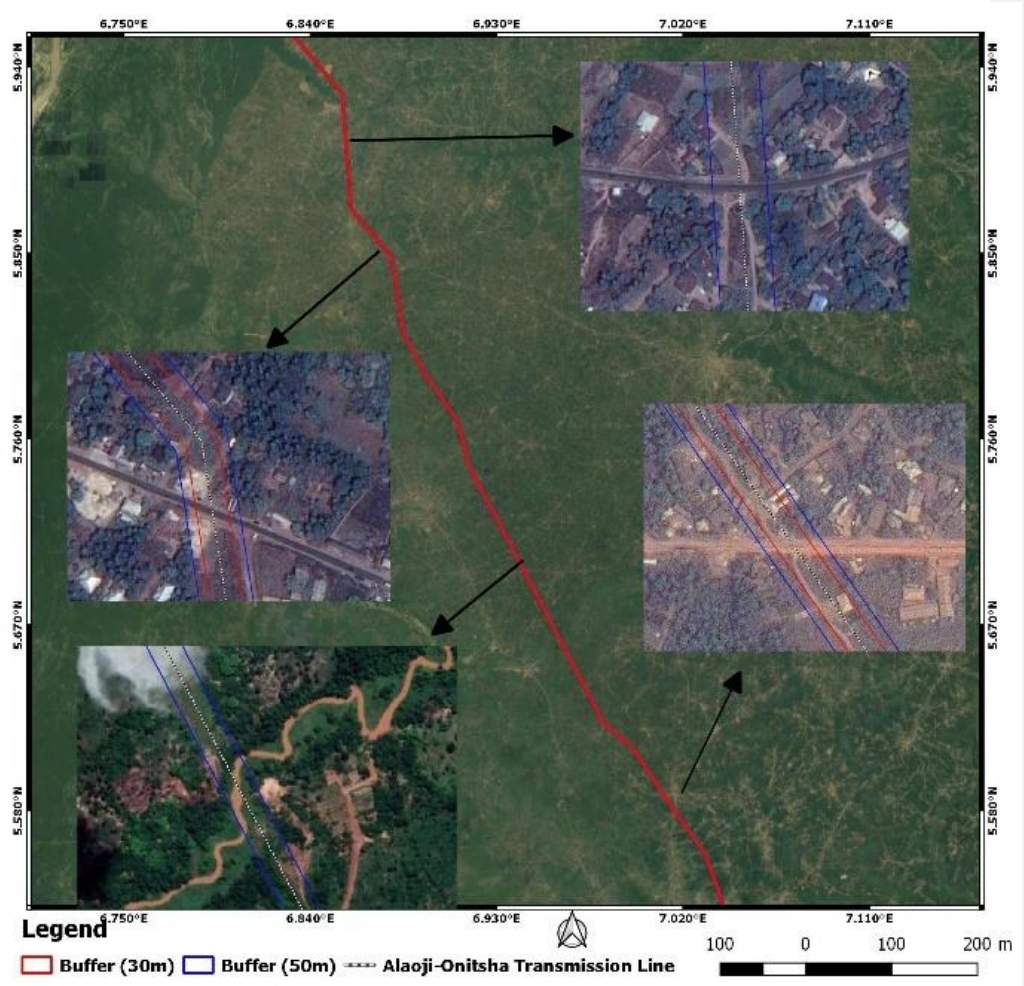

Figure 5:Reduction of ROW from 50 m to 30 m at Uli axis

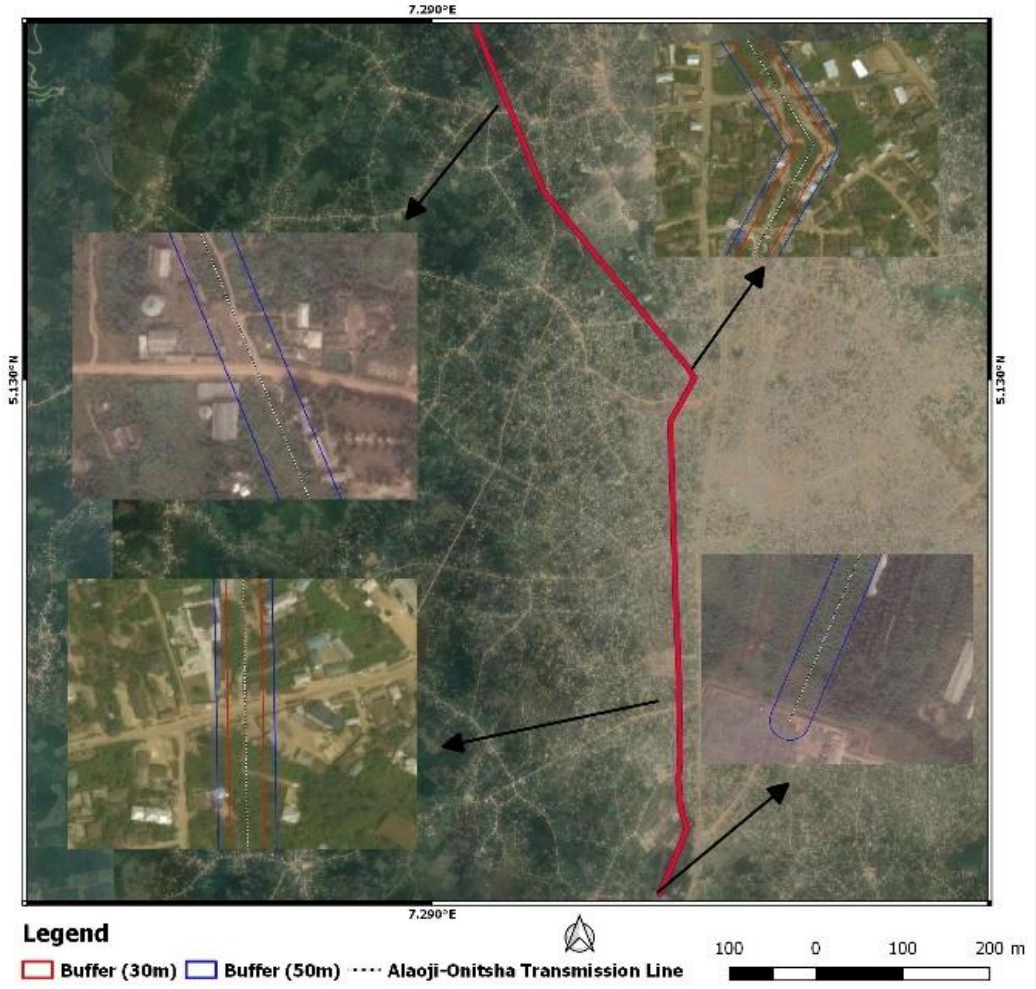

Figure 6: Reduction of ROW from 50 m to 30 m at Owerri axis

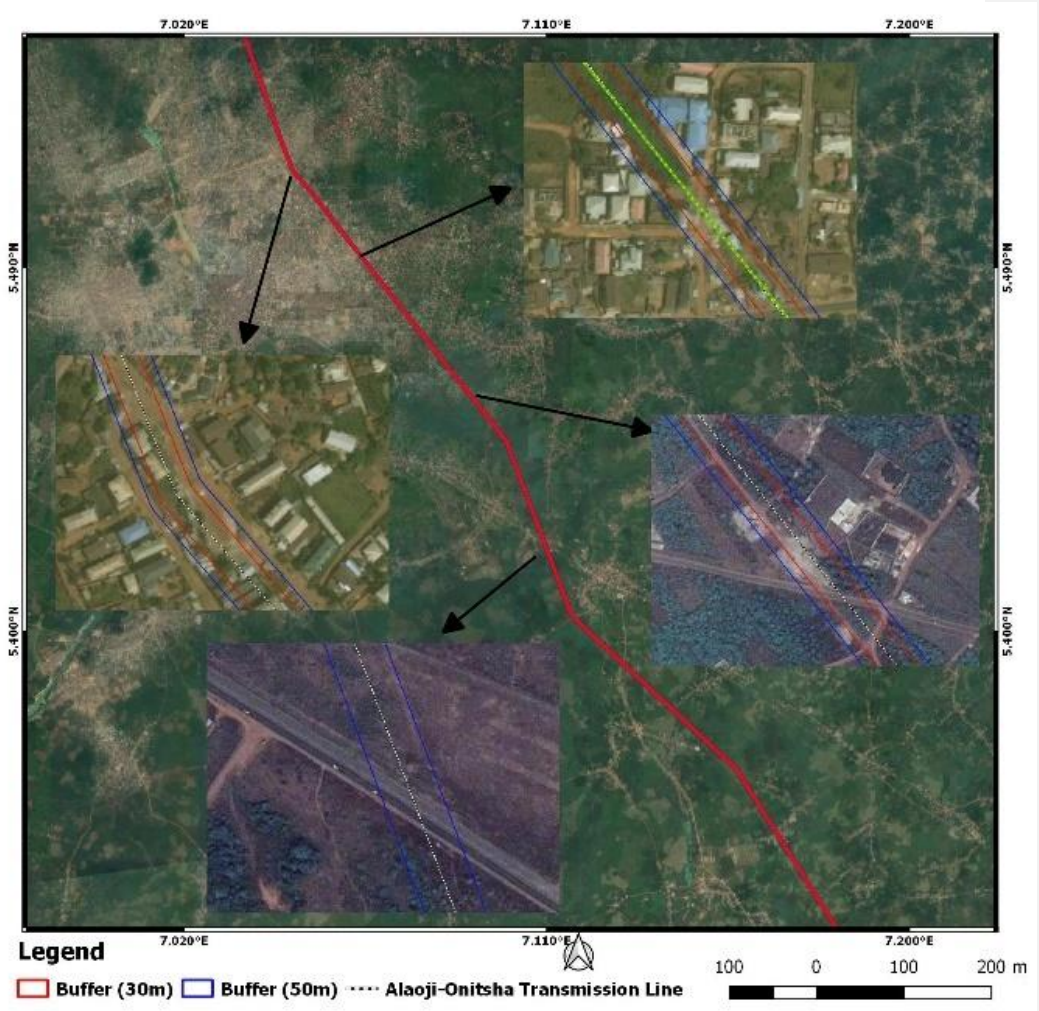

Figure 7: Reduction of ROW from 50 m to 30 m at Aba axis

4. Discussion

For a major developmental project like the building of a power transmission line, both man and the environment are likely to be impacted. The socio-demographic details of the people around the project area as assessed in this study show that the gender of preponderance of head of household's was males (396) representing 79.2% and 20.8% (104) were females. The marital status of heads of households showed that majority of the household heads were married and represent 48.2% (241 out 500) of the sampled household of which monogamy predominated (446 out of 500). The educational status indicated that most of the respondents

attained at least primary level of education and this represent 20.8% (180 out of 500) of the sampled household. According to Ismail and Mustaquim [12], education remains a vital pointer concerning the socio-economic development, extent of occupation and income. Considering the income level of the respondents on annual basis, the finding revealed that majority of the respondents earned between N200,000-N299,999 annually which represent 27.0% (135 out of 500) of the sampled household. This implies that the respondents earn between N16,000 – N25,000 in a month and less than N600/day which shows that they earn less than $1/day and can be regarded to be living below poverty line. This outcome also revealed the extent of vulnerability to external phenomenon such as displacement and resettlement. The household size of majority of the respondents was 3-5 persons which represents 72.0% (360 out of 500) of the sampled household. The ethnicity component as deduced indicated that majority of the respondents (71.7%) are of Igbo ethnicity extraction.

The vulnerable groups across the project location were identified as a total of fifty-eight (58) individuals with the number of elderly, women and land tenantsbeing 19, 13 and 26respectively, as the prominent vulnerable groups in the project area. This implies that most vulnerable groups are the land tenants. This outcome shows similarities with that of Flynn and Vergara [13] which opined that developmental project in many cases unfavourably affect lands and land tenant leading to the loss of home and source of livelihood. Also, Vanclay [14] posited that land needed for projects in many cases leads to resettlement of the individuals living on the land before the project and only few instances allow the people temporarily vacate their land for a period and return after the project is done. The vulnerability aspect of the present study concerns with the attributes and situations that makes the individuals susceptible to the impact of the project. By indication, the people at the project location are susceptible to developmental-project impact such as land loss but the extent of such impact is determined by the coping capacities provided by those in-charge of the project. According to Muller et al. [15], the process by which an organization uses their available resources and abilities could overturn possible disastrous consequence of resettlement action.

As regards the impact of the project on the environment, the biodiversity loss at the operation phase of the project is rated medium/moderate as a result of the applied mitigation practice such as minimum disturbance of vegetation and policies that restrict staff from hunting activities. The loss of biodiversity is generally linked to the electromagnetic field emitting from the transmission lines which leads to disturbance and physical removal of vegetation that are found within the corridor of the line[16].

As per the severity and extent of the project impact on the environment, the indicators considered by the environmental impact assessment of the RAP include air quality, noise level, soil and geology, surface and groundwater, vegetation and land use. The impact significance of the indicators revealed that most of the indicators impact is medium except for land use that was high. The residual impact of the indicators revealed that air quality, soil and geology has minor residual impacts, noise level and surface and groundwater have negligible residual impact while biodiversity and land use has medium residual impacts. The severity rating of the impact indicated that indicators such as air quality and noise is rated 1 which

implies that impact has a minor damaging effect on the environment and such impact is reversible within a month or a year of the project. The severity rating of surface and groundwater is rated 2 which implies that impact has moderate effect on the environment and such impact is not reversible within a year. Environmental indicators such as soil and geology, vegetation and land use severity rating is 3 which implies that impact high damaging effect on the environment and such impact is a long term or irreversible.

The standard ROW for 330 kV TL in Nigeria is 50 m, 25 m on either side of the centre line. The ROW of the existing TL has been heavily encroached, making resettlement cost exorbitant. To solve this problem, three alternative options were considered. The third alternative was accepted because it saves time, readily available data on soil properties; minimize impact on PAPs and RAP cost and importantly, the availability of engineering solution (technology) through staggering of the width of ROW. The adopted technology is specially designed towers (slimly built with better height than the normal towers) with electromagnetic field of ≤ 30ms. With the special towers, the ROW is reduced to 30m (instead of 50m for normal towers), at five axes along the Transmission Line, totalling 31 km (Onitsha axis (7.5 km), Uli axis (3 km), Ifekala axis (3 km), Owerri axis (11 km) and Aba axis (7 km), thereby reducing the amount of households to be displaced by 1211. Although, the cost of acquiring the special towers is higher compared to the normal towers but the transfer of social cost from RAP cost is taken as trade-off which consequently resulted in a net saving of about N7 billion.

5. Conclusion

The proposed reconstruction of 138 km Alaoji-Onitsha 330 kV single circuit TL to 330 kV double circuit quad conductors' TL, will have medium impact on ambient air quality, ambient noise level, soil and geology, surface and ground water, vegetation / wildlife and high impact on land use. The RAP assessment of the project should consider the environmental cost of restoration and resettlement for the PAPs.

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