



Survey of Encroachment of the Benin-Ughelli Transmission Line Right of Way

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study examined the environmental impacts of the 107 km Benin-Delta (Ughelli) 330 kV power transmission line (TL) upgrade project right of way (ROW). Encroachment was determined through ground monitoring and GIS mapping. A total of 83 communities lie within the zone of influence of the transmission line. The communities are 8 in Ethoipe West, 27 in Okpe, 21 in Sapele, 5 in Ughelli North, 1 in Udu, 3 in Uvwie and 18 in Ikpoba Okha. A survey of the communities within the sphere of influence of the TL line revealed that 56 communities had encroached into the transmission line ROW: 5 in Ethoipe West, 9 in Okpe, 15 in Sapele, 5 in Ughelli North, 1 in Udu, 3 in Uvwie and 18 in Ikpoba Okha. The encroachers need to be enlightened on the health implication of building under the TL and the socio-economic consequences that may arise as a result of forceful evacuation from the occupied land. For the upgrade of the TL, encroachers should be persuaded to vacate the route.

Keywords: Encroachment; GIS mapping; communities; transmission line.

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1. INTRODUCTION

The timely development of national infrastructure is a prerequisite for economic growth and is generally associated with significant economic and social returns [1]. Such undertakings include electricity transmission networks, which need to connect a growing number of upstream power generation and downstream supply facilities.

Despite their economic benefits, grid development projects often involve adverse environmental impacts and give rise to community opposition. The issues of climate change and global warming have gained a growing interest and discussion globally over the last decades. More and more people have developed environmental concerns and care deeply about the limited natural resources and the conservation of planet Earth [2]. Such rising concerns have led to public scrutiny of every developmental project.

The environment supports the livelihood of persons, such that project-affected persons and communities often expect compensation for their losses. Failing to convince the owners of the land on which developmental projects are to be sited and also failing to reach an agreement on the deployment and siting of projects could lead to opposition to projects, which could cause lengthy and costly delays to the planning process and even jeopardizes the project altogether [3,4]. From an economic point of view, local opposition can be considered the result of externalities caused by grid development and imposed on neighbouring communities. However, the practical applications of financial compensation are not trivial, including the difficulty in estimating the exact costs and benefits of the projects and the public perception of compensation as a bribe [4].

Modern societies rely on a continuous supply of energy and electricity in particular. The electric power grid is crucial for economic prosperity and national security [5]. Disruptions in electricity supply pose a risk of stopping important activities in society, which could disable many critical services ranging from heating to healthcare or access to drinking water. Disruptions to electrical power grids paralyse daily life in modern societies causing huge economic and social costs for these societies [6]. The strong dependencies of other critical infrastructures such as telecommunications, transportation, and water supply on the electric

power grid amplifies the severity of large-scale blackouts [7].

According to Popper [8], transmission lines are among several development projects that are frequently objectionable to those living near them. Such projects are dubbed Locally Unwanted Land Uses or LULUs (which include strip mines, prisons, military installations, airports, highways and nuclear power plants). The context of decision-making in siting such developmental projects has gradually shifted from one being a primarily technical matter to an increasingly social, environmental, and thus political one. Therefore, establishing a grid network requires more active community engagement.

The present study assessed the community characteristics along the 107 km Benin-Delta (Ughelli) 330 kV power transmission line (TL) upgrade project's right of way (ROW) to show the level of encroachment.

2 METHODOLOGY

2.1 Study Area

The study area lies within the South-south region of Nigeria. The South-south region comprises the area covered by the natural delta of the Niger River and the areas to the East and West, which also produce oil. The region is located between latitudes 4010'N and 7035'N and longitude 5030'E and 9025'E. The 107km Benin - Delta (Ughelli) transmission line to 330 kV double circuit quad conductors cuts across Edo and Delta States.

2.2 Assessment of Encroachment

Encroachment was determined through ground monitoring and GIS mapping. Ground monitoring involved physical visits to communities within the sphere of influence of the TL. Geospatial mapping of the 107 km Benin - Delta (Ughelli) transmission line to 330 kV double circuit quad conductors was carried out using high-resolution satellite imagery.

2.3 Socioeconomic Characteristics

Data collection was done through direct observation and questionnaires. Two types of questionnaires were administered – household and community-based. The community based was administered to all communities within the ROW and the household questionnaires were

administered to all available homesteads within the ROW. The people were assisted (mainly in pidgin and local dialects) in responding to the questionnaires.

The questionnaire consists of several questions, both open and closed-ended to information related to age, educational level, ethnicity, gender, occupation, etc.

2.4 Data Processing

There are two aspects involved in data processing: data editing and coding. Editing involves crosschecking the collated data with the instrument used to detect, correct or eliminate errors arising from either omission of facts or illegibility to enhance data quality before analysis. Coding is the process of transformation of qualitative data to quantitative data by assigning specific numerals and tabulated as percentages or frequency tables suitable for statistical analysis.

3. RESULTS

3.1 Communities within Direct Influence of the Transmission Line

A total of 83 communities lie within the zone of influence of the transmission line. The communities are 8 in Etoipe West, 27 in Okpe, 21 in Sapele, 5 in Ughelli North, 1 in Udu, 3 in Uvwie and 18 in Ikpoba Okha (Table 1).

Fig. 1 shows communities that have encroached into the TL ROW. A total of 56 communities were identified to have encroached on the ROW. Figure 2 is satellite imageries showing encroachment of the Benin-Ughelli TL ROW.

Table 2 shows communities and households that have encroached on the ROW. A total of 56 communities were identified to have encroached on the ROW: 5 in Etoipe West, 9 in Okpe, 15 in Sapele, 5 in Ughelli North, 1 in Udu, 3 in Uvwie and 18 in Ikpoba Okha.

3.2 Household Characteristics

A total of 292 household questionnaires were administered and 56 community questionnaires of which 292 and 34 were retrieved representing a success rate of about 100% and 60.7% of the population.

Information on the socioeconomic status of heads in the study area is presented in Table 3. A total of 71.2 % of household heads were male and 28.8% female. The married status of respondents in the study area of 64.73% (51.03% married and 13.70% widowed). Preponderance of encroachers were farmers (42.81%), with the least being traders (2.74%). The highest educational attainment for most of the respondents was secondary education (45.89%). Only 4.45% had no formal education.

4. DISCUSSION

The Benin-Ughelli transmission line expansion project is envisaged to affect communities whose lands would be used for the project's right of way (ROW). The issue of compensation for land is not so straightforward at times if ownership of land cannot be exactly ascertained. Because the practical applications of financial compensation are not trivial, project-affected persons (PAPs) must be ascertained to forestall disruption to project execution.

In the present study, a survey of the communities within the sphere of influence of the TL line revealed that a total of 83 communities lie within the TL sphere of influence of which 56 had encroached on the ROW. Encroachment was determined through ground monitoring and GIS mapping. Encroachment of TL ROW is a common issue in Nigeria, particularly the portion of the ROW that transverses urban areas. In the case of the Benin-Ughelli TL, residents have been repeatedly cautioned not to erect structures within the ROW, but such warnings always fall on deaf ears. The TL expansion is an important project aimed to achieve greater electricity distribution [9,10].

For a project of this magnitude, it is expected that land owner will lose their land and the livelihood of households as well as communities are expected to be impacted, for which compensation is required by law [3,11]. Land in the project communities is primarily owned by families. Ownership rights over lands are handed down from one generation to another within the extended family. Such inherited land is put to any use as desired by the owner (s). These are the lands on which family members build their houses and are allocated farmlands for cropping. Land could be bought from owners who were willing to sell. Apart from the family lands, there are also communal lands. The communities also owned some land.

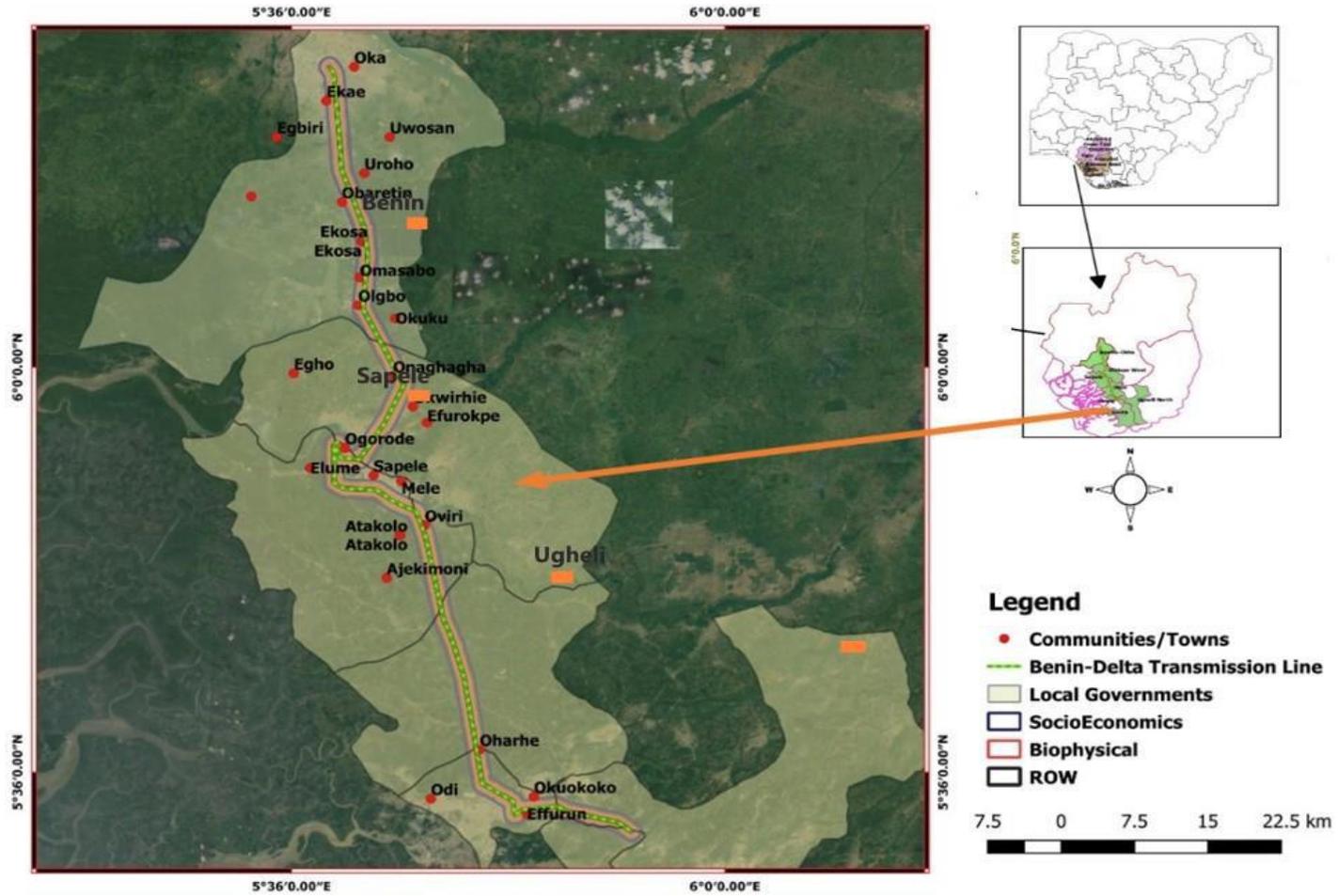


Fig. 1. Communities along the Benin-Delta transmission line



Fig. 2. Satellite imageries showing encroachment of the Benin-Ughelli TL ROW

Table 1. Communities within the sphere of influence of the transmission line

LGA	Communities
Sapele	Ojikwa, Eneose Island, Amukpe, Adagbarassa, Oyohe, Oviri, Ogegere, Odjedi, Gbimidaka, Egbeku, Ebada, Utornyatsere, Okwadiokpara, OWkuovwori, Ituru, Ikwewu, Igoyo, Elume, Ebada, Atakolo and Amuegbedi
Okpe	Mereje, Okwuidiemo, Okuruvu, Okuotomewo, Okuoke, Okuijiorugu, Okugbogbo, Okuetolor, Okuemaife, Okuabude, Odjedi, Jakpa, Iginene, Egborode, Ajede, Ukpe, Sabo, Ukan Market, Oviri court, Ugwagbagere, Okuvo, Oपुरaja, Okuokoko, Okuobadjere, Okughurhe, Okoejeba, London, Iriama and Adagbrassa
Uvwie	Tori, Enerhen and Effurun
Udu	Uwodwo Erere
Ughelli North	Orho Agbarho, Orhokpokpor, Eruemukohwarien, Oguname and Ekrerhevbe
Ethiope West	Munro Island, Michigan, Jesse, Jamieson River, Wright Creek, Ogharefi, Ovade and Ugbenu
Ikpoba Okha	Okonaovi, Okaubogu, Okabere, Ekae, Idunmwunivdiode, Etete, Aubriaria, Oha, Obaretin, Utesi, Uhie, Oka Ohoghobi, Ogbe Orogho, Obayantor, Imasabor, Ighobaye,

Table 2. Communities and households that have encroached on the ROW

State	LGA	No of communities	No of Households
Delta	Ethoipe West	5	32
	Okpe	9	27
	Sapele	15	61
	Ughelli North	5	25
	Udu	1	5
	Uvwie	3	16
Edo	Ikpoba Okha	18	126

Table 3. Socioeconomic status of head of household

		Ethiope West	Okpe	Sapele	Ughelli North	Udu	Uvwie	Ikpoba Okha	Total	(%)
Gender	Male	19	16	45	13	4	15	96	208	71.2
	Female	13	7	20	3	1	10	30	84	28.8
	TOTAL	32	23	65	16	5	25	126	292	100
Marital status	Single	10	6	9	3	0	9	37	74	25.34
	Married	17	13	34	10	2	14	59	149	51.03
	Widowed	4	2	12	1	2	1	18	40	13.7
	Divorced/ Separated	1	2	10	2	1	1	12	29	9.93
	TOTAL	32	23	65	16	5	25	126	292	100
Occupation	Farming and Fishing	20	15	50	6	4	15	15	125	42.81
	Pastoralist	3	0	3	3	0	1	0	10	3.42
	Self-employed	2	4	4	0	1	4	54	69	23.63
	Private employee	5	2	5	2	0	5	37	56	19.17
	Public employee	1	1	2	5	0	0	15	24	8.21
	Trading	1	1	1	0	0	0	5	8	2.74
	TOTAL	32	23	65	16	5	25	126	292	100
Education	Informal	2	1	3	1	0	1	5	13	4.45
	Primary	7	2	7	2	0	3	28	49	16.78
	Secondary	16	12	24	3	5	13	61	134	45.89
	CoE and polytechnic	4	3	14	4	0	4	10	39	13.36
	University	3	5	17	6	0	4	22	57	19.52
	TOTAL	32	23	65	16	5	25	126	292	100

Establishing the communities within the sphere of influence of the project will be helpful for engagement, compensation and resettlement planning, to forestall opposition to the project [12]. However, project-affected persons are mainly those whose structures (residential houses), economic trees and farm/crops will be displaced as a result of the nature of the project area in Edo and Delta states, which is expected to impact businesses, houses or means of livelihoods of the people. It is the PAPs that get compensated according to the valuation of their losses [13,14]. Compensation might come in the form of resettlement and monetary payment. It must be noted that eligibility for settlement is subject to providing proof of land ownership [15]. So, residents that encroached unlawfully should not expect to be compensated at replacement cost. The encroachers need to be persuaded to vacate the route.

A look at the demographic of respondents revealed that persons within the age bracket of (19-39) years formed the bulk of the population (above 30%) across the LGAs, while those above 65 years of age were the least (below 15%) represented in the study area. This also implies that the communities have an able-bodied labour force that could participate actively in the various activities that will take place during the construction and operation phase of the transmission line. However, according to the National Bureau of Statistics (NBS, 2012), persons within the age bracket (0-18) form the bulk of the Nigerian population in contrast to the respondent age and sex in the study area. Kidokoro (2008) attributed urban pull factors as a determining criterion in age bracket configuration.

The population of males was 158 (54.11%) and females was 134 (45.89%). However, the household where males were the head was 71.2%. This is less than the Nigerian average of 85.7%, and 76.6% for South-South states implying more female house heads in the study area than the 14.3% Nigerian and south-south average (NBS, 2012). Nonetheless, all areas in the line route have more male house heads. It was observed that most of the household heads that are females are widowed. In addition, there are more married and single household heads in all the LGAs.

The highest educational attainment for most of the respondents was secondary education (45.89%). Only 4.45% had no formal education. A survey of the means of livelihood of the

respondents revealed that the preponderance of encroachers were farmers (42.81%), with the least being traders (2.74%). This is not surprising because the TL ROW transverses a large area of rainforest in the Niger Delta, with farming/fishing as the predominant land use.

5. CONCLUSION

This study has established that communities within the existing Benin-Ughelli transmission line had encroached on the right of way (ROW). The practice of building under TL lines comes with great risks to developers and occupiers of such buildings. There is a need to persuade communities to evacuate encroached land to allow for the upgrade of the transmission line ROW.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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