

Achieving Sustainability in Civil Engineering Projects in Nigeria: A Case For Climate Change

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Introduction & Background



CIVIL ENGINEERING PROJECTS PLAY A CRUCIAL ROLE IN A NATION'S DEVELOPMENT, IMPACTING THE ECONOMY, SOCIETY, AND THE ENVIRONMENT.



THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS (SDGS), EMPHASIZES THE INTEGRATION OF SUSTAINABLE PRACTICES IN CONSTRUCTION TO MITIGATE CLIMATE CHANGE EFFECTS.



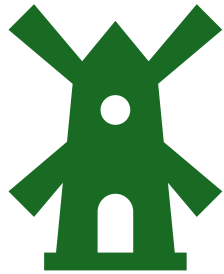
NIGERIA FACES THE CHALLENGE OF MEETING INFRASTRUCTURE NEEDS AMID RAPID POPULATION GROWTH, NECESSITATING SUSTAINABLE APPROACHES TO PREVENT EXACERBATING CLIMATE CHANGE IMPACTS.

(FGN, 2020; UN, 2019, 2022)

Aim, Objectives, and Scope

The research aim is to investigate the sustainability of civil engineering projects in Nigeria amidst urbanization demands and its implication for climate change.

The objective of the study is to answer the following research questions ;



RQ1. How do civil engineering professionals in Nigeria perceive the significance of climate change in the built Environment?

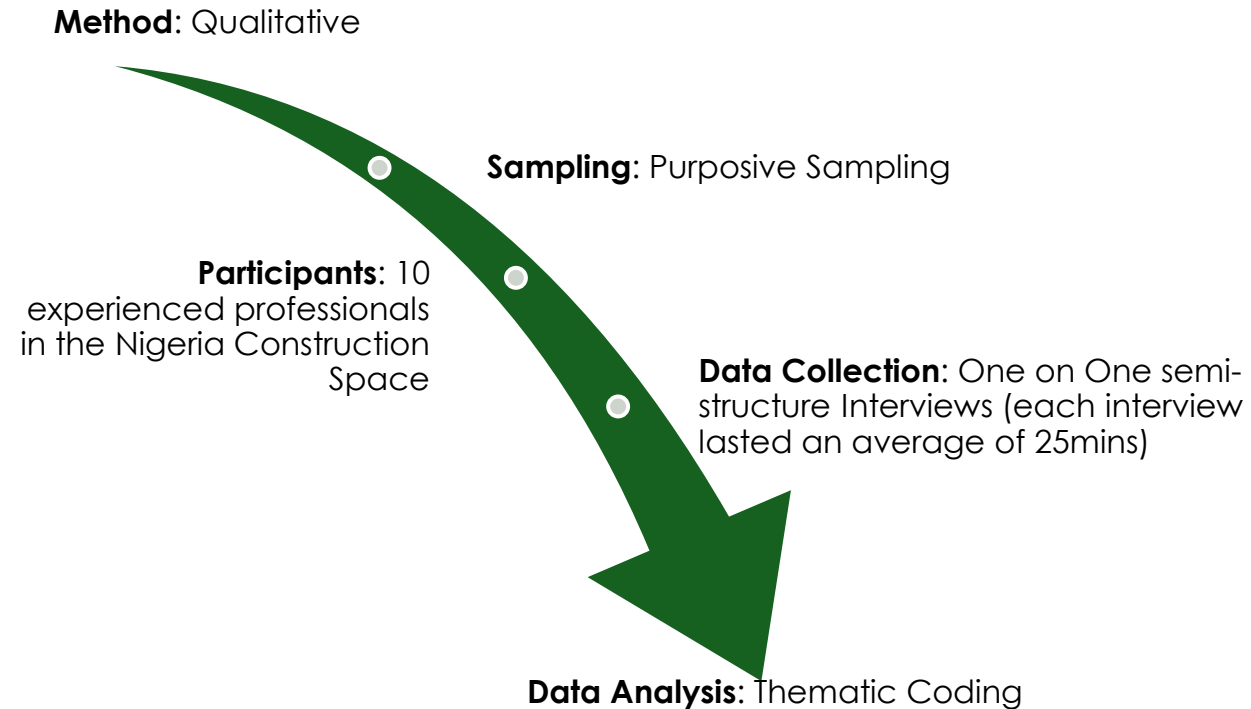


RQ2. What sustainable practices are currently being employed in civil engineering projects, specifically in highway and building projects, in Nigeria concerning climate change?



RQ3. What recommendations can be put forward to stakeholders to effectively reduce greenhouse gas emissions in civil engineering projects and foster sustainability in Nigeria?

Research Design and Methodology



Thematic Coding



Results (RQ1) Perception and significance of Climate change

Perception

- Climate change a Reality
- Knowledge Gap in Awareness

Impacts of Climate change

- Biodiversity Loss
- Agricultural and Economic Impacts
- Extreme Weather Events
- Livelihood Loss
- Water Scarcity and Access Issues
- Region Specific Impacts

Significant Role of Civil Engineering Sector

Participants unanimously agree that Nigeria's civil engineering sector is crucial in striving for net-zero greenhouse gas emissions

Some Notable Quotes

"I believe climate change is real"

"climate change is a serious problem for us in this region"

"Nigeria's climate is definitely changing"

"I strongly believe that the sector is not yet doesn't have a full understanding of what climate change is,"

"we've over the years we've witnessed a significant increase in floods In temperature witnessed a lot of biodiversity lost cause I from my experience working on reforestation, afforestation projects, we've seen the loss in the forest which has reduced".

"Some key impacts of climate change in the southwest is the increased rainfall and flooding that has affected agricultural produce"

"Bayelsa state witnessed a terrible flood last year, halting socio-economic activities and construction projects"

"we have shrinkage of water bodies, desertification, drought, and famine because of climate change. We have constantly been battling heat waves for a long period of time now. Even water for construction purposes is becoming hard to get."

"I think it's very important that the engineering and construction sector in Nigeria begins to look into climate change and how it can adopt sustainable practices."

Results (RQ2) Current Sustainable Practices in Nigeria

Some Notable Quotes

Existing Sustainable Practices

- Greenland conservation and afforestation
- Alternative Use of Low Carbon Materials
- Waste management
- Renewable Energy Use
- Transportation and Logistics

"revegetation exercises"

"adding green areas around buildings instead of block wall fencing"

"Use of eco-friendly materials for construction—for example, I am aware of the use of palm kernel in replacement of coarse aggregate in concrete works,"

"I am aware of the use of cold asphalt in some private estate projects I worked on,"

"also that I've seen used is using Palm canal shells for concrete, which has proved to be strong,"

"we try to ensure that we maximize materials and use the right quantity on site now,"

"Proper waste management on construction sites"

"Renewable energy integration (solar energy)"

"one of the things that we do is to reduce our carbon footprint when constructing...is to first source raw materials more locally so that way we are reducing the travel our mileage."

Results (RQ3) Recommendations for reduction of greenhouse gas emissions



Promote comprehensive awareness campaigns, training, and continuous learning for civil engineering professionals



Invest in research and development to identify and fund local alternatives for construction projects



Develop and implement a sustainable framework and guidelines for construction projects at all government



Establish economic incentives for contractors committed to reducing carbon emissions and promote the adoption of internationally recognized certification standards like ISO 14001 as selection criteria for civil engineering projects,



Implement financial mechanisms and support structures to assist construction firms, especially in small-scale projects

Conclusions



This study underscores the urgent need for Nigeria's construction sector to undergo a transformative shift towards sustainability to slow down climate change



Incremental changes are no longer sufficient; radical transformation is now an imminent imperative to safeguard our future



The journey to low carbon and resilient infrastructure demands immediate, well-coordinated, and multifaceted initiatives



The insights gained can inform policy reforms, inspire industry-driven initiatives, and guide professionals toward climate-conscious decision-making



As Nigeria progresses towards its infrastructure development ambitions, overlooking the sector's environmental implication can risk exacerbating emissions