

SUSTAINABLE URBAN BUILT ENVIRONMENT FOR NIGERIA: A FRAMEWORK APPROACH

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ABSTRACT

This study examines how the sustainability of the urban built environment in Nigeria can be enhanced through the use of a proposed sector-based sustainable design framework in the face of a changing climate. Selected built environment professionals from the three climatic regions formed the three focus groups used to ascertain the applicability of the framework as a decision tool for developing regional design guide. The framework has seven operational levels, these include; the context, background, assessment/identification, informed decisions, policy actions, collaborations and output. Views of these professionals were sought based on these operational levels, in order to draw out the potentials of using the processes offered by the framework. Findings suggest that, the framework has potentials that would significantly improve sustainable practices within the built environment sector. This study also notes the importance of using a sustainable framework as guide and discusses the significance impact such an approach would have in the promotion of environmental sustainability and the production of sustainable buildings. The study concludes with suggestions for future studies, especially in the production of regional design guides that are climate sensitive for Nigeria.

Keywords: Built Environment, Design Guide, Framework, Nigeria, Sustainability.

1. INTRODUCTION

Buildings forms part of the environment and constitute a large part of the built environment. Thus, their sustainable functions have significant effect on the sustainability of the environment. Yet, many of the earlier studies are targeted only at environmental sustainability (Swanson, 2003; Zhu and Lin, 2004; Hugo, 2005), even though it is equally important to look at the processes that would aid and enhance the sustainability of the built environment (Allu, 2014b). Similarly, other studies expressed concern for the need to provide sustainable buildings (Straube, 2006; Eromobor and Das, 2013; Conejos et al. 2013). This concern was noted to be most relevant to the housing industry globally, because the industry is largely the highest contributor of carbon emissions (IPCC, 2007; Bond, 2011). This is also the case for residential buildings in Africa (Trends, 2005) and Nigeria in particular. The expected new buildings for the Nigerian urban centres should like the rest of the world, key into the global sustainable agenda for the built environment (UN-Habitat, 2009; Janda, 2011; Allu and Ebohon, 2014).

2. LITERATURE REVIEW

It has also been established by researchers that, climate change is the main challenging factor for achieving sustainability in the built environment globally (Pyke et al, 2012). Also buildings are major contributors to the causes of climate change (Simoni 2011; Berrang-Ford et al, 2011). On the other hand, buildings are without doubt, affected by the impacts of climate change, hence affecting the functionality of buildings because of their long life-cycle (De Wilde et al, 2008; Wong, et al, 2010; Gething, 2011). Furthermore, it has been observed that, the magnitude of the effects and impacts of climatic changes on buildings are also dependant on the geographical locations of such buildings, their design and construction (Liso et al, 2003; Crawley, 2008). It has also been argued that, decisions on the processes involved with the production of buildings have a long term effects on the environment due to both the physical and economic value of buildings (Ryghaug and Sørensen 2009; Attia and De Herde, 2011) and the sustainable performance and the negative effects of such buildings on the built environment (Urge-Vorsatz et al, 2007; Allu, 2014a).

In recognizing the aforementioned in the preceding paragraph, Butt et al. (2010) suggests that, activities within the built environment sector needs to integrate sustainability. It is therefore, necessary to study and bring to the public domain approaches that are holistic in meeting the needs of sustainable housing and the environment in a changing climate. Similarly, other research within the built environment sector, opined that, sustainable actions within the sector requires; holistic guide resulting from interactive input from stakeholders, which can be provided through the use of a sustainable framework (Hugentobler, 2006; Turcotte and Geiser, 2010). This study adopts a sustainable framework and focuses on it workability and application within the urban built environment in the Nigerian context. Thus, this study is relevant for the promotion of sustainable conscious actions by the built environment professionals.

2.1 Study context

Nigeria is part of the West African region that is also in the Sub-Saharan African continent. The country is located within the tropical belt (see Figure 1), with a wide land mass area of

923,768km², and a total coastline length of 850km (National Communication, 2003; Nwilo et al, 2006). Nigeria is situated in the northern latitudes between 4 degrees and 14 and between 3 degrees and 15 degrees of the eastern longitudes (National Communication, 2003; Oguntunde et al, 2011). This explains the country's climatic variations and the differences on the magnitude of climate change impacts being experienced across the country (Allu, 2014b).

It has also been noted that, Nigeria suffers a huge housing deficit. Particularly studies on housing have noted that Nigeria requires about 40 million houses to meet its urban housing deficit by 2020 (Ademiluyi, 2010; Ogu and Ogbuozobe, 2011) and by implication; this suggests that, the production of new buildings are expected. While the built environment professionals are busy to satisfy the demand for new buildings, very little is known about research activities on buildings and climate change related activities in the West African region (Laryea, 2011; De Wilde and Coley 2012). While Onyekuru and Marchart (2012) observed that, the climate change policy implementation in Nigeria has been slow. Hence, the rationale for the choice of Nigeria as the context for this study's investigation. Additionally, the study also intends to contribute to research activities and data documentation to aid future studies.



Figure 1 Map of Nigeria showing location latitudes and longitudes

Source: <http://www.infoplease.com/atlas/country/nigeria.html>

2.2 The framework

A framework usually has attributes or elements that serve as support processes and have implications for decisions. A framework has been defined as a means linking the processes that lead to the actualization of a desired goal (Dantata, 2011). According to, Sev (2009) and Akadiri et al. (2012) built environment professionals have the capacity to effectively collaborate and implement decisive actions for sustainability through sustainable processes

that a framework offers. As such, this study adopts the framework shown in Figure 2 as its case study to ascertain the earlier discourse.

The framework has seven operational levels or attributes; context, background, assessment and identification, informed decisions, policy action, collaborations and the output. These seven attributes are interwoven, interactive and allows for feedback as a mechanism for evaluation.

The first attribute of the framework which is the **context** gives an as identity to the proposed decision tool. The second attribute which is the **Background** primarily gives an overview on how the framework was developed in other to test the suitability of the methodology adopted. At the **Assessment and Identification** level it is expected that, a detailed documentation of regional evidence of climate change, impacts, peculiar design parameters of each climatic region are carried out for assessment purposes. This is followed by the **informed decision**, where decisions are taken based on assessments undertaken. Based on the informed decision policy guidelines are formulated for **policy action** that would enhance the effective application, enforcements and monitoring purposes. All the processes are only attainable with **collaboration** amongst the built environment professionals, government agencies and end users. The final step of the framework is the **implementation** stage, where clear decision guides are provided for in order to promote the production of regional design guides. At the implementation level feedback are also expected to evaluate the framework.

In the overall, this framework has also been design to serve as a decision tool which would promote the development of climate sensitive regional sustainable design guides (Allu, 2014b).

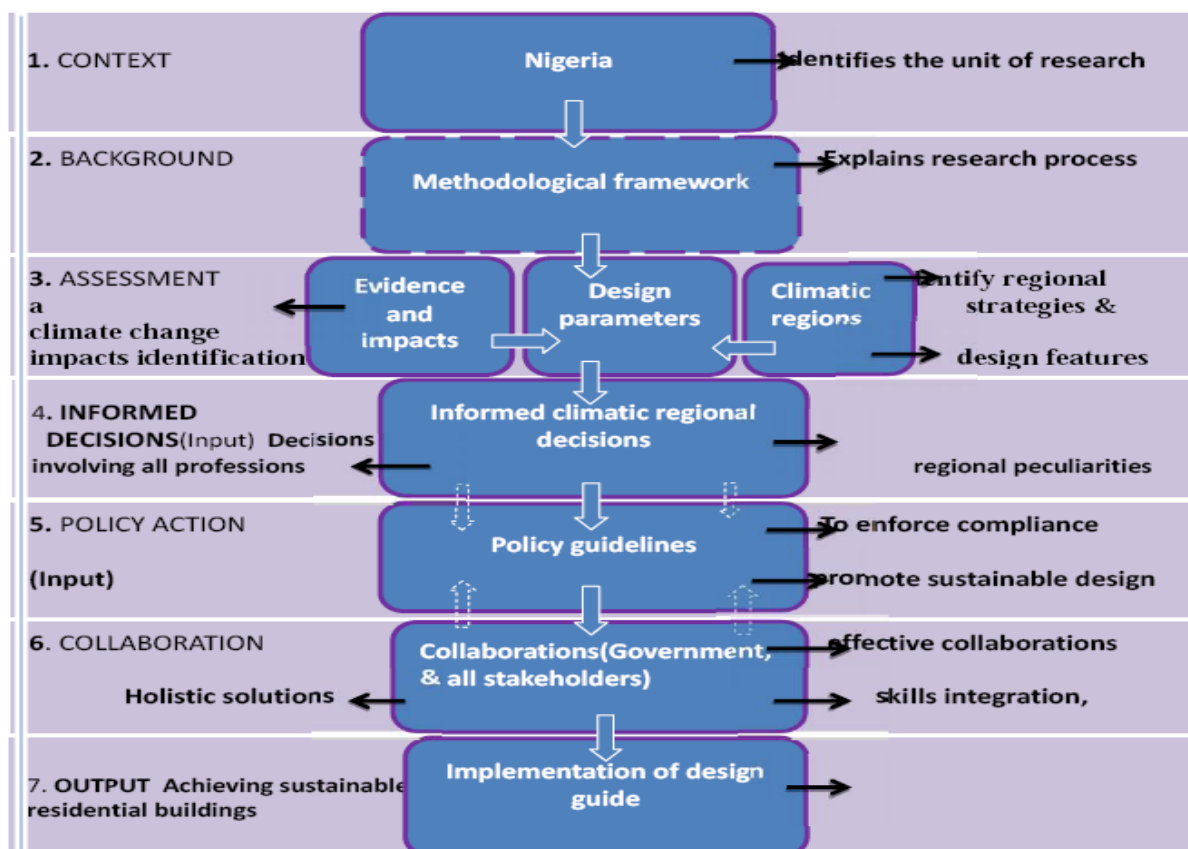


Figure 2 sustainable design guide framework

Source: Allu, 2014b page 260

3. METHODOLOGY

This mixed method research builds upon the underpinning reviews carried out and adopts a qualitative investigation through a focus group interview was adopted to examine the views of the built environment on the potentials of the framework in promoting sustainability of the built environment through the processes provided by the framework.

The qualitative investigative approach best suits the study because it allows an in-depth investigation (Domegan and Fleming, 2007; Myers, 2009). Additionally, it allows for bringing together participants which a quantitative approach may not satisfy.

Three focus groups were employed, one from each of the three climatic regions. The three climatic regions identified were the; Highland Climate Region, Tropical Savannah Climate and Tropical Rainforest which spread across the 36 states of Nigeria in order to give the study a wide coverage as shown in Table 1.

Table 1 Three Climatic Regions and their States

Climate type	Climatic/geo-political regions	States	Survey locations
Tropical savannah	North-Central,	Benue, Federal Capital, Kogi, Kwara, Nasarawa, Niger, Plateau,	Federal Capital, Abuja
	North-East	Adamawa, Borno, Bauchi, Gombe, Taraba and Yobe,	
	North-West	Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, Zamfara	
Tropical rainforest (Monsoon)	South-East	Abia, Akwa-Ibom, Anambra, Enugu, Imo,	Uyo, Akwa-Ibom
	South-South	Bayelsa, , Delta, Ebonyi, Edo and Rivers	
	South-West	Ekiti, Lagos, Ogun, Ondo, Osun, Oyo	
Highland climate (Alpine)	No entire region/zone falls in this category	No entire state falls in this category. Specific areas include; Jos Plateau (Plateau), the Mambila Plateau (Adamawa/Taraba and Obudu Mountains (Cross Rivers).	Jos Plateau

Source: Adopted from Allu (2014b) page 130

3.1 Focus group selection

According to Bryman (2008) the number of participants for a face-to-face survey should be between 12 and 60 participants. Similarly, WBDG (2012a and 2012b) concludes that, to produce a sustainable guide for buildings inputs are required from professionals within the built environment sector. In this study each of the three focus groups assembled, had two professionals representing the profession of architecture, builders, planners and surveyors. The total numbers of participants in this study’s survey were 24, thereby, satisfying the

recommended range. Also, Sherman and Ford (2013) observed that, quality of research findings are enhanced when participants are willing and knowledgeable in the subject area of the study. Hence, the participants for this study signed their consent to indicate their interest in the study and were drawn from the public, private and academic practices. Sunders et al, (2009) and Danika (2010) have opined that, the most appropriate sampling method for specific research findings is the non-probable sampling technique. Thus, an expert sampling which is a non-probable sampling technique was used to carry out this study, in order to have findings which are not based on probability.

Participants were sent a copy of the framework and the semi-structured interview questions ahead of the face-to-face group interviews. This was to familiarise them with the study and cut down on the time that would have been spent during the focus group meeting making explanations. Total average time spent between the three groups was 75 minutes.

4. DATA COLLECTION AND ANALYSIS

The face-to-face group interviews has been acknowledged to be one the reliable technique of collecting data in a qualitative inquiry involving people (Kelley et al., 2003). This is also particularly suitable for this study because it allows the researchers to guide the discussion within their scope and also to observe the body language of the participants during interactive discussions.

Three semi-structured questions guided the discussions and each member of the group was asked to express their professional views and their experiences in their practices. For each of the seven attribute on the framework, the questions were;

- Do you think this attribute is relevant and applicable is this framework in the Nigerian context?
- Do you think this framework has potentials to guide in the production of regional design for climate sensitive buildings?
- Are there possible challenges for adopting this framework?

There were also follow up questions arising from the responses given. During the each group's interactive sessions, notes were written down and audio recorders were used in order not to miss out any views expressed.

5. FINDINGS

This section presents the findings from the three groups simultaneously. However, the first part presents the characteristics of the participants. There were only 2 females in each of the three groups, which give a total of 6 (25%) female participants and 18 (75%) male participants. Allu and Ebohon (2014) in an earlier study noted the low level of female participation in the built environment research activities. Secondly, the section discusses views of all the participants for each of the seven attributes in the framework.

Context: All three groups agreed that, the context is a relevant attribute to the framework because it helps to identify the regional or local location and makes the framework adaptable to regions outside Nigeria with similar climatic condition and environmental scenarios. In addition, the three groups noted that, the context is an important aspect of their professional practices, because it gives an overview of the environmental, socio-cultural, historical and economic context for which the proposed guide would be provided for. When the participants were asked to explain how the context identification is reflected in their practices were few, which states that the context allows for, the responses included;

- *Inclusion of location name on each project titles*
- *Specific features in religious projects were appropriately placed or designed with captions to reflect its socio-cultural identity*

Background: As much as the respondents agreed that, the background was an important and necessary attribute. Other view expressed was that of the possibility of merging the *context* and the *background* as one attribute. This here by suggests that, the framework should consist of six levels instead of the seven it has.

Assessment: Although all the groups are of the opinion that, assessment is a strong attribute and relevant for the framework. Yet about 50 % of the participants across the three groups this attribute is not always integrated into their professional practices. This was observed to be for the reasons of limited knowledge, inaccessible regional data, and non-documentation of strategies and standardised regional design parameters. A typical response was quotes thus;

“There are for example, local strategies mitigate and adapt to the impacts of climate change but not many of such are documented” and another participant also added that *“...some of the local strategies are documented by researchers and some international agencies and such information may only be accessed by those carrying out research only.”*

These statements are implying that, as important as this attribute is to the framework, it has not been utilised in practice. Another follow up question sought to know if there are regional sustainable design parameters and the participants blamed the National Building Code (NBC), which they claimed offers minimum standards for practices and may not necessarily be sustainable in its approach. Again these views may suggest that there is the yearning for a decision tool to be formulated for the built environment sector professionals.

Informed decisions: Participants collectively agreed that, every climatic region need to establish its own peculiarities in order to ascertain what regional inputs are important and relevant to aid the development of a sustainable design guide for each climatic region. However, the participants also did observe that, the challenge for this attribute lays with the ability to successfully carry out a regional assessment. The follow –up question sought to know if they are guided by regional informed decisions in their practices. Divergent views were expressed in the negative; one of such was quotes as:

“Standards or minimum requirements are provided for in the NBC and the some of which are adopted by the approval boards or agencies for approving professional services, but these standards may not be specific or consciously included to climate change impacts or sustainability purposes.”

Again, this statement reveals that, when informed decisions on sustainable practices are provided on the appropriate regional design parameters and features, they are most likely to be use by the built environment professionals to enhance the production of sustainable buildings which in turn, will have a positive bearing on the environment.

Policy actions: Recognising that, effective implementation and application of sustainable guide to sustainable practices within the building industry is necessary, policy action was provided for in the framework. In order to confirm the theoretical underpins on the role of policy actions and its relevance as an attribute, the respondents were asked to make

comments. The importance of policy actions were emphasised by all the three groups and a typical response has been captured as follows;

“...without a sound policy, formulation with strategic or specific action... the implementation of any regional sustainable action for the built environment may not be practiced.”

Collaborations: following the underpinning discourse from earlier sections and the inclusion of collaborations amongst stakeholders in the framework, the opinions of the participants were sought on its relevance. In one of the three groups, 1 (12%) respondent had a contrary opinion on the inclusion of all stakeholders. The opinion of the lone respondent is

“...I do not think an end user should be included in the collaboration, because he or she may not understand the technicalities and the seriousness of such deliberation and at the end causing unnecessary delays in trying to make such a person to him understand the technicalities and measures being discussed.”

The other 88%, who were of the opinion that all stakeholders be involved in the collaborations, gave their reasons to include; promoting harmony within the professionals enhances and aids the actualisation of the set goals of the framework, easier policy formulation and actions, corporate monitoring and evaluation, provision of sector based sustainable parameters and collaborations allow for check and balances.

Output: Respondents were of the opinion that, it is at this final stage that the success of the framework can be measured. This is because in their opinion, it is only after this attribute of the framework that, regional sustainable guides for buildings are considered. It is also only after stage that a tangible design tool is produce and accessible to the public.

Answering the question on what are the respondents offered the following views;

- When utilized the framework would serve as necessary decision tool for the built environment professionals.
- Framework has the potentials to promote the synergy of mitigation and adaptation to climate change.
- The framework has the potentials to limit omissions of some regional peculiarities
- It helps to create avenue for professional collaborations
- Promotes the development of sector based policy formulation and standards
- Encourages sustainable consciousness in the production of new buildings
- Makes the production of new buildings a product of holistic processes
- The framework is also structured to allow for flexibility and periodic feedback.

The final question asked was “Do you think that, this framework is applicable and workable?” The responses across the groups were in affirmation. However, some concerns were resonated to include;

- It may be necessary to also provide a checklist that will serve as guidance to all stakeholders
- That all professional representatives should be asked to sign an undertaking to also train other members of their professions on the workings and processes of the framework

- Administrative bottle necks and corruption may delay the adoption of the framework as well as hinder an effective monitoring and evaluation provided for, by the framework.

6. SUMMARY AND CONCLUSION

This study argued for the use of a sustainable design framework as a mean for actualising the development of regional climate sensitive design guides as a tool for the production of sustainable buildings in order to promote the sustainability of the urban built environment for Nigeria.

Firstly, the study presents the underpinning background review of a framework and discusses the attributes (elements) of the adopted sustainable framework. Secondly, the qualitative inquiry was conducted through three focus groups that were selected from the climatic regions identified. Thirdly, findings from this investigations on each of the attributes contained in the framework revealed that, although the respondents opined that each of the attributes was relevant, it was also observed that; the first two attributes (context and methodology) could be merge as background. The survey also notes that, the framework has a lot of potentials, however, expressed concern that, there are possible challenges that could hinder its workability and application. These challenges include; corruption, administrative bottle necks, sector based coordination due to difference in sustainable targets by each of the profession in the built environment. The robustness of this investigation and the selection of experienced professionals as respondents have placed this study in the public domain for further investigations. Future studies are encouraged for the production of regional sustainable design guides and the formulation of checklists for its application.

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