

An Evaluation of the Adequacy of the National Building Code for Achieving a Sustainable Built Environment in Nigeria

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Abstract: This research set out to assess the adequacy of the National Building Code for achieving a sustainable built environment in Nigeria. In achieving this objective, research survey technique was used, with a total of 50 well - structured questionnaires administered to professionals in the building industry, out of which 40 were received. Descriptive analysis, mean, percentages and ranking factors were used for data analysis. Results showed that the introduction of the NBC is a step forward in improving the quality of building products and hence, achieving sustainable built environment. It was also found that the code has incorporated few sustainable construction measures. However, there are some problems that need to be addressed. Therefore, it was recommended, as part of strategies in which the NBC can promote sustainable built environment, that an efficient enforcement agency, should be established, adequately staffed and funded, to ensure the implementation of the code, especially those provisions concerning sustainable construction. The document should be reviewed to incorporate more sustainable construction measures, especially the use of sustainable waste management and construction methods, renewable building materials, and enforcing environmental impact assessment of projects.

Key words: Adequacy, control measures promotion, national building code, sustainable built environment

INTRODUCTION

The importance of Building Code cannot be over emphasised, for it sets the minimum standards on building pre-design, design, construction and post construction stages with a view to ensuring quality, safety and proficiency of our building industry. According to Snelling (1997) building regulations are designed to secure the health, safety and convenience of people in or about buildings and of others who may be affected by buildings or matters connected with them Anderson *et al.* (2004) noted that building codes are needed in every society to take care of risks posed by lack of uniformity, victims of poor construction, lack of enforcement of other legislations and billions of annual losses, of which 24-40% could be avoided.

This is particularly important in the case of Nigeria where human activities in the built environment were haphazardly carried out, and this led to the deplorable condition of the built environment. Besides that there is serious abuse in the built environment due to careless human activities, evidenced by the unsightly, decaying and dilapidated buildings that become the common features of our national building stock within the built environment, both in cities and villages. (Abiola and Makonjuola, 2005). Other problems are the rampant

building collapses and fire infernos that continuously claim lives and properties, and make the environment very unsustainable. (Mbamali, 2007). These problems received the attention of the government and stakeholders in the construction industry which led to the first ever, National Building Code (2006) which, according to Anejo and Abdulhameed (2008) is aimed at sanitizing the building industry and protecting the environment..

There is no doubt that the promulgation of the National Building Code (2006) is very important development in the building industry in Nigeria, however, to legislate is one thing and to enforce such an important legislation is quite another. For many measures must be put in place in order to make the National Building Code (2006) workable. This include among others, creation of an enabling environment for its operation, enlightenment campaign, provision of all the necessary legal frame works for its operation, etc. This explains the reason why many experts have done alot of work on various issues relating to the National Building Code (2006). These include: Ademoroti (1992) on the need for laws to control buildings in Nigeria, Bamisile (2000) wrote on the need for National Building regulations in Nigeria. Lamoreaux (2002) has undertaken work on understanding building codes and housing codes. Ojambati (2001) has done a work on the need for code of conduct, Building

regulations and bye laws for the building industry in Nigeria, While Abiola and Makonjuola (2005) studied the building regulations in Nigeria with a review of the current and inherent problems, Another research by Jackson(2006) was on how the National Building Code will sanitize construction industry, Similarly Yusufu (2007) wrote on the topic, Building Regulation, what next?

Thus it can be noted that experts have touched many issues relating to the code: need for it, uses, the anatomy of the code, strategies for its implementation/enforcement etc. However, one very important issue that, seems to be neglected is how the NBC can promote sustainability. This is especially important in view of the fact that there are the reciprocal impacts between human actions and the biophysical world. According to Taylor the question is increasingly being asked as to whether current rates of exploitation of resources can be sustained without serious implication for the future. Construction activities put a lot of pressure on the physical environment. For instance, according to Bokinni (2008), building account for one fourth of the worlds wood harvest, two fifth of its material and energy consumption and one sixth of its fresh water usage. Dimson (1998) in Dahiru (2005) also observed that human habitats (buildings) contribute to environment crises through resources depletion, energy consumption air pollution and waste creation. Ajatar (2000), in Dahiru (2005), outlined up to ten different adverse effects of construction activities on the environment, which include land misuse, existing of natural resources, among others. In view of the excessive consumption of resources by the construction industry, it is often called the 'forty percent industry' because it accounts for 40% of natural resources consumption and waste generation. (CIOB, 2001 in Dahiru, 2005).All these have great implications on the environmental quality as well as the survival of man This means measures which improves the quality of human life while living within the carrying capacity of supporting eco-systems (sustainability) should be put in place. It is against this important background that national and international governments are making effort to influence the relationship between development and environment. One important means of achieving this important goal is the Building Code.

This is a report of a study on the assessment of how the National Building Code (2006) can promote sustainability. In to achieve the desired goal, the following objectives were followed:

- To establish, through literature, the concept, origin, objectives and functions of a building code.
- To articulate the concept of sustainability, with special emphasis on measures that will lead to the achievement of a sustainable built environment. .
- To study existing legislations on environment in Nigeria.
- To examine the National Building Code (2006) document, and determine whether or not there are

adequate provisions that can be used to achieve a sustainable built environment in Nigeria.

MATERIALS AND METHODS

The research was undertaken at the Department of Building, Ahmadu Bello University, Zaria - Nigeria between 2009 and 2010; it covers the six geo - political zones in Nigeria.

Population sampling size and technique: Descriptive research approach was used for the study in which a field survey was conducted using well structured questionnaires as the main research instrument. Besides that, a structured oral interview was also undertaken.

The survey was carried out by random sampling of stakeholders in the construction industry, especially lecturers of tertiary institutions, professionals concerned with the building code such as architects, builders, engineers, quantity surveyors, town planners, etc.

Out of the 50 questionnaires distributed, 40 were returned and used for the analysis. The questionnaires solicited substantial information on the National Building Code (2006) in relation to the achievement of a sustainable construction/ built environment in Nigeria from the aforementioned respondents based on their knowledge and experience. The opinions sampled included the respondents' understanding of sustainable construction/built environment, benefits, problems, and measures of achieving sustainable built environment in Nigeria, building code and its benefits to the construction industry and the entire built environment. The questionnaire had three sections, namely; section A, B and C respectively. Section A contained the respondents' profile, section B solicited information on sustainable construction and section C sought information on building code.

Description of data and collection instrument: Structured questionnaires containing closed ended questions with suggested answers, measured on a Likert scale were developed and administered. Four point's scales of the Likert were applied in this work. Most of the data in this research fall under the ordinal scale since they involve rating, which normally uses integers in ascending or descending order for example. Others fall under the nominal scale which tends to classify the data having a particular property but does not imply any idea of rank or priority. The scales were labelled as 1= not important, 2 = less important, 3 = important, 4 = very important, and also 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree were used for determining the level of acceptance of the respondents.

Methods of analysis and presentation: The method used for the analysis was the descriptive analysis. That is, using percentages, mean scores and ranking of some factors. Microsoft excel software was used for such computations.

Table 1: Distribution of questionnaires

Number distributed	50
Number properly completed and returned	40
Percentage response	80%
Field survey (2009)	

Table 2: Professions of respondents

Profession	Number distributed	Number of responses	Percentage of response
Architects	10	8	80
Builders	13	9	69
Engineers	11	8	72
Quantity surveyors	7	7	100
Town planners	9	8	88
Total	50	40	80
Field survey (2009)			

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

Data presentation and analysis: Results obtained from the research are presented under the following appropriate headings and subheadings.

Breakdown of respondents: Looking at Table 1, it can be observed that 80% of the questionnaires distributed were returned. While, Table 2 shows the breakdown of the questionnaires from 40 respondents. Architects returned 80%, Builders 69%, Engineers 72%, Quantity Surveyors 100% and Town Planners 88%.

With respect to qualifications of the respondents, Table 3 shows that: 7.5% have a National Diploma (ND), followed by 35% Bachelor of Science degree (B.Sc.), 20% with Higher National Diploma (HND), 30% with Master of Science degree (M. Sc.) and 75% with Doctorate degree (PhD). In terms of their working experience, majority of the respondents have experience ranging from 0-5 (i.e. 42%), then 5-10 years experience (22%), followed by those with more than 20 years of experience (20%) then 10-15 and 15-20 years 7.5% each.

From Table 4, it can be observed that all the respondents claimed that they are aware of the concept of sustainability, while majority of them said they heard of sustainable development and sustainable built environment (i.e., 80 and 65% respectively).

The study gauged the perception of the respondents on the concept of sustainability. As can be observed from Table 5, 10% of them believed that it is the characteristics of a process or state that can be maintained indefinitely, another 10% opined that it is a process that tells of a development of all aspects of human life, and 40% hold the view that sustainability means providing for the best for the people and the environment both now and in the indefinite future, while a significant number of the respondents are of the opinion that it is meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Table 6 shows the responses from questionnaires on the measures of achieving sustainable built environment in Nigeria. The result shows that use of local, reusable and non hazardous materials averaged 3.48, meaning it is

important, while use of environmentally friendly waste management method averaged 3.6 (important), use of clean technologies that require less energy averaged 3.33 (important), provision and enforcement of building codes, regulations, etc averaged 3.62 (important), imbibing sustainable construction methods in building codes averaged 3.64 (important), development of new building materials averaged 2.93 (important), methods of demolition that result in more reuse of materials averaged 2.83 (important), use of traditional construction methods averaged 2.36 (less important), while encouraging sustainable design and construction practices averaged 3.72 (very important). The result indicates that the respondents believed firmly that most of the measures of achieving sustainable construction/ built environment are important.

Table 7 shows responses from questionnaires on the benefits derived from sustainable construction/built environment. It brings about savings on construction cost averaged 3.32, which means it is important, reduce impacts on the environment averaged 3.57 (important), waste reduction during construction and operation averaged 3.50 (important), energy conservation averaged 3.45 (important), natural resources conservation averaged 3.45 (important), and biodiversity protection averaged 3.29, meaning it is important also. This indicates that the respondents accepted all the benefits of the sustainable construction/built environment to be important.

Table 8 is about the problems affecting sustainable construction/built environment. Poverty and low urban investment averaged 2.95, meaning it is agreed upon, lack of knowledge of sustainable practices averaged 3.25 (agree), lack of technical know how averaged 3.07 (agree), lack of awareness averaged 3.23 (agree), lack of interest by construction professionals and stakeholders averaged 2.39 (disagree), lack of enabling environment in form of building codes averaged 2.74 (agree), lack of compliance with the relevant existing statutory documents averaged 3.35 (agree). This indicates that the respondents agree with the problems affecting sustainable construction/built environment in Nigeria.

Table 9 shows the respondents' assessment of the measures to be included in the building code to ensure sustainable built environment. During site selection, Putting charges on agricultural/virgin land used for construction averaged 2.50, meaning that the respondents disagree with the option, provision of incentives for utilising abandoned sites and water logged or marshy areas averaged 2.85 (agree), at the design stage. Encouraging synergistic design approach averaged 3.24 (agreed), maintain traditional values of the people of the area averaged 2.94 (agree), ensure energy efficiency in the design averaged 3.30 (agree), undertake environmental impact assessment of the project averaged 3.48 (agree), specification of local, reusable and affordable materials averaged 3.31 (agree), at construction stage, ensure/encourage tree plantation on every residential development averaged 3.30 (agree), use of

Table 3: Details of respondents

Qualification			Work experience		
Qualification	Frequency	Percentage	Experience	Frequency	Percentage
ND	3	7.5	0-5 years	17	42.5
HND	8	20	5-10 years	92	2.5
B. Sc.	14	35	10-15 years	3	7.5
M. Sc.	12	30	15-20 years	3	7.5
P. hd.	3	7.5	Above 20 years	8	20
Total	40	100	Total	40	100%

Field survey (2009)

Table 4: Awareness of professionals

Response	Sustainability concept		Sustainable development		Sustainable built environment	
	No. of response	% of response	No. of response	% of response	No. of response	% of response
Yes	40	100	38	80	34	85
No	-	0	2	20	6	15
Total	40	100%	40	100%	40	100%

Field survey (2009)

Table 5: Respondents perception of sustainability

S/N	Definitions	No. of responses	% of response
1	Meeting the needs of the present without compromising the ability of the future generations to meet their needs	24	60
2	Characteristics of a process or state that can be maintained indefinitely	4	10
3	A process that tells of a process of a development of all aspects of human life	4	10
4	Providing for the best for the people and the environment both now and in the indefinite future	16	40
	Total	40	100%

Field survey (2009)

Table 6: Measures of achieving sustainable built environment

S/N	Measures	Frequency of response				$\sum f$	$\sum fx$	Mean (\bar{x})
		1	2	3	4			
1	Use of local, reusable and non hazardous materials	0	4	12	23	39	136	3.48
2	Use of environmentally friendly waste management methods	0	0	14	24	38	138	3.63
3	Use of clean technologies that require less energy	1	3	17	18	39	130	3.33
4	Provision and enforcement of building codes	1	1	10	28	40	145	3.62
5	Imbibing sustainable construction measures in building codes	0	2	14	24	39	142	3.64
6	Increased awareness on the concept of sustainability	0	0	12	26	38	140	3.68
7	Development of new building materials	1	11	18	10	40	117	2.93
8	Methods of demolition that result in more reuse of materials	2	11	19	8	40	113	2.83
9	Use of traditional construction methods	14	4	14	7	39	92	2.36
10	Encouraging sustainable design and construction practices	1	0	12	27	39	145	3.72

1: Not important; 2: Less important; 3: Important; 4: Very important. Field survey (2009)

Table 7: Benefits derived from sustainable construction/built environment

S/N	Benefits	Frequency of response				$\sum f$	$\sum fx$	Mean (\bar{x})
		1	2	3	4			
1	Savings on construction cost	1	5	10	19	40	133	3.32
2	Reduce impacts on the environment	0	2	13	25	40	143	3.57
3	Waste reduction during construction & operation	0	1	18	21	40	140	3.50
4	Energy conservation	1	4	11	24	40	138	3.45
5	Natural resources conservation	0	2	18	20	40	138	3.45
6	Biodiversity protection	1	1	22	14	38	125	3.29

1: Not important; 2: Less important; 3: Important; 4: Very important. Field survey (2009)

local and reusable materials averaged 3.26 (agree), use of clean and energy efficient technology averaged 3.24 (agree), use of energy equipments by operatives averaged 3.37 (agree), use of traditional construction methods averaged 2.57 (disagree). This indicates that the respondents agreed to all these measures of achieving sustainable construction/built environment through the building code, except two.

Oral interview: Oral interview with some experienced professionals was conducted in an attempt to deal with other aspects of the objectives. Below are the results of the interview.

- The factors that may hinder effective functioning of the building code and hence, the achievement of sustainable built environment are:

Table 8: Problems affecting sustainable construction/built environment

S/N	Problems	Frequency of response						Mean (x')
		1	2	3	4	∑f	∑fx	
1	Poverty and low urban investment	7	5	10	17	39	115	2.95
2	Lack of knowledge of sustainable practices	1	4	19	16	40	130	3.25
3	Lack of technical know how	1	8	18	13	40	123	3.07
4	Lack of awareness	1	4	20	15	40	129	3.23
5	Lack of interest by construction professionals and stakeholders	7	13	14	4	38	91	2.39
6	Lack of enabling environment in form of legislation like building codes, regulations, etc	6	11	9	13	39	107	2.74
7	Lack of compliance with the relevant existing statutory documents	1	4	15	20	40	134	3.35

1: Strongly disagree; 2: Disagree; 3: Agree; 4: Strongly agree. Field survey (2009)

Table 9: Sustainability provisions to be included in the building code

S/N	Provisions	1	2	3	4	∑f	∑fx	Mean (x')
Site selection								
1	Charges on agricultural/virgin land to be used for construction	4	12	16	4	36	90	2.5
2	Provision of incentives/supports for utilizing abandoned sites/marshy areas	2	9	15	8	34	97	2.85
Design stage								
3	Encourage synergistic design approach	2	4	11	16	33	107	3.24
4	Maintain traditional values of the people/area	1	5	25	5	36	106	2.94
5	Ensure energy efficiency in design	1	5	22	8	36	109	3.03
6	Undertake environmental impact assessment of the project	0	2	12	21	35	122	3.48
7	Specification of local, reusable and affordable materials	0	3	18	14	35	116	3.31
Construction stage								
8	Ensure/encourage tree plantation in every residential development	0	4	17	15	36	119	3.30
9	Ensure the use of local/reusable materials	0	4	18	13	35	114	3.26
10	Use of clean /energy efficient technologies	0	4	18	12	34	110	3.24
11	Use of safety equipments by operatives	1	1	17	16	35	118	3.37
12	Use of traditional construction methods	3	13	15	4	35	90	2.57

1: Strongly disagree; 2: Disagree; 3: Agree; 4: Strongly agree. Field survey (2009)

- Lack of effective enforcement agency.

Inefficient supervision of construction works.

- Lack of publicity of the code.
- There were some statutory provisions regarding construction and the environment previously in Nigeria, such as the FEPA 1992, EIA, various state edicts and bye laws, which can help in ensuring sustainable built environment, but they were not properly implemented and uniform for the whole country. It was then foreseen that the introduction of the NBC can serve as a check when it comes to their enforcement.
- Foreign origin of the building code: Respondents were of the view that the National Building Code (2006) evolved from foreign legislations, most of which are not applicable to our environment, and no serious efforts are made to fully implement, talk less of reviewing it to suit our own conditions.
- Inadequate sustainable construction measures: The investigation revealed that the, National Building Code (2006), incorporated sustainable construction measures, only to an extent; for instance, there are not enough provisions with regards to the issues of research and technical development on new renewable building materials.

DISCUSSION OF RESULTS

From the survey results, it was seen that

Awareness of respondents: The field survey result revealed that majority of the respondents are conversant with the concept of sustainability and building codes, looking at the percentage (60%) of the respondents that perceived sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”. This shows that there is, to a very appreciable extent, some level of awareness from the respondents on the general concept of sustainability. Similarly, it also portrays that all the respondents are aware of building code and its purposes only that, little awareness is there on the evolution and provisions of the National Building Code (2006) in Nigeria, and this calls for more enlightenment on the needs and functions of the document.

Sustainability in the building code: The respondents are of the view that the new NBC document is short of provisions that can enhance the achievement of a sustainable built environment in Nigeria, since it does not dwell much on issues like sustainable design and construction measures and sustainable construction

materials. For instance, no much attention was given to energy efficiency of designs; energy saving components like bulbs; low emission materials; ensuring tree plantation in new construction sites; and so on. They therefore agreed to the importance of encouraging sustainable design and construction practices (3.73) and increased awareness on the concept of sustainability (3.68) as some of the measures of achieving sustainable built environment.

Existing legislations: investigation revealed that there were some legislation on the environment in Nigeria, like the Environmental Impact Assessment (EIA), various state edicts and so on, but lack of enforcement and/or compliance was noted as a major challenge to the achievement of sustainable built environment in Nigeria (3.35). It was then observed that the National Building Code (2006) can be used to ensure compliance with such legislations. For instance, it should mandate the use of EIA for granting approval of construction works, and other legislations can also be enforced by the code.

Review of the document: there was a unanimous agreement among the respondents on the need for review of the NBC to incorporate more sustainable construction measures at the pre-design, design and construction stages like synergistic design approach (3.24) ensuring tree plantation (3.30) and so on. They also reputed the suggestion of charges on the use of virgin/agricultural lands used for construction purposes (2.50), and the use of traditional construction methods (2.57).

Other aspects of sustainability: The achievement of a sustainable built environment through the building code, according o some of the respondents, cannot be fully actualised without proper attention being paid to other aspects of sustainability such as the social and economic aspects.

The social aspect should be considered by making provisions that can ensure the preservation of the socio cultural values of people, such as the protection and maintenance of all structures of historical and cultural importance for the improvement of our traditional architecture. Some of these are the ancient city walls and gates, palace buildings, courts, religious and others that portray the cultural heritage of the country. Moreover, design of buildings in, especially the ancient cities should be made to depict the traditional values of the area, through the building code.

Similarly, there should be some restrictions regarding zoning or citing of buildings and other projects such as dams, large commercial and industrial structures that may require the input of foreigners during construction in order to limit interaction between them and the inhabitants of the area so that their cultural values will be preserved.

On the issues of traditional construction, the respondents were of the view that the building code

should promote the joint research works between the professionals and traditional/local builders in order to improve and preserve the traditional construction methods for greater productivity and efficiency.

The respondents also opined that the enforcement of EIA should be community driven, such that any large construction project should be advertised on national dailies for the people and NGOs concerned to express their approval or disagreements before such a work is allowed to be carried out. This will go a long way in ensuring ecological integrity and protection of biodiversity.

It was however observed that the economic aspect of sustainability has been taken care of by the building code in issues of quality and local renewable construction materials. another issue that is not covered is the area of investment on tourism for improved economic development.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary: The study found that

- The respondents believed that the measures outlined in the questionnaire are important for the achievement of a sustainable built environment in Nigeria, except the use of traditional construction methods.
- All the benefits outlined for sustainable built environment were seen as important.
- Out of the problems/challenges stated, the most agreed upon by the respondents was lack of compliance with the relevant existing statutory documents, (3.35), and the disagreed was lack of interest by professionals and stakeholders, (2.39).
- All the respondents believed that the, National Building Code (2006) needs future review.
- On the sustainability provisions to be included in the building code, the respondents agreed with all, except charges on agricultural/ virgin lands used for construction purposes (2.5), and the use of traditional construction methods (2.57)

CONCLUSION

Based on the results of the research, the following conclusions were arrived at:

- The sustainable construction measures in the National Building Code (2006) are insufficient.
- The relevant existing legislations regarding the environment are not enforced.
- There were some legislation regarding building and environment, in existence in some parts of the country, before the new national building code, but were not uniform for the whole country and not effectively enforced.

- The National Building Code (2006) is a step forward in realising sanity and sustainability in the Nigerian built environment, but it has some flaws and other challenges that must be addressed, for it to effectively perform the functions.
- The document needs to be circulated and publicised among the professionals and other stakeholders for effective compliance with the sustainable construction measures in it.
- There is need for a well organised enforcement system, free from corruption to gear up the enforcement of the building code, hence achieving sustainable built environment

Recommendations: Based on the results obtained in this research, the followings are recommended:

- One of the ways of achieving sustainability is the use of EIA. The NBC should be used to enforce it, by incorporating it as part of the conditions for approval of construction.
- The federal government should, as a matter of urgency, establish the building code enforcement agency to facilitate immediate take up of the National Building Code (2006) so as to achieve through it, sustainable built environment.
- There should be a proper enlightenment of stakeholders and the general public on the need to adhere to the provisions of the building code.
- A periodic, say five or ten year review should be adopted for the document to make it up to date, after an immediate one that should be carried out to incorporate more sustainable construction measures.
- There should be more provisions for ensuring sustainable built environment, such as waste management methods and renewable building materials, sustainable construction methods, and environmentally friendly buildings, e.t.c, in the NBC.
- Incentives and other forms of support should be provided by governments, Non Governmental Organisations (NGOs), and professional bodies for upholding to the sustainable construction measures of the building code by any firm or individuals by making the materials tax free or by granting loans.
- More cooperation and understanding is required among professionals and other stakeholders in the built environment in order to promote a sustainable built environment through the building code.
- More efforts should be made in the area of research and technical development on sustainable construction materials, green building, sustainable construction and waste management methods, code advancement and energy efficient building codes, such as the ones used in the United States of America.

**Appendix:
Questionnaire**
Department of Building,

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Dear Respondent,

This questionnaire is being administered as part of an undergraduate research project at the Department of Building, Faculty of Environmental Design, Ahmadu Bello University, Zaria. It is designed to gather relevant information on the role of the National Building Code (2006) in promoting a sustainable built environment in Nigeria. You are required to, please complete this questionnaire. All information would be treated confidentially and strictly used for academic purposes only.

Section A; (Personal Data)

- Name of Respondent(optional)
- Profession (please tick as appropriate)
() Architecture, () Building, () Quantity Surveying, () Engineering, () Urban and Regional Planning, () others, please specify
- Years of Experience
()0-5 ()5-10 ()10-15 ()15-20 ()above 20years

Job title/Designation

- Highest Qualification Obtained
() ND () HND () B. Sc () M. Sc. () Phd.
() Others, Please state

Section B: Sustainability

- Have you heard of the term Sustainability? () Yes () No
- Sustainable Development () Yes () No
- Sustainable built environment () Yes () No
- Sustainability has been defined in diverse ways, what in your opinion is sustainability? (Tick all that apply)
() Meeting the needs of the present without compromising the ability of the future generations to meet their own needs.
() Characteristic of a process or state that can be maintained indefinitely.
() A process that tells of a development of all aspects of human life.
() Providing for the best for the people and the environment both now and in the indefinite future.
() Ability of an ecosystem to maintain ecological processes, functions, biodiversity, and productivity into the future.
- What has been your source of information on Sustainability/Sustainable development?
() Personal Research, () Seminars attended, () Courses attended, () Media/ Articles () Co workers, () Clients, () Others,(Please specify)
- What benefits of sustainability/sustainable development do you know?
() Environmental Benefits.
() Economic Benefits.
() Social Benefits.
- Do you see the need for sustainable construction/sustainable built environment?
() Yes () No
- Rate the following measures of achieving sustainable construction/built environment in Nigeria, according to their level of importance, using scale 1-4 (where 1=not important, 2=less important, 3 = important, 4 = very important)

Measures	1	2	3	4
Use of local, reusable, and non hazardous materials that do not require long distances, energy consuming transport				
Use of environmentally friendly waste management methods				
Use of clean technologies that require less energy				
Provision and enforcement of building codes, regulations, etc				
Imbibing sustainable construction methods in building codes				
Increased awareness on the concept of sustainability				
Research and technical development especially in areas				

of new building materials
 Methods of demolition (deconstruction) that result in more reuse of materials
 Use of traditional construction methods
 Encouraging sustainable design and construction practices
 Cooperation between professionals in the construction industry
 Others, please list.

- Do you employ sustainable practices in your projects? () Yes () No
- Do you believe any benefit(s) can be reaped from sustainable construction/built environment? () Yes () No
- Rate the following benefits of sustainable construction/built environment according to their levels of importance, using scale 1-4 (where 1=not important, 2= less important, 3=important, 4=very important.)

Benefits	1	2	3	4
Savings on construction cost				
Increased competitiveness				
Reduce impacts of on the environment				
Waste reduction during construction and operation				
Energy and water conservation				
Climate stabilization				
Natural resources conservation				
Biodiversity protection				
Air and water quality protection				
Soil protection and flood prevention				
Others, please list				

- Kindly assess the following problems affecting sustainable construction/built environment in Nigeria, using scales 1-4, where 1=strongly disagree, 2=Disagree, 3=Agree, 4=strongly agree.

Problems	1	2	3	4
Poverty and low urban investment				
Lack of urban construction policy				
Lack of knowledge of sustainable practices				
Lack of technical know how				
Lack of professionals to handle the task				
Lack of efficiency to manage growing demands for public services				
Lack of awareness				
Lack of interest by construction professional s/stakeholders				
Lack of enabling environment such as legislations like building codes, building regulations, etc				
Lack of compliance with the available relevant statutory documents				
Others, Please state				

Section C: Building Code

- Which of the following have you heard about? (tick all that apply)
 Building Act () Yes () No
- What, in your opinion, are the purposes of building codes/regulations? (tick all that apply)
 Build safe buildings ()
 Ensure health and safety of occupants ()
 Fire protection ()
 Avoid property Damage ()
 Enhance sustainable practices ()
 Ensure conservation of fuel and power ()
 Environmental protection ()
 Building Code () Yes () No
 Building Regulation () Yes () No
 Building Bye-law () Yes () No

- Do you know of any statutory legislation previously used for building projects in Nigeria?
 () Yes () No
- If yes, select the one(s) you know
 British standard ()
 Building Bye-law ()
 National Building code ()
 Codes of practice ()
- What is your view about the relevance of the newly evolved National Building Code N B C (2006)?
 () Relevant () Not Relevant
- Are the provisions of the code adequate to solve the Nigerian built environmental problems? () Yes () No
- Rate the following areas addressed by the building code in order of adequacy, using scale 1-4, (where 1= Not addressed, 2= Not adequately addressed, 3=Adequately addressed, 4=Very adequately addressed)

Areas	1	2	3	4
Building materials and components				
Waste management				
Fire Safety				
Structural stability				
Maintenance				
Energy audit				
Environmental impact of construction				
Others, please state				

- Do you think the code can bring about any environmental benefits in Nigeria? () Yes () No
- If yes, what benefits can be derived from it? (select all that apply)
 Ensure construction quality ()
 Safeguard the environment ()
 Check out quacks from the construction industry ()
 Others, please state.
- Kindly assess the following practical measures, which may/ or may not be provided for, through which the National Building Code (2006) would ensure the achievement of sustainable built environment in Nigeria, using scale 1-4 (where 1=Strongly disagree, 2=Disagree, 3=Agree, 4=strongly agree)

Measures	1	2	3	4
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Site Selection

Charges on agricultural/virgin lands used for construction
 Provision of incentives/supports for utilizing abandoned sites, water logged, landfills, and swampy /marshy areas etc
 Others, please state

Design Stage

Encourage synergistic design approach (where all stakeholders participate in coming up with a design)
 Maintain traditional values of the people/area
 Ensure energy efficiency in the design
 Undertake environmental impact assessment of the project
 Specification of local, reusable and affordable materials
 Others, please state

Construction Stage

Encourage/ensure tree plantation in every residential development
 Ensure the use of local/ and reusable materials
 Use of clean and energy efficient technologies
 Use of safety equipments by operatives
 Use of traditional construction methods
 Others, please state

- Below are some important documents that should be included before a permit is granted for a construction project. Which of them is provided for in the National Building Code (2006)?
 Project quality plan ()
 Drawings and specifications ()
 Bill of quantities ()
 Environmental impact assessment ()
 Project health and safety plan ()
 Waste management plan ()
- Do you think the title of the document 'Building Code' is appropriate?
 () Yes () No
- If No, which title do you consider better?
 Building Regulation ()
 Building Act ()
 Others, Specify
- Has the code incorporate sustainable construction measures?
 () Yes () No
- Do you think the code requires any future review?
 () Yes () No
- If yes, at what interval?
 () 5yrs () 10yrs () 15yrs () 20yrs
- Do you think is necessary to comply with the provisions of the code?
 () Yes () No
- If yes, why?
 In order to ensure minimum standards of quality ()
 In order to protect the environment ()
 In order to enhance sustainable construction ()
- How do you think the enforcement of the code would be effective?
 By sanctioning the violators ()
 By public enlightenment campaign ()
 By ensuring strict supervision of construction works ()

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