

# Environmental Impact Resulting from Unplanned Building in Nigeria

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**Abstract:** The construction industry in Nigeria plays an important role in the economy. The activities of the industry are also vital to the achievements which include providing shelter, infrastructure and employment. This research paper is aimed at assessing the drawn information from Nigeria, where construction activities of unplanned buildings are affecting the environment and the governments inefficiency to provide for the public safer housing for the people. The purpose of this research is to identify the environmental impact resulting from unplanned building in Nigeria. Building of houses on waterways and land reclamation for construction are the ways the activities have made the situation worse and people raising structures on waterways and inappropriate construction of water ways as well.

**Keywords:** Complains, Waterways, Construction, Settlements.

## 1. INTRODUCTION

The environmental and construction industry have always worked close together and are growing closer with each generation. Environmental issues in construction typically includes soil, and ground contamination, water pollution, construction and demolition waste, etc. A method of analysis was formulated and distributed out based on the responses on the questionnaire and based on the nature of construction in Nigeria, the results indicated that guidelines and regulations are not being followed, there has been a high frequency in the number of collapsed building/structures in recent time, individuals were internally displaced, and loss of lives were recorded due to flooding, and more unflattering answers from the questionnaire.

In Nigeria, the problem of delays is severing, especially when one is considering the current economic condition of the country. Construction and engineering services industry play an important role in the economic uplift and development of the country. The construction industry is also a prime source of employment generation offering job opportunities to millions who are unskilled and skilled in the work force. Therefore, this paper aims to shine light at the relationship between construction output and economic growth in Nigeria in a new to determine the influence of the construction sector on the economy.

## 2. LITERATURE REVIEW

Rapid urbanization and inadequate capacity to cope with the housing needs of people in urban areas have contributed to the development of unplanned settlements. According to The Guardian, (2019) the continuous rise in the population of the state and the increasing need to accommodate this influx has led to a situation where all manner of clusters is gated and they suddenly take up the appellation estates.

According to KNUPDA (2009), in recent years, the state capital of Nigeria (Abuja) has attracted enormous population increase and concomitant socio-economic activities, bringing along a growth of related unplanned structures especially along our major roads and streets. The situation has undoubtedly reached an alarming proportion, resulting in substantial changes negatively bearing on both the social and physical outlook of the city. There have been many expressions of concern about this situation from individuals and groups in and outside the media.

Aluko O.E, the growth and physical expansion of cities have been accompanied by unplanned urban sprawl, deterioration, deficiencies in modern basic facilities, and general urban decay. As increased poverty and urbanization exert more pressures on urban facilities, most Nigerian cities tend to have lost their original dignity, social cohesion and administrative efficiency.

Babatola, 2021, A Professor of Water resources and Environmental Engineering warned that the rate of unplanned building and arbitrary urbanization in the country is causing a lot of damage to environment and other natural resources. He said if more proactive measures are not put in place to control unbridled urbanization, the environment will continue to degenerate with disastrous consequences for its inhabitants

In recent times, there have been incidents of buildings collapsing including the capital. Unplanned and unregulated buildings are occasionally damaged and tilted in different parts of the country causing loss of life and property. Many buildings are tilting without any major earthquakes, natural disasters or landslides and these issues are now creating a kind of panic among the people. Especially in the capital, the number of building collapses has increased in the country recently.

Ojo et al. (2013), attributed the predominant causes of building collapse to the non-adherence to approved building plans before construction commencement, non-compliance with approved standards by developers, the use of substandard materials, inefficient stringent quality control in material utilization and management, lack of proper supervision on construction works, boycotting the professionals.

Unplanned building also affects the growth of development in some areas. According AMIR, (2009) Due to rapid and uncontrolled growth, millions of these cities' inhabitants live in slums. It is now common for 30 to 60 percent of an entire city's population to live in houses and neighborhoods that have been developed illegally. It is very rare for Governments to furnish infrastructure and 26 services essential for health and well-being - piped water, sewers, storm drainage, all-weather roads, public transit, electricity and health care - to those who build illegally. When the authorities lack the political and organizational will to dismantle illegal neighborhoods, they tolerate them and simply bulldoze others. Housing in squatter settlements is illegal in two senses. First, land is occupied illegally and the site is developed without regard for zoning and subdivision regulations (i.e., concerning the permitted use of the land, permitted density, water supply, drainage, and access roads). Second, many individuals and businesses profit from the development of illegal communities or the needs of their inhabitants. Landowners, land developers, and businesses make money from buying and selling land illegally and, in some cases, extensive and highly profitable landlordism has developed.

### **3. METHODOLOGY**

Questionnaire was used to elicit the views of respondents.

Questionnaires comprising of 20 questions each was distributed to 60 randomly selected construction practitioners; Architects, Surveyors, Estate Developers, site workers, Building/Construction Engineer and individuals domiciled in the mostly affected areas in Nigeria

Data Collected were analysed using Anova with software package R.

#### **3.1 Statistical Methods**

##### **Environmental Impacts Questionnaire**

The purpose of this questionnaire is to identify the environmental impact resulting from unplanned building in Nigeria. Please answer all question. This section contains series of question related to environmental impacts indicators. These questions are given weights based on scale from 1 (strongly Agree) to 5 (strongly Disagree)

#### 4. DISCUSSION/RESULT ANALYSIS

S/N	Indicators	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)
1	There has been a massive influx of people in this area.	30	20	5	4	1
2	The rate of building construction has increased drastically within the last 6 months	20	35	3	1	1
3	Landowners obtain certificate of occupancy from the government	20	5	15	13	7
4	Individuals engaged building professionals before construction.	20	5	10	20	5
5	Landowners obtain survey document before purchasing land	10	5	30	13	2
6	physical planning / housing guidelines are followed when building.	10	10	15	5	20
7	Several land disputes have resulted in the purchase of land between individual	20	20	10	5	5
8	Increase rate in land reclamation for building, and construction	30	25	3	1	1
9	There are sanctions to individual who faulted physical and housing guidelines	5	5	5	10	30
10	There are good road network in this area	5	5	15	25	10
11	There are good Drainage systems in this area.	10	7	10	28	5
13	Demolition for house occurs when government are constructing road.	30	20	5	3	2
14	High frequency in the number of collapsed building/structures in recent time	20	20	10	5	5
15	There have been damaged to property because of Flooding in this area	30	20	5	1	4
16	traffic congestion is moderate in this area	10	7	10	28	5
17	Effective scrutinizing by planning approval authorities during building activities	10	10	10	10	20
18	Monitoring the level of compliance of buildings before and during construction with the operational building codes and bye-laws in the area	10	10	5	15	20
19	Building approval process are stringent	10	10	15	23	2
20	Individuals were internally displaced, and loss of lives were recorded due to flooding	20	15	5	10	10

This section contains series of question related to environmental impacts indicators. These questions are given weights based on scale from 1 (strongly Agree) to 5 (strongly Disagree)

We merged the strongly agree column agree column together and strongly disagree and disagree column together to be able to analysis response data using Anova software package R

S/N	Indicators	Strongly Agree (1) and Agree	Strongly Disagree (4) and disagree	Neutral (3)
1	There have been a massive influx of people in this area.	50	5	5
2	The rate of building construction has increased drastically within the last 6 months	55	2	3
3	Landowners obtain certificate of occupancy from the government	25	20	15
4	Individuals engaged building professionals before construction.	25	25	10
5	Landowners obtain survey document before purchasing land	15	15	30
6	physical planning / housing guidelines are followed when building.	20	25	15
7	Several land disputes have resulted in the purchase of land between individual	40	10	10

8	Increase rate in land reclamation for building, and construction	55	2	3
9	There are sanctions to individual who faulted physical and housing guidelines	15	40	5
10	There are good road network in this area	10	35	15
11	There are good Drainage systems in this area.	17	33	10
13	Demolition for house occurs when government are constructing road.	50	5	5
14	High frequency in the number of collapsed building/structures in recent time	40	10	10
15	There have been damaged to property because of Flooding in this area	50	5	5
16	traffic congestion is moderate in this area	17	33	10
17	Effective scrutinizing by planning approval authorities during building activities	20	30	10
18	Monitoring the level of compliance of buildings before and during construction with the operational building codes and bye-laws in the area	20	35	5
19	Building approval process are stringent	20	25	15
20	Individuals were internally displaced, and loss of lives were recorded due to flooding	35	20	5

is.discrete, summarize

The following objects are masked from 'package:base':

format.pval, units

Attaching package: 'ggpubr'

The following object is masked from 'package:plyr':

mutate

```
In [7]: 1 T = read.csv("/Users/oma55/OneDrive - University of Pittsburgh/Desktop/LING 2144/T2.csv")
```

```
In [8]: 1 head(T)
```

A data.frame: 6 × 5

	S.N	Indicators	Agree	Disagree	Neutral
	<int>	<chr>	<int>	<int>	<int>
1	1	There have being a massive influx of people in this area.	50	5	5
2	2	The rate of building construction has increased drastically within the last 6 months	55	2	3
3	3	Landowners obtain certificate of occupancy from the government	25	20	15
4	4	Individuals engaged building professionals before construction.	25	25	10
5	5	Landowners obtain survey document before purchasing land	15	15	30
6	6	physical planning / housing guidelines are followed when building.	20	25	15

```
In [9]: 1 T$Indicators=as.factor(T$Indicators)
```

```
In [11]: 1 summary(T)
```

```

S.N
Min. : 1.00
1st Qu.: 5.50
Median :10.00
Mean :10.42
3rd Qu.:15.50
Max. :20.00

Indicators
Landowners obtain survey document before purchasing land : 1
physical planning / housing guidelines are followed when building. : 1
Building approval process are stringent : 1
Demolition for house occurs when government are constructing road. : 1
Effective scrutinizing by planning approval authorities during building activities: 1
High frequency in the number of collapsed building/structures in recent time : 1
(Other) :13
  Agree Disagree Neutral
Min. :10.00 Min. : 2.00 Min. : 3.000
1st Qu.:18.50 1st Qu.: 7.50 1st Qu.: 5.000
Median :25.00 Median :20.00 Median :10.000
Mean :30.47 Mean :19.74 Mean : 9.789
3rd Qu.:45.00 3rd Qu.:31.50 3rd Qu.:12.500
Max. :55.00 Max. :40.00 Max. :30.000

```

```
In [13]: 1 library(reshape2)
2 TN <- reshape2::melt(T, id.vars = c("Indicators"),
3 measure.vars = c("Agree", "Disagree", "Neutral"))
```

```
In [14]: 1 head(TN)
```

A data.frame: 6 × 3

	Indicators	variable	value
	<fct>	<fct>	<int>
1	There have being a massive influx of people in this area.	Agree	50
2	The rate of building construction has increased drastically within the last 6 months	Agree	55
3	Landowners obtain certificate of occupancy from the government	Agree	25
4	Individuals engaged building professionals before construction.	Agree	25
5	Landowners obtain survey document before purchasing land	Agree	15
6	physical planning / housing guidelines are followed when building.	Agree	20

```
In [15]: 1 str(TN)
```

```

'data.frame': 57 obs. of 3 variables:
 $ Indicators: Factor w/ 19 levels " Landowners obtain survey document before purchasing land",...: 18 13 10
 8 1 2 12 7 16 15 ...
 $ variable : Factor w/ 3 levels "Agree","Disagree",...: 1 1 1 1 1 1 1 1 1 1 ...
 $ value : int 50 55 25 25 15 20 40 55 15 10 ...

```

```
In [23]: 1 summary_stats2 <- summarySE(TN, measurevar="value", groupvars=c("variable"))
2 print(summary_stats2)
```

```

variable N value sd se ci
1 Agree 19 30.473684 15.47172 3.549457 7.457133
2 Disagree 19 19.736842 12.71413 2.916822 6.128015
3 Neutral 19 9.789474 6.44273 1.478064 3.105297

```

```
In [24]: 1 ggplot(data = TN, aes(x = variable, y = value, fill = variable)) +
2         geom_boxplot(outlier.size = 0) +
3         geom_point(pch = 25, position = position_jitterdodge())+
4         xlab("")
5         ylab("")
6         ggtitle("Environmental Indicator")
7         theme(aspect.ratio=4/6)
```

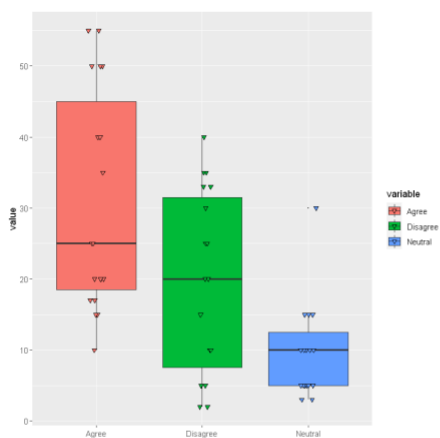
```
$y
[1] ""

attr(,"class")
[1] "labels"

$title
[1] "Environmental Indicator"

attr(,"class")
[1] "labels"

List of 1
 $ aspect.ratio: num 0.667
- attr(*, "class")= chr [1:2] "theme" "gg"
- attr(*, "complete")= logi FALSE
- attr(*, "validate")= logi TRUE
```



```
In [26]: 1 skewness(T$Agree)
2         skewness(T$Disagree)
3         skewness(T$Neutral)
```

```
0.429310196616806
-0.0304807918436149
1.60843285959431
```

```
In [28]: 1 shapiro.test(T$Agree)
        2 shapiro.test(T$Disagree)
        3 shapiro.test(T$Neutral)
```

```
Shapiro-Wilk normality test

data: T$Agree
W = 0.86958, p-value = 0.01421

Shapiro-Wilk normality test

data: T$Disagree
W = 0.91791, p-value = 0.1035

Shapiro-Wilk normality test

data: T$Neutral
W = 0.80515, p-value = 0.001359
```

```
In [29]: 1 TN.aov <- aov(value ~ variable, data=TN)
        2 summary(TN.aov)
```

```
          Df Sum Sq Mean Sq F value    Pr(>F)
variable   2   4066   2033.2   13.78 1.46e-05 ***
Residuals 54   7966   147.5
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

12/5/22, 1:08 PM

Texas Analysis - Jupyter Notebook

```
In [30]: 1 TukeyHSD(TN.aov)
```

```
Tukey multiple comparisons of means
95% family-wise confidence level

Fit: aov(formula = value ~ variable, data = TN)

$variable
      diff      lwr      upr    p adj
Disagree-Agree -10.736842 -20.23335 -1.2403298 0.0231622
Neutral-Agree  -20.684211 -30.18072 -11.1876982 0.0000078
Neutral-Disagree -9.947368 -19.44388 -0.4508561 0.0381068
```

```
In [31]: 1 state.lm <- lm(value ~ variable, data= TN)
        2 summary(state.lm)
```

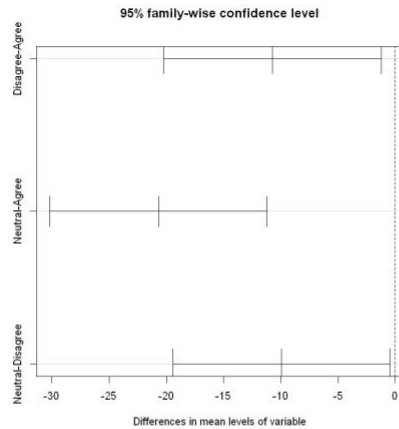
```
Call:
lm(formula = value ~ variable, data = TN)

Residuals:
    Min       1Q   Median       3Q      Max
-20.4737  -9.7368   0.2105   5.2632  24.5263

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)    30.474     2.786   10.937 2.61e-15 ***
variableDisagree -10.737     3.940   -2.725 0.00865 **
variableNeutral  -20.684     3.940   -5.249 2.64e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 12.15 on 54 degrees of freedom
Multiple R-squared:  0.338,    Adjusted R-squared:  0.3134
F-statistic: 13.78 on 2 and 54 DF, p-value: 1.458e-05
```

```
In [32]: 1 plot(TukeyHSD(TN.aov))
```



```
In [33]: 1 library(effects)
```

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Texas Analysis - Jupyter Notebook

```
In [34]: 1 eta_squared(TN.aov, partial = FALSE)
```

A effectsize\_anova: 1 × 5

Parameter	Eta2	CI	CI_low	CI_high
<chr>	<dbl>	<dbl>	<dbl>	<dbl>
variable	0.3379672	0.95	0.1644892	1

```
In [ ]: 1
```

### CONCLUSION

A good environment is one that does not negatively affect the health of the people living there. The issue of negative environmental impact resulting from unplanned building in Nigeria are legendary and must be given adequate and serious consideration. From the review, the answers from various respondents in the data generated above gave us a clear understanding that there is linkage between unplanned building and negative environmental impact in Nigeria.

The impact of unplanned building on the environment were identified and highlighted. These impacts include displacement, loss of lives, loss and damages to properties, congestion, high frequency in the number of collapsed building and structures, pollution, deforestation and wetland destruction, erosion and flooding, urban sprawl, slum and squatter settlement, heat island and aesthetic degradation. All these have had negative consequences on both human and other living organisms.

The study also made recommendations on how to improve the environmental impact resulting from these unplanned building in Nigeria. In order to safeguard the environmental interests, planning of building and building processes should be controlled and managed effectively without exceeding the main and general capacity of the environment. In addition to this, any activity that can have negative effect on the environment should be properly managed.



Government, stakeholders and residents need to build a long-term resilience to natural disasters, especially flooding. In addition, further strategic master-plans focusing on drainage and solid waste management are to be launched, highlighting the adaptability of master-plans, able to perform across several thematic areas with the added flexibility to react to a variety of scales. Citizen engagement in planning must be incorporated and result oriented. Building plans in Nigeria that fully embrace the community's feedback and knowledge are able to gain a true understanding of real issues at hand. There are many different tools that should be used when gathering views from communities, such as interactive workshops, focus groups, expert meetings, local community presentations and engagements, whereby citizens are able to identify thematically, technically, and visually priorities they would like the planning exercise to consider.

There is also a need for Town Planning and Approval Authorities to review their list of documents required for building approval to include soil tests and services drawings and others as stipulated in the 2006 National Building Code. This is to ensure that all critical aspects of the building plan approval process are given equal attention they deserve. Adequate number of qualified building professionals should be employed by government to man sensitive positions in Town Planning and Approval Authorities.

Building approval process should be stringent. There should be monitoring of the level of compliance of buildings before and during construction with the operational building codes and bye-laws in the area, and sanctions should be placed on individual who faulted physical and housing guidelines.

The data for this research project was collected via questionnaire, a structured questionnaire originated on the basis of guidelines selected from literature review. The factors of environmental impact resulting from unplanned building in Nigeria are identified and Government, stakeholders and residents must take proper care of these factor in order to make the environment a better place to live.

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