

**AN ASSESMENT OF THE ENVIRONMENTAL EFFECT OF  
SQUATTER SETTLEMENT IN DUTSE-ALHAJI, BWARI AREA  
COUNCIL FEDERAL CAPITAL TERRITORY ABUJA, NIGERIA.**

**BY**

**SHUAIBU, Onimisi Salihu**

**M.TECH/SSSE/2005/1484**

**DEPARTMENT OF GEOGRAPHY  
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA**

**DECEMBER 2010**

**AN ASSESMENT OF THE ENVIRONMENTAL EFFECT OF  
SQUATTER SETTLEMENT IN DUTSE-ALHAJI, BWARI AREA  
COUNCIL FEDERAL CAPITAL TERRITORY ABUJA, NIGERIA**

**BY**

**SHUAIBU, Onimisi Salihu**

**M.TECH/SSSE/2005/1484**

**A THESIS SUBMITTED TO POSTGRADUATE SCHOOL, FEDERAL  
UNIVERSITY OF TECHNOLOGY, MINNA, IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF  
DEGREE OF MASTER OF TECHNOLOGY (M. TECH) IN  
GEOGRAPHY (ENVIRONMENTAL MANAGEMENT )**

**DECEMBER 2010**

## **DEDICATION**

This project is dedicated to my late parents, Mr. and Mrs. Shuaibu my Children, wife, Mrs. Maimunat Shuaibu and everyone God has used to assist in the course of this research work.

## DECLARATION

I, Shuaibu Onimisi Salihu, with the Registration Number M.Tech/SSSE/2005/1484 of the department of Geography, School of Science and Science Education, Federal University of Technology Minna, do hereby declare that this research project titled, “ An Assessment of the Environmental effect of Squatter Settlement in Dutse Alhaji, Bwari- Area Council, Federal Capital Territory, Abuja, Nigeria” has been carried out solely by me under the supervision and guidance of Dr. M.T Usman

The research work has been carried out in accordance with regulations governing the preparation and presentation of project in the Department of Geography. I here by declare that this work has not been presented any where for any certificate

However, relevant works by other authors have been dully acknowledged in the project.

Name: \_\_\_\_\_

Sign:  \_\_\_\_\_

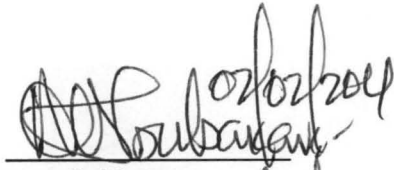
Date: 13-1-11

## CERTIFICATION

This thesis titled: An Assessment of the Environmental effect of the Squatter Settlement in Dutse Alhaji, Bwari- Area Council, Federal Capital Territory, Abuja, Nigeria, by: SHUAIBU, Onimisi Salihu (M.Tech/SSSE/2005/1484) meets the regulations governing the award of the Degree of M.Tech of the Federal University of Technology, Minna and is approval for its contribution to scientific knowledge and literary presentation.

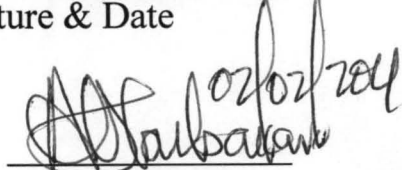
**Dr. A. S. Abubakar**

Name of Supervisor

  
Signature & Date

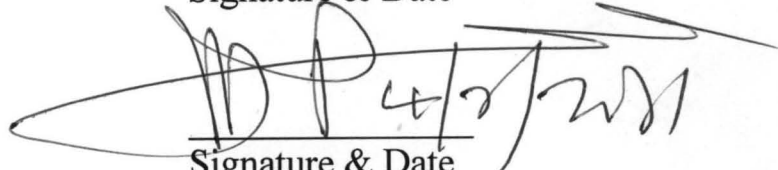
**Dr. A. S. Abubakar**

Name of Head of Department

  
Signature & Date

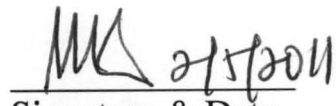
**Prof M. Galadima**

Name of Dean, SSSE

  
Signature & Date

**Prof. S. L. Lamai**

Name of Dean, Postgraduate School

  
Signature & Date

## ACKNOWLEDGEMENTS

For a well conceived research work to become successful and appreciated, it requires immense input from some concern people who are either in the academics, friends, colleagues and relations. It is at this background I deem it very appropriate to make few comments on the contributions that has really helped a great deal in achieving this remarkable success. God Almighty is the major actor here, without him, nothing at all can be successful. I am particularly indebted to my project supervisor Dr. A. S. Abubakar whose untiring effort saw me through to the end of this research work. Despite his tight schedule his encouragement urged me on until I successfully concluded this research work. My appreciation and thanks goes to Professor Nsofor who approved this topic and encouraged me to take it as a challenge and deserved efforts towards contributing to scientific knowledge. My foremost appreciation goes to the Head of department Dr. A. S. Abubakar, who inspired me in the course of this programme. Mr. Salihu of the Geography Department deserves my appreciation too. He did all he could to ensure I complete this research work, on time. The entire staff of the Geography department are not left out for the knowledge they impacted on me. Notable among them are Dr. M.T. Usman, Dr. Halilu, Dr. Jinadu and host of others. Outside the academic circle, a lot of friends, well wishers

contributed immensely towards this success we are recounting today. First among them that deserve my appreciation is Alh. Lawal Y. Abubakar, of the Federal Ministry of Housing and Environment. Mr. Yahaya Badaru Usman a Director with Shambilat Shelter Nigeria Limited, he assisted with lots of journals and past project he undertook in the same school. My appreciation also goes to Mr. Adewumi .M. of the National Population commission who helped with the Satellite imagery of Dutse Alhaji. Mr. Nuhu Muhammed, Goke Adigun and Halim M. all of FCDA, helped me with information related with the land use status of Dutse Alhaji. I appreciate their efforts. My dear wife and children, I strongly need to appreciate their efforts morally and financially which helped me great a deal. Finally, I appreciate and thank the management of Federal University of Technology, Minna for the opportunity given to me to pursue a Master degree Programme in Environmental Management.

## ABSTRACT

The research effort was set to examine the environmental effect of squatter settlement in Dutse Alhaji, Bwari Area council. In view of the above, necessary procedures were selected to accomplish this. Approach included the development of data base and choice of appropriate data sources, (primary and secondary data sources). In details, the actual procedures were questioner administration, direct interview of respondents, collection and updating of the base maps, and the use of necessary instrument for the study. The data gathered were analysed using the descriptive method. These entail the application rank scores to percentage distribution of variables, revealing quality of basic characteristics of the squatter settlement. The end result has revealed a number of environmental problems due to the existence of this settlements (Dutse Alhaji). These problems are , soil erosion, gully erosion, poor drainage system, forestation , traffic congestion, noise pollution, illegal refuse dump sites , slum situations etc. Appropriate recommendations in form of short time and long time solution were suggested to conclude the research work.



## TABLES OF CONTENTS

	<b>Page</b>
Title page	ii
Dedication	iii
Declaration	iv
Certification	v
Acknowledgements	vi
Abstract	viii
Table of Contents	ix
List of Tables	xvi
List of Figures	xviii
List of Plates	xix

### CHAPTER ONE:

<b>1.0 INTRODUCTION</b>	<b>1</b>
1.1 Background to the Study	1
1.2 Statement of Problems	4
1.3 Aim and Objectives	6
1.4 Scope and Limitation	77

	<b>Page</b>
1.5 Justification for the Study	7
1.6 Background information of the study area	8
1.7 Historical Background of the study area	8
1.8 Settlement pattern	13
1.9 Population Distribution	14
1.10 Socio-Economic Background	14
1.11 Existing Settlement Structure	15
1.12 Climate	16
1.13 Topography	24
1.14 Hydrology	25
1.15 Geology	26
1.16 Soil and Vegetation	26

## **CHAPTER TWO:**

<b>2.0 LITERATURE REVIEW</b>	<b>29</b>
2.1 Human Settlement	29
2.2 Overview of Squatter Settlement	29
2.3 Slum and Squatter Settlement	31
2.3.1 Characteristics of Slums	32

	<b>Page</b>
2.3.2 Effects of Slum Environment	33
2.3.3 Causes of slums	34
2.3.4 Symptoms of Slums	34

### **CHAPTER THREE:**

<b>3.0 MATERIALS AND METHODS</b>	42
3.1 Preamble	42
3.2 Acquisition and Development of Data Base	42
3.3 Sources of Data	42
3.4 Questionnaire Survey	43
3.5 Questionnaire Administration	44
3.6 Raster Based Data	45
3.7 Vector Based Data	45
3.8 Attribute Data	46
3.9 Instrumentation	47
3.10 Method of Analysis	47

### **CHAPTER FOUR :**

<b>4.0 RESULTS</b>	48
--------------------	----

	<b>Page</b>
4.1 Quality Rank - Scores Distribution	49
4.2 Housing Type	50
4.3 Qualities of Wall Materials	51
4.4 Floor Area Distribution and Assessment	52
4.5 House Types and Rooms Distribution	53
4.6 Room Size Assessment	54
4.7 Quality of Roof Materials	55
4.8 Quality of Toilet Facilities	56
4.9 Position of Latrine Facilities	57
4.10 Quality and Material of Kitchen facilities	58
4.11 Position of Kitchen	59
4.12 Personal Judgment on Set-Back Adequacy	60
4.13 Type of Access to Houses	61
4.14 Road Standards	62
4.15 Participative judgment on Materials Finishing of Roads	63
4.16 Availability of drainage System	64
4.17 Type & Quality of Electricity supply sources	65
4.18 Source of Water Supply	66
4.19 Availability of Social Facilities & Services	67

	<b>Page</b>
4.20 Plot Sizes	68
4.21 Method of Disposal of Solid Waste Disposal	69
4.22 Source of Energy for Cooking	70
4.23 Type of Health Hazard Witnessed	71
4.24 Community Based Assessment of causes of Health Hazard	72

#### **CHAPTER FIVE:**

<b>5.0 DISCUSSION, CONCLUSION AND RECOMMENDATION</b>	<b>79</b>
5.1 Discussion	79
5.1.1 Physical Condition of Natural Features of the Environment in Dutse Alhaji	79
i. Water Body	79
ii. Biological Condition	81
iii. Soil Condition s	82
iv. Temperature Variation	83
5.1.2 Housing and Environmental Condition in Dutse Alhaji	84
i. Quality Ranking of House Type	84
ii. Age of House	85
iii. Roof Materials	86

	<b>Page</b>
iv. Habitable Room Distribution	86
v. Floor Materials	87
vi Window Materials	87
vii Door Materials	88
viii Facilities in housing (Bathroom Toilet/Latrine)	88
ix. Availability and Condition of Drainage system	89
x. Kitchen Facilities	89
5.1.3 Environmental Condition of Physical Infrastructure in Dutse Alhaji	90
i. Water Supply	90
ii Access Road	90
iii Electricity supply	91
5.1.4 Availability and Environmental Condition of Social facilities and services in Dutse Alhaji	92
5.1.5 Environmental Condition of Socio-Economic/Cultural Facilities in Dutse Alhaji	93
5.1.6 Identified Physical Environmental Problems in Dutse Alhaji	93
i. Soil Erosion	94
ii. Traffic Congestion	95

	<b>Page</b>
iii Land Pollution	96
5.1.7 Spatial and Conditional Assessment of the Housing Environmental Quality Levels	96
5.2 Summary	97
5.2.1 Variables	108
5.3 Conclusion	109
5.3.1 Urban Environmental Indicators	109
5.4 Recommendation	118
5.4.0 Short Measures	119
5.4.1. Long Term Measures	121
References	122
Appendix	126

## LIST OF TABLES

Table	Page
1.1 Temperature Variation Table for FCT, Nigeria	18
4.1 Quality Rank score Distribution	49
4.2 House Type Distribution	50
4.3 Quality of Wall Materials	51
4.4 Floor Area Distribution and Assessment	52
4.5 House Type/Room Distribution	53
4.6 Room Sizes and Adequacy	54
4.7 Quality of Roof Materials	55
4.8 Quality of Toilet Facilities	56
4.9 Position of Latrine Facilities	57
4.10 Quality and Material of Kitchen Facilities	58
4.11 Position of Kitchen	59
4.12 Personal Judgment on Setback Adequacy	60
4.13 Type of Access to Houses	61
4.14 Standard of Road in terms of Sizes and Widths	62
4.15 Participative Judgment on Materials Finishing of Roads	63
4.16 Availability of Drainage System	64
4.17 Type and Quality of Electricity Supply Source	65



<b>Table</b>	<b>Page</b>
4.18 Source of Water Supply	66
4.19 Availability of Social Facilities and Services	67
4.20 Plot Sizes	68
4.21 Method of Disposal of Solid Waste	69
4.22 Source of Energy for Cooking	70
4.23 Type of Health Hazard Witnessed	71
4.24 Community Based Assessment of Causes of Health Hazard	72

## LIST OF FIGURES

Figure		Page
1.1	Location of Federal Capital Territory, Nigeria	10
1.2	FCT Area Councils, Nigeria	11
1.3	Bwari Area Council, FCT, Nigeria	12
1.4	Temperature variation Graph for FCT, Nigeria (1998 – 2007)	19
1.5	An Updated Base Map of the existing squatter settlement in Dutse Alhaji.	20
1.6	An Updated Road Network pattern of the existing settlement in Dutse Alhaji.	21
1.7	Satellite Imagery of Dutse Alhaji (2006).	22

## LIST OF PLATES

Plate		Page
i	River, Dutse-Jam showing it's Erosive effects	73
ii	Poor Drainage System (Site A)	73
iii	Poor Drainage System (Site B)	74
iv	Illegal Refuse Dump Site (A)	74
v	Illegal Refuse Dump Site (B) and Presence of High Tension Cable	75
vi	Filthy Surrounding Site (A)	75
vii	Filthy Surrounding Site (B)	76
viii	Typical Dutse Mud House with attached Latrine and Bathroom	76
ix	Typical Gully Erosion Spot	77
x	On-Street Open Market	77
xi	Traffic Congestion within the Market	78
xii	Steam Flow Path Being Narrowed by Natural Environment	78

## CHAPTER ONE

### 1.0

### INTRODUCTION

#### 1.1 Background of the study

The environment is everything that surrounds us, both living things and non-living things. It consist of our natural surroundings, such as land, air, water, animals, plants and things made by people, such as, building, roads, machines, etc, (Adrew 1996). The oxford dictionary of ecology defines the environment as the complete physical and biological conditions, in which an organism lives. Environment includes social, cultural, economic, and political considerations, as well as the more usually understood features such as soil climate and food supply.

The environment is also referred to as “all the surroundings of our organism, including other living things, climate and soil, etc. in other words, the condition for development or growth” (Andrew, 1996).

Everything which surrounds us (both living and non living) may be referred to as the environment (Asthana, 2006).

The concern for environment is an expression of fundamental changes in human perception of nature, natural resources and wildlife on our planet. The traditional concept, that natural resources are abundant for man to use or abuse, has been responsible for massive degeneration of nature, natural systems,

environment and wildlife. Departing from the traditional perception of human dominance over nature, a more realistic view that man is just a specie has now emerged. Man cannot survive alone and aloof from other living beings. The natural systems in which man exists along with all other species must be maintained in a healthy and functional state.

Human activities and the environment are inter-related (Smart, 1998). This is because any activity of man is done in the environment and the resultant effect is either positive or negative to man. Human activities are diverse. According to Smart, (1998), negative effect on man arises from his economic and domestic activities. For instance, agriculture requires pesticide that pollutes the atmosphere or enters the drainage system via - run - off and sewers.

The earth environment consists of our natural surroundings, which include the air, water, soil, mineral and things made by man such as road, houses and machines. The conflict between natural and man-made environment started when humans began to use part of surrounding land for example to grow crops and raise livestock. Trees are cut down for their wood, to clear land for farm, roads and houses. Man in the quest to provide more for the increasing population and to live a healthy and comfortable life, remove and use resources from the environment to build shelter, where he sleeps and lies, manufacture chemicals, machines, medicines and household goods for his use. These

resources cannot be replenished at the rate at which they are taken. The waste generated from factories, business premises and homes are released into the environment, thus upsetting it (Berkeley, 1989). Man activities such as removal of the forest, use of pesticide and chemical fertilizers, dumping of waste, use of fossil fuels, housing, mining and nuclear power, often lead to environmental problem such as soil erosion, flooding and pollution of air, water and land (Michael, 1987). Human activities which cause destruction of wildlife habitat, soil erosion, pollution rise in temperature and change in climate, will lead to the upset of the natural environment. Environmental damage can lead to destruction of human life and properties. Our challenge is to make sure that our actions cause little or no damage to the environment, so that it can continue to support all living things, human, plant and animals.

The part of the earth's environment in which organisms can be found is known as biosphere. The biosphere is further divided into units called ecosystems (ecological system) (Warford, 1989). An ecosystem consists of living organism (biotic part) and non-living (physical or biotic part), interaction to form a stable system. The fundamental concepts of ecosystem include the flow of energy through the food chains, food web and recycling of nutrients. The abiotic part of the ecosystem is the habitat. The habitat is the place where a group of organism lives. There are varieties of different ecosystem which is unique in

terms of suitable temperature, shelter settlement), food and water supply (Ikechukwu, 2000).

Each ecosystem or habitat has particular conditions of factors, which determine what type of organisms live in it and the population of each type of organism (species) (Mecra, 2000). Each type of organism has adaptation which enable them to survive and reproduce. Human through their various activities often upset this well balanced different population of organism in there natural ecosystem or change the physical part (habit) of the system, so that some species find it difficult to survive. With rapid growth in human population all over the world, there is a serious danger to both local and global environment. Rapid population growth and the increase in the standard of living (Williams, 2005).

Raw materials including non-renewable energy resources are rapidly being used. Also more waste has being generated. Building of roads, houses, factories, farm etc are also activities of man that reduces the amount of land available for organism unless done wisely.

## **1.2 Statement of Problem**

The environment of man is a complex one, and to understand the evolution and character of squatter settlement, many field question should be asked and not to

be seen as discrete entities, for they interact within each other.

Squatting is seriously an illegal act in its ramifications. That is it is a complex activity of man which to a great extent destroys the environment. Here, there is no amount of enforcement of any environmental law that can work. Meanwhile environmental law where it exists is made for man to ensure security of life and properties and to further enhance his living standard. The safety of the environment is uppermost here. It is a well known fact that environmental law both at local and global level does not exist where squatter settlement exists. Where an element of it is found at all, it is either ill formulated or poorly and wrongfully enforced.

A squatter settlement lacks cultural, planning and management tools to ensure the safety of the environmental. Man as a major component of the environment here, is the focal element. His attitude as a squatter towards the use of available environmental resources is highly destructive. To this end, problem has emerged and the environment is fast degrading resulting from the activity of man. Man now becomes vulnerable to risk posed by the problems resulting from this activity.

On the whole-some view, this squatter settlement brought about by man, is exerting some effects on the environment where man himself is an important element. These effects are numerous and we are required to identify their types,



nature, magnitude and level of risk to the security of man himself.

A shelter has been described as any structure that shields against danger, rain, wind, sunlight etc (Eteng 1999) Shelters are in different forms, types, shapes and sizes. Our concern is the human shelter, which is, in form of modern buildings or houses of various types, shapes, forms and sizes. A group of these houses, which is giving shelter to more than one person is called settlement, (Imodu 1988).

### **1.3 Aim and objectives**

Aim:

The aim of the study, is to examine the environmental effects of squatter settlement in Dutse Alhaji Bwari area council, Abuja.

Objectives:

- a. To identify the existing housing condition in items of it's type, density and characteristics.
- b. To examine the availability of social facilities and services.
- c. To assess the type and level of liquid and solid waste generation and disposal method.

#### **1.4 Scope and Limitation**

This study is aimed at examining the effects of squatter settlement on the environment. A study area has been chosen, so that a clear physical boundary of the study can be determined.

Dutse Alhaji the study area, is one of many squatter settlements along the Bwari axis. While the topic has already been discussed generally at the introduction level to touch on both local and global issues relating to these studies, the main effort shall be concentrated on the physical size of the area. The general effort in this study is to examine the effects of squatter settlement on the environment. It is already agreed that problems is caused in the environment resulting from the existence of this illegal settlement. These problems shall be identified and their effects on the physical, social- economic and cultural environments of the area shall equally be examined.

#### **1.5 Justification for the Study**

Presently, the FCT administration is carrying out the demolition of squatter settlements in Abuja. The programme has been a welcome development, since the aim is to correct the existing bad situation or system/distortion of the Master Plan.

According to the opinion of the people, the demolition of some of these illegal

settlements was personalized and a wicked act on the part of the government. The reason basically was because government has not been able to pass the awareness to the affected persons before the demolition was carried out. The government of F C T has not also been able to come up with a detailed study on the effects of the squatter settlement on the environment of Abuja.

Having realized the unfriendly nature of any squatter settlement to the environment, the identified effects shall be a source of conviction to the general populace or human race why squatter settlement should not be encouraged.

The study shall present result that show that squatter settlements as unplanned settlements has grater degrading abilities in the environment more than the planned ones.

#### **1.6 Background Information of the Study Area**

#### **1.7 Historical Background of the Study Area**

Dutse Alhaji is one of such small Gbagyi settlements, which came into existence recently out of present traditional Bwari town in Bwari Area council of F C T Abuja.

Originally, the inhabitants settled in the locality in a nucleated numbers of farmstead settlement owned and headed by somebody called Alhaji as popularly known. They were identified with an unplan called Dutse. Dutse is a

Hausa word that means rock or stone. Dutse Alhaji therefore means Alhaji's rock or Alhaji on the rock.

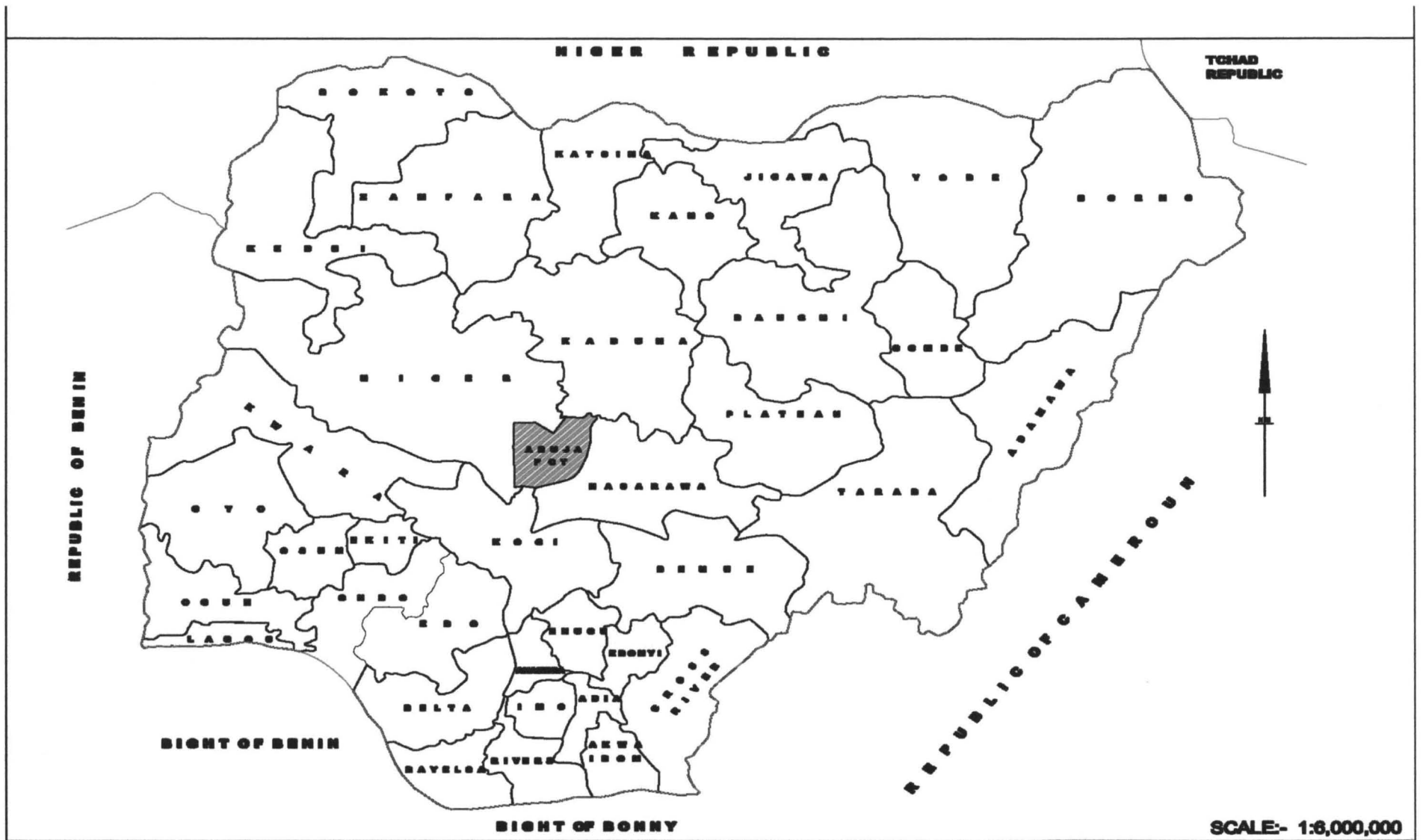
One other historical fact held that, there was a cave beside the rock, which served as a hide-out or a prospective shed from external attack.

This small temporary settlement witnessed a rapid and tremendous expansion in the last decade. This was due to the movement of seat of government from Lagos to Abuja in 1991.

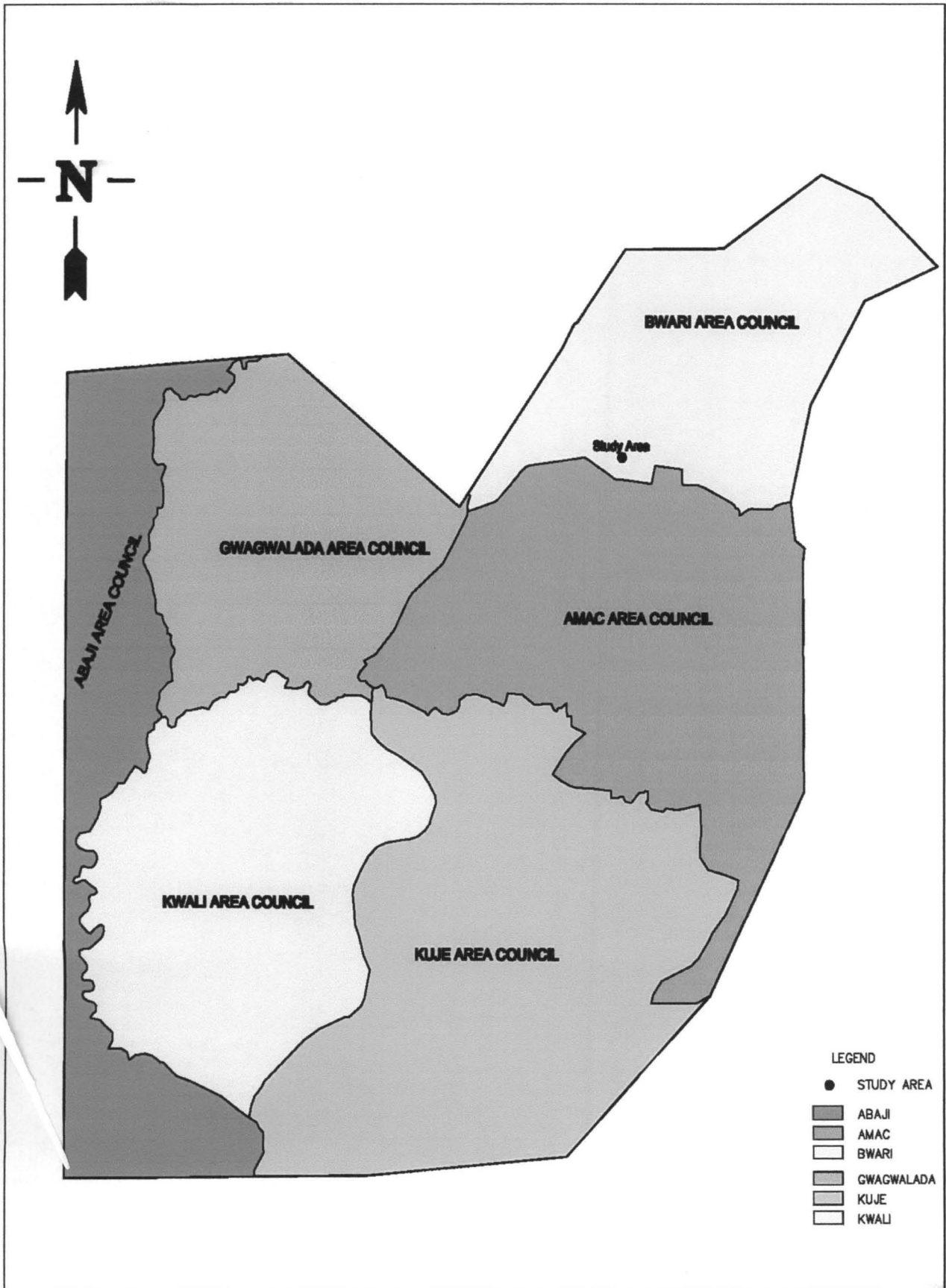
The final movement of the seat of government from Lagos to Abuja by the Babangida administration in 1991 had met with and created several problems.

The known immediate problem was acute shortage of offices, business and residential accommodation that led to high rent, unprecedented growth and development of existing traditional villages and massive proliferation of squatter settlements around Abuja city and its environs (Abubakar, 1997).

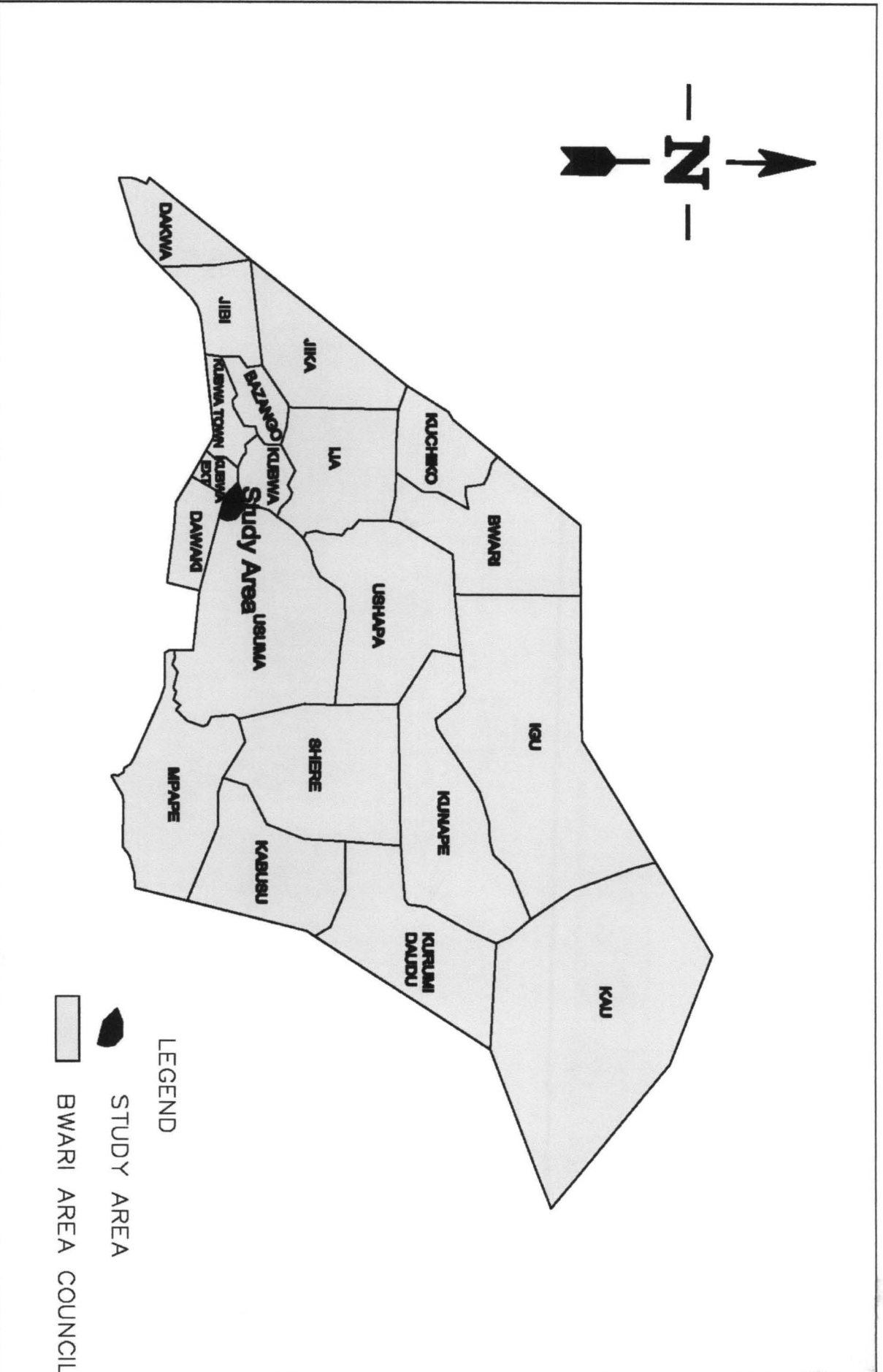
Medium and low income government workers and privately employed, had to secure their accommodation at the satellite towns squatter settlement; like Mabushi, Jabi, Utako, Kubwa, Gwagwalada, Karmo, Gwagwa, Idu, kuje, Kuchingoro, Aleita, Lugbe, Dutse Alhaji, Dutse Makranta etc.



**FIG. 1.1 LOCATION OF FEDERAL CAPITAL TERRITORY, NIGERIA**



**FIG. 1.2: F.C.T AREA COUNCILS, NIGERIA**



**FIG. 1.3: BWARI AREA COUNCIL, FCT, NIGERIA**

## 1.8 Settlement Pattern

It is essential to distinguish between temporary and permanent settlements. Most settlements have some degree of permanence, even though their building may have to be replaced from time to time, due to their functions offered. Some settlements, however, are temporary.

They may be occupied seasonally and then left untenanted, or they may be so transient that they occupy a particular site for only a short time, and are then either abandoned or shifted elsewhere. Some may be cleared or demolished to give way for other permanent uses. An example of these temporary settlements is Dutse Alhaji squatter settlement.

The settlement is nucleated in nature and type. They are presently dominated by non-indigenes that are non-Gbagyi origin. Physiographically, Bwari falls within the Kau and Gwagwa plains.

Bwari is encompassed with rock Outcrops of tectonic ridges and rounded hills with possible scenic resources which requires protection.

In terms of climate, Bwari is reputed to have one of the best climates in the Federal Capital Territory. It is relatively cooler than other parts of the -FCT. In terms of vegetation, Bwari is characterized by park.



## **1.9 Population Distribution**

As estimated by Zamani consultant (1996), who first prepared physical development plans in Bwari, the estimated population of Bwari in 1982 was 900 people. By this time Dutse Alhaji was like a farmstead traditional settlement. The 1992 population projection, put the population of Bwari town at a little less than 10,000 people. By our estimate in the year 2001, the population was 29,000 while in the year 2003 projected to 33,202. It is however envisaged that in next 20 years the population would be increased at geometric rate to about 210,000. This would be influenced by more than natural process. Presently, Dutse Alhaji population is put at over 30,000. In terms of sexual distribution, males are 36% while female are 64%. Going by the trend of development factors in the growth of Bwari, it is estimated that people in the working population (18 - 65 years) will become preponderant in the population as able bodies men from all over Nigeria seeking greener pastures will continue to come to Bwari with specific interest in settling at Dutse Alhaji because of location advantage.

## **1.10 Socio-Economic Background**

Socio-economic background of Dutse Alhaji can be measured in terms of the social status, the social opportunities and economic activities that avail of these.

The social status includes, among others, sex distribution of the residents and workers, age structure, material status, household size, occupational structure, religious group, nationality, length of stay in the neighbourhood, and the status of property ownership tenancy, etc.

The economic background reflects, the economic base and activities that the residents engaged in. This includes the buying and selling, farming activities, public service, private employment activities, construction activities and transportation activities among others.

Majority of the residents of Dutse Alhaji are non-indigenes and chiefly self-employed (NPC 2006). Close to this in percentage is another group that are chiefly civil servants. The last group is a mixture of farmers and unemployed residents.

### **1:11 Existing Settlement Structure**

From the instrumentation survey conducted and land use analysis carried out on the updated land use plan, over 82% of the land is occupied by residential use, while uses like roads, industrial, commercial, institutional etc takes the remaining 18%.

The settlement has essentially traditional area around the chief's palace which has the market, palace, on street commercial activities, motor garage, etc. The

area is unplanned with few earth roads or any other infrastructural facilities. The houses are substandard and generally poor environment condition (Field assessment).

### 1.12 Climate

The climate of Bwari where Dutse Alhaji is located is examined within the context of the climate conditions prevailing over the Federal Capital Territory, which is part of the basic monsoon climate experienced in Nigeria. Climate in areas covered by monsoon regime is expressed as a contrast between two seasons, the wet and dry. Generally speaking, Bwari falls within the semi-seasonal equatorial zone. This zone lies between the wet southern rain forest region and the dry northern grassland. Bwari, thus experienced seasonal weather comprising primarily of wet laden south-west maritime wind and the north-east hamattan dry dust laden wind. The dry season spans from May to September. The components of the climate of the study area are highlighted below:

Note that because of the effect of climate change, this regime has been altered slightly.

a. **Temperature**

The highest temperature is usually experienced during the dry season with maximum temperature range between 26°C - 32°C. Lower temperature are however experienced with a range of minimum temperatures between 21°C and 23°C (NIMET).

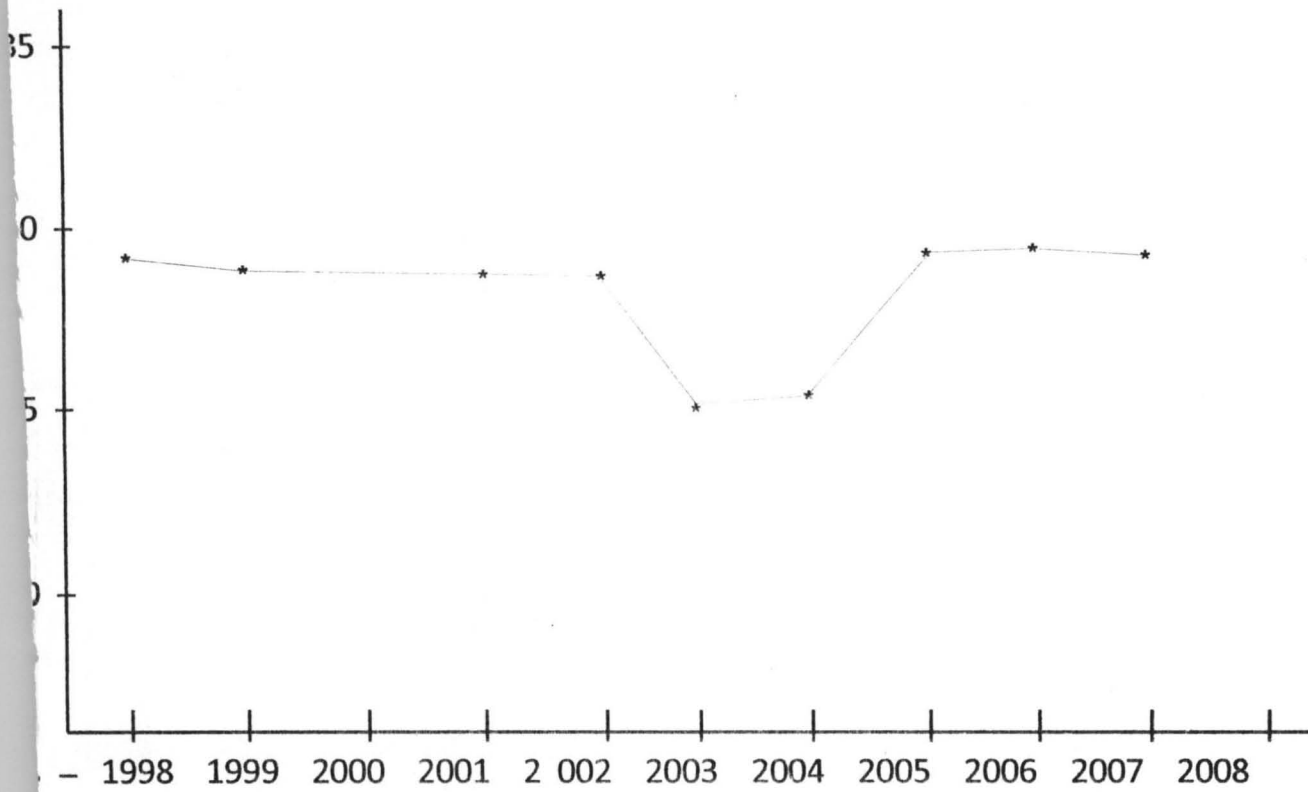
b. **Relative Humidity**

Relative humidity is higher during the wet season with an average of 70%. Usually, in the morning of the wet season relative humidity is

**Table 1.1 Temperature Variation Table for FCT, Nigeria****(1998-2007)**

<b>SPATIAL AREA</b>	<b>Years</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Annual Ave. Temp.</b>
Kubwa	2007	31	31	28	31	28	26	23	25	24	25	30	28	27.58
Dutse	2006	32	31	28	31	31	25	23	25	23	25	31	30	27.91
Bwari	2005	31	29	28	29	31	25	25	25	23	25	29	29	27.41
Dawaki	2004	29	29	28	29	30	24	24	23	24	24	28	28	26.67
And	2003	20	30	27	29	29	25	23	24	21	24	28	30	25.83
Usman	2002	31	31	28	29	29	25	23	25	21	23	29	30	27.00
	2001	31	32	28	29	30	24	24	25	22	23	30	30	27.33
	1999	29	29	29	31	31	26	26	25	21	27	30	29	27.75
	1998	30	31	28	32	29	26	24	25	22	27	31	32	28.08

Source: - NIMET 2007
















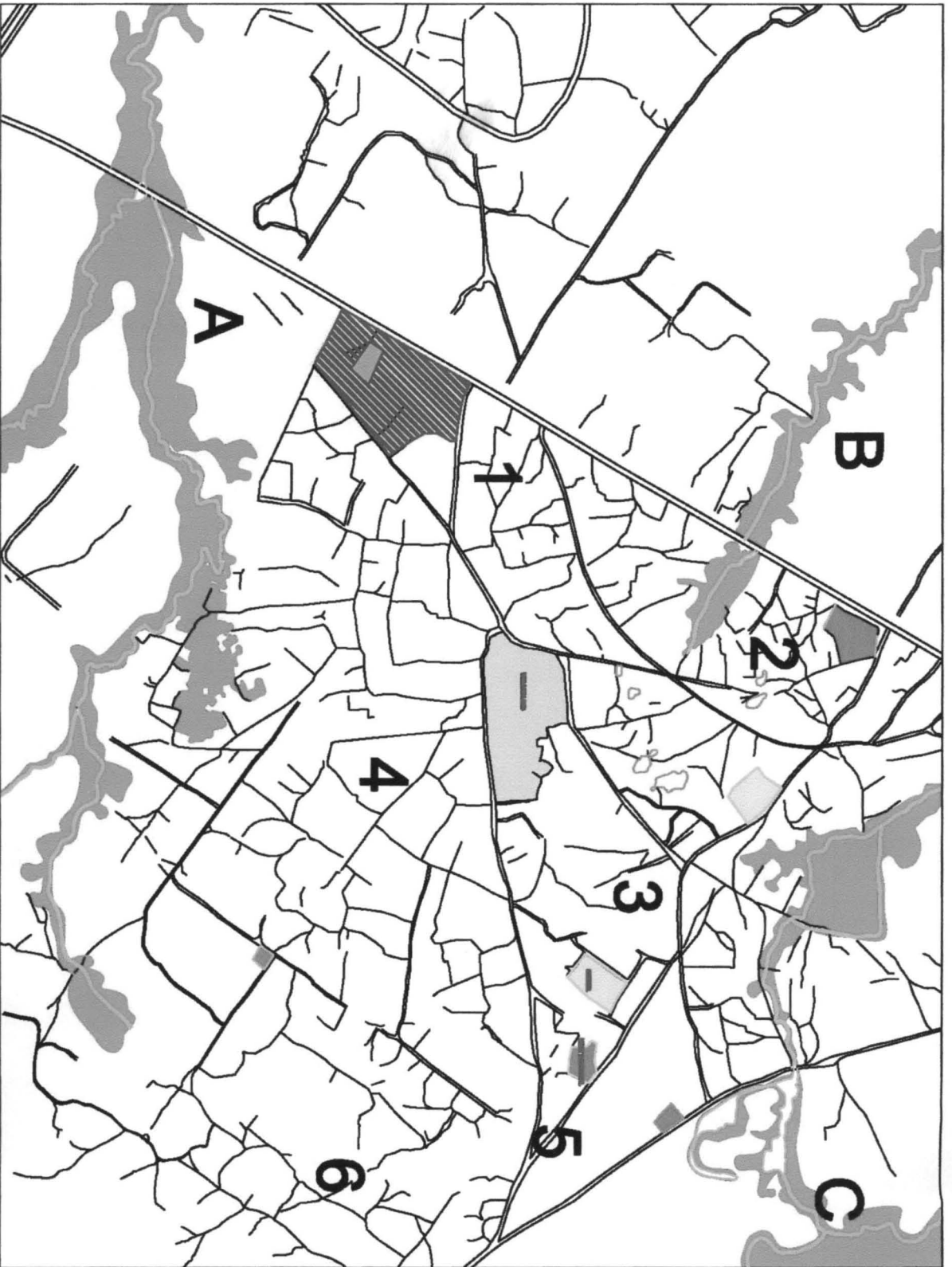
Source – (NIMET 2007)

Figure 1.4 **Temperature Variation Graph for FCT,**



**FIG: 1.5: AN UPDATED PATTERN OF THE EXISTING SQUATTER SETTLEMENT IN DUTSE ALHAJI, ABUJA.**

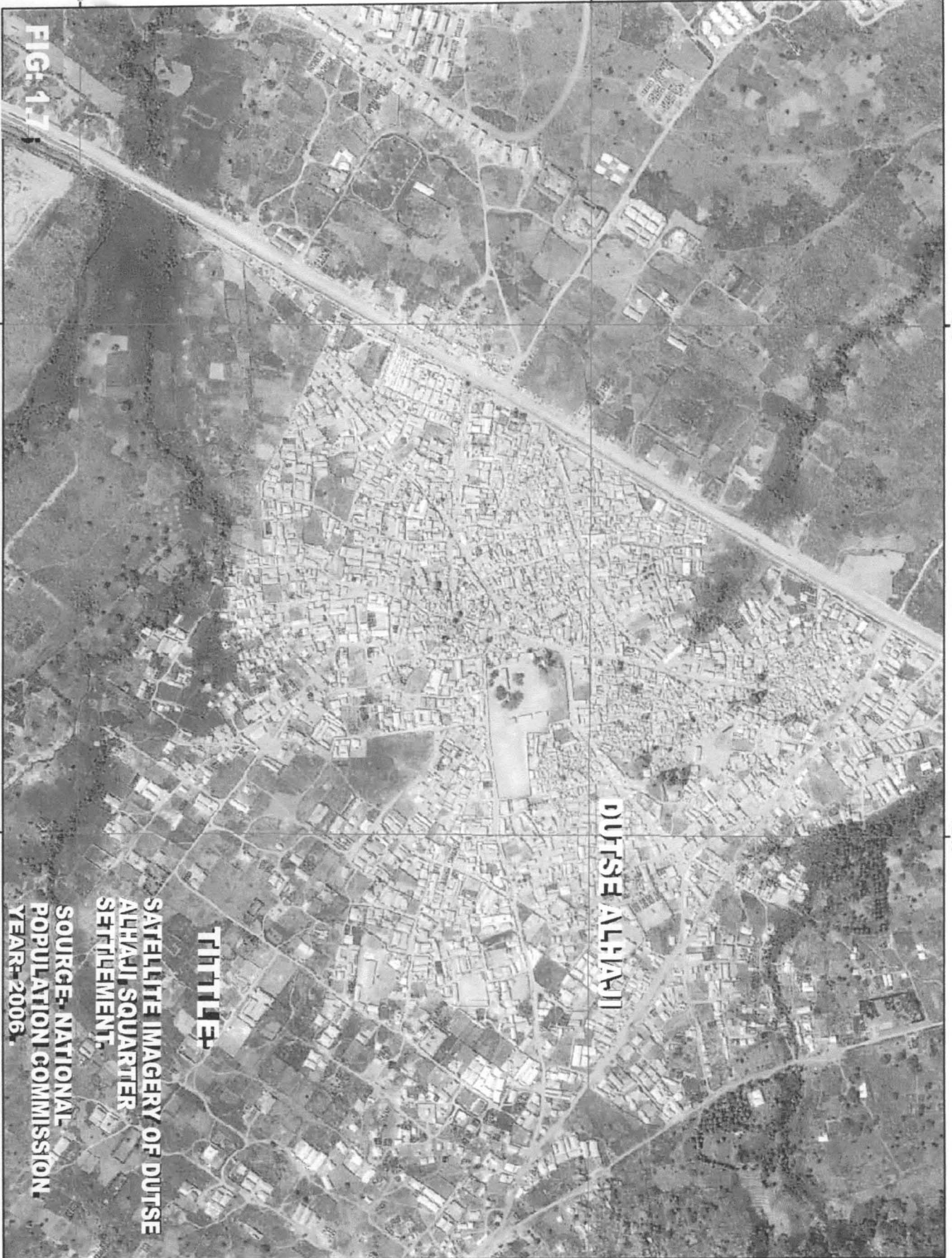
TITLE:	
LEGEND	<ul style="list-style-type: none"> <li> ROAD</li> <li> FOOT PATH</li> <li> BUILDINGS</li> <li> MARKET</li> <li> INDUSTRY</li> <li> SCHOOL</li> <li> STREAM</li> <li> MARKET GREEN</li> <li> AVENUE</li> <li> VILLAGE</li> <li> SETTLEMENT (EXISTING)</li> <li> SETTLEMENT</li> <li> SETTLEMENT ZONES</li> </ul>
SCALE 1:10,000	
DATE: 2008	
1:10,000	



**FIG: 1.6: AN UPDATED ROAD NETWORK PATTERN OF THE EXISTING SQUATTER SETTLEMENT IN DUTSE ALHAJI, ABUJA.**

TITLE:-
LEGEND
ROAD
FOOT PATH
BUILDINGS
MARKET
INDUSTRY
SCHOOL
STREAM
MANRY GREEN AREA
VILLAGE SETTLEMENT (INDIGENES)
SETTLEMENT ZONES
1-6
SCALE 1:10,000
DATE: 2009
FIG. 1.14





**FIG: 17**

**DUTSE ALHAJI**

**TITILE**

**SATELLITE IMAGERY OF DUTSE  
ALHAJI, SQUARTER  
SETTLEMENT.**

**SOURCE- NATIONAL  
POPULATION COMMISSION  
YEAR- 2006 .**

much higher. It may get as high as 83%. However, in the dry season, the relative humidity is much lower. It sometimes gets as low as 23% especially in the afternoon.

c     **Rainfall**

The wet season occurs between April and October with the highest precipitation value between May and September. The annual rainfall ranges from 1290mm to 1590mm with an average of 1391.5mm per annum (Bwari Water Plan, 1996). The large volume of annual rainfall has implication for the drainage system that would be developed for the draining of the study area in order to stem flooding and erosion.

d.     **Wind**

Inter- Tropical Discontinuity controls the two types of wind, which have strong influence over Bwari area. The two types are the' North-East Trade Wind associated with the tropical continental air mass and South-West pasture-ladden wind associated with the tropical maritime air mass formed over the Atlantic ocean. The former is usually dry, characterized by dust laden hamattan developed over the Sahara desert and moving towards the South-West direction, while the latter is warm and moist moving generally towards the North-East direction.

e. **Sunshine**

Maximum daily sunshine hours and minimum daily sunshine hours are experienced in December and August respectively, with corresponding values of 8.5 and 3.8 hours. More sunshine hours are experienced during the dry season between November and April (Bwari Water Plan 1996).

**1.13 Topography**

The entire Bwari area features an interesting terrain which combines rounded hills and clusters of rock outcrops dissected by river valleys, as well as gentle rolling plains. The area is part of the plains, which resulted from alternating activities of denudation and aggradation. The landform here is composed of crystalline rocks of basement complex. Generally viewing the study area, hill areas are located towards the eastern part, posing constraint to physical development while the plains occupy the central and western areas slope analysis.

Available data and topographical maps reveal a land configuration of slopes ranging between 0% to over 25%. Areas lying between 0 - 3% would pose slight constraint to drainage while those between 3 - 8% constitute no constraint to development. A moderate constraint for most development is posed by areas lying within 8.15% range while areas with slopes of 15.25% present moderate

to severe constraints for most development, and would be expensive to develop. A greater proportion of the land, however, lies within the slopes range of 8 - 25% (Bwari Water Plan, 1996).

#### 1.14 **Hydrology**

Detailed hydrologic information about this part of FCT is not quite handy, nothing much was available when the field survey was conducted. Information could only be obtained on the Usman Dam, which is about 15 minutes drive from Dutse Ahaji. Apart from Bwari having some ground water, the Usman Dam Water Project is a feasible of surface water.

The general flat topography in the area locates Usman Dam on a lower site with relatively poor storage characteristic, greater evaporation losses and lower rainfall run-off input, in spite of its high elevation with protected catchments. Moreover, since there is limited information on the quality of the water, it may be anticipated that water will have low total hardness values, as observed by Mabogunje, in the summer of 1977. Alkalinity is also anticipated to be low, ranging from 6.0 to 7.3 (FCT Journal, 2002).

### 1.15 **Geology**

The geology of Bwari Area Council is part of what is known as basement complex, which constitutes of the oldest exposed rocks in Nigeria. The basement complex comprises the remnants of an ancient sedimentary series that have been transformed into analectic migmatites and granite. Although large tracts of the basement complex are barren of economic minerals, they are nevertheless important as local sources of economic minerals such as gold, tin, columbite, etc. The Kuduru area is believed to have some deposit of gold.

### 1.16 **Soil and Vegetation**

Four classes of soil are common in the Federal Capital Territory environment. They include alluvium deposits, colluvial soils, hydromorphic soils and laterites (Bwari Master Plan, 1996).

#### a. **Alluvium Deposits**

This class of soil is usually found along watercourses. Alluvium deposits are highly unsuitable for construction purposes as they are of low load bearing capacity. However, they are highly suitable for agricultural uses. The areas covered by these deposits are best left in this natural position and plantings on them would reduce the incidence of erosion. Part of this land is recommended

in urban agricultural purposes (Bwari Master Plan, 1996).

b. **Colluvial Soils**

This class of soils comprises weathered rock materials that are accumulated at the depths of river valleys as a result of the erosion of the rock surfaces located along the watercourses. As the case is with alluvium deposit above, colluvial soils also have no capacity for the development of buildings.

c. **Hydromorphic Soils**

These are colluvial soils that are concentrated in the highest part of watercourses. They possess very water content and therefore unsuitable for building purposes (Bwari Master Plan, 1996).

d. **Laterites**

This class of soil is predominant within the study area. It is also worthy of note that it occupies a vast proportion of the entire Bwari area. It has an average thickness of about 30m - 40m. This particularly makes it suitable for building purposes;. The materials are generally found to be lateritic in formation (Bwari Master Plan, 1996).

## **Vegetation**

a. **Natural Vegetation**

The vegetation that pervades the Federal Capital Territory Area is within the

zone classified as mixed leguminous wooded savanna. This is defined as a mixed formation of tree shrubs and grasses, the grasses are at least 1.2m in height, they are perennial forming continuous layer that dominates a lower stratum, which is usually burnt annually. Three types of savanna form the mixed leguminous wooded savanna. They are savanna woodland, tree savanna and also known as park savanna and shrub savanna. Park savanna particularly characterizes the vegetation of Bwari, which is typically a stratified community with a discontinuous canopy featuring scattered trees and shrubs.

The tree stratum is less dense than that of savanna woodland but more substantial than that of the shrub savanna. Riparian forest is noticeable along watercourses, thus, punctuating the vast savanna land. Ecologically speaking, Bwari falls in the ecological zone characterized by dry forests.

#### **b. Cultivated Vegetation**

Apart from the park savanna and riparian vegetation that characterized the study area, tracts of land with cultivated vegetation also exist. The cultivated areas are occupied predominantly with food crops, which are planted on a subsistence level.

## **CHAPTER TWO**

### **2.0 LITERATURE REVIEW**

#### **2.1 Human Settlement**

Settlement can be described as a group of building with people living in them (Oyeleye, 2006). It is also a unit or organized group of men, women and children making a living out of their environment. These units vary in sizes, complexity shape, form etc. there are often reasons why a group of people chooses to live in certain place. Settlement can be temporary or permanent (Oyeleye, 2006). Example of permanent settlement is like the traditional and planned settlement. Examples of temporary settlement are, nomadic and hunting. Our concern in this discussion is the temporary settlement, which is the squatter settlement or the unplanned settlement.

#### **2.2 Overview of Squatter Settlement**

A squatter is one who settles on land without Title or legal authority and without paying rent. (Encyclopedia America, 1987). Where a land law does not exist spelling out an unauthorized person or persons is referred to as squatting. The unauthorized individuals are squatters (Samuel, 2001). A squatter settlement therefore, is a place where groups of people are residing illegally. It is often defined as an enclave of illegal acquired land and informally developed



settlement whose inhabitants are largely low and middle income groups living without or inadequate basic community facilities and services.

Squatter settlement in Abuja are identified and characterized with the following features (Lawal, 2003)

- a. They are mostly unplanned
- b. Offshoot of existing- traditional villages
- c. Lack adequate and efficient basic facilities and services
- d. Mainly settled first by one indigenes at the center
- e. Located along developed access road
- f. Very densely populated
- g. They harbor criminals, unemployed young gangs stars, prostitute and destitute alike
- h. Available records shows that over 90% of the inhabitants are either unemployed or underemployed, low and middle income groups engage as artisan, mechanic and open-air recreational operators.
- i. Over 80% of the structures here are made of mud, iron zink, poor wooden building materials etc.
- j. More than 90% of the structures built here were done illegally, in other words there was no building permit or approval.
- k. The few community facilities and services available here are not only

largely illegally provided, but are grossly inadequate and over stretched.

Lawal (2003) defined squatter settlement as an enclave of illegally acquired land and informally developed settlement whose inhabitants are largely low and middle income groups living without or inadequately provided with basic community facilities and services.

### **2.3 Slum and Squatter Settlement**

For the purpose of this review, there is the need to establish a demarcation between a slum and squatter settlement.

George (2006) defined slum or blighted area as a group of buildings, or an area characterized by overcrowding, deterioration, unsanitary conditions, or absence of facilities or amenities such as potable water, drainage system, schools, health facilities, recreational grounds, post office etc which because of these conditions or any of them endanger the health, safety or morals of its inhabitants or the community.

In other words, slum may be re-defined as physically, socially and emotionally harmful to the residents at large, it is an area where the social and environmental factors are proven to cause problems and pathologies.

There are two schools of thought, one said that it is the dirty living habits of the dwellers and the neglect of buildings that makes a slum. Another school argues

that it is the physical deterioration which encourages slum habits in people.

In essence, there are two types of slum:

- a. Districts which had been slums right from its inception. Unsanitary and wretched housing conditions exist here because of the original arrangement, construction and type of building materials used in the area.
- b. Squalid housing results from misuse of dwelling units originally for less intensive uses.

A slum therefore can be described as an environment in which a set of forces interact to give rise to a devalued physical and social image of an area by a larger community.

### **2.3.1 Characteristics of Slums**

The characteristics of the devalued image of an area by the community would include:

- i. Poor sanitary surroundings caused by indiscriminate litter of refuse and poor sewerage
- ii. Dilapidated structures
- iii. High occupancy ratio
- iv. Inadequate provision of or complete lack of public facilities

- v. Ownership by absentee landlords who are not interested in the maintenance of the property
- vi. Physical dullness in terms of landscaping and other social amenities
- vii. Uniform architectural design characterized by low rent

General features of vandalism

### 2.3.2 Effects of slum environment

The identified effects of slum are:

1. A slum environment provides, 'good hide-out for criminals. This is facilitated by the nature of structure or building with inadequate air space, which makes the environment dark and dank.
2. It provides an atmosphere for high fertility and also high infant mortality rate. Since slum areas are associated with lack of necessary social amenities, sexual relationships is the major means of recreation. Differences in the rate of individual development can also be associated with slum areas. This is manifested in the behavioural pattern of children brought up in slum areas, which are quite unlike those nurtured in decent environment. Differences can also be noticed in the levels of intelligence, social interaction and exposure to the good things of life. Children raised in decent areas are usually well composed in public places and are adventurous positively, while those raised in

slum areas are usually involved in delinquent behaviour, such as pilfering and truancy. However, the interpersonal relationships among slum dwellers are closer than those in decent development.

### **2.3.3 Cause of Slums:**

1. Low capitals formation has been identified with slum areas. In developing economics like Nigeria, the major cause of slum is low capital formation of the less privileged groups. The income they generate is only enough for sustenance, while they have low capital to utilize in improving their homes or to keep environment healthy for human habitation. The poor financial position of such residents is the main reason why 6 - 10 persons would live in a room.

2. There is a sense of alienation among the rural - urban migrants to the urban centre in search of white collar or blue collar jobs which are not always available. They find solace in poor quality housing in a filthy environment. They feel a sense of alienation from the whole urban system of life and are satisfied with the fact that they can find a place to live in, though substandard.

### **2.3.4 Symptoms of slums**

Slums are caused not only .deterioration of buildings, but also by inadequacy of

space standards (George, 2006); resulting in congestion of various uses and inadequacy of circulation space. Other causes are:

- i. Types of buildings (in an environment) which may be of poor architectural design, poor construction materials and non-conformity with town planning rules and regulations.
- ii. Break down of infrastructural facilities such as pipe born water supply system, resulting in a filthy environment, lack of maintenance of drains and roads, which result in stagnant pools breeding mosquitoes.
- iii. Land tenure system which encourages the subdivision of land to each member of the family. This results in small plots that cannot accommodate a good standard of living.
- iv. Over-population is another symptom of slums. One of the causes is the rural-urban drift to the high-density residential areas. The drift has been identified as one of the major contributors to population increase, while has a resultant effect in slum development at the area of destination, because the available facilities are over stretched.
- v. The change of use of building has also been identified as a symptom of slums. For instance, the change of a single household

unit into two or three or sometimes even four household units. This can encourage slum development.

Smith (1981), is of the view that, there is no single an acceptable definition of what a slum area is. He further went to say that, there are various definitions, which reflect the different orientations of various disciplines such as sociology, demography, economics, medicine and physical planning. At the same time, different societies define slum in different ways, even among people in the same discipline. Thus, the physical planner's definition of a slum in the United States of America or Great Britain is bound to be different from that of a developing country such as Nigeria. This is a reflection of the varying levels of socio-economic development, which characterizes different countries in the world.

Despite this lack of agreement, Drakakis (1981) provides an over view of what constitutes slum areas in the context of third world countries in general and Nigeria in particular. Third world cities are known to have two types of environmentally degraded areas. The first is the squatter settlement which comprises uncontrolled or temporary dwelling largely inhabited by immigrants from outside the city concerned. Often, such areas are occupied illegally since building plans are not approved before dwellings are built. The second type is the slum proper which can be defined as legal, permanents which have become

substandard through age, neglect and or subdivision into micro-occupational units such as rooms, cubicles or cocklofts (Onokerhoraye 1988).

Odongo (1979) noted that, most contemporary attitudes and interpretation of the nature and origin of slums are derived from the Victorian era. During the Victorian period, slum dwellers were viewed as a socio-spatially isolated group whose separation was attributed variously to preferred deviance, the rejection of the work ethic, and other anti-socials value. In his words, slum areas were viewed as generations host deviant behaviours such as criminality, prostitution and juvenile delinquency (Odemerho, 1988).

Economically, slum areas are viewed as areas inhabited by the poor in the urban system. The economic perception of slum areas is thus largely that of a people who are unskilled and therefore cannot be employed. Since there is no employment, there is no source of income for the vast majority of the dwellers of slum areas. Thus, Portes (1971) in a not untypical passage has described urban slums in Chile as housing the poorest of the poor, the unemployed, the vagabond, and the delinquent. The unskilled and illiterate and often the alcoholic, the vagabond, the delinquent.

There is the political perspective, which views slum areas as the breeding ground of political radicalism and violence. This perspective stems from the basic assumption that slum dwellers, experiences of poor living conditions and



a variety of socio-economic hardship would in time generate feeling would eventually led to an eruption of political radicalism and violence (Porters 1971).

Abrams, (1966) is of the view that over-crowding is generally regarded as a hazard to health and in particular encourages the spread of infectious diseases, such as typhoid and tuberculosis. This is most pronounced in a residential situation in which sleeping accommodation is congested and the ventilation facilities poor. Thus, the theory that a filthy and decaying environment is indeed a health hazard of town in India and Lagos, Clinard (1966) and Marris (1961) have independently observed that the often supposed poor health of slum dwellers is not exclusively a consequence of housing conditions as such, as poor health could also be attributed to unbalanced diet, inadequate medical facilities and conflux disregard of personal hygiene.

In Nigeria (Lagos state) Public Health Bye-law of April 1972 recommends room occupancy of 2 persons per room, only the high-income areas conform to this standard, while residents of low income areas live in overcrowded rooms with occupancy ratios ranging from 8 people per room in a defined area of squatters settlement (Mabogunje 1968).

Besides overcrowding in slums and squatters settlements. Mabogunje view the grossly inadequate essential services of water supply, storm drainage, roads, electricity, waste removal and disposal.

In third world countries, studies of slums as a social problem have, in general, tended to follow the colleagues. Reviewing studies carried out in Ghana, Uganda, the Philippines and Venezuela, among other developing countries, Clinaod and Abbot (1973) have noted a significant degree of correlation between slum/squatter housing and deviant behaviours.

The survey conducted by the Nigerian Institute of Social and Economic Research (NISER) in 1982, shows that vigorous definition and identification of slum areas was attempted. The selected slum areas in each urban area were made after a through reconnaissance survey of all the worst residential areas with respect to their physical characteristic. In addition, the questionnaire administered focused on the social and economic of the households and dwelling in which the inhabitants live. However, the analysis has focuses on the physical characteristics of the dwellings and the overall environments, in which they are located,

In the opinion of a British Writer Schnore (1966), suggested that certain variable should be measured to find out whether a settlement is a slum or not.

He says to defined squatters settlement one needs to incline to the choice of

those variables, which can be statistically measured. These variables include population, type and level of economic activity predominant in the area, migration pattern, heterogeneity and social differentiation and stratification.

According to Mba (1995), the Nigerian squatter's settlement has always been dominant scenery in the country mainly because Nigerian, the settlement spaces has been most extensive. Virtually the settlement spaces of the country in pre-colonial era were few and far apart. From available records these settlement were of the relating small population and had not the features associated with modern urban centers.

Hagget (1979) is of the view that uncontrolled squatters settlement often lie around the periphery of the built-up areas, and are made up of temporary building (built-by the squatter themselves) with few social infrastructures. He went further to say that their names vary from country to country. In Jamaica they may be called Ghetto, In Latin America ranchos of favelas, in Asia Bustees or Kampongs; in Africa boonville's or shanty towns.

According to Makinwa and Abebusoye (1998) defined squatter's settlement as area characterized by substandard housing built mainly of corrugate iron sheets, planks and plywood set haphazardly on land without adequate thought for vehicles movement, drains and natural light. He further said existing houses are usually overcrowding rooming houses and most of these, over 80%, contain

more than these households. (Odemerhon, 1988).

The only different between slum and squatter settlement is their legal status.

While all squatter settlements are illegal, most slums are traditional and legal in nature. However, their structures and characteristic are the same.

## **CHAPTER THREE**

### **3.0 MATERIALS AND METHODS**

#### **3.1 Preamble**

This chapter presents a brief account of the procedure used in carrying out the research and the methods of data collection. It identified some limitations of the methodology due to the problems often associated with convectional methods of data collection.

#### **3.2 Acquisition and Development of Data Base**

The relevance of adequate data for the realization of a study like this cannot be over-emphasized. The area of study (Dutse Alhaji - Abuja) which comprises six zones did not have identifiable physical boundaries. The criteria for grouping zones include the sizes and the presence of notable features such as stream footpath or vehicle road. This has been considered important for the purpose of identification of other features and interpretation.

#### **3.3 Sources of Data**

Basically, two sources of data were used. These are the primary and secondary sources. And in this research, both sources were used.

Primary data used were acquired from direct field measurement, questionnaire

survey, interview survey Focus Group Discussion (FGD) and community participation method.

The secondary data involves the use of information already in existence and this was source from agencies, offices among others. This data must have been collected for more general purposes and often distinct from the objective and the uses. The secondary data is often divided into roster, vector and attribute data

### **3.4 Questionnaire Survey**

The questionnaire which was used to gather primary data was divided into four broad sections, with each section containing variables such as condition of houses, physical and social infrastructural facilities and services, and socio-economic/cultural setting. The question on condition of houses was aimed at identifying the type and conditions of material used for the house in the study area. They also included question on the type of houses, number of rooms, size of rooms, type, condition and number of windows. It also included, type and condition of various in house facilities and the immediate environment, among others.

The third section of the questionnaire contained information on vehicular

access, to individual houses, width of road, material finishing of roads, availability type and quality of drainage system, electricity supply, water supply, social facilities and services.

The fourth section sort information on size, location and condition of land on which the houses were built, title on land if any was also asked, other included information on, refuse dump site; health hazard and any known environmental hazard was also sought among others.

### **3.5 Questionnaire Administration**

The administration of the questionnaire took the following form. It was recognized that it was impossible to achieve a full coverage of the study area; therefore a suitable sample frame was used. The available and more reliable sample frame obtained in the study area was the network of foot path and roads in each zone, apart from inconsistencies in the data from the national population census and ministry of Federal Capital Territory on the number of houses in Dutse Alhaji, the number of roads in each zone presented a more reliable and adequate sample population for the study.

Information on roads in each zone was obtained from Bwari Area Council, FCDA Resettlement Department and the satellite imagery from the population commission. It was realized during the reconnaissance that multi tenanted

housing were predominant in the study area, therefore a random sampling technique was used to select the household to be interviewed in a house. The greatest problem discovered in the course of questionnaire administration was the usual apathy displayed by some of the respondents, as they appeared suspicious of the purpose of the survey. It was difficult to reach some houses to be interviewed, because their housing could not be assessed. Some respondents were also sensitive to questions pertaining to their socio-economic profile, particularly family size, among others. In a summary, at least an average of thirty questionnaires per zone as defined, were administered for the analysis.

### **3.6 Raster Based Data**

For the purposes of this level of research, the following data sets were used: satellite imagery of the study area were obtained from the necessary agencies, like FCTA, Abuja and Population Commission. This served as one of the base maps for the physical updating exercise that was carried out. This base map also helped in the questionnaire administration in a more defined way.

### **3.7 Vector Based Data**

In addition to raster-base data, other maps acquired from the respective



agencies include, a political map of Abuja Area Council's with particular interest on Bwari Area Council where Dutse Alhaji is located and demarcated for political reason. Also location maps was acquired for this research.

Picture information on necessary features, like houses or building, refuse dump site, borrow pits, hazard locations, river, rock road etc. was also acquired.

### **3.8 Attribute Data**

This data set can be divided into sub-categories, which are attribute data from secondary sources and primary data generated from geographic analysis.

Attribute data from secondary sources were data obtained from various related agencies. Zoning system as shall be applied here are, dynamic in nature, they may change with time in response to the contemporary politics in the country. Therefore the research used the rating zones, which is relatively stable where the boundaries could easily be delimited. The rating zone can further be grouped into sub-zones in order to improve the level of accuracy.

### **3.9 Instrumentation**

Some basic tools were used to aid this research. Among them were survey instrument, such as hand GPS for reconnaissance purpose. Others were hand camera for picture information, measuring tape to confirm distances and other information.

Vehicle speedometer was also used to confirm long distance measurements. Computer (hard and soft wares) was used for the analysis of data and presentation of same in report as finished work. Digital camera was also used to capture some environmental degradation areas and some features that could constitute environmental problems within the study area.

### **3.10 Methods of analysis**

Simple descriptive statistical method of data analysis which was used to express the scores, of the variables, as is related to the percentage interval ranking the quality distribution of the basic characteristic of the squatter settlement .

## CHAPTER FOUR

4.0

### RESULTS

During the survey an average of 50 respondents in each of the six defined zone of the study area were considered for investigation. In all, 300 respondents were interviewed, and the results of the investigation are presented in the tables below.

#### 4.1 **Quality Rank - Scores Distribution.**

Table 4.1 below is showing a general rank scores as is related to the quality distribution of variables (characteristic of the squatter settlement) expressed in percentage intervals.

#### 4.1 **Quality Rank - Scores Distribution.**

Table 4.1 below is showing a general rank scores as is related to the quality distribution of variables (characteristic of the squatter settlement) expressed in percentage intervals.

**Table 4.1 Quality Rank scores Distribution**

---

<u>Percentage intervals</u>	<u>Scores.</u>
0-10	1
10-20	2
20-30	3
30-40	4
40-50	5
50-60	6
60-70	7
70-80	8
80-90	9
90-100	10

---

Source: Field Work 2009

## 4.2 Housing Type

The available House types were assessed through the effort of the respondents. The Table 4.2 below is showing the respondents views regarding the distribution of the available House Types.

**Table 4.2 Housing Type Distribution**

S/No	House Types	Respondent Distribution	% of Total	Scores
1.	Face to Face (FtoF) Bungalow (FFB)	232	77.33	8
2.	High Rise (HR)	10	3.33	1
3.	Others (OT)	58	19.34	2
4.	Total	300	100	-

Source: Field Work 2009

### 4:3 Qualities of Wall Materials

The available qualities of building wall materials were assessed through the combine effort of the respondents. Table 4.3 below is showing the distribution of such various materials.

**Table 4:3 Qualities of Wall Materials**

S/No	House Types	Respondent	% of Total	Scores
<b>Distribution</b>				
1.	Mud	124	41.33	5
2.	Mud/brick	90	30.00	3
3.	Sandrete	57	19.00	2
4.	Burnt brick	17	5.67	1
5.	Planks	8	2.67	1
6.	Others	4	1.33	1
7.	Total	300	100	-

Source: Field Work 2009

#### 4.4 Floor Area Distribution and Assessment

The standards of floor area of the House Types were assessed. Respondents' opinion or view assisted in arriving at the distribution in the Table 4.4 below.

**Table 4.4 Floor Area Distribution and Assessment**

S/No	Floor area Coverage (m <sup>2</sup> )	Respondent Distribution	% of Total	Scores
1.	Below 50 m <sup>2</sup>	210	70.00	8
2.	Above 50 m <sup>2</sup>	90	30.00	3
3.	Total	300	100	-

Source: Field Work 2009

#### 4.5 House Type and Room Distribution

The room distributions in term of numbers available, in the various House Type were assessed. Respondents' views are shown in the distribution table 4.5 below.

**Tables 4.5 House Type/Room Distribution**

S/No	House Type	No. of Room	Respondent Distribution	Floor area per family	% of Total	Scores
1.	Face to face bungalow	Above 6	32	Below 50m <sup>2</sup>	77.33	8
2.	Duplex	4 & 5	10	above 50m <sup>2</sup>	3.33	2
3.	Others	3 & 4	58	above 50m <sup>2</sup>	19.34	2
4.	Total	-	100	-	100	-

Source: Field Work 2009



#### 4.6 Room Size Assessment.

The Rooms sizes as they were related to the various House Types were assessed through the respondents and table 4.6 below reveals such distribution.

**Table 4.6 Room Sizes and adequacy**

S/No	Room Sizes	Respondent Distribution	% of Total	Scores
1.	Less than 3m x 3m	198	66.00	7
2.	3m x 3m	40	13.33	2
3.	3m x 3.3m	24	8.00	1
4.	3m x 3.6m	20	6.67	1
5.	Above 3m x 3.6m	18	6.00	1
6.	Total	300	100	-

Source: Field Work 2009

#### 4.7 Quality of Roof Materials

The qualities of the roof materials used to roof Houses in the study area were assessed through the efforts of the respondents. The table 4.7 below is showing such distribution.

**Table 4.7 Quality of Roof Materials**

S/No	Materials	Respondent	Quality State		% of Total	Scores
			New	Old		
1.	Corrugated Iron zinc	207	62	140	69.00	7
2.	Asbestor	88	30	58	29.33	3
3.	Concrete	5	4	1	1.67	1
4.	Total	300	100	199	100	-

Source: Field Work 2009

#### 4.8 Quality of Toilet Facilities

The qualities of toilet facilities as related to the House Types were also assessed through the respondents. Table 4.8 below shows such distribution.

**Table 4.8 Quality of Toilet Facilities**

S/No	Toilet Facilities	Respondent Distribution	% of Total	Scores
1.	Latrine	90	30.00	3
2.	WC	51	17.00	2
3.	Bush System	129	43.00	5
4.	Others	30	10.00	1
5.	Total	300	100.00	-

Source: Field Work 2009

#### 4.9 Position of Latrine Facilities

Through the cooperation of the respondents, the positions of Latrine facilities in some of the houses identified were assessed. Table 4.9 explains the distribution.

**Table 4.9 Position of Latrine Facilities**

<b>S/No</b>	<b>Position of Latrine</b>	<b>Respondent Distribution</b>	<b>% of Total</b>	<b>Scores</b>
1.	Detached	63	21.00	3
2.	Attached	237	79.00	8
3.	Total	300	100.00	-

Source: Field Work 2009

#### 4.10 Quality and Material of Kitchen facilities

The materials of kitchen facilities in term of its quality were also assessed through the respondents. Table 4.10 reveals the distribution.

**Table 4.10 Quality and Material of Kitchen facilities**

S/No	Facilities	Respondent Distribution	% of Total	Scores
1	Zinc	69	23.00	3
2	Planks	186	62.00	7
3.	Thatch-Leafs	31	10.33	2
4.	Others	14	4.67	1
5.	Total	300	100.00	-

Source: Field Work 2009

#### 4.11 **Position of Kitchen.**

The Positions of Kitchens within the identified House Types were assessed through the respondents. Table 4.11 below shows the distribution.

**Table 4.11 Position of Kitchen**

<b>S/No</b>	<b>Position</b>	<b>Respondent Distribution</b>	<b>% of Total</b>	<b>Scores</b>
1.	Detached	52	17.33	2
2.	Attached	248	82.67	9
3.	Total	300	100.00	-

Source: Field Work 2009

#### 4.12 Personal Judgment on Set-Back Adequacy.

The adequacy of building set-backs were assessed through the efforts and personal judgment of the respondents. Table 4.12 below reveals the distribution of the responses.

**Tables 4.12 Personal Judgment on Set-Back Adequacy**

<b>S/No</b>	<b>Judgment</b>	<b>Respondent Distribution</b>	<b>% of Total</b>	<b>Scores</b>
1.	Not adequate	198	65.00	7
2.	Adequate	66	22.00	3
3.	Quit adequate	21	7.00	1
4.	Very adequate	18	6.00	1
5.	Total	300	100.00	-

Source: Field Work 2009

#### 4.13 Type of Access to Houses.

Accesses to houses were assessed in term of types and width using personal judgment and respondents views. Table 4.13 is showing the distribution.

**Table 4.13 Type of Access to Houses**

S/No	Access to House	Respondent Distribution	% of Total	Scores
1.	Space between Building	173	57.66	6
2.	Foot path	74	74.67	8
3.	Motorable road	53	17.67	2
4.	Total	300	100.00	-

Source: Field Work 2009



#### 4.14 Road Standard (Sizes and Width).

The assessment of standards of the roads available in terms of sizes and width, were carried out with the respondents playing major roles in the outcome of the result. Table 4.14 is showing the details and the distribution of such standards.

**Table 4.14 Standard of Road in terms of sizes and widths**

S/No	Road Widths	Respondent Distribution	% of Total	Scores
1.	Below 10m	174	58.00	6
2.	10m	43	14.33	2
3.	11m	29	9.67	1
4.	12m	24	8.00	1
5.	15m	17	5.67	1
6.	Above 15m	13	4.33	1
7.	Total	300	100	-

Source: Field Work 2009

#### 4.15 Participative judgment on Materials Finishing of Roads

The materials finishing of roads were assessed through self participative efforts of the respondents. Table 4.15 is showing the distribution of such materials.

**Table 4.15 Participative judgment on Materials Finishing of Roads**

<b>S/No</b>	<b>Finishing</b>	<b>Respondent Distribution</b>	<b>% of Total</b>	<b>Scores</b>
1.	Earth road	300	100	10
2.	Asphalt	-	-	-
3.	Concrete	-	-	-
4.	Total	300	100	-

Source: Field Work 2009

#### 4.16 Availability of drainage System

The drainage system available was assessed. The respondents were also able to give their own general assessment. Table 4.16 is showing the distribution of such response from the respondents.

**Table 4.16 Availability of drainage System**

<b>S/No</b>	<b>Response on</b>	<b>Respondent</b>	<b>% of</b>	<b>Scores</b>
	<b>Available</b>	<b>Distribution</b>	<b>Total</b>	
1.	Yes	289	96.33	10
2.	No	11	3.67	1
3.	Total	300	100.00	-

Source: Field Work 2009

#### 4.17 Type & Quality of Electricity supply sources.

The sources of electricity supply were also assessed using the view of the respondent. Table 4.17 is showing the distribution of such views.

**Table 4.17 Type & Quality of Electricity supply source**

S/No	Type of supply	Respondent Distribution	% of Total	Scores
1.	Private generator	68	22.67	3
2.	Community	-	-	-
3.	PHCN	64	21.33	3
4.	Private/PHCN	168	56.00	6
5.	Total	300	100.00	-

Source: Field Work 2009

#### 4.18 Source of Water Supply

Water supply sources were assessed through the identification and physical contact with the available sources and the respondents view and assessment.

Table 4.18 below shows the distribution of respondents' views of the availability of sources.

**Table 4.18 Source of Water Supply**

S/No	Water Sources	Respondent Distribution	% of Total	Scores
1.	Well (Hand dug)	201	67.00	7
2.	Bore-hole	12	4.00	1
3.	Pipe-borne	-	-	1
4.	Rain Water	15	5.00	1
5.	Stream	72	24.00	3
6.	Total	300	100.00	-

Source: Field Work 2009

#### 4.19 Availability of Social Facilities & Services.

The social facilities and services available were assessed through the participative views of the respondents. Table 4.19 is showing respondents views of the distribution.

**Table 4.19 Availability of Social Facilities & Services**

S/No	Room Sizes	Physical and Availability	Respondent Assessment Of Adequacy	% of Total	Scores
1.	Primary School	Available	Very Adequate (102)	34.00	4
2.	Secondary Sch.	Available	Not Adequate (13)	4.33	1
3.	Clinic/hospital	Available	Not Adequate (17)	5.67	1
4.	Shopping/market	“	Averagely Adequate (50)	16.67	2
5.	Place of worship	“	Adequate (60)	20.00	2
6.	Refuse dump site	None	-	-	-
7.	Cemetery	None	-	-	-
8.	Police Post	Available	Adequate (58)	19.33	2
9.	Children Play	-	-	-	-
10.	Motor park	-	-	-	-
11.	Recreation Facility	-	-	-	-
12.	Total	-	-	100.00	-

Source: Field Work 2009

#### 4.20 Plot Sizes

The plot sizes were assessed using the available traditional plot sizes and the respondent views. Table 4.20 below shows the distribution of such plot sizes.

**Table 4.20 Plot Sizes**

S/No	Sizes	Respondent Distribution	% of Total	Scores
1.	Less than 9 x 9m	164	54.67	6
2.	9m x 9m	72	24.00	3
3.	15m x 15m	30	10.00	2
4.	15m x 30m	21	7.00	1
5.	30m x 30m	13	4.33	1
6.	Total	300	100.00	-

Source: Field Work 2009

#### 4.21 Method of Disposal of Solid Waste Disposal.

The methods of disposal of solid waste were assessed and the respondents' views on the distribution of such methods are shown in the table 4.21 below.

**Table 4.21 Method of Disposal of Solid Waste**

S/No	Methods	Respondent Distribution	% of Total	Scores
1.	Burning	79	26.33	3
2.	Burying	47	15.67	2
3.	Anywhere	174	58.00	6
4.	Total	300	100.00	-

Source: Field Work 2009



#### 4.22 Source of Energy for Cooking.

The respondents gave an in-depth view of the various sources available where energy for cooking was derived. Table 4.22 below is showing the distribution of such sources.

**Tables 4.22 Source of Energy for Cooking**

<b>S/No</b>	<b>Sources</b>	<b>Respondent Distribution</b>	<b>% of Total</b>	<b>Scores</b>
1	Firewood	154	51.33	6
2	Gas	26	8.67	1
3	Kerosene	120	40.00	4
4.	Cool	-	-	-
5	Total	300	100.00	-

Source: Field Work 2009

#### 4.23 Type of Health Hazard Witnessed

The assessment of the possibility of health hazard in the study area was conducted. The respondents' views and assessment of the possibility is explained in the distribution table 4.23 below.

**Table 4.23 Type of Health Hazard Witnessed**

S/No	Health Hazards	Respondent	% of	Scores
		Distribution	Total	
1.	Typhoid Fever	80	26.67	3
2.	Malaria fever	60	20.00	3
3.	Cholera	45	15.00	2
4.	Chicken-pox	20	6.67	1
5.	Measles	26	8.67	1
6.	Diarrhea	12	4.00	1
7.	Guinea worm	12	4.00	1
8.	Dysentery	21	7.00	1
9.	Skin disease	6	2.00	1
10.	Eye problem	4	1.33	1
11.	Others	10	3.33	1
12.	Total	30	100.00	-

Source: Field Work 2009

#### 4.24 Community Based Assessment of causes of Health Hazard

The causes of the some of the identified Health Hazard were assessed through a community based-effort. Table 4.24 is showing the distribution of the respondents' assessment.

**Table 4.24 Community based assessment of causes of Health Hazard**

S/No	Likely causes	Respondent Distribution	% of Total	Scores
1.	Poor quality of water	123	41.00	4
2.	Excessive heat	52	17.33	2
3.	Poor sanitary system	92	30.67	3
4.	Dust	22	7.33	1
5.	Others	11	3.67	1
6.	Total	300	100.00	-

Source: Field Work 2009



**PLATE I: RIVER, DUTSE-JAM, SHOWING BANK EROSION**



**PLATE II: POOR DRAINAGE SYSTEM (SITE A)**



**PLATE III: POOR DRAINAGE SYSTEM (SITE B)**



**PLATE IV: ILLEGAL REFUSE DUMP SITE (A)**



**PLATE V: ILLEGAL REFUSE DUMP SITE (B)  
AND PRESENCE OF HIGH TENSION CABLE**



**PLATE VI: FILTHY SURROUNDING (A)**



**PLATE VII: FILTHY SURROUNDING (B)**



**PLATE VIII: A TYPICAL MUD HOUSE WITH ATTACHED  
LATRINE AND BATHROOM**



**PLATE IX: TYPICAL GULLY EROSION SPOT**



**PLATE X: ON STREET OPEN MARKET**





**PLATE XI: TRAFFIC CONGESTION IN THE MARKET AREA**



**PLATE XII: STREAM (B)'S FLOW PATH BEING NARROWED BY MAN ACTIVITIES**

## **CHAPTER FIVE**

### **5.0 DISCUSSION, CONCLUSION AND RECOMMENDATION**

#### **5.1 Discussion**

##### **5.1.1 Physical Condition of Natural Features of the**

##### **Environment in Dutse Alhaji**

Natural features of the physical environment in Dutse Alhaji were identified during the field survey. Their states in terms of location, type, quality, quantity, existing physical variations and changes were studied to find out the effects these conditions have impacted on the environment in Dutse Alhaji.

#### **1 Water Body**

Three major natural sources of water were identified. Source 'A' as labeled on the base map is a stream named Dutse-Jam and located at the eastern fringe, stretching from an underground source North-East of the settlement. A tributary from the Gwarinpa end join this main boosting the volume at the Kubwa end. Study also revealed that water is available throughout the year, running South-ward and gradually reducing in force and volume towards December time period. The development of Gwarinpa Estate and the physical distortion resulting from the existence of this settlement has strongly reduced the annual volume of water expected from the tributary stream- (field survey).

Bounding the entire length of this stream was a marshy expanse of land which was being used to cultivate local rice by the original inhabitants of Dutse Alhaji.

Study also revealed that the water quality have also been affected greatly. It has now presented a brown colour situation resulting from contamination and over-use by the immediate inhabitants up stream. At down stream fish-farming that is always the practice has been affected greatly due to the activities of man up-stream, resulting from the rapid expansion of Dutse settlement.

Source 'B' is a stream located within zone one of the study area, stretching South-West across the Bwari express way into Kubwa axis to join Usman river (field investigation). This stream derived it's source from the underground water beneath the vicinity. It is seasonal, not deep but wide in boundary and the running is less erosive. This was why the recent occupants could attempt to reclaim the Northern part for residential use, leaving the remaining stretch before the express way to be less than two kilometers in length and yet to be reclaimed. Investigation also presented a fact that the remaining portion could not be reclaimed because of its degree of marshness (Bwari Area Council). The use presently is strictly domestic. A health centre located close to this place had on record, epidemic which had health cases experienced around the area in

2005 resulting from contamination and over use of the stream.

The traditional rice cultivation noted along this stream in the past has been taken over by the settlement (Area Council).

The source 'c' is a stream located at the East end of the North-West of the study area.' It is running south-west and still in its natural state. Human activities have not brought any notable physical changes to it. The location, distance running force and volume are major factors (field survey). Also see table 1.1

## ii. **Biological Condition**

The study generally revealed that the entire biological system of the study area has been distorted greatly by the coming into existence of these compacted settlements called Dutse Alhaji.

It is a common practice in Nigeria for the entire vegetation to be cleared during housing development. This is quite a very wrong method as the physical environment is not usually safe where this method is in practice. The

Study further revealed that over 300 hectares of land has been estimated as the total expanse of land occupied by the entire Dutse Alhaji .

Such expanse of land was covered by vegetation characterized by savanna vegetation which contains very few timber tree species which are mostly scattered. Among the known trees are tophira, mitragyna, terminalia, glauscens,

atzelia etc (Adejuwon 1983). It is often referred to as grass land. Also this expanse contained a million species of plants and animals. Clearing such expanse of land at various times and unwisely too, and without replacing such lost trees means decalcification effect would set in and extinction of millions of plants and animal species would be experienced as is the case of Dutse Alhaji Settlement which is unplanned.

### iii **Soil Conditions**

In the earlier chapter the type of soil found within the study area was identified as that of alluvium deposits which is suitable for agricultural use. It is a common knowledge also that soil is the uppermost layer of the lithosphere.

The practice of housing development involves clearing and leveling of land often called project site. The study area too went through these processes over time either on the basis of individual or group of individual's development activities. The important fact is that these development processes, to a great extent has distorted this uppermost layer of the Soil which support plant growth. Figure 1.5 is showing a typical example of such situation of land in Dutse Alhaji resulting from this unplanned development processes. This unplanned processes which involves unwise removal of trees; shrubs and grass has presently exposed the entire land of Dutse to continues erosive forces of uncontrolled run-off during the rainy season. Soil erosion is now experienced

throughout the rainy season in Dutse, which gradually has exposed some building or houses to immense danger of collapse (see plate 4:9).

#### iv. **Temperature Variation**

Study revealed also that before the on-set of the emergence of this settlement over 10 years ago an average annual temperature between 25°C and 27°C was recorded, while during' this study period an average temperature between 26°C and 29°C was recorded (NIMET, 2006). The difference which has shown an unusual rise in temperature within this locality can be linked up with the emergence of this compacted settlement and other settlement within the immediate neighbourhood.

A congested settlement is associated with poor air circulation, air pollution and a "heat engine" where lose of heat is very slow and temperature is relatively high throughout the year (Lawal, 2002). The study revealed that excessive heat experienced here ranked next to poor sanitary system after poor quality of water as casuses of health hazard in Dutse Alhaji.

### **5.1.2 Housing and Environmental Condition in Dutse Alhaji**

The result of the survey, has revealed that almost all the landlords in Dutse Alhaji at the time they came to build houses, discovered that prices of plots of land were quite affordable, easily assessable and development of same quite easy too, since no body needed any building permit to build any house in this locality.

#### **1. Quality Ranking Of House Types**

Bungalows' in the likes of face to face apartment were predominantly the building types found in the area (See table 4.1 & 4.2). These buildings were sited haphazardly such that no defined building set backs were observed.

Most of these building had no access road to them and where available were so much in deplorable condition and generally poor too. The only available means of reaching most of these houses were through footpaths only available by chance or circumstances.

The sizes of the houses were generally substandard (Nig reviewed building code 2010) with crowdy rooms that were below architectural standards. (see table 4.5 & 4.6). The rooms were poorly ventilated as only one substances window (arch data) per room was generally recorded. Most houses were built

with mud materials with floor area below 50m<sup>2</sup> (see table 4.4). In other words, the houses were overcrowded and congestion set in.

## ii. **Age of Houses**

Respondents were asked on the ages of the houses where they live. A good number of them could remember and gave the date that the houses were built, however some tenants could not estimate the age of their buildings. In such cases, the researcher estimated the age of houses by observing and monitoring the physical attributes of the building and structure. In the final analysis, majority of the buildings were built or rebuilt within the last 20 years, while about few of the buildings were over 30 years old. They are generally dilapidated and no longer fit for human habitation (habitable room standard, planning code). Majority of the houses within the Dutse were either built with mud or plastered with cement while few were built with sancrete blocks (see table 4.3). This indicates a relative urban slum quality with wood/iron sheet or others. This however represents only the living houses. Though the quality of the materials for the walls appeared in good order, larger proportion of the buildings was not in good condition. In addition to the poor condition of the wall, (see table 4.3), they stood on weak foundation that endangers the life of occupants (field survey).



### iii **Roof Materials**

However, on the condition of roof, corrugated iron sheet which covers the highest percentage of the roofing' material in the study area was noted with considerable rusting, leaking and sagging. Many have some part missing while less building has no defect in their roof. On the ceiling condition, the study shows that few have asbestos tiles as the ceiling materials while majority had ceiling wood, mat and cardboard covers commonly in use. The survey on the condition of the ceiling reveals that few building ceiling were in good condition while majority were leaking with missing parts. This constituted a great risk to the life of the inhabitant.

### iv **Habitable Room Distribution**

Housing in Dutse seems to have high number of rooms as the survey reflected that only few buildings have five rooms. Those with number of habitable rooms ranging from 4 - 6 rooms are less than those above 6 rooms (see table 4.5). This is a reflection of two important characteristics of housing in the study area. Most of the buildings, especially in the core area were roomy (face to face) type while a significant proportion were still native building. The household size is between 11 and 15 people in the liked of core bedroom flat (field survey). This is a conjection (M.I. Lawal 1995).

## v **Floor Materials**

The floor material is a reflection of the quality level of housing in a place and usually it is one of the area researchers do focus on during survey. Small proportions of the houses here had cement concrete as the floor materials, while tenazzo materials and modern tiles cover very less numbers. The timber materials also cover less which revealed not a particularly common material for floor in the study area. The condition of floor was further investigated. That studies revealed that majority of the floor were cracked and those with lower foundation belts were permanently damp for most part of the year. Generally, the floor condition of Dutse housing were below average in terms of quality. Studies further revealed that the topography of Dutse as generally undulating and marshy terrain. No wonder during rainy season the only available main roads becomes unmotorable due to flooding.

## vi **Window Materials**

Study shows that majority of the buildings had louvres, which was closely followed by wood materials, mat and other window materials cover less. Generally, the window materials can be regarded as being in bad condition. Majority were either broken or falling off while only few were without serious defects and generally lack mosquito nets that endangered the health of the occupants.

## **vii Door Materials**

The material for doors show metal, metal/glass and wood. The majority of types of doors available, were wooden. The observations on door condition shows that majority were either broken or falling off while only few were in good condition. These conditions put the entire area under serious security risk.

## **viii Facilities In Houses (Bathroom And Toilet / Latrine)**

The type and condition of facilities in houses explain the quality levels of the houses/residential structures in an area. The study revealed that, bathroom and toilet/latrine facilities in the study area were located mainly outside the house, while few were located within the buildings. Majority of the bathrooms were mere zinc, kiosks, outside the houses. The type of bathroom commonest in the study area generally was the one where users carried buckets into the bathroom which might be outside or within the houses, shower-bath type covered less. (See table 4.8 & 4.9)

## **Ix Availability And Condition Of Drainage System**

The drainage condition in the study area shows a very deleterious condition. The drainage in Dutse was the open type with the entire stretch polluting the

environment. There was no covered type available while majority of the houses had no drainage system at all. However, many of the available drainage systems were also blocked. This explains the incessant erosion problems prevalent in Dutse especially during rainy season. (See table 4-17)

However too, the time of the survey was also very significant in determining the condition of the available drainage. The period coincided with the onset of the rainy season, therefore most of the debris on the path of these drainage had been partly cleared by the storm water from the rain.

x **Kitchen Facilities**

The common types of kitchen facilities in the study area were those situated inside the house, while some were open fire places, stove or modern cooker. However, few had their kitchen outside their houses. (See table 4.11)

### **5.1.3 Environmental Condition Of Physical Infrastructure In Dutse**

#### **Alhaji**

##### **i. Water Supply**

This is a major indicator of measuring the quality of residential environment. The residents in Dutse Alhaji used well and bore hole as the sources of supply of their domestic water. Pipe borne water lines were not connected to any of the zones. Stream also plaid some role in meeting the domestic water need in the Dutse Alhaji. This in the past years has exposed the resident to water borne diseases.

Study also revealed that almost every landlord had at least a well to his house. Also the study revealed further that most of these well got dried up during the dry season. The resultant effect was scarcity of water during the dry season. The drying up of the well according to study, was also due to the indiscriminant sitting of this facility.

##### **ii Access Road**

The important of vehicular access road in any settlement cannot be over emphasized and is yet another indicator which enhances the functionality of such settlement.

The study area was characterized by its undefined few vehicular access

roads which were used to define the zoning formation. Study has also revealed that, large numbers of the houses here had no vehicle access to them. The interview survey recorded that, the average road width here was below 10 meter which made vehicular traffic generally as quite chaotic. Traffic bottle-neck was often experienced during the peak periods. The roads were chiefly the earth type with no drainage system. (See tables 4.14 & 4.15)

### iii **Electricity Supply**

Electricity supply to the study area was chiefly from PHCN which is the only source of electricity supply to all Nigerians. Because of the recent power problem in the country, the only alternative source of power supply has been the electrical generating sets. Almost all household has at least one set each (field survey). The identified effect was measured in terms of the amount of carbon dioxide as pollutant these sets were emitting, thereby endangering the health of all the inhabitants of Dutse Alhaji.

#### 5.1.4 Availability and Environmental Condition Of

##### **Social Facilities and Services in Dutse Alhaji**

Social facilities and services are the basic elements or requirement needed for any neighbourhood unit to function very effectively and efficiently as a unit of such settlement (Adebiyi, 2002). where the availability of these basic elements were not adequate, such settlement deteriorate so easily and becomes less functional in due cause (Adcbiyi, 2002).

The field survey revealed these following sets of social facilities and service identified in scattered locations in Dutse Alhaji. They were, Nursery and Primary Schools, Public Primary School, Hospital, Clinics, place of worship and cemetery.

According to the available Town Planning Standard in Nigeria (Kehinde George, 1999) Dutse Alhaji if planned and with the size now (554.84 hectares) should have a total of 110,969 population going by the standard of 200 person per hectare. Presently the population of Dutse now is put at over 200,000 (field survey 2007). The available facilities and services therefore is grossly inadequate, where at all they are available.

The resultant effect is non-functioning of the settlement and this generally affects the social set up of the environment of Dutse Alhaji.

Table 4.20 is showing the distribution, availability and usage of the

identified community facilities and services in Dutse Alhaji.

#### **5.1.5 Environmental Condition of Social - Economic /**

##### **Cultural Facilities in Dutse Alhaji**

Socio-economic and cultural facilities in any settlement are the basic economic elements needed to enhance the business or commercial and social life of the inhabitants, while the cultural facilities are such elements needed to improve or enhance the cultural and the traditional set up of the settlement.

In Dutse Alhaji, the following socio-economic and cultural facilities were available. They were market, bank, town hall, police post, offices, bakery, and pure water factory.

The condition of these facilities in terms of availability, quantity, quality location and adequacy is analysed in table 4.20

#### **5.1.6 Identified Physical Environmental Problems in Dutse Alhaji**

Environmental problems are numerous. They are caused either by man's activities or natural situations.

During the questionnaire survey, a number of environmental problems were identified as continues situation or periodical occurrence. The identified



problems are soil erosion, traffic congestion and pollution.

## **I Soil Erosion**

Soil erosion is the wearing away and transportation of soil by water wind or ice (Environmental Science Tenth Edition). Soil in other words is the process whereby surface layer of weathered rock is loosened and carried away by running water, wind , ice or natural agent and lower horizon in the soil is exposed.

Basically there are three types of erosion by water which is the area of concentration. They include, surface flow erosion, splash erosion, rain drop or splash erosion and sheet erosion. The field studies and available traces of physical consequences also shows that two types of soil erosion were identifiable in Dutse Alhaji. They were surface flow and splash erosion. The known basic factors are not far from the unplanned settlement identified within the study area. They were the unplanned building construction processes and indiscriminate clearance of vegetation. These activities exposed the soil to surface run-off during heavy rainfall. The resultant effects were loss of soil fertility, diminution of cultivable land, disruption of communication route, water scarcity and other known situations as experience now in the study area (field work).

## ii **Traffic Congestion**

Traffic is a collection of vehicles, ships or air craft moving along particular routes for defined purposes (World Dictionary). Traffic congestion often referred to as "traffic bottle-neck", is a situation where these routes become overused thereby hampering the normal traffic flow. The concern of this study is on the road traffic situation in Dutse Alhaji. Road traffic congestion as experienced in Dutse was revealed by' the result of the field study. The situation emerged when vehicular movement in convoy, becomes too slow almost at a stand-still, which often result from an unplanned traffic volume. In this situation the traffic volume has outgrown the traffic carrying capacity of the available access road. The study revealed Dutse as an unplanned settlement where vehicular ownership and movement cannot be controlled. The few available access roads were narrow and in deplorable condition (field survey). Two ranges of peak periods were identified; between 7.30am - 9.30a morning time and between 4.30pm and 7.30pm evening period (field observation). The above noted situations are in its ramification are effects and environmental social problems.

### **iii Land Pollution**

Land pollution results mainly from dumping of solid and chemical wastes on land. Solid waste comprise of domestic refuse commercial and industrial wastes. The components of refuse includes, garbage, food waste, rubbish, e.g. glass, tin, paper, abandon vehicle and polygene bags etc. from the result of the field study two major indiscriminate refuse dumping ground was identified in Dutse Alhaji. Most of them were sited close to residential structures, putting the occupants at high risk of contacting communicable diseases.

#### **5.1.7 Spatial and Conditional Assessment Of The Housing Environmental Quality Levels**

The objective of this section was to examine the spatial pattern of urban quality in the study area based on the results of data collected through the questionnaires. It requires the application of discrete scores which were developed through examination of past literatures and initiative judgment, legislative minimum standard and the cultural standard in the study area.

It was variously observed that standard can be divided into two major categories, the legislative standard which was adopted by the government

and handed down to the populace as the set of norms to be followed by every citizen. There are minimum standards for every component of building in Nigeria as is in the Nigerian building code. On the other hand, there is cultural standard that develops with time and is commonly accepted as the norm by the society. They may not be minimum standards but every member of the society aspires to have such level of quality and judge the same as good environment from their own perspective. This assessment brings out the facts that such societal norms affects the environmental quality. In Dutse Alhaji generally, a lot of substandardness both in the physical and social setting were observed which actually affects the environmental quality of this area.

## **5.2 Summary**

Table 5.1 below, further explain the analysis discussed in the previous chapter, as the summary, which centered on the condition of the various facilities found in the study area in terms of their availability, quantity, quality, location congestion and adequacy. Each value of the variables were scrod between 1-10 to further described the above set of level of conditions and states of the facilities

**Table 5.1 list of scores attached to each value as related to the analysis tables**

S/No	Variable	Values	Score	Remark
1.	Type of house	Face to face flat/bungalow	6	Substandard
		storey	1	and poor
		Bungalow	3	quality
		Duplex	0	
		Others	1	
2.	Material of the houses	Planks	1	
		Mud	3	Outdated
		Mud/brick	3	quality and
		Sandcrete	2	requiring
		Baaco Products	1	replacement
3.	Size of Building	Below 50m <sup>2</sup>	5	Not
		Within 50m <sup>2</sup>	3	Adequate
		Above 50m <sup>2</sup>	2	
4.	Average Number Of Rooms	1	1	
		2	1	
		3	1	Congestion

		4	2	
		5	2	
		6 and above	3	
5.	Average size of	Less than 3m x 3m	8	
	Rooms	3m x 3m	5	Not
		3m x 3.3m	3	Adequate
		3m x 3.6m	1	
		Above 3m x 3.6m	1	
6.	Age of Building	1-5years	2	
		5-10years	2	Requires re-
		10-20years	5	development
		Above 20years	1	
7.	Roofing material	Corrugated iron	6	
		Sheet	1	Poor
		Others	1	Quality
		Asbestos	1	Condition
		Aluminum	0	
		Concrete decking ladder	0	
8.	Condition of	Part missing	0	

	Roofing material	Sagging	5	Requiring
		Rusty	3	replacement
		Leaking	1	
		Good shape	1	
		Other	0	
9.	Flooring material	Timber	2	Mostly
		Cement Concrete	6	Dilapidated
		Terrazzo	1	state
		Modern tiles	1	
10.	Condition of floor	Cracked	2	
		No cracks	3	Required
		Damp	4	replacement
		Dry	1	
11.	Window materials	Mat	1	
		Wood	4	Poor
		Glass	3	Quality
		Lovers	6	
12.	Condition of Window	Falling off	3	Endangers
		Broken	4	life

		Good	3	
13.	Type of doors	No door	0	
		Others	0	Poor
		Wooden	5	Quality
		Metal	3	
		Metal glass	2	
14.	Condition of	Falling off	1	Good
	Doors	Broken	3	Quality
		Good	6	Condition
15.	Toilet facilities	Bush system	3	
		WC	1	Poor
		Pit latrine	6	Quality
		Others	0	
16.	Bathroom	None	1	Not
	Facilities	Zinc kiosk for outside	5	Adequate
		Around the house	3	& poor
		Within the house	1	Quality
17.	Type of	Others	6	Poor



	Bathroom	Shower	3	Quality
		bath	1	Condition
18.	Drainage	None	6	Deplorable
		Open drains	4	Condition
		Covered gutter	0	
19.	Condition of	Blocked	8	Poor
	drainage	Free flow	2	Quality
20.	Kitchen facilities	Open fire place	5	
		Kitchen detached	4	Inadequate
		Kitchen within the house		facilities
21.	Set back between	Quite adequate	0	Vehicular
	Houses	Adequate	2	Access not
		Not adequate	8	Adequate
22.	Type of access	Foot path	7	
	To building	Motorable	3	Not
		No access	0	Adequate
23.	Width of size of	Below 10m	7	
	Access road	10m	2	
		road 11m		0 Not
		12m	1	Adequate

		15m	0	and
		Above 15m	0	Substandard
24.	Materials	Earth road	10	
	Finishing of	Asphalt	0	Substandard
	Access road	Concrete	0	
25.	Source of	Private generator	7	
	Electricity supply	Community Plant	1	Not
		PHCN	2	Adequate
26.	Source of water	Well	6	
	Supply	Water tanker	2	Not
		Pipe borne	1	Adequate
		Bore hole	0	
		Rain water	0	
		Stream	1	
27.	Social facilities	Primary school 2Nos.	Available	Not adequate
	And services	Secondary school 1No.	Available	Adequate
	(field assessment)	Clinic/hospitals 3Nos.	Available	Not adequate
		Market 1No.	Available	Poorly located
		Place of worship 10Nos.	Available	Adequate
		Refuse dump sites	None	Not adequate

	Cemetery	1	-
	Police post	Available	Not adequate
	Play ground	None	-
	Motor park	None	-
28.	The availability	Zone 1	3
	And distribution	Zone 2	2
	According to	Zone 3	2
		Zone 4	1
		Zone 5	1
		Zone 6	1
29.	Plot sizes	Less than 9m x 9m	4
		9m x 9m	2
		9m x 15m	1
		15m x 15m	1
		15m x 30m	1
		30m x 30m	1
30.	Plot title	FCDA	0
		Local	7
		Agent	3
31.	Reason for		

	taking risk to	pressure from Problem of	9	Inadequate
	build house at	accommodation	1	reason
	the study area	Just love the risk		
32.	Refuse dump	1-1km	1	Poorly
	Site (illegal)	1-2km	1	distributed
		2-3km	3	& endangers
		3-4km	5	human
		4km and above	0	health
33.	Alternative	Burning	1	Unhealthy
	Method for	Burning	6	method
	Solid waste	Anywhere	3	
	Disposal			
34.	Source of energy	Fire wood	2	Less
		Gas	1	population
		Kerosene	5	encouraged
		Charcoal	1	
35.	Identified health	Malaria fever	4	
	Problem	Cholera	1	More people
		Chicken pose	2	suffered
		Measles	1	malaria

		Dysentery	2	
36.	Identified causes	Poor water quality	3	Mosquito
	Of the disease	Heat	2	habitat
		Poor sanitary system	5	encouraged
37.	Identified	Soil erosion	5	Encouraged
	physical	traffic congestion	3	soil erosion
	environmental	Land pollution	2	is in the road
	hazards			
38.	Security	Very safe	1	
	Situation	Safe	2	No
		Not quite safe	1	Adequate
		Not safe	6	Security
		Terrify	0	
39.	Social-economic	Market – 1No.	Available	Poorly located
	Facilities and	Banks - 2Nos	Available	Not adequate
	Services	Town hall – Nil	None	-
		Offices –Nil	None	-
		Bakery –3Nos.	Available	Adequate
		Factories -2Nos	Available	Adequate
		Shops –many	Available	Adequate

40.	Comparing	Market	3	
	Availability of	Banks	1	
	These social	Town hall	1	Market
	Economic	Offices	1	Rank
	Facilities and	Bakery	1	Highest
	Services	Factories	1	but
		Shops	2	Ill located

---

As earlier mentioned the questionnaire contained 53 variables comprising both socio economic characteristics of inhabitants and the physical condition of the built environments in the study area. A general analysis was performed to select the physical attributes of the environment in order to arrive at the parameters that can be used in measuring urban environmental as is related to quality of the study area and subsequently the level of effects that can be recorded. The variables are:

### **5.2.1 Variables**

i. **Natural features:** This focused on availability quantity, quality adequacy of these features which included, water body, biological state, soil state, and temperature.

ii. **Housing conditions:** This focused on detailed assessments of the followings:- house type, materials, building size, room number, room size, building age, roof materials and condition, floor materials and condition, window and door conditions, toilet and bathroom and kitchen facilities.

iii **Infrastructural facilities:** This focused on availability, size and distribution of these facilities which entails, access road, water and electricity supply

iv **Social facilities and services:** This focused on the availability quality and distribution of these facilities

v. **Social-economic/cultural facilities:** This also focused on the availability quality and distribution of these social-economic facilities and cultural issues which entails building plot size's, plot title, plot ownership building set backs, waste management and energy source

vi **Environmental hazards identified:** This focused on soil, erosion, traffic congestion and land pollution. (source:- Author's field work 2007)

### 5.3 Conclusion

#### 5.3.1 Urban Environmental Indicators

The increasing importance of the world urban slum areas, and subsequent need to evolving universal tools to help interpret urban dynamics, provide means to measure changes in urban conditions and assist in policy-making process at the city regional and national levels. This is the main focus of HABITAT II Conference on human settlement held in 1996. The conference attempted to develop sets of urban slum indicators. The indicators were envied at after series of testing from a wide choice of countries.



Consequently, sub-sectors were identified as basis or indicators for measuring, monitoring and policy sensitive programme formulation. These are: socio-economic background, housing conditions, health conditions, natural environment, land use, urban transport, energy use, air pollution, noise pollution, water and sanitation, solid and hazardous wastes. The questionnaire from which the indicators were derived was developed in 1989/1990 by an international technical working group including, UNSO, UNDP, UNEP, WHO and the World Bank. The working group drew on earlier analytical approaches and survey instruments developed by the UN statistical office EEC and World Bank. It was recommended that the indicator's be used to gauge the magnitude of a particular urban sector problem and whenever possible provide a quantitative rather than qualitative statement of a particular urban condition. This should enhance the change monitoring potential in the incidence of urban problem over space and time. The report however, insists that urban indicators should be structured to allow comparisons between different time periods for a given urban areas within and between countries. While the arrival at uniform indicators would be adequate for interregional comparison of urban condition, the paucity of data in many developing countries and low level of integrity of data where available will result to in-accurate and inconsistent estimate of urban

conditions. The socio-economic and cultural variations in each settlement may introduce difficulty in applying common denominators to the urban condition. Further problem identified in applying a common discriminators or indicators of urban condition by HABITAT 11 conferences is that urban indicators which apparently address a common urban problem across regional or national boundaries may not capture different perceptions of the problem resulting from unique local cultural socio-economic or other variations.

The UNDP Human Development index builds on only a few quantable indicators and this is at the national level without any desegregation by urban/rural share. HABITAT 11 noted also that many aspects of urban development in most developing countries are not well understood. From the above, it became necessary to derive parameters to measure urban quality at neighbourhood level in developing countries.

The Parameter selected in this study partly confirmed the dimension arrived at by Abumere (1985) and the UNDP indicators. Street parking, street width, street grade, traffic access to building, refuse, loading and parking were chosen. The first five relate to accessibility condition while the last two were representatives of sanitary and density conditions.

Abumere (1987) however chose the following dimensions in factor analysis

percentage derelict houses, percentage dirty and degraded neighbourhood, ideal waste water disposal and no water variable. They were the main yardsticks of classification of the study area into different quality zones for the different time periods from which measurement were taken.

These urban indicators as applied to the study area were the sets of variables highlighted earlier in the previous paragraph. The state of the environment of the study area as generally influenced by these factors or indicators are enumerate in the next paragraph.

### **Water Sources**

Earlier in the analysis, three water sources were identified and their condition analysed. They were also physically marked on the base map. The course of each of these bodies were identified and the original lengths and widths identified as following:

Source A 3,852.8m length 26.19m width

Source B 991.79m length 48.38m width

Source C 1,572.35m length 3.7.58m

width (source:- Bwari area council)

The present condition of each were also studied and physical measurement taken and results presented as follows:

Source A 2,237.58m length 23.86m width

Source B 721.35m length 38.71m width

Source C 1,332.72m length 29.84m width

(source:- Author's field work 2007)

Using comparative factor each of the stream has reduced both in length and width due to construction activities here. The up streams were mostly affected.

Because of the factors and the limitation of these studies, the volume and the quality of water in these streams could not be studied.

The analysis has shown that the stream is gradually going into extinction. This is then an effect on the entire environment of Dutse resulting from these human activities.

### **Housing Condition**

A ideal housing is an Economic process and product as well as a social symbol. It is an economic process because it involves the process which involves land acquisition, housing finance mobilization, monetary assemblage and actual construction (Tuner 1976). As 'a social symbol it is a product that is desired by every member of the society and it is seen as a sign of prestige, self recognition and respect. In fact it is a status symbol in

the society.

Housing goes beyond the physical facilities and services within and around the shelter that it provides for healthy and efficient environmental quality for working, living and recreating (Eteng 1999).

The United Nation recognizes housing as a basic right and Article 25(1) of the universal declaration of human right which means that housing is a product that everybody must have to ensure a good life and security.

Having enumerated how important this activity of man influences his life and security, the danger it pose to the environment his is part of, is equally enormous, particularly if this activity is not wisely carried out.

Dutse Alhaji, from the study carried out, belongs to that group of housing development wisely organized and built up. The resultant effect is the emergence of an unsafe environment, as clearly indicated in the analysis score tables. The values 10 which scores were attached, is describing either the quantity, the quality, the size or the availability of each variables.

### **iii Soil Condition**

Soil condition here was analyzed to be witnessing serious distortion. Construction activities in Nigeria generally involves, land clearing, leveling,

back filling, and reclamation (Housing practice Lawal 2006). These processes of building construction involved complete distorting of the soil profile. The practice of environmental conservation is completely ignored. The results observed due to this destruction of the soil structure, is that the entire build up area has turned into a “hard plan”, that is the place no longer support plant growth unless treated.

#### iv **Temperature Variation**

Temperature variation observed in Dutse through a general overview of the Area Council where the study area is situated and as applied to FCT in general, is a common global environmental issue brought about by climate change. However, from the questionnaire or participative survey conducted in Dutse, the heat experienced presently and warming that ensured resulted in the year upward review in the temperature of this area. This hypothesis could not be tested because of the study period.

George 2002, stated in her discussion of urban slum, that any compacted or congested settlement will experience heat almost throughout the year due to the distorted movement of the air. In other words the air within the locality becomes trapped within the buildings and not able to circulate effectively. Dutse therefore is an example of slum settlement, so this is an effect.

#### **v. House Type**

The lowest quality house type as enumerated by Lawal's principles and practice of housing management, 1997 is the "face to face" flats. It lacks cross-ventilation, privacy, security and basic facilities. These house types are more in Dutse. The study area can thus be described as presently having an environment that is socially and mentally defective which put residents at high risk to communicable diseases.

#### **vi. Materials**

The score tables show that mud and mud/brick materials were predominantly the structures here. There was no specific defect observed that this mud material could cause to the environment. There was no readily available literature to that effect too.

#### **vii. Building Size**

The size of a residential building determines the habitability of such structures (Lawal 2002). Smaller structure of "face to face" house that is below 50m<sup>2</sup> as on the score table, is highly substandard. Earlier in the analysis, "face to face" houses constituted the greatest percentages of the house types in Dutse Alhaji. These in turn has the sizes below 50m<sup>2</sup>, which

is considered as quite substandard. Substandard houses are the ones below a given standard code. Building standards are often put in place to make habitation a livable one.

The sizes of residential buildings in Dutse are generally substandard which affects the living standard of the people, thereby constituting an effect.

#### **viii. Room Size And Number**

According to Architectural room standard code, a habitable room is that which size ranges between (3m X 3m) and (3m x 3.6m). At a luxury level it can be as high as (3.6m x 4.2m).

From the scores table the value "less than 3m x 3m was given 8 scores which revealed that not less than 60% of the' entire rooms in Dutse are below 3m X 3m. This has high occupancy rate which is number of person residing in a habitable room (Obateru 2003). This has presented a high number of person per room. (Field survey 2007). This is congestion and indeed a social environmental effect.

The number of rooms in building is directly related to the block and the room sizes. The quality of rooms does not really apply here. A common occurrence discovered among the landlords of Dutse Alhaji during the field study was that people decided to have as many rooms as possible without



necessary giving consideration to the size of their blocks and the plots. This also gave rise to substandardness.

#### ix. **Age of Building**

Age of building measures the time of Construction. From the score table most of the structures in Dutse were built about twenty (20) years back. according to Nigeria building code, the older a building becomes the more it is open to deterioration. Buildings that are structurally not sound also constitute substandardness. However the ages of buildings here only measured how many times landlord had his structure renovated and how many rooms he added since there was no control in force to guide against such act.

#### 5.4 **Recommendations**

The enumerated effects in the previous pages has shown that squatter settlement is more hazardous to man than the known advantages.

Most of these negative effects are long time in nature and not readily visible until they have gradually destroyed the environment and also until such a time when drastic measure has to be taken to save the same environment.

This is what happened in the case of some of the squatter settlement in Abuja during Mallam EI-Rufai's tenure as the FCT Minister.

Many squatter settlements in FCT were cleared or demolished and Dutse Alhaji was not to be an exception. According to the master plan, Dutse Alhaji was as a site earmarked for biological zoo to serve FCT and the environs.

The recommendations towards alleviating the enumerated environmental effects of the existence of Dutse Alhaji as a squatter settlement are follows, and they are divided into two major categories, immediate and long-time measures.

#### **5.4.0 Short Term Measures**

- i An effective control measure should be put in place to ensure Dutse Alhaji does not grow more than it's present size. In other words more house should not be allocated to spring up in Dutse Alhaji through government control effort.
- ii Selective clearance should be carried out such that houses that are no longer habitable for now are rid off until a major decision is taken on Dutse.

- Iii An effective environmental sanitation measure should be put in place and managed by any appropriate environmental agency to reduce frequency of health hazard in Dutse Alhaji.
- Iv The rehabilitation of the available earth road in Dutse should be encouraged through communal efforts so as to reduce the persistent traffic congestion within and around Dutse Alhaji.
- v The indiscriminate sitting of well as source of domestic water supply to the residents of Dutse, should be controlled to avoid underground water contamination and extinction which is already a known environmental effect here.
- vi An effective environmental education should be introduced through Government and communal efforts to encourage the rehabilitation of the facilities in Dutse houses, which study had already revealed as generally in deplorable condition. Such facilities include kitchen, toilet, bath, etc.
- vii To avoid outbreak of fire in Dutse Alhaji, PHCN should intensify efforts to ensure every house-holds is given the opportunity to connect to national line, so as to reduce the usage of private generators and also will drastically reduce noise pollution.
- Viii The on - the - street Monday market should be discouraged to reduce

the traffic bottle-neck around the main entrance to Dutse as always experienced on Mondays.

#### 5.4.1 Long Term Measures

Outright clearance of Dutse is the ultimate. A gradual and complete clearance measure should be intensified by the government such that the present resident of Dutse do not completely feel the demolition exercise, was carried out by El-Rufuai Government.

- ii Payment of compensation to the affected landlords should also be intensified as 'kushen effect'. Alternative locations could also be provide as an added effort to make the evacuation not totally felt by the residents
- iii Immediate usage of the land for it's original use after clearance or demolition to avoid further occupation by squatters.
- iv As a lasting measure, an affordable housing programme should be initiated both by the government and private developers to meet the shortage of housing in FCT, particularly low income houses for the low income groups. Not until this is done the proliferation of squatter settlements in Abuja cannot be completely stopped.

## REFERENCES

- Abumere S. I. (1985) the Nigeria Urban environment and the problem of slums, department of geography University of Ibadan, P.33
- Abumere S. I. Urbanisation and urban decay in Nigeria, urban renewal in Nigeria Edited by Onibokun D. G., Olokesusi O. E. (1987)
- Adaeze C. O. (2004) Research methodology and Project Writing: first edition, published by Allanza International Books, Kunle Social Printers No. 92, Lagos Street Minna, Niger State. Pp. 141 – 198.
- Andrew P. (1996) Dictionary of Environmental Science and Technology: second edition, published by John Wiley and Sons Ltd, Battind Lane, Chichester West Sussez P019 IUD, England. Biddles Printer Limited Guildford and King's Lynn. Pp. 199-214.
- Anthony G.B. and B. Dahiya (2004) Urban Environment and Infrastructure towards Livable Cities: first edition; published by World Bank, Washington DC 20433, USA, same as printer. Pp. 89-90.
- Asthana D and M. Asthano (2007) A Text Book of Environment Studies: second edition; published by S. Chard & Company Ltd. Head Office: 736, Ram Nagar, New Delhi India, Rajencha Ravindra printers, New Delhi. Pp. 352-356.
- Berkeley, C. A. (1989) Simple things you can do to save the Environment: first edition, published by Earth Works Press, Book 25, 1400 Shattuck Avenue Berkele, Delta Lithograph Co. (printer). Pp. 30-31.
- Carla W. M. (2000) Environmental Geology: fifth edition, published by Edward E Bartell of United State of America, Quebecor printing group/Dubuque IA United State of America. Pp. 465-479.
- David M. (1996) Geographic Information Systems, Socio-economic Application: second edition, published by Routledge, 29, West 35<sup>th</sup> Street, New York, IYY 10001 Biddles Ltd, Guridford and King's Lynn Printers, Great Britain. Pp. 64 -65.
- Denton K. D (1994) Environmental Management; How Smart Companies Turn Environmental Cost into Profit: first edition, published by

Library of Congress Cataloging-in-Publication Data, Prentice Hall Career & Personal Development Printers Englewood, Cliffs, New Jersey 07632. Pp. 55-56.

Enger E D and B.F. Smith (2006) Environmental Science: Tenth edition; published by McGraw-Hill Companies Inc. 1221 Avenue of the Americas, New York, NY 10020, printed by R.R Donnelley Willard OH. Pp. 435-440.

Eteng E. I. (1999) "Alternative approaches to mass housing delivery in Nigeria, in the next millennium." At a paper presented in the seminar, organized by CROSPIL, Cross river, Nigeria.

Ezeani E O and N.N. Elekwa (2001) Issues in Urbanization and Urban Administration in Nigeria: first edition; published by Jamoe Enterprise (Nigeria), I Ezenweke Close Abapka Nike, Enugu State, Nigeria printer same. Pp. 126-236.

Ikechukwu N. E. O. (2000) A Perspective of Industrial and Environmental Bio Technology. First edition, published by I.N.E. Onwurah, printed Department of Biochemistry University of Nigeria, printed by Snaap Press Ltd 1, Snaap Drive Independence Layout P.O. Box 11204 Enugu Nigeria. Pp. 95-106.

Jimoh, A. J. O. and Hassan A. Salihu (2005) Basic Issues in Research Methodology: first edition, published by the Faculty of Business and Social Sciences, University of Ilorin, Ilorin, Nigeria, T.A. Olayerri Printers, Ilorin, Kwara State. Pp. 11-90.

Kehinde C. G (2006) Basic Principal and Methods of Urban and Regional Planning: third edition, published by Libro-Gem Limited P.O. Box 25,Yaba, Lagos, Nigeria, Frankad Publishers, 38, Moshalashi Street, Somolu, Lagos

Linda W. (2005) Environmental Science: Self Teaching Guide; first edition, published by Tata McGraw-Hill Publishing Company Inc, New York, same as printer. Pp. 171-189.

Louis C.U. and Smart N.G. (1992) Environmental Impact Assessment

- (EIA). First edition, published by Computer Edge Publisher, same as printer. Pp. 50-55.
- Mba N.C. and Uchegbu S.N. (1995) Issues in Physical Planning: first edition, published by Spotlight Publisher Ltd, 31 Awikunanaw Street, Achara Layout, Enugu, Enugu State – Nigeria, same printer. Pp. 119-123.
- Michael E. D. (1987) Agricultural activities and the Nigerian environment, A case study of Eastern Nigeria, a sermon paper presented during the “Agricultural week” Umahia, Abia state, Nigeria.
- Nworgu B .G (2006) Educational Research Basic Issues & Methodology: second edition, published by Wisdom Publisher Ltd, State Hospital Road, Ring Road Box 24084 Mapo P.O. Ibadan - Nigeria, Century Computers, Olaogan Ibadan. Pp 43-182.
- Oduwole O. (2005) Basic principal of Site Selection and Planning. First edition, published by Penthouse Publication Ltd, 30 Ilaro Street Old Bodija University Ibadan Nigeria, same as printer. Pp. 12-16.
- Osuala E .C (2005) Introduction to Research methodology: third edition; published by African First publishers Ltd, Book House Trust African, First Drive PMB 163d, Onitsha, Nigeria, Rex Charles & Patrick Ltd. Naimo Anambra State, printers. Pp. 72-197
- Oluremi I. O. (2003) Space Standards for Urban Development: first edition, published by Penthouse Publication (Nig) 30 Ilaro Street, Old Bodija Ibadan – Nigeria, same as printer. Pp. 8-23.
- Oluremi I. O (2005) Controlling Residential Densities: second edition, published by Penthouse Publication Ltd, 30 Ilaro Street old Bodija University, Ibadan – Nigeria, same as printer. Pp. 1-41.
- Schramm W. (1989) Environmental Management and Economic Development: first edition, published by World bank, same as printer. Pp. 57 – 69.
- Senate Committee Publication on Environment & Management: edited by

Vivien Njemanze and Law Mafor (2006) first edition, published by the Editorial and Publishing Consultant Psycom Ltd, same as printer. Pp. 34-47.

Smart N. U (1998) Issues and Strategies in Environmental Planning and Management in Nigeria: first edition, published by Spotlight Publisher 27 Ochi Street Achara Layout Enugu, Enugu State - Nigeria, same as printer. Pp. 92-163.



**APPENDIX I**

**AN ASSESMENT OF THE ENVIRONMENTAL EFFECT  
OF SQUATTER SETTLEMENT IN DUTSE ALHAJI,  
BWARI AREA COUNCIL FEDERAL CAPITAL  
TERRITORY ABUJA, NIGERIA.**

The information in request is for a research project in the pursuance of an award of Master Degree in Environmental Management. It shall be handled as confidential for that purpose only. Thanking you for your anticipated co-operation.

**QUESTIONNAIRE**

**SECTION A: PERSONAL INFORMATION**

1. Name: .....
2. Occupation: .....  
(Civil servant, Privately employed, Self-employed, or Unemployed)
3. Contact address: .....  
.....
4. State of Origin: .....

5. Religion: .....  
(Christianity, Islam, Free Thinker)

6. Tribe: .....

**SECTION B: INFORMATION ON CONDITION OF HOUSES**

7. What type is your house.....  
(Bungalow, Storey, Face to Face, High Rise and Others)

8. What material the house is built.....  
(Mud, Mud/Brick, sandcrete, Burnt Bricks, Planks, Bagco Product  
and Others)

9. Size of building.....floor area (Below  
50m<sup>2</sup>, 50m<sup>2</sup> or above 50m<sup>2</sup>)

10. How many rooms: .....  
(1, 2, 3, 4, 5, 6, and above)

11. Size of rooms: .....  
(Less than 3m x 3m, 3m x 3m, 3m x 3.3m, 3m x 3.6m and above 3m  
x 3.6m)

12. Age of your building.....  
(1-5yrs, 5-10yrs, 10-20yrs, above 20yrs)

13. Window materials: .....

(Mat, wood, glass, louvers)

14. Door materials: .....

(wood, metal, metal glass, no door)

15. Roof material.....

(corrugated iron sheet, asbestos, concrete decking larder)

16. Toilet facilities: .....

(latrine or WC, bush system or any other known system)

17. Is latrine attached to your building or detached: .....

18. Bathroom facilities: .....

(open-air, zinc cover, indoor with shower)

19. Kitchen facilities: .....

(Zink, plank, thatch-leafs)

20 Where available, is it attached or detached: .....

21. Do you share these facilities with your neighbour: .....

(Yes or No)

22. If yes, which of these facilities you share: .....

(toilet , bath, kitchen, etc) you can name more than one if applicable)

.....

23. Do you like to share facilities with you neighbours: .....

(Yes or No)

24. Do you have any sort of building permit: .....  
 (Yes or No)
25. If yes, what is the sources: .....  
 (local chief, community levels, government)
26. Base on personal judgment, set backs between your building and your  
 neighbour is .....  
 (very adequate, quite adequate, not adequate)

**SECTION C      INFORMATION ON PHYSICAL AND SOCIAL  
 INFRASTRUCTURAL FACILITIES AND SERVICES**

27. Do you have any access to your house: .....  
 (Yes or No)
28. if yes what type: .....  
 (space between building, footpath, motorable road)
29. If road, what size is it in term of width: .....  
 (below 10m, 10m, 11m, 12, 15, or above 15m)
30. If no road, what other form of access is to your house: .....  
 (footpath, space between building or river path)
31. Material finishing of roads.....  
 (Erath road, asphalt finishing, or concrete finishing)

32. Any drainage system available: .....  
(Yes or No)
33. Do you enjoy any electricity supply: .....  
(Yes or No)
34. If yes, what is the source :.....  
(Private generator, community plant, PHCN, Private/PHCN)
35. What is your source of water supply: .....  
(well, bore-hole, water tankers, pipe-born, rain water or stream)
36. Which of these social facilities and services are available within this settlement (you can mention more than one).....  
(primary school, secondary school, clinic/hospital, shopping/market, place of worship, refuse dump site, cemetery, police post children playground or motor park recreation).

**SECTION D      INFORMATION ON SOCIO-ECONOMIC/  
CULTURAL BASE**

37. On what size of land did you build your house: .....  
(less than 9m x 9m, 9m x 9m, 15m x 15, 15m x 30m and 30 x 30)
38. Do you have any title on such land: .....  
(Yes or No)

39. If yes, name the source: .....  
 (FCDA, local chief, an agent or friend)
40. If no, why did you take such risk: .....  
 (pressure on accommodation, and ownership cheaper here or just love the risk)
41. Any refuse dump site in the neighbourhood: .....  
 (Yes or No)
42. If yes, how far is it to your house .....  
 (0-1km, 1-2km, 2-3km, 3-4km, above 4km)
43. If no, how do you dispose off your solid waste: .....  
 (burring, burning, anywhere)
44. What is the source of energy you use for your cooking: .....  
 (firewood, gas, kerosene, or cool)
45. Have you witnessed any health hazard or outbreak of communicable diseases here in Dutse: .....  
 (Yes or No)
46. If yes, what type/tyes (please you can mention more one).....  
 (typhoid fever, malaria fever, cholera, chicken-pose, measles, diarrhea, guinea worm, dysentery, skin disease, eye problem, any other different from above)

47. What are the likely courses of the above health hazards: .....  
(poor quality of water, heal, poor sanitary system, dust, or other )
48. Have you experienced any physical environment hazard in Dutse  
(Yes or No)
49. If yes, what type: .....  
(Soil erosion, floor, wind storm, traffic congestion, land pollution or  
water pollution)
50. If you are re-located from here will you accept it: .....  
Yes or No)
51. If yes, what is your reason: .....  
(Congestion trend, fear of health hazard, or fear of demolition)
52. Security situation here, in Dutse is: .....  
(Very safe, safe, not quite safe, not safe, terrible not safe)
53. Which of these socio-economic and cultural facilities are available  
(market, banks, town hall, offices, bakery, tailoring, shops etc.)