

## An Assessment of Some Environmental Effects of Squatter Settlement in Dutse Alhaji, Bwari Area Council, Federal Capital Territory, Abuja, Nigeria

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### Abstract

Environment and human activities are omen to development. Bwari Area Council in FCT is one of the areas that require such development drive. The study is required to facilitate this need. This research effort is 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 includes the development of database and choice of appropriate data sources (primary and secondary data sources). From the methodology, there were questionnaire administration, direct interview of respondents, collection and updating of the base maps, and the use of necessary field 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 these 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.

**Key words:** Squatter settlement; Environmental problems; Environmental effects

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DOI: <http://dx.doi.org/10.3968/j.ans.1715787020120501.1029>

### INTRODUCTION

The environment is everything that surrounds us such as land, air, water, animals, plants and things made by people, such as buildings, roads, machines, etc. (Andrew, 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.

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 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 interrelated (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 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 built 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.

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). An ecosystem consists of living organisms (biotic part) and non-living (physical or abiotic 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 organisms live. There are varieties of different ecosystem which is unique in terms of suitable temperature, shelter, settlement, food and water supply (Ikechukwu, 2000).

The environment of man is a complex one, and to understand the evolution and character of squatter settlement, many field questions 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 levels 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 environment. 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.

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.

On the wholesome 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.

### **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 FCT, Abuja.

Originally, the inhabitants settled in the locality in a nucleated number of farmstead settlements owned and headed by somebody called Alhaji as popularly known. They were identified with an upland 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.

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



Figure 1  
Location of Federal Capital Territory, Nigeria

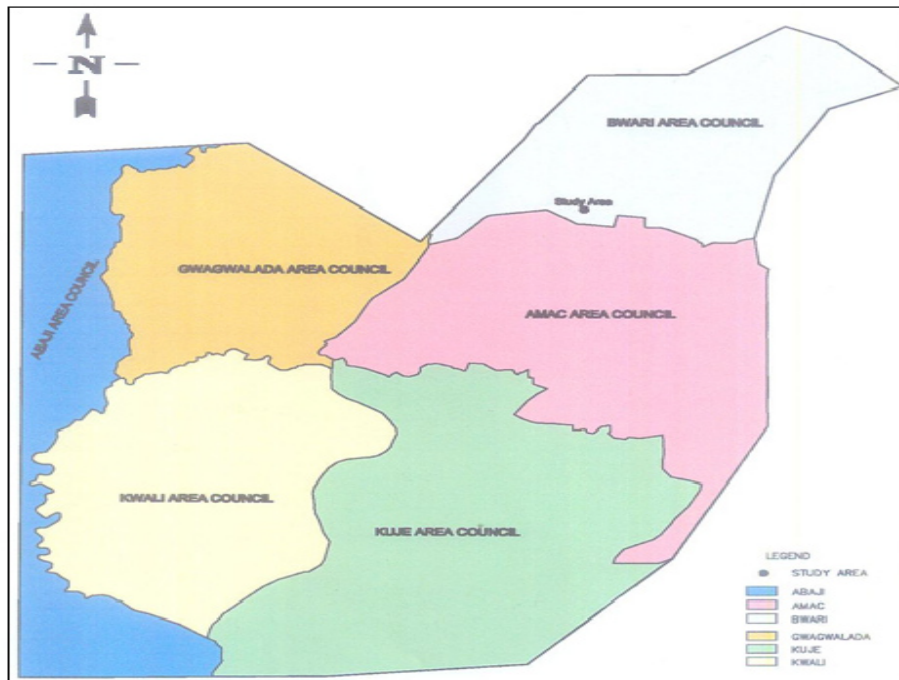
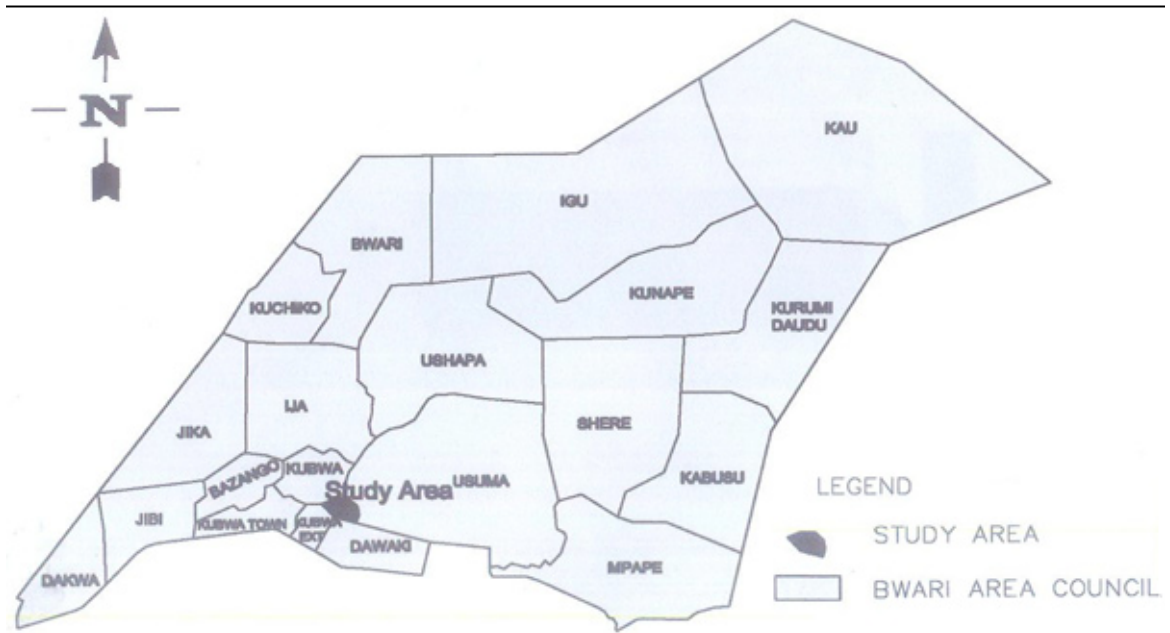
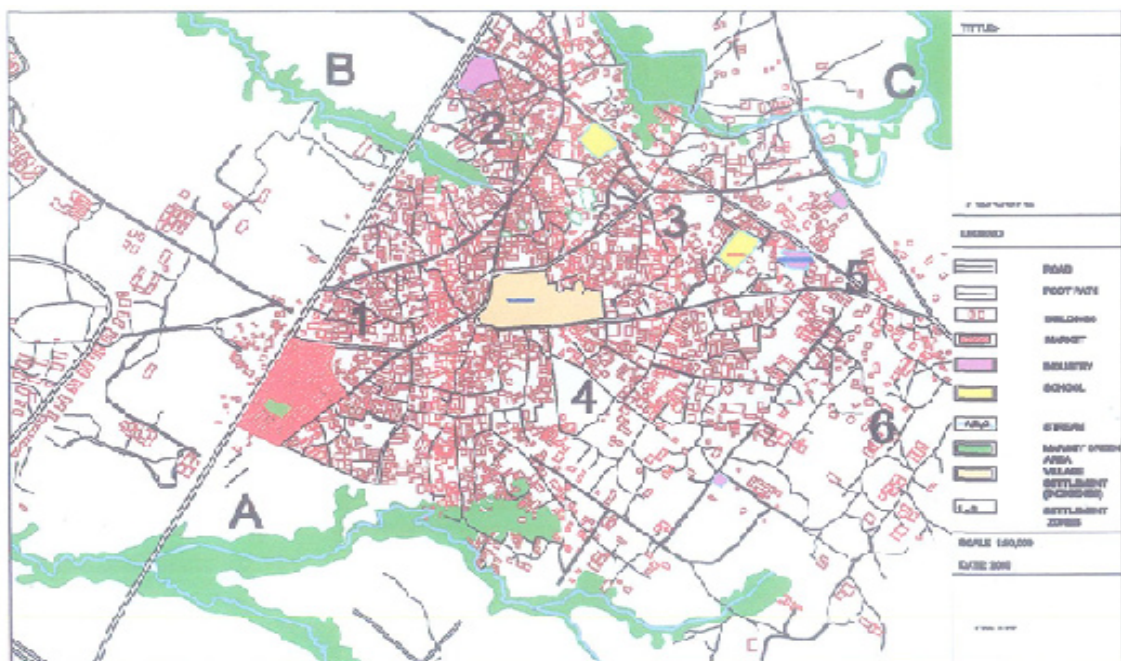


Figure 2  
FCT Area Councils, Nigeria



**Figure 3**  
Bwari Area Council, FCT, Nigeria



**Figure 4**  
An Updated Pattern of the Existing Squatter Settlement in Dutse Alhaji, Abuja





Source: National Population Commission, 2006

**Figure 5**  
**Satellite Imagery of Dutse Alhaji Squatter Settlement**

## METHODOLOGY

This presents a brief account of the procedures used in carrying out the research and the methods of data collection and analysis.

The relevance of adequate data for the realization of a study like this cannot be overemphasized. 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.

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 methods.

The secondary data involves the use of information already in existence and this was sourced 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.

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.

The third section of the questionnaire contained information on vehicular access to individual houses, width of roads, 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, others included information on refuse dump site, health hazard and any known environmental hazard was also sought among others.

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 footpath 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 was 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 was defined, were administered for the analysis.

For the purposes of this 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.

In addition to raster-base data, other maps acquired from the respective agencies include a political map of Abuja Area Councils with particular interest on Bwari Area Council where Dutse Alhaji is located and demarcated for political reason. Also, location maps were acquired for this research. Picture information on necessary features, like houses or building, refuse dump sites, borrow pits, hazard locations, rivers, rock roads, etc. was also acquired.

This data set can be divided into sub-categories, which are attributes 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.

Some basic tools were used to aid this research. Among them were survey instruments, 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.

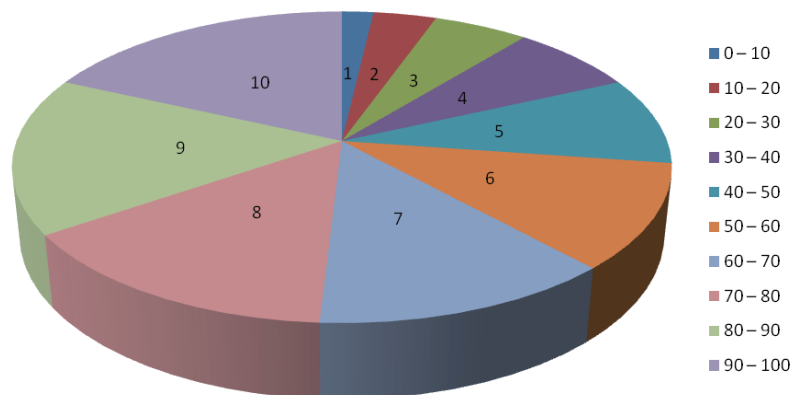
Simple descriptive statistical method of data analysis which was used to express the scores of the variables, as is related to the percentage interval ranking the quality distribution of the basic characteristics of the squatter settlement.

## RESULTS

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

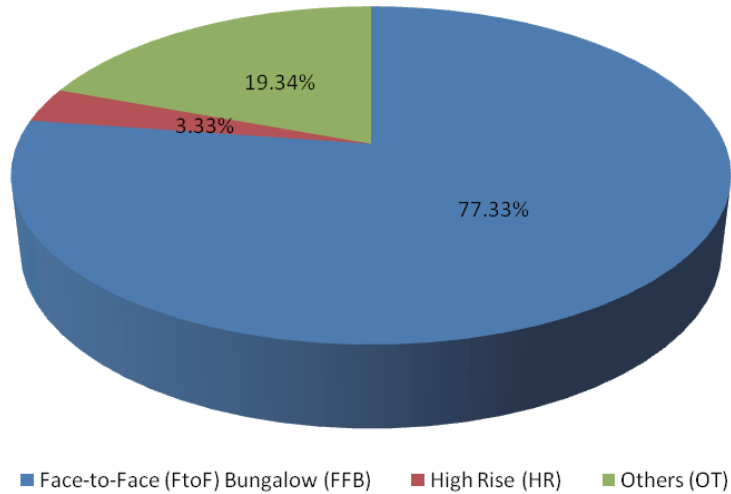
### Quality Rank Scores Distribution

Figure 6 below is showing a general rank score as is related to the quality distribution of variables (characteristic of the squatter settlement) expressed in percentage intervals.



Source: Field Work, 2009

**Figure 6**  
**Quality Rank Scores Distribution**



Source: Field Work, 2009

**Figure 7**  
**Housing Type Distribution**

**Housing Type**

The available house types were assessed through the effort of the respondents. The Figure 7 is showing the respondents’ views regarding the distribution of the available house types.

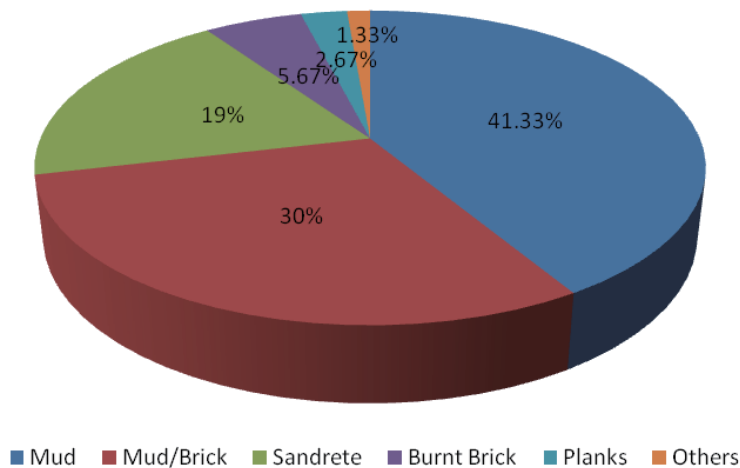
Bungalows in the likes of face-to-face apartment were predominantly the building types found in the area (see Figure 7). These buildings were sited haphazardly such that no defined building setbacks were observed. Most of these buildings had no access roads. The only available means of reaching most of these houses were through footpaths only available by chance or circumstances.

The sizes of the houses were generally substandard

(Nigeria Reviewed Building Code, 2010) with crowded rooms that were below architectural standards (see Figures 10 and 11). The rooms were poorly ventilated as only one substance window (arch data) per room was generally recorded. Most houses were built with mud materials with floor area below 50 m<sup>2</sup> (see Figure 9). In other words, the houses were overcrowded and congestion set in.

**Quality of Wall Materials**

The available qualities of building wall materials were assessed through the combined effort of the respondents. Figure 8 below is showing the distribution of such various materials.



Source: Field Work, 2009

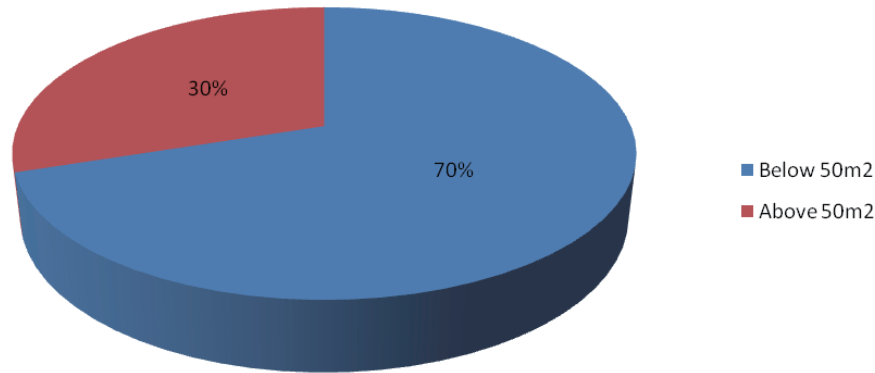
**Figure 8**  
**Qualities of Wall Materials**

Majority of the houses within the Dutse Alhaji were either built with mud or plastered with cement while few were built with concrete blocks (see Figure 8). 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, they stood in weak foundation that endangers the life of occupants (field survey).

#### Floor Area Distribution and Assessment

The standards of floor area of the house types were assessed. Respondents' opinions or views assisted in arriving at the distribution in the Figure 9 below.



Source: Field Work, 2009

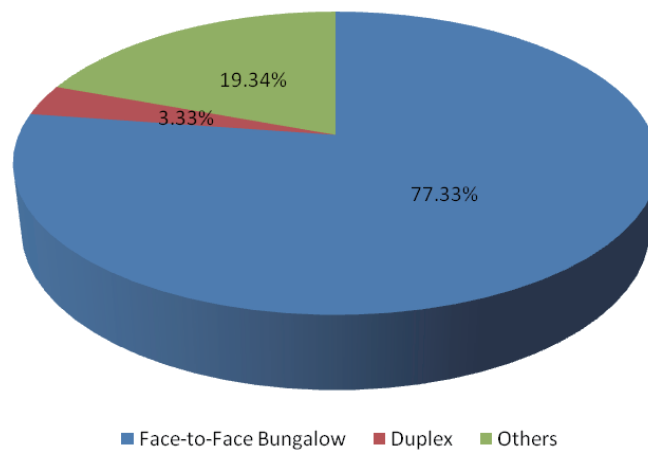
**Figure 9**  
**Floor Area Distribution and Assessment**

The floor material is a reflection of the quality level of housing in a place and usually it is one of the areas 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. Studies also revealed that majority of the floor were cracked and those with lower foundation belts were permanently damp for most parts of the year. Generally, the floor conditions of Dutse housing were

below average in terms of quality. Studies further revealed that the topography of Dutse is generally undulating and marshy terrain. No wonder during rainy season the only available main roads become unmotorable due to flooding.

#### House Type and Room Distribution

The room distributions in term of numbers available in the various house types were assessed. Respondents' views are shown in the distribution Figure 10 below.



Source: Field Work, 2009

**Figure 10**  
**House Type/Room Distribution**

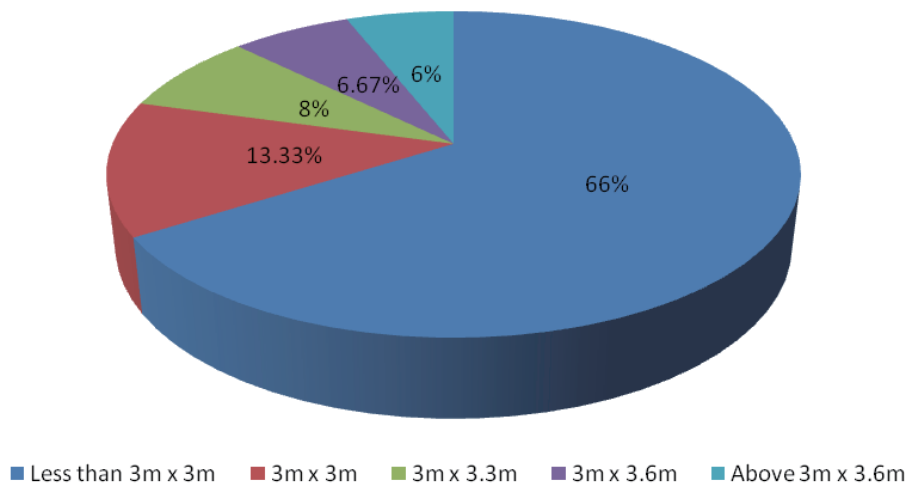


Housing in Dutse Alhaji seems to have high number of rooms as the survey reflected that only few buildings have five rooms. Those with number of habitable rooms ranging from 4 – 6 rooms are less than those above 6 rooms. This is a reflection of two important characteristics of housing in the study area. Most of the buildings, especially in the core area were roomy (face-to-face) type while a

significant proportion were still native buildings. The household size is between 11 and 15 people in the likes of core bedroom flat (field survey). This is a congestion.

**Room Size Assessment**

The rooms’ sizes as they were related to the various house types were assessed through the respondents and Figure 11 below reveals such distribution.



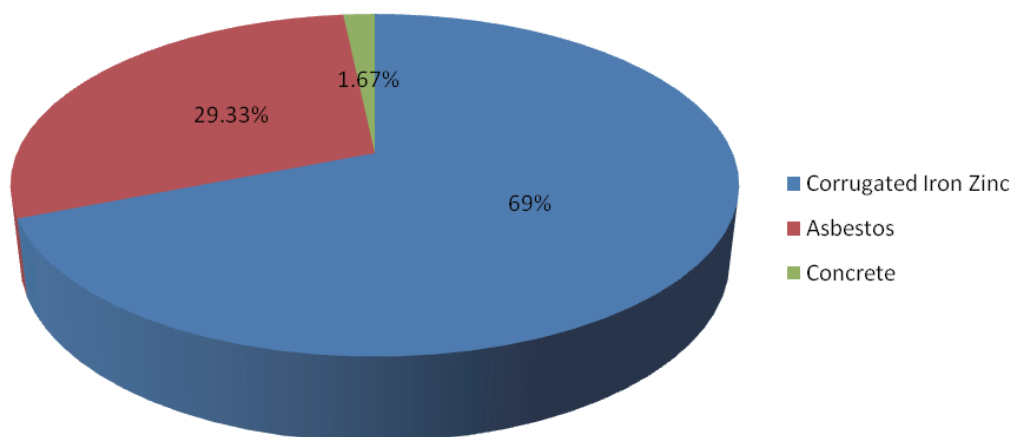
Source: Field Work, 2009

**Figure 11**  
**Room Sizes and Adequacy**

Less than 3 m x 3 m room size constitute the majority. That explain why there is congestion in household size in Figure 8 above. The standard room size according to Town Planners is 3.6 m x 4 m and 4 m x 4.5 m and none have in the study area.

**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 Figure 12 below is showing such distribution.



Source: Field Work, 2009

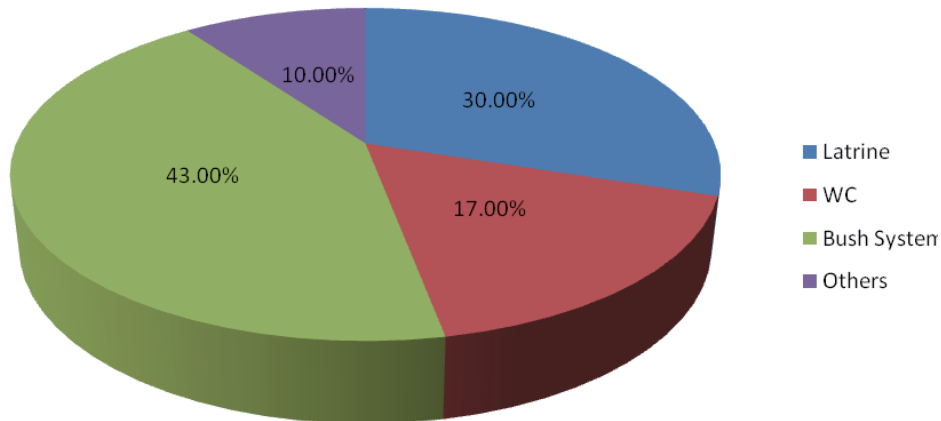
**Figure 12**  
**Quality of Roof Materials**

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 parts missing while less buildings have no defect in their roof. On the ceiling condition, the study shows that few houses 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 ceilings were in good condition while majority were leaking with missing parts. This constituted a great risk to the life of the inhabitants.

### Quality of Toilet Facilities

The qualities of toilet facilities as related to the house types were also assessed through the respondents. Figure 13 below shows such distribution.



Source: Field Work, 2009

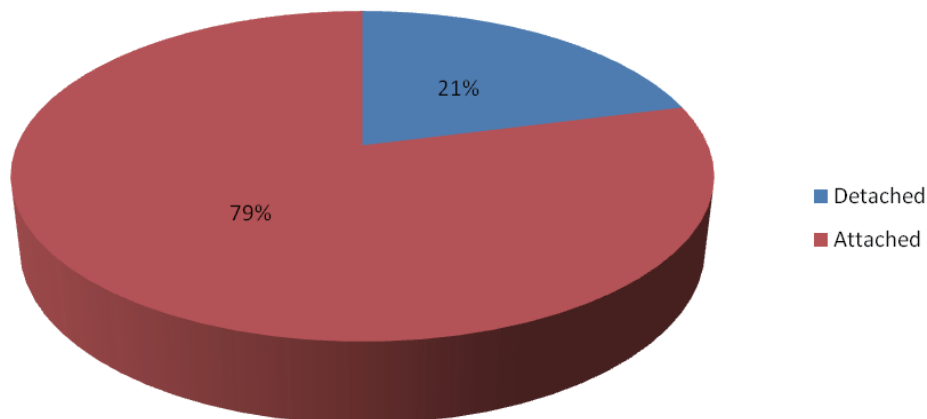
**Figure 13**  
**Quality of Toilet Facilities**

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 Figures 13 and 14).

### Position of Latrine Facilities

Through the cooperation of the respondents, the positions of latrine facilities in some of the houses identified were assessed. Figure 14 explains the distribution.

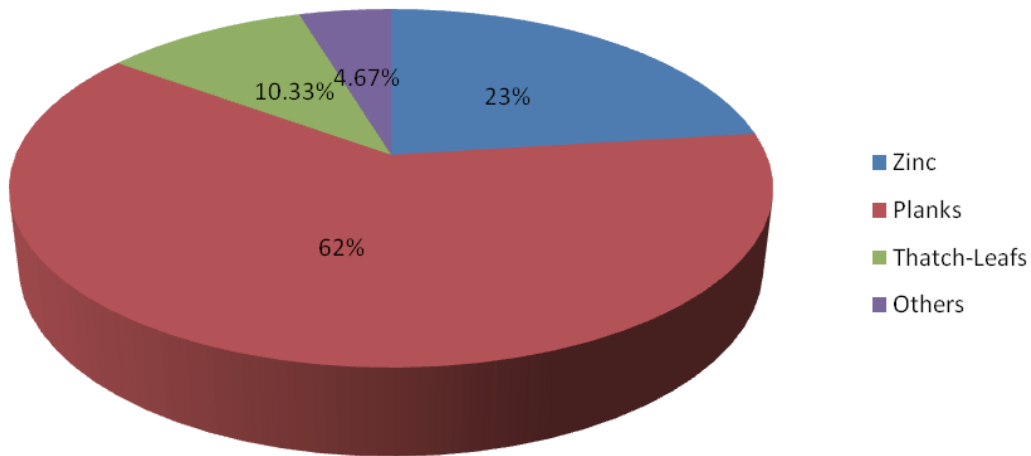


Source: Field Work, 2009

**Figure 14**  
**Position of Latrine Facilities**

### Quality and Material of Kitchen Facilities

The materials of kitchen facilities in term of its quality shows the distribution. were also assessed through the respondents. Figure 15



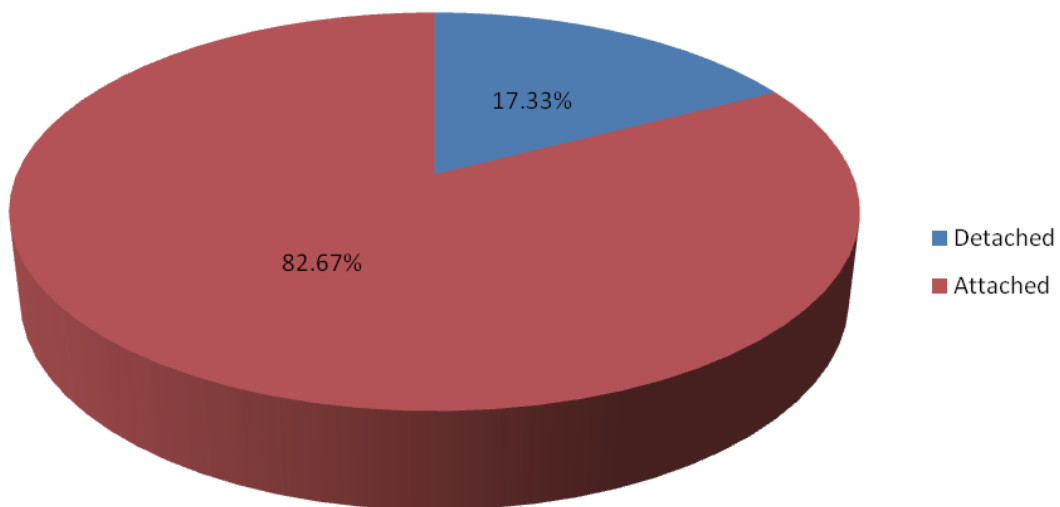
Source: Field Work, 2009

**Figure 15**  
**Quality and Material of Kitchen Facilities**

This means that their kitchens are subjected to leaking during rainy season due to plank roofing without zinc which may eventually destroy other building structures.

#### Position of Kitchen

The positions of kitchens within the identified house types were assessed through the respondents. Figure 16 below shows the distribution.



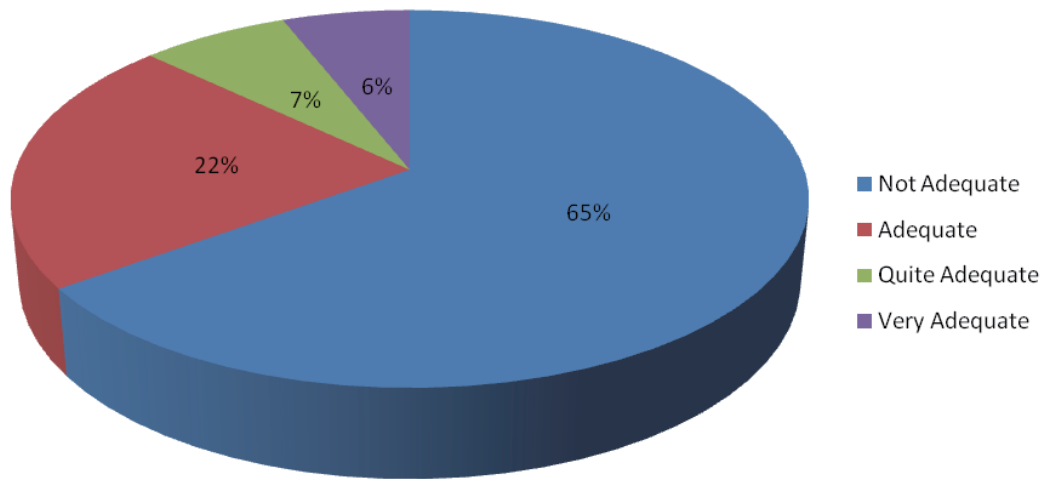
Source: Field Work, 2009

**Figure 16**  
**Position of Kitchen**

#### Personal Judgement on Setback Adequacy

The adequacy of building setbacks were assessed through

the efforts and personal judgement of the respondents. Figure 17 below reveals the distribution of the responses.



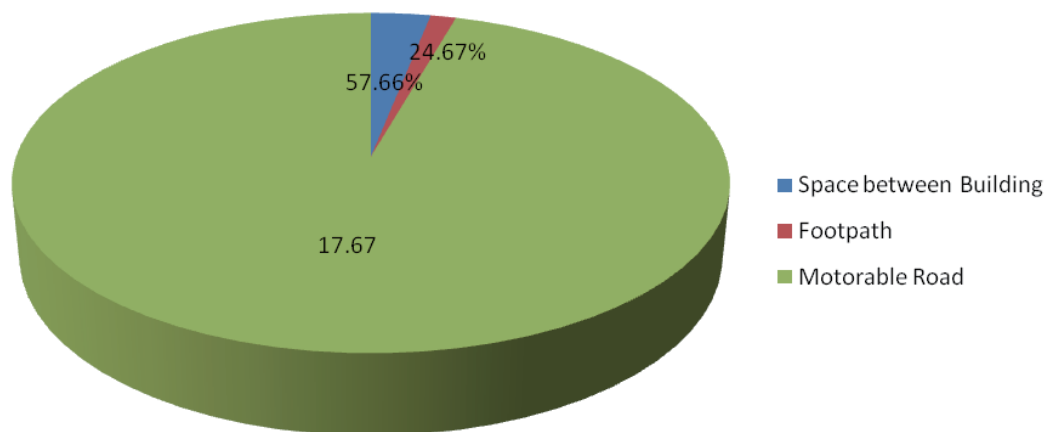
Source: Field Work, 2009

**Figure 17**  
Personal Judgement on Setback Adequacy

This is an indication of poor housing where setbacks are not adequate that explain why they squatter settlements.

#### Type of Access to Houses

Accesses to houses were assessed in term of types and width using personal judgement and respondents' views. Figure 18 is showing the distribution.



Source: Field Work, 2009

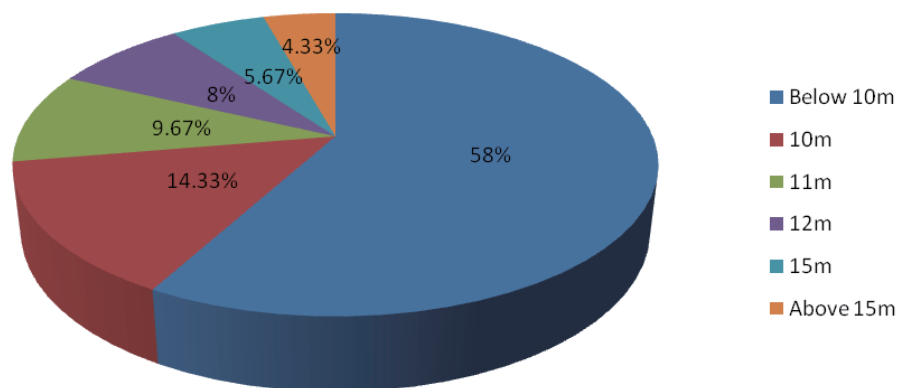
**Figure 18**  
Type of Access to Houses

This means that most of the study area no motorable roads which is dangerous in terms of emergencies, it is a poor planning settlement that require urgent attention by the relevant authorities.

#### 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. Figure 19 is showing the details and the distribution of such standards.





Source: Field Work, 2009

**Figure 19**  
Standard of Road in Terms of Sizes and Widths

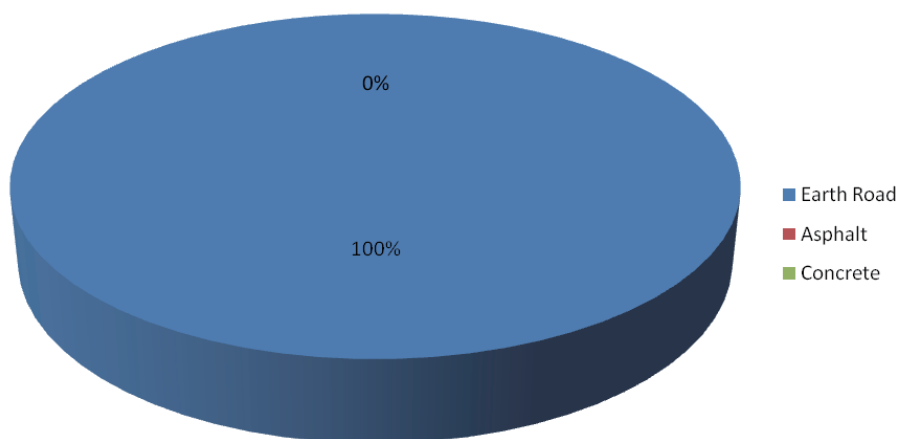
The important of vehicular access road in any settlement cannot be over-emphasized and is yet another indicator which enhances the functionality of such settlement.

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.

**Participative Judgement on Materials Finishing of Roads**

The materials finishing of roads were assessed through self-participative efforts of the respondents. Figure 20 is showing the distribution of such materials.



Source: Field Work, 2009

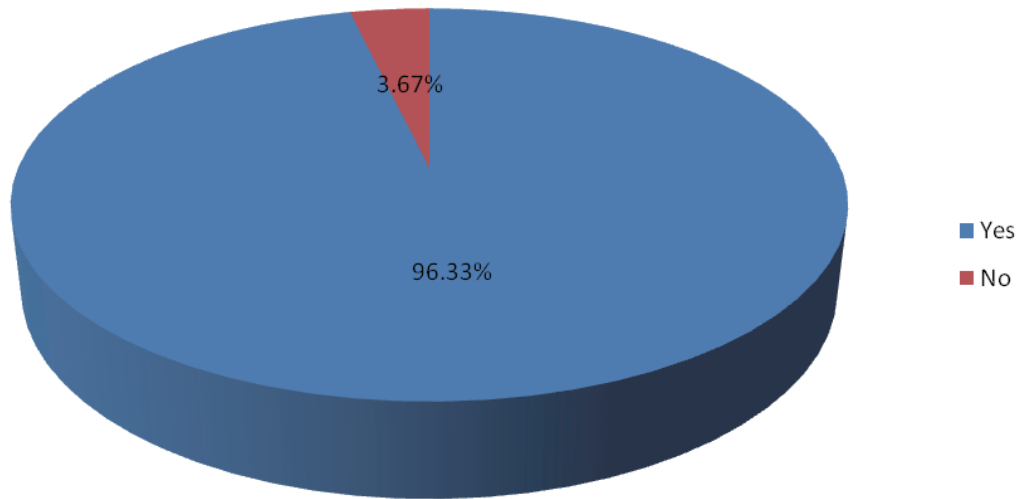
**Figure 20**  
Participative Judgement on Materials Finishing of Roads

Figure 20 above revealed that there are no Asphalt and Concrete roads in the study area.

**Availability of Drainage System**

The drainage system available was assessed. The

respondents were also able to give their own general assessment. Figure 21 is showing the distribution of such response from the respondents.



Source: Field Work, 2009

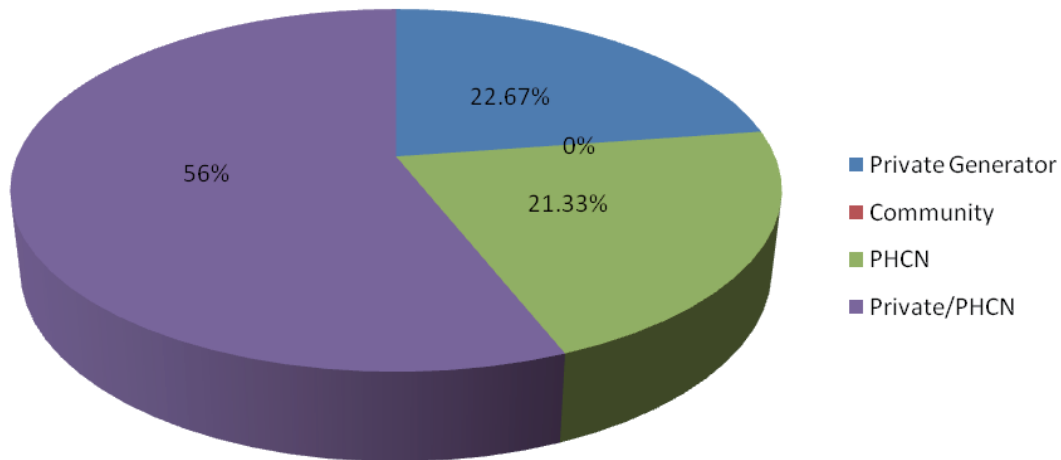
**Figure 21**  
Availability of Drainage System

From field observation, the drainage in Dutse was the open type with the entire stretch polluting the environment. There was no covered type available. However, many of the available drainage systems were also blocked. This explains the incessant erosion and flood problems prevalent in Dutse especially during rainy

season.

### Type and Quality of Electricity Supply Sources

The sources of electricity supply were also assessed using the view of the respondents. Figure 22 is showing the distribution of such views.



Source: Field Work, 2009

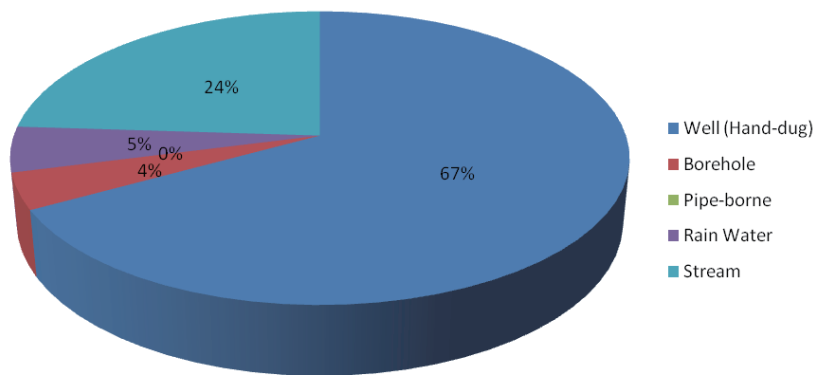
**Figure 22**  
Type and Quality of Electricity Supply Sources

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 monoxide as pollutant these sets were emitting, thereby

endangering the health of all the inhabitants of Dutse Alhaji.

### Sources of Water Supply

Water supply sources were assessed through the identification and physical contact with the available sources and the respondents' view and assessment. Figure 23 below shows the distribution of respondents' views of the availability of sources.



Source: Field Work, 2009

**Figure 23**  
Sources of Water Supply

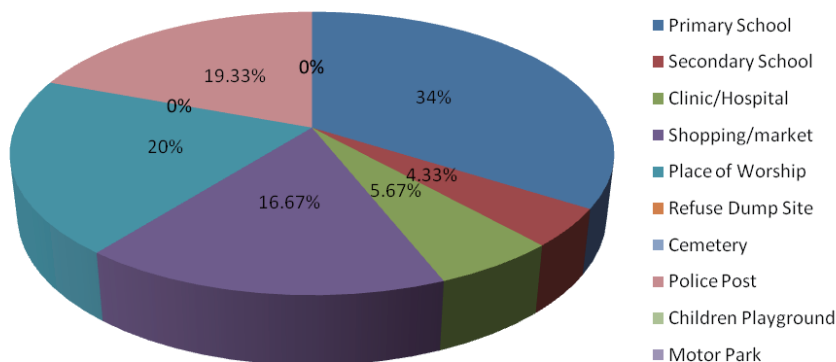
This is a major indicator of measuring the quality of residential environment. The residents in Dutse Alhaji used well and stream water as the major sources of domestic water supply. Pipe-borne water lines were not connected to any of the zones. Stream also paid some role in meeting the domestic water need in the Dutse Alhaji. This in the past years has exposed the residents 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 wells got dried up during the dry season. The resultant effect was scarcity of water during the dry season.

**Availability of Social Facilities and Services**

The social facilities and services available were assessed through the participative views of the respondents. Figure 24 is showing respondents' views of the distribution.



Source: Field Work, 2009

**Figure 24**  
Availability of Social Facilities and Services

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 where the availability of these basic elements were not adequate, such settlements deteriorate so easily and becomes less functional in due cause.

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 Schools, Hospitals, Clinics, Places of Worship and Cemetery.

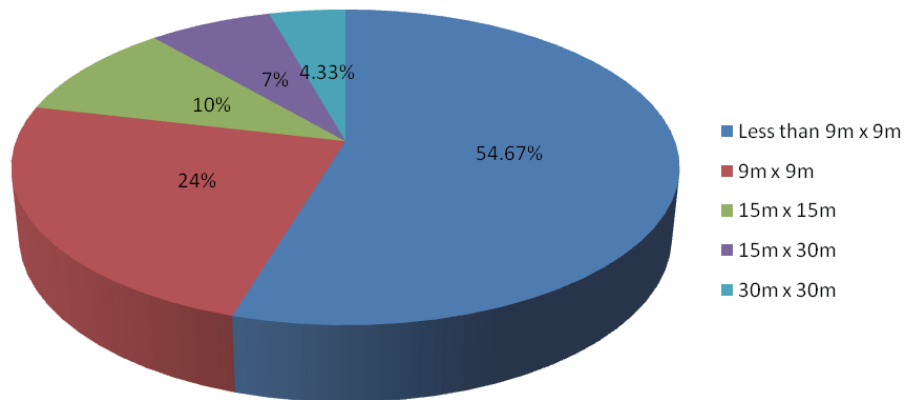
According to the available Town Planning Standard in Nigeria (Kehinde, 1999), Dutse Alhaji if planned and

with the size now (554.84 hectares) should have a total of 110,969 population going by the standard of 200 persons 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.

**Plot Sizes**

The plot sizes were assessed using the available traditional plot sizes and the respondents' views. Figure 25 below shows the distribution of such plot sizes.



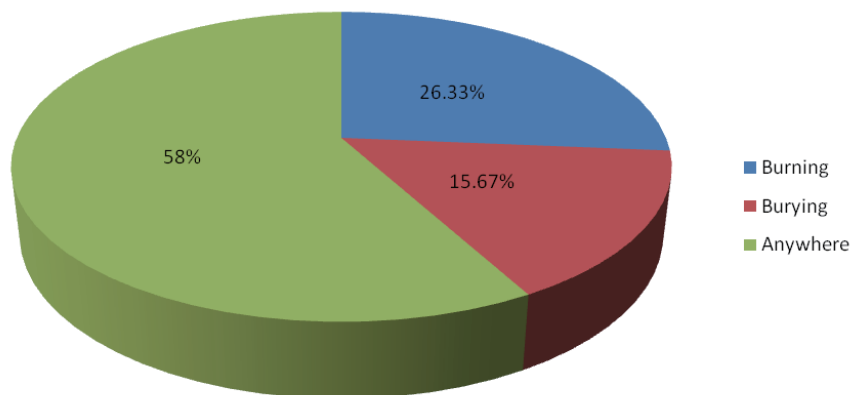
Source: Field Work, 2009

**Figure 25**  
**Plot Sizes**

Figure 25 revealed that majority of the occupants have less than 9m x 9m size of plot that explains why there are small squatter houses in the study area.

#### Method of Disposal of Solid Waste

The methods of disposal of solid waste were assessed and the respondents' views on the distribution of such methods are shown in the Figure 26 below.



Source: Field Work, 2009

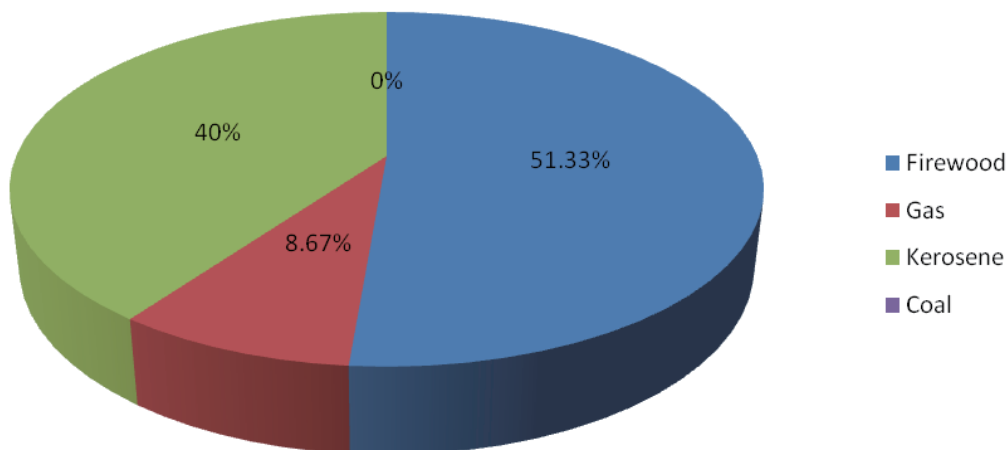
**Figure 26**  
**Method of Disposal of Solid Waste**

Dumping refuse anywhere can cause land pollution which will consequently put the occupants at high risk of contacting communicable diseases as revealed in Figure 26 above.

#### Sources of Energy for Cooking

The respondents gave an in-depth view of the various sources available where energy for cooking was derived. Figure 27 below is showing the distribution of such sources.





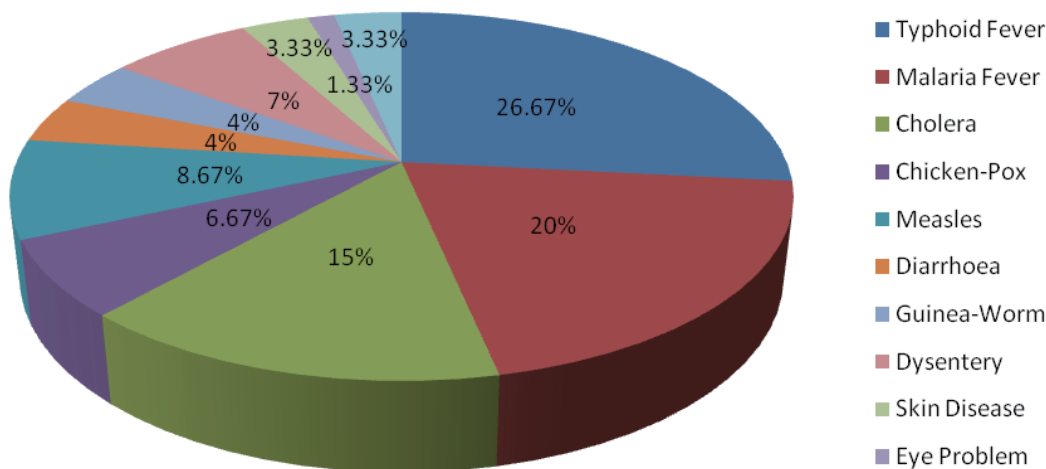
Source: Field Work, 2009

**Figure 27**  
**Sources of Energy for Cooking**

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. Firewood is the major source of energy used for cooking which if not checked, may result to deforestation.

**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 are explained in the distribution Figure 28 below.



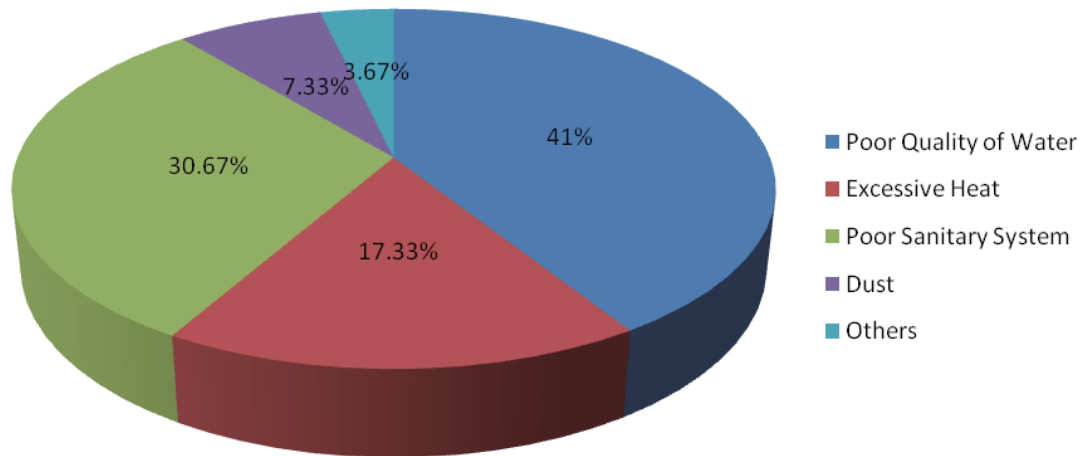
Source: Field Work, 2009

**Figure 28**  
**Type of Health Hazard Witnessed**

Typhoid and malaria fever as well as cholera are the most health hazard experienced in the study area this is probably attributed to poor drainage system, poor method of refuse disposal pollution etc.

**Community-based Assessment of Causes of Health Hazards**

The causes of some of the identified health hazards were assessed through a community-based effort. Figure 29 is showing the distribution of the respondents’ assessments.



Source: Field Work, 200

**Figure 29**  
**Community-based Assessment of Causes of Health Hazards**

## CONCLUSION

The study attempted to examine some environmental effects of squatter settlement in Dutse Alhaji, Bwari Area council Federal Capital Territory Abuja, Nigeria.

The results obtained revealed poor housing structures ranging from poor qualities of wall materials, poor standard of floor surface, small room sizes (Less than 3 m x 3 m), poor quality of roofing materials (Planks). Toilet and Kitchen facilities were grossly found to be inadequate.

The result also confirmed poor drainage system, poor accessibility, poor social facilities such as water supply, energy etc. Also discovered poor refuse disposal system which consequently result to outbreak of communicable diseases such as typhoid, malaria fever, cholera etc.

The enumerated effects above have shown that squatter settlement is more hazardous to man than the known advantages.

Most of these negative effects are long term 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 settlements in Abuja during Mallam El-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.

## RECOMMENDATIONS

The recommendations towards alleviating the enumerated environmental effects of the existence of Dutse Alhaji as a

squatter settlement are as follow and they are divided into two major categories, immediate and long-term measures.

### Short-Term Measures

An effective control measure should be put in place to ensure Dutse Alhaji does not grow more than its present size. In other words, more houses should not be allocated to spring up in Dutse Alhaji through government control effort.

Selective clearance should be carried out such that houses that are no longer habitable for now are gotten rid of until a major decision is taken on Dutse.

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.

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.

The indiscriminate citing of well as source of domestic water supply to the residents of Dutse Alhaji should be controlled to avoid underground water contamination and extinction which is already a known environmental effect here.

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..

To avoid outbreak of fire in Dutse Alhaji, PHCN should intensify efforts to ensure every household 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.

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.

### 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 residents of Dutse do not completely feel the demolition exercise, which was carried out by El-Rufai Government.

Payment of compensation to the affected landlords should also be intensified as 'kushen effect'. Alternative locations could also be provided as an added effort to make the evacuation not totally felt by the residents.

Immediate usage of the land for its original use after clearance or demolition to avoid further occupation by squatters.

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.

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