

**THE ROLE OF LANDSCAPE PLANNING IN
CITY BEAUTIFICATION AND CONTROL OF
NATURAL DISASTERS.**

(A Case Study Of Abuja Phase I)

BY

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DECEMBER, 2004

DECLARATION

This is to certify that this project is an original work undertaken by **ADAMU SANI**. It is part of the requirement for the award of PGD in the Department of Geography FUT Minna.

Sani

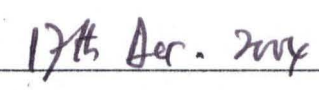
30-12-2004

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DATE

CERTIFICATION

This is to certify that this research project has been examined and approved for the award of **POST GRADUATE DIPLOMA IN ENVIRONMENTAL MANAGEMENT** of the Federal University of Technology Minna.



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DEDICATION

This project work is dedicated to Almighty Allah and to all my family members.

ABSTRACT

The major goal of this research work is the application of landscape planning to achieve a convenient, safe and aesthetic environment for living especially in a new Federal Capital City of Abuja.

Chapter one highlights the importance of a thesis of this nature by analyzing the problems associated with landscape planning in Abuja City.

Chapter two focuses attention on the review of related literature on the concept of landscape planning, causes and effects of natural disasters and mitigation strategies.

Chapter three is basically concerned with the methodology adopted in order to accomplish the research, which include observation, administration of questionnaires and physical survey.

Chapter four is concerned with the analysis and presentation of data in a tabular and chart forms.

Chapter five utilizes the findings in chapter four to make recommendations towards an effective and functional Abuja City.

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CHAPTER ONE

1.0 INTRODUCTION

The basic resource for man, which is becoming scarce, is a clean and healthy environment. This planet's environment is in great danger. The rate of environmental degradation is accelerating as a result of urbanization and increased human activities. This is mostly noticeable in urban centres with large concentration of people. These activities will lead to natural disasters of unimaginable proportion if urgent remedial measures are not taken to protect the environment.

Billions of tones of green house gases infected into the atmosphere are the causes of global warming, acid rain, heat, wave and other effects of climate change, the depletion of ozone layer results in the ultraviolet radiation reaching the earth, it increases the risk of skin cancer, eye disease and suppression the human immune system. Due to the global warming caused by green house gas effect, the sea level is expected to rise and threaten the low-lying coastal towns and settlements.

Landscape planning refers to as the art and science of embellishing of the spatial expression of human settlements development in some instances it can be viewed as spatial modification to produce a comprehensive aesthetic scheme plan, it involves planning in land use which involve balanced development through well designed, roads, buildings, bridges etc before they are built. No particular model fits every site, because each area provides a unique challenge depending on the physiographic features of the area.

A well-organised landscape plan will contribute immensely in the control of the occurrence of natural disasters and the attainment of a sustainable development. It is necessary to identify the various designs and control parameters and the environment improvement effort which will help in providing a safe and healthy environment.

1.1 BACKGROUND INFORMATION ON THE STUDY AREA

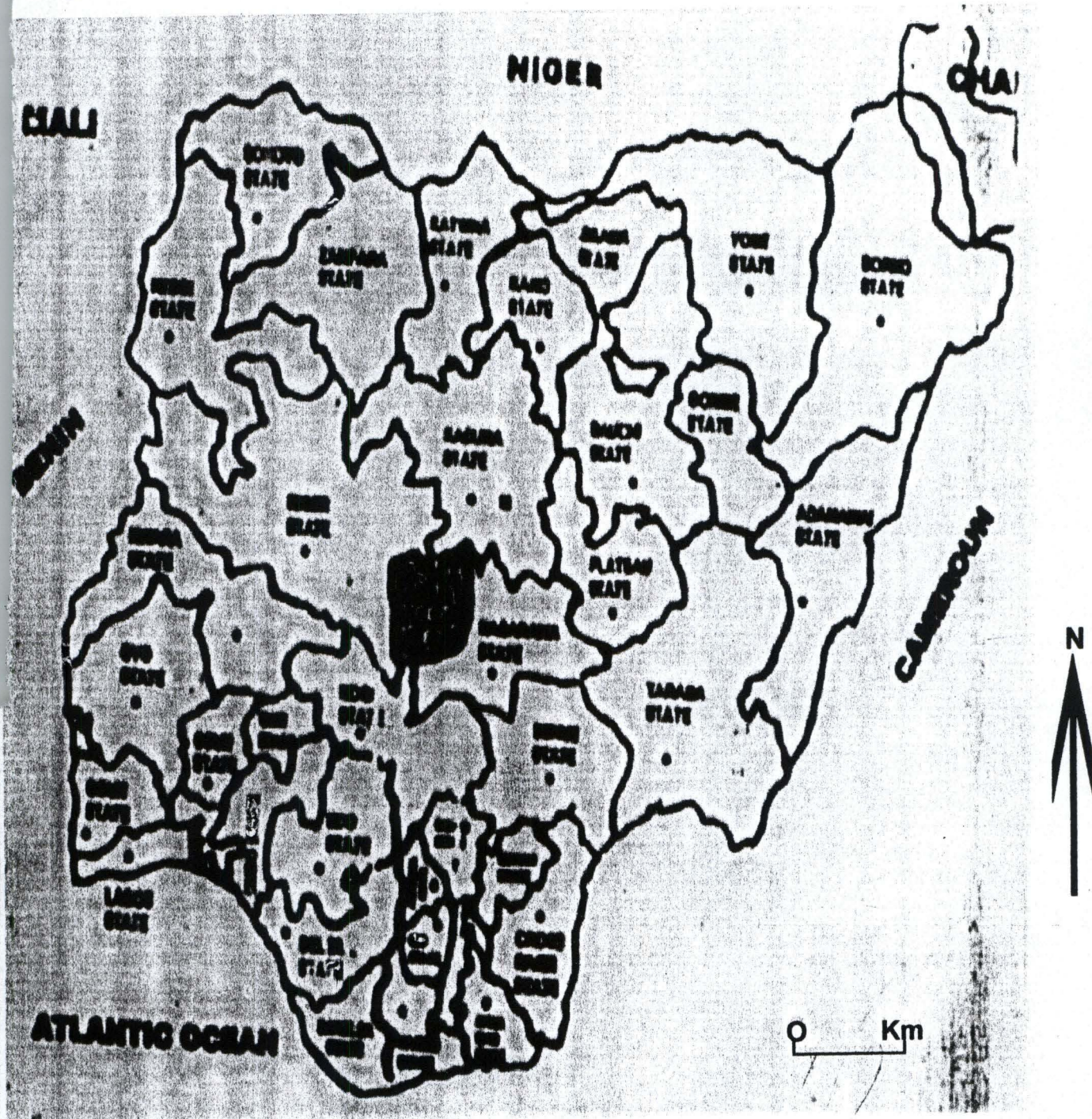
Abuja was chosen as the site for the FCT because of its "geographically central location to Nigeria and as further quoted on page 31 of the master plan its urban suitability factors. These human suitability factors include human comfort, buildable geology, vegetation, slope of between 3% - 15% and good soils. The above factors as outlined by the advisory panel were also very important especially for "construction and landscape purpose. Landscape planning finds ample expression in the master plan for Abuja as evidenced in its pronouncements made even at the conception stage. Reference to page 4, of the master plan, the number three (3) criteria for selecting the site is to create a site that offers satisfactory geological and soil condition for construction and landscaping.

1.2 STATEMENT OF PROBLEM

Abuja (the FCT) was established in October, 1975 with a view to developing a new Federal Capital for Nigeria. A new capital was desirable that would be secure, ethically neutral, centrally accessible, comfortable and healthful and possess adequate land natural resource to provide a promising base for sustainable urban development. The total land use requirements for a population of 1, 642, 100 people in 218, 000 households were projected for the Phase I. However increased economic

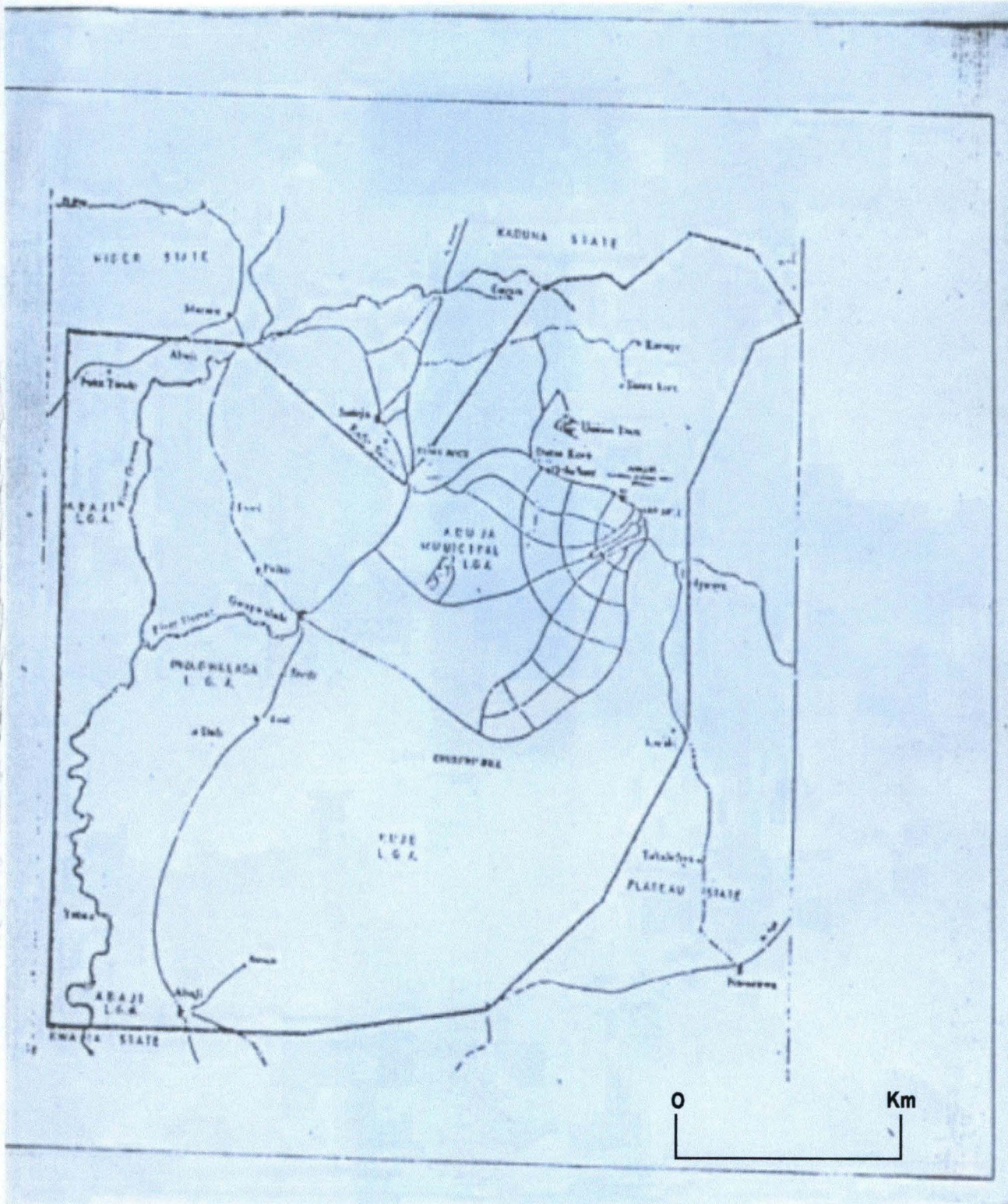
MAP OF NIGERIA SHOWING THE LOCATION OF ABUJA

Fig: 1.1



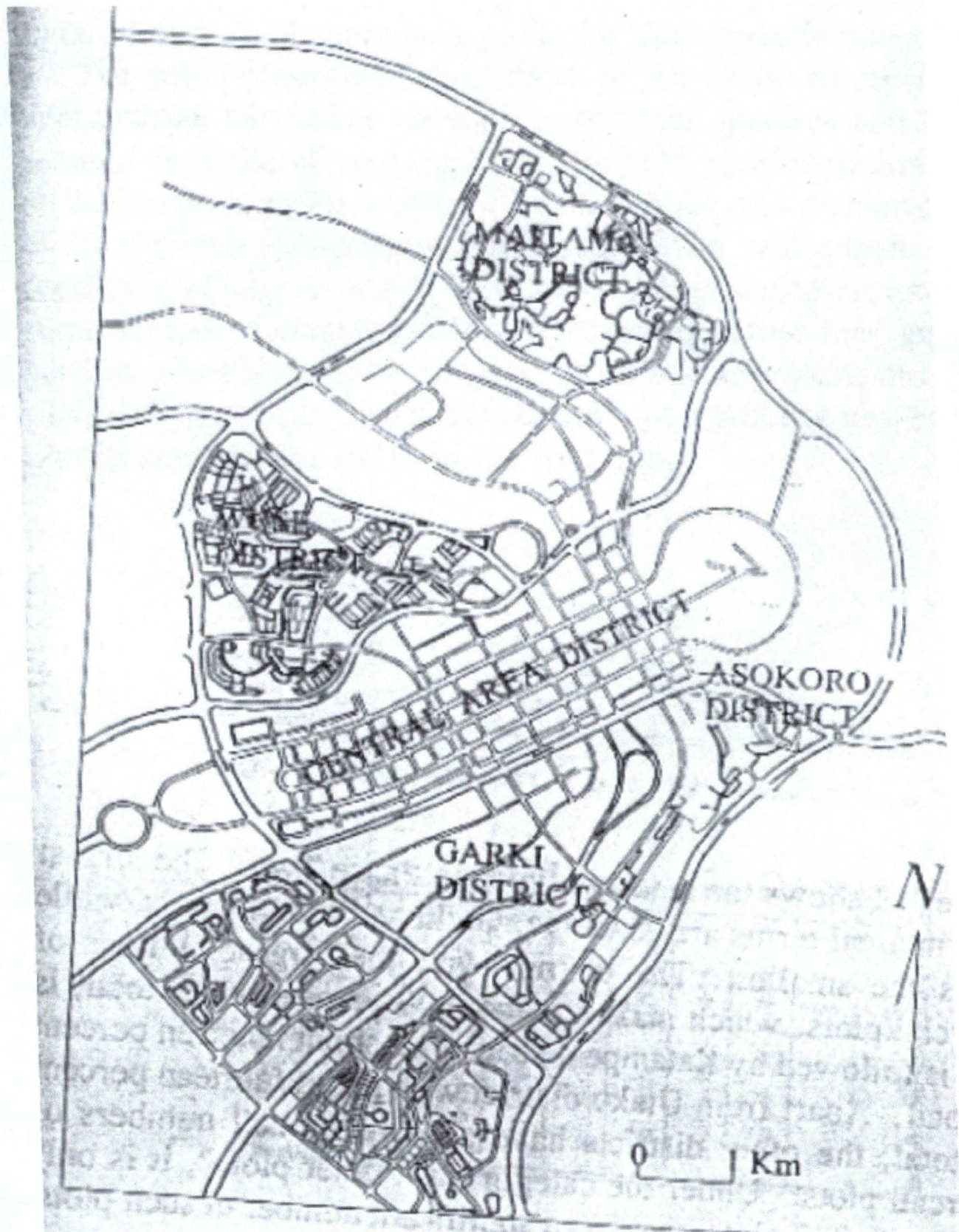
MAP OF ABUJA SHOWING THE LOCATION OF AMAC

Fig: 1.2



**MAP OF PHASE I
ABUJA.**

Fig: 1.3



rather than administrative activities have led to influx of people, which has now made the population to exceed the projected figures. This has caused pressure on land for residential and commercial activities, with the attendant landscape deformations and related problems. These landscape degradations are in the form of replacement of open spaces, shelterbelts and recreation centres with corner shops, residential quarters and batcher settlements. These structures inhibit plantation and gardens, which serve as windbreakers for controlling wind, and use up the carbon emission from the city activities.

Over the past years since about 1985 the rate of degradation has been exacerbated by natural disasters and by extreme, climate episodic events like acid rain, storms, heat wave, blocked drains, flash flood etc. Thus the problem of FCT cannot be addressed from urban planning angle alone but such a strategy must be complimented by environmental assessment or appraisal of natural weather phenomena. This study attempts such a combined appraisal in order to identify such areas "most guilty" of the landscape lapses, so as to prevent further degradation of the area.

1.3 AIM OF THE STUDY

The aim of the study is to examine the problems associated with poor landscape planning practices in Abuja, with a view to proffering environmental management solutions to problems identified.

1.4 OBJECTIVE OF THE STUDY

1. To document the location and distribution of parks and gardens within Abuja Phase I.
2. To assess the level of their conversion to other uses (commercial, residential, etc).
3. To examine population growth and level of awareness as factors of environmental decay.
4. To recommend environmental management strategies to improve on identified shortcomings.

1.5 SCOPE OF THE RESEARCH

The work will cover the five districts of the phase I of the Federal Capital City (Abuja) i.e. Maitama, Asokoro, Garki, Wuse and Central area district.

The extent and level of performance in landscape practices of individuals, corporate bodies and government agencies.

The work will also assess the role of development control department in ensuring compliance with set out guidelines.

1.6 LIMITATION OF THE STUDY

The limitations of the study include the size of the city; hence the study will be limited to only Phase one. Unavailability of reliable data from the meteorological agency may also limit coverage of spatial data.

1.7 JUSTIFICATION OF THE STUDY

The idea of a New Federal Capital City came into being as a result of problems of working and living in a city unplanned (i.e. Lagos). There were problems of congestion, squalor and inadequate space for expansion.

Furthermore a new Federal Capital was desirable that will be centrally located and will provide an environment well planned, so that people can live and work conveniently, safely and achieve maximum aesthetic. Consequently, the Abuja City came into being, however the problems that were intended to be corrected in the former capital are beginning to manifest in the new capital. The study will seek to find relevant data concerning the likely occurrence of natural disasters as a result of poor landscaping practices in the FCT. Hence the study is justifiable on the basis that it will provide knowledge of happenings especially those related to landscape planning in order to avert the occurrence of natural disasters like flood, drought, tornadoes, urban heat island, epidemics acid rain, pollution, toxic wastes and so on.

1.8 ORGANIZATION OF THE WORK

The research work will follow the sequence of being categorized into chapters, which will logically lead to one another to the logical conclusion of the research.

Chapter one highlights the introductory aspect of the project, which includes problem identification, formulation of aims and objectives, scope, limitations, and background information of the study area. The study will be justified in this chapter.

Chapter two basically will attempt to review relevant literature on landscape planning and natural disasters; it will indicate what has been happening concerning the subject matter.

Chapter three will be mainly concerned with the methods to be adopted in carrying out the research work. These include

- a) Data to be collected and used
- b) Method of data collection
- c) Method of data analysis etc.

In chapter four the focus will be on result of finding and analysis of the data collected and inferences drawn from the analyzed data.

The last chapter will cover conclusions recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 THE CONCEPT OF LANDSCAPE

An urban scene without gardens and vegetation, where the only open spaces are roads, pavements and courtyards, is likely to be soulless and monotonous, the necessity for providing urban development with a larger proportion, and better location, of open space and natural vegetation is one of the outstanding characteristics of modern planning practice (Lawal 2000). The urban scene is essentially man-made; and one's choice of plant material should generally be determined by a rational analysis of architectural and horticultural limitations. Trees are not so important to the urban landscape in giving vertical scale, but they are valuable in providing a foil, both in form and colour, to the harshness and rigidity of masonry and brickwork. Problems of limited financial resources and the difficulty even of long term satisfaction of open space needs often gives rise to an unfortunate 'cosmetic' approach to urban landscape, whereby some planting is introduced into areas after all building development is completed (Fines, 1968). The right approach, of course, is to treat landscape (i.e. including basic land moulding planting, paving, street, furniture, etc) as a basic determinant in large-scale urban design and not as an expensive afterthought (Lawal, 2000).

There is a growing awareness of the visual chaos represented by the haphazard accumulation of street furniture in the urban environment (H.M.S.O, 1953). The litter of small buildings, light standards, bus stops,

bollards, hydrants, refuse bins, traffic lights, telephone kiosks, traffic control signs, telegraph poles and wire etc, must be designed and sited in a coordinated fashion in order that they may serve their functional purposes (be they for "road safety, traffic control, illumination, information, convenience and even comfort") in a way that is visually satisfactory (Winterbottom, 1967).

2.2 DECORATIVE ELEMENTS

2.3 SCULPTURE

(i) Representational Statuary

Representational Statuary includes equestrian statues, figures and busts of monarchs, statesmen, benefactors, heroes and others. These should be sited so as to be in scale with their setting and be seen to greatest effect (Lawal, 2000).

(ii) Decorative Symbolic sculpture

These are 'abstract personages' used in public places to decorate and humanize physical environment. Sculpture and statuary, like all fine detailing, is best appreciated by the pedestrian; and it is therefore to the sedentary areas and areas of pedestrian circulation that these elements of town design must relate (Lawal, 2000).

2.4 FOUNTAINS AND PONDS

Water in all forms is one of the most varied elements with which the civic designer has to work; and some of the salient characteristic which need to be understood and exploited by the designer and its colour-quality, its movement, its ability to reflect and its magnetic appeal (Lawal, 2000).

Water succeeds in attracting old and young alike; it humanizes, characterizes and identifies a place. The manifold uses of water, water area (depending on their scale and location) for plant life, bird life, sailing, boating, peddling and swimming or possibly skating, suggests its qualities. Even in the street or square, the water sculpture, fountain or pond may exploit some of these qualities.

2.5 PLANTING

One of the most important features in the furnishing of a town is the use of trees their variety of form and colour and suggestiveness of the countryside make them infinitely valuable within the urban boundaries. (Downing 1981). Nothing forms a more pleasing contrast to the mathematically precise lines of architecture than lovely masses of tree foliage or the sculptural, linear, character of deciduous trees. Trees and grass form the natural decoration of streets and "places" in towns, wherever the condition of the atmosphere will allow them to grow.

The third type is the type best adapted to street planting. Although tree-planting in a town can be a means of obtaining certain fine effects, the indiscriminate use of trees can destroy the openness of streets, can be destructive of amenity by obstructing light and marring the spacious quality

of public "places", or can be simply incongruous with the purpose of the street or district. While the need for trees is generally recognized, there is still a great deal of room for improvement in their use, both in selection of sites and of species suitable in form and scale. (Lawal, 2000).

2.6 OPEN SPACE SYSTEM

Open spaces should have reason and design in their own right and not merely be a series of odd patches left over after the buildings and streets have been planned such remnants are often of unpleasant shape in themselves, too small to be of practical use and extremely wasteful in upkeep. Every space should be thought of in relation to the people who use it and as an integral part of the general design, and not as an odd corner, which can be used as superficial trimming to the buildings. (Crowe 1971).

The uses to which the open spaces are to be put become a ruling factor in location and design. Some may be for exercise or recreation; for rest and reflection; to accommodate thoughts of people attending open-air meetings; to provide a setting for fine architecture; as a refuge from overcrowded industrialization. Whether these spaces are large or small, the suitable divisions of the spaces and their relation to each other, their communication with roads, entrances and buildings, will provide the main problems of the plan. This plan will be found to consist of its particular purpose. It is the function of the planner, in collaboration with the landscape architect, to coordinate these requirements and express them in his design. (Crowe,1971).

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2.7 ELEMENTS IN THE URBAN LANDSCAPE

(a) Public Open Space

3 hectares of public open space per 1000 population is recommended as the general ideal to be aimed at. Of this, 1.3 hectares should be parkland, 0.85 hectares as small urban park; children play park and parkways; and 0.85-hectare playing fields (including playing fields belonging to schools).

(b) Playing Fields

Sizes of recreational areas are dependent on the types of games played. The following table indicates areas taken up by the principal games played in Nigeria.

Soccer

(i) Maximum	100m x 70m
(ii) Minimum	75m x 50m
Tennis	40m x 20m
Hockey	100m 60m
Cricket (Complete pitch)	80m x 80m

These areas will need to be supplemented by extra space for spectators and for tree planting and paths to avoid undivided groups of playing fields.

(c) Children's Playgrounds

Comparatively small spaces will fulfill the needs of children up to 5 years of age, and these should be provided within 300 metres of every house. The sites should form an integral part of the housing layout. A certain amount of ready-made equipment such a swings,

roundabouts, see-saws, etc, are of definite value and should be provided in dry paved areas.

(d) Playing Fields for adolescents

The main units in adolescent playgrounds are pitches and grounds for team games, such as cricket, football and hockey. These need not be full size grounds and must be within reasonable distance of the school.

(e) Sports ground for Adult

Ample space is needed over and above the actual requirements of the games for spectators, provision of shelter from wind and outside distractions should be considered by means of adequate tree planting. (Lawal, 2000).

(f) Cemeteries

A more progressive approach to the design of cemeteries would enable them to serve a general amenity function as well as being places of burial. (Lawal,2000).

An attempt should be made, by utilizing existing conditions, such as contours, trees, shrubs if any, and by additional planting, to subdivide a cemetery into a number of smaller spaces, so that only one section of the ground can be seen at a time. While it may be necessary for paths to be laid out in a formal manner, the planting should be as informal and as natural as possible. (Leiber et al,1981).

2.8 THE ENVIRONMENTAL CATASTROPHES

Man and his environment are ageless, but the environment, which might affect the mankind, has never been realized so clearly. Man must realize that he is not just the master of the nature, which he has subdued but that he is both its creature and its trustee. In protecting his environment, man protects himself.

According to Ramamurthy, (1992), there is a growing concern that the world economic system will collapse even before the year 2100. According to the study, industrial output will increase so rapidly that the supplies of raw materials and fossil fuel energy resources will soon be exhausted and, with environmental pollution increasing in leaps and bounds, the effect will be disastrous. The exhaust gases of combustion process of all kinds accumulate in the air of our cities and their surroundings. The combustion of coal, oil and exhausts from moving vehicles gives off poisons which amount to several hundred million tones yearly. The general contamination of the air contributes to the following illness either as a cause or as an aggravating factor; acute and chronic infection of the respiratory organs; lung cancer, constriction of the blood vessels etc.

The water requirements in the various cities, towns and villages are steadily increasing whereas the supplies of suitable water available tend to diminish. Water is also the universal solvent and thus the ultimate source for most of the toxic chemical that are released from the industries. The polluted water is unfit for use.

Life is also threatened by the chemical pollution there are an estimated 100, 000 commercial chemicals in the world and the number grown by

1000 to 2000 per year. Most of these chemicals have not been tested in any depth for their effect on the living environment.

Biologist knows 1.7 million forms of life including plants insects, fish, reptiles, animals and birds, and an estimated 1000 species are threatened annually. It is the greatest extinction of life since the dinosaurs vanished.

Increasing technological and industrial development has resulted in the extensive use of computers for every operation and process including typing. Recent studies confirm that long exposure to the radiation of the computer screen result in cancer, permanent eye damage and brain disease. In addition, blind application of computer aided diagrams without the concept of the physical behaviour of structure and other environmental problems lead to project failures or computer aided catastrophes.

Environmental degradation affects all nation of the world and respects no boundaries. Best Robin suggested that whether we like it or not the world is at a turning point. The environment cannot be allowed to deteriorate planet in addition to local and national solution. Our geo-environmental has been abused resulting in what is generally termed "CLIMATE CHANGE". Consequently we are all witnesses to change and sometimes ineffective planning seasons, erratic but destructive storms, hot days and hot nights, more wind, more rains yet drought desiccating heart polluted cities even those without industries, poor life support facilities (water, electricity, communications, etc).

URBAN GROWTH

Increasing human demand is damaging the natural resources base-land, water and air upon which all the development ultimately depends. A clear

survey by Omoniyi (1999) suggested that Nigeria population is expected to rise up to 150 million by the end of the century while world population is also expected to rise up to 6 billion within the same period. The tropical forests are shrinking by million hectares a year. New deserts are appearing at the rate of 6 million hectares a year.

In many areas the ground water is being used faster than it is being replenish and sanitation and water logging affect considerable vast area of Nigeria irrigable cropland.

Environmental stress is the cause of uneven population distribution, particularly the rapid urban growth. (Agwu 1995). By the end of the century, half the world will be living in the urban areas. An unknown quantity of toxic and hazardous waste is being transported across the national borders. Transporting the waste. Waste itself is hazardous, and too often disposal sites are unregulated and usage. (Oyeshola 1995).

The marine environment in the sea has become more apparent. Hydrocarbon caused by the oil spill, tank ballast washings and disposal of sewage and other hazardous waste in the sea are the major threat to the marine environment. As population increases it brings stress to our terrestrial environment in which we will have to look at the marine environment for some of the resources that we have traditionally depended on land to provide.

Omoniyi (1999) suggested that we must be careful that we do not end up in the same mess by polluting the marine environment as we have done with the terrestrial. The effect of resources use, environmental damage and pollution growth are not confined within the national borders. In

order to establish a sustainable relationship between the growing human needs and available resources, action will be needed on all level from international to the individual.

2.9 HOW URBAN MICROCLIMATES FUNCTION

The construction of buildings and roads at high densities, combine with intensive human use, especially during a working day produces great changes in the urban microclimate. Two aspects are most important in this and they are: modification of temperatures and modification of atmospheric gases. (Detwyler & Marcus (1972).

2.10 MODIFICATION OF TEMPERATURE

City temperatures indicate a gradient from higher values in central areas to lower values in surrounding rural areas. This 'heat Island' effect may result in minimum temperatures that are 5 – 6 °C higher in urban areas than in the surrounding countryside. It is particularly noticeable in mid-latitude cities during calm, clear, anticyclonic weather, especially in the early evening. This is when the heat stored by urban surfaces during the day is released, supplemented by space heating in buildings. It is also caused by, the relative heating and cooling of urban and rural areas. Rural areas, which generate less heat from human activities, cool down far more quickly.

According to Digby, (1995), Research shows that it is the density of urban buildings and not the size of the city that increases the heat-Island effect. Many medium-sized Cities of 250, 000 people may therefore have the same warming effect as large cities of over one million people. To this, is added the friction effect on air movement over densely packed buildings in cities.

This produces instability in the atmosphere and results in more thunderstorms over cities.

2.11 MODIFICATION OF ATMOSPHERIC GASES

The atmosphere of cities is modified by the addition of aerosols, which produce smoke pollution and fogs as a result of the greater number of particles on which condensation can take place. This is less characteristic of cities in Europe, the USA and Japan where there some laws concerning air pollution. In some cities of developing world, China and the Communist block, the use of coal with a high sulphur content, particulates from heavy industry in city centres and lack of regulation on emissions, cause health-threatening smogs. A boundary develops the stable air near the urban surface and the warmer air above. It is the opposite of the normal temperature pattern where cooler air replaces warmer air above, and it is therefore called an inversion. The temperature increase results from the increased production of heat energy emitted from the burning of fossil fuels and other industrial, commercial and residential sources. Also the decrease rate of heat loss because the dust in the urban air traps and reflects back into the city long-wave (infrared) radiation emitted from city surfaces. Concrete, asphalt and roofs also tend to act as solar collectors and quickly emit heat into the air. Anthes, et al (1992). Also according to Detwyer, (1972) particulates in the atmosphere over a city are often at least ten times more abundant than in surrounding areas. Although the particulates tend to reduce incoming solar radiation by up to 30% and thus cool the city, the effect of particulates is small in relation to the effect of process that produce heat in the city.

Source: Council on Environmental Quality and the Department of state, 1980, "The Global 2000 Report to the President: Entering the 21st Century".

2.12 MITIGATION STRATEGIES

A long-term strategy of planting trees and installing reflective materials for roofs and pavements can mitigate the urban heat Island effect and help reduce associated economic, environmental, and health-related costs. When the sun beats down on buildings covered with dark coloured roofing materials, most of the heat collected by the roof is transferred inside, increasing the demand for air conditioning. Installing highly reflective roofs will keep buildings cooler and reduce energy bills. Research conducted in Florida and California indicates that buildings with highly reflective roofs require up to 40 percent less energy for cooling than buildings covered with darker, less reflective roofs. Roads, parking lots, and driveways paved with dark, heat-absorbing materials (e.g. asphalt) also contribute to the urban heat Island effect. Increasing the albedo of these surfaces through the use of reflective paving materials will help to cool down the surrounding ambient air temperature. (Athens et al 1992).

Planting shade trees reduces the amount of heat absorbed by buildings by directly shielding them from the sun's rays. In addition, trees, shrubs, and other plants help reduce ambient air temperatures through a process known as "evapotranspiration". This occurs when water absorbed by vegetation evaporate off the leaves and surrounding soil to naturally cool the surrounding air. Within 10-15 years the time it takes a tree to grow to a significant size-strategically placed trees can reduce heating and cooling costs for a typical home or office by an average of 10-20 percent.

Additional benefits from trees include reductions in storm water runoff, erosion, and urban noise to name a few.

These urban heat island mitigation strategies when combined, can help to reduce direct energy use in buildings, and if implemented on a community wide basis. Can reduce overall ambient air temperature in a given areas. The result is a decrease in criteria pollutants such as Nox from power generation, Reductions in energy consumption. For example, computer simulations generated by Lawrence Berkeley national laboratory, demonstrate that the effect of planting trees around a typical house can save 18-44% of peak electrical power, and up total annual cooking electricity use. LBNL also estimates that a typical house with an albedo (reflectivity level) consumed 60% less energy, had a 35% lower peak electrical power demand, and experienced 44% fewer cooling hours. Furthermore, the U.S department of energy predicts that if all the nations roads and buildings were changed from black to light-colored, reflective surfaces, approximately \$4 billion a year could be saved annually in air conditioning bills and smog could be reduced by 10%. (Ellsworth, 1990).

2.13 ENVIRONMENTAL PROBLEMS

Climate change with its causes and consequences may be referred to as the environmental problem. But pollution, acid-rain, and toxic waste are major aspects of the problem. (Oyeshola, 1995).

Climate Change:

The greenhouse effect is a phenomenon whereby some gases close to the earth's surface allow ultra violet radiation to heat the earth's temperature. This phenomenon has kept our planet relatively stable at an average of

15°C the last few hundred thousand years. The process allows the human species and a range of ecosystems to survive. In general terms the greenhouse effect has to do with the regulation of incoming and outgoing of energy and heat from the sun to our planet and by so doing keeping the earth's temperature relatively stable; it is neither too hot nor too cold. The problems with which we are confronted today in relation to the greenhouse effect are due to the building up of greenhouse gases over and above previous levels (Suliman, 1990). Some of the gases allow ultra violet radiation of the sun to heat the earth's surface but trap the heat being reflected out, thus causing an abnormal increase in the earth's temperature.

The most important Green House Gases (GHG) are the water vapour (H₂O) and carbon dioxide (CO₂). Other gases are methane (CH₄), nitrous oxide (N₂O) and ozone (O₃). Also, there are several manufactured gases, of which the most important are the chlorofluorocarbons (CFCs), which have an extremely potent greenhouse effect. (Oyeshola 1995).

The CFCs are human-made chemicals. They vaporize just below room temperature. They are non-toxic and non-flammable. They are ideal for use in refrigerators and aerosol spray cans. Since they are so chemically uncreative, once they are released into the atmosphere they remain for one or two hundred years before being destroyed. Since their use has increased rapidly through the last decade, their concentration in the atmosphere has been building up. Their effects on ozone vary considerable over the globe and very difficult to quantify. They destroy ozone; a molecule consisting of three atoms of oxygen present in small quantities in

the stratosphere (a region of the atmosphere between 10 and 50 kilometers). The increase in carbon dioxide has contributed about 70 percent of the enhanced greenhouse effect to date, methane about 23 percent and nitrous oxide about 7 percent (Houghton, 1994).

Today, the stability of our planet is seriously threatened. This is a result of an intensification of the greenhouse effect due to the building up of greenhouse gases over the above previous levels.

Consequently, this is gradually increasing the temperature of the global commonly referred to as global warming thus changing the climate of the planet. The global warming may have a disastrous effect on the planet. Some of the effects are now highlighted.

2.14 EFFECT OF GLOBAL WARMING

At the World Climate Programme (WCP) workshop in 1985, at Villach, Austria, a consensus was reached that the concentration of carbon dioxide in the atmosphere could double by around 2030, which could lead to a temperature rise of 1.5-4.5° C. (With 1° C rise in temperature, the detailed impact of global warming for instance on agriculture is impossible to assess at the moment due to lack of adequate information). However, one fact remains definite; the ice-cap of both the Antarctic and Arctic Circles will melt swelling up the volume of the oceans.

Table 2.1: Comparison Of Greenhouse Gases

Greenhouses gas	Approximate greenhouse impact compared with carbon dioxide	Present Concentration	Rate of increase (%/year)	Present Life time in atmosphere (years)
Carbon dioxide	1	353 pm	0.5	50-200
Methane	60	1.7 pm	0.9	10
Nitrous oxide	270	0.3 ppm	0.2	150
Ozone	2000	100ppb	1	0.1
CFC-11	4500	0.3 ppb	4	65
CFC-12	7000	0.5 ppb	4	130
HCFC-22	4100	N.a	n.a	15

Source: Based on data from IPCC Working Group Report. (Produced by the Panos Institute, 1991).

With sea level changes (Rodda, 1991) due to global warming many of the world's richest and most heavily populated agricultural zones in low-lying lands will be flooded. Many beaches will be eroded and fresh water reserve can be in danger of pollution with salt water. The cost of 'fight' back will be huge and may be far beyond the ability of many nations to finance themselves. These low-lying lands and heavily populated agricultural zones include the deltas of great rivers like the Ganges in Bangladesh, Nile of Egypt, the Mekong in Indo-China, the Indus in Pakistan and India, Limpopo

River Basin in Mozambique (Houghton, 1994) and the Niger Delta in Nigeria.

Other low-lying areas vulnerable to rising sea levels are in Guyana, Papua New Guinea, India and Indonesia. Much of the Netherlands is 5 metre below sea level while Lagos is only 3 meters above sea level and many of the world's largest cities including Calcutta, Shanghai, Bangkok, Jakarta, Tokyo, London, New York, Miami and Venice are also in low-level coastal areas (Foley, 1991).

2.15 POLLUTION

Two major types of pollution are here considered. They are atmospheric and marine pollutions but the former will be discussed.

Atmospheric Pollution:

Our atmosphere is polluted majorly through biomass burning, industrial emissions, vehicular emissions and oil-producing refineries. (Oyeshola, 1995).

Especially in developing countries burning of bushes and grass is the commonest way of getting land ready for farming. These bush and grass fires represent a major source of carbon dioxide (CO_2), Nitrous oxide (NO), hydrocarbons and sulphur dioxide (SO_2) in the atmosphere. Biomass burning is a significant source in the emission of methane and could represent one fourth of the total methane emission in the tropics.

From many industries, factories and furnace, industrial particles and gases are emitted into the atmosphere. These industries include cement, metal,

fertilizer, pulp and paper and textile. Coal-generated electricity belongs to this category.

The carbon dioxide emission in a cement industry is an instance. This results from current manufacture occurring during the production of clinker, (a round, marble – sized particle) a material produced mid-way through the process. After the raw materials (cement rock, limestone, clay and shale) are quarried and crushed, they are ground and blended to a mixture that is approximately 80% limestone by weight. The mixture is then fed into a kiln for firing, where it is exposed to progressive higher temperature that causes heating, then drying, calcining and sintering. Finally, the feed is heated to a point of fusion (at approximately 1595° C) and clinker is produced. It is during the calcinations process at approximately 900° C to 1000 ° C that the limestone (CaCO_3) is converted to lime (GO) and CO_2 , CO_2 is then released into the atmosphere. Similarly, metal industries emit gases especially SO_2 into the atmosphere. Atmosphere pollution coming from vehicles is equally significant. 60 percent of petroleum products consumption in Nigeria is used up in the transport system. Combustion of these fuels produces sulphur, nitrogen and carbon oxides, which constitute atmospheric environmental hazards. In addition, since most of the roads particularly in rural areas are not tarred, a lot of suspended particulate matter is emitted into the environment through dust mobilization from vehicular activity. (Oyeshola, 1995). Where the roads are tarred, lead content of the immediate surrounding is high. Pollution of the atmosphere by emission of sulphur dioxide and sulphur trioxide is one of the problems posed by petroleum refineries. The noxious gaseous effluents from petroleum refinery also include hydrocarbon

vapours. Another problem posed by these refineries is gas flaring. (Alejo, 1994).

Toxic Wastes

The major toxic wastes especially those dumped in African are radioactive wastes, incineration ash, metal ash, dioxins, arsenics, cyanide, asbestos solvents, expired pesticides, PCBs, DDTs, Silicium, hydrochloric acids, chlorinated organic compounds, and spent mercury.

Nuclear wastes are noted for radioactivity and radiation particles penetrate skins and damage living cells. Such damaged cells can be the focus of cancerous growths. Nuclear wastes increase solar intensity and heat. For instance radioactive wastes dumped in Lake Kunukhai, Russia, virtually dried up the lake in 1947 (Gramp, 1992). Radioactive materials are also very mobile, capable of being carried by wind to very distant locations. They are initially indestructible but become harmless only through decay, which may occur over one hundred thousand to millions of years. The common type Uranium 238 from which nuclear weapons are made has a half-life of 4.5 million years. Radioactive materials thus require appropriate and adequate storage. Where disposal is not appropriate, radioactive waste are known to have destroyed whole communities and to have caused serious deformities and other health problems.

Nuclear wastes consist largely of unwanted residue in the nuclear industry at practically every stage of the nuclear production cycle. Particularly, at close levels of contact nuclear wastes are lethal within a short period of time.

It is estimated that the chemical industry generates over 150 million pounds (1bs) of chemicals annually. Over 4 million chemical compounds exist and as such are capable of being discovered and produced in short periods. A large number is hazardous to life and the environment. Many are capable of being misused and many are conditioned to expire, all at a speed rate that is very difficult to monitor the production of chemicals and their use (UNEP, 1992). Some of these chemicals include PCBs, dioxins, asbestos fibres, ethyl Chloride and Pyridine. Dioxins are carcinogenic, that can cause and induce cancer, and cause skin diseases. By 1990, over 60 countries has banned its importation and use (Clive, 1991). PcBs were banned in the mid-70s by Japan and USA. The European community banned it in the 80s. PcBs cause skin defects and birth deformities. Similarly, DDTs and other pesticides are known to cause nervous irritations, muscles itching, paralysis, comma and convulsion. All other toxic wastes have varying degrees of dangers to human health and the environment when such chemicals enter into the ground water, they then get into the food chain and become practically impossible to remove for many years.

Acid Rain

Acid rain is caused when coal or oil (fossil fuel) is burned. Both fuels contain a certain amount of sulphur, which is released on combustion and rises into the air as sulphur dioxide gas (SO_2). Nitrogen contained in the fuels is similarly released as nitrogen oxides (NO_x). (Oyeshola, 1995).

The burning of these fuels may take place in an industrial furnace or power station. When this occurs, the gases float up the chimney and escape. Up to 50 percent of the pollutants linger in the vicinity of the furnace, as gas, or as particles in the air, which eventually drift to earth within a 30-

kilometer circle of the emission source. About 30 percent of the pollutants mix with water in the clouds and fall as localized rain, snow, sleet or mist. The remainder eventually falls to earth as dust, rain, snow or mist. Acid rain is not just rain; it includes rain, snow, sleet, hail, mists, fog, gas and dry particles (Ellsworth, 1990).

Acid rain degrades lakes and streams if it falls long enough to overcome natural defence mechanisms. The lakes become acidic and all the living marine lives die. Acid rain also destroys forests. It corrodes sandstone, limestone, leather, paper, certain metals, historical monuments and stained glass.

The pollutants occur in their original state as SO_2 or NO_x ; in their acid state, as sulphuric or nitric acid; or in another form when the acids break down into their component parts as hydrogen, sulphates and nitrates. Each has a different particular effect on the environment but all share the same consequence namely that of destabilizing natural cycles. Sulphur dioxide in the air also cause respiratory disease in humans and animals.

Environment and Health

A healthy environment is essential to the health and well-being of the planet and its inhabitants who depend on it for the air they breathe, the water they drink as well as the food they eat. Correspondingly and unhealthy population produces less and may be forced into practices damaging to the environment (WHO/UNEP, 1986).

As a new WHO reports states:

"Every year, biological and chemical agents in the human environment – in the air, soil, food or water – cause or contribute to the premature death of millions of people, mostly infants and children, and to the ill-health or disablement of hundreds of millions (WHO, 1992)".

Unhealthy environments and lack of access to the natural resources essential for health (food, fresh and uncontaminated water, fuel) also contribute much to ill-health. In this connection, environment and human health are inevitably interconnected. (Oyeshola, 1995).

2.16 SUSTAINABLE DEVELOPMENT

The recognition of the relationship between economic and environmental issues led the U. N. General Assembly to set up a Commission on Environment and Development in 1983. The report of the Commission-the Brundtland Report titled "Our Common Future", introduced the concept of sustainable development which is defined as:

Development that meets the needs of the present without compromising the ability of future generations to meet their own need.

Sustainable development is called upon to argue for conservation and development restraint or. More often, no development at all. The term is used often to show that some developments are more acceptable environmentally than others and has been interpreted in various ways. (Agwu, 1995).

Munt, (1992) outlined about three of them, for example.

1. Those who advocate the concept of sustainability as ecosystem seem to have revealed the "moral order of being".
2. Many aid agencies and financial institutions that lend to poorer countries attach sustainable conditions as an obligatory measure of international community acceptability; such a condition could be the preservation of tropical rain forest.
3. Eco-businessmen especially expatriates, who may demand protection for their eco-tourist lodges or eco-tourist operators or the growth and prosperity of economic activity while they need efficiency for prudent use of natural resources chase the eco-profit from individual business point of view.

2.17 SUSTAINABLE BUILT ENVIRONMENT

Two thirds of the total population of developing countries live in human urban settlements. Between 1950 and 1980 the city dwellers had increased from 300 million to 1.8 billion. The towns and cities in developing countries now take in some 45 million people a year compared to 7 million in the developed countries (UNDP, 1992,). At this rate about 2 million people will populate the urban centers by the year 2,000 cities and towns provide shelter, health, education, employment and social services not only to their own residents but also to many more people who cannot find adequate facilities in the small towns elsewhere. The increasing number of people has implication on the facilities and services.

The issue of built environment is complicated by weather conditions. The building materials are so adversely affected that frequent maintenance and replacement are needed. The implication is that after 30 years or so the

quality and quantity of the facilities handed over to future generation are low. (Agwu. 1995).

The deterioration of environment in and around growing cities has serious consequence on the health and comfort of the urban poor who cannot help themselves. For most urban poor in developing countries the living conditions are worsening as a result of wastes generated and the incapability of local and state governments to render services including water, transport electricity, sanitation, and energy for cooking. The rich can always move out of the deteriorated parts of the inner city areas but the poor is trapped within.

The U. N. World Housing Survey reported that between 1960 and 1970 Nigeria required 2,238,000 housing units and for 1970 to 1980 it required 5,591,000 units. In view of the apparent housing shortage, the Federal Government proposed to build 202, 000 housing units between 1975 and 1980 but only 12.1 per cent of this planed number was realized. This number did not include the private sector contribution to housing production. Starting from 1980 to the present the various governments up to Obasanjo's administration expressed the desire to provide housing to the urban poor. But in spite of the efforts of the public and private sectors, there has not been marked improvement in the housing shortages in most towns. Housing shortages in Nigeria reflect the escalating housing rents varying from N500.00 per flat in some cities to about N1, 000,000 per flat per month in others. As part of the explanation to this paradox. I tend to agree with Okpala who said.

*... in actual fact only a relatively small
Proportion of the public sector planned housing
Program by the government is actually
Realized during the target period stipulated in
the plans and program, (Okpala 1982,).*

Another reason for failing to meet the demand targets is the high cost of providing building materials, the infrastructure, transport services and unforeseeable costs of cumulative growth or economic decline. To meet the costs and ensure a sustainable development require a change and a long-term view. The town planning failures are attributed to uncertain increasing demand and economic decline in the country. (Agwu, 1995).

CHAPTER THREE

RESEARCH METHODOLOGY

The methodology is intended to show full details of step-by-step process and techniques that will be employed in the accomplishment of the research work the methodology will also serve as a guide in keeping along the main stream of the work, for the objectives of this work to be realized at the end of the project, there is need for a good and sound methodology. The methodology will be itemized as below.

3.1 PRELIMINARY ASPECT.

This is the early stage of this work, the identification of the problem of landscaping within the FCT, which has deformed the city aesthetic and functionality, was noticed out of curiosity and concern for the environment. This has led to problems of unimaginable proportion as outlined in the problem statement.

3.2 POPULATION AND SAMPLING

Abuja is a new Federal Capital, which presently experience high and daily influx of people from all corners of the Federation. The city which was planned for a population of 1, 642, 100 by the year 2005 at a growth rate of 2.5% has over populated to about six million 6, 000, 00 people before even the target year.

Demographic or population data is a vital tool in changing our environmental programmes, without reasonable information about he population of a place; the environmentalist is deprived of the premise to practice. A sample of the population will be used to represent the whole.

This is so, because the overall population cannot be questioned to obtain information due to limitations mentioned earlier on.

3.3 SAMPLING SIZE AND TECHNIQUE

Having known the population from estimates provided by the national population commission. The proportion of the population to be administered with questionnaire is 0.01% of the population of 6, 000, 000, which is 600 persons. Therefore 0.01 will be the sample size to be used in representing the whole.

The population technique to be employed will be random sampling technique. In this method each member of the population has an equal chance of being selected. A sample drawn at random is therefore unbiased in the sense that no member of the population has any more chance of being selected than another.

3.4 PROCEDURE FOR DATA COLLECTION

The procedure of obtaining data for the successful completion of the research work involves the following

- (a) Observation
- (b) Questionnaires
- (c) Direct enquiry
- (d) Literature review

3.4.1 QUESTIONNAIRES

This involves designing questions that will be sent to respondents for their opinion about the issues concerning the research. The respondents will be required to tick their opinion or make comments where they are required to do so.

3.4.2 OBSERVATION

This involves observing the problem under research. This is relevant, as it will make the researcher appreciate the situation as it is. Drainage pattern, erosion, nature of landscapes and the general environmental conditions are some of the areas where observation becomes relevant.

3.4.3 DIRECT INTERVIEW

This will involve carrying out of report with some personnel of ministries and parastatals especially those from Ministry of Environment, Federal Capital Development Authority (FCDA) and Development Control Department (DCD).

This is with the view of gaining insight into what policies and measures that are put in place in order to regulate development and ensure compliance with laid down standards and regulations.

3.4.4 LITERATURE REVIEW

This refers to information that will be gathered on the past trends from textbooks, journals, magazines and the Internet. The literature concerning experiences of other countries in respect to the subject matter will also be reviewed. The first category of literature to be reviewed is that which is logically connected to the statement of problems.

The second type of literature will highlight how the present research fits into the whole scheme of things. It surveys the researches previously done on the problem and evaluates what the research has and has not accomplished in solving the problem currently under study. The review of literature therefore becomes an integral part of the study and not merely an appendage.

3.5 DATA ANALYSIS AND PRESENTATION.

The data collected from primary sources will be analyzed using simple analytical tools, which include the use of averages, indexing, tabulation and grouping techniques.

Summary of findings will be drawn from the analyzed data in order to draw inferences about people's response. This will form the basis for suggestions and recommendations on how to solve the problem.

The data analyzed will be presented in a tabular, charts, and plates form, it will show the number of people that say this or that and a percentage of response will be deducted in the tabular form.

This concludes the methodology aspect, the proceeding chapter will look at the data collected and its analysis.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS.

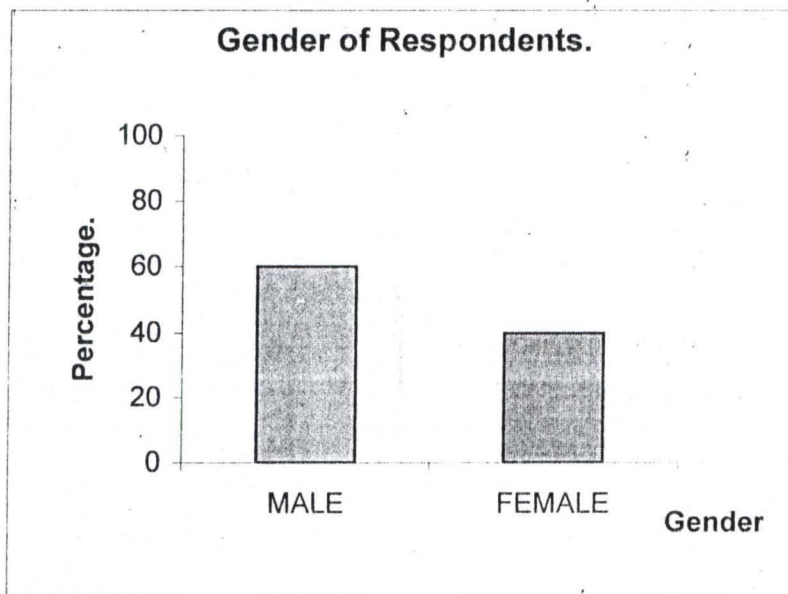
This chapter describes and analyses the data collected, as mentioned in the previous chapter one major tool for the collection of information is the questionnaire, 600 questionnaires representing 0.01 percent of the population was distributed and the response obtained will be analyzed below.

Table 4.1: Gender Of Respondent.

RESPONDENT	NUMBER	PERCENTAGE%
Male	360	60
Female	240	40
Total	600	100

Source: field survey 2004

Fig: 4.1



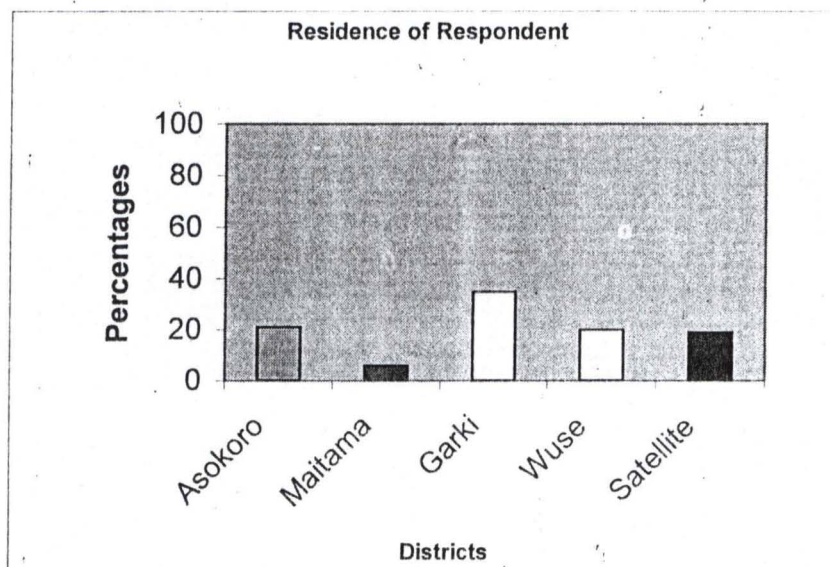
Majority of the respondents are males

Table 4.2: Residence Of Respondent.

DISTRICT	NUMBER	PERCENTAGE%
Asokoro	126	21
Maitama	36	6
Garki	210	35
Wuse	120	20
Satellite town	108	19
Total	600	100

Source: field survey 2004

Fig: 4.2



Majority of the respondents lie in Garki districts with about 35% followed by Asokoro district with 21%, the least area of residence by the respondents are the Maitama district.

Table 4.3: Type Of Occupancy.

OCCUPANCY	NUMBER	PERCENTAGE%
Tenant	350	58.3
Landlord	60	10
Sub-tenant	190	31.7
Total	600	100

Source: field survey 2004

The survey indicates that majority of the population live in rented and sub-rented apartments. This will affect the level of maintenance of lawns and gardens.

Table 4.4: Type Of Occupancy.

OCCUPANCY	NUMBER	PERCENTAGE%
Civil servant	240	40
Private business	120	20
Applicant	150	25
Student	90	15
Total	600	100

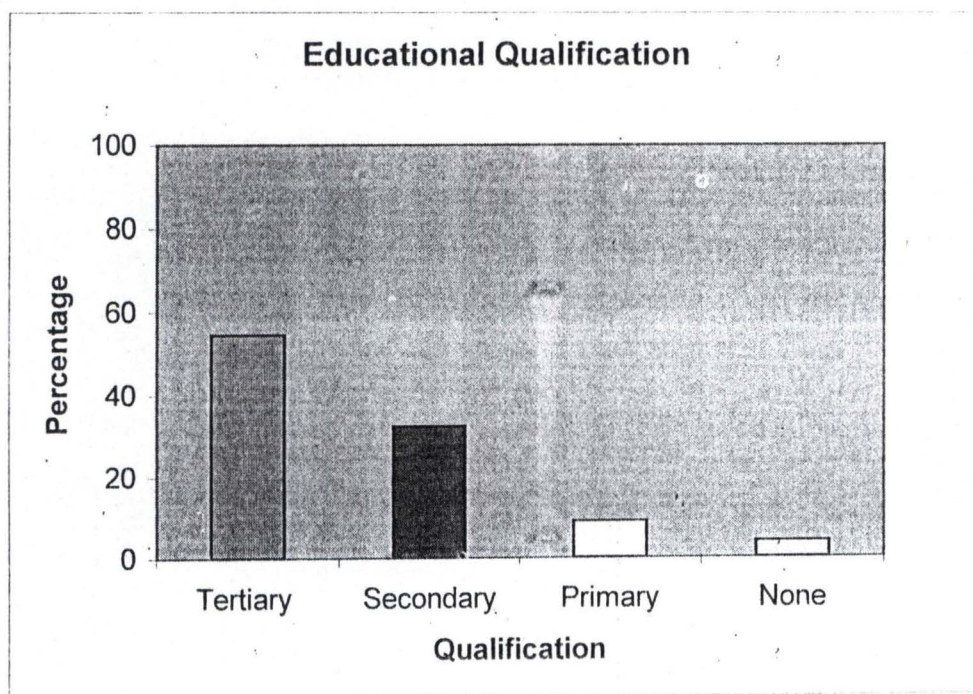
The type of occupancy affects the economic well being of an individual, this in turn affects his/her willingness to commit resources to better the environment. From the survey majority of the residents in the city are civil servants with a population of 40%. The implication is that as civil servants are lowly paid they commit less resource for environmental protection and enhancement purposes.

Table 4.5: Educational Qualification.

QUALIFICATION	NUMBER	PERCENTAGE%
Tertiary	328	54.6
Secondary	194	32.4
Primary	34	9
None	24	4
Total	600	100

Sources: field survey 2004

Fig: 4.3

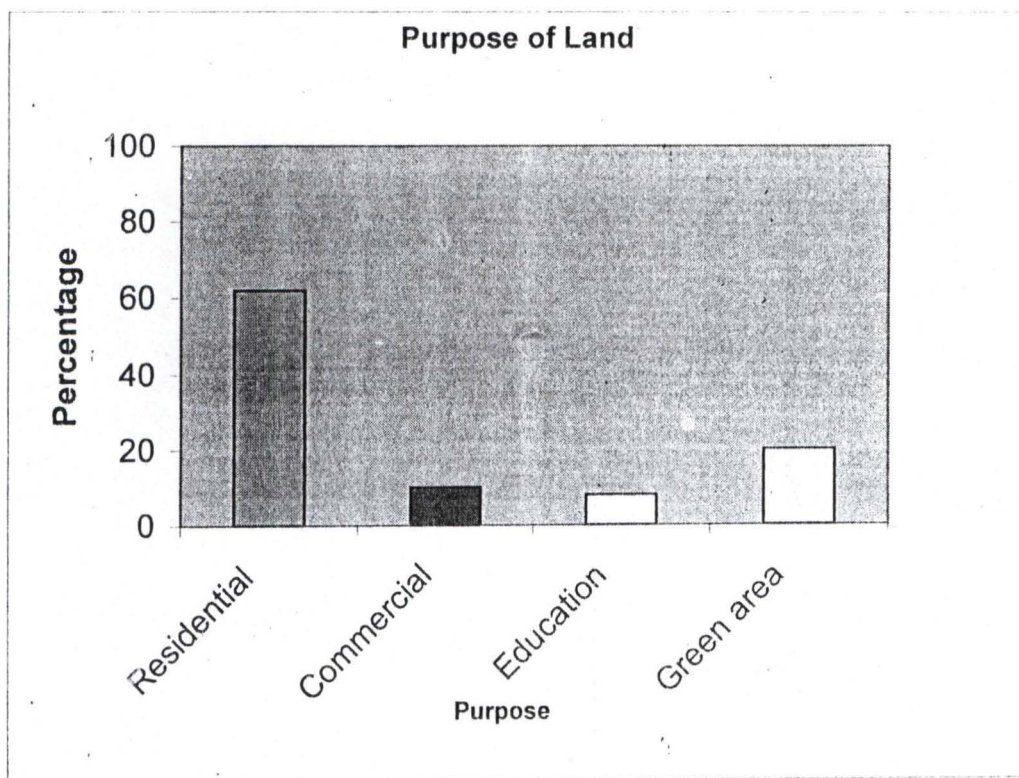


The sample survey shows that majority of residents have attended tertiary institutions with 54.6% followed by those who attended secondary, with little people with no education at all.

Table 4.6: Purpose Of Land.

PURPOSE	NUMBER	PERCENTAGE%
Residential	372	62
Commercial	60	10
Educational	48	8
Green area	120	20
Total	600	100

Fig: 4.4



The survey indicates that 62% of the residents live in a land designated for residential purpose, commercial with 10%, those living in educational land, mostly within school quarters form 8%, those living in green area are 20%. This indicates that there is about 30% of land conversion from commercial and green area to residential use.

Table 4.7: Refuse Disposal Method.

METHOD	NUMBER	PERCENTAGE%
Dustbin	63	10.5
Organized Dump	174	29
Back of House	147	24.5
Indiscriminately	216	36
Total	600	100

Source: field survey 2004.

The survey indicates that majority of the residents throw away refuse indiscriminately with 36%, this has serious negative effects on the environment

Table 4.8: Percentage of Land Developed.

PERCENTAGE	NUMBER	PERCENTAGE%
30-40%	30	5
40-50%	60	10
50-60%	144	24
60-70%a	120	21
70%+ ...	240	40
Total	600	100

Soured: field survey 2004.

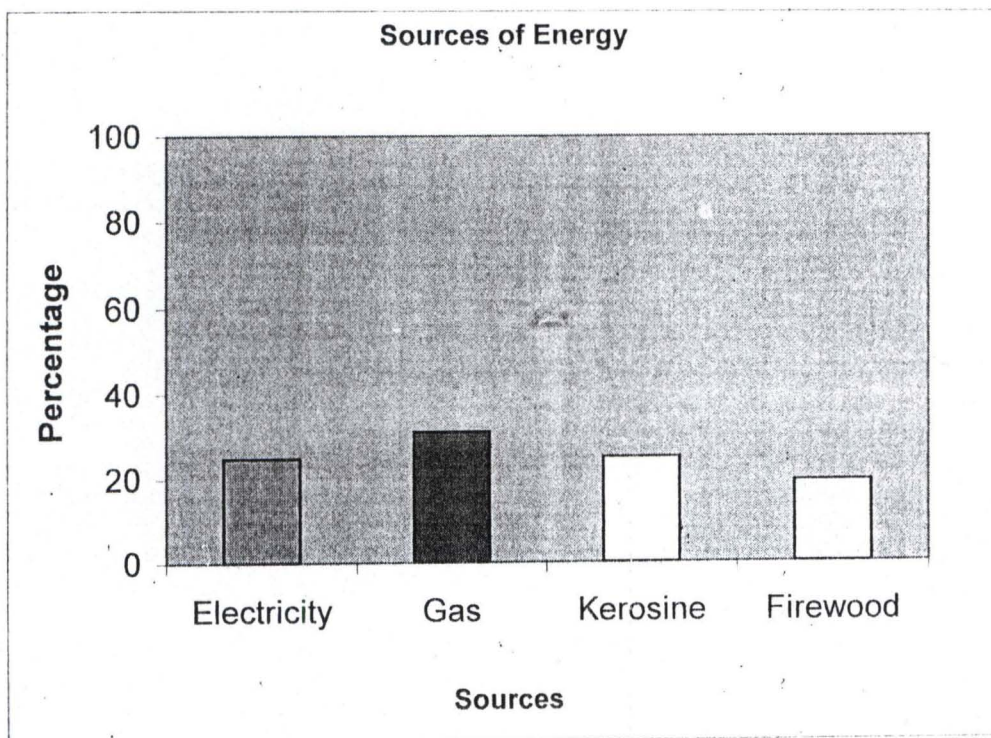
The survey shows that most of the plots of land are developed above 70% (i.e. 40% of the land owners develop above 70%) leaving little space for landscaping and parking spaces.

Table 4.9: Sources Of Energy.

SOURCE	NUMBER	PERCENTAGE%
Electricity	148	24.7
Gas	186	31
Kerosine	150	25
Firewood	116	19.3
Total	600	100

Source: field survey 2004

Fig: 4.5



Majority of residents use gas for domestic and commercial purposes. This will increase the rate of discharge of carbon dioxide into the atmosphere.

Table 4.10: Air Condition Availability In The House.

AIR CONDITION	NUMBER	PERCENTAGE%
Yes	335	55.9
No	265	44.1
Total	600	100

Fig: 4.6

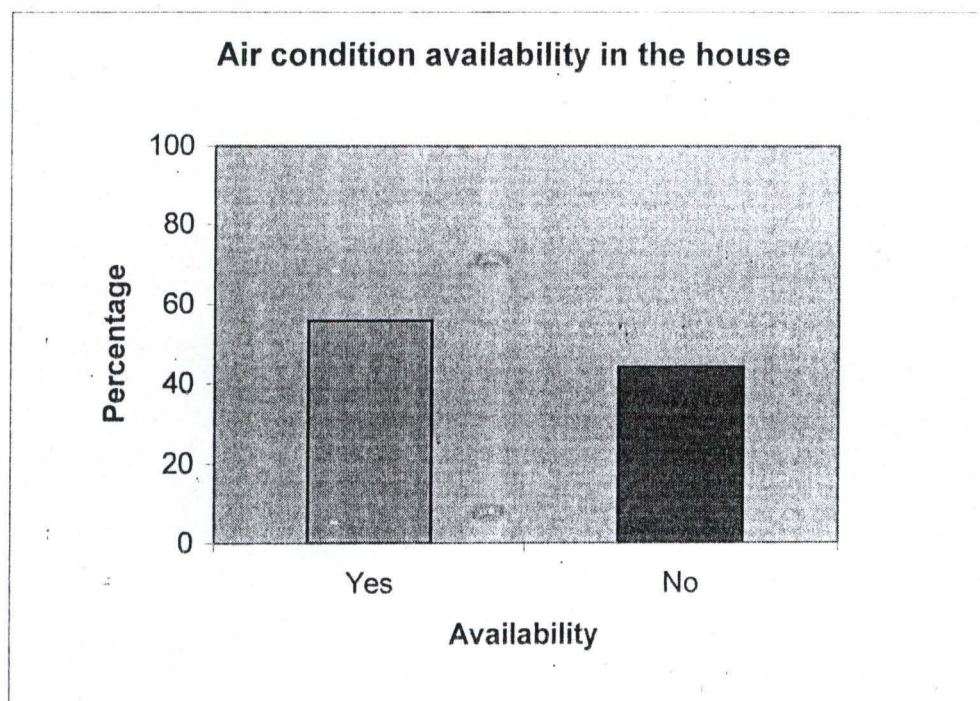


Table 4.11: Refrigerator Availability

FRIDGE	NUMBER	PERCENTAGE%
Yes	552	92
No	48	8
TOTAL	600	100

Source: field survey 2004.

Table 4.12: Do You Have A Private Car?

CAR	NUMBER	PERCENTAGE%
Yes	390	65
No	210	35
Total	600	100

Source: field survey

The availability of Air condition, refrigerator, and car are major sources of emission into the atmosphere. The survey shows that 65% of the residents use a private car, 92% have refrigerator and 55.9% people use air condition. These emission sources destabilize local microclimate, resulting in urban heat island, acid rain etc.

Table 4.13: Assessment Of Environmental Quality

QUANTITY	NUMBER	PERCENTAGE%
Satisfactory	348	58
Not satisfactory	252	42
Total	600	100

Source: field survey 2004

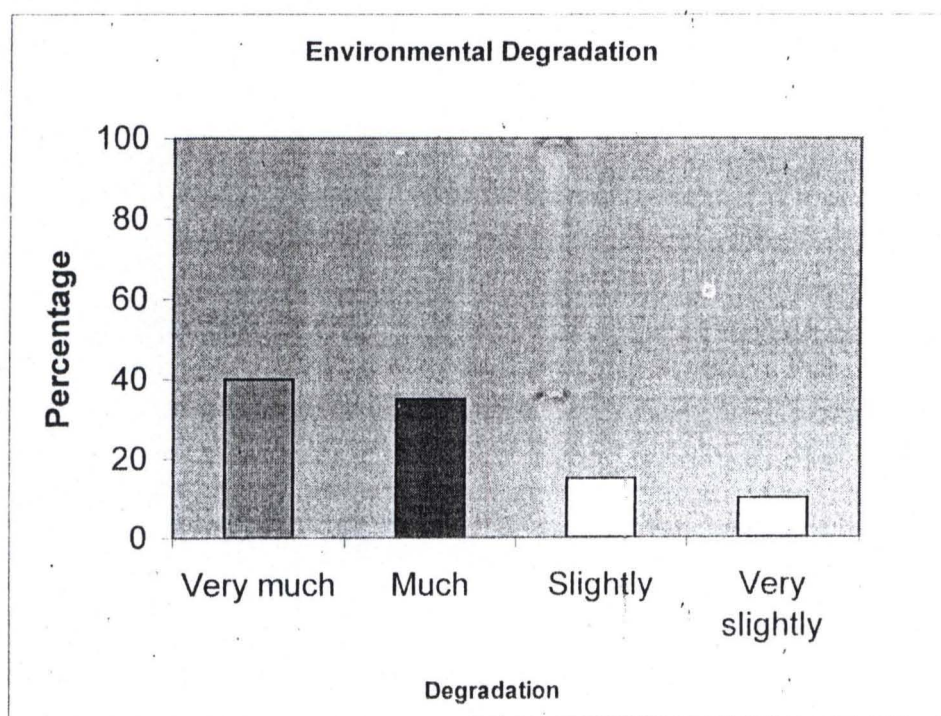
This survey indicates that 58 percent of the residents within the city are not satisfied with the quantity of the environment they live and work in. the respondents gave reasons as lack of garden and lawn maintenance, noise from vehicular traffic, throwing of garbage etc.

Table 4.14: Opinion Of Human Degradation Of The Environment.

DEGRADATION	NUMBER	PERCENTAGE%
Very much	240	40
Much	210	35
Slightly	90	15
Very slightly	60	10
Total	600	100

Source: field survey 2004

Fig: 4.7



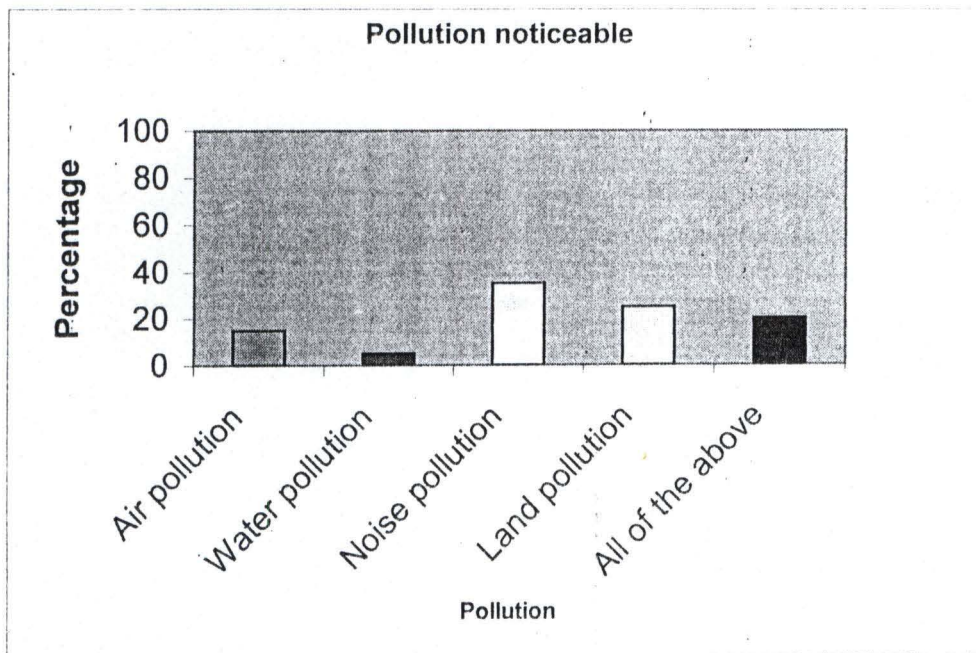
Human activities degrade the environment very much.

Table 4.15: Pollution Noticeable In Your Area.

POLLUTION	NUMBER	PERCENTAGE%
Air pollution	90	15
Water pollution	30	5
Noise pollution	210	35
Land pollution	150	25
All of the above	120	20
Total	600	100

Source: field survey 2004

Fig: 4.8



Various pollution types occur within the city. However the most noticeable one is the noise pollution with 35%.

Table 4.16: Performance of Environmental Managers.

PERFORMANCE	NUMBER	PERCENTAGE%
Very good	60	10
Good	150	25
Fair	300	50
Poor	90	15
Total	600	100

Source: field survey 2004

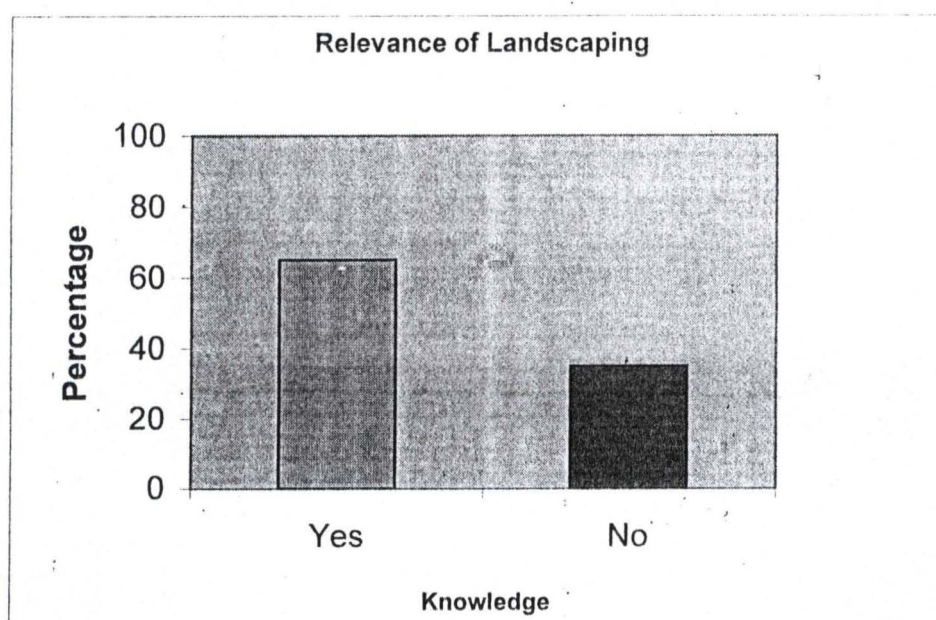
Performance of environmental managers in enhancement of the environment is rated fair.

Table 4.17: Knowledge of Relevance of Landscaping

KNOWLEDGE	NUMBER	PERCENTAGE%
Yes	390	65
Nos	210	35
Total	600	100

Source: field survey 2004

Fig: 4.9



The survey indicates that 65% of the residents know the relevance of landscaping.

Table 4.18: Duration of stay in FCT.

DURATION	NUMBER	PERCENTAGE%
1 year	240	40
2 years	120	20
3 years	102	17
4 years	77	12.9
5 years	61	10.1
Total	600	100

Source: field survey 2004

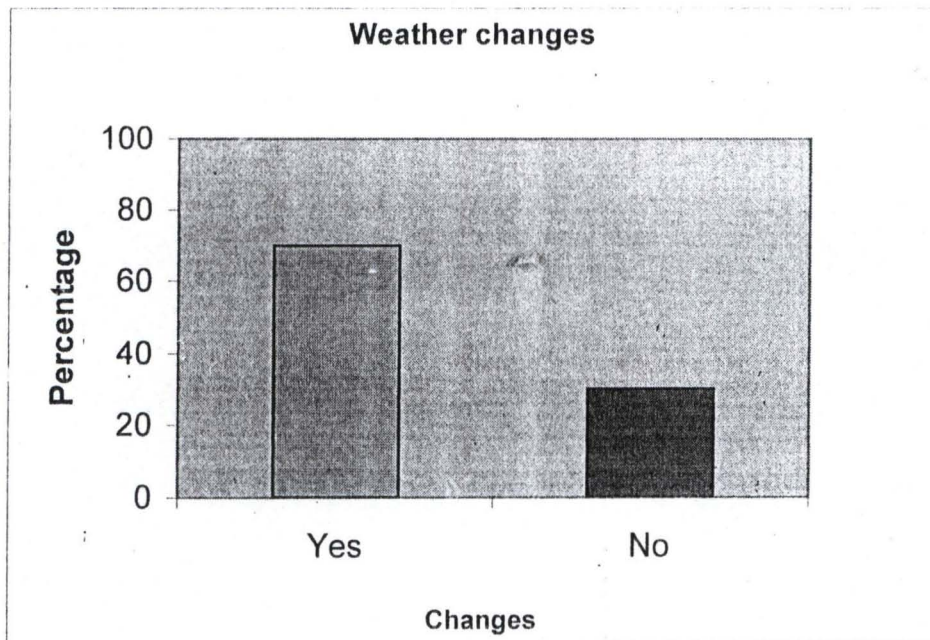
The survey shows a high increase in population within Abuja, this is attributed to the high migration rate from other areas to the capital city.

Table 4.19: Have you notice any weather changes recently.

CHANGE	NUMBER	PERCENTAGE%
Yes	420	70
No	180	30
Total	600	100

Source: field survey 2004

Fig: 4.10



There is a general change in weather in the federal capital city over the years.

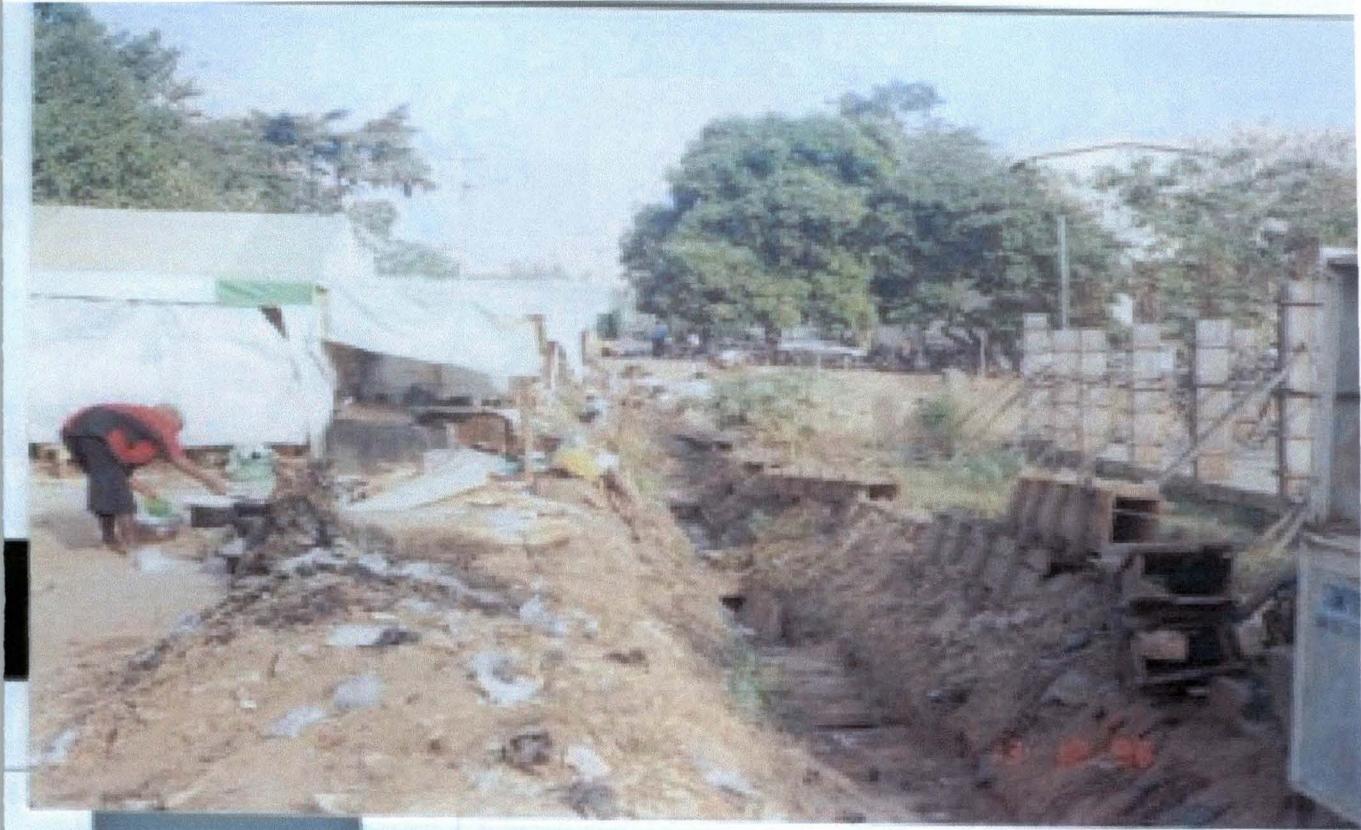


Plate 1: Blocked Drain Wuse Zone 5. Abuja.



Plate 2: Bush burning in an open space. Opp. Old Wuse Market.



Plate 3: Batches Central Area District.



Plate 4: Open Space converted to Shopping Complex. WUSE ZONE 4 ABUJA.

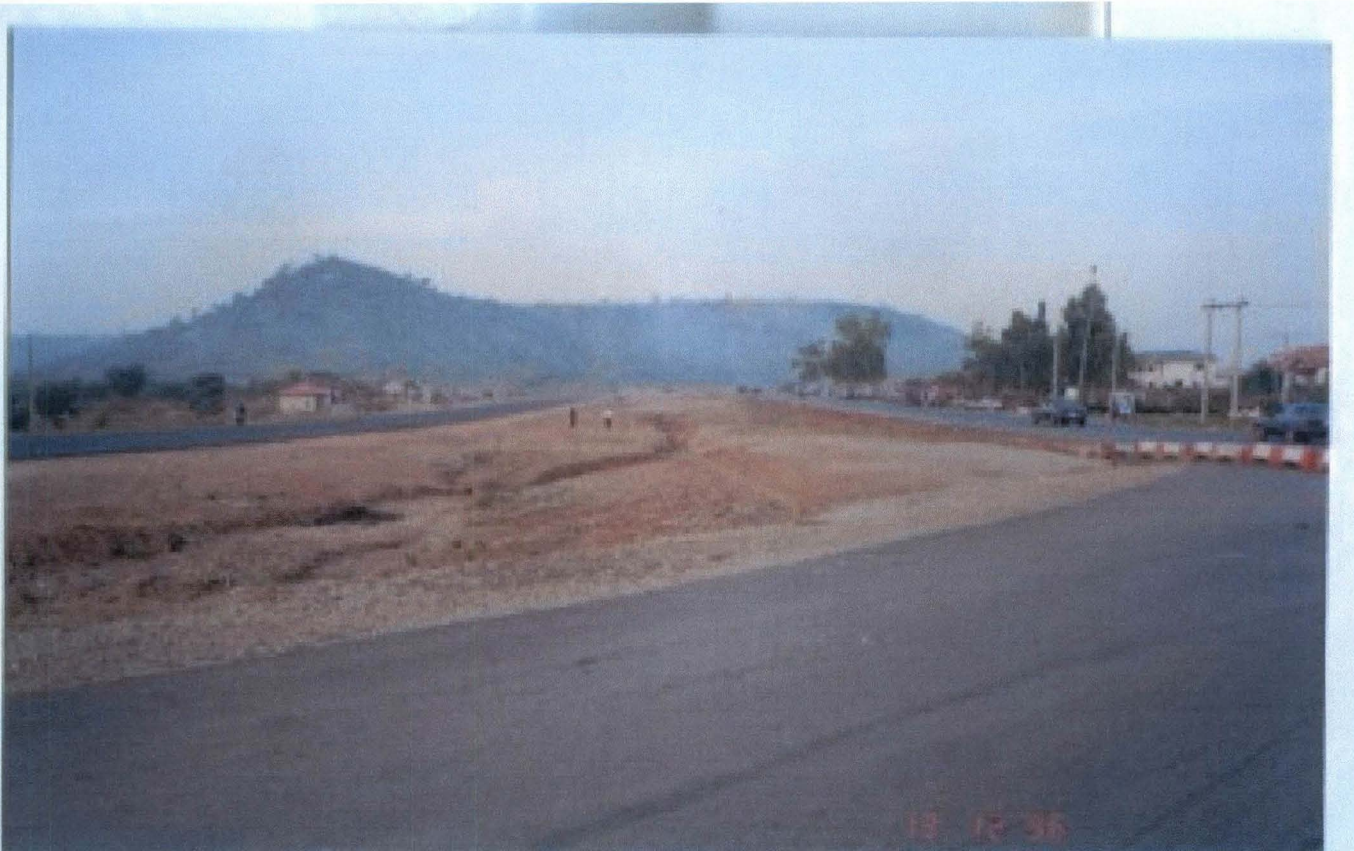


Plate 5: Erosion Maitama District.

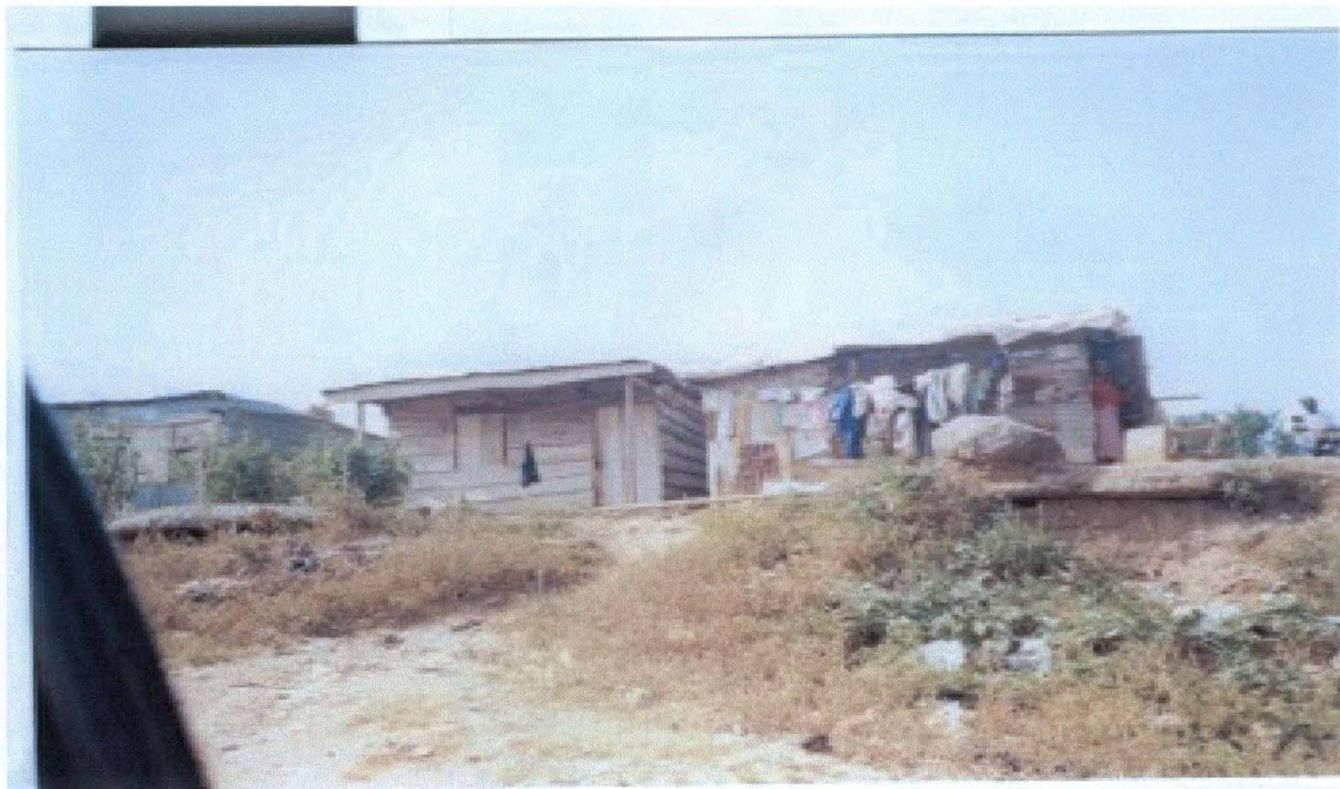


Plate 6: Polluted environment Garki District.



Plate 7: Polluted environment Asokoro District.



Plate 8: A well landscaped House Asokoro District



Plate 9: Good environment Wuse II, Abuja.



Plate 10: TRAPEZOIDAL OPEN CIRCUIT BLOCKED WITH GRASSES, CENTRAL AREA DISTRICT.



Plate 11: Major Road with Baren Landscaping



Plate 12: Landscaped Commercial building.
AREA II GARKI ABUJA.

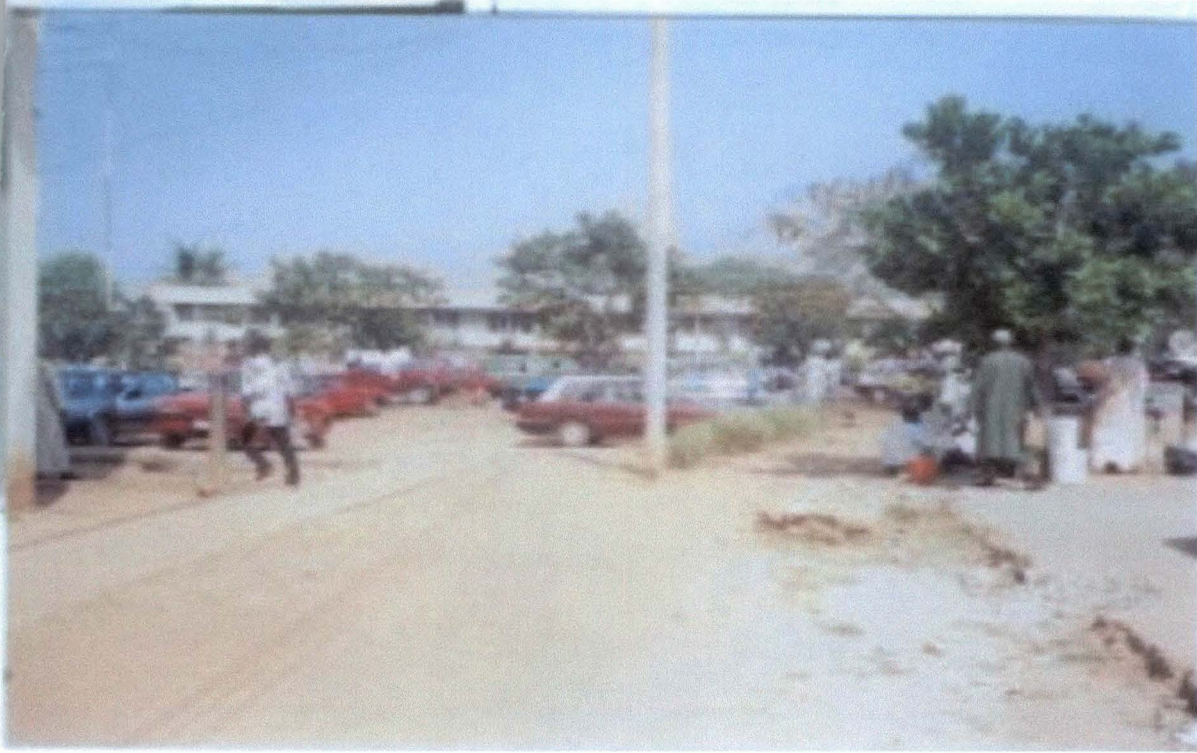


Plate 13: Open Space taken over by cars. Garki District.



Plate 14: Space unattended to Central Area District.

SUMMARY OF FINDINGS.

From the analysis of the data collected it has been discovered that:

- (a) There are more people living in Garki district with 35% out of 100%.
- (b) Majority of the residents are tenants.
- (c) Majority of the residents are civil servants.
- (d) Most of the residents attended tertiary institutions.
- (e) The average conversion rate of other uses of land to residential use is 30%.
- (f) Majority of residents dispose refuse indiscriminately.
- (g) 40% of the residents develop their plot above 70%
- (h) Majority of residents relies on gas for domestic purpose.
- (i) Most of the residents own a private car, have a fridge and use air condition
- (j) 58% of the residents express dissatisfaction with the environment
- (k) Noise pollution is the most predominant.
- (l) Residents express fair performance of environmental managers.
- (m) There is a large influx of people, which is on the increase annually.

SUMMARY

The study carried out indicates that majority of residents are civil servants and are educated, however, there is less serious concern about the environment even among the learned people.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

The significance of man-environment interaction is the changes that do occur both on the environment and man. The man environment impacts are enhanced by increase population pressure, which consequently influences settlement patterns (Emman 1995) while human activities make demand on resources and affect peoples life style, investment and the environment. It is through these interactions that changes occur, some of these changes may be negative or positive. But whatever changes, the man environment pressure will not continue indefinitely, because there is a limit the environment can absorb. On the other hand man places a limit to what he can do by creating problems for himself such as air and water pollution, wastes and climate change.

In view of this observation this research tried to look at the role landscape planning can play in beautification of city as well as averting the likely occurrence of natural disasters.

The study highlighted the problems to include lack of awareness, population pressure and illegal conversion of green areas and open spaces to other uses. The aim and objectives were fashioned towards solving identified problems.

In order to have a sound knowledge of the situation a literature review was carried out which highlights how a proper landscaping should be carried out and what is the resultant effect when the environment is allowed to

degenerate. This research uses observation to appreciate the situation from a professional point of view and subsequently a questionnaire was circulated in order to get the response of the residents concerning the subject under investigation. The findings indicate that although majority of the residents are educated they pay little attention to the issue of landscaping.

Lastly, the study made recommendation on the need for more awareness on the landscaping issue, more monitoring of developments by the agency concerned. This will further be enhanced through co-operation between the ministries, parastatals and agencies concerned with the regulation of landscape planning.

5.2 RECOMMENDATION

1. There is a need for more awareness i.e. government agencies charged with the responsibility of managing the environment need to educate the entire citizenry on the benefits derivable and the short comings of damaging the environment. This will go a long way in giving support as an environmental issue is far too wide to be left for government alone. The idea of community participation has to be inculcated on the people so as to attain a sustainable development.
2. The development control department of the MFCT and the AEPB need to improve on their monitoring and enforcement mechanisms. The development control department needs to ensure strict adherence to standard and laid down procedure in all manner of development in the FCT. The AEPB on the other hand must ensure that all developments meet the minimum requirements for

sustainable development. The agency must ensure that green areas and other open spaces are not encroached on.

3. Government need to discourage the use of building materials that absorbs heat and cause high temperatures (heat island). This can be done through enacting laws for the producers of the building materials and the developers and creating of specification for developers, which will form a guideline for them to follow.
4. There is a need for co-operation between the Ministry of environment, the AEPB and the development control department. Since their main objective is sustainable development, they need to work in collaboration with one another especially in matters of common interest.

5.3 CONCLUSION

The quest for a sustainable environment will continue to elude us, unless we learn to manage both the environment and the input to it in a rational and ecologically sensitive manner. The responsibility therefore falls not only on government alone but such a combined effort must include individuals, community, private organisations NGO's CBO's etc. it involves the active participation of not only shareholders but stakeholders as well. Landscaping if managed very well can prevent or reduce the occurrence of natural disasters to a bearable level.

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APPENDIX I
POST GRADUATE DIPLOMA THESIS
ENVIRONMENTAL MANAGEMENT
DEPARTMENT OF GEOGRAPHY
FUT MINNA, NIGER STATE.
QUESTIONNAIRE.

**TOPIC: THE ROLE OF LANDSCAPE PLANNING IN CITY
BEAUTIFICATION AND CONTROL OF NATURAL DISASTERS.**

A CASE STUDY OF ABUJA, PHASE I

THIS QUESTIONNAIRE IS FOR ACADEMIC PURPOSE ONLY

1. Respondent (a) male (b) female
2. Area of residence (district)
(a) Asokoro (b) Maitama (c) Garki (d) Wuse (e) Satellite towns
3. Type of occupancy
(a) Tenant (b) Landlord (c) Sub tenant
4. Occupational Status
(a) Civil servant (b) Private business (c) Applicant (d) Student
5. Educational qualification
(a) Tertiary (b) Secondary (c) Primary (d) None
6. What is the purpose of land, which you reside in?
(a) Residential (b) Commercial (c) Educational (d) Green area.
7. Refuse disposal method.
(a) Dustbin (b) Organized refuse dump (c) Back of house
(d) Indiscriminately
8. What percentage of land is developed in your house?
(a) 30-40% (b) 40-50% (c) 50-60% (d) 60-70% (e) 70% and above.
9. What is the major source of energy available to you?

(a) Electricity (b) Gas (c) Kerosine (d) Firewood.

10. Do you use air condition in your house?

(a) Yes (b) No

11. Do you use Refrigerator?

(a) Yes (b) No

12. Do you own a car?

(a) Yes (b) No

13. How can you asses the quality of landscaping in your house

(a) Satisfactory (b) Not satisfactory

If (b) Why?

14. Type of drainage.

(a) Open drainage (b) Enclosed (c) others (specify)

15. How much in your opinion have human activities degraded the city environment?

(a) Very much (b) much (c) slightly (d) very slightly.

16. What type of pollution did you notice in your area?

(a) Air pollution (b) Water pollution (c) Noise pollution (d) All of the above.

17. How can you assess the performance of environmental managers?

(a) Very good (b) Good (c) Fair (d) Poor

18. Do you know the relevance of planting trees and maintaining them in you environment?

(a) Yes (b) No

19. How long have you been staying in Abuja?

(a) 1 year (b) 2 years (c) 3 years (d) 4 years (e) 4 and above.

20. How you noticed any weather changes in recent years?

(a) Yes (b) No.