APPRAISAL OF CLIMATE AND ESTATE DEVELOPMENT IN ABUJA

BY

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PGD/GEO/2001/2002/221

DEPARTMENT OF GEOGRAPHY
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MINNA.

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BEING A DISSERTATION PROJECT SUBMITTED TO THE DEPARTMENT OF GEOGRAPHY SCHOOL OF SCIENCE AND SCIENCE EDUCATION

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CERTIFICATION

I certify that this work entitled "appraisal of climate and esate development in Abuja was carried out by me OJO AYODEJI TOLULOPE with registration No PGD/GEO/2001/2002/221 of the department of Geography. FUT-MINNA

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DEDICATION

To my Parents MR. & MRS.M. O. OJO and my younger ones Engr. Dotun, Engr. Lekan, Engr. Dapo Balenle Ojo

ACKNOWLEDGEMENT

To God be the Glory!!

Years ago I knew little about Environmental Management. That I now posses a knowledge of the subject is due to many people unfortunately for too numerous to mention here individually. Nonetheless I am in their debt. However, many thanks to all those who have taught me, to those who taught me knowing they were doing so, and to those who contributed one way or the other to my success and words of encouragement

ABSTRACT

Since humanity began, man has developed his shelter as a structure/facility for bioclimatic comfort the rigors of climate. The result was a better expression of the influence of climate on design than much of the Estate Development we see today. The enhancement of human comfort in dwelling through impact of efforts of climate change is the focal point and the goal of the study, as man is believed to be the brain behind Estate Development.

A planned Estate Development of the Federal Capital Territory formed our interest, while planned segment of the territory of the lower order level of planning, formed by prime area ofd concentration, which is regarded as an element of the urban environment. This prime interest is called the study area of phase 1 of the F.C.T. this phase has been existing and functioning effectively under a well guided and articulated system for human comfort.

These systems due to man activities and global warning resulting to climate change have started failing. The task was to identify the activities of man as the cause of the changes.

The study area, phase 1 of the Federal Capital City (Area 1, Section 2) consist of mostly civil servants in government owned designed houses. The design decision therefore was purely governmental.

Foreign Architectural design was employed through the introduction of new building materials and techniques to promote modern image than climate, socio-economic and cultural life styles of the populace.

Similarly, the orientation is to the developer interest rather than the planner with climatic consideration. During the hot months of February, March and early April, members of household either sleep in the open courtyard (if available) or with doors and windows open.

In the hot afternoon, people, prefer the comfort of the shady free to the rather hot interiors of their houses.

The dwellings mainly rely on mechanical systems to separated conditions inside from those out side the population of the study area has generally outgrown the planned size and still growing. Household heads resulted to converting set-outs, verandahs and some courtyard into bedrooms thereby over-utilizing the available infrastructures i.e.) water, electricity, road.

Equally, illegal commercial activities and street hawking on green belts zone and play grounds increase traffic congestion. Most of the civil servants are business men and women or petty traders. This gave rise to illegal kiosks and grinding machines proliferating the environment resulting to land degradation, air and noise pollution.

Estate developer should have climatic data, to have a clear picture of year round, every moment of the day, performance of climate,

its influence on building and the people who live in it (Bio Climatically in formation) Government policy on construction of houses for civil servants should be received to consider family size, socio-economic and cultural background and religions inclination. Government should introduce a more effective development control regulation to check the menance of illegal developers. An articulated environmental sanitation and environmental education should be introduce to the residents to emulate the spirit of environmental quality ideology.

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CHAPTER ONE

INTRODUCTION OF THE NATURAL ENVIRONMENT

Background:- The natural (Earth) environment setting is composed of the atmosphere (gaseous) portion which envelops the Earth); the hydrosphere liquid or liquid porting; the lithosphere or earth crust (solid porting) , the biosphere which contains organic or living matter and the cryophere (ice portion).

All parts of the environment work together giving necessary for life. These parts of the environment are what Okafor (1988) grouped into five (5) categories including climate temperature, humidity and precipitation) Tarrain (mountain, hills, valley etc); vegetation soils and Artefacts (man made components.

.2 Climate and Human survival:-

Man's in pact on atmospheric system have been confirmed as the cause of climatic changes (IPCC-1977; WATSON-2001) climatic variability on the other hand, is within the climatic systems and changes human influences. Nigeria is a country endowed with climatic condition conducive for human comfort in terms of temperature, precipitation, sunshine and humidity etc.

Over the past three decades, Nigerians have been experiencing extreme weather conditions leading to a rapidly deteriorating environment. Today this deterioration is marked by droughty (induced) in the Northern air and water pollution, flood and gully erosion. In urban areas, poor drainage and solid water disposal have increased problems of pollutions while automobile and

industrial effluents have led in parts to urban "heat island" effects thereby making living condition difficult to cope with.

It is now recognised that, of all factors and variables the affect shape and influence life, man's activities and the very survival of man on the earth, none is as significant and over whelming in its impact as climate. Although man has no control over climate, climate effects the soil, vegetation and water resources, which are man's basic natural resources on which life depends and constitutes an agent of economic advancement. Human comfort it is to be assumed that under equitable climate is guaranteed. There exists therefore a delicate relationship between man, climate and environment, which is synonymous with "Balanced or stable ecosystem"

1.3 HUMAN POPULATION AS A FACTOR OF DECLINING ENVIRONMENT:

Increase in human population witnessed during that last centring and the resultant increase in human needs (foods, shelter, energy industrial products etc) has resulted in a rapid disruption of this equilibrium. Various land-use practices, infra-structural designs, massive water impoundment especially in semi-arid areas for agriculture and domestic water requirement in human habitats have depleted natural resource endowments. In the Nigerian context, the discovery of oil have led to great increase in wealth and the desire of importation of Architectural designs that are not environmentally friendly and the resultant effect is in balance in the environmental system.

Often climatic factors have been ignored in the planning, design, construction developing and management of cities to the detriment of human effort and comfort, well-being and the urban environment. On a metropolitan scale, land use and design have implications for urban air quality, energy consumption and the rational use of resources. At the same time the design features of each building influence the health and physical comfort of household. Generally, it can be deduced that excessive climatic change in any form has an unpleasant influence on the biophysical comfort of human beings and they are naturally various in finding solutions to their problem instead of acclimatizing. it is only where a solution could not be affected that they start thinking of acclimatization. In the present global climatic changes which are characterized by extreme conditions at both seasons, man has been trying to adjust to his habitat by alleviating the condition. The steps adopted include change in building orientations, use of sun-shading devices as well as mechanical means of ventilation. All these are in addition to careful and critical application of specific building materials depending on the peculiarity of the situation. The main elements of an urban plan are the resident, industrial, commercial, educational health, public administration, transportation and infrastructure. Water, electricity, road, etc.) If any of the above elements is not adequate or in deplorable condition or better still decaying state the urban set up called urban environment may loose its quality and cease to perform the function it was created for thus, this forms the basis of this project as it relate with study area.

1.4 STATEMENT OF PROBLEM.

The thought of a new capital city was conceived when Lagos which has become a seamless web because of its multiple role as a state and Federal Capital. The continued retention of Lagos as the Federal Capital has become impracticable, especially with its intractable traffic, housing and sanitation problem which has great discomfort to human settlement.

On Gust 9th 1975, under the distinguished chairmanship of the Hon. Justice T.A. Aguda (RIP) the panel was appointed and empowered to examine the dual role of Lagos as a state and Federal Capital.

The report of the panel set forth several key conclusions:

i. The city of Lagos is incapable of functioning as both Federal state Capital due to the problem of inadequate land space for development commensurate with its status as a capital of Nigeria.

ii. Lagos is identified with predominately one ethnic group. A new Capital in a more central location would provide equal access to Nigeria's great diversity of cultural groups.

iii. A new capital is desirable that would be secure, ethnically neutral, centrally accessible comfortable and healthful and possess adequate land natural resources to provide a promising base for urban development.

iv. A new capital is needed as a symbol of Nigerians aspirations for unity and greatness.

The Federal Capital Development Authority (FCDA) charged with the responsibility of planning and development of the city was established by. Decree NO. 06 of 1976 following the acceptance of

Justice Aguda Report by the then Federal Military Government. Due to reasons which range from ill provision, ill management. Irrational decision, greed, high population, high traffic volume and development of structures not in consonance with the Abuja Master plan the Federal Capital (Phase I) today is not being developed as desired. The trend of development in Federal Capital city have resulted to human discomfort against the concerted view of conducive environment for human settlement.

1.5 AIM AND OBJECTIVES.

AIM: The general aim of the study is to assess the effect of climate change on existing Estate Developer on the study area in consonance to human comfort.

OBJECTIVES:

1. To examine climate change with special emphasis on thermal comfort in the Federal Capital Territory)phase 1) and the likely socio-economic consequence.
2. To proffer possible solutions to identified flaws in the FCT master plan which are environmentally unfriendly and will therefore impair human health and comfort.
3. To offer appropriate planning and architectural design that is environmentally friendly to projected climate condition of the FCT.

1. JUSTIFICATION OF THE STUDY

This research in set out to reconcile urban planning, estate developers and building climatology as related disciplines that centres around mans activities on the environment. This study will enable the estate developer and the architects, the planner at planning and design stages to analyze the effect of thermal comfort of man in relation to his habitant and the likely socio-economic consequences. I will also draw Architects to employ climatic design for the enhancement of human health as well as to minimize climatic modification the ultimate population of the city is put at 3.10 million in habitants. The four () phases as follows:

Table I population Distribution of the FCT

Phase	Years of commencement	Project target population on completion	Present population
I	1979	230,000	652,000
ii	1992	585,000	-
iii	2000	640,000	-
iv	-	1.7 million	-
		3.755 million	-

Sources: National population commission 2

The planning of the city is based in good forecast of the scenarios of events with adequate land being allocated to the various sectorial I activities that will and should take place in the city, At present, 100% of plots in phase 1 of the city have been allocated

and over 90% are developed and put into use,. In spite of this high percentage of development, the level of human activities and high population has out grown the planned lots and infrastructure, Basically, infrastructure facilities such as water, roads, electrically etc. are in adequate for human comfort and activities.

The high population in phase 1 of the city as against the planned population of 230,000 has necessitated the creation of curve-out(plots created on green areas and parts) and slums both for residential and commercials uses. Some of these project includes.

I The area 1 shopping centre
ii The wuse 1 market extension
iii The temporary central area market
iv Wuse shopping plaza
v The Julius Berger junction market and
vi Various curve-out residential plots.

These projects are highly inimical to human comfort within the FCT as the resultant effect is increase sin population as against planned facilities and the subsequent effect is rise in temperature and thermal discomfort, degradation of the soil (erosion), increase in solid and liquid waste disposal, create intractable traffic and social upheaval and in security. It is therefore expedient that at the planning stage consideration for human comfort should be of paramount importance.

1.6 THE STUDY AREA

The FCT is located within the meddle belt of the nation. If lies between latitude of 25%N-902%N and longitude of 7039. If occupies an area of 8000 sq km.

The FCT records its highest temperatures during the dry season when there are few if any clouds changes in temperature of as much as 10% have been recorded between the highest and lowest temperature in a single day. During the rainy season, the maximum temperature is lower due to the dense cloud cover. Durirnal annual range it also much lower, sometimes no more than 7% in July and August, Human sensibility to temperature is greatly, affected, by relative humidity. During the dry season, relative humidity falls in the afternoon as low as 20% in the city zone. This low relative humidity, coupled, with the high afternoon temperatures account for the desiccating effects of the dry season. In the raining season, the relative humidity is much higher it can reach as high as 95% in the morning hours, even though the temperature is slightly lower, the effect is to create a heat trap. When this situation occurs, the general feeling is to be uncomfortably hot.

The start of the raining season in the FCT is around the 10th of April and it tapers off very rapidly after the 20th October. Thus, the duration of the rainy season is between 180-190 days. The mean monthly distribution shows a tendency for concentration in three to four month. In the city area 60% of the annual rain fall is in the month of July, August shows the needs for drainage system that can handle volumes of water very quickly. The FCT has frequent

occurrence of squall lines, which being with dense dark, cumulus-nimbus clouds with thunder and lighting followed by strange winds and intense rainfall. The intense rain may last for up to one half duration. This condition is then replaced by a few days of brought, clear skills. It is most common in the late afternoon at the beginning and ends of the raining seasons and often causes serious property damage. This calls for need to protect building against blown - off roots. The tropical maritime mass gives the southwest monsoon winds. In June, the northerly flow of air components has weakened and only the southerly flow predominates. Being moisture - laden, it brings a lot of rain. In September the tropical continental begins to intensify over the territory and the northern east trades become the dominant wind form October to March bringing with it dry, cloudiness bowl just-laden conditions associated with the harmaltan.

The New Federal Capital city (NFCC) site is exposed to 2,500 sunshine hours annually (Maboyunje 1977). During the dry month (November April) the monthly variation in the amount of sunshine follows the general trend of an increase from over 275 hours on the city site. As the raining season approaches, the trend is to increase cloudiness. The decline in sunshine hours become more intense as the raining season progresses and reaches its lowest values in the month of August. At this time, there is actually an inversion in the city site area where there is less sunshine hours than in the southern parts of the FCT.

1.7 SCOPE AND LIMITATION

The scope of study of this project is limited to phase 1 of the Federal Capital city (FCT) master plan. The phase 1 of the Federal Capital city has a project target population on completion of development of 230 within 600,000 hectares of planned area.

CHAPTER TWO

2.0 METHODOLOGY

Two methods of survey were generally used in the process of gathering data in relation to the assessment of the existing building, utilities and services of the study area. They are reconnaissance and questionnaire survey methods. These methods were both used to collect two distinct types of data namely primary and secondary sources respectively. The whole processes were failure towards the objectives of the study.

2.1 RECONNAISSANCE SURVEY METHOD

The process of reconnaissance involved during personal assessment of these buildings, infrastructures and gathering of data, which include photographs of the existing buildings and supporting facilities.

The secondary data gathering under this method include, the base map and other related plan obtained from the study area, which guided the assessment of the existing buildings within a neighboured) .

2.2 QUESTIONNAIRE SURVEY METHOD

This method of survey involved the use of prepared questions, which were in printed form and administered through personal interview on the respondents. Data gathered through this method included, the residents perception of the existing designs and materials used, infrastructures in terms of their adequacy and quality.

Date, were extracted from climates charge centre FVT Minna, from completed work of Adetolalu et al, from library, test books, Journal, maps etc. Information were also obtained from various source such as population commission. Abuja municipal Council etc. Since this on appraisal work, information were gathered from instructions offices of the National Assembly FCT

2.3 SOCIO - ECONOMIC SURVEY METHOD

Data relating to socio interaction among the resident through social gathering such as co-operative society irreligious, ethnic meeting etc were gathered using "section" of the questionnaire forms during the interview exercise. Also data gathered to economic well being of the residents were equally gathered.

If is believed that the ability of any residents of a neighbourhood to discuss any type building so preferred depends on their economics and social affiliation and well being or their purchasing power (Well burn 1972)

CHAPTER THREE

3.0 DISCURSION

In the chapter data extracted from the primary and secondary sources using the two survey methods and secondary sources using the two survey methods namely reconnaissance and questionnaire method were organised in p resentable and readily comprehensive form and analysed.

The reconnaissance survey conducted focused on the following;-

a The quality and structural condition of the existing utilities, facilities and services within the neighbourhood

b The land ratio in respect of development of approved or recognised plots curved outs plots and illegal developers to population density.

c The spacing of buildings and orientation in relation to wind velocity and sun/rain direction in order to achieve comfort.

d. Materials used and their conductivity at season (rainy and dry) to human comfort.

The questionnaire survey conducted focused on the following.

a Residents perception of the existing building types houses Neighbourhood central, Hotel etc.)

b Population distribution and household size and characteristics and

c. Socio and economic status of the residents.

3.1 EXTRACTED FROM THE PHYSICAL ASSESSMENT OF THE EXISTING DESIGNS, NEIGHBOURHOOD FACILITIES AND SERVICES

BUILDING DISTRIBUTION: Based on the physical in Area 1 section2. It revealed that the percentage of total coverage of building units is within the physical planning standard while other facilities such as water and electricity are adequate.

Facilities like open space and children playground are grossly under which invariably force the residents to expose themselves to open space for some activities. The high population per household noticed during the survey put facilities like water, electricity refuse dump to over - utilized thereby become a menace to the environment and consequently discomfort and health hazard to the residents. The neighbourhood centre which was originally designed to consist of open shops, clinics, post office, light - mechanical workshops and recreational facilities (volleyball, basket ball and lawn temis) is being over utilized due to population pressure and socio- economic activities. Due to pressure and excessive use it defeated the entire neighbourhood into a menace joint for refuse dump and illegal activities. The conclusion here is that as a result of high population green open space are no longer available due to illegal trading, refuse are dumped into drainage indiscriminately causing blockage and subsequently water run-off leading to erosion and flooding of streets especially M.K.O Abiola road. The resultant impact is over - utilization of such facilities causing sharing or rationing of electricity, street haw king, traffic congestion at all major roads and crime and social upheaval within the neighbourhood.

3.2 DATA RELATING TO THE RESIDENT PERCEPTION OF THE EXISTING DESIGNS.

Most of the residents are civil servants in government owned quarters. Therefore the residents do not dictates the building designs. This analysis is mainly on the thermal comfort of the residents. The volume of interior spaces as well as the number and size of windows are not adequate to the ratio of the occupants for ventilation and lighting purpose.

During the hot moths of February, March, and April members of the household either sleep in the open court grad or sleep with door and widows opens

Cooking which is usually done inside is being done outside to avoid heating the walls. During the hot afternoon people prefer the comfort of the shady tree to the rather hot in teriors of their houses

If can be concluded that, the design decisions which have great influence on the thermal comfort in dwellings, is taken by government. Similarly, the orientation is to the planner interest rather the Architect with climate consideration.

Investigation carried out reveals that foreign planners through the introduction of new buildings materials and techniques have more to do with presenting a "modern image" than with climate consideration of the study area, equally, the socio-cultural life styles are not taken into consideration while planning (Appendix)

3.3 DATA ON POPULATION AND HOUSEHOLD SIZE

Data from the field survey clearly shown a gradual rise in population growth of the study area between 1994-1998. This trend therefore indicated pressure on the building facilities and services such as toilets, kitchens dinning rooms, bedrooms and electrically, water and roads usage. The major problem is as earlier highlighted vis-a over utilized and subsequent collapse.

3.4 SOCIO-ECONOMIC DATA ANALYSIS.

Data were extracted during questionnaire survey relating to the socio-economic status of the residents within study Area. The data shows the level of involvement of the residents in the various social activities.

CHAPTER FOUR

4.1 SUMMARY OF FINDINGS.

Here is the summary of the analysis as end result of the exercise.

1. the study area phase 1 of the Federal Capital City with emphasis to Area 1, Section 2, consist of mostly civil servants in government owned designed houses.

These houses are designed and built to foreign standards with less consideration to Nigeria Socio-cultural and economic background. This has resulted to the study area being over developed from where green belts and organized open play grounds has been converted to residential and commercial activities thereby resulting to human discomfort both in the houses and outside.

4.1 RECOMMENDATION

Appraisal of climate and Estate Development in Abuja on the environment of the study area has been assessed analyzed and parented in from of finds, result of which brought about the issue of "human comfort". The major issue is hoe to solve this problem of human comfort within FCT. The first step to be for planning and Estate Development designs purposes is having climatic data, to have a clear picture of the year round, every moment of the day, performance of climate, its influence on building and the people who live in it (Bio Climatical information). Designers should also consider the followings

- Spacing of building
- Orientation of buildings

- Space organization
- Windows opening
- Sun shading device
- Materials selection
- Construction details
- Colour finishes and
- Air pollution
- Land pollution

Government policy on construction of houses for civil servants should be reviewed with the following at the background.

- The size of the family with anticipated population increase.
- The social-cultural background
- The religious background
- The economic base of the family.

Government should introduce a more effective development control regulation. This measure will assist greatly in checking the influx of illegal development and structures as well as to have a physical control over the land use. Penalty of great measure should be placed on all those who tamper with approved layout designs with a view to avoid curve-out plots. An articulated environment sanitation program is required to ensure a more healthy way of disposing refuse generated within the tool for creating awareness. It will be of great assistance if a brief knowledge of the environment is impacted to the resident to emulate the spirit of environmental quality ideology.

4.3 CLIMATE CHANGE

Climate is always changing. The fluctuations of weather and climate take place on all time scales, from the gusts and hills of the wind, which occur within a fraction of a minute, to associated with continental drifting and wandering of the poles. Attitudes of climate and awareness of its fickleness have changed down the ages, being probably never more than during the resent century. The vagaries of climate and the longer-lasting changing of its moods were an ever-lurking source of danger.

In the Federal Capital city 9phase 1) the various an thropogenic activities embarked upon by man in this environment have lead to a number of problems whose consequences are severe on the environmental system such as activities include:

(a) Activities leading to deforestation and the alteration in the land use system.

(b) Activities of topography and drainage systems and

(c) Activities leading to urban growth (upland).

These human based activities within the environmental system indeed have led to a number of problems such as:

4.5.1. **CLIMATIC MODIFICATION:** Is associated in main to the activities of man which have in turn generated micro-climate variations, pollution of the environment by forest fuels burning daily from industries and automobiles all of which generates heal thereby allering the heading balance.

Specifically, urbanization have been found to modify the city climate in a number of ways (Bry. Son and Ross 1972). These include the effort changes in the physical surface of the land, which increases the roughness and in consequences of wind speed. Several human activities generates enormous particles into the space that are capable of greatly modifying the solar energy incident on the earth surface.

(Landsberg, 1970). The scenario is such that transforms the natural surface to meet a particular requirement, often times with disregard to the associated environmental stress.

4.5 CLIMATE CHANGE

Climate can be defined as average weather. Weather is the instantaneous atmospheric condition over a particular place. Since it is an average weather events of some time past. These statistics are calculated for a period long enough to establish the variance, standard deviation, and probability of existence events among others. Climate change is normally regarded as a "complete shifting of climate of an area. For example change from cold to warn or from wet to dry climates.

Usually it is a long term changes in climate especially over a geographical period, say millions of years. Climate change refers to fluctuation in weather averages over a relatively short period of about 100 years. This is change within human lifespan.

Abrams (1971) had defined the environment as the sum total of all external conditions influencing the growth and development of an organism. These factors could be physical, biological, social and cultural (Keller 1976).

4.6 URBANIZATION:

Urbanization refers to the change in the proportion of the population of a nation living in an urban place (Palen, 1987).

Thus, in urban areas there is a near total transformation of the landscape through the broadening and beautifying the city space. The process borders essentially on various construction works such as dual carriage ways, electrification, industrialization, and commercial activities. While, piloting these development indicators in place, allowance for the environmental stress is hardly considered. The general increasing process of urbanization in Abuja all have brought pressure to bear on social structures such as buildings, transport, communication, health, education. Unfortunately, because of the rapid range of these developmental efforts, unplanned infrastructural developments often takes place, which further compounds the live ability of the environment.

S. Water Resources: Man's activities which include clearance, agricultural intensification, urbanization, irrigation, domestic w ater use, power generation, tourism, water impounding by use of weirs-small medium and large, have both of the quantity and quality of water (Oye bande, 1995).

Specifically, climate change due to the concentration of green house gases has to also greatly affected the input of energy and thus precipitation into the watershed system. Generally, human-based activities easily leads to reduction in soil water, soil capacity to store water and retention of water as well as verifications, surface and sub-surface water storage.

4.7 THERMAL COMFORT

Thermal Comfort related to the ability to eliminate discomfort and irrigation, due to excessive hearing or cold. In other words, it connotes a state of pleasantness. Two separate and independent causes of discomfort have been established; the thermal sensation of excessive healing and specified air and retaining temperatures and the air velocity over the body as the two major environmental conditions that affect the thermal sensations. A state of thermal balance is therefore essential for comfort. Comfort Zone is thus a range of conditions experienced physiologically, a comfort zone is the range of conditions under which the thermoregulatory machines of the body are putting in a stage of minimal activity (Givain 1976).

Any temperature below 33^0c, increase in air velocity would have significant positive effort on the body comfort. At temperatures between 33^0-37^0c, body comfort would be affected by any increase in air velocity, although the air velocity could reduced the skin wetness. Carmon (1984) describes human body as a homothermic system. According to him for the body system to function properly, a metabolic heat, is basically derived from the internal bio-chemical process generated in the body.

The body for thermal comfort. In the excessively cold period, when the skin temperature is far lower than the body temperature, high humidity could be detrimental health and causes subjective discomfort. In hot dry climates low humidity may cause excessive dryness or lips and mucus membranes of the lipper respiratory tract with the respect to micro-flora and dust. (Givoni 1976) and Goromosson)

4.7 ABUJA MASTER PLAN

THE CONTENT: a brief reference to Abuja Master plan reveal that in scope besides including the major elements of the regional development plan for the Territory the plan intended to cover and co-ordinate land use, transportation, infrastructure housing, services economic etc. in a fashion that also recognize both their inter-relationship and their spatial requirements which are paramount. In general terms the Abuja Master plan proposed and apportioned land to various uses as follows:

S/No	Type of Category	Land budget	As% Total
I	Government activity	500.00 hectares	1.96
II	Services	891.00 hectares	3.49
III	Residential	12,486 hectares	48.97
IV	Light Industry	920.00 hectares	3.61

4.8.1 FLAWS IN THE MASTER PLAN

The area of 5,500 Hectares includes both developable and under developable lands.

In respect of the planned population target of 214,100 inhabitants achieved in the detail urban design of the phase 1, this figures falls below the master plan projection of 230,000 people's down fully developed. This has become oblivious because the detail planning process has identified in more details the un-developed lands in phase 1. Also some residential plots in Garki and Asokoro District were found inadequate during the physical setting out on the ground.

This further reduced the target population and creates more disparity between what is planned and what is realized.

The movement of the seat government from Lagos to Abuja on Dec. 20 1991 created high population increase within the city. This resulted not only to neighbourhood infrastructural decay being include and necessitate creation of curve our plots, use of green areas and parks which are highly inimical to human comfort. Such are visible in Area 1 Shopping Centre, Julius Berger Junction, and the Wuse Shopping Plaza among others. Absence of adequate provision of facilities will result to a number of social problems thereby distorting the socio-economic environment. Various experts enumerate so many others. This aspect of our discussion, generally form our major concern is this research. Our study tends to find out the degree of man's activity due to high population as a causes to climate change and the use of Architectural design in relation to human comfort.

4.9 ESTATE DEVELOPMENT IN ABUJA

Majority of dwelling in Abuja today are what may be called "Foreign Estate Developer" rather than "Traditional Or African Estate Developer"

Quite a number of modern elements have been incorporated into their planning design and construction. These include the use of long-span aluminium roof sheets, asbestos with glazed metal sheets shutters, cement-screed to tiled (cement) floors, sand create blocks, plastered and while washed walls and so on. All these have definite efforts on the thermal comfort levels achieved in the dwellings.

The planning of the neighbourhood are cluster from or row houses in Garki 1 and II while Wuse, Maitama and Asokoro consist of detached / semi-detached, flats and multi-family. The planning is a mixed type between government plots and private plots. Most of the government's plots are usually not fenced to provide the desired privacy. As shown in figure 1 four board housing types were considered for this study.

Land / Housing type ration distribution

Phase 1

S/no	Housing type	Sub-type	Plot area per household	Built space/ Household
1.	Detached/semi-detached	A – Large B – Medium C – Small	1,000m^2 100-800m^2 75-100	120-160 70-100m^2 30-60
II	Serviced land	A – large B – medium	1000m2 400	
III	Flats	A – Large B – Medium C – Small	80m^2 60-80 35-60	100m2 85-100 45-70
IV	Multi family	A – 2 - 3 B – 4 family C – Transitional	120 – 150 180^0 240^0	40 – 75 60 – 80 60 – 80

Source: Abuja Master Plan

CHAPTER FIVE

5.0 CONCLUSION

This study was well conceived and carried out with a clear goal of understanding the activities of man as an Architect of climate change within the study area and effects of that change to architectural design on human comfort.

Architecture has to serve a man and his lining comfort. Man's comfort is the measure, therefore, of the extent to which buildings have succeeded in satisfying the purpose for which they were designed. The natural environments in ours buildings are rarely within acceptable comfort limits. Hence the provision of comfort for better living and performance remains constant struggle.

Physical planning in his understanding of the complexity of man unending desire for land for urban development has put this desire emanating under three purpose, convenience, beauty and economy purposes. The developer, in an effort to describe man's crave for land, has not chosen there key purpose carefully.

These three basic purpose of man's desire for land and urban development are in their nature complex. Beauty and economy are easily achieved together at some degree.

While convenience cannot easily go along with any of the above in the same degree. The physical planner therefore is charge with the responsibility of reconciling these purpose while planning an urban area, which is always a great task.

Residential, an element of urban area is always designed along with the unifying tool entirely focused. This tool is often called infrastructures. Infrastructures is always provided for collective use. Residential neighbourhood earn its name from common provision of facilities and services called infrastructures. In the course of management of an urban area, a misconception always emerges between physical planner and environmental manager.

An environmental manager perceives an urban environment as a complex entity. His opinion is that, the planner should not forget while planning the urban area, to always be mindful of the consequences it may bring to natural environment.

Environmental manager's major concern is that, the quality of the general environment should be first while equality satisfy man's desire.

This has been the key concept of this study. Just as high lighted in the recommendation, solving the problem is not all that is required were buy the issue of environment and human comfort with that developer and environmental manager.

All are expected to pursuing common goal. Developer concerns first the people and their needs, second the climate and its attendant and third materials and the means of building. Therefore, it necessary to put new designs on the drawing board to take care of physiological comfort and energy conservation.

5.1 REFERENCE

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