A REPORT
ON
CLIMATIC DATA OF AKURE FOR YEAR 2001
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SUBMITTED TO
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ABSTRACT

Over much of world surface, the natural environment does not provide expected momentarily satisfactory condition for human comfort in the dwelling and buildings (shelter). Therefore, man has always set out methods to provide protection from the weather elements for the building occupant.

Fortunately, the precedents and the acceleration of technical development has given rise to research which help to make clear the fundamental principle of many environment phenomenon. Historically, the main aim of environment control has been human comfort. The human environmental requirements are for lights, air and warmth in addition, sound must be considered since it is indispensable in every activity.

This report is a critical look at the climatic condition at Akure in 2001. The analyses is use to evaluate the various climatic problems and some recommendation were made on solution to housing problems.
1.0 INTRODUCTION

Akure is the capital city of Ondo State. A state with an area of 20.555 square kilometer. Osun, Ogun and Ekiti states at the west, Kwara and Kogi at the North, Edo and Delta at the East and at the southern part by the Atlantic Ocean, bound it.

Topographically, the land rises steadily from the shores of the Atlantic Ocean to the giant highlands of the Akoko’s in the North. These highlands which are part of the famous Yoruba highlands of western Nigeria constitutes a great water shed from where most of the notable rivers draining Ondo state take their source. River Owena, which supplies water for domestic use to one third of the inhabitants of the states, is the most prominent amongst the rivers. The importance of this river is seen in its usage in the various government establishments and enterprises which includes, Owena motel, Owena mass transportation company.

The 2006 National census puts the figure of Akure at Six Hundred Thousand which could be demographical and logical to say that this number have been greatly threaded in the past 10 years. The upsurge in the city’s population can be adduced to its administrative, commercial, and educational as well as religious importance.

1.1 GEOGRAPHICAL LOCATION OF AKURE

Akure lies on latitude 7° 15' North of the Equator and on longitude 5° 15' east of the Greenwich meridian. It stands on the altitude of about 370 meters above the sea level. The land towards Ado-Ekiti is hilly and studded with granite formations believed to be of volcanic origin spreading over an
area of 99,287 square kilometers. Akure is situated 210 kilometers east of Ibadan, the capital of city of Oyo state, 168 kilometers west of Benin the capital of Edo state, 311 kilometers north east of Lagos, capital of Lagos, 189 south East of Ilorin the, capital of Kwara state.

In relation to all big towns in state, Akure is centrally located, being surrounded with a 48-kilometer radius by those important towns. It is bounded by Ondo and Idanre to the south, Owo to the east, Iju / Itaogbolu to the north and Ile-oluji to west.

1.2 IMPORTANCE OF AKURE

Akure city's importance covers the wide range, which included Administrative, Educational religious and commercial. It’s attainment of administrative importance dates back to the days of colonial era when it was made a district headquarter. In July 1915 the divisions of Owo, Akoko and Ondo were merged into a province known as the Ondo province. Akure was made the provisional headquarter, which it was until the creation of Ondo states in 1976 when it became a state headquarter. Some important government establishments were already located in the city, which included the public works Department (P.W.D). The ministry of Agriculture and Natural Resources, the ministry of Education (Inspectorate Division).

The federal ministry of communication, the police headquarters, the federal ministry of trades and industries, the water corporation and the National Electric Power Authority (now the Power Holding Company of Nigeria (P HCN). The establishment of Ondo State in February 1976 has since led to the establishment of many ministries and statutory co-
corporations as well as quasi-governmental institutions that had greatly influenced the demographic structure of the city.

Religious wise, the city serves the headquarters for many Christian denomination inducing the Catholic Diocese of Ondo, the Anglican Diocese of Akure, a district headquarters for the C.A.C church and the General Headquarter for Agape Christian Assembly etc.

Also, Akure is the host city of educational institutions like, the federal University of Technology, State school of Nursing and school of Midwifery as well as the school of Health Technology.

1.3 GEOGRAPHICAL LOCATION

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1.4 DESCRIPTION OF PROCESS OF DATA COLLECTION

1.4.1 SOURCE

The information in this write up was collected from the Ondo state government Agro-climatological and ecological monitoring unit (PMU), Akure. Also other sources of data include textbooks, Journal and Internet.

1.4.2 TIME

The data was collected at Automatic weather station of PMU unit Akure. The data was recorded automatic recordable machine at appropriate time interval depending on the sensors setting.

1.4.3 PROCESS OF DATA COLLECTION AND ANALYSIS

The process of data collection and analysis is according to the approved international standard method of data collection in an Automatic Weather station.
CLIMATIC DATA CHART FOR AKURE IN YEAR 2001 SHOWING THE TEMPERATURE RISE

MONTHS

DEGREE CELSIUS

Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Nov Dec

Dry bulb temperature
Wet bulb temperature
Maximum temperature
Minimum temperature
Dew point temperature
4.0 CLIMATIC ANALYSIS

Akure lies in the tropical zone; solar heat, glare and humidity are its characteristics. The area is particularly noted for dry and wet season, a tropical climate characteristically defined by the wet Southwest and dry Northeast trade wind marked seasonal changes in rainfall from maximum record of 40mm in July to low rainfall of 83mm in December. The average daily temperature ranges between 72°C in January and 92°C in July and June. All these are treated briefly below:

4.1 RAINFALL

Being in the equatorial tropical hinterland, two distinct seasons are experienced in the two viz: Dry season which characteristically wet and ranges between April to October and Wet season which is characteristically dry and ranges between November and March. Rainfall usually begins around March /April and reaches the maximum in June, decreasing from thereafter until September/October when it finally ebbs out. The southwesterly moisture laden wind brings the rain while the Northeasterly wind brings harmatan during the dry season. In Ondo state, annual rainfall varies from 1150mm in the Northern part to 2550mm in the south. On the average this can be considered to create a need for adequate drainage system in order to avoid the damaging and loss of properties.

4.2 TEMPERATURE

Akure maintains a moderately high temperature line throughout the year. The maximum temperature of about 34% (86°F) is usually in March while the minimum stand at about 22°C (71.6°F) with an average daily temperature between 30°C (93.2°F) and cloudy atmosphere reduces
excessive high temperature. The annual mean temperatures is about 26.65° C the diurnal range is usually very low often times not more than 70 °C in July and August. Hotness in interiors is a common problem therefore; opening should be as wide as possible to enable the cooling of the interior spaces. Trees should be used as shade against solar and diffused radiation from the sky.

4.3 RELATIVE HUMIDITY

In Akure town, high annual rainfall makes the relative humidity to be high throughout the year, and it ranges between 64% and 87%. In the morning times, during the raining season, 80% is commonly observed. In times of high temperature with high temperature with high relative humidity, the atmosphere could be pretty uncomfortable. However pleasant atmosphere is generally experienced at the raining season when the relative humidity generally falls. The mean maximal at 10:00am is 77% from December to May and 88% in August. The annual average maximum is 83%. The extreme mean at 4:00pm is 57.5% in January and 81.9% in July and August. The annual mean maximum humidity is 71.88%. Efficient wall opening for breeze and cross ventilation is recommended. Thermal resistant materials are preferred for the exterior surfaces to withstand disintegration drying.

4.4 SUNSHINE

The effect of sunshine is in influenced by the humid-south west trade wind with rate of cloud coverage. Available statistics shows that an extreme mean of 2.5% mid-day is registered in the months of January and October.
In the months of July recorded, while 54.10% is registered in the peak period between January and October.

4.5 WIND

Two major air masses dominate the climate of Akure. The southwest trade wind (Tropical marine air mass), which is formed over the Atlantic Ocean to the south of the country and is therefore warm and moves inland generally in the South-West to North-East direction and is prevalent for about 50% of the local time. The North-East trade wind (continental air mass) is developed over the Sahara desert and is therefore, warm and dry and blows in the North-East to the South-West direction and is prevalent for about 25% of the time. The remaining 25% is combination of various winds blowing from different directions such as North, South, West, Northwest and Southeast. The wind velocity is 1-10 knot with occasional velocity of 11-21km. But at very rare occasions, wind velocity goes as high as between 22-23 knots. The oscillation between the two major air masses produces the highly seasonal characteristic of weather condition in the state while the south-west wind is humid.

5.0 CHARACTERICAL HOUSING PROBLEM IN AKURE AS A WARM WET CLIMATE REGION

1. The atmosphere has high vapour pressure hence all uncovered housing metallic parts are liable to rust and wooden part to rot.

2. The trade wind which usually comes from the southwest trade wind basically brings cold breeze blowing on the surface. Hence the prevailing wind and storm must be studied before building is oriented. Also ventilation of internal space is of major importance.
3. Convention Rainfall usually has its peak in the month of July and September at an average annual precipitation of 2699mm could affect the roofing if not well designed to have the proper slope.

4. High temperature which ranges from $27^\circ C$ usually have their hottest month in June with temperature up to $27^\circ C$ could affect the thermal comfort of building occupants. Hence there is need for prevention of internal temperature rise during the day in order to enhance minimization of temperature during the evening and night.

5. Buildings are also prone to biological attack or fungal growth

6.0 PRINCIPLES OF BUILDING DESIGN

The requirements to be satisfied by the design and construction of a building in a warm-wet climate are these

(i) Provision of continuous and efficient ventilation

(2) Protection from the sun, rain and insets

(3) Prevention of internal temperature elevation during the day and minimization during evening and night.

(4) To adequately cross-ventilate the occupied areas of a house either all the rooms should be provided with doors windows etc on both windward or leeward sides of building, or those rooms on the wind wards or leeward sides only should be given access through large openings to rooms on the opposite pressure region side.

(5) Open planning and wide free spaces between buildings helps to achieve good ventilation.
(6) Raising the building on stilt is also advantageous in a warm wet climate as it helps to enable bather ventilation, cooling of the floor and bather protection from floods & termites.

(7) High buildings rising above the level of nearby trees and lower building, which can be spaced at wider distances with the same total density provides improved ventilation conditions for their occupants, and may also improve the ventilation condition in the smaller building around them and thus are preferable warm -wet climates.

(8) Orientation in a warm-wet climate should be aimed at providing the best possible ventilation and therefore the direction of the prevailing winds should be carefully studied.

(9) The direction of the storms should be also take into consideration in orders minimize their impact.

(10) Large opening, doors and windows are of advantage in a warm -wet climate provided that they are effectively protected from penetration of solar radiation, driving rain and intrusion of insects. The advantage of large openings is not only due to the better ventilation conditions that they provide, but also because they enable the achievement of lower temperature during the night.

(11) The most effective height of the windows from the human comfort aspect is about 0.5 -1.5 meters above the floor. In bedrooms, it is particularly important to bring the window sill as close as possible to the height of the beds, thus ensuring adequate air floor around the occupants' sleeping area at those times when the outdoor winds speed is very low.
Large sliding walls, when kept open most of the time but closed during storms, may provide good control of conflicting requirements for maximum ventilation alternating the wind and rain protection during storms. Adjustable or retractable louvers and other shading devices may be equally satisfactory if they are able to withstand the force of the wind.

Fly-screens are essential in warm-wet regions and should be at some distance from the wall so that they would not block the windows.

The large area of openings required in a warm-wet climate necessitates adequate shading; otherwise indoor temperatures may rise appreciably above the outdoor level. Shade is required not only against direct solar radiation, but also against diffused radiation from the sky, which in tropical regions may be combined with rain.

In many instances, solar protection may be combined with rain protection by extending the roof beyond the floor area. This is more necessary in warm-wet regions as tropical rains are very heavy and wind-borne, where the almost horizontal wind-driven rain penetrates through joints and cracks the walls & fenestration.

Another problem connected with tropical rains concerns the necessity for providing means of disposal of the run-off water and prevention of soil erosion around the building. Planning according to the contour lines helps greatly in reducing the erosion hazard.
REFERENCE.


Ondo State government Agro-Climatological and Ecological Monitoring Unit (PMU), Akure


www.google .com

www.ask.com
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Fig 2.0 CLIMATIC DATA SHEET FOR AKURE FOR THE YEAR 2001