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Awareness of Climatic Variation through Indigenous Knowledge in Akungba-Akoko, Ondo State, Nigeria

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Abstract

This study focused on examining climatic variation to identify its impact on sustainable environmental development in Akungba-Akoko, Ondo State, Nigeria. The specific objectives are to; identify peoples' perception on climatic variability, examine environmental impact of climatic variability, and formulate adaptation strategies to variability status of climate in the study area. Primary data for the study were collected through questionnaire and direct observation with a reconnaissance visit to the sample groups, while secondary data were sourced from the existing books, journals, maps and internet. Random Sampling technique was adopted to draw a population of 120 (10%) from the population of 1,212 in the study area. The population comprised of both academic and non-academic staff member. One hundred and twenty copies of questionnaire were administered and used in the course of the study. The data obtained were analysed using simple percentages and descriptive statistics. Tables and figures were used for presentations and discussions of results. Generally, more than 60% respondents revealed the fact that climatic variability is a common phenomenon in the study area. Based on this, the study had revealed declined crop yield, increased mosquitoes breeding, spread of disease, water shortage, and hill exposure as major impact of climate variation in the study area. The study therefore recommended that the government should intensify the use of public sensitization tool on climatic variation as a prerequisite to sustainable environmental development. This will, in a long way improve adaptation strategies especially through developing and promoting environmental protection policies.

Keywords: Climate change; Sustainability; Environment; Education

Introduction

It is worthy to note that man is inseparable from his environment. This is evident in the influence of environment on human existence, which is reciprocating, in most cases. The relationship between man and his environment is connected with increasing population which necessitates desire for available resources. For instance, increase in urban cities in many part of the world where more houses and industries are demanded calls for consistent interference on the environment. This invariably causes a lot of damages to the earth atmosphere.

The need for man to explore the environment where he lives and earn a more conducive living is an age long challenge. As a result, various means through which resources could be harnessed were devised. This is what brought about new ideas which look faster and scientific but its long term impact endangers the earth atmosphere. The fact about this is that little action as a drop of water has never been considered a mighty ocean which could sweep off a whole city.

Today, the ever increasing in the warming of the globe is the major focus of many researchers. All the events may not be specifically attached to global warming alone, but various researches prove that the activities of man are mostly responsible for the increase of the earth's temperature.

Variation in climate causes global warning diversity that may not be noticed equally on human system because of uneven distribution of climate change impact. Some regions and sectors are likely to experience benefits while others will experience costs. For instance, Intergovernmental Panel on Climate Change [1] observed that low-latitude and less developed areas, such as Nigeria where the study area fall, are probably at the greatest risk from climate change due to diversity of its climatic system.

This study serves as an impetus toward understanding climatic variability and how this diversity in climatic experience could impact human environment. The study specifically identifies peoples' perception on climate change in the study area, the environmental impact of climatic variability, and adaptation strategies to climatic variability within the study area. This essentially has the potential to identify human indigenous knowledge on changing climate and its effects towards sustainable environmental development. Understanding this will ensure conscious effort to ameliorate future consequence of climatic impact on sustainable development.

Study Area

Extent and location

Akungba-Akoko is found in Akoko South-West Local Government Area of Ondo State, Nigeria. It is one of the education-institutional towns at a distance of 56km away from Akure the state capital of Ondo State. This study location is situated between latitudes 7°28' and 7°0' N of the equator and longitudes 5°44' and 5°0' E of Greenwich meridian. It is bounded by Ikare-Akoko to the North, Etioro-Akoko to the South, while to the East and West by Supare-Akoko and Iwaro- Akoko respectively (Figure 1).

The climate of the study area is equatorial with two peaks of rainfall. The first peak comes up between April and July while the second peak falls between late August and October. These two peaks are marked by heavy rainfall with the mean annual rainfall of 1500-2000 mm. The

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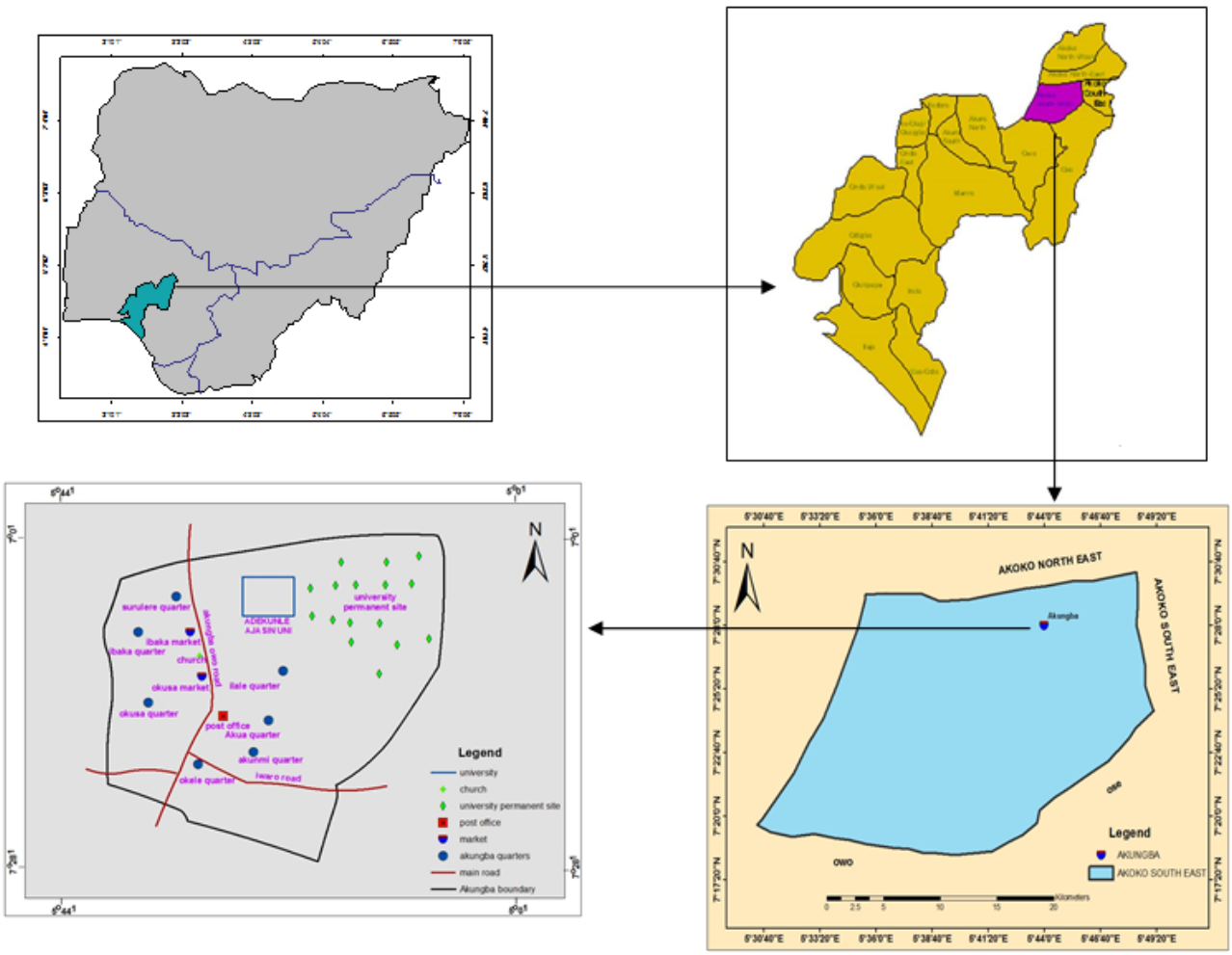

Source:Lands and Housing and Author's modification (2013)

Figure 1: Study Area.

relative humidity of 75-95% results into severe cold condition in most cases. As observed by Duze and Ozo [2], the mean annual temperature is 23-26°C.

The area under study is situated in the deciduous rainforest in southwestern part of Nigeria. It is dominated with ever-green vegetation. This vegetation type reflects the rainforest and guinea savannah vegetation which is characterized by different plants and trees with height between 5m and even more.

The study area is mainly for agriculture, which is restricted to small scale farm holdings with production of food crops as, maize, yams, cassava, and vegetables. Also, people in the study area are preoccupied with industrial activities that include; traditional craft, trading, soap making, red-oil production, mechanic, educational, health and religion purposes.

Conceptual Issues

Climate variability in human environment

An Adage in "Yoruba" says "*oko ti a ba so ba ope ni ope n so bani*". This means, the stone thrown at palm tree, it sends back to the sender. This is not surprising that little action of a man on earth atmosphere has a reciprocating effect. The reaction of global warming is severe than the action posed by man. The fact is that, the effects of global warming are of utmost concern both for the environment and human life. This has to be intensified as it requires continuous effort in order to address its future consequences.

Easterling et al. [3] observed that climate change is expected to have a mixed effect on agriculture, with some region benefiting from moderate temperature increases and others being negatively affected. That low-latitude area is at most risk of suffering decreased crop yields for temperature increases of up to 1-3°C (relative to the period 1980-99). Issues on this was recently described through an article in the "new scientific" that rice crops might be strongly affected by rising temperatures. Because the benefits of atmospheric carbon dioxide concentrations were said to be outweighed by the negative impacts of climate change.

Adaptation to climate variability

As put forward by IPCC [4], adaptations are adjustment to or intervention, which take place in order to manage the losses or take

advantage of opportunities presented by a changing climate. This further encapsulates the definition of adaptive capacity as the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with consequences. In essence, the goal of adaptation measures should base on increasing the capacity of a system to survive external shocks or changes.

According to Santiago [5], adaptation involves adjustment to enhance the viability of social and economic activities and to reduce their vulnerability to climate, including its current variability and extreme events as well as long-term climate change. Alao explained that adaptation to climate is the process through which people reduce the adverse effects of climate on their health and wellbeing and take advantage of opportunities that their climate environment provides.

Literature Review

Awareness of climate change

Dunlap [6] observed that awareness and concern of climate change varies within and between developed and developing world. Bergeson and parman [7] found that 23 countries have great variation in perception of climate change. The observation indicates over 70% in Germany, Portugal and Brazil, where Nigeria is the least with 26% of their respondents regarding climate change as a serious social problem. This indication shows that individual awareness of human contribution to climate change is limited. Based on this, IPCC [1] submitted that just over one-third population of the developing countries was aware of climate.

National Research Council [8], identified variations in the level of awareness of Climate Change. For example, adults in Asia, with the exception of those in the developed countries are the least likely to perceive climate change as a threat. This awareness campaign about the effect of climate change plays an essential part in fighting global warning.

In Nigeria, many authors have talked on public awareness of climate change. For instance, Nest [9] observed that between 75 and 250 million people in Africa will be exposed to increased water stress due to climate change in 2020.

Materials and Methods

Data for this study were collected through primary and secondary sources of data. Questionnaire administration and direct observation with a reconnaissance visit to the sample groups forms the primary data. Secondary data were sourced from the existing books, journals, maps and internet. The sample area is Adekunle Ajasin University. Random Sampling technique was further adopted to draw a population of 120, that is, 10 percent of 1,212 AAUA [10] representing total population of both academic and non-academic. In all, one hundred and twenty copies of questionnaire were administered and used in the course of the study. The data obtained were analysed using simple percentages and descriptive statistics. Tables and figures were used for presentations of results.

Results and Findings

Description of respondents

Description of the respondents in Table 1 shows quality of responses recorded in this study. The study shows that largest proportion above 40% of the respondents fall between ages 31- 40 years. The age group identified in the study indicates that information was derived from experienced and working class people in the study area. However, it was observed that highest percentage of the respondents were male. This could mean that male respondents are most accessible given 56 percent response in the study. Also, 75 percent response was received from married, while the remaining percentages were either for unmarried or divorced. This shows that higher categories of people in the study area are responsible and able to give their responses based on their discretions. The highest percentage above 83% of the tertiary education recorded among the respondents in the study area revealed the quality of educational background of the people. This, to large extent, determined the worth of the source of the information used in the study.

Peoples' perception on climatic variation in Akungba

The study established that awareness of climatic variation is a precondition to ameliorate its posing impact on an environment. As indicated in Table 2, largest percentage response was given to show how people observed variation in the climatic system of this area over the years. Above 67 percent response given in the study confirmed that the climatic condition in this area is not evenly distributed. On the other hand, 33.3% response indicated constant climatic situation in the study area. It was as well observed that this climatic situation has not reflected noticeable environmental impact, especially, during the period of this study. The diverse opinions established by the individual respondents were as a result of different perception influenced by literacy level, numbers of year spent in a location and level of interaction among colleagues. The study generally established, based on peoples'

Age Distribution			Gender Description			Marital Status			Educational Status		
Years	Freq	(%)	Sex	Freq	(%)	Status	Freq	(%)	Status	Freq	%
20-30	15	12.5	Male	70	56.67	Single	20	16.7	Tertiary	100	83.3
31-40	50	41.66	Female	50	43.33	Married	90	75	Secondary	10	8.3
41-50	40	33.33	Total	120	100	Divorce	10	8.3	Primary	10	8.3
<50	15	12.5				Total	120	100	Total	120	100
Total	120	100									

Source: Author's Survey, 2013

Table 1: Characteristics of the Respondents.

Response	Frequency	Percentage
Yes	80	66.7
No	40	33.3
Total	120	100

Source: Author's Fieldwork (2012)

Table 2: Awareness of climate change within the university.

Climate	Frequency	Percentage (%)
Cold	5	4.2
Warm	32	26.7
Hot	80	66.7
Total	120	100

Source: Author's Fieldwork (2012)

Table 3: Description of the Climate Condition within University.

Variables	Hot		Warm		Cold	
Crop Yield	15	12.5	20	16.7	30	25
Mosquitoes Breeding	30	25	23	19.2	25	20.8
Diseases	30	25	30	25	20	16.7
Water	10	8.3	24	20	35	29.2
Hill Exposure	35	29.2	23	19.2	10	8.3
Total	120	100	120	100	120	100

Source: Author's Survey, 2013

Table 4: Observed Environmental Impact of Climate Change in Akungba-Akoko.

Agent of Strategy	Frequency	Percentage (%)
Government	12	10
Natural	28	23.3
Personal	80	66.7
Total	120	100

Source: Author's fieldwork (2013)

Table 5: Adaptation Strategies to Climate Change Impact in Akungba-Akoko.

knowledge of climatic variability in the study area, that awareness of climatic condition in a given environment is pre-requisite to sustainable environmental management.

The description in Table 3 revealed how climate in the study area was perceived in the study area. The study basically reflects peoples' consciousness of the present climatic condition within the environment based on perceived knowledge of hot, cool, warm and cold effects. It was recorded that larger proportion of 66.7 percent response affirmed that the present climatic situation is hot, 26.7% and 2.5% perceived it to be warm and cool respectfully, while 4.2% of the respondents were of the opinion that the present climatic condition is cold. What this deduced is that people viewed the condition of this environment differently. These views in diversity, to some extent, have determined different ways by which people in this area relate to the environment because it is often time difficult to ascertain the status of climatic condition to determine environmental configuration under such unstable condition.

Environmental impact of climatic variability in Akungba-Akoko

The study observed some of the effects of climatic variability in Table 4. The effects emanated from increasing and decreasing nature of some major environmental indices such as decline crop yield, increased mosquito breeding, spread of disease, water shortage and desertification and hill exposure as influenced by the prevailing climatic situation in the study area. For instance, crop yield is one of the important variables in a given society being the major source of food and income for farmers. Climatic variability has negative and positive impact on crop growth and development. In this study, 12.5 percent response shows that there is low yield of crops during hot condition in the study area, while 25 percent observation supports improved crop growth in cold season and 16.7 percent crop grows was recorded under warm environment. Low crop yield observed in this study is connected to a situation where 8.3 percent response was recorded for low water availability in hot condition. The described situation becomes noticeable when water holding capacity in soil becomes so low and enough water to support crop growth is lacking. However, cold climate supports water availability with 29.2 percent and induces crop production in the study area. This shows that crop yield and moisture availability are mutually connected and that water should be available in good quantity to support food production from time to time. In support of this finding, Jotoafrika [11] observed that climatic variability has the potential to impose severe pressures on water availability and accessibility. Adding that 30 million Africans (more than 35 percent of the population) are currently under shortage of safe drinking water.

It is equally observed in this study where mosquito breeding multiplies during hot condition. For example, Table 4 shows 25 percent, 19.2 percent and 20.8 percent increase in mosquito breeding which are connected to hot, warm and cold weather respectfully. The different level of observed mosquito breeding in these categories is obvious within human environment where sanitation is less prioritized; especially, when stagnant waters in gutters are not adequately drained. The study established that hot temperature encourages fast hatch of mosquito egg and increases malaria outbreak. As indicated in Table 4, for instance, diseases are common to hot, warm and cold weather condition but its outbreak is prominent during hot and warm condition with 25 percent response for each. This shows that climatic variability on humans is prevalent when temperature is hot in the study area. The observation was noted by McMichael et al. [12], that higher air temperature increases the concentration of ozone at ground level and lower atmosphere and ozone becomes a harmful pollutant. The harmful pollutant damages lung tissues and causes problems for people with asthma and other lung diseases.

Hill exposure is another effect of climatic variability which was identified with 25 percent response of the study. It was revealed that unusual exposure of hill bodies have put some notable animals into extinction. This situation displaces some animals to find an abode in a more secured environment. To this, Schneider et al. [13] submitted that climate change results in reduced diversity of ecosystems and the extinction of many species. In this way, climatic variability poses risks on the habitats in the study area. The study identified the exposure of rocks due to prolonged hot period.

Apart from the hill exposure possess on animal habitats, United Nations [14] observed that changes in environmental configuration of this kind could affect the availability of freshwater for natural systems and human uses. Also, Science Direct [15] reported that changes in global climate pose a number of potential risks to mountain habitats and that researchers expect that over time, climate change will affect mountain and lowland ecosystems, the frequency and intensity of forest fires, the diversity of wildlife, and the distribution of water.

Adaptation strategies to climate variability

Adaptation strategy is crucial to climatic impact in order to suit the changing condition for different purposes. In Akungba-Akoko of Ondo state, effort at ensuring quality adaptation to climatic variability is reflected in Table 5 where governmental, natural and personal strategies are considered. Governmental effort at adapting to climatic variability is very low with 10 percent response when compared to higher percentage of 66.7 recorded for personal adaptation strategy which is also higher than natural strategy (Table 5). The observation admits that government has not been really involved in ensuring the safety of life's and properties on the subject of climatic impact. However, personal adaptation strategy may not be sufficient in terms of management costs.

Conclusions and Recommendation

The study revealed climatic variation as one of the major environmental phenomenon with obvious challenge in the study area. The effects were noticed on the examined environmental parameters that include crop yield, mosquitoes breeding, spread of disease, water availability and hill exposure. The study generally established, based on peoples' indigenous knowledge of climatic variability in the study area, that awareness of climatic condition in a given environment is pre-requisite to sustainable environmental management. It is however adequate to state that several efforts are being made to reduce impact of climatic variability. This study therefore suggests that conscious effort to understand climatic variability should strongly be supported by the government than personal and natural adaptation measure. This will enable proper and sustainable environmental management of climatic impact in an avoidable cost within the study area and other similar environment.

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