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Review Article

Analysis of Climate Change Perception and Adaptation Strategy among Rural and Urban Dwellers in Lagos State Implication of Climate Change On Rural Productivity

Dr. AJIBOYE E.O.[1*] and ADEJOBI O. SAMSON[1]

[1]Department of Sociology and Geograhy and Planning Lagos State University, Ojo Nigeria

*Corresponding Author
ADEJOBI O. SAMSON

Abstract: This paper seeks to examine the implication of climate change on both rural and urban environment of lagos ,Climate change has exerted a great influence on mans activities in varying degrees, virtually all aspects of mans activities are climate dependants, and it has impacted the pattern of physical development of rural and urban morphology, The objective of this paper is to appraised climate change perception and adaptation strategy among rural and urban dwellers in Lagos State, Eti-Osa and Badagry Local Government Areas as a case study. Data were generated through secondary and primary data; primary data was collected through designed and administration of questionnaires Hypothesis were generated and tested; the first hypothesis states that there is significance and there is no significance difference between perception and adaptation strategy among rural and urban dwellers in the study areas. In testing the hypothesis using chi-square, the chi-square (D cal) = 3.380; tabulated (Dtab)= 3.841; degree of freedom= 1 and level of significance 20.05. The decision rule is that null hypothesis is accepted and the alternate hypothesis is rejected, on testing the second hypothesis which states that there is no significance and there is significance difference between primary activities and its associated impacts on climate change in rural and urban dwellers in the study area. The correlation coefficient value 0.069 for urban communities while 0.30 for rural community; which indicate that there is slight positive impact on climate change in both areas. Findings revealed that urban dwellers are aware of climate change which serves as a potential for its vulnerability and adaptation strategy unlike the rural dwellers counterparts. Recommendations made on policies and strategy that should be put in place to ensure sustainable development, through Institutional adaptation strategy, where the local governments and city au thorities are the locus of adaptation planning, funding and decision making processes.

Keywords: Climate change, adaptation strategy, Vulnerability, Rural-urban, livelihood.

INTRODUCTION

Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effect, which moderates harm or exploits beneficial opportunities (IPCC, 2001). Fussel (2007) argues that emphasis should focus on adaptation because human activities havealreadyaffected climate, climate change continues given past trends, and the effect of emission reductions will take several dacades before showing result, anadaptation can be undertaken at the local or national level as it depends less on the actions of both the rural and urban dwellers. Therefore, to increase management efficiency of natural resources, the perceptions of the people directly involved need to be taken along with those of experts (Kamau, 2010). Again, failure to address the issue of climate change may lead to a situation where Lagos and other Nigeria states incur agricultural losses of up to 4% of GDP due to climate change (Mendelsohn et al. 2005).

Climate change is an environmental, social and economic challenge on a global scale (Scholze *et al.*, 2006; Mendelsohn *et al.*, 2006). Climate change can be exacerbated by human induced actions such as: the widespread use of land, the broad scale deforestation, the major technological and socioeconomic shifts with reduced reliance on organic fuel, and the accelerated uptake of fossil fuels (Millennium Ecosystem Assessment, 2005). The most devastating adverse impacts of climate change in Lagos and other subtropical states includes frequent drought, increased

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environmental damage, increased infestation of crop by pests and diseases, depletion of household assets, increased rural urban migration, increased biodiversity loss, depletion of wildlife and other natural resource base, changes in the vegetation type, decline in forest resources, decline in soil conditions (soil moisture and nutrients), increased health risks and the spread of infectious diseases, changing livelihood systems, etc (Reilly, 1999; Abaje and Giwa, 2007).

Rural Peoples who are vital and active parts of many ecosystems may help to enhance the resilience of these ecosystems. Their livelihoods depend on natural resources that are directly affected by climate change, and they often inhabit economically and politically marginal areas in diverse, but fragile ecosystems. In addition, they interpret and react to climate change impacts in creative ways, drawing on traditional knowledge as well as new technologies from urban areas to find solutions, which may help society at large to cope with the impending changes (Jan and Anja, 2007). In Lagos, just as in many developing countries in the Subtropical region the agricultural sector is more vulnerable to climate change landless farmers, livestock keepers, people in poor health, those who are under-nourished, people with low economic power, women and children including women headed households, those with low level of education, and those with low technological know-how are more exposed to the risk of climate change (Barber, 2003). Doss and Morris (2001) opine that the perspectives of the rural people, the way they think and behave in relation to climate change, as well as their values and aspirations have a significant role to play in addressing climate change. Despite this, rural and other traditional peoples are only rarely considered in academic, policy and public discourses on climate change, despite the fact that they are greatly impacted by impending changes of climate (Berkes and Jolly, 2001).

Cities contribute much to Green house gas emissions (Castan Broto and Bulkeley, 2013), several researchers point out that major cities are one of the main sources of climate change (Lankao, 2009). The lives and livelihoods of hundreds of millions of people will be affected by what is done (or not done) in urban centers with regard to climate change over the next five to ten years (Robert I. McDonald, 2011). The need for city and municipal governments and civil society groups to act to reduce greenhouse gas emissions is not well established with many city governments in the developing world. On the other hand urban centers (and nations) that face the highest risks from the negative effects of climate change are those with small contributions to the greenhouse gases in the atmosphere; most also have serious constraints on their capacity to adapt to these effects (David Satterthwaite, 2009).Cities in developing countries are vulnerable for extreme urban heat waves, floods and storms (Craig D Idso, 2001, Emanuel, 2005). Communicable diseases caused by many waterborne and vector borne infectious diseases are strongly influenced by climate conditions, and several are common within these cities.

With increasing urbanization, understanding the impacts of climate change on the urban environment becomes more important. The manner at which slums grow and the handling of several household activities in developing countries does not only depict weak governance but also a people that lack proper understanding of implications of their activities on the environment (Olayinka C. Oloke, 2013). To prevent adverse effects of climate change in cities, public knowledge about perception of the nature of the impact, adaptation should be considered as some of the strategies in the governing process. There is a clear need to develop and evaluate effective public health interventions for extreme weather events, such as heat health-warning systems to reduce the impact of heat waves (Corvalan, 2007). Many studies have been focusing on climate change policies and action at the national level, but few have studied policies and action at the city level, especially cities in emerging economies (Karabag, 2011). There is a paucity of studies done on the capacity of Lagos-city municipalities that examine their perception and adaptation practices.

Rural and Urban communities have an important stake in the climate change perception and adaptation. First, climate change effects already have direct impacts on our rural and urban populations and economies. Second, climate change legislation and policies currently under consideration will have serious repercussions for livelihoods and prosperity

There are many problems facing perception and adaptation strategy of climate change. Notable among them are wrong perception among rural and urban dwellers as result of Large uneducated majority of rural and urban dwellers perceived climate change to spiritual forces and traditional beliefs with no scientific understanding that they are the one responsible for it; while the uneducated on the other hand perceived as being scientific through natural forces without giving account that it s through their obnoxious activities; another problem is poor adaptation measures to improve people's ability to cope with harmful climate change impacts or take advantage of beneficial ones (ibid). Adaptation strategies are often identified as individual or community choices such as: a farmer switching to growing a different crop variety better suited to warmer or drier conditions; a company relocating key business centers away from coastal areas vulnerable to sea-level rise and hurricanes; poor state of Climate change vulnerability- vulnerability as the extent to which a natural or social system is susceptible to sustaining damage from climate change. Vulnerability is a function of the sensitivity of a system to changes in climate and the system's ability to adapt to these

changes and inadequate environmental education and enlightment coupled with dearth on the level of education and enlightment by relevant organizations of government agencies on the need to educate populace, change their traditional perception and educate them on the mechanism on adaptation.

Hypothesis One

Ho: There is no significance difference in perception and adaptation strategy among rural and urban dwellers in the study areas.

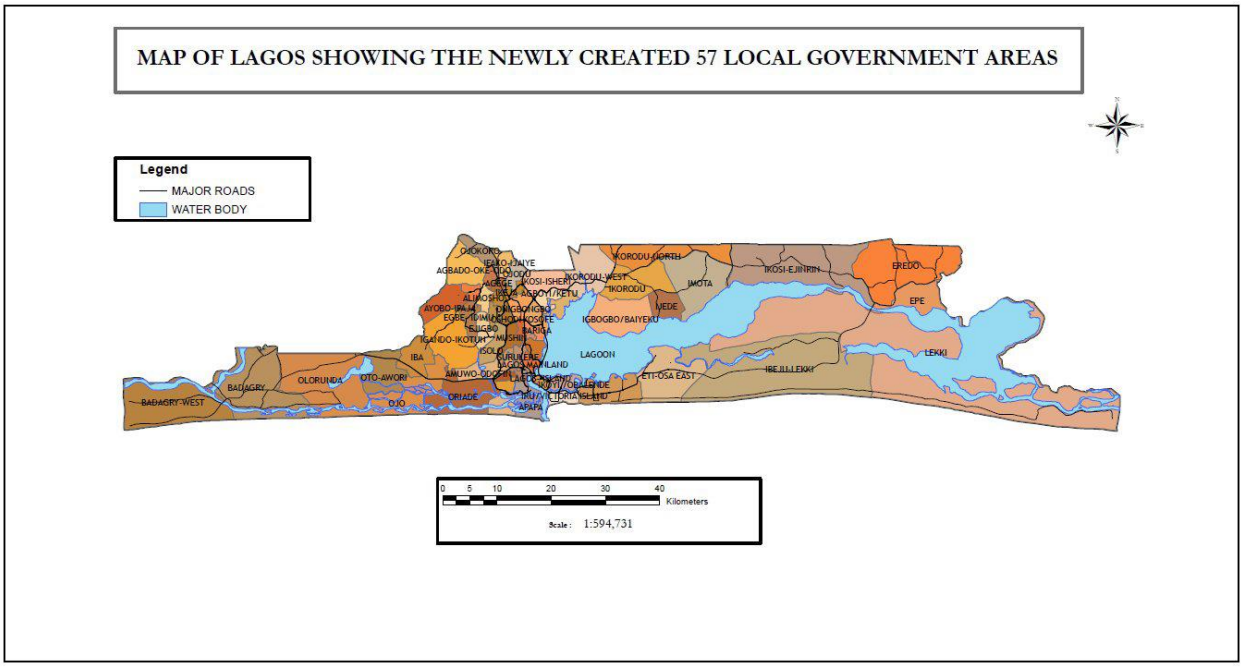
Hi: There is significance difference in perception and adaptation strategy among rural and urban dwellers in the study areas.

STUDY AREA

GEOGRAPHICAL BACKGROUND

Lagos State is located in southwestern Nigeria, bordered in the north and east by Ogun State, in the west by the Republic of Benin and in the south by the Atlantic Ocean. The state has an area of approximately 3,345 square kilometres, which is about 0.4% of the total land area of Nigeria.

Lagos State has a coastline of approximately 180 km. Underlain by sedimentary rocks; the State is on a coastal plain characterized by predominantly flat terrain, with an average elevation of less than 1.5m above sea level. The land slopes gently from the interior to the sea. Water bodies and wetlands cover over 40% of the total land area of the state and an additional 12% is subject to seasonal flooding. The coastal areas consist of lagoons, creeks and swamps, separated from the open sea by a strip of sandy land that varies in width from 2 to 16 kilometres. The entrance into Lagos Lagoon is the only major outlet through which the lagoons and creeks drain into the sea.



Source: Lagos ministry of science and Technology, Alausa, Ikeja.2015.

The climate of Lagos State is the wet equatorial type influenced by its nearness to the equator and the Gulf of Guinea. It is affected by atmospheric interactions in which the Inter-Tropical Convergence Zone (ITCZ) is a controlling factor. The northward movement of the ITCZ is associated with the coming onshore of a warm, humid maritime tropical air mass, while its retreat is associated with the hot and dry continental air mass from the interior.

These two air masses give Lagos two contrasting seasons; a rainy season, which usually lasts from April to October; and a dry season, which lasts from November to March.

The rainy season has two peak rainfall periods: May to July and September to October, with rainfall being heaviest during the first peak period. Floods usually occur during these periods of peak rainfall. These floods are aggravated by the poor surface drainage systems of the coastal lowlands. The mean annual rainfall varies from one location to another with Ebute- Metta, Yaba, Bariga on the mainland areas

recording 1750mm, Badagry in the extreme west of the State recording 1636.1mm, Epe in the extreme north-east recording 1676.5mm and Agege in the north-west recording 1567.2mm.

Lagos State has consistently high temperatures, with the mean monthly maximum temperature of about 30 degrees Celsius (Iwugo *et al.*, 2003). The state experiences the highest temperatures in November to December and February to March, while the lowest temperatures occur in June to July, which coincides with the middle of the first period of peak rainfall.

BADAGRY LOCAL GOVERNMENT AREA

The foundational history of Badagry, which is situated in the Lagos State of Nigeria, dates back to approximately 1425 A.D. It is predominantly inhabited by the Egun people, who are both the politically dominant and numerically preponderant ethnic group in the area. As a community that actively served as a slave port in Nigeria during the trans-Atlantic slave trade period, Badagry has demonstrated the continued transfer of memories of the slave trade through oral traditions. In particular, relics of the enslavement system have been preserved to the present from the time of the abolition of the slave trade in the area and are currently the subject of increasing focus among local community members.

Another interesting feature in Badagry that relates to the cannon is its link, in the present day oral history of the people, with the etymology of Agbalata, the name by which the popular Badagry traditional market is called. This is a notable development in the historiography of Badagry as the topographical location of the cannon confirms remarkably close proximity to the Agbalata market. It housed the Administrative staff college of Nigeria **(ASCON)**, Suntan beaches, whimspring palm for recreational activities.

ETI-OSA LOCAL GOVERNMENT AREA

Eti-Osa Local Government Area is located between latitude 60 15' and 160 17' and longitude 303' east and 30 35' east. It is bounded in the south by Atlantic Ocean, in the east by Ojo local government, north by Lagos lagoon and part of Mainland and Island local government and in the west by Ibeju- Lekki local government (Odumosu *et al.*, 1999). The study area occupies an area of about 192.3km2.The population is about 287,785 with density of 1,496 person per km2 (NPC, 2006). The study area houses the Lagos lagoon and the beaches, which stretch to the Atlantic Ocean. It comprises of nine wards namely; Victoria Island, Ward H1 and H2, Ikoyi West, Ward L1, Ikoyi East, Ward L2, Obalende, Ward M, Eti-Osa N. E, Ward K3, Eti-Osa, S. E, Ward K2, Eti – Osa N.W, Ward K1, and Eti – Osa S.W, Ward.

The climate is tropical type with an average rainfall of 2500mm and temperature of 300C. The vegetation pattern reflects its coastal location with mangrove swamp trees being the dominant type. The topography is between 3-15m above sea level. The geology consists of quaternary alluvial deposits such as red-yellow, red-brown, grey and sandy- clays, silt, sand, gravels, and other detrital material. The major source of water provision in the study area includes pipe-borne water and borehole.

CONCEPTUALIZATION OF CLIMATE CHENGE PERCEPTION

Climate change refers to the change in the state of climate that can be identified by changes in mean or variability of its properties and that persists for extended periods, typically decades or longer. Climate change occurs when the amount of energy stored by the "climate system" is varied. The variation occurs when the balance, for example between energy received from the sun and the radiated energy is disturbed. This disturbance can be caused by a number of natural mechanisms such as variation in the earth's orbit, variation in ocean circulation, and changes in earth's composition. In recent times the disturbance is caused by human activities. Climate change is used to describe a change in the climate, measured in terms of its statistical properties, e.g. the global mean surface temperature (Bade, 2007). Thus, climate change is taken to mean the average weather condition of a place.

Climate can change over a period of time ranging from months to thousands or millions of years. The classical time period is 30 years, as defined by the world meteorological organization (2007). The climate change referred to may be due to natural causes, e.g. changes in the sun's output, or due to human activities, for example, changing the composition of the atmosphere (Albritton, 2001). Any human-induced changes in climate will occur against the "background" of natural climatic variations.

According to the Intergovernmental Panel on climate change (IPCC, 2007), most of the observed increase in global average temperatures since the mid-20^{th} century is very likely due to the observed increase in human greenhouse gas concentrations. It is predicted that future climate changes will include further global warming (i.e., an upward trend in global mean temperature), sea level rise, and a probable increase in the frequency of some extreme weather events. Climate change will impact agriculture and food production around the world due to; the effects of elevated CO_2 in the atmosphere, higher temperature, altered precipitation and transpiration regimes, increased frequency of extreme events, and modified weed, pest and pathogen pressure (Easterling *et al.*, 2007). In general, low-latitude areas are at most risk of having decreased crop yields (Schneider, *et al.*, 2007).

Climate change is one of the most outstanding challenges facing the global community and as such has been given different definitions by different authors according to their perception and the way it affects them.

The intergovernmental panel on climate change (IPCC) defines climate change as statistically significant variations that persist for an extended period, typically decades or longer. It includes shifts in the frequency and magnitude of sporadic weather events as well as the slow continuous rise in global mean surface temperature. Ozor (2009) defined climate change as change in climate over time, whether due to natural variability or as a result of human activity and is widely recognized as the most serious environmental threat facing our planet today. This definition elicits the seriousness of the threat posed by climate change and the urgency of the need for countries to rise up to this urgent clarion call of combating the negative effects of climate change. The climate we know cannot be said to be static, but variations are very insignificant that it is only climatologists identify it. Over the years, the change becomes more pronounced and significant. This is as a result of earth's natural variations and man's activities which cause emissions of green house gases thereby increasing global warming. This global warming is what actually induces the change in climate. Scientists have noted that the average temperature of the earth has increased by 0.74 degrees Celsius over the past 100 years. And if nothing is done, there is going to be more rise in the earth's temperature to the extent that it will be difficult to cope with it. This statement buttresses more the seriousness of the threat pose by climate change to countries that depend mostly on climate-sensitive resources for sustenance of livelihood and overall development. Eboh (2004) stated that countries in sub-Saharan African, including Nigeria are likely to suffer the most because of their geographical location, low incomes, low institutional capacity as well as their greater reliance on climate-sensitive renewable natural resources sectors like agriculture. This is further supported by Watson (1997) which stated that African countries are particularly vulnerable to climate change because of their dependency on rain fed agriculture, high levels of poverty, low levels of human and physical capital, inequitable land distribution and poor infrastructure. Adaptation to climate risks in Lagos in particular and Nigeria in general is therefore a primary necessity. Government need to integrate climate change issues as well as adaptation strategies into the countries development plan as the climate change risks is not only a challenge to agriculture development (food security) but to the country's general development and livelihood sustenance of the entire citizenry.

CONCEPT OF URBAN HEAT ISLAND IN URBAN AREA OF STUDY

We are all familiar with the fact that cities are generally warmer than the surrounding, more rural areas. We see it referenced most nights in our television weather reports. It is especially significant on nights with clear skies and light winds which favor radiational cooling. This is most significant in the rural areas but in the city, the excess heat absorbed during the day and the local heat sources maintain higher night time readings. During the days or nights with strong winds and clouds the differences are minimized due to mixing and the advective cooling of the city by the winds.

Because of this relative warmth, a city may be referred to as an urban heat island.

The reason the city is warmer than the country comes down to a difference between the energy gains and losses of each region. There are a number of factors that contribute to the relative warmth of cities according to Ackerman:

During the day in rural areas, the solar energy absorbed near the ground evaporates water from the vegetation and soil. Thus, while there is a net solar energy gain, this is compensated to some degree by evaporative cooling. In cities, where there is less vegetation, the buildings, streets and sidewalks absorb the majority of solar energy input.

Because the city has less water, runoff is greater in the cities because the pavements are largely nonporous (except by the pot holes). Thus, evaporative cooling is less which contributes to the higher air temperatures.

Waste heat from city buildings, cars and trains is another factor contributing to the warm cities. Heat generated by these objects eventually makes its way into the atmosphere. This heat contribution can be as much as one-third of that received from solar energy.

The thermal properties of buildings add heat to the air by conduction. Tar, asphalt, brick and concrete are better conductors of heat than the vegetation of the rural area.

The canyon structure that tall buildings create enhances the warming. During the day, solar energy is trapped by multiple reflections off the buildings while the infrared heat losses are reduced by absorption.

The urban heat island effects can also be reduced by weather phenomona. The temperature difference between the city and surrounding areas is also a function of winds. Strong winds reduce the temperature contrast by mixing together the city and rural air.

The urban heat island may also increase cloudiness and precipitation in the city, as a thermal circulation sets up between the city and surrounding region.

Peterson (2003) considers a town with a population of less than 10,000 people to be rural and not to require any adjustment for urbanization. Oke (1973), and Torok et al (2001) show that even towns with populations of 1000 people have urban heating of about 2.2 C compared to the nearby rural countryside. Oke (1973) finds evidence that the UHI (in ^{o}C) increases according to the formula:

UHI=0.73log$_{10}$ (pop); where pop denotes population.

This means that a village with a population of 10 has a warm bias of 0.73 ^{0}C, a village with 100 has a warm bias of 1.46 ^{0}C, a town with a population of 1000 people has a warm bias of 2.2 ^{0}C, and a large city with a million people has a warm bias of 4.4 ^{0}C (Oke, 1973).

Several general and city-specific criteria have been developed that cities have at their disposal to adapt to climate change. The Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC FAR) in the 'Summary for Policymakers' (WGII 2007a) and the 'Technical Summary' (WGII 2007b) can be used as a starting-point for analyzing urban adaptation strategies. The IPCC FAR identifies behavioural options for adapting to increased rainfall and flooding for vulnerable sectors such as food, fibre and forestry. Measures for the protection of crops suggested by the IPCC include the creation of polders, to improve drainage, to adjust plantation and harvesting schedules and to float agricultural systems. In a social dimension, public utility infrastructure and services should be improved. The IPCC further underlines the importance to implement protection measures for water resources including flood forecasting and warning. It also highlights the need of regulation through planning legislation and zoning. Moreover, insurance should be promoted and vulnerable assets should be relocated. Relating to human health, structural and non-structural measures should be implemented such as early-warning systems, disaster preparedness planning, and effective post-event emergency relief. With a focus on industry, settlement and society flood protection infrastructure should be improved by flood-proof buildings and a change of land use in high-risk areas by managed realignment. Moreover, flood hazard mapping and flood warnings should be implemented and community institutions have to be empowered. With a special focus on cities, another approach dealing with adaptation strategies and measures was released in 2009 by the World Bank that introduced a primer on reducing vulnerabilities to disasters called 'Climate Resilient Cities' (The World Bank 2009). This primer intends to guide local governments in the East Asia Region 'to better understand the concepts and consequences of climate change, how climate change consequences contribute to urban vulnerabilities, and what is being done by city governments in East Asia and around the world to actively engage in learning, capacity building, and capital investment programs for building sustainable and resilient communities' (The World Bank 2009: XIV). As a key task for urban governance, the adaptation to climate change requires the consideration of disaster risks management and the climate change agenda as essential components of urban development in the management of urban areas, their growth and spatial planning. Next to the activities of the IPCC and the World Bank, cities behavioural options also comprise city-city cooperation in transnational initiatives such as the C40 initiative or the Clinton Climate Initiative (CCI). City-city interactions can facilitate best practice sharing can be used to gain an insight in putting in place adaptive strategy for curbing the menace of climate change.

MATERIALS AND METHOD

Methodology simply explained, is the various methods employed in choosing variables for an investigation, different ways that exist for data collection and sources of data. The research has to do with the comparative analysis of perception adaptation strategies of climate change among rural and urban dwellers in Lagos State. The Research is designed to cover. Badagry and Eti- Osa Local Government Areas of Lagos State.

However, the researcher went to collect data from different income groups residing in the local government areas under scrutiny, different classes of people basically the respondent of questionnaires and also to have first-hand information on the subject matter under study.

The method which will be employed in the generation of data will be through two sources of data. Primary and Secondary sources.

Ho: There is no significant relationship between the primary activities and its associated impact on climate change among rural and urban dwellers in the study areas.

Hi: There is a significant relationship between the primary activities and its associated impact on climate change among rural and urban dwellers in the study areas.
Ho: Null hypothesis
Hi: Alternative hypothesis

METHODOLOGY AND DISCUSSION

This study chose its population from various groups of people in Badagry and Eti-Osa Local Government Area of Lagos State. They range from those engaged in primary activities such as hunting, fishing, farming, lumbering and those involved in secondary activities such as construction, manufacturing e.t.c.

Correlation will be used for the second hypothesis to determine the significant relationship between the physical activity and its impact on the climatic changes in the urban and rural area.

The formula for calculating Chi-square (X2) is;
Chisquare (X^2) = Chi-square
O = Observed Frequency
E = Expected Frequency
∑ Jurisdictiona = Summation.

TEST OF HYPOTHESIS ONE USING CHI-SQUARE

H_0: There is no significant difference in perception and adaptation strategy among rural and urban dwellers in the study areas.

H_1: There is significant difference in perception and adaptation strategy among rural and urban dwellers in the study areas.

Perception and adaptation strategy among rural and urban dwellers in the study areas

	Observed N	Expected N	Residual
Yes	87	100.0	-13.0
No	113	100.0	13.0
Total	200		

Source: **Source:** Generated from analysis using SPSS

Test Statistics	
	urban respondents perception and adaptation strategy
Chi-Square	3.380[a]
Df	1
Asymp. Sig.	.066
Source: Generated from analysis using SPSS	

Calculated Chi-square (D_{cal})	=	3.380
Tabulated (D_{tab})	=	3.841
Degree of Freedom (df)	=	1
Level of Significance	=	0.05

Decision rule state that, if the tabulated chi-square is greater than the calculated chi-square ($D_{tab}>D_{cal}$) the null hypothesis is accepted and the alternative hypothesis is rejected. Thus, the null hypothesis which states that, there is no significant difference in perception and adaptation strategy among rural and urban dwellers in the study areas is accepted**.**

TEST OF HYPOTHESIS TWO USING CORRELATION

H_0: There is no significant relationship between the primary activities and its associated impact on climate change among rural and urban dwellers in the study areas.

H_1: There is significant relationship between the primary activities and its associated impact on climate change among rural and urban dwellers in the study areas.

Correlation

	Urban			Rural		
	Pearson correlation	Sig(2-tailed)	N	Pearson correlation	Sig(2-tailed)	N
Relationship between the primary activities and its associated impact on climate change among rural and urban dwellers in the study areas.	0.069	.497	100	.300	.002	100

Source: Field Survey, 2015

Table 4.34 shows a correlation coefficient value of .069 for urban communities while 0.30 for rural a community, which indicates that there is a slight positive relationship between the primary activities and its associated impact on climate change in both areas. This implies that a unit increment in the primary activity will increase the impact of climate change by 6.9% in the urban communities and by 30% in the rural communities. The coefficient of determination (COD) is computed to be 0.005 for rural and 0.09 for urban communities, which implies that .5% of the variation in urban communities climate change and 9% of the variation in rural communities climate can be predicted from the relationship between the primary activities and its associated impacts on the rural and urban communities. In conclusion since the correlation significant coefficient value is less than 0.05 for rural communities we will accept the null hypothesis while for the urban communities we reject the null hypothesis

SUMMARY

Rural Peoples who are vital and active parts of many ecosystems may help to enhance the resilience of these ecosystems. Their livelihoods depend on natural resources that are directly affected by climate change, and they often inhabit economically and politically marginal areas in diverse, but fragile ecosystems. In addition, they interpret and react to climate change impacts in creative ways, drawing on traditional knowledge as well as new technologies from urban areas to find solutions, which may help society at large to cope with the impending changes (Jan and Anja, 2007). In Lagos, just as in many developing countries in the Subtropical region the agricultural sector is more vulnerable to climate change landless farmers, livestock

keepers, people in poor health, those who are under-nourished, people with low economic power, women and children including women headed households, those with low level of education, and those with low technological know-how are more exposed to the risk of climate change

Urban centres contribute much to Green house gas emissions (Castan Broto and Bulkeley, 2013), several researchers point out that major cities are one of the main sources of climate change (Lankao, 2009). The lives and livelihoods of hundreds of millions of people will be affected by what is done (or not done) in urban centers with regard to climate change over the next five to ten years (Robert I. McDonald, 2011). The need for city and municipal governments and civil society groups to act to reduce greenhouse gas emissions is not well established with many city governments in the developing world. On the other hand urban centers (and nations) that face the highest risks from the negative effects of climate change are those with small contributions to the greenhouse gases in the atmosphere; most also have serious constraints on their capacity to adapt to these effects (David Satterthwaite, 2009) Cities in developing countries are vulnerable for extreme urban heat waves, floods and storms (Craig D Idso, 2001, Emanuel, 2005). Communicable diseases caused by many waterborne and vector borne infectious diseases are strongly influenced by climate conditions, and several are common within these cities.

Air pollution in cities are also exacerbated due to levels of many pollutants, such as ozone, that are affected by atmospheric conditions and tend to be higher on warmer days (Corvalan, 2007). Urbanizations with a growth of population have been identified as one of the most powerful and visible anthropogenic forces on earth (Dawson, 2009). It is a process and outcome of social changes, inflow and concentration of people and activities in cities (Ogundiji, 2009).

With increasing urbanization, understanding the impacts of climate change on the urban environment becomes more importantThe manner at which slums grow and the handling of several household activities in developing countries does not only depict weak governance but also a people that lack proper understanding of implications of their activities on the environment (Olayinka C. Oloke, 2013). To prevent adverse effects of climate change in cities, public knowledge about perception of the nature of the impact, adaptation should be considered as some of the strategies in the governing process. There is a clear need to develop and evaluate effective public health interventions for extreme weather events, such as heat health-warning systems to reduce the impact of heat waves (Corvalan, 2007). Many studies have been focusing on climate change policies and action at the national level, but few have studied policies and action at the city level, especially cities in emerging economies (Karabag, 2011). There is a paucity of studies done on the capacity of Lagos city municipalities that examine their perception and adaptation practices.

Rural and Urban communities have an important stake in the climate change perception and adaptation. First, climate change effects already have direct impacts on our rural and urban populations and economies. Second, climate change legislation and policies currently under consideration will have serious repercussions for livelihoods and prosperity.

HYPOTHESIS

There is no significance relationship difference between perception and adaptation strategy among rural and urban dwellers in the study areas.

There is significance relationship difference between perception and adaptation strategy among rural and urban dwellers in the study areas. On testing the hypothesis using SPSS; the calculated chi-square (Dcal)= 3.380; tabulated (Dtab)= 3.841; degree of freedom (df)= 1 and level of significance = 0.05.

Decision rule state that, if the tabulated chi-square is greater than the calculated chi-sqaure (Dtab>Dcal) the null hypothesis is accepted and the alternative hypothesis is rejected. Thus, the null hypothesis which states that there is no significance relationship difference between perception and adaptation strategy among rural and urban dwellers in the study areas is accepted.

Having tested the hypothesis using SPSS shows a correlation coefficient value.

o69 for urban communities while 0.30 for rural community, which indicates that there is slight positive relationship between the primary activities and its associated impact on climate change in both areas. This implies that a unit increment in the primary activity will increase the impact of climate change by 6.9% in the urban communities and the 30% in the rural communities. The coefficient of determination **(COD)** is computed to be 0.005 for rural and 0.09 for urban communities, which implies that .5% of the variation in urban communities climate change and 9% of the variation in rural communities climate change can be predicted from the relationship between the primary activities and its associated impact on the rural and urban communities. Since the correlation significant coefficient value is less than 0.05 for rural communities; we will accept the null hypothesis while for the urban communities in the study area, we will accept the null hypothesis.

CONCLUSION AND RECOMMENDATION

Adaptation refers to adjustments in practices, processes or structures in response to projected or actual changes in climate (Dixon, 2003), with the goal of

maintaining the capacity to deal with current and future changes. Adaptation to climate change also refers to activities that reduce the negative impacts of climate change and/or takes advantage of new opportunities that may be presented. It includes activities that are taken before impacts are observed (anticipatory) and after impacts have been felt (reactive).

The adaptation strategy of climate change in rural communities can be summarized as follows:

Livestock management: the common adaptation strategies employed by producers include; modifying the time of grazing; altering forage and animal species/breeds; altering the integration within mixed livestock and crop systems including the use of adapted forage crops; ensuring adequate water supplies and the using supplementary feeds and concentrate.

Crop production: a lot of cropping options are also available, these include: altering of the timing or location of cropping activities; improved water management through use of technologies to 'harvest' water, conserve soil moisture (for example, through crop residue retention) and use/transport water more effectively; altering inputs such as crop varieties and species to those with more appropriate thermal time and vernalization.

Diversifying livelihood strategy to include income from other farming and non farming activities; improving the effectiveness of pest , disease and weed management practices through wider use of integrated pest and pathogen management, development and the use of varieties and species resistant to pests and diseases and maintaining or improving quarantine capabilities and monitoring programs. Using climate forecasting tools to reduce production risk.

There should be environmental education and public enlightment for rural dwellers on the need to have knowledge of climate change with adaptation strategy.

These adaptation options/strategies must not be used in isolation, rural people especially farmers can combine two options where necessary in order to achieve the desired result. The fact that rural dwellers predominantly engaged in Agricultural practices which are still climate- sensitive and variations in climate may not be avoided in the nearest future; building up adaptation strategies to cope with the varying climate becomes the most realistic option for rural dwellers to employ in combating climate change risk.

ADAPTATION STRATEGY OF CLIMATE CHANGE IN URBAN COMMUNITIES

- A set of adaptation measures are required in Lagos state to respond to climate change impact of flooding and these range from 'hardening up' of urban infrastructure such as roads, culverts, bridges, drainage systems, water and sewerage networks to neighborhood-scale adaptation in the form of livelihood-based measures to enable communities build resilience climate system.
- The apparent need to involve a wide range of stakeholders in urban adaptation requires partnerships between communities, researchers and policy makers and other relevant stakeholders.
- Urban adaptation should be based on comprehensive and good assessment of the actual or possible effects of climate change impacts to urban systems and population in Lagos.
- Adaptation measures to reduce runoff include tapping water for urban utilization which can be done at various scales from household to citywide levels taking the water-basin approach**.**
- Adaptive infrastructure planning such as earth dams in catchment areas and productive greening are necessary to revitalize vegetative cover, enabling infiltration and increase in lag period of storm water flow.

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