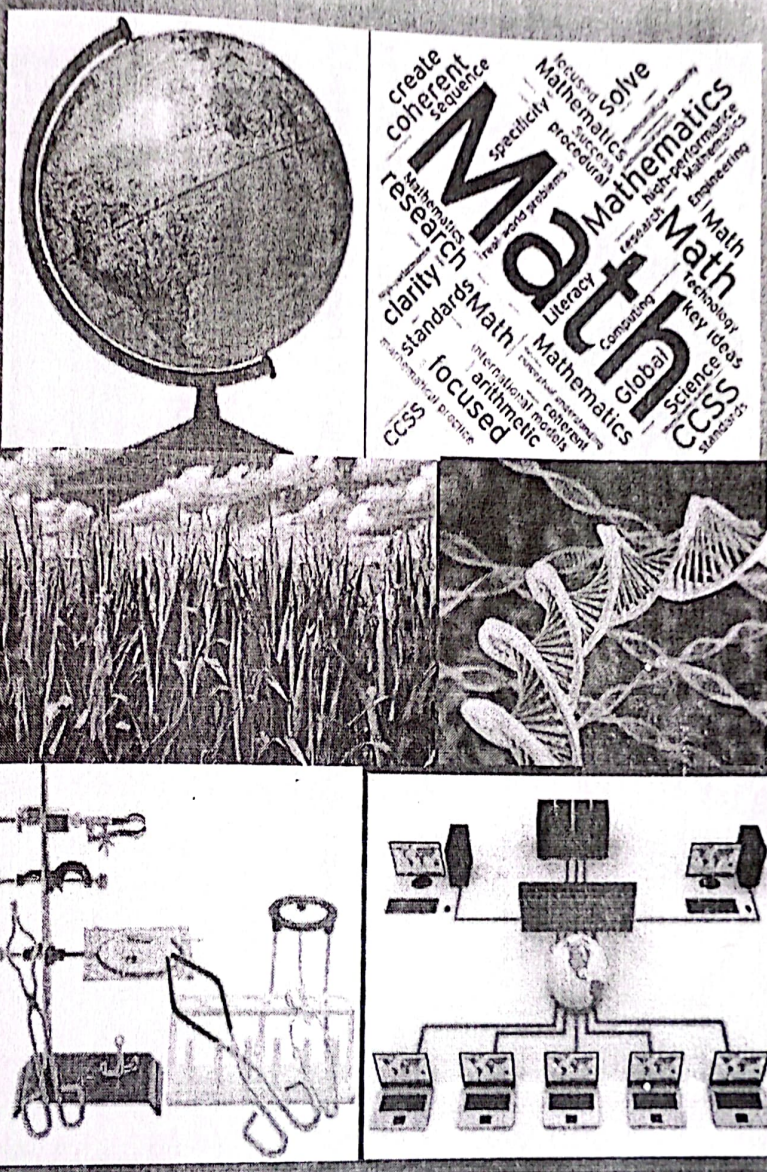
15

ADAMAWA STATE UNIVERSITY

JOURNAL OF SCIENTIFIC RESEARCH

Volume 5, Number 1, April 2017 ISSN:2251-0702



PUBLICATION OF FACULTY OF SCIENCE,
ADAMAWA STATE UNIVERSITY, MUBI

Volume 5 Number 1 April 2017.

ISSN: 2251-0702

Thank you for taking time to visit Vol5(1) of the ADSU Journal of Scientific Research.

To download and read any of the articles below you will need to login to this site (if you already have an account with us) or register (if you are a new user).

If you wish to submit your own article you can do so here.

If you wish to contact us for details or further clarification you can do so here.

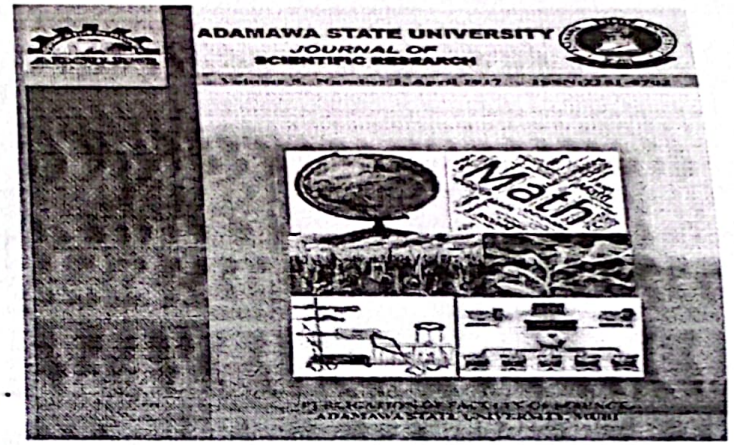


Table of Contents

Utilization of Banana Peels for Biogas Productions **Kangpe N.S, Dalen M.B, Aweh G.A and Egga S.E**	146 – 152
The Influence of Some Meteorological parameters on Solar Radiation in Yola, Adamawa State, Nigeria. **Medugu D. W., Ibrahim S. B. and Yonanna E.**	153 – 160
Assessment of Internally Displaced Persons Needs in Maiduguri Metropolis, Borno State, Nigeria: Implications for Counselling ***Hamsatu J. Pur Amos Audu and Wasinda Gideon***	161 – 167
Factors influencing students' acceptance of Electronic Examination at the University of Maiduguri ***Gambo Yusufu, Pur Hamsatu and Kellu Maigana Gadzama***	168 – 178
Preliminary Geochemical Assessment of Asa River Sediments, North Central Nigeria ***Omotoso, O. A., Ojo. O. J., Okebaram, U. D., Alebiosu, M. T.***	179 – 191
Impacts of Climate Change on Waste Management and Control Syndrome: A Case of Ilorin City Environment **Y.A. Ahmed**	192-203
Increased Threatening Level of Unauthorized Parking Lots in an Urban Environment, Example from Ilorin City, Nigeria **Y.A. Ahmed**	204 – 217

Adamawa State University Journal of Scientific Research
ISSN: 2251-0702 (Paper)
Volume 5 Number 1, April, 2017
http//www.adsujsr.com

Impacts of Climate Change on Waste Management and Control Syndrome: A Case of Ilorin City Environment

Y.A. Ahmed
Department of Geography and Environmental Management, University of Ilorin, Nigeria
Corresponding Author: royalkayb@yahoo.com; +2348036927049; +2348054292949

Abstract

Ilorin city in Nigeria is growing tremendously in social and economic perspectives in recent times. Ironically, the city environment is potently stained with some heaps of refuse and reeking of effluent resulting into incidences of health hazard from both air, water and land pollution. Current problems persist due to impacts of climate change on natural world and improper wastes management and control, and these have a wide range of health implications on residents of the city. This work evaluates the management and control of waste in Ilorin which has been the sole responsibility of the Kwara State Environmental Protection Agency (KWEPA) and other subsidiary sector. Evidences show that climate change and its dues, give rise to emissions of Green house gases (GHGs) which invariably disturbing the world. Two hundred questionnaires were randomly distributed to members of households in twenty wards in Ilorin, and an addition of fifty questionnaires to agencies that manage and control waste, making it 200 questionnaires in all. The results show more than half of the total households agreed that, they experienced sudden changes in climate conditions, such as, hotness throughout the day even in the wet seasons. Policy measures were suggested to all stakeholders in order to sustain hygienic environment for Ilorin city.

Keywords: Climate Change, Potential impacts, Green house gases, Effluents, Waste management.

Introduction

Climate change results from the increase in the average temperature on Earth. As the earth is getting hotter, disasters like hurricanes, droughts, floods, land degradation, accumulation of wastes and wastes decomposition are getting more frequent. Human activities have led to large increases in heat trapping gases over the past century. The climate change in the past 50 years or more is due primarily to human-induced increase. Global average temperature and sea level have increased, and precipitation patterns have changed. All these not alone, human "fingerprints" also have been identified in many other aspects of the climate system, including changes in ocean heat content, precipitation, atmospheric moisture, plant and animal health and location, and de-forestation syndrome have contributed to the phenomenon of our time.

In the U.S., the amount of rain falling in the heaviest downpours areas has increased approximately to 20 percent on average in the past century. Many types of extreme weather events, such as heat waves and regional droughts, have become more frequent and intense during the past 40 to 50 years. The destructive energy of Atlantic hurricanes has increased. In the eastern Pacific, the strongest hurricanes have become stronger since the 1980s, even while the total number of storms has decreased. Sea level has risen along most of the U.S. coast over the last 50 years, and will rise more in the future. Arctic sea ice is declining rapidly and this is very likely to continue (Lynne Cherry and Gary

Brasch, 2008). This work focuses on a study of Environmental Impacts of Climate Change on Waste Control Procedures in Ilorin city of Nigeria. The aim of this study is centered on how to improve on climate impacts to reduce perils of waste accumulation in the area of study. The attending objectives used are:

Assessment of changes in temperature and other weather parameters, which in turn activate waste generation in the study area. Examination of disposal methods, if in conformity with modern method of waste control and management or not, and, what are the assessment impacts resulting from climate change on waste product on livability of people of Ilorin.

Climate change discourse has been a serious international environmental concern and the subject of much research. Moreover, in international scientific circles, a consensus is growing that the buildup of C02 and other Green House Gases(GHGs) in the atmosphere will lead to major environmental changes such as; (l) rising sea levels that may flood coastal and river delta communities; (2) shrinking mountain glaciers and reduced snow cover that may diminish fresh water resources; (3) the spread of infectious diseases and increased heat-related mortality;(4) possible loss in biological diversity and other impacts on ecosystems; (5) agricultural shifts such as impacts on crop yields and productivity; and (6) increase in waste generation impediment (McCarthy, 2001).

Climate change could result in changes in temperatures, cloud cover, rainfall patterns, wind speeds, and storms: all factors that could impact future waste management facilities' development and operation. The time scales for climate change and waste management are similar. For instance, landfill sites can be operational for decades and still remain active for decades following their closure (Houghton, 2001). There is, therefore, a need to consider potential changes in waste management over significant timescales and respond appropriately.

In most developed and developing countries with increasing population, prosperity and urbanization, it remains a major challenge for municipalities to collect, recycle, treat and dispose of increasing quantities of solid waste, especially in a changing climate. A cornerstone of sustainable development is the establishment of affordable, effective and truly sustainable waste management practices in developing countries. It must be further emphasized that multiple public health, safety and environmental co-benefits accrue from effective waste management practices which concurrently reduce GHG emissions and improve the quality of life, promote public health, prevent water and soil contamination, conserve natural resources and provide renewable energy benefits. The major problems facing Ilorin city today are incessant migration of people from rural areas and from other urban centers, most especially from Northern parts of the country where many people fled from religious or political persecutions. This new settlers added to the urbanization problems already prevailed in the city. This also added to some challenges facing by urban planners and developers on ways to ensure that the city adopt cleanliness pattern in conformity with modern cities of the world (Adedibu, 1983; Ahmed, 2008).

Ilorin metropolis lacks proper land use zoning arrangement, and has no precinct layouts of both new and old area demarcation. The city has little proper provisions for open spaces, greenbelts and recreational activities. The results of these have led to pollution of all types which are collectively referred as "brown agenda". This set of problems disproportionately has impacts on human,

urban health and productivity (Bartone et al. 1994).For any city to be well developed, it must be properly planned because planning tends to concentrate on physical environment through; orderliness of layouts, provision of needed and necessary infrastructure and facilities, efficiency as well as ultimate aesthetic quality for the area. In other words, the planning process, from drawing board to implementation is nothing but environmental control as a means of ensuring functional and harmonious relationship between components of the urban areas and the ability to guarantee good health for urban residents through a sanitary control and management (Anozie, 1994).

In Ilorin, the capital of Kwara state, the problem of wastes is turning into alarming rate because the more these wastes are evacuated the more they are generated on a daily or weekly basis(see table 1). Huge of refuse are found dumped on unauthorized places, gutters and roads are filled up with sand and sediments which at times obstructed both free movement of pedestrians and vehicles alike. Thus, the issue of solid waste situation in Ilorin areas, to say the least, is quite distressing (Oyegun, 1987; Ahmed, 2000).

In Africa and Nigeria in general, cities and urban areas are the engine of economic growth and development, but implications of such growth need a thorough environmental management and adequate control. All over the world, urban centers/cities need environment that is free of health hazard, an environment where water, land, river and forest, public health, sewage and garbage disposal in factories among others, are of great important to all and sundry. Where these measures are not properly maintained, the consequences are numerous and hazardous. The gathering and disposal of solid wastes become a major public health issue of our time and this needs some urgent attention if our environment is to be protected. Therefore, this work sets up to achieve the following objectives: Examination of disposal methods that conform to the modern time techniques in removing effluent, bad odour, vermin, dust and other urban waste products in Ilorin township resulting from climate change in the recent time. Also assessment of changes in temperature and other weather parameters, which in turn could affect waste management and control processes among others in the study area.

Evidences of Climate Change in Developed and Developing Countries

The global temperature has risen by about 0.60c over the last 100 years and 1998 was discovered to be the single warmest year in the last 142 global instrumental records (Jonathan and Kerey (2003). There is also evidence in Nigeria today that climate change is already happening and it is due, to human activities that give rise to emissions of greenhouse gases (GHG) get proper checks. Climate models suggest that in the future in this country we are likely to experience higher temperatures, changes in seasonal precipitation and a shift to more extreme rainfall events, rising sea levels and more frequent storms. These changes could have significant impacts on a range of socio-economic and environmental processes that are affected by the weather (NIMET, 2009)

The timescale for climate change and some of the consequences on how we manage our waste in urban centers are similar. For example; landfill sites can be operational for decades and still be active for decades following their closure. Residual wastes will remain in the landfill site for many years after degradation processes have ceased, while capital assets like energy from waste plants and materials will remain to be operational for

decades and so could be affected by climate change. Climate change is happening now and so could already be affecting waste management processes and operations that are subject to weather related impacts. There is therefore a need to consider potential changes over significant timescale and respond appropriately. Different other types of waste are daily piled up in streets of Ilorin, though a contracted company-, 'Clean and Jerk' (Ola Kleen) is responsible for streets cleaning, but our disposal sites are affected by some undisputable items which need some additional and modern means of waste disposal if we must abate the peril of impacts ahead of time in the state in general. This study therefore, call for establishing a lasting solution to the socio-economic menace attached to the impacts that change climate exerts on; individual, agricultural products and on human health conditions in the study area. It suggests that some improvements on the methods of waste collection, transportation and disposal need additional and overhauling operations.

Accordingly, the United Nations Programmes on 'Global Environmental Outlook 2000' has warned that an impending worldwide environmental damage is imminent as a result of irreversible harm done to ecosystems (Owolabi, 2000). The Earth Summit in Rio in1992 has also clearly alerts the world on the evils of environment mistreatment (FEPA, 1993). Though many nations are giving priorities to other environmental issues, while many nations are facing other hazards. For example, the United States of America had the highest awareness on environmental issues followed by the European countries. While some Asian, Mid-East and African nations are facing political upheaval and instability.

Climate Impacts

The world view of global warming project is documenting this change through science photography from the Arctic to Antarctica, from glaciers to the oceans, across all climate zones. Rapid climate change and its effects is fast becoming one of the prime events of the 21st century. It is real and it is accelerating across the globe. As the effects of this change combine with overpopulation and weather crises, climate disruptions will affect more people than wars (Oyedele, 2009). The status of waste management sector in Nigeria indicates that the availability and quality of annual data are major problems for the waste sector. Data pools on waste control and/or management are sparsely available in many countries of Africa, Nigeria inclusive. This has led to unequal and inter-annual variability in the measures used in managing/controlling wastes in major cities of Africa and the world at large. However, there are three major approaches that have been used to estimate global waste generation and this is adopted for this work:

i. data from national waste statistics or surveys including IPCC methodologies (IPCC, 2006);
ii. estimates based on population (NBSC, 2006)
iii. the use of a proxy variable linked to demographic or economic indicators for which national data are annually collected (US EPA, 2008). Global solid waste generation rates range from <0.1 t/cap/yr(tons per capita per year) in low income countries to >0.8 t/cap/yr (table 1). Overall, the waste sector contributes <5% of global GHG emissions (US EPA, 2003).

In Nigeria, accurate data on the quantities of municipal solid waste generated in Nigeria are not easy to come by. Nevertheless, Rushbrook and Pugh (1999) outlined the range of per capita waste generation as well as waste densities (on net weight basis) from low

and middle income neighborhood of Nigerian cities (see table 1).

Table 1: Range of Solid Waste Management (SWM) Per Capita Generation and Density in Nigeria

Waste Generation Capacity(WGC)	Middle Income Earner	Low Income Earner
Waste generation (Kg/cap/day)	0.5- 0.9	0.4- 0.6
Waste densities (net weight basis-Kg/m3)	170-330	250-500

Source: Rushbrook and Pugh (1999) and as modified by the Author.

Waste Management Activities in Nigeria

In Nigeria, recycling activities are not popular and non-existent. However, the recovery of materials from wastes (scavenging) is practiced on a large scale. This type of recovery takes place at both legal and illegal dump sites where scavengers search continually for valuable metals, plastics, and bottles to be reused or for sale to buyers of different type of scraps. In general, treatment of solid wastes is not often carried out in Nigeria. Incineration of wastes or use of approved sanitary landfill is non-existent. The most common practice is open dumping and burning of waste within residential areas and at illegal and legal dumps. Other strategies employed in disposing waste in the country include:

a) **Composting:** Composting is a biological process that uses micro-organisms to degrade organic matter using atmospheric oxygen. The stabilized end product occupies a reduced volume compared with the starting materials. The principal emissions are C02 and water vapor, bio-aerosols and odor. It is estimated that nearly a quarter of all household waste is organic and can be composted. In Nigeria, compositing is undertaken in the open. The end product is used in farms.

b) **Collection and Transfer:** Waste transfer points are used by waste management companies as a means of increasing the efficiency of their waste collection service through the bulking up of waste into larger consignments prior to transfer to dump and disposal sites. At the transfer points, waste is loaded directly into large bulk container vehicles and transferred by road to the dump site. The environmental impacts commonly cited are: odor, dust, bio-aerosols, attraction of bird, noise and surface water pollution and surface water runoff management. Waste transfer stations are often located along the streets, while the dump sites are usually away from the city centers.

Waste Management Policies and Regulations in Nigeria

The discovery of a major toxic waste dumped by a foreign company at Koko Town near Warri in Delta State, Nigeria in 1987 led to the establishment of Federal Environmental Protection Agency (FEPA) by Decree No. 58 of 1988. In June, 1999, the Federal Government of Nigeria created the Ministry of Environment and as a result, FEPA's function was absorbed by the new ministry. The Federal Ministry of

Environment has the following instruments of intervention in place to tackle the problem of environmental degradation including waste management: The revised policy on environment, 1999.

The National Agenda 21 (published in 1999), which touches on the various cross-sectoral areas of environmental concern and map out strategies on how to address them.

These instruments complement what existed in the form of guidelines and standards for environmental pollution control in Nigeria and other regulations that deal with effluents, industrial pollution, waste management and environmental impact assessments (FME, 2003).Among FEPA's instructions in combating environmental degradation are the waste management Regulation S.1.9 of 1991 and Environmental Impact Assessment (EIA) Decree No. 86 of 1992. FEPA policies regulate the collection, treatment and disposal of solid and hazardous waste for municipal and industrial sources and makes EIA mandatory for any major development project likely to have adverse impact on the environment (see table 2).There is also in existence an environmental sanitation edict of 1997 that declared the last Saturday of every month to be used for cleaning the environment for three (3) hours (7am – 10am). This edict is still in force and still being observed all over Nigeria. Every last Saturday of the month, between the hours of 7am and 10am, people are required by law to clean their surroundings and offenders are apprehended and punished as stipulated by the act. The post-1988 environmental laws and regulations continue to prevail without any change.

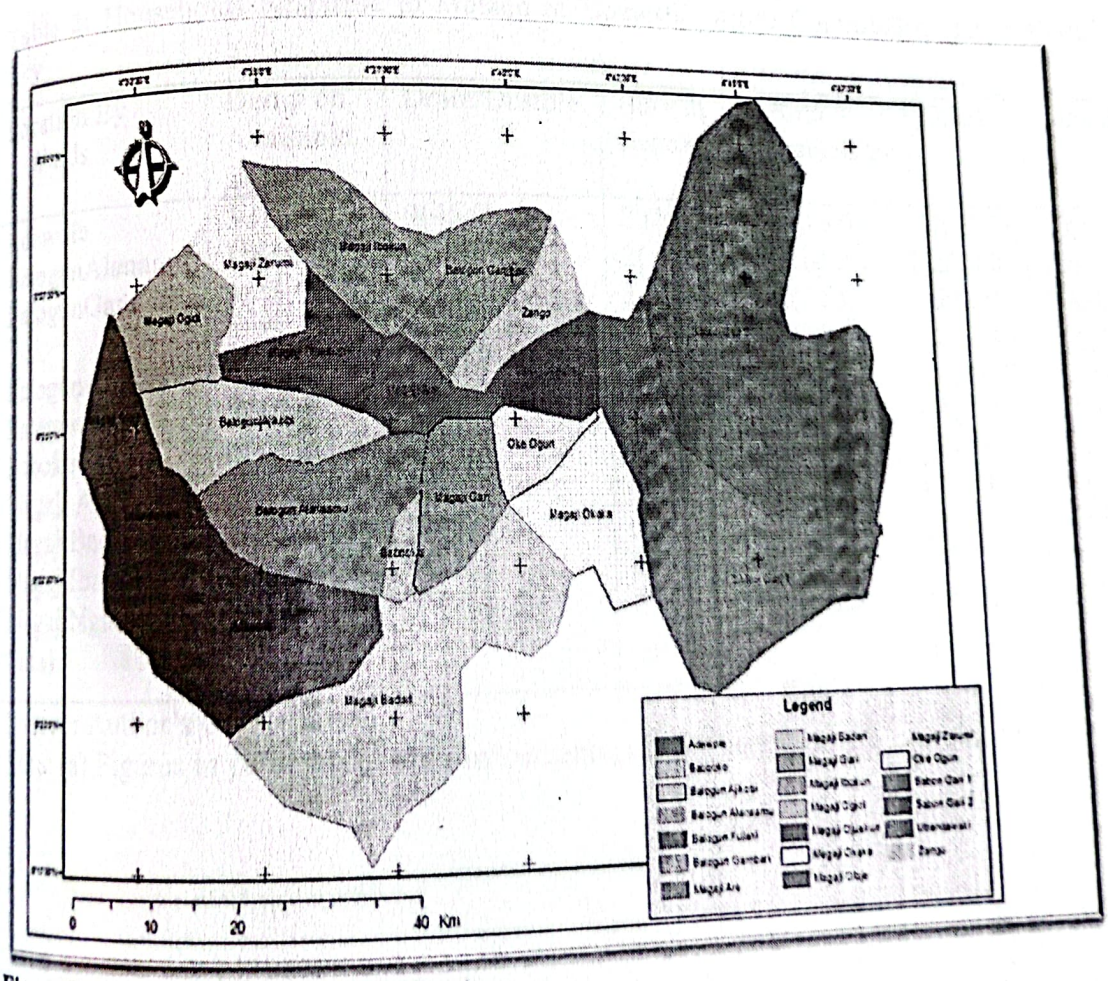


Figure1: Wards in Ilorin – city Nigeria.

Source: Kwara State Ministry of Land and Survey (2015).

Materials and Methods

This work employs in addition to secondary data, a survey aimed at generating primary data on the potential impacts of climate change on waste management standard in Ilorin. The work embarks on the random distribution of questionnaire to 200 households in ten selected wards from Ilorin. This allows for generation of needed and necessary information on; respondents perception about the causes of climate change, the estimated volume of water in which households use during dry season periods, quantity of fuel used when there is no supply of electricity from the Power Holding Company of Nigeria (PHCN) and impacts of combustion carbonized items and other domestic wastes generated by households from homes, selling points (stalls) and farmlands (see tables 3 & 4,). In all, three hundred structured questionnaires were used to assess the households' response to impact of climate change as affecting domestic waste in their areas and their coping mechanism. In addition to this, on the spot assessment and oral discussions were carried out among the agencies that control and manage waste in the selected study area. The agencies include; the Kwara State Environmental Protection Agency (KWEPA), the Kwara State Ministry of Health and the Kwara State Waste Management Company (KWMC).The reason for this is to assess their contributions and attendance challenges on climate change as affecting waste management activities in the state.

Table 2: Households Response to Method of Domestic Waste Control/Disposal in Ilorin City

Location By Wards	Dump on Available Space	Drum/Dustbin	Bury in Ground	Burn in Incinerator	Others	Total & %
Adewole	3 (15.0)	9(45.0)	2 (10.0)	3 (15.0)	3(15.0)	20(100)
BalogunAlanamu	10(50.0)	4(20.0)	2(10.0)	2(10.0)	2(10.0)	20(100)
BalogunGambari	9(45.0)	7(35.0)	3 (15.0)	1(5.0)	0(0.0)	20(100)
	5(25.0)	5(25.0)	2(10.0)	3(15.0)	5(25.0)	20(100)
BalogunAjikobi	4(20.0)	6(30.0)	3(15.0)	3(15.0)	4(20.0)	20(100)
Balogun Fulani	7(35.0)	4(20.0)	4(20.0)	4(20.0)	1(5.0)	20(100)
Baboko	2(10.0)	9(45.0)	4(20.0)	2(10.0)	3(15.0)	20(100)
Magaji Aare	6(30.0)	7(35.0)	4(20.0)	2(10.0)	1(5.0)	20(100)
MagajiBadari	4(20.0)	5(25.0)	5(25.0)	2(10.0)	4(20.0)	20(100)
MagajiIbagun	6(30.0)	2(10.0)	6(30.0)	3(15.0)	3(15.0)	20(100)
MagajiNgari	**280	**570	**175	**125	**130	200(100)
Total						

Source: Author's Computation

Note: (a) Figures in parentheses are row percentages.(b)** are total row percentage

Table 3: Weekly estimated figures of waste generated by households in twenty Wards, Ilorin City (2016).

ation / Area	Garbage		Ashes		Paper		Rags		Polythene bag		Unclassified Items		Total		
	Kg	%	kg	%	kg	%	kg	%	kg	%	kg	%	kg	%	
Maraba	0.78	0.10	0.51	0.06	2.63	0.32	0.24	0.03	2.61	0.32	1.43	0.17	8.20	9.84	
Adewole	0.74	0.30	0 .04	0.00	0 54	0.06	0.04	0.00	0.73	0.29	0.88	0.35	2.49	2.99	
Ita-Amodu	0.92	0.23	0 .67	0.18	0 22	0.06	0.83	0.21	0.60	0.15	0.73	0.18	2.97	3.56	
Oloje	0.60	0.12	2.72	0.56	0 09	0.00	0.28	0.06	0.41	0.09	0.81	0.17	4.55	5.45	
Oja-Oba	0.24	0.07	2.23	0.61	0 31	0.04	0.11	0.03	0.23	0.06	0.73	0.20	3.67	4.41	
Idi-Ape	0.51	0.06	0.79	0.14	0.99	0.18	0.36	0.07	1.73	0.31	1.14	0.21	5.54	6.65	
Oju-Ekun	0.63	0.12	0.77	0.14	0.71	0.01	0.93	0.17	1.55	0.28	1.53	0.28	5.48	6.58	
Alore	0.53	0.11	0.66	0.14	0.21	0.04	0.88	0.18	1.46	0.30	1.09	0.23	4.83	5.79	
Tanke	1.22	0.24	0.72	0.14	0 32	0.05	0.73	0.14	1.02	0.02	1.17	0.23	5.09	6.11	
Ajikobi	0.26	0.08	0.34	0.10	0.02	0.01	0.55	0.17	0.93	0.12	0.98	0.30	3.31	3.97	
Alanamu	0.85	0.16	1.72	0.33	0.77	0.15	0.30	0.06	0.85	0.16	0.76	0.14	5.25	6.29	
Baboko	0.94	0.21	0.90	0.20	0.63	0.14	0.27	0.20	0.97	0.21	0.84	0.18	4.55	5.46	
Oke Aluko	0.77	0.19	0.39	0.10	0.79	0.20	0.31	0.08	1.20	0.29	0.62	0.15	4.08	4.89	
Gurulere	0.93	0.15	0.66	0.11	0.89	0.14	0.65	0.10	1.41	0.23	1.70	0.27	6.24	7.49	
Ita-Ajia	0.98	0.23	0.05	0.01	0.71	0.17	0.07	0.02	1.55	0.36	0.89	0.21	4.25	5.09	
Zango/Kulende	1.66	0.45	0.14	0.04	0.11	0.03	0.06	0.02	0.65	0.17	1.10	0.3	3.72	4.46	
Balagun Fulani	0.88	0.25	0.61	0.17	0.14	0.04	0.09	0.03	0.85	0.24	0.93	0.27	3.50	4.19	
Taiwo-Isale	0.94	0.03	0.04	0.01	0.92	0.30	0.43	0.14	0.99	0.32	0.58	0.19	3.05	3.66	
Taiwo-Oke	0.12	0.01	0 .01	0.00	0.65	0.45	0.01	0.01	0.63	0.43	0.15	0.10	1.45	1.74	
Gabon-Ngari	0.05	0.05	0 .03	0.00	0.51	0.46	0.11	0.10	0.14	0.13	0.33	0.30	1.11	1.33	
Total	14.57	3.1 6	13.92	3.04	11.43	2.85	6.34	1.77	20.51	4.48	18.4	4.43	83.36	99.95	

Source: Author's fieldwork.

Table 4:Summary of Climate Change and their Impacts

Climate variable	Climate change	Examples of Impacts on Waste Management
Temperature	Annual warming about 1^{0} to5^{0} by 2080s. More hot days increases especially in dry Seasons.	Increased water demand by both workers and site operators. High distribution of vermin and pests.
Precipitation	Generally wetter days in Nigeria especially in the South. Precipitation intensity increases in rainy seasons	Increased risk of flooding from groundwater surface water tidal and sea surfaces. Disruption of infrastructure e.g. road and rail may intensify in some major cities in the country.
Cloud cover	Reduction in cloud cover	Impacts on biological processes e.g. composition, Anaerobic digestion. Risk to workers of skin conditions associated with increased exposure to ultra-violet rays of sun at outdoor workings
Humidity	Specific humidity increases mostly during rainy seasons	Impacts on outdoor biological processes.
Sea level	Means sea level may rise up to 86cm above its present level as a result of thermal expansion and natural land movements by the 2080s.	Inundation of waste management facilities. Increased erosion activities in coastal areas.

Source: Entete (2010) and modified by the Author.

Results and Discussion

Before a material or product becomes a solid waste, it undergoes a series of climate changes that involves a long cycle of revolving and processing raw materials, manufacturing the product, transporting the materials and products to markets, and using energy to transform the product (Entete, 2010). Each of these activities according to him have the potential to generate Greenhouse Gas Emissions (GGE) through one or more of the following processes:

a. Energy Consumption: Extracting and processing raw materials, manufacturing products, and transporting materials and products to markets all generate greenhouse gas emissions by consuming energy from fossil fuels.

b. Methane Emissions: When organic waste decomposes in landfills and dumps, it generates methane, a greenhouse gas.

c. Carbon Storage: Trees absorb carbon dioxide, a greenhouse gas, from the air and store it in wood through carbon sequestration. Waste prevention and recycling of wood and paper products allow more trees to remain standing in the forest, where they can continue to remove carbon dioxide from the air, which helps minimize climate change impacts (see table, 4).

It was found out that most households studied need some orientation as regards how, when and where to dump waste they generated daily in their community and homes in order to avoid hazards. Because most the households dumped refuse at all available areas and empty space in their homes or send their wards to dump refuse

in the river course closed to their residential areas. Even where bins are available for waste disposal from homes and community, after bins are filled up, many people still dump waste products in the bare floor.

In Ilorin, it was discovered that 56 (28%) households studied dumped refuse generated in their homes on any available spaces, while 58 (29%) of the total households dropped waste generated from their homes in drums/dustbins in selected wards in Ilorin. Similarly, only 23(11.5%) households drop their waste in barrel or dustbins. However, most households at selected wards in Ilorin claimed that Government did not provide them with any waste-bins but they make provisions for this on their own. In general, when households from the study area were asked if they filled any changes in the weather within their locations, more than half of the total households retorted sharply that, they experienced such sudden changes in climate conditions, such as, hotness throughout the day even in the wet seasons. The likely solutions as they suggested, are that, they want Government to ease the problems of incessant power output so that every home could afford either air conditioners of fans to wade-off heat. Also, Government to takes more responsibility on issue of waste management in all cities and towns in the states in order to avoid epidemic diseases.

Conclusion and Recommendations

This work attempts the study of climate change and its impacts on poor waste management in Ilorin where the standards of waste management and control measures are inadequate. As the city continuing to grow in leap and bound from population increasing, so thus, more wastes are generated. Wastes management and control in some cities in developing world are alike, as they invariably experience unexhausted collection, inadequate control measures and uncontrolled dumpsites that worsening the situations. It was also found out that inadequate planning, poor management and inadequate funding from the government added to the poor control syndrome. The inability of the existing infrastructural facilities to consistently meet the necessary demand in the urban area sand to provide opportunity for the public and private sector to explore alternative measures for waste management and control in general, reverse are always the answer. Thus, it is suggested herein that, for proper control and management of wastes in any urban environment, the following policy measures are recommended as proper succors. All Nigerian cities' environment must be designed to;

- Recognizing generated waste as a recycled and reusable resource for generating other energy like electricity through energy recovery processes. Rather than an unfortunate urban menace through a mere collection and disposed waste on unwanted areas or/and wastes littering all available spaces in urban areas.
- Designing robust and sustainable municipal waste management plan that are based on strategic goals.
- Identifying and recommending appropriate disposal infrastructures that reduce environmental pollution caused by combustion of waste in regulated and non-regulated waste disposal sites.
- Identifying sustainable energy solutions using Landfill Gas to Energy (LFGE) / Municipal Solid Waste to Energy (MSWE) technologies to address the endemic power supply shortage in most urban areas/cities of Nigeria while

mitigating greenhouse gas emissions.

- Providing lower cost alternative LFGE / MSWE energy solutions as compared to the current prohibitive acquisition costs for private fossil fueled electricity generating sets.
- Financing LFGE / MSWE projects through the Clean Development Mechanism (CDM) as commonly done in advanced world.
- Recognizing Noise Reducing Syndrome (NRS); the noise pollution caused by fossil fuel generators which arethe current prevalent sources of electricity in Nigeria city environmentneeds redemption, and
- Optimally recognized Land Use/Reclaiming land from landfill and waste disposal in regulated and non-regulated sites with high generation levels of methane in landfills (50 to 60%) and leach generation makes dumpsites unsafe on every available dumpsite, thus need proper control.
- Creating public and private sector jobs in the area of waste collection and disposal, facilities operations, maintenance and recycling among others can create job opportunities, this must be encouraged.

References

Adedibu, A.A.(1983): Solid Waste Characteristics and Management in Ilorin. *Journal of the Nigerian Institute of Town Planners (NITP)* 3(1)13-19.

Ahmed, Y.A.(2000):Waste Generation and Management: A Contemporary Environmental Issue. In Jimoh, H.I. and Fabiyi, I.P (ed.) *Contemporary Issues in Environmental Studies.* Ilorin. Haytee Press,

Ahmed, Y.A.(2008):Waste Management in Ilorin Metropolis: Lessons for Nigerian Cities. *FUTY Journal of the Environment*, 3(1) 49-58. A Publication of the School of Environmental Sciences, Federal University of Technology, Yola.

Bartone, T; Cheema, G and Lema, E.S.(1994): Towards Environmental Strategies for Cities in Nigeria Urban Centres. A Case Study of Onitsha. Unpublished BURP Dissertation University of Nigeria.

Enete, C. I. (2010): Climate, Earth Observation, Energy and Technology. Dept. of Geography and Meteorology NnamdiAzikiwe University, Awka, Nigeria.

Environmental Sanitation Edict, (1984): *Kwara State Edict* No.6, Ilorin, Nigeria.

FEPA, (1993): Guidelines and Standards for Environmental Pollution Control in Nigeria. Federal .Environmental Protection Agency, Lagos Nigeria.

FEPA, (1993): *The Making of the Nigerian Environment Policy.* FEPA Monograph.1 Lagos, Nigeria.

Houghton, J.T. (2001): Climate Change: The Scientific Basis. *Intergovernmental Panel on Climate Change (IPCC)*, Cambridge University Press.

IPCC (2006): IPCC Guidelines for National Greenhouse Gas Inventories. *IPCC/IGES, Hayama, Japan.* http://www.ipccnggip.iges.or.jp/public/2006gl/ppd.htm.

McCarthy, J.J. (2001): Climate Change: Impacts, Adaptation, and Vulnerability. *IPCC.* Cambridge University Press. pp. 9 – 13.

Microsoft Encarta (2007): Microsoft® Encarta 2007. (c) 1993-2006 Microsoft Corporation.

National Population Commission (1991): Census News Publication, 3(1); Lagos, Nigeria.

National Population Commission (2006): Census News Publication, Abuja, Nigeria.

National Population Commission (1992): NPC News Publication, 3(1); Lagos Nigeria.

Rushbrook, P. and Pugh, M (1999): Solid Waste Landfills in Middle and Lower Income Countries. A Technical Guide to Planning, Design and Preparation. World Bank Technical Paper No. 426, Washington D.C, pp. 2.

Oyegun, R.A.(1987): Sediment Redistribution in Ilorin, Nigeria. *The Environmentalist*, 7(2)123-129.

US EPA (2003): International Analysis of Methane and Nitrous Oxides Abatement Opportunities. *Report to Energy Modeling Forum, working Group US Environmental ProtectionAgency,* http://.epa.gov/methane/intlanalyses.html.