RELATIONSHIP BETWEEN HOUSEHOLD CHORES POLLUTANTS, ENVIRONMENTAL POLLUTION AND LEVEL OF POLLUTION IN NORTH-WEST GEO-POLITICAL ZONE, NIGERIA

BY

Faith KOMOLAFE

DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION
FACULTY OF EDUCATION
AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA

MARCH, 2015

RELATIONSHIP BETWEEN HOUSEHOLD CHORES POLLUTANTS, ENVIRONMENTAL POLLUTION AND LEVEL OF POLLUTION IN NORTH-WEST GEO-POLITICAL ZONE, NIGERIA

BY

Faith KOMOLAFE
B.Ed (Home Economics Education) (FCE, Zaria, 1988)
M.Ed (Home Economics Education) (ABU, Zaria 2001)
(Ph.D/EDUC/00467/2008-2009) (ABU,Zaria)

A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILLMENT FOR THE REQUIREMENTS FOR THE AWARD OF DEGREE OF DOCTOR OF PHILOSOPHY IN HOME ECONOMICS EDUCATION.

DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION
FACULTY OF EDUCATION
AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA

MARCH, 2015

DECLARATION

I hereby declare that this dissertation titled "**RELATIONSHIP BETWEEN HOUSEHOLD CHORES POLLUTANTS, ENVIRONMENTAL POLLUTION AND LEVEL OF POLLUTION IN THE NORTH WEST GEO-POLITICAL ZONE, NIGERIA**" has been carried out in the department of Vocational and Technical Education. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was presented previously for another degree in any university.

Faith Komolafe	____________________ **Signature**	________________ **Date**

CERTIFICATION

This is to certify that this dissertation work entitled "**RELATIONSHIP BETWEEN HOUSEHOLD CHORES POLLUTANTS, ENVIRONMENTAL POLLUTION AND LEVEL OF POLLUTION IN THE NORTH WEST GEO-POLITICAL ZONE, NIGERIA**" by Faith KOMOLAFE meets the regulations governing the award of the degree of Ph.D. Home Economics Education Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

Professor T.O. Ojo Chairman, Supervisory Committee	Signature	Date
Dr. S.L. Ajayi Member, Supervisory Committee	Signature	Date
Dr. E.E. Adamu Member, Supervisory Committee	Signature	Date
Professor A.A. Udoh Head of Department Vocational and Technical Education	Signature	Date
Professor A.Z. Hassan Dean, School of Postgraduate Studies	Signature	Date

DEDICATION

This work is dedicated to God Almighty.

ACKNOWLEDGEMENTS

If it had not been the LORD who was on the researcher's side she would not have being able to attain this height academically. The researcher remains eternally grateful to Him, the Author and helper of my destiny.

The researcher would like to thank her supervisors: Professor T.O. Ojo, Dr. S.L. Ajayi and Dr. E.E. Adamu for their endless patience and support throughout the work. Their comments and feedback on this work indicated a high level of commitment to improving the work, and appreciate all the time and efforts that they put into the work. The researcher expressed her utmost gratitude to my internal examiners, Professor. C. Bolaji, Professor A.A. Udoh and Professor P.E. Onuigbo who willingly agreed to participate in this study. The research deeply appreciate the time they had taken out of their tight schedules to go through this work. The researcher, feels honoured to have had the opportunity to work with such talented matured, thoughtful, perceptive mentors who polished this work to completion. May their academic excellencies inspire others as much as they have inspired her for better endeavour.

The researcher is forever grateful to Professor A.A. Udoh, the Head of Department of Vocational and Technical Education for his unquantifiable support, excellent encouragement and purposeful direction toward the completion of this work, and also to Dr. Sani Ibrahim for his purposeful direction on this work at all stages and very useful constructive criticisms that finally fine tuned this work to completion. Thanks also go to Professor E. Ike, Professor A.Z. Mohammed, Professor M.M. Aliyu, Dr. D.O. Oni, Dr. I.M. Haruna, Dr. M.F. Ahunwa, Dr. M.A. Abubakar, Dr. T.J Adesina, Dr. S.S. Amoor, Dr. A. Adamu among others. Each of these personalities played vital roles in the formation and completion of this dissertation, only God will bless them abundantly. The researcher wishes to sincerely express her profound gratitude to the management of Federal College of Education, Katsina for the sponsorship of the programme.

The researcher is grateful to all her course-mates and friends, Mrs. E. Kantiok, Mrs. H. Chindo, Mrs. Alkali and among others for their prayers and moral support. Furthermore, the researcher is grateful to her parents Alhaji Ibrahim Yusuf and Madam Hadiza Ibrahim, her late brother Ishaq Ibrahim, her uncle Dr. (SAN) S.E. Mosugu, Late Alhaji Abdulrahaman Obayemi and family and for their prayers, moral and financial support. She is also very grateful to the Management of Katsina Transport Authority (KSTA) and others too numerous to mention for being sources of encouragement at all times. The researcher would like to express her gratitude to the authors whose works and materials were consulted in the course of her study. She sincerely appreciates the seven research assistants who inspite of their tight schedule assisted in data collection for the study. Finally the researcher is thankful to her husband and friend Dr. Awo Komolafe, her cherished children Miss Winner Komolafe and Mr. Victor Komolafe for their unquantifiable moral and financial support genuine love, care and very kind words of encouragement to her that had tremendousness helped her to complete this work successfully.

TABLE OF CONTENTS

LIST OF TABLES

Tables **Pages**

LIST OF APPENDICES

Appendices **Pages**

OPERATIONAL DEFINITION OF TERMS

Compound House: (It is the setting of family living in) an enclosed structure which is made up of many rooms facing each other

Environment of the House: The interior part of a house and its immediate exterior and surrounding

Environmental Pollution: It is any discharge of material or energy into water, land and air that lowers the quality of life.

Pollutant: It is substances from the air, water, soil that is harmful to human being living in the environment

Household: A domestic unit consisting of family members who live together, relatives and non-relatives.

Household Chores pollutants: These are substances released from air, water and land that are harmful to human beings living in the environment as a result of household chores performance.

GLOSSARY OF ABBREVIATION

EPA: Environmental Protection Agency

FEPA: Federal Environmental Protection Agency

NEEDS: National Economic Empowerment and Development Strategy

NEST: National Environmental Study Team

NPC: National Population Commission

SEPA: State Environmental Protection Agency

UN: United Nations

WHO: World Health Organization

ABSTRACT

This study examined the relationship between household chore pollutants and environmental pollution in the North West Zone of Nigeria. Descriptive survey design was used to carry out the research from a population of one million one hundred and two thousand, five hundred and fifty nine (1,102,559). A sample of two thousand six hundred and eighty six (2,686) was drawn using multistage sampling techniques, the respondents were made up of literate and non-literate households living in compound houses. A self designed questionnaire was employed to obtain data for the study. The study had six (6) objectives, research questions and null research hypotheses. The data was analyzed by using Pearson Product Moment Correlation Co-efficient (PPMC) statistical technique. All the hypotheses were tested at 0.05 level of significance. Some of the hypothesis were that: there was no significant relationship between meal preparation and environment pollution, there was no significant relationship washing/cleaning activities and environmental pollution in compound houses. The findings indicated among others that, meal preparation activities were related to environmental pollution with 3.2 which was greater than the decision rule of 3.0 in compound houses. Cleaning and washing is related to environmental pollution with 3.1 with decision rule of 3.0 in compound houses of north-west zone Nigeria. Based on the study, the researcher concluded among others that: meal preparation activities had relationship with environmental pollution, cleaning and washing activities in compound houses constitute health hazards affecting the society. One other findings among others was that handling of waste from the activities of the household in the study area was generated by water which was thrown in open drainages, gutters and fields posing hazards to the environment with 3.06 which was greater than the decision rule of 3.0. Furthermore, the study revealed that significant relationship of 0.759 existed between levels of pollution and environmental pollution in north-west geopolitical, zone, Nigeria. In view of these, it was recommended among others that households and builders should construct houses with standard drainage systems to channel all dirty water from meal preparation activities in the house. Scraps of food remnants should be discarded into refuse dumps designated for it. The Ministry of Environment should legislate adequate punishment against illegitimate dumping of household wastes in Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Environmental problems such as environmental degradation and pollution have affected human ecosystem so much that man lives in fear due to health hazards (Ogboru, 2001). Environmental hazard, such as high level pesticides and other chemicals in foods, continuing deterioration of water ways, episodes of hazardous air pollution and wastes in cities are now common occurrences. All human diseases are largely determined by both the interested characteristics of the individual and the environmental experience to which that individual is subjected to. In other words, a clean environment free of pollutants promote good health while a filthy one, saturated with hazardous pollutants adversely alter the environment and health comfort or property value of the people.

Environmental pollutants may result generally from any three naturally classified aspects of the environment, namely, the atmosphere, land and water. Pollutants are introduced into the environment by daily routines of household chores (meal preparation activities, cleaning, and washing, sweeping and dusting, refuse proposal, generation of light, and cleaning of surrounding). Human existence is primarily dependent on a healthy environment. Environment is the combination of both physical and non-physical objects made by human beings, the interrelationship between these and various circumstances which surround people on earth (NEST, 1995). The physical components include; land, water, air, plants and animals and man-made feature of associated infrastructure (e.g. buildings), while the non-physical is made up of socio-economic, cultural educational, religious, legal institutions, relationships and conditions.

Human habitat in both the rural and urban housing are sited in the environment. There is a direct relationship between the environment and human dwellings (housing). A house in a general term is a dwelling place for living which ranges from rudimentary huts to high-rise apartment buildings. It is characterized by a physical building, furnished and decorated according to income and taste of the people who reside therein (Carter, 2005). A house is more than just a dwelling place but must be provided with facilities that provide the required comfort for all the members of the family. Houses with such facilities are called standard houses.

A standard house is a residential environment which includes in addition to the physical structure that man uses for shelter, all necessary, facilities, equipment and decries needed or designed for the physical and mental health and social well-being of the individual and family (Onibokun and Kumuyi, 2006). Good housing conditions create foundations for healthy social, economic spiritual, physiological, physical and emotional relationships necessary for achieving a complete and emotional relationship necessary for achieving a complete and meaningful life.

Olatuah (2006) states the features of a standard house as units and apartments which includes bedroom sleeping, sitting room for relaxation and entertaining visitors, dining room for eating, kitchen for preparation of meals, serving of meals, washing of equipment and utensils, bathrooms for bathing and washing of cloths and a laundry room for laundering clothes. According to Bullard, (2007), a standard house is a term used in describing bungalows, twin flats, single family detached houses, storey buildings, multi and family houses. Coker, (2007) enumerated the essential features of a standard house as adequate space for living and relaxation rooms, open spaces for recreation, space and facilities for safe disposal of wastes, production and consumption of goods and services.

A standard house has a large potential to contribute towards providing efficiency in performing daily household chores. For instance, some facilities like open space and courtyards are for relaxation of family members, garden for fresh fruits and flowers for beatification and good breeze, ranks and garages, courts for exercises and game, all of which add values to the likes of the households the other form of housing and the most popular in Nigeria and in particular the North-West zone is the compound house. Compound houses popularly called 'face me, I face you' is substandard. It lacks the features and facilities of standard houses with serious repercussions on individuals, command health and peace. Due to the prevalent problems associated with compound houses, the major thrust of this study is 'compound houses'.

A compound house according to Bullard (2007) is a traditional form of housing that accommodates the immediate and extended families with several dwelling within the same proximity of fenced or walled compound. There are several types of compound houses in Nigeria and in particular, the north-west geo-political zone. They include the single room model, built in a straight line with a court yard at the center for ease of movement and performance of other household chores by the occupants (Perth, 2005). According to Perth, the other type is the barrack model which could be a flat or single fenced for the occupants' safety.

Compound houses are often characterized by many occupants, poor and inadequate facilities of change suckawaye, toilets, bathrooms, kitchen and so on. The few facilities are often shared such as bathrooms, toilets and sometimes kitchen. Parking areas may be enclosed for common use and with a central gate. Some of the factors influencing the demand for compound houses include, its flexibility to accommodate many people at a time, it is less expensive both to hire and maintain. The growing income disparity between high and low income earners has necessitated the need for the reliance on compound housing mode of dwelling. Compound houses exists in households.

Households are group of people living together in a compound house and sharing common cooking and daily house-keeping arrangements (Anyakoha and Eluwa, 2010). They are consuming units that exist in the physical environment which they depend on for their survival. The daily routine of domestic activities carried out by household are known as household chores. Household chores are the daily routine activities performed by a person to maintain a house and put every part of the living house in good and proper shape (Adams, 2009). They are tasks performed by homemakers and other members of the household or family.

Household chores are daily and compulsory duties and activities done by persons to maintain their household. These include preparation and cooking of meals, washing of cooking equipment and eating utensils, sweeping and dusting of rooms, emptying of refuse bin, scheduled scrubbing and mopping of floors, yard cane, decoration and renovations, cleaning of home ornamentals and furniture, laundry, keeping the environment clean among others (Okeke, 2007, Robin, 2005).

In the course of carrying out the scheduled daily household chores enormous quantities of diverse novel materials (Pollutants) are dispersed daily into the air water and land. (Jimoh and Ifabiyi, 2000). These cause a breakdown in the web of physical and biotic potential process. The link between the physical and biotic process is what maintain the ecological system in which man lines (Ahmed, 2002). Pollutants are unwanted by products of household chores or activities or used substances which have several consequences to health and environment. They are contaminants released during the use of various products and in performing routine daily household chores (Srinivas, 2004). There are expectations that pollutants are released whenever some household chores are performed in the home (Hales, 2000).

Households generate sewage, a variety of different types of more or less biodegradable solid wastes ranging from organic residues to plastic packaging material and indoor air pollutants associated with cooking and fire space heating, particularly in lower income households that use smoky fuels. The household chores that could produce pollutants according to Hales (2007) include fire wood fuel fumes kerosene fuel, gas fumes sweeping, dusting power generating set, bumming of refuse (papers, polythene, nylon, leaves etc) pounding in mortar with pestle, loud sound of music, the use of pesticides and insecticide, washing of lavatories, gutters, broken sewage system warming of vehicles among others, significantly pollute the environment. This is hazardous and injurious to both the environment and human beings. Pollutant is a substance or energy introduced into the environment that has undesirable effects or adversely affect the usefulness of a resource (Adams, 2009).

There are various factors that combine together which can influence the generation of pollutants from household chores. These factors include compound houses large populations, unapproved and unplanned buildings, lack of environmental hygiene awareness programme, increased domestic activities, and poor habit of hygienic practices. Other factors lack of knowledge in waste disposal practices, lack of waste disposal facilities operation of daily household chores includes among other. (Jimoh, 2003). The household pollutants that are generated from rotten foods, food remnants, burnt foods, dirty stagnant water, broken sewage system, greasy residue from kitchen and bathrooms and unhygienic household wastes could cause further deterioration of indoor air quality (Adams, 2009).

Environmental pollution is a generic term waste water because houses are built on canals. There is a significant relationship between household chore pollutants and environmental pollution. Wherever household chores are carried out, pollutants are pollution. The negative consequences of improperly managed environmental pollutants have great implications on the health of human beings and environment. These include environmental problems of air, water pollution, flooding, blockage of drains conducive breading environment for pests, spread of diseases such as Malawa from mosquitoes, cholera, dysentery, diairhoea and offensive odour (Brodrick, 2006). The health and environmental consequences of pollutants can be controlled by evolving some strategies.

Strategies are deliberate plans of activities adopted to cope with a given situation. The strategies of controlling pollutants is to contract the primary source of the pollutants. This can be achieved through the strategies of careful planning, organizing, monitoring of waste flows within households, the use of right methods, equipment, clearing agents and right attire in cleaning, dusting and washing. Other strategies include the regular disposal and evacuation of wastes and public enlightenment campaign on environmental sanitation.

Metropolitan cities in the north-west geo-political zone of Nigeria are the empire of economic growth and development but the environmental implications of such growth needs to be thoroughly managed because of its numerous and hazardous consequences. The critical and indeed the most prominent problems facing Nigerian cities are the environmental problems of air, land and water pollution, flooding, various health hazards, pile of sediments (aesthetic destruction), unsanitary conditions and low level of hygienic standard (Jimoh, 2003). The issue of environmental pollution and its attendant health problems in the study area is critical to the present study.

1.2 Statement of the Problem

Compound houses are most popular among the low income earners because of their affordability and capacity to accommodate a very large family size. Compound houses in the north-west geo-political zone area of this study are usually not as well planned as a standard house such as flats and duplexes among others. They in most cases lack the essential facilities and structures that could be managed and curtail environmental pollution. Compound houses are characterized by common toilets, bathrooms and kitchen without soak-ways and gutters for drainage. Often times they are not designed and are without the approval of the local or states government urban and regional planners. Compound houses seem to be vulnerable to environmental problems due to lack of facilities required to curtail the effects of pollutants generated from household chores.

It is common to find stagnant water within and outside the compound premises as a result of lack of drainage facilities. It create atmosphere for breeding of mosquitoes, flies, household flies, reptiles cockroaches in the environment. It also gives room for the residents to breath in polluted air. These may bring along with vomiting and diarrhea among others.

In most urban and rural areas, households solely depend on firewood and charcoal used as cooking fuels. Some compound house dwellers develop lungs diseases, eyes problems and difficulty in breathing as result of prolonged inhalation of smoke from dried leaves, animal dumgs, firewood, charcoal and smoke from burning of open refuse dumps. Kerosene is popularly used as cooking fuel by average households in Nigeria. Stoves and local lamps produce poisonous gases that ultimately pollute the air which affect the eyes and lungs of the users.

The erratic power supply by the transmission company of Nigeria (TCN) has placed a demand on dwellers for the use of electric power generating sets. The use of electric power generating set in and out the homes produces fames and noise polluting the air, water and land. These affects household negatively causing hearing loss, sleep disorder, inabilities to have good sleep and other health hazards like high blood pressure, chocking and eyes problems among others. This is as a result of long exposure to noise and fumes.

Furthermore, passers-by and even compound dwellers complain of offensive odour, oozing from uncovered sewage system. It is common to find dirty stagnant water within and outside the compound as a result poor drainage facilities, these also breed micro-organisms and diseases carrying insects such as mosquitoes, cockroaches, houseflies, greenflies, and even rodents and reptiles. Poor drainage facilities create conducive environment for pests and they spread diseases such as malaria fever from mosquitoes bit, cholera, dysentery, diarrhea and offensive odours. The problem of the study therefore whether the different pollutants relate to environmental pollution which will be addressed using empirical data.

1.3 Objectives of the Study

The major objective of this study was to assess how household chore pollutants related to environmental pollution among households in the North-West Geo-Political Zone, of Nigeria. Specifically, the study sought to:

1. determine the relationship between meal preparation activities and environmental pollution in compound house of North-west geo-political zone, Nigeria,
2. determine the relationship between the household cleaning/washing activities and environmental pollution in compound house of North-west geo-political zone, Nigeria,

3. determine the relationship between household cooking technologies and environmental pollution in compound houses of North-west geo-political zone, Nigeria,
4. identify the relationship between waste disposal methods and environmental pollution in compound houses of North-west geo-political zone, Nigeria.
5. determine the relationship between alternative sources of light and environmental pollution in compound houses of North-west geo-political zone, Nigeria, and
6. determine the relationship between the strategies employed by homemakers for reducing household environmental pollution in compound houses of North-west geo-political zone, Nigeria,
7. determine the level of environmental pollution in compound houses of North-west geo-political zone, Nigeria.

1.4 Research Questions

The following research questions were raised for the purpose of this study:

1. What is the relationship between meal preparation activities and environmental pollution in compound houses of North West geo-political zone, Nigeria?
2. What is the relationship between household cleaning/washing activities and environmental pollution in compound houses of North West geo-political zone, Nigeria?
3. What is the relationship between household cooking technologies and environmental pollution in compound houses of North West geo-political zone, Nigeria

4. What is the relationship between waste disposal methods and environmental pollution in compound houses of North West geo-political zone, Nigeria?
5. What is the relationship between alternative sources of light and environmental pollution in compound houses of North West geo-political zone, Nigeria?
6. What is the relationship between the strategies employed by homemakers for reducing household and environmental pollution in compound houses of North West geo-political zone, Nigeria?
7. What is the relationship between the level of environmental pollution in compound houses of North-west geo-political zone, Nigeria?

1.5 Research Hypotheses

The following null hypotheses were postulated for this study on the basis of the research questions raised:

HO_1: There is no significant relationship between meal preparation activities and environmental pollution in compound houses of North West geo-political zone, Nigeria.

HO_2: There is no significant relationship between household cleaning/washing activities and environmental pollution in compound houses of North West geo-political zone, Nigeria.

HO_3: There is no significant relationship between household cooking technologies and environmental pollution in compound houses of North West geo-political zone, Nigeria.

HO_4: There is no significant relationship between household waste disposal methods and environmental pollution in compound houses of North West geo-political zone, Nigeria.

HO_5: There is no significant relationship between alternative sources of light and environmental pollution in compound houses of North West geo-political zone, Nigeria.

HO_6: There is no significant relationship between the strategies employed by homemakers for reducing household environmental pollution in compound houses of North West geo-political zone, Nigeria.

HO_7: There is no significant relationship between the levels of environmental pollution in compound houses of North West geo-political zone, Nigeria.

1.6 Basic Assumptions of the Study

The study was based on the following assumptions that:

1. the type of houses inhabited and attendant household chores by community members contribute significantly to environmental pollution.
2. the types of household chores performed in household determine the extent of environmental pollution generated.
3. it is possible to determine the level of awareness on household activity of environmental pollution in the North-West geo-political zone of Nigeria.
4. a well thought out plan, sensitization and orientation could be employed to reduce household pollution generation in the North West Geo-political zone of Nigeria.

1.7 Significance of the Study

The result of this study will be of benefit to the households, communities, curriculum developers among others. This will be done by educating the public through public enlightenment; advocacy and health talk as these could sensitize community members on the need for proper environmental sanitation. The finding of the study will create awareness among families within the communities on the need to discover new ways of accomplishing household chores as it will help individuals to be conscious of household environmental pollution.

The findings of this study will be of great benefit to the communities on the need to ensure clean environmental conditions since some families share spaces and public areas together. The community members will experience better healthy living as a result of good air, clean water, safe and clean environment. Findings of the study will also compliment the efforts of the Federal Environmental Protection Agency (FEPA) as well as States' Environmental Protection Agencies (SEPA) on the weekly and monthly environmental sanitation exercises particularly in the states in the North West Geo-political Zone of Nigeria. The study will help expose areas that are affected with different types of environmental pollution, thereby making Federal Environmental Protection Agency (FEPA) as well as States' Environmental Protection Agencies (SEPA) direct their weekly and monthly sanitation chores properly.

The result is expected to open up new dimensions, ideas, and strategies to execute health laws on environmental cleanliness and monitor environmental degradation as carried out and championed by Federal Environmental Protection Agency (FEPA) and its counterparts at State level. The findings will therefore create awareness on the impact of poor sanitation on the health of community members who would consequently spend less on hospital bills.

The result is expected to lead to closer relationship between the sanitary management officers, health workers and the community as prompt information on health issues will be received from community members. Also, the result will help community leaders to have the cooperation of their people in managing environmental issues which will ensure better living. Findings of the study are expected to help governments to spend less on preventive rather than curative care of the citizens.

Finally, the finding will create awareness for future research work/efforts that could lead to the emergence of other problems in the area of household environmental pollution.

1.8 Delimitation of the Study

The study covered all the households within the communities in the selected local governments in the area of seven (7) states in the North-West Geo-Political zone, Nigeria. The states were Kaduna, Kano, Katsina, Zamfara, Sokoto Jigawa and Kabbi. The respondents in these seven states were specifically delimited to the household members in the communities who live in compound houses, who were either literate or non-literate because living in compound houses was not restrictive to educational qualification. The choice of these households was because they are directly responsible and accountable for the performance of household chores in their various homes and generated more wastes.

The study was further delimited to the following variables: Meal preparation activities, cleaning and washing, cooking technologies, waste disposal, alternative sources of light, and strategies employed. The restriction was based on the assumption of the researcher that these variables have significant influence on environmental pollution in the North-West Zone, of Nigeria.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

For the purpose of this study, literature were reviewed under the following sub-headings:-

2.1 Theoretical Framework

2.2 Concepts

2.2.1 Concept of Houses

2.2.2 Concept of compound Houses

2.2.3 Concept of Household chores

2.2.4 Concept of Environment

2.2.5 Concept of Environmental Pollution

2.3 Types of Environmental Pollution

2.4 Types of Household Chores pollutants

2.4.1 Meal Preparation Activities in the Household

2.4.2 Cleaning and Washing Activities in the Household

2.4.3 Cooking Technologies in the Household

2.4.4 Waste Disposal in the Household

2.4.5 Alternative Sources of Light in the Household

2.5 Strategies for Reducing Household Environmental Pollution

2.6 Level of Pollution

2.7 Empirical Studies

2.8 Summary of the Reviewed related Literature

2.1 Theoretical Framework

The present study was predicated on the theory of environmental settings propounded by Nightingale (1985). The theorist asserts that environmental settings are appropriate for the gradual restoration of the individual health and the external factors associated with the individual surrounding that affect lives and physical process. Nightingale (1985) identified some household chores that pollute environment such as cooking, washing, laundry, burning of refuse etc. other authors such as Craven and Hirnle (2003) also identified the household chores that pollute environment such as paints and solvent, and automative products, pool chemical, health and beauty care product.

Nightingale (1985) stated in her nursing note that nursing "is an act of utilizing the environment of the patient to assist him in his recovery" , she added that it involves the individual's initiative to configure environmental settings appropriate for the gradual restoration of the individual's health, and that external factors associated with the individual's surrounding affect life or biologic and physiologic processes, and his development.

By this, Nightingale (1985), explained that there is the need for the following:

1. Pure fresh air – "to keep the air he breaths as pure as the external air without chilling him."
2. Pure water – "well water is of a very impure kind of water used for domestic purposes. And when epidemic diseases shows itself, persons using such water are almost sure to suffer."
3. Effective drainage – "all the while the sewer maybe nothing but a laboratory from which epidemic disease and ill health is being installed into the house."
4. Cleanliness – "the greater part of nursing consists in preserving cleanliness."
5. Light (especially direct sunlight) – "the usefulness of light in treating disease is very important." (Nightingale, 1985).

This theory received the support of scholars in Nigeria such as Bukola (2005), Aminu (2009), Kozier, Erb, Bermen, Siydel (2013), who posits that household chores pollutants such as disposal on the streets waste generated from electricity, kerosene, gas, firewood, charcoal play significant role on environmental pollution.

In Nightingale (1985) theory, public environment is affected by the household products that releases toxic chemicals that affect the air, water and land. The theory is significantly related to the present study as it focuses on curtailing household chore pollutants in the compound houses and environmental pollution. The present study draws inspiration from Nightingale's environmental theory.

2.2 Concepts

2.2.1 Concept of Houses

A house is a social unit where people live. Agboola (2005) explained that some houses are the direct expression of the changing values images, perceptions and ways of life, as well as of certain constancies. Uzumah (2001) agrees that household is a social unit that lives in a house. A household is also defined as a dynamic institution and organization that is constantly adapting to internal and external influences (Uzumah, 2001).

According to Uzumah (2001) a house is generally a shelter or building or structure that is a dwelling or place for habitation by human beings. The term includes many kinds of dwellings ranging from rudimentary huts of nomadic tribes to high rise apartment buildings. Hoover (2001) opines that a house may mean the same as dwelling, residence, home, abode, lodging or accommodation for family or housing alcoholic, among other meanings. Bamigboye and Odundele (2005) say that a house is characterized by a physical building which is furnished and decorated according to taste and social status, and economic status of the occupants. The house provides warm atmosphere for meeting the basic physiological, spiritual, economic, social, physical and emotional needs necessary for achieving a complete and meaningful life.

Oladapo (2006) considers a house as a shelter (with other essential facilities like water supply, electricity, sewage system, bathroom, toilets and kitchen) which permits sufficient convenience, comfort and safety for family living. Moreover, Agboola (2005) sees a house as the direct expression of human ways of life, as well as of certain constancies. Housing is also defined as both product and process. As a product, it describes the shell or structure of dwellings: It is the design and basic built-in equipment (such as the amount of allocation of open space, sanitary facilities etc) (Agboola, 2005).

According to Karter (2000), housing is a process of bringing a house into being (i.e. the construction, the neighbourhood layout, materials used for building a standard house for the well-being of occupants. Onibokun (2008) defines a house as an ideal place to live in which assists the occupants to carry out their daily chores efficiently. It provides space for eating, carrying out household chores and enjoying oneself, such as simply listening to music. It is also a place where one share things with others. To Karter, (2000), the word "house" has many meanings: For most people it signifies or denotes security, comfort, companionship and leisure.

Housing is more than the care for just a roof for everybody (McCarthy, 2007). Onibokun (2008) opined that housing is a broad term that includes both inside and outside housing. It should be a source of satisfaction and should be flexible enough to continue to satisfy you as one as one’s life situation changes in terms of needs and values, regardless of the type of dwelling in which one lives. Odeyemi (2008) pointed out that housing is a means by which a man expresses himself. The styles and the designs of the house are affected by individual taste and the desire to attain the highest level of architectural beauty of the period. Bello (2007) also explained that every family requires shelter and house used as a home base. Housing has a great effect in one's life style and personal development. One’s house affects one’s behaviour and seal, and your style of living affects your housing. Kick Lighter (2008) indicated that the term housing refers to more than just a dwelling. It also includes all that is within the dwelling. Ann & Anderson (2008) indicated that the quality of a family housing can influence the development of health, comfort, and happiness of the households.

Housing Needs

Need is a concept that could be considered from several views. It could be personal, socio-economic, practical, cultural, religious, governmental, and so on. A need is therefore measured with reference to particular periods of time and geographic areas. However, three steps required to meet up with the housing needs of under-developed countries according to Agboola, (2005) are:

a) remove existing housing shortage

b) replace the large quantity of sub-standard housing now occupied: and

c) cater for the additional population increase in the urban areas.

According to Imnakoya (2006), the four dimensions in which housing needs are mentioned are itemized:

a. The physical quality of the dwelling unit: That is houses with uncompleted indoor plumbing or in a state of extreme physical disrepair.

b. Extent of overcrowding; that is where a household lives in physically adequate housing which consists bathrooms, store, lobby etc).

c. 'Burden of housing expenditures

d. Quality of social and physical environment:

That is where family members may be adequately housed, not over crowded but live in neighbourhood setting that falls below the minimum standard of acceptability. Imnakoya (2006) opined that a need is something more than a numerical quantity of dwelling. Other essential requirements with public housing scheme programme are:

a) Health: such as potable water supply, wastes disposal systems, medical care and others.

b) Economic: That is, public transport services, food market.

c) Socials: That is clubs, recreational centers, religious institutions.

Imnakhoya (2006) further stated that neighbourhood conditions, structure, internal inadequacies of dwelling units and their peculiar requirements and traditions combine to constitute different needs for individuals, families and households. The American Public Health Association (APHA) as reported by Karter (2000) identified four areas of adequacy that housing must satisfy: These are:-

a. Fundamental physiological Need: Atmosphere of reasonable chemical purity, admission of natural and artificial lighting, space for recreation, protection against excessive noise

b. Fundamental psychological Needs: Safe, sanitary, water supply, toilet and storage facilities, exclusion of vermin which transmit disease, good sanitation, adequate sweeping space, etc.

c. Need for protection Against Accidents: Common are fire, construction and electrical defects, injuries in home traffic hazards, etc.

Imnakoya (2006) opined that housing needs are based on cultural norms, regardless of socio-economic status and the consumers housing needs can only be defined in terms of these norms, which in turn are applied to justify the various aspects of life style or level of living. That is, the consumer needs what others in the society think he ought to have in order to be respectable. Smith (2000) viewed housing needs as a planning concept, which expresses the difference between actual conditions on one-hand and minimum standards on the other hand.

Odetolusu (2003) lamented that the level and type of housing needs are not uniform across the country and the practice in Nigeria of allocating housing units to all states is very unrealistic. As such, Federal Housing Authority (FHA) should device an objective method of assessing the dimension of housing problems and the number and type of houses needed in each state. The (2002) National Housing Policy stated that Nigeria needed 37 million housing units to meet present and future needs (32 million in the rural areas and 5 million in the Urban areas). The amount of essential services needed was approximated to be equivalent cost of producing about 3 million new housing units. Also, about 100 billion Naira is required to realize the Nigerian dream of "Housing For all By The Year 2000 A.D". According to Coker et al (2007) the urban population of Nigeria by the end of the century will be nearly 60 million and consequently 6 million new housing units will be required between 1980 and the year 2020.

Coker (2007) pointed out that there is need for an urgent "Housing standards to address the housing needs of different localities in order to ensure that the social and cultural sensibilities of Nigerians are taken into consideration. He further reiterated that the country needs to come up with housing standards to cater for the varying requirements of housing types and household chores performed in these houses across the country.

Housing Standards

The process of evolution of standards came as a response to observed failures in the environmental dynamics in the developed countries. However, in developing nations housing standards were imported. The former British colonies fashioned out their own regulations after the British Model (Bamigboye, 2005). In setting up housing standards, the Nigerian Housing Scheme (2002) pointed out that specific standards applicable to space and different types of occupancy be clearly designed. It should be clear whether it is the minimum which no family is expected to violate. He further mentioned that standard should be analyzed with respect to the quality factors and international normative standards set up, mostly with respect to health and general community welfare.

Bamigboye (2005) pointed out that the standards are changing from "minimum" requirements of habitable areas and space to controlling over-crowding and promoting better sanitation (including plumbing, water supply, drainage, etc); ventilation, greater safety and privacy. This also includes storage facilities, the preparation of food; the general neighbourhood and its relation to those respects of community life which are of significance to only particular households. There must also be provision for relatively high levels of community services, facilities and utilities even in cases where the household income does not allow for high level of shelter.

The United Nations (1980) at a seminar of experts on “Building Codes and Regulations in Developing Countries" prescribed standards for eleven facility indexes for low-income houses and which countries were expected to adhere to. The standards were in connection with the following facility indexes:

a. Adequacy of space for outdoor chores; According to the United Nations low income houses should be walled or fenced with a compound and a backyard. If they are blocks of flats, there should be a balcony with rails.

b. Fundamental psychological Needs: The facility index is in relation to overcrowding. A maximum of three people-per. room (two adults and one child) is prescribed.

c. Adequacy for privacy: The facility for adequate privacy prescribes to ·metres between blocks and 30 metres with the opposite blocks.

d. Ease of Household operation: For this facility, there should be pipe-borne-water with the house having a small kitchen; a shower bathroom and storage facilities.

e. Maintenance and cleanliness: According to this prescription, blocks or houses should be renovated at least once in 15 years; there should be communal refuse disposal system and at least one central dustbin for blocks.

f. Facility for Aesthetic: It is prescribed that the external walls and 'surrounding of blocks and houses should be painted with a mixture of matching colours.

g. Protection Against Contagion: The surroundings of blocks should be cemented and drained. The environment should be sprayed as often as necessary.

h. Facility for water supply: The United Nations prescribed communal pipe-borne water for the low-income houses, recommending at least one stand for every 100 houses on every other street.

i. Toilet facilities: One pit latrine between 5 dwelling units is prescribed.

j. Good Storage facilities: Some storage space and facilities should be provided.

k. Facility for protection Against Accident: This facility is in relation to three attributes, thus:-

    i. Construction of building system to be built should be with materials that are mostly industrial and factory made.

ii. Fire protection: There should be at least one fire extinguisher or alarm per block and also access way for fire fighters.

iii. Traffic:- It is prescribed that there should be good road network within the estate.

Bamigboye (2005) pointed out that social scientists generally see developing countries as emulating the experience of industrially advanced countries in housing. The lowcost houses in developing countries fall short of standards. Most houses are too expensive for those (the low income earners) for whom at least in theory basis of acceptable standards, are generally beyond their means. Imana further maintained that the houses must have the bearest minimum adequacy sanitary facilities; these standards cannot be lowered and must be adhered to at all cost, whatever be the location and whatever the economic, situation of the country. According to Usman and Raheem (2010), basic minimum standard of houses should cater for the tradition of the people with the environment it represents as it is unworkable to impose a standard which is at variance with the local customs.

Ukong and Chamberlain (2010) also said that any responsible government anywhere in the world will put in place facilities that will make delivery of decent housing for her citizens easy. She will also provide and maintain technical and social infrastructural facilities and services such as roads, water, electricity, functional drainage channels, schools, hospitals, clinics etc for her citizens at the right time in the right places, in the right quantity and of the right quality. However, for reasons of economy, standards could be set temporarily at relatively low ever levels. But, promotion of high standards for future development should be aimed at in accordance with anticipated economic and social advances, and the improvement of dwelling as family progresses in life.

2.2.2 Concept of Compound Houses

According to Lewis (2005), types of housing in the past were determined "by the availability of the materials and the locality". Today, with the advancement in technology, there are improved building materials in the society. Thus, assorted styles and designs are built (Ann, & Anderson 2008), though the geographical condition and availability still influence the type of house built in an area as listed below:

1. Single Room Apartment: This is a house that provides living space for one family. It is not attached to any other building. It usually stands on a separate lot with a lawn and outdoor living space. They may be small or large, one story or several stories higher. They offer more privacy than other types of housing.
2. Multiple/double room family Apartment: This is a building that, contains a number of separate living rooms. It ranges from three to four apartment.
3. Town Homes or Houses: These are town homes or houses are built in rows and attached at the side walls. Each family lives in a different unit.
4. Manufactured homes: This is also called a mobile home. It is a factory built house, which is moved to their final location through the use of truck. These types of houses are less expensive than traditional single family houses. Some come with complete furniture and furnishing and other appliances (Abraham, 2006).
5. Rooming house: A type of single room occupancy building where most washing, kitchen and laundry facilities are shared between residents, which may also share a common suite of living rooms and dining room, with or without board arrangements.
6. 2-Flat, 3-Flat and 4-Flat houses: According to Abraham (2006) these are

houses or buildings with 2, 3 or 4 flats, respectively, especially when each of the flats takes up one entire floor of the house. There is a common stairway in the front and often in the back providing access to all the flats 2-flats and sometimes 3-flats are common in certain older neighbourhoods.

7. Garden Apartment: A building style usually characterized by two stories, semi-detached buildings, each floor being a separate apartment.

8. Mess: A building or flat with single bedroom per tenant and shared facilities like toilets and kitchens.

9. Studio apartment or bachelor apartment or efficiency apartment: a suite with a single room that doubles as living/sitting room and bedroom, with a kitchenette and bath squeezed in on one side. The unit is designed for a single occupant or a couple.

10. Single Room Occupancy: A studio apartment, usually occurring within a block of many similar apartments, intended for use as public housing. They may or may not have their own washing, laundry and kitchen facilities.

11. Apartment: A relatively self-contained housing unit in a building which is often rented out to one, two or more people sharing a lease in a partnership, for their exclusive use, sometimes called a flat or digs.

12. Apartment building: A multi-unit dwelling made up of several (generally four or more) apartments. (Contrast with two family houses and three families).

13. Barracks: A type of military housing, formerly connoting a large "open bay" with rows of bunk beds and attached bathroom facilities. But in the most recent four or five decades in the United States, Armed Forces are most times excepting boot camps, a dormitory layout for two to four occupants. The apartment styling and extra privacy was found to aid retention of trained

personnel in volunteer based professional (non-draft dependent) military branches.

14. Stilt houses or pile dwellings: Houses built on stilts over the surface of the soil or a body of water.

15. Vernacular house: House constructed in a native manner, close to nature, using the materials locally available.

16. Duplex: Commonly refers to two separate residences, attached side-by-side, but is sometimes used to mean stacked apartments on two different floors (particularly in urban areas such as New York and San Francisco).

17. Modern Houses: As described by Klicklighter (2008) are listed below:

    a) The walls are constructed with concrete blocks. The blocks are made by mixing cement, sand and water at a ratio of about one part of cement to six part of sand. The mixture is turned into a uniform paste with a shovel or by a concrete mixer and molded into blocks. The blocks are left to dry slowly. They are usually sprayed with water to make them stronger and prevent cracking.

    b) The roofs of modern houses are built with any of the following; corrugated iron sheets, cement tiles, Adex roofing sheets or asbestos sheeting.

    c) The walls are finished by plastering with cement and painted with different types of paints. They can also be finished with ties or wooden panels.

    d) The floor can be made of any of the following materials: concrete, wood, ring tiles, terrazzo etc. Terrazzo is hard wearing:

    e) Windows and doors of a modern house can be made of wood and steel frames with glass panes-louvered windows are common. Sliding doors and windows are also available. Doors and windows are today commonly fitted with metal burglar-proof bars.

f) Modern houses usually have the following rooms: kitchen, store, sitting room, dinning rooms, bedrooms, toilet and bathroom. Some may also have a study room, garage and veranda.

g) Modern houses can be bungalows or storeyed. flats or a duplex. They can also be unit houses.

Guabor (2000) opined that a block of flats is a house that is made up of a number of complete housing units each of which is self-contained and can be occupied by a family. A duplex is a house that has just two floors and built to serve only one family, a house unit is also one that is occupied by just one family.

Compound houses are the setting of family living in an enclosed structure which is made up of many single rooms and barrack models. Compound houses are popularly called “face me I face you”. They are sub-standard and they lack the features and facilities of standard houses with serious consequence on individuals and family lives. Compound house are characterized by many occupants, poor and inadequate facilities of drainage system, and toilets, bathrooms, kitchens among others. Facilities like toilets, bathrooms, kitchen parking spaces are often shared among the occupants. Some of these factors limit the efficiency of living in compound houses in Nigeria.

2.2.3 Concept of Household Chores

Adams (2009) defined household chores as tasks performed by homemakers and other members of the family. Okeke (2009) equally defined household chores as many duties performed by established family members. Household chores when successfully performed by family members make for happy and good quality of life. These household chores include fetching of water, sweeping and dusting of room, fetching and collection of firewood, food preparation and cooking, washing of dishes and cooking utensils, laundry work, bathing,and making beds. Others are pounding, emptying of refuse, burning of incinerators, generating electricity with mini-generators, house polishing, driving of automobiles, washing of toilets and bathrooms, listening to music and others.

Household chores are part of looking after a residence and the people in it, and doing a piece of work especially some important chores that must be done regularly (Okeke, 2009). Household chores are things that all households have in common whether they are old, young, married, or single. These chores must be done properly to keep the house in good shape for dwelling (Uzumah, 2001). Household chores cannot be separated from the environment. Thus, every family member performs their daily chores to keep the house and environment clean and free from pollution. According to Musa (2001), the by-product of these chores may cause environmental pollution which affects the air people breathe in. The pollution can also affect the soil and sources of water supply by causing acidic toxicity.

Variety is the keynote of what a homemaker does. The content of the job of a homemaker varies from day to day and from task to task (Okeke, 2009). In order to achieve the functions of a home, a wide variety of tasks are done. An overview of what a homemaker does can be obtained by considering the day to day chores. The researcher said further that the number of chores also grossly describe the amount of shifting from one task to another. The number of changes of activity during a day suggests a substantial amount of shifting form one activity to another. Family is a bond of relationship connected by birth (Okonkwo, 2005). It may form a larger extended family particularly within the context of African society. Wikipedia (2010) describes family as a group of related people who share a house. Family also refers to all people's ancestors and other relations living together.

Okonkwo (2005) noted that the members belong to the family through birth, marriage and adoption. However, every group that is not based on kinship think of themselves as a family because they share a house and feel ties of affection. Encyclopedia Americana (2001) defined family as a group of persons related by birth that resides in the same house. As the first social unit of a child, it has great influence on the life of the society. Mansuri (2009) and Habib (2007) are of the opinion that family is established and ordained by God for the purpose of love, companionship, economic development, security, sexual needs and the want of children for continuity.

The house is the centre of performing family chores. The chores include decision making, home gardening, shopping, entertaining guests, planning and preparing meals, house cleaning, animal rearing, environmental clearing, electricity generating, burning of refuse, among others (Habib, 2007). Children learn basic social skills such as how to interact with others and how to get the house clean in the home. The family members also learn and acquire health and safety habits. A home life could be influenced by relatives who live outside the family house, traditions, laws and social conditions help to determine who does what in a home and the performance of household chores by all the members of the family.

In many societies, the woman's roles are influenced by the cultural norms and gender issues which determine the position of women in the society. Most of the times, cultural norms favour women mainly in their domestic and marital roles whether they are employed or not. Galadima and Garba (2011), agreed that the society regards women as secondary to their husbands who are accorded the "head of the house". According to Smith (2000) it was stated that the earliest prehistoric people probably lived in groups made of several families.

They moved from place to place hunting animals and gathering wild plants for food. equally stated that while the men hunted animals the women were busy giving birth and caring for children. The women's primary roles in the family are reproduction and education of children, these are contrast with their husband.

American Time Use Survey (ATUS) (2009) identified households chores available in homes as including those tasks performed by persons to maintain their houses and surroundings. These also include housework, cooking, pet care, vehicle maintenance and repair, home maintenance, repairs, decoration, renovation, household chores and organizational chores (such as refilling of gas, filling out' paper work, balancing the check book etc). Household chores performed by families as stated by Usman and Raheem (2010), include production roles, which comprise fetching of water, animal rearing, food processing and cooking, and washing of cooking utensils. Other chores include emptying of refuse bins, laundry work and washing of toilets and bathroom, home gardening, entertainment of guest, cleaning and clearing of the environment as well as provision of alternative source of light and power.

American Time Use Survey report (2009) indicated that types of chores generated, have a kind of effect on the environment and these include:

i. Cooking of food which involves pounding of yam, ingredient, use of mixers, blenders which produces noise pollution. Cooking with firewood and kerosene as well as gas stoves which affects the environment negatively with offensive thick smokes and fumes.
ii. Sweeping and cleaning of the household with the use of vacuum cleaning

machine create noise pollution. The use of broom raises dust from the carpets, floor, upholsteries and chair.

iii. Washing of cloths with soap and detergents caused water and land pollution, making the water hard and undrinkable. The soapy water destroy the land. Therefore, crops and plants cannot grow in the area.

iv. Through washing of dishes and utensils, the oil substances and food remnants, as well as soaps and detergents pollutes the water and land in the environment.

v. Refuse disposal can cause air, land and water pollution when not properly manage and disposed. The delay can cause offensive smell or odour, attracts as well as become breeding ground of pest that are disease carrying agents.

vi. Through animal rearing in the household, the air could become polluted from their feeds and feaces. Similarly, feathers of birds can cause allergy and the noise from the birds could cause air and noise pollution that makes life unbearable for human.

vii. Entertaining guest can also cause land and noise pollution through the littering of food remnants and items carelessly as well as the high level of sound from the music boxes used to entertain the guest.

viii. The clearing of dead, dry leaves and sticks from trees from the ground causes the rise of dust that affect the quality of air within the environment. Similarly, the burning of these dead, dry leaves and sticks also constitute air pollutants because of the smokes that it generate.

ix. Rattling sound from alternative source of light and power especially from the generating sets causes noise pollution. Also, the fume from the generating set produces carbon monoxide that destroy the air within the environment and invariably becomes harmful to human.

Okeke (2009) explained that there are five major household tasks, namely; preparing food, house cleaning, washing, family care and marketing. Homemakers from different sphinxes of life such as the full-time farm homemakers, full time city homemakers and employed city homemakers on each day perform these tasks (Okeke, 2009). Habib (2007) noted that these' housekeeping always makes the home remain attractive and not the amount of furniture in it. Okeke (2009) said that a good housekeeping covers a wide range of house work for example preparation of food with firewood, stove, cooking gas, laundry, cleaning of the different surfaces in the home, application of insecticides e.g. otapia-pia, sheltox and cleaning of dustbin, sewing or mending equipment, emptying of bins, marketing, entertainment, child care, burning of tyres burning of incinerators, washing of gutters, sweeping of the surroundings and others. Performance of household chores is time consuming and very tasking to family members. It is therefore most essential to find ways and means of simplifying the various household duties.

Anyakoha (2000) indicated that from time immemorial, the role of women in the family are spelt out to avoid confusion in their role performance. stated that women are expected to bear children, involve in agricultural production and housekeeping. The preparation and serving up of meals is one of the exciting roles of women and it involve other roles like chopping of firewood, the milling food item like pepper, millet and other soup ingredients and will as the cooking proper. Anyakoha (2000) explained further that the wife is free to pursue her own trade but it is the men's duty to provide for all her needs for carrying out responsibilities in the home. He sums up thus "the situation will prevent that the American Women have to fight against an oppressive culture, religious obligation, illiteracy and outright discrimination against sex in the so doing in order to make it as a satisfied woman, Galadima and Garba (2012) in his study on cultural and scriptural roles of the wife and husband discovered that in most cultures, like among Yoruba and Hausa couples, domestic chores appear to be solely within the domain of women. Any participation by men in this area may be viewed as trespassing their given roles. Consequently, parents, relatives and friends would frown at it. Also male children are not allowed to help in performing household duties with their mothers, which could result in boredom and dissatisfaction with tasks in the family.

Anyakoha (2009) said that women's roles are to bear children and nurture them. The women prepare the food and serve meals for the family, look after the husband and children, take care of the house, participate in the buying of clothes for the family, contribute to the education of the children by meeting some educational needs and also serve as models to the daughters. The above identified roles are widely accepted. Baxter (2002) also confirmed that the wife is regarded as the chief homemaker of the family and the one whose major role expectation is to cook and serve meals for the family, dress the bed, clean the house and its environs, wash of dishes and cooking pots, and shop and among other.

Accordingly, the man is the bread winner, and the head who controls the family and sees to the welfare of every member of the family. Baxter (2002) investigated into men and women level of enjoyment of household chores performance., The researcher found out apart from been the head of the house, men generates light and power in the home, spraying insecticides in the rooms, locking of windows and doors at night, purchasing of food items, gardening and sometimes racking and cleaning up of the surroundings, repairing of broken sewage systems, rearing of pets and car driving. Baxter (2002) added that the above household chores could also be performed by any member of family. In the same vein, the children are expected to clean up after cooking, wash plates, sweep, empty dustbins, and hawk farm produce, fetch water and run general errands in the family. Habib (2007) in his study of family roles found that both husbands and wives are dual earners. In India, men are mainly appraised in their role as providers.

The striking findings are that the employed women are the most conservative in their performance of household chores. Baxter (2002) further reported that dual earner couples experience maximum satisfaction in performing their gender roles. This signifies that women employment does not alter sex role perceptions mainly because of the prevailing culturally defined gender-based norms. Many families today do not have a stay-at-home parent because of their job condition and for this reason, children are exposed to doing household chores, which are needed for training. Work, family chores, personal interests and community responsibilities keep families twice as busy as they used to be. In order to keep a home running smoothly, all family members should share responsibilities. Household chores assigned to children tend to be self-care tasks such as making the bed and keeping the bedroom tidy. Children are expected to participate in family care tasks, but they are usually requested to help or expected to volunteer for such jobs rather than given responsibility for them (Baxter 2002).

The perception of household task performance is becoming more flexible. This is demonstrated in a study conducted by Veufert and Ernest (2002) on views of adolescents on' children's involvement in household work, in six countries. They discovered that very few adolescents thought that children should be involved in household work. The range of responses are 1-2% for self-care tasks and 2-5% for family care tasks. In all countries, majority of adolescents thought that children should begin self-care tasks early, either from age 6 or 7 (range 29-30%) or younger (range

29 - 39%) or younger (range 18 - 54%). In contrast, fewer in each country thought children should begin at 8 years or older. They also discovered that almost all of the adolescents thought that ·children's involvement in household work had some values. The range of 'no value' response over the countries was only 2-3% for self-care tasks and 1-3% for family care tasks. Only a small percentage (2%) saw the major value as helping parents (range 7 - 14% for self care tasks, 13- 24% for family care tasks). Majority of answers referred to developmental value of household work for children. Adolescents saw household work as a way to encourage the development of responsibility in children.

Taking responsibility for chores is an important lesson that parents can teach their children. House tasks help children understand that living in a family involves work and that every member shares the responsibilities and the benefits; through chores, performance children become more responsible and self reliant; chores build self-esteem. As their confidence blooms with each new task mastered, children learn necessary life skills and the ability to prioritize, organize and use time wisely. Assigning of tasks to children also helps parents to achieve their primary goals - to teach children to be responsible and capable adults.

Generally therefore, *Household chores* are those done by persons to maintain their households. These include housework; cooking; yard care; pet care; vehicle maintenance and repair; home maintenance, repair, decoration, and renovation; and household management and organizational chores (such as filling out paperwork, balancing a checkbook, or planning a party). For a more detailed description of this activity category. Illustrations of some household chores can be seen below including cleaning, cooking, dining, laundry, sewing, and other household chores.

Cleaning

Household cleaning chores include dusting, mopping, polishing, window washing and beating furs.

Cooking and Dining

The Cooking and Dining include preparing and consuming food for people in the home.

Gardening and Lawn Care

The Gardening and Lawn Care include chores and equipment necessary to maintain a lawn and garden.

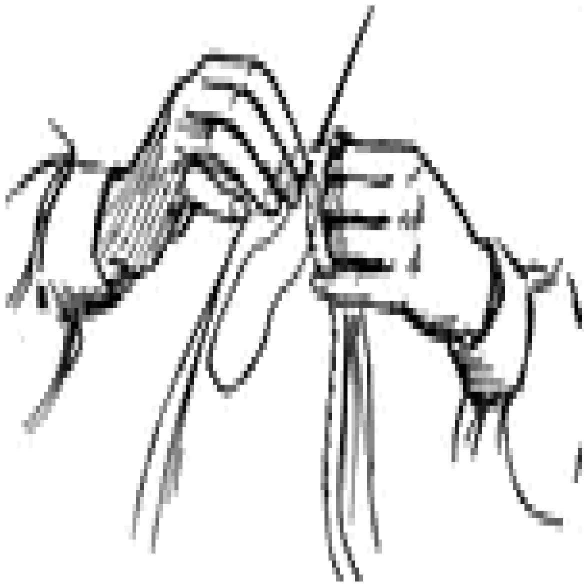
Laundry and Ironing

The Laundry and Ironing include chores and equipment needed to wash, dry, and iron clothes.

Other Household Chores

The Other Household Chores include a wide variety of chores from bathing to flower arranging.

Spinning, Sewing, and Mending



Spinning, sewing, and mending are also included in household chores along with the necessary equipment and supplies.

According to Abraham (2006) household chores include housekeeping which accordingly is the act of cleaning the rooms and furnishings of a home. It is one of the many chores included in the term *housework*. Housecleaning includes chores such as disposing of rubbish, cleaning dirty surfaces, dusting and vacuuming. It may also involve some outdoor chores, such as removing leaves from rain gutters, washing windows and sweeping doormats. The term is often used also figuratively in politics and business, for the removal of unwanted personnel, methods or policies in an effort at reform or improvement, (Rollings, 2011).

Housecleaning is done to make the home look better and be safer and easier to live in. Without housecleaning lime scale can build up on taps, mold grows in wet areas, bacterial action make the garbage disposal and toilet smell and cobwebs accumulate, (Kim and Aggie, 2004) Tools used in housecleaning include vacuum cleaners, brooms, mops and sponges, together with cleaning products such as detergents, disinfectants and bleach.

A regular house cleaning usually involves cleaning everything in sight. However, house cleaning may also involve cleaning hard to reach areas, moving furniture and cleaning thing that are not in sight. This can include the inside of an oven, inside of a refrigerator, and moving appliances to get those hard to reach areas.

Disposal of rubbish is an important aspect of house cleaning. Plastic bags are designed and manufactured specifically for the collection of litter. Many are sized to fit common waste baskets and trash cans. Paper bags are made to carry aluminum cans, glass jars and other things although most people use plastic bins for glass since it could break and tear through the bag. Recycling is possible with some kinds of litter, (Dellutri, 2005).

Over time dust accumulates on household surfaces. As well as making the surfaces dirty, when dust is disturbed it can become suspended in the air, causing sneezing and breathing trouble. It can also transfer from furniture to clothing, making it unclean.

Various household cleaning products have been developed to facilitate the removal of dust and dirt, for surface maintenance, disinfection and to a large extent prevent environmental pollution, (Galadima and Garba, 2012). Products are available in powder, liquid or spray form. The basic ingredients determine the type of cleaning tasks for which they are suitable. Some are packaged as general purpose cleaning materials whilst others are targeted at specific cleaning tasks such as drain clearing, oven cleaning, lime scale removal and polishing furniture. Household cleaning products provide aesthetic and hygiene benefits but are also associated with health risks for the users, and building occupants, (Kwon, Jo, Lim, and Jcong, 2008). Generally, disinfectants stop smell and stains caused by bacteria.

Residue from cleaning products and cleaning activity (dusting, vacuuming, sweeping) has been shown to impact indoor air quality (IAQ) by redistributing particulate matter (dust, dirt, human skin cells, organic matter, animal dander, particles from combustion, fibers from insulation, pollen, and polycyclic aromatic hydrocarbons) that gaseous or liquid particles become adsorbed to. The particulate matter and chemical residual will of be highest concentrations right after cleaning but will decrease over time depending upon levels of contaminants, air exchange rate, and other sources of chemical residual, (Nazaroff, and Weschler, 2004).

While household chores can be seen as an objective chores that can be done by any kind of human person, male or female, some people have argued that household chores is a site of historical oppression and gender division between traditionally gendered men and women, (http://www.feministezine.com/feminist/modern/The-Politics-of-Housework.html). However, housekeeping also has a role in maintaining certain parts of the capitalist economy, including the division of home and work life, as well as industries that sell chemicals and household goods (http://bad.eserver.org/issues/2012/82/hankwitz.htm)

Household Units Related Chores

The house is divided into units where the family chores are daily carried out. According to ATUS (2009) the units of a house has made household chores more of drudgery. Bamigboye and Odundele (2005), stated that the existing units include the kitchen, sitting room, bedroom, 'bathroom and the surroundings.

(a) Kitchen: Okeke (2007) observed that the kitchen is the centre for food planning, preparation, food storage and services in the home. Chores such as pounding, blending, washing of utensils, grinding and cooking are carried out here. Thus there is the needs for proper planning and furnishing so as to save labour, prevent accidents, create space and ensure good health for the family. Whatever the income of the family, the kitchen which is the key centre of household chores performed in the family should be well planned to facilitate the acquisition of hygienic habits and be comfortable to work in. Okeke (2007) stated that the design of a kitchen with its facilities and space allocation must allow for easy cooking and other kitchen chores. Planning with strong emotions can be generated by the manner in which space is used. It may spell freedom, comfort, inspiration, confusion, cluster or efficiency among possibilities.

According to Baxter (2002), the way the kitchen is built may affect one as it would be an ordeal to perform chores in it. Desirable facilities include water, heat, provision for safety and protection against accidents, a cupboard and shelve at the appropriate location for storing, appliances, eating ware cutlery, etc. The light selection of natural and artificial lighting is desirable so that equipment and work surfaces are 'well lit whenever they are in use. He further stated that a yard adjacent to the kitchen be paved to enable one perform some of the operations which are often better done outside. This should be a space to dry or cut some vegetables or washing of meat etc. Whether the dining area is separated from the living room or not the area should be well planned with space for a table to serve at least six people. Also, direct connection between dinning space and kitchen, and convenient access to the dinning room enables convenient services.

(b) **Bedroom:** The bedrooms is private to occupants and are so important that houses are frequently categorized as one, two, three or four bedroom flat. The family numerical strength determines the number of bedrooms needed (Baxter 2002). Veufert (2002) stated that all bedrooms be conveniently located with easy access to the bathroom, toilet and such chores as laying of bed, changing of dress and raiment, sewing, studying knitting, ironing of clothes and arranging of wardrobes. Enough space is therefore desirable to accommodate beds' permit cleaning under them, and provide for the necessary storage and closet facilities for small items commonly used in it as, writing and reading equipment and sieving supplies, also, in each bedroom provision should be made for a built-in-helping cupboard and equipment with ample space for clothes. Storage space should be ample, convenient and be damp-proof with enough lighting and air circulation. According to Okeke (2007), such chores as relaxation, body exercising, bed making, spraying of insecticide, burning of incense, physical care for child, men, sweeping the room, dusting the furniture, scrubbing the floor, and others should be easily carried out.

(c) Living/Sitting Room: Since family members spend most of their times and working day in the sitting room, the area requires a relatively large room preferably oblong in shape, situated as to obtain maximum of lighting and arranged to provide several centres of interest and chores in which all family members can take part. Alabi (2009) pointed out that essential items to be supplied in this area include standard unit shelves for books, drawers for cutlery and small articles, and fixing or fitments to take certain rods over windows and doors to prevent damage to the walls of the house on change of tenancy. Baxter (2002), said that the living room is used for various chores such as entertaining guests, listening to the radio, watching television, reading, telephoning, sweeping of floor, rug,' carpet and dusting of furniture, picture frames, arranging of furniture etc. While some chores suggest privacy and quietness at one time or another or involve two or more people, others do not. Also these chores are not confined to one room as cooking is to the kitchen, personal hygiene to the bathroom and sleeping to the bedroom. For good ventilation and for good view of the outside, Baxter (2002), suggested that the living room windows be larger than those in other rooms.

(d) Bathroom–Toilet: This area contains the sanitary and principal washing conveniences (bath, toilet seat and wash hand basin). In most houses of three bedrooms and less they are usually in .a single room, In all houses for high-income earners, two toilets are recommend. For convenience and hygiene purposes the bath and toilet should be in separate compartment and be readily accessible from the bedrooms through a common doorway. According to Bawa (2004) some of the chores carried out in this part of any building include washing of hands, bathing by family members, washing of clothes flushing of the toilet, washing of the zincs and bath taps and scrubbing of the floor. Baxter (2002), stated that consideration be given to this area above all others to alleviate congestion during peak periods of use as in the morning, and to ensure privacy and also to permit convenient use by guests; It is undesirable to have a bathroom opening to two adjoining rooms, or be so located that it is necessary to get to them by passing through the living room or bedrooms, or the kitchen and dining areas.

According to Alabi (2009), a shower should be installed over the bath, or be separated, with handgrips solidly built into the wall above the bath tubs in bathrooms to ensure safety. The provision of rails, hooks, toilet paper holders and built-in-cabinet with mirror - door shelves for toiletries as soap, toothpaste, bath brushes, and the likes prevent damage of the walls by the tenant installing such fitting himself/herself. The provision of these conveniences also encourages good hygiene and children acquire good habits from an early age.

(e) **Garage:** Bawa (2004) mentioned that two major factors which necessitate the provision of a garage are:-

i. The possibility of the mass production of motorcycles and cars to cater for a large proportion of the population.

ii. Presently, many tenants require or desire to keep automobiles now, or in the future.

Garage must be designed and planned in harmony with the housing schemes and be either attached to which individual house grouped together and be connected directly by a drive way or through owned passage, an entry or be attached to the way. Bawa (2004) observed that chores performed in the garage include warming of automobiles, cleaning of cars, car repairs, etc.

(f) **Surroundings/Courtyards:** The surrounding features of houses include the backyard, gutters, courtyard and trees, Alabi (2007) listed the chores carried out as sweeping, washing of gutters, warning of cars, burning of refuse, burning of tyres and other solid wastes, emptying of refuse, hoeing and raking of dried grass, admitted other chores as winnowing, pounding, burning of firewood, washing of dishes and utensils. Baxter (2002), reported that in the developed world the occupants paint their dwellings by themselves as hobby and keep garden and plant trees in their surroundings. These provide fresh air and provide good ventilation for the relaxation of the family members. Alabi (2007) reported general household chores include, high dusting of the building, washing the house, spraying of imbeciles, burning of refuse, cleaning of glass windows, painting of houses, personal hygiene keeping, cutting of grace, hoeing, among others. Marshall and Corper (2008) pointed out that the court yard is an essential facility in every family house. It can be seen as an outdoor living space and in the African setting. It provides a place for most domestic chores. These include outdoor cooking, family gathering, sit outs, washing clothes. Sometimes huts or sheds are erected for rearing of domestic animals as goats, sheep and keeping poultry and vegetable garden chores.

Impact of Household Chores on Environment

Households rather than isolated individuals generally take decisions regarding the number of children in a family and the major purchases that are made only occasionally. These and more routine household decisions and the resulting behaviours are among the key determinants of the impact a society has on the physical environment. One objective for a *Science of Sustainable Societies* (SSS) is to recommend alternative behaviours that can substantially reduce the physical impact of household chores on the environment and to identify material and social contexts in which households might come systematically to consider adopting such alternatives. A starting point is to determine if households can be classified according to what is often defined as their lifestyles in a way that is consistent with theoretical understanding and can serve as a basis for action. Pointedly, the general perspective appears to be that an economist accustomed to working with data and quantitative models and keenly aware of the qualitative analysis that will be needed to bring the power of models to the analysis of household behaviour.

A lifestyle can be defined in many different ways: the challenge is whether a classification principle can be found that groups together households by key structural attributes and behaviour patterns and simultaneously by similar prospects for changing these behaviours. Sociologists, economists, statisticians, and market researchers use different household classifications, which are examined below as candidates for the stated purpose. The power of classifying households by lifestyles in ways relevant to environmental impact is not yet widely acknowledged among social scientists. A common classification can incorporate insights and concerns of several disciplines into a conceptual map of household chores in a given society and help build a cumulative body of research out of what are still sparse and isolated pieces.

From the empirical point of view, the calculation of the environmental impacts associated with household activity as an indicator of the ecological footprint of the Nigerian economy represents a new approach which it is believed will be of use for economic policy making, in particular because it must take into consideration the pollution contained in imports and household pollution.

The pollutants are complex and may range from its effects on human health to environmental effect. Basically, indoor pollutants are known to affect the quality of air we breathe, the quality of ground water and the soil. Fears (2009) is of the view that ground water contamination from indoor pollutants not only kill fish and other aquatic life but they poison your own water supply. Elsa (2007) adds that although spotting the first cause of alarm in household pollution is extremely difficult and unrealistic; the danger ranges according to the time of exposition and the combination of pollutants.

It is claimed that one kilogram of burning wood produces tiny particles of soot which can blog and irritate the bronchial pathways. Smoke also contains various poisonous gases such as aldehydes, benzenes and carbon monoxides which are implicated with varying degrees of evidences, as casual agents of several diseases such as acute lower respiratory infections (ALRT) and chronic obstructive pulmonary diseases (COPD), cataracts and blindness, lung cancer, tuberculosis, premature births, and low birth weights.

Of utmost concern is the fact that women and children are the worst hit by the health risk posed by household pollutants. This is attributed to cooking for up to several hours each day in enclosed environments (Hutchison Encylopedia, 2000). Pollutants such as particulate matter can accumulate in the lungs and interfere with their ability to exchange gases, and also irritate the lining of the respiratory system. They are known to aggravate asthmatic and other respiratory conditions. There is also mounting evidence that some of these indoor pollutants are contributing to the dramatic increase in diseases such as allergies, eczema, dermatitis, childhood cancer and attention deficit disorder (ADD).

Research has also shown that household pollutants do not only pose substantial health risk but because they contain greenhouse gases, they also contribute to global warming (Fear, 2009) with both its economic and health implications. According to Fear (2009), several signs and symptoms are associated with air household pollution. They include allergies, asthma, bleeding lung cancer, central nervous system defects, colds recurring and with decreased resistance to infection , coughing and resulting sore lungs/chest from excessive coughing, coughing up blood, dandruff problems (chronic) that would not go away despite the use of anti dandruff shampoos, dermatitis and skin rashes, diarrhoea, eye and vision problems, fatigue (chronic, excessive or continuous) and or general malaise, feeling lost or "disconnected" from what's happening around you, flu symptoms, hair loss, headaches, haemorrhage, peneymanitis, hives, hypersensitivity, pneumonitis (extrinsic allergic alvcotis, farmers lung diseases) irritability, itching of the nose, mouth, eyes, throat, skin or any area, kidney failure, reduced reaction times, learning difficulties or mental functioning problems or personality changes, memory loss or memory difficulties/Alzeimer-like symptoms and poor concentration (Fear, 2009).

According to Hales (2007), others are open skin sores and lacerations, organic dust toxic syndrome, peripheral nervous system defects, redness of the sclera (white part of the eye), running nose (rhinitis), clear, thin, watery mucus from the nose, appearing suddenly or thick, green slime coming out of the nose (from sinus cavities), seizures, effects on reproductive health (sometimes infertility), sinus congestion, sinus problems and chronic sinusitis, skin redness, high blood pressure, sleep disorders, sneezing and sneezing fits.

Marshall and Copper (2008), from studies, discovered that some dangers in performing household chores have claimed many lives. Scientific study shows that deleterious health effects of air pollutants include breathing and respiratory diseases, cardiovascular diseases declining body's defence system against foreign materials, damage to lung, tissues and premature mortality (Marshall et al, 2008).

Obiora (2007) equally reported that effect of air pollutants (most of which are greenhouses cases are global warming and climate change leading to continued desertification and drought. According to Hutchison Encyclopedia (2000) adverse air quality do kill many organisms including humans. Ozone pollution can cause respiratory and cardiovascular diseases, throat inflammation, chest pain and congestion.

2.2.4 Concept of Environment

The environment generally constitutes the surroundings. The United Nations (2002) viewed environment as a global concept which comprises natural and man-made resources available at a given time for the satisfaction of human needs. The environment is where organisms such as animals, plants, and the non-living components such as water, air and land habitate. Abbey and Paulson (2000) stated that the environment is being exploited by households in their daily chores performance in trying to make life more comfortable. This is known to influence individual and community developments, because development evolves from peoples increasing ability to utilize the environment and its resources in the production of goods and services for better living (Abbey and Paulson, 2000). These achievements cannot take place in a polluted environment thus, the households' atmosphere must be kept free from pollutants that will mess up the environment.

2.2.5 Concept of Environmental Pollution

Environmental pollution is a generic term for any situation on state of event which poses a threat to the surround and environment. Environmental pollution is any discharges of materials or energy into water, land, or air that may cause acute or chronic detriment to the earths' ecological balance or, that lower the quality of life (Mohammed 2005). Pollutants may cause primary damage, with direct effects on the environment or secondary damage in the form of various perturbations in the delicate balance of the biological food web that are detectable only over long time period (World Health Organization 2005). Anyakoha (2010) stated that improper management of wastes and refuses accompanying household chores effectively can lead to environmental pollution. Indiscriminate dumping of household refuse can lead to state the household drains are not regularly cleaned, stagnant dirty water, poor kitchen planning leading to smoke pollution, building without due approval from the regional and Town planners also prevent free flow of waste water because houses are built on the canals.

Environmental pollution connotes the processing of making air, water and soil dirty. It can also be seen as a state of being dirty, per this result in environmental hazards, a grim problem of the modern world (Madu, 2001) it is contamination of earth's environment with materials that therefore causes threat to human health, lowering the quality of life, and the natural functioning of ecosystems. (UNESCO, 2009).

The UNESCO Report (2009) observed that environment pollution has recently being noted to create a primarily local problem. The industrialization of society, the introduction of motorized vehicles and the explosion of human population, however, have caused an exponential growth in the production of goods and services. Coupled with this growth has been a tremendous uncrate in waste by-products. The indiscriminate discharge of untreated industrial and domestic waste into water ways, the spewing of thousands of tons of particulates and airborne gases into the atmosphere, the "thruway" attitude toward solid wastes, and the use of newly developed chemicals without considering potentials consequences have resulted in major environmental hazards. In most part of the world and Nigeria in particular Technology has began to solve pollution problems and public awareness of the extent of pollution will eventually force government to undertake more effective environmental planning and adopt none effective antipollution measures.

One of the ways households pollute their environment is by discharging pollutants from the chores carried out in their various homes. Environmental pollution is the accumulation of something where it is not wanted. Graeme (2005) agreed that pollution is the introduction of contaminants into the environment that cause harm or discomfort to land, water, soil, human or other living organisms which can come in the form of chemical substances, or energy such as noise, heat or light. This is a human central definition based on human preferences and desires. This is because it has direct harmful effects on people. Odun (2007) defined environmental pollution as an undesirable change in physical, chemical and biological characteristics of air, water and soil that will be or may be harmful to human and other living things conditions and cultural assets. Taiwo (2010) saw environmental pollution as the contamination of the physical and biological components of the earth system to such an extent that normal environmental processes are adversely affected Environmental Pollution is therefore a by-product of household chores.

Environmental Pollution arises from the contaminants that are released during the use of various chores and products. Anyakoha (2003) indicated that indoor pollution is far worse than that of outdoor. Taiwo (2010) explained that household pollutants are trapped in houses ensuring further deterioration of indoor air, water and soil quality. Durojaiye (2000) reported that household pollution and factories in the developing world put environmental pollution issues on the map. Buckle and Smith (2000) equally reported that in many third world cities, growth rates make the household environmental problem alarming. World Health Organization (2001) observed that some grasses, bushes, pounding, use of water of firewood, coal or kerosene for cooking, use of mini generators, use of bush and local lamps and others produce poisonous gases and substances which can pose serious challenges to the environment.

2.3 Types of Environmental Pollution

The following are some common types of environmental pollution:

Air Pollutions

Air is a mixture of nitrogen, oxygen, and minute amounts of other gases that surround the earth and form its atmosphere. It supports life by providing a medium of exchange of gases for the cells of living organisms.

Air pollution is the presence of contaminated or pollutant substances in the air that do not disperse properly and thus, interfere with human health or welfare or produce other harmful environmental effects. The result is poor ambient air quality.

In Nigeria, ambient air pollution emanates from three major sources _ energy generation, industry. and transportation - all of which increase with population and economic growth. Motor vehicles produce more air pollution than any other single human activity. Globally, 20% of all energy produced is used for transportation; if this, between 60 and 70% go towards transporting people while the rest go for moving freight. Additional threats to air quality include power plants, factories, and other stationary sources, including the thousands of privately owned diesel generators.

While people's household, commercial and industrial chores produce a wide range of air pollutants, "the six most important pollutants" to monitor regularly for better air quality are 'what the WHO calls the classical pollutants. These are lead, suspended particulate matter (SPM), nitrogen dioxide ($N0_2$), carbon monoxide ($C0_2$) and ozone (0_3). Particulate matter is the general term for the mixture of solid particles and liquid droplets found in the air.

Scientific study shows that deleterious health effects of air pollutants include breathing and respiratory diseases, cardiovascular diseases, and alteration in the body's defense system against foreign materials, damage to lung fissures, carcinogenesis, and premature mortality. Other effects of air pollutants (most .of which are greenhouse gases are global warming and climate change leading to continued desertification and drought.

Significantly, this researcher sees air pollution as the accumulation in the atmosphere of substances that, in sufficient concentrations, endanger human health or produce other measured effects on living matter and other materials. Among the major sources of pollution are power and heat generation, the burning of solid wastes, industrial processes, and, especially, transportation. The six major types of pollutants to the knowledge of the researcher are carbon monoxide, hydrocarbons, nitrogen oxides, particulates, sulfur dioxide, and photochemical oxidants. According to a Kwon, Jo, Lim and Jcong (2008) issues relating to air pollution could be approached from local, regional and global perspectives.

Smog has seriously affected more persons than any other type of air pollution. It can be loosely defined as a multisource, widespread air pollution that occurs in the air of cities. Smog, a contraction of the words smoke and fog, has been caused throughout recorded history by water condensing on smoke particles, usually from burning coal. The infamous London fogs--about 4,000 deaths were attributed to the severe fog of 1952--were smog of this type. Another type, ice fog, occurs only at high latitudes and extremely low temperatures and is a combination of smoke particles and ice crystals.

As a coal economy has gradually been replaced by a petroleum economy, photochemical smog has become predominant in many cities. Its unpleasant properties result from the irradiation by sunlight of hydrocarbons (primarily unburned gasoline emitted by automobiles and other combustion sources) and other pollutants in the air. Irradiation produces a long series of photochemical reactions (see photochemistry). The products of the reactions include organic particles, ozone, aldehydes, ketones, peroxyacetyl nitrate, and organic acids and other oxidants. Sulfur dioxide, which is always present to some extent, oxidizes and hydrates to form sulfuric acid and becomes part of the particulate matter. Furthermore, automobiles are polluters even in the absence of photochemical reactions. They are responsible for much of the particulate material in the air; they also emit carbon monoxide, one of the most toxic constituents of smog.

All types of smog decrease visibility and, with the possible exception of ice fog, are irritating to the respiratory system. Statistical studies indicate that smog is a contributor to malignancies of many types. Photochemical smog produces eye irritation and lacrimation and causes severe damage to many types of vegetation, including important crops. Acute effects include an increased mortality rate, especially among persons suffering from respiratory and coronary ailments. Air pollution also has a deleterious effect on works of art (see art conservation and restoration).

Air pollution on a regional scale is in part the result of local air pollution--including that produced by individual sources, such as automobiles--that has spread out to encompass areas of many thousands of square kilometers. Meteorological conditions and landforms can greatly influence air-pollution concentrations at any given place, especially locally and regionally. For example, cities located in bowls or valleys over which atmospheric inversions form and act as imperfect lids are especially likely to suffer from incidences of severe smog. Oxides of sulfur and nitrogen, carried long distances by the atmosphere and then precipitated in solution as acid rain, can cause serious damage to vegetation, waterways, and buildings.

Humans also pollute the atmosphere on a global scale, although until the early 1970s little attention was paid to the possible deleterious effects of such pollution. Measurements in Hawaii suggest that the concentration of carbon dioxide in the atmosphere is increasing at a rate of about 0.2% every year. The effect of this increase may be to alter the Earth's climate by increasing the average global temperature. Certain pollutants decrease the concentration of ozone occurring naturally in the stratosphere, which in turn increases the amount of ultraviolet radiation reaching the Earth's surface. Such radiation may damage vegetation and increase the incidence of skin cancer. Examples of stratospheric contaminants include nitrogen oxides emitted by supersonic aircraft and chlorofluorocarbons used as refrigerants and aerosol-can propellants. The chlorofluorocarbons reach the stratosphere by upward mixing from the lower parts of the atmosphere (see ozone layer). It is believed that these chemicals are responsible for the noticeable loss of ozone over the Polar Regions that has occurred in the 1980s.

Land Pollution:

Land is any part of the earth's surface not covered by a body of water (terrestrial biosphere). It is used by human beings to grow food, rear animals, build shelter, provide aesthetic scenery, and for a whole range of social and economic chores. Land pollution is the alteration of the form and function of terrestrial biosphere through improper handling of human, household and commercial wastes, and contamination with mineral-antagonistic industrial effluents.

Land pollution, this researcher feels should be seen as the degradation of the Earth's land surface through misuse of the soil by poor agricultural practices, mineral exploitation, industrial waste dumping, and indiscriminate disposal of urban wastes. Wastes are by-products of human chores, which at their material state cannot be used further for the same chores and are sometimes considered to be harmful to human well-being. Wastes are usually categorized according to their form, source and location.

In terms of forms, waste is biodegradable or non-biodegradable. Biodegradable wastes are wastes capable of being decomposed through microbial activity. Non-biodegradable wastes are not easily decomposed by microbial activity or last very long before being decomposed or broken down. Non-biodegradable wastes include such polyethylene-based materials as plastics and rubber. Others are glass and asbestos-containing materials (ACMs). In terms of form also, wastes can be categorized as solid or liquid, both being two extremes of a continuum.

Considering the source, wastes are categorized as either household or commercial (including health and laboratory or industrial wastes). Household wastes include kitchen refuse, faeces, discharges, furniture, and other household items. Commercial wastes are wastes generated in the normal course of exchange of goods and services. These include such wastes as paper and stationery, construction wastes, junked vehicles, waste oil (usually spilled on the ground by numerous automobile mechanics in the country). In terms of location, wastes are either rural or urban. In all the above, it is important to note that wastes are not pollutants, except when they are not handled properly.

The issue of land pollution in the opinion of this researcher should also include soil misuse and solid waste. Poor agricultural practices--removes rich humus topsoil developed over many years through vegetative decay and microbial degradation and thus strips the land of valuable nutrients for crop growth. Strip mining for minerals and coal lays waste thousands of acres of land each year, denuding the Earth and subjecting the mined area to widespread erosion problems.

The increases in urbanization due to population pressure presents additional soil-erosion problems; sediment loads in nearby streams may increase as much as 500 to 1,000 times over that recorded in nearby undeveloped stretches of stream. Soil erosion not only despoils the Earth for farming and other uses, but also increases the suspended-solids load of the waterway. This increase interferes with the ecological habitat and poses silting problems in navigation channels, inhibiting the commercial use of these waters.

On solid waste Kwon et al (2008) maintained that In the United States in 1988, municipal wastes alone--that is, the solid wastes sent by households, business, and municipalities to local landfills and other waste-disposal facilities--equaled 163 million metric tons (1980 million U.S. tons), or 18 k (40lb) per person, according to figures released by the Environmental Protection Agency. Additional solid wastes accumulate from mining, industrial production, and agriculture. Although municipal wastes are the most obvious, the accumulations of other types of wastes are the most obvious, the accumulations of other types of waste are far greater, in many instances are more difficult to dispose of, and present greater environmental hazards.

The most common and convenient method of disposing of municipal solid wastes is in the sanitary landfill. The open dump, once a common eyesore in towns across the United States, attracted populations of rodents and other pests and often emitted hideous odors; it is now illegal. Sanitary landfills provide better aesthetic control and should be odor-free. Often, however, industrial wastes of unknown content are commingled with domestic wastes. Groundwater infiltration and contamination of water supplies with toxic chemicals have recently led to more active control of landfills and industrial waste disposal. Careful management of sanitary landfills, such as providing for leakage and runoff treatment as well as daily coverage with topsoil, has alleviated most of the problems of open dumping. In many areas, however, space for landfills is running out and alternatives must be found.

Recycling of materials is practical to some extent for much municipal and some industrial wastes, and a small but growing proportion of solid wastes is being recycled. When wastes are commingled, however, recovery becomes difficult and expensive. New processes of sorting ferrous and nonferrous metals, paper, glass, and plastics have been developed, and many communities with recycling programs now require refuse separation. Crucial issues in recycling are devising better processing methods, inventing new products for the recycled materials, and finding new markets for them.

Incineration is another method for disposing of solid wastes. Advanced incinerators use solid wastes as fuel, burning quantities of refuse and utilizing the resultant heat to make steam for electricity generation. Wastes must be burned at very high temperatures, and incinerator exhausts must be equipped with sophisticated scrubbers and other devices for removing dioxins and other toxic pollutants. Problems remain, however: incinerator ash contains high ratios of heavy metals, becoming a hazardous waste in itself, and high-efficiency incinerators may discourage the use of recycling and other waste-reduction methods. Composting is increasingly used to treat some agricultural wastes, as well as such municipal wastes as leaves and brush. Composting systems can produce usable soil conditioners, or humus, within a few months

Water Pollution

Water is a compound of hydrogen and oxygen. In its pure form, water is tasteless, colourless and odourless. In this form, it is utilized by living organisms for sustenance and procreation. Water pollution is the presence in water of enough harmful or objectionable material to damage water quality. Such objectionable substances include dissolved mineral elements, and microbial population, which are indications or water quality criteria. In this regard are two broad measures of water quality:

- Oxygen levels or demands in the water, and
- Concentration of heavy metals.

The above criteria show specific levels of water quality that, if reached, are expected to render a body of water suitable for its designated use. The criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

However, the researcher is of the opinion that Water pollution is the introduction into fresh or ocean waters of chemical, physical, or biological material that degrades the quality of the water and affects the organisms living in it. This process ranges from simple addition of dissolved or suspended solids to discharge of the most insidious and persistent toxic pollutants (such as pesticides, heavy metals, and non-degradable, bio-accumulative, chemical compounds).

Two types of pollutants have been identified when water pollution is extensively discussed. These are conventional and nonconventional.

Conventional or classical pollutants are generally associated with the direct input of (mainly human) waste products. Rapid urbanization and rapid population increase have produced sewage problems because treatment facilities have not kept pace with need. Untreated and partially treated sewage from municipal wastewater systems and septic tanks in unsewered areas contribute significant quantities of nutrients, suspended solids, dissolved solids, oil, metals (arsenic, mercury, chromium, lead, iron, and manganese), and biodegradable organic carbon to the water environment.

Conventional pollutants may cause a myriad of water pollution problems. Excess suspended solids block out energy from the sun and thus affect the carbon dioxide-oxygen conversion process, which is vital to the maintenance of the biological food chain. Also, high concentrations of suspended solids silt up rivers and navigational channels, necessitating frequent dredging. Excess dissolved solids make the water undesirable for drinking and for crop irrigation.

Although essential to the aquatic habitat, nutrients such as nitrogen and phosphorus may also cause overfertilization and accelerate the natural aging process (eutrophication) of lakes. This acceleration in turn produces an overgrowth of aquatic vegetation, massive algal blooms, and an overall shift in the biologic community--from low productivity with many diverse species to high productivity with large numbers of a few species of a less desirable nature. Bacterial action oxidizes biodegradable organic carbon and consumes dissolved oxygen in the water. In extreme cases where the organic-carbon loading is high, oxygen consumption may lead to an oxygen depression: (less than 2 mg/l compared with 5 to 7 mg/l for a healthy stream) is sufficient to cause a fish kill and seriously to disrupt the growth of associated organisms that require oxygen to survive.

The nonconventional pollutants include dissolved and particulate forms of metals, both toxic and nontoxic, and degradable and persistent organic carbon compounds discharged into water as a by-product of industry or as an integral part of marketable products. More than 13,000 oil spills of varying magnitude occur in the United States each year. Thousands of environmentally untested chemicals are routinely discharged into waterways; an estimated 400 to 500 new compounds are marketed each year. In addition, coal strip mining releases acid wastes that despoil the surrounding waterways. Nonconventional pollutants vary from biologically inert materials such as clay and iron residues to the most toxic and insidious materials such as halogenated hydrocarbons (DDT, kepone, mirex, and polychlorinated biphenyls--PCB). The latter group may produce damage ranging from acute biological effects (complete sterilization of stretches of waterways) to chronic sub-lethal effects that may go undetected for years. The chronic low-level pollutants are proving to be the most difficult to correct and abate because of their ubiquitous nature and chemical stability.

Surface water is usually polluted through industrial thermal effluents, fecal discharges (or other dissolved organic solids), run-offs, chemical discharges, and certain atmospheric compounds dissolved in rainwater. Ground water is usually polluted by persistent inorganic compounds such as lead, which eventually find their way to the aquifers.

Noise Pollution

Noise can be described as the sound that is not wanted or any disturbing sound. Noise is subjectively annoying sound or unwanted signals that interferes with radio transmission or thinking process. According to Agboola (2005), what we hear is caused by vibration in air, water, sea or other media for example, musical instruments produce harmonic sound. Random sound from non-musical instrument or equipment produces disharmonious noise. Such noise interferes with communication or listening to speech or music. Sometimes noise is annoying or distracting and it can damage the hearing mechanism. Noise according to Baxter (2005) is an unexpected and unfamiliar stimulation that distracts attention; that is moving attention from what one is doing and directing it towards the source thereby making it difficult to perform a task. An unexpected noise is worse than a continuous noise. Moreover, noise with a predominance of high frequency is more disturbing than lower ones.

Furthermore, the Graeme (2005) explained that noise is non-musical sound, but whether or not a certain sound is referred to as "noise", depends on the viewpoint of the listener., Some people may find it irritating. The difference depends on the meaning attached to it. For example, the ring of telephone is associated with sweet anticipation if it is a call we expect and want to receive. The same ringing sound is shrill and jangling if it is not wanted and interrupts a conversation or experience we are enjoying. But at the same time it is generally agreed that the sounds created by such things as jet aircraft, automobiles, heavy machinery and household equipment constitute noise.

According to the Graeme (2005) the second can be classified as either noisy or musical. A noise is produced by a vibrating object, such as rattling window that sends out irregular vibrations at irregular intervals. While 'music is made by a vibrating body that sends out regular vibrating at regular intervals such as piano played by a skilled musician. Some other kinds of sounds include the sounds .made by people and animals. Then, there are stereophonic sound and ultrasound. 'Or when a drum is struck, the drumhead vibrates and the vibrations are transmitted through the air in the forms of waves, when they strike the ear, these waves produce the sensation of sound. There is also sound that cannot be heard, that is, infra - sound - below the range of human hearing and ultra-sound, above the range of human hearing. But this study is concerned with sound coming from household equipment, which is unwanted sound.

According to Larry (2002) further stated that sounds surround us all the tirne like buzzing of an alarm clock or the chirping of birds may awaken us in the morning or throughout the day and we may hear many kinds of sound such as clatter of pots and pans, roar of traffic and voices of people. As we fall asleep at night we may listen to the croaking of frogs or the whistle of the wind. All the sound we hear have one thing in common; Every sound is produced by vibrations of an object. Thus, when an object vibrates, it makes the surrounding air vibrate. The vibrations in the air travel outward in all directions from the object. When the vibrations enter our ears, the brain interprets them as sounds.

According to Larry (2002), there are different sources of air-borne noise and these can be grouped as follows:

a. **External Noise:** Refers to street noise such as children shouting outside, dogs barking, footsteps and house constructions, driving automobiles, mourning, etc.

b. **Internal Noise which can also be grouped, with the equipment noise:** .For example, slamming of doors, walking and stamping our feet, children playing - shouting, water running from taps, vacuum cleaner, blender, water running, mortar and pestle, radio, television, etc.

Therefore, Larry (2002) explained further that this process depends on external circumstances and psychological attitudes and is difficult to generalize. However, people cannot acclimatize to noise when it reaches certain level, since all kinds of equipment will raise the noise level in spaces where it operates. Household equipment, heating appliances air conditioning system, and plumbing are commonly seen in the home. Therefore we must take the necessary measures to ensure that their operation is not disturbing. Sound and noise levels vary with the physical pressure expected by the sound wave. The unit for measuring a noise level is the, decibel (db). Larry (2002) further described a decibel as a logarithmic ratio of a sound physical pressure relative to a standard reference pressure.

It is usually measured with a sound - level meter. It has instrument that contains a microphone to detect the sound wave and convert them to electric signals, an amplifier to increase the levels of these signals and a meter to indicate the final levels. The average sound level of a whisper is about 20 decibels and that of heavy traffic, about 80 decibels. Nevertheless, because of the poor state of our environment, it has attracted the attention of the ministry of environment at the federal level. Thus environment protection agencies have been established in each of the 36 states of Nigeria and Abuja. The agencies are to ensure a healthy environment, and care of the earth.

Noise is unwanted sound. What is pleasant to some ears may be extremely unpleasant to others, depending on a number of factors. According to David et al (2010) man made noises from house hold machines, for example blenders, pressure cookers, mortars and pestles, washing machines, dish washers, electric mixers and vacuum cleaners and others like automobiles, planes, explosives and fire crackers, etc are more contentious. All these kind of noise affect sleep, hearing, communication, as well as mental and physical health.

Aminu (2009) opined that noise is an important component of air pollution and it is an inescapable by product of household and industrial environment. He added that noise from such chores as auto-repairs, grinding and printing affects those living in the immediate surroundings. Aminu (2009) reported that noise not only causes irritation but also constricts the aireries and increases the flow of adrenaline and forces the heart to work faster. He further explained that continuous noise causes an increase in the cholesterol level resulting in permanent construction of blood vessels, making one prone to heart attack and strokes. Health experts are of the opinion that excessive noise can also lead to neurosis and nervous breakdown.

Noise originating within a room will be airborne; for example, slamming of doors. vacuum cleaner, blender, mortar and pestle. According to Bamigboye et al

(2005) such noise create ailments like stress headache and lack of concentration in listening to radio, news, information sharing and so on. Nowadays, noise presents much greater problems than in former times and the probable reason could be partly in the extensive mechanization of industry and modern life generally such as densely populated cities. In shops or offices, noise causes annoyance and distraction. A noise is acceptable as long as it does not annoy the occupants of a building. Baxter (2002) revealed that there are no effective ways of measuring annoyance. So it will be useful to refer to it as acceptable noise level, provided the limitations to the application of this concept are realized or accepted. Acceptable noise level depends first on the inevitable background of the noise because in some places, it has an almost constant level while in other places it varies. For example, noise is easily noticed in the home due to the following:

1. House with fewer and small rooms.
2. Typical walls are not so sound proof as those thick expensive walls of many older houses.
3. Open planning has reduced the number as floor to ceiling partitions.
4. Furnishing is not so bulky and noise absorbing as they used to be.

However, it is the opinion of this researcher that the idea of Noise pollution has a relatively recent origin. It is a composite of sounds generated by human chores ranging from blasting stereo systems to the roar of supersonic transport jets. Although the frequency (pitch) of noise may be of major importance, most noise sources are measured in terms of intensity, or strength of the sound field. The standard unit, one decibel (dB), is the amount of sound that is just audible to the average human. The decibel scale is somewhat misleading because it is logarithmic rather than linear; for example, a noise source measuring 70 dB is 10 times as loud as a source measuring

60 dB and 100 times as loud as a source reading 50 dB. Noise may be generally associated with industrial society, where heavy machinery, motor vehicles, and aircraft have become everyday items. Noise pollution is more intense in the work environment than in the general environment.

Besides, this researcher feels that the most readily measurable physiological effect of noise pollution is damage to hearing, which may be either temporary or permanent and may cause disruption of normal chores or just general annoyance. The effect is variable, depending upon individual susceptibility, duration of exposure, nature of noise (loudness), and time distribution of exposure (such as steady or intermittent). Though, it would appear that little hard information is available on the psychological side effects of increased noise levels, many people have been known to attribute increased irritability, lower productivity, decreased tolerance levels, increased incidence of ulcers, migraine headaches, fatigue, and allergic responses to continued exposures to high-level noises in the workplace and the general environment.

2.4 Types of Household Chores Pollutants

1. **Smoke**:- This is one particularly dangerous household air pollutant. It is a colourless, odourless gas that forms when carbon containing compounds such as wood, coal, soap residue, charcoal, dung, trash, oil or gasoline (fossil fuel) are burned without sufficient oxygen. It is reported that about three billion people in developing countries across the globe rely on these fossil fuel for cooking. Other common sources of carbon monoxide include generators, cigarette smoke and automobiles. Carbon monoxide is dangerous because it binds to heamoglobin in the blood and makes the heamoglobin less able to carry oxygen (Enger and Smith, 2006). Nitrogen dioxide is yet another type of

air pollutant found in houses and their environs, in exceptionally high levels indoors, if for example one uses a natural gas or propane stove in a poorly ventilated kitchen. Heating, air conditioning devices and some cooking materials - such as plastic and plastic wrapping materials that may allow chemicals to leak into food. For instance, in high concentrations some of the chemicals such as (OEHA, which makes plastic more pliable) is known to cause cancer in mice (Hales, 2007)). This calls for caution from consumers using clingy plastic wasp when re-heating left over foods in plastic encased metal. "Heat susceptors" included in convenience foods such as popcorn and pizza even though seem safe when tested in conventional ovens at temperatures 300 to 350f, are suspected sources of household pollution. Although, irradiated foods are believed to be safe to eat, it is also possible that the ionizing effect of radiation creates new compounds in foods that may be mutagenic or carcinogenic (Hales, 2007).

2. **Dust particles**:- It is an invisible radioactive atomic gas that results from the radioactive decay of radium, which may be found in rock formation beneath buildings or in certain building materials. Radon produces charged decay products that cling to dust particles. The presence of radon in buildings is associated with lung cancer and other health problems (Hales, 2007; Enger and Smith, 2006).

3. **Molds and other Allergens**:- Mold which is a type of fungus that decomposes organic matter and provides plants with nutrients, has emerged as a major health concern (Hales, 2007). These biological chemicals arise from a host of sources out of which two are common.

   i. Moisture induced growth of mold colonies; and

ii. Natural substances realised into the air such as animal dander and plants pollen (Hales, 2007)

Moisture may build up inside building due to plumbing leaks, from condensation due to improper ventilation or form ground moisture penetrating a building part. In areas where cellulosic materials (paper, wood and drywall) become moist and refuse to dry up within 48 hours mold mildew can develop and release allergenic and spores into the air. Black mold and toxic mold problem are the causes of indoor air and water pollution (www.indoorpollution.com.1999-2010) Common areas where rnold grows indoors are ceilings (from roof leaks), wood product, on and behind wall papers, behind and under showers and tubs, toilets and bathroom walls, upholstered furniture etc. Frequent causes of mold growth include flooding and water intrusion, closeness to lake, river or ocean, swampy areas, construction defects e.g. poor plumbing work, high indoor humidity (60% & above) inadequate ventilation, over flow from tubs, showers, sinks, toilets leaking roofs, sewage pipe leaks, wet clothes etc.

Volatile organic compounds (VOC):- They, are primarily composed of carbon and hydrogen and therefore referred to as hydrocarbons. They are volatile because they evaporate into the air; they emitted gases from certain solids or liquids. VOC's include a variety of chemicals, some of which may have short or long term effect on health. Indoor concentration of VOC's may be up to ten times higher than outdoors (Srinivas, 2010). VOC's are emitted by a wide array of products such as paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids, carbonless copy paper. Graphics and craft materials include glues and adhesives, permanent markers and photographic solutions. Others include vanishes wax and many cleaning, disinfecting, cosmetics, degreasing and hobby products and fuels. All these can release VOC's during usage and to some extent when they are stored According to Enger and Smith (2006), The main sources of pollution are:- Construction materials such as particle board, plywood, certain paints, wood polish ceiling boards, floor tiles, old plumbing lines, wood.

4. **Asbestos fibres**:- This is a mineral based compound commonly found in building materials. They are widely used for building insulation, and for floor tiles, ceiling tiles, tapping mud, pipe wrap and roofing etc. When asbestos containing materials are damaged or disintegrated due to cutting, sanding, drilling or building remodeling. fibres from asbestos are released into the atmosphere. According to Insel and Roth (2002) asbestos can pose a danger in homes and apartment buildings about 25% of which are thought to contain some asbestos. Srinivas (2010) asserts that inhalation of asbestos fibres over long period of time is associated with increased incidence of lung cancer. Furniture and furnishings:- A number of household furniture and furnishings may contain urea-formaldehyde such as carpet backing, furniture made with foam insulation, furniture polish, plywood and particle board which can release formaldehyde gas into the air we breathe; a solution that has been shown to cause cancer in animals (Hales, 2007) and may even lead to death in humans. Carpet may emit nearly 100 different chemical gases). Mattresses may contain formaldehyde and aldehydes). Likewise, wood preservatives. Exposure to very high concentration of formaldehyde may lead to death (www.poliutionissues.com.2008). Coatings:- Many products used to treat and care for wood such as wood polish, furniture polish, paints and paint strippers and other solvents is yet to be seen as a problem. The transient makes it more dangerous to ignore (Effiong, 2000). This may later

pollute the environment.

5. **Pesticides**:- these are chemical compounds commonly used for two purposes:-

   i. to prevent the spread of insect-borne diseases, and

   ii. to maximize food production by killing insects that eats crops

Because pesticides are usually spread over large, open areas, they can pollute the air, water and soil. Even low levels of these chemicals can build up to harmful concentrations. Pesticides are known to disrupt the cycles of birds, fish and reptiles (lnsel and Roth, 2002). Today, there is growing concern over the health effects of long term exposure to small amounts of pesticides residue in foods. This concern is particularly of importance in Nigeria, where pesticides have been used for food storage such as in beans and we have had cases where families have perished after a meal of beans containing such pesticides.

6. **Particulate matter**:- this refers to solid particles and liquid droplets lodged into the environment (atmosphere). This particulate matter usually arises from 2 major sources.

   i. The primary source:- such as dust, asbestos, lead, and carbon particles that are released directly into the environment through sources such as dust from flaking paint, travel on road, agricultural chores, construction sites, industrial processes and smoke particles from fires.

   ii. The secondary sources; which are made up of fine particles are usually due to the interactions of the primary source such as sulphates and nitrates formed from sulphur dioxide and nitrogen oxides.

This particular matter is a cause of several environmental problems ranging from reduced visibility to soot settling on equipments and environment. They also serve as centres for deposition of other substances from the atmosphere (Enger and Smith 2006).

Household pollution in America became a popular issue after World War II due to radioactive fallout from atomic war fare and testing which killed at least 4000 people (Deadly Smog, 2006). This prompted some of the first major modern environmental awareness and legislation. Pollution began to draw major public attention in the United States between the mid -1950s and early 1970s. When congress passed the noise control Act, the Clean Air Act, the Clean Water Act and National Environmental Policy Act. According to Rim-rukeh et al (2007) growing evidence of local and global pollution and an increasingly informed public over time have given rise to environmentalism and the environmental movement which generally seek to limit human impact on the environment.

A study conducted by Ewubar and Ochonogor (2004) revealed that the level of awareness of environmental pollution generation is higher in older adults than in younger adults. Generally the respondents have a high level of environmental pollution awareness as majority respondents agree that some household chores pollute and spread diseases. They agreed that solid and liquid waste should be effectively disposed. The study also revealed that both literates and illiterates have high level of environmental pollution awareness. Mark and Horton (2000) stressed the need for creating awareness on the dangers of poor methods of performing household chores and on appropriate disposal methods in all citizens, in both formal and non-formal education sectors.

Aina and Ohonba (2001) defined environmental education as a type of education aimed at developing a world population that is aware of a concern about the environment and its associated problems and which has the knowledge, skills, and attitudes, motivations and commitment to work individually and collectively towards a solution of current problems and the prevention of new ones. Awareness through education is essential because it is only then that families can become active participants in decision making in the appropriate ways of performing household chores that can prevent polluting the environment. According to Mark and Horton (2000) the environmental *effects* of improper performance of household chores can be controlled through public education, economic incentives, careful planning, monitoring of waste flows and enforcement of clear, well-defined solid waste management regulations in houses. They further stated that the approaches must cover storage of waste collection and waste disposal. According to Mark et al (2000) examples include:-

i. Education, Public programmes or private contacts that ensure reliable central or curbside collection consist out with storage requirements.

ii. Education, incentives or regulations that eliminate littering and the indiscriminate disposal of solid waste - especially burning of tyres, incinerating and open dumping.

iii. Education on how not to operate mini generators in the room but outside to avoid polluting the rooms.

iv. Education on how to avoid inhaling smoke from, burning firewood and burning of incense.

v. Provision of containers that require controlled storage of solid waste so that every waste generator has an adequate number of containers to store wastes between times of collection.

Folarin (2005) emphasized the need for public enlightenment campaign on television, radio station and news papers to get people educated on the effects of improper performance of household chores especially. Waste disposal practices on health. There is need to devise measures for engendering more action on environmental awareness and ensuring that the need for efficient household environmental education is generally recognized and acceptable. Folarin (2005) reported that it is only then that the traditions/conventional public enlightenment and persuasion campaigns can have an impact on households. For effective less household chores pollution generation, Alabi (2005) stressed the need for education for households regarding environmental problems as by-product of man chores.

Alabi (2005) suggested that environmental education should intend to promote among citizens the awareness and understanding of the environment, our relationship to it, and the concern and responsible action necessary to ensure our survival and to improve the quality of life. According to Oguabor (2000), the goals of Environmental Awareness programme are to:

i. Foster clear awareness and concerned inter-dependence in urban and rural areas.

ii. Provide every household with opportunities to acquire the knowledge, skills, values and attitude to improve the household chores performance and its implication in the environment.

iii. Create new patterns of behaviour of individuals, groups and society towards the environment pollution.

Nwokonkwo (2003) observed that survival of individuals depends on the environment in terms of the air we breathe, the water we drink, the food we eat and the resources we use. Ukwe (2006) identified two ways by which households could receive environmental awareness on better ways of performing household chores.

2.4.1 Meal Preparation Activities in the Household

Meal preparation, cooking and serving up of meals are one of the exciting roles of household members. It's the most vital activity in the home. It involves other roles like chopping and pounding of ingredient, the milling food items like pepper, millet and other ingredients as well as cooking proper (Komolafe, 2001). Cooking is act of controlled combustion, when one sets oil, fat, protein and carbohydrate on fire during cooking. According to Courter (2005) as a health hazard incinerating hamburgers and green beans may be pale in comparison with lighting wood or coal fire indoors; the leading environmental cause of death and disability around the world. Yet frying, grilling, or toasting food with gas and electrical appliances create particular matter, for example nitrogen dioxide, carbon mono oxide, carbon dioxide and volatile organic compounds. (Acrolein, which most cooks recognize as the smell of burnt fat and oil) was used in granules in the World War I because it causes irritation to the lungs and eyes (Abraham, 2006).

Emission of nitrogen dioxide in homes with gas stoves exceeds the environmental pollution agency's definition of clean air in an estimated 55% to 70% of those homes, according to one model: a quarter of them have air quality worse than the worst recorded smog (nitrogen dioxide) events in London. Cooking respondents are of the single large contributors, generating particular matter (formally known as PM 2.5) at concentrations four times greater than major haze events in Beijing. (Logue, 2012) she further explained that "Because we are use to the smell of food, we don't think of it as an issue". When we live in a small building, one cook a lot and don't use his range hood, which may not be very effective in any way, than you have probably have problems with pollutant from cooking.

Logue (2012) recently estimated the long-term health effects expected from average homes. Indoor combustions create more pollutants that linger in tightly sealed spaces, for instance, this is formed when ozone react with gases, scenting agents, plug-in air fresheners and cleaners. Furthermore, pollutants from vapour and moisture from cooking affect household members by affecting the eyes and their throat causing hard breathing and chocking. Ekpong and Chambalain (2011) discovered in their study that the air flow and the amount of burner exhaust and cooking contaminate health of the household during cooking of meals. According to Adekogbe (2008) Radiation are powerful and very dangerous rays that are sent from radioactive substances during cooking of food. He pointed out that emission from appliances and radiation affect the basic unit of the body, which is the cell, causing it to stop dividing and sub-dividing rendering dead. Jackson and Lane (2004) also agreed that radiation affect cells most when they are producing.

Noise is a sound especially when it is loud, unpleasant or disturbing. Okorie (2000) also stated that noises are various sounds produced by tools/equipment such as blenders, grinding machines and other food processing machineries. Noises in the kitchens can damage ear drums. Apart from damaging the ear drums, can prevent an operator from hearing the sound of his machine that may render the worker insensitive in cooking situations. During food preparation there are work place pollutants. These are constituents of variety of materials such as food peeling e.g water from washing basin which are referred to as solid and liquid wastes (Ewubare and Ochonogor 2004). They define solid waste as unwanted material that result from human activities in the homes and the environment. Odour from cooking and fermenting food, steams and vapour are also work place pollutants in the kitchen. Gas leakages resulting from gas cooker, stain removers such as Oxalic ammonia and cleaning agents such as chlorine bleach have irritant gases which have corrosive effects on the breathing organs, and gases such as carbon mono oxide and hydrogen sulphide are also harmful to the blood stream.

Cooking of food sometimes produce toxic chemicals. According to Nwachukwu (2002) these are corrosive substances which can burn the skin and the eye contact, if haled in the form of mist, some of these could possibly damage respiration track and lungs. Besides the adverse effects on humans, the substances have tarnishing effects on ferrous metals, wool, leather and other materials and products found in the kitchen. Cooking oils, fats and grease poured down drains can build up in pipes causing blockage and backups at home into streets and & he storm drain system causing a bad smell to occupants and passers-by. Srinivas (2010) stated that proper disposal of cooking oils and other greases and fat will help to prevent a sewage backup in homes and overflows can pose health environmental hazard.

Household equipment in the home can save a lot or energy and time for the housewife if they are used properly and situated in a convenient location and cared for. Such equipment are blenders, dish washing machines, food mills, mortar and pestle. Tasks such as mixing cakes and beverages, blending fruits, grinding tomatoes and pepper are some of the chores done by these equipment, (Carter, 2005). Abrahams (2006) classified the two types of kitchen equipment used in modern kitchens. These are (1) the non-electric operated cups, beaters, knives, spoons, forks, used in the kitchen and eating areas, power and pestle, and manual knife sharpeners. (2) the household equipment, which are mortar driven which use electricity, for example, food blenders, dish washers, mixers, vacuum cleaners, washing machines, electric knife sharpeners, and hair dryers. Abrahams (2006) reported that the consumers of household equipment use these equipment because of the, need to have improved labour saving devices and satisfaction, the desire for convenience in food preparation and home management too. Those who are employed outside the home and those who are rearing children also use them. They may have no helper or maid and the traditional husband giving no helping hand, thereby compounding the problems. Abrahams (2006) revealed that most of these equipment when in operation in the tasks such as electric can opener, blender, clothes dryers, and others are power driven driver equipment. Most of these equipments when in operation produce noise which can disturb homemakers and household members and even neighbours. Furthermore, blenders and food mixers are termed the noisiest than most. This might be because blenders and food mixers are used more often than other equipment for example washing machine or vacuum cleaner which may be in operation 'may be once a week or once in two weeks.

Dish washing machines, blenders, food mixers, refrigerators/freezers, according to Srinivas (2010) are equipment which when in operation, produce unwanted noise. This is due to faults or electrical temperature variations. Some of the equipment generate electrical circuits and magnetic electrical circuits attachment to them, for example; blenders. The speed and the food itself affect and increase ·the level of the noise produced by such household equipment. In developed countries, guidelines are given by manufacturers on how to operate the household equipments. and if such is not given, consumers are advised not to purchase such equipment.

In Nigeria sometimes we buy some equipment without guidelines especially second hand household equipment, for example, pressure cookers, blenders, refrigerators and even washing machine, which is not a good thing to do. But what can one do, since new ones are not affordable? Nevertheless, Enhrenkranz (2006) gave some guidelines to consumers of household equipment: Does the manufacturer's literature indicate some provisions to decrease the noise of operation? It is therefore advised that the buyer should check the effectiveness of this provision by listening while the machine is on. Also the consumer should bear in mind that noise is relative and may seem different at home. Furthermore, does the manufacturer's literature indicate that electrical circuit of the motor has some provision for minimizing radio and television interference? (if no such provision is made, radio and television reception may be poor, if the machine is in operation).

Just as noise of equipment can affect the time period needed for completion of household task so also will it affect productivity or work performance. Some of these household equipment according to Mushelia (2006) are for laundry areas and the location for many years, has been the basement which has been used for the laundry areas. Though sometimes they are installed in the kitchen, for example, a dish washer and a dryer may be placed along the kitchen work areas. Alternatively, if the kitchen includes a peninsula of cabinets and appliances, a washer and dryer can be installed on the side that faces away from the food preparation and clean up area. This use of space in the kitchen can be one way of meeting the recommendation that area be provided in the- kitchen for chores appropriate to the family's needs.

Many of the household equipment that make noise are in the kitchen. This is probably one reason why the kitchen is traditionally in the rear of the house. In recent years, the kitchen is less isolated. It is a workplace. Some of the noise from the equipment used in food preparation and cleaning up is unpleasant. Sounds from the electric mixer, the dish washer and food blenders, mortar and pestle are not conductive to resting and relaxation of household members. This explains why some equipment that make noise are isolated from work in the kitchen, for example, tomatoes grinding machine. Therefore, Abrahams (2006) gave some pieces of advice to consumers in question forms in connection with working areas. For example, which level of a house will be most satisfactory for working area? Will one level eliminate carrying of equipment, favour isolating it on one level and thus out weigh other consideration such as the distance to and from the work area when the worker's action is intermittent? Or does separating noisy equipment outweigh the advantages of obtaining visual and auditory information about the progress of the action?

Considerations to these questions will contribute to a more functional location for work areas and help develop a good compromise. It is also to be noted that noise from any household equipment has compelled many homemakers to locate such equipment far from bedrooms, sitting and reading rooms (Baxter, 2002). Some of the equipment such as grinding machines are sometimes operated at the back of the house or when most of members of the household are away from home. As Baxter, (2002) advised, equipment that make disturbing noise should be separated from where household members are relaxing, resting or reading. The kitchen in many ways is the centre of chores. Therefore equipment that make disturbing noise should not be operated where household members are relaxing, resting or hearing news from televisions or radios.

Power plants, freezers, refrigerators, carbon dioxide/monoxide are emitted in large quantities into the Nigerian homes through the use of fairly used generators, freezers and refrigerators. According to Liko-Uko-aviomoh and Oso-Olubukexa (2007) the use of second hand electrical appliances especially generators inside the house, within or outside household corridors are known to emit large quantities of carbon dioxide/monoxide into the environment Oguntola, (2007) opined that the use of ovens, cookers and stoves, microwave ovens in preparing meals in Nigeria pollutes the house. In Nigeria, locally fabricated ovens make use of coal as their sources of fuel. Also people roast cocoyam, yam, plantain, meat, fish for domestic and commercial purposes using coal. Coal has been reported do emit 1.7 times as much carbon per unit of energy when burned as does natural gas and 1.25 times as much as oil (Oguntola, 2007).

Stoves, second hand cookers and microwave ovens produce carbon emission into the environment as these gadgets are known to burn fuel inefficiently. Oguntola (2007) added that other household chores that pollute environments are use of firewood in cooking, burning of incense, spraying insecticide, sweeping which blows dust and generates washing and the use of detergents, soaps and cleaners. Walsh (2008) agreed that chores like raking and clearing of compound, farming chores, burning of refuse, and use of fertilizers on crops around the living houses can be harmful to the inhabitant. According to Cable Network News (2008), driving of cars and use of automobiles are part of household chores. It was reported that driving second hand vehicles imported from Europe and other developed countries emit large quantities of carbon dioxide/monoxide freely from their exhaust into the environment therefore polluting the air. This is unfit for breathing.

Waiting at traffic lights has been reported to result in increased emission of carbon into the environment due to incomplete burning of fuel (Cable Network News, 2008). It is also known that many Nigerian cities are characterized by regular stagnation of traffic due to impatience, bad roads and unruly nature of drivers. This could result in increased release of carbon into the atmosphere. In Cable Network News, (2008) it was reported that burning of old tyres, rotten heaps of refuse, and other smoking chores around the house produce increased CO_2 emission and further harm the household.

The U.N's Intergovernmental Panel on climate change (United State Environmental Protection Agency 2007) estimated that aviation causes 3.5% of environmental pollution while building structure accounts for about 12% of carbon dioxide emissions. The figure in Nigeria could be less since there are less number of aircrafts plying Nigerian airways and fewer number of buildings compared to developed countries. Perry (2001) added that burning of papers, cellophane and other plastics also emits carbon into the atmosphere. Deforestation and fetching of firewood is another principal cause of environmental carbon dioxide emission into the atmosphere (Midori, 2007), Perry (2001) observed that un-controlled cutting of trees in Nigeria is rampant but the Nigerian government discourages tree cutting and felling and encourages tree planting.

2.4.2 Cleaning and Washing Activities in the Household

According to Ferro (2011) dusting, cleaning and in the house of course, kicked up a significant amount of particles but it wasn't the biggest contributor, as the highest source is from walking and sitting on furniture which can suspend as much dust as vacuuming. Ferro (2011) said that this released particles were at a rate of almost two milligrams per minute-about half as much as smoking a cigarette. Ferro (2011) did not only design the study but also performed the chores. She equally discovered that dancing on a rug emitted as many particles as dusting, and she concluded that dancing on a wooden floor was near the bottom of the list. Vacuuming is also large source of particles and dust. Vacuum brushes releases deep particles from the carpet. The motor produces additional particles and the bags are not 100 percent efficient in collecting particles (Ferro, 2011). Ferro opined that different cleaner could produce different results depending on the design.

Ferro (2011) discovered in a study that about two thirds of house dust is trapped in from outdoor. She said that leaving shoes at the doors can make a significant difference in reducing the particles reservoir on the floor. Ferro (2011) observed that most homemakers leave their windows closed while cleaning and this poor attitude increases the effect of toxic household products, like pesticides, and installing new-carpet. Walsh (2008) studies the deterioration of the environment as a result of human chores in the houses. Scientists like Oguntola (2007) have been alerting the world about the impending environmental challenge, if there is continuous pumping of green house gases into the atmosphere trapped the heat that flows in from the sun and raising global temperatures. According to Midori (2007) human chores are the source of carbon emission into the atmosphere. The following are the household environmental pollution and chores associated:-

Sweeping the floor, vacuuming the floor, carpets and rings can increase a home makers exposure to particulate pollution. According to a new study, whether you are cleaning the ring or just vacuuming it, you may be inhaling tiny particles that could be harmful to health. Ferro (2011) discovered from a study on “clued to glust” that she measured concentrations of air borne particles continuously while performing a variety of normal human chores that re-suspend house dust in the home, she equally explained that particles of dust can accumulate in the respiratory system and aggravate health problem like Asthma. Homes are filled with these particles which often come from outdoors, heating equipment and according to the study, dust kicked up from human chores (Potsdam, 2011).

Clearing sweeping and raking of external environment raise dust and particles which affects the atmosphere according to Anyakoha and Eluwa (2010) cleaning equipment use in cleaning include brooms, rakes, brushes, dusters, rags among other. They opined that cleanliness is basic to good health. It is therefore, necessary to keep our houses and its environs clean and healthy for safe and sound living of all the household members.

Bamigboye and Odundele (2005) opined that noise produced as a result of household chores performance are for example slamming of doors, wailing and stamping of feet, children playing, shouting, use of vacuum cleaners, blenders, mortar and pestle, radio, television and all pollutants emanating from houses. Abrahams in a study conducted in (2006) discovered that household chores that can cause pollution in Thailand include the following:-

i. Not checking the expiration date of food; Eating expired food is a very common way to get sick in many number of ways. Food poisoning is a common outcome of eating certain kinds of expired food. Other illnesses include nause, diarrhoea and vomiting.

ii. Not vacuuming or not shampooing your carpet; carpets are an amazing trap for –pollen, dust and other allergens, when left un-kept. A simple vacuuming removes over 80 percent of the dirt trapped in a carpet. Health professionals recommend getting the carpet' shampooed once every six months. He further explained that households should not spend the bit bucks for carpet cleaners as one can cheaply rent one for a few days a time.

iii. Not cleaning your fan and air conditioner. The inside of an air conditioner is a common breeding ground for many different kinds of mold. Because of the air conditioners most ducts and generally warm environment, molds very easily grow and sprout inside the unit. To avoid allowing your entire house to be overrun by mold, simply make an *effort* to clean your air conditioner once a week during high-use season.

iv. Leaving dirty dishes out for too long or leaving dirty dishes in the sink for days due to a lazy habit can introduce germs to the sink arid surroundings, causing the breeding of harmful bacteria causing pollution.

v. Not washing household pests: In order not to invite ticks, germs, dirt, fleas and lots of parasites and allergens, pets like dogs should be bathed frequently.

vi. Let heaps of dirty clothes sit around for days and weeks. Leaving dirty clothes out for days on end contribute to the overall bacteria in the air. This can lead to the common cold, allergic reactions and more.

vii. Using cold water to wash dishes: Hot water is essential to washing your dishes. Hot water kills the bacteria in dishes as it removes the visible dirt and germs.

viii. Not dusting hardwood floors.

ix. Not changing bed sheets

Experts recommended changing of the bed sheets once a week to avoid allergy. Marshall and Copper (2008) discovered from studies that in performing household chores like, washing of gutters, toilet and others, hard water deposits contribute to environmental pollution, because solvent toxic disinfectants are poisonous to the environment. As long as house hold (i.e a group of people sharing common cooking and house - keeping arrangements) carry out the chores in a family home; household pollution would be inevitably generated. It is practically obvious that with time, every material used by man overtime becomes pollution. Okoro (2004) observed that at household levels, human chores often result to household environmental pollution generation. Therefore household chores pollution generation with its attendant problems is a continuous process.

2.4.2 Washing of Household Articles

Washing of clothes cooking equipment and eating utensils are very paramount in the daily running of a home. Anyakoha and Eluwa (2010) observed that washing of clothes involves a number of steps which make up the process. It is very important that a home maker understand all the steps and methods that one can plan a proper routine for carrying out the family work. Anyakoha and Eluwa (2010) three reasons for washing in the home which include:

1. Dirty is unhygienic and can be dangerous. Dirty clothes, equipment and utensils can harbor germs such as scabies and disease-carrying pests, like bedbugs and fleas. These can be transferred to the skin when we wear clothes. In fact our skin can be heater than the clothes we are wearing and utensils we use in homes.
2. Dirty and stained articles are unpleasant to look at and smell bad. A person wearing dirty clothes would be avoided by other.
3. Dirty can damage fabrics. Washing of clothes, dishes, utensils helps them last longer.

Iloefe (2004) explained that washing can be done by squeezing, kneading, and rubbing with hand. It can also be done with a washing machine. Therefore correct methods must be used of washing all forms of fibre to reduce environmental pollution. According to Nwokonwo (2003) these methods include:

(a) Rubbing or friction. For this hard soap or heavy duty detergent is used and the soap is rubbed on the fabric, which is then rubbed vigorously with hands. This is used for cotton and when articles.

(b) Kneading and squeezing. These methods used a soap solution or sud. The fingers gently knead the soapy water into the articles and the wasahing water becomes dirty. These methods are used for polyester blend nylon, coloured and printed cotton, and then articles with colours that are likely going to run.

(c) Squeezing alone: here the articles are cleaned by gently squeezing the soapy water without kneading.

(d) Kneading: this is used for delicate materials such as wool silk and washable pleated garments containing acrylics, nylon, among others.

Household equipment, cooking and eating utensils are washed by using soaps, washing liquids, sponges and drains. These could be washed by using hands or dish washing machine. Nwokonwo (2003) explained that detergents soap liquids, soaps used in cleaning and washing of cloths and household utensils can result into polluting the environment if not properly disposed or if the dirty soap water is left stagnant, which results into causing offensive odour and this can be inconveniencing to the occupants and neighbour. Various form of industrial waste is released from washing in the household which flow into the flowing water and affect the quality of soil pollution do not only affect human beings by destroying their respiratory and cardiovascular systems: it also affects natural plants, fruits, vegetables, river, ponds, forestry, animals etc. on which they are highly dependent for survival (Smith, 2000). It is crucial to control pollution of all forms, as all forms of nature wild life and human life are precious gifts to the mankind.

Cleaning Agents for Washing in the Household

Anyakoha and Eluwa (2010) observed that household cleaning agents come in such a wide variety that people may find it hard to choose among them. Many cleaning agents serve the same function, so there is (he need to read labels carefully before selecting the one you need. Whenever possible, people should avoid dangerous products. Thus, people should always follow the cleaning agents directions exactly. They went further to say that many basic cleaning agents are both inexpensive and to> the environment. Baking soda, for example, makes a good, gentle cleansing powder for sinks, refrigerators, and microwave ovens. It can also be used to remove odours. Cleaning agents that can clean more than one type of surface often are a good buy.

Anyakoha and Eluwa (2010) opined that cleanliness is basic to good health. It is therefore, necessary to keep our houses clean. There arc many types cleaning agents available for cleaning different articles and surfaces in the home. Also, that specific cleaning agents remove specific types of dirt. Some are harmful to certain types of surfaces but good for others. There are also those that arc good for almost any surface. Some of (he cleaning agents were identified to be; solvents, detergents, abrasive alkalis, acids, bleaches, polishes, and waxes. Each of the cleaning agents were defined thus:

1. **Solvents:** These are substances which act to remove dirt or oil by liquefying it and holding it in suspension. They arc of different types which some of them arc inflammable while others are not. The solvents include:
    a. **Water** - which is the most common solvent. It loosens or dissolves dust particles readily. Soft water is a better solvent than hard water, Hot water is a belter solvent for most dirt than cold water. A combination of water, heat and soap will dissolve greasy dirt.
    b. **Grease solvents** - These arc organic solvents which include paraffin, turpentine, methylated spirits, benzene, petrol, carbon tetrachloride. acetone, amyl acetate. These act by dissolving grease, evaporating, and carrying the dirt with them. Any remaining dirt or markings can then be removed by brushing, wiping or washing, depending on the type of materials. These grease solvents are highly inflammable and should not be used near naked fire.
2. **Soap and Synthetic Detergents:** These can emulsify grease and enable it to be washed away along with the dirt it held. Synthetic detergent can be in the form of powders, pastes, or liquid. They dissolve oil and greasy dirt readily and do not form scum in hard water.

3. **Abrasives:** Abrasive cleaners act by rubby off, or wearing away or abrading dirt or soil by friction. Abrasive cleaners vary in degree of coarseness from very fine to very coarse. These abrasives include steel, wool, copper and other metal sponges, and paper, and glass paper. Scouring powders may contain a variety of abrasives differing in the hardness and size of particles. Soap alkali and a bleach may be added to the abrasives in the scouring powders to aid their cleaning power.

4. **Alkalis:** These are combined readily with grease dirt and so reduce the amount of rubby needed for cleaning. Alkaline cleaners may damage materials with an oil base, such as linoleum and paint. The alkali can be combined with the oil base and dry out oil-based material being cleaned, so that it may crack and chip. Some alkalis may also affect dyes and colours. Thus it is adviceable to carefully choose and use alkaline cleaners. Some of these alkaline cleaners are:

   a. Borax (Sodium phyroborate). This is a mild alkali which can be used as a fine abrasive. It can also be used as a water softner in Laundry work.

   b. Ammonia. This is useful in laundry. It emulsify grease but should not be used on aluminum.

   c. Caustic soda (sodium hydroxide). This is a strong alkali which is useful in soap-making and dyeing. It is a cleaning agent but will not corrode aluminum, enamel and porcelain.

   d. Washing Soda (Sodium Carbonate). This is water softener and a grease solvent. It is useful for cleansing drains and sinks. It should be used carefully and according to specified proportions, because it can harm wood and metal paint.

5. **Acids:** Some acids are used as cleaning agents, some remove tarnish from copper, rust from white fabrics, lime deposit from flower vase and certain household decorative accessories, Acidic cleansers include:

    a. Vinegar: This is useful in laundry for the purpose of reviving colours on coloured fabrics. It can be used in dilute concentrations for removing spots from furniture and for cleaning glass windows and mirrors. It is also useful for removing tarnish from brass. Vinegar is equally good in food preparation.

    b. Lemon or lime juice: This is useful for cleaning copper and brass.

    c. Oxalic acids: it is very poisonous and is sold in a crystalline foam.

6. **Bleaches:** The bleaches most commonly used in the home arc those in the chlorine and sodium parborate groups. Follow the directions given on the container for using a bleach strictly. Chloride bleaches are useful in laundry. Some can be used to whiten porcelain enamel sinks. They can be used in disinfecting drains and sinks. They do not remove marks or grease on pans. When used rinse the articles several times to make sure that all traces of bleach used arc removed.

7. **Waxes:** These are of different forms and brands. They arc used to protect surfaces' and to improve their appearance. Remove any wax on surfaces before a surface finish such as vanish or paint can be renewed. These waxes arc said to be of different types. They are:

    a. Cream wax - this is used on light or dark furniture and wood work. It is not recommended for floors.

b. Paste wax - this contains about 20% to 33% of wax with a spirit or inorganic solvent. It gives a heavier film but requires more polishing than liquid wax. It can be used on most surfaces except rubber and asphalt.

c. Liquid wax - This have about 10% to 15% of wax with the organic solvent. It gives a thinner film of wax than the paste wax. It requires less polishing. It may be used to clean and touch up spots on a floor that have already been waxed.

d. Water wax - This is an emulsion of wax in water. It is suitable for asphalt and rubber surfaces and on linoleum. It docs not require polishing because it dries up, leaving a shiny surface. It is not used on furniture or wood work.

c. Kitchen wax - This is an all - purpose wax that can be used for all surfaces in a kitchen except the floor. It is a blend of waxes, solvent, mild detergents, and other special cleaning ingredients. It is applied with a damp cloth. While the damp cloth help to dissolve sugar, and starches other components of the wax work on fats and oils. Kitchen wax is thus very useful.

8. **Polishes:** These polishes arc of different types. There-arc polishes for furniture and floor. Many of them contain some oil. Oil polishes should not be used on wax finishes.

9. **Enzyme Cleaners:** These act as catalysis in the removal of protein stains, pepsin is sold in powdered form and is useful in laundry work.

Allow and Sunest (2005) observed some of the local cleaning agents and said that they are locally available materials which can be prepared easily by people and use for cleaning. They are:

a. Starch powder: which can be used to remove spills of lea or milk on carpets and rugs. An adequate quantity of the powder is placed on the affected area and it absorbs the liquid. Then the powder can be brushed off. It can be used to clean such smooth surfaces as aluminum dishes, spoons, brass and bronze ornaments.

b. Chalk powder or paste: This is just like starch powder. The paste can be used for removing such stains and ink on a table and other surfaces.

c. Fine sand: This is said to be used as an abrasive for cleaning pots, stained cement floor; it should not be used on smooth surfaces such as aluminum and polished or painted wood.

d. "Edo" powder: This is a yellow coloured substance that is common in local Nigerian markets. It is fine textured and suitable for cleaning ornaments such as gold and brass. It imparts a golden appearance on gold plated jewelry.

c. Ground China: These arc broken China which can be finely ground and used as scouring powder for cleaning pots and other aluminum surfaces.

f. Egg-shell powder: Empty egg shells can be roasted, ground into a fine powder, and used as a scouring agent for sinks, bath tubs, and aluminum. The addition of detergent powder improves its cleansing power.

10. **Ground Charcoal:** Charcoal can be ground into fine powder and used for cleaning smooth metal surfaces.

11. **Pawpaw Leaves:** The fresh pawpaw leaves with ashes can be used for cleaning blackened pots and pans, and for scouring galvanized pails and pans. If the inside of a cooking pot is stained or discoloured by food, the fresh pawpaw leaves can be boiled in the pot to remove the discolouration. The fresh leaves can be dried and ground into powder then store and used as *a* scouring powder.

12. **Local Sand-paper Leaves:** These leaves have rough sandy surfaces, and can be used as abrasives on metals that require refinishing, white wood and for cleaning blackened pots and pains. The leaves can also be dried and stored in air-tight containers for use when needed.

Other cleaning agents included French Chalk, fuller earth, and Talcum powder. These can be used to obtain a shiny effect on smooth surfaces like mirrors, glass doors, louvers, stainless steel, and laminated surfaces. According to Allow and Sunest (2005) all these household cleaning agents have adverse consequences on the environment and lives of the occupants.

2.4.3 Cooking Technologies in the household

Prior to industrialization of societies, mankind's requirement fort energy have been met primarily by muscular effort, fuelwood, direct solar warming and punctuated occasionally by the use of coal (Majekodunmi, 2014). Presently, peast, coal, petroleum products and fuelwood, gas, electricity, kerosene are sources of energy in homes. Majekodunmi (2014) noted that more than two-thirds of all third world people rely more on wood almost exclusively, even in oil-rich Nigeria.

According to Akingbade (2005), a worrisome third in the use of these cooking technologies in Africa is that in the household sector. Hosier (2001) cited the survey done by Nkonoki and Sorenon (2000) in Bundlya village in Tanzania. And they found out that nearly 80 percent of the energy flows in the form of woodfuel. The findings of Miner (2003) carried out in Villages in south India also show that household use all sources of energies in cooking but fuelwood supplies 80 percent of the poison substance which pollutes the atmosphere.

World Report (2002), stated that biomass, used mainly by households in developing countries like Nigeria, is the large source of energy and efficiency in its use will be important in controlling air pollution . Today, Nigeria's trees are vanishing at an alarming rate. And, the world bank figures have indicated that the country's losses in sustainable production of timber and fueldwood from fuel wood from forestry resources, represents about US $750 million annually as a result of deforestation (Akintoye, 2002). Nigerian Environmental Study Team (1991), estimates the total annual consumptions of wood in Nigeria at about 50 to 55 million cubic meters of which about 90 percent is firewood and kerosene. Annual deficit of cooking energies in the northern part of Nigeria is about 5 to 8 million cubic metres. The fuel extraction rate in other parts of Nigeria is located and estimated to be 3.885 times the rate of re-growth and almost ten times the rate of regeneration (MEET, 2001). These speculative figures give enough idea of the magnitude of deforestation and degree of severe population pressure on woody species in these southern villages and township.

Many of the household in rural and some urban areas in the North West geo-political zone, Nigeria have no real alternative to firewood and kerosene other than greatest use of annual during or crop residues which often are distances, sometimes up to 10 kilometers in search of fuelwood. That means increased man-hours or days spent on collecting firewood. Fuel combustion have been identified as one of the principal sources of atmospheric pollutants. Fuel combustion releases nitrogen, sulfur and methane among others. In addition about 584, 000 tones of smoke particles were estimated to be emitted annually into the atmosphere from burning of about 80 million cubic metres of fuelwood (Akintoye, 2002). This poses a number of health hazards. According to Afolabi (2005) cooking makes people to sweat after performing such household chores which produce body odour. This can repel marriage partners from another immediate bath after such chores is an antidote to body odour.

Furthermore, the traditional stones of three nud pieces and iron tripod perform inefficiently due to the absence supply control and insufficient combustion. These stoves do not have any system of channeling heat flow and the escape of smoke. Therefore, households are exposed to a variety of health hazards-bronchitis, emphysema, lung cancer, blindness and so on. It essential therefore, that in Nigeria especially in north western geo-political zone there should be improvement on the efficiency with which wood is produced and consumed in order to ensure sustainable developments of the households. Nwakonwo (2003) cited that cooking with kerosene stove, fuelwood, gas produce poisonous gases has negative economical impact in the atmosphere. Kerosene stove also found to be a major source of carbon dioxide which pollute the air causing air pollution. All forms of cooking technologies such as dry plants, animal dung, fuelwood, kerosene stoves, cooking gas should be consumed properly to limit the polluting of the natural environment.

Alabi (2005) in a work carried out on assessment of selected environmental parameter of residential houses in Sabon-Gari Zaria discovered that atmospheric air is polluted in most areas as a result of smoke from burning firewood, kerosene, smoke from burning of refuse at the premises. These sources of air pollution make family living in such compound very uncomfortable. Air pollution can be detrimental to health. Alabi (2005) have claimed that exhaust fumes cause faulty time judgment, headache, visual impairment, dizziness, unconsciousness and at the same time reduce work capacity

Cooking is the most vital household activity in homes. The most common cooking technologies are the tripod-woodstove, the kerosene and stoves (Iloefe, 2004). All the stove types produce and discharge waste heat as well as the combustion products (O_2, Co and No) into the cooking environment. Combustion is less complete in the wood stove and so higher proportion of co is produced, in addition to smoke which affects the eyes, lungs and hearts. Ash is equally generated. The kerosene stove gives off some kerosene fumes which pollutes the air; CV is a poison and all the gaseous' and particulate effluents can cause respiratory diseases. (Iloefe, 2004). According to Abrahams (2006) many households have suffered losses as a result of poisonous smoke generated from firewood and kerosene. He added that in most Nigerian homes, the three stoves or tripod wood stove is the most inefficient energy conversion device only about 7-10% of the energy content of the wood is utilized usefully, the rest being lost through inefficient combustion. Hot combustion produces gases, radiation and convection by the wind. According to Galadima and Garba, (2012) coal is a very valuable alternative to fuel wood for cooking and for other thermal applications. But coal produces soot, sulphur and effluents which are hazardous to health.

Worn-out stoves, second hand cookers and microwave ovens produce carbon emission into the environment as these gadgets are known to burn fuel inefficient. Oguntola (2007) added that other household chores that pollute environments are use of firewood in cooking, burning of incense, spraying insecticide, sweeping which blows dust and generates washing and the use of detergents, soaps and cleaners. Walsh (2008) agreed that chores like raking and clearing of compound, farming chores, burning of refuse, and use of fertilizers on crop around the living houses can be harmful to the inhabitant. According to Cable Network News (2008), driving of cars and use of automobiles are part of household chores. It was reported that driving second hand vehicles imported from Europe and other developed countries emit large quantities of carbon dioxide/monoxide freely from their exhaust into the environment therefore polluting the air, making it unfit for breathing.

2.4.4 Waste Disposal in the Household

In Nigeria, waste disposal practices are still far from being efficient. Collection and disposal of solid wastes have been a major expense and troublesome problem not only for cities in Nigeria, but cities of the world in general (Onyelucheya, 2003). Household solid waste disposal is part of solid waste management which has been described by Virk (2004) as the purposeful systematic control of the generation, storage, collection, transportation, separation, processing, recycling, recovering and disposal of solid waste. At the household level, a lot of heterogeneous waste is generated and the volume and types have been on the increase (Virk, 2004). According to Rollings (2011) the experience of Nigeria shows that solid wastes continue to be generated faster than they are disposed.

In Nigerian Television Authority News, (2008) it was reported that burning of old tyres, rotten heaps of refuse, and other smoking chores around the house produce increased CO_2 emission and further harm the household. The UN’s intergovernment Panel on climate change (United State Environmental Protection Agency 2007) estimated that aviation causes 3.5% of environmental pollution while building structure accounts for about 12% of carbon dioxide emission. The figure in Nigeria could be less since there are less number of aircrafts plying Nigerian airways and fewer number of buildings compared to developed countries> Perry (2001) added that burning of papers, cellophane and other plastics also emits of environmental carbon into the atmosphere. Deforestation and fetching of firewood is another principal causes of environmental carbon dioxide emission into the atmosphere (Midori, 2007), Perry (2001) observed that un-controlled cutting and burning of tress in Nigeria which contributes to degradation of the atmosphere.

Household chores pollution generated when performing household chores and housekeeping chores, according to Abrahams (2006) include burning of refuse, plastics, tyres, generating electricity with mini-generators inside the house, cooking with firewood, and unserviceable household appliances. In the same vein, Galadima and Garba (2012) agreed that household pollution generation in Nigerian houses contain several substances including burning of leaves, plastic containers, carcass of dead animals, chemicals, metal scraps, polythene bags, used tyres, stagnant water, broken sewage systems and poor drainage systems in the towns and cities.

According to NEST (2000) some household chores that generate pollution are by products of housekeeping chores and consumption. These include fuel residues, use of insecticides in closed windows, use of firewood in cooking in a kitchen without chimney and the use of cleaning agents. Abraham (2006) and Galadima et al (2012) stated that some of the wastes may be toxic, flamenable or non-biodegrades; others are biodegradeable such as pollution of plant and animal materials. Ania (2000) stated that household chores generate pollution in modern Nigerian families' whether in urban or rural areas. They are organic and inorganic pollution. Organic pollution include all refuse of perishable nature. They are usually of rotten animal and vegetable origin. Examples include indisposed peelings from vegetables, vegetable leaves, fruits grains and animal droppings are regularly produced at home as family organic wastes.

Aina (2000) further stressed that as a result of their composition, organic wastes are degradable by bacteria action. Thus, these biodegradable pollution has the ability to poison the land, and water. Aina and Ohonba (2001) defined inorganic family wastes as all waste materials generated at home that will not rot or decay by bacteria action. They are also called non-biodegradable tins, cans, wrappings, packaging, cellophane bags and glasses. Plastics of synthetic material origins are also examples. When not properly disposed, they breed mosquitoes, scorpions, snakes and are dangerous to the occupants. Galadima et al (2011) referred to them as solid pollution. These classes of environmental pollution result from the increasing use of canned or tinned foods such as tomatoes puree, tinned fish or beverages in the family. She added that household chores that pollutes environment include smokes from use of firewood. Use of insecticides, sweeping, burning of incense, pounding, grinding, house painting vehicle maintenance and general use of household appliances and tools.

Anyakoha and Eluwa (2010) reported that the method of waste disposal is determined by the type of refuse and the facilities available to the household. They identified the following methods of disposing various types of household refuse as:

i. Burying of such refuse as broken plates bottles, cups, old tins etc in available spaces.
ii. Burning dry refuse such as old papers and rags.
iii. Feeding animals with suitable food wastes.
iv. Making compost manure with wastes that can decay or rot are suitable for the purpose.

Ruby (2000) in a household survey of household solid waste disposal techniques in Belmont district of Jamaica discovered that the citizens have different for taking care of their garbage, depending on the differing levels of collection services. A total number of 35 people were interviewed. The result revealed that those living closet to the dumpsites dumped all their household garbage into it. People living furthest away either carried all their garbage down to the dumpster, or separated the non-burnable (such as glass, tin, and sometimes plastics) materials, carried them to the dumpster, and buried the rest those living furthest from the dumpster mostly burned all their garbage, buried it or created mini dumps in the bush.

Ukwe (2006) citing the study of Anyakoha and Igboeli (2003) reported that waste disposal in private homes in Nigeria is grossly inadequate. According to the study, waste disposal in private premises (homes) are discussed as follows:

(1) **Use and management of waste bins:** The efficient disposal of household solid waste involves the use of some form of containers or bins or receptacle with which wastes can be collected and carried for disposal at dump site. The use and management of waste bins becomes an issues in waste disposal at home. Onyelucheya (2003) reported that the need, use and management of household waste bins as a vital link between generation and disposal is not given prime consideration. NEST (1991) also reported the lack of adequate by-laws and regulations specifying the type of containers to be used for waste storage ion Nigeria urbans. This has resulted to the use of inappropriate containers as dustbins by most households. For instance, some households use empty cartons, which disintegrate easily while others use local baskets, plastic and metal bins.

(2) **Household members responsible for waste disposal:** effective waste disposal system in households requires the committed involvement of every family member. Nwana (1991) and NEST (1991) reported that it is the usual practice of mothers to ask children or househelps to carry household solid wastes for disposal at dumpsites. These uninformed agents most often do not dispose the wastes properly but rather litter the wastes indiscriminately on the path to disposal point. This is a practice that doubtlessly give rise to the pilling up of wastes in wrong places.

(3) **Treatment given to Wastes Prior to Disposal:** Anyakoha (1995) stated that the commonest practice given to household solid waste in the households is "dumping all forms of wastes in a small bin the kitchen prior to outside disposal". Enueze (2004) stated that households do not normally sort their refuse in different bins. This means that no effort is made at treating different types of wastes differently for disposal purposes. Thus, both the biodegradable and non-biodegradable are always mixed together and disposed at dump sites. Sorting of wastes at the source of generation does not only facilities waste disposal, it also enhances the use of waste for various desirable purposes such as animal feeds, crafts, recycling, and so on.

(4) **Use of Solid Wastes Dumpsites by Households:** NEST (1991) reported that most households threw their household wastes in any available open space for waste to be collected later, if at all by the garbage truck. Afolabi (2005) in the same vein posited that households use anywhere and anyhow method in disposing households waste freely either into gutters, drains or river channels, roads, streets, outside houses, in an uncompleted building etc. in a study by NEST (1991), it was revealed that 71% of households usually dump their

wastes in open spaces, 22% of the sample disposed their refuse in proper depots where there were containers of either metal, plastic, concrete blocks or mud walls, while about 6% of the households deposited their wastes in pits. In the same vein, Uzoka (2001) reported that family members contribute immeasurably to environmental degradation. 95% of her respondents have “throw-away” life styles attitude of garbage while 98% dump refuse along the roadside.

Anyakoha and Ugboeli (1993) in Anyakoha (1995) identified two major dumping practices and these include (a) disposal of household solid waste in front of homes/houses for government agents to collect for final disposal (b) disposal of waste at government approved dumpsites. They further indicated five deplorable practices by households with regards to dumping of wastes at dumpsites. These include (i) dumping wastes at unauthorized places (ii) littering the street with wastes (iii) defecation and urinating at dumpsites (iv) setting fire at dumpsites, and (v) ignoring bill-board instructions at dump sites. Onyediran 91995) reported that wastes dumping is the common practice based on the “throw away culture” or disposal into the nearest open space on land or surface water without environmental considerations. He stated further that wastes burning or incineration is also practiced especially in the dry season thereby causing air pollution. Other wastes disposal methods include composting and use of biodegradable packaging and recycling.

Ezeoguine (2005) reported also that government on its own part collect the waste at irregular intervals and take it to authorized dumping sites and dump in an open way and this has been the practice practically in all the towns and cities as no efforts are made either to recycle or dispose in more hygienic way. She asserted that most of the waste generated from homes and are disposed in the following places; a vacant or unused land or plot in the community, incineration, in front or back of homes, landfills, located in the center of the city, both authorized and unauthorized location for refuse dumps road side walks drains and streams. Ogundele (2000) also reported that prominent among the methods of household solid waste disposal are incineration, sanitary landfills, open dumping, grinding and composting.

Okoro (2004) reported that waste disposal in two urban towns revealed that women adopt various practices in the disposal of household solid waste. According to her, these practices relate to:

i. Use and management of refuse bins, and which majority of women use non-durable materials such as baskets and cartons for waste bins despite the fact that majority of the study samples showed they know suitable materials for bins for household solid waste.

ii. Disposal of refuse at public dumpsites where available and where not, backyards, gutters, streets, and nearby available open spaces are sometimes converted into dump site.

(5) **Disposal Practices where Government Approved Dumpsite does not Exist:** This is a situation whereby government agents have not provided dumpsites for household waste disposal. Under such situations, individual and households dispose their household solid waste in different places.

Anyakoha (1995) reported that about 30% of their household sample threw their refuse into gutters, or rivers or channels. This is in consonance with the findings of Afolabi (2005). In the findings of Uzoka (2001) it was revealed that while 61% of his sample dumped refuse in gutters 22% dumped theirs by the roadside. Abubakar (2000) reported that about 48.3% of his respondents did not have dumpsites in their local government, about 10.5% of the samples dumped their household solid waste close to their houses 5.5% did so in gutters, 10% dumped their household solid waste in government approved dumpsites, and 26% dumped their household solid waste in open space around their houses. Kumuyi (1996) cited by Osho (2004) reported that wastes are dumped in open drains, urban water courses and any available open space including roadsides, with unpleasant consequences for the environmental quality and aesthetics of these settlements as well as the health and well-being of the inhabitants.

2.4.5 Alternative Sources of Light in the Household

Electricity is an important form of energy its energy provides us with light, heat and power. Today, there are numerous electrically operated appliances available to families such as the radio, television, refrigerator, air-conditioners, fans, blenders, sewing machines, electric cookers etc. (Coker, 2007). Electricity is a good servant in the home though it could be source of danger. It is therefore, necessary that you understand the working of electricity so that household members can consume it intelligently and safely. The epileptic and insufficient supply of electricity in Nigeria today has resulted into the use of alternative sources of light in our homes. The use of small and large scale generators which produce electricity, by the movement of insulated coils of wire in a magnetic field and locally made lamps for generating light produce poisonous gases that pollute the air, land and water, (Oguntola, 2007).

Power plants, freezers, refrigerators, carbon dioxide/monoxide are emitted in large quantities into the Nigerian homes through the use of fairly used generators, freezers and refrigerators. According to Liko-Uko-aviomoh and Oso-Olubukexa (2007) the use of second hand electrical appliances especially generators inside the house, within or outside household corridors are known to emit large quantities of carbon dioxide/monoxide into the environment Oguntola, (2007) opined that the use of ovens, cookers and stoves, microwave ovens in preparing meals in Nigeria pollutes the house. In Nigeria, locally fabricated ovens make use of coal as their sources of fuel. Also people roast cocoyam, yam, plantain, meat, fish for domestic and commercial purposes using coal. Coal has been reported do emit 1.7 times as much carbon per unit of energy when burned as does natural gas and 1.25 times as much as oil (Oguntola, 2007).

According to Anyakoha and Eluwa (2010) locally made lamps include pot lamp, Harricane lamps, the aladin lamp pressure lamps candles and these use kerosene which produce poisonous smoke polluting the atmosphere, when the wick is not properly adjusted to give a blue flame light. They further explained that its of most paramount to make use of these lamps to prevent polluting the environment.

Waiting at traffic lights has been reported to result in increased emission of carbon into the environment due to incomplete burning of fuel (CNN, 2008). It is also known that many Nigerian cities are characterized by regular stagnation of traffic due to impatience, bad roads and unruly nature of drivers. This could result in increased release of carbon into the atmosphere. In CNN News, (2008) it was reported that burning of old tyres, rotten heaps of refuse, and other smoking chores around the house produce increased CO_2 emission and further harm the household.

The U.N's Intergovernmental Panel on climate change (United State Environmental Protection Agency 2007) estimated that aviation causes 3.5% of environmental pollution while building structure accounts for about 12% of carbon dioxide emissions. The figure in Nigeria could be less since there are less number of aircrafts plying Nigerian airways and fewer number of buildings compared to developed countries. Perry (2001) added that burning of papers, cellophane and other plastics also emits carbon into the atmosphere. Deforestation and fetching of firewood is another principal cause of environmental carbon dioxide emission into the atmosphere (Midori, 2007), Perry (2001) observed that un-controlled cutting of trees in Nigeria is rampant but the Nigerian government discourages tree cutting and felling and encourages tree planting.

Bamigboye and Odundele (2005) opined that noise produced as a result of household chores performance are for example slamming of doors, wailing and stamping of feet, children playing, shouting, use of vacuum cleaners, blenders, mortar and pestle, radio, television and all pollutants emanating from houses. Abrahams in a study conducted in (2006) discovered that household chores that can cause pollution in most households in most community and in Nigeria.

2.5 Strategies for Reducing Household Environmental Pollution

Taiwo (2000) saw reduction as the act of bringing into an excellent condition to become better. Enhancing effective household pollution generation and disposal can be seen as a way of performing and controlling household chores in a hygienic and aesthetically acceptable manner. Any effort that seeks to minimize the health, environmental and aesthetic impact of household pollution is a sound pollution management. Effective ways of performing various household chores must be sought. Hornby (2000) defines enhancement as the act of increasing or to further improve the good quality, value or status of a thing.

Warner (2007) states that households in performing chores should avoid the use of second hand freezer, generators, cookers, oven, microwave ovens to reduce emission of carbon into the environment. If the upper class and middle class segment of the society arrange their priorities well, they can afford to buy new brands of the household equipment. He added that occupants should plant trees around their compounds.

This will act as wind breakers as well as absorb carbon dioxide from the compound while releasing oxygen for human and animal use. Habib (2007) in her own opinion stated that effective waste disposal is still a problem in Nigeria. The solid waste may be grouped under the following; sorting of garbage at source. This implies that as waste is generated, the different components are put directly into appropriate, separate containers. According to her, separated components may be orange and fruit peels, food pieces, pieces of paper, plastic of all types, broken bottle and metallic objects.

In the same vein, Awo (2007) posited that households need to be encouraged to take out household wastes prior to disposal. This, she opined, will not only facilitate waste disposal but will also enhance the use of waste for various desirable purposes such as animal feed, crafts, recycling etc. Ezeabasili (2006) stressed that the easiest way to go about reducing household waste is to learn how to sort, organize and reuse it. As these may be possible ways of enhancing effective household chores performance:

Legislation on Level of Household Chores that Pollute Environment

There is need for legislation on level of household chores. Sorting of household and public wastes at source should be made mandatory through federal government legislation. Osimen (2005) recorded that legislation involves making and enforcing laws that minimize or prohibit actions capable of causing household and environmental pollution and degradation. Galadima et al (2012) stated that National Governments all over the World have enacted laws designed to reduce pollution. Such laws are not enforced. Ezeabasili (2006) stressed that the absence of any provisions dealing on household chores performance especially disposal of solid waste management is a yearning gap that need to be filled without delay as the impact of improper waste management and disposal will affects the air, water and soil.

Akpan and Usoro (2005) posited that the provision of such law will make it mandatory for defaulting households to pay waste disposal tariff for cutting down trees, etc and there should be enforcement of environmental pollution compliance. Akpan and Usoro, (2005) are of the stern opinion that government should establish regulatory by-laws on environmental pollution, including specification on types of bin and defaulters made to pay a stipulated fine. Ezeabasili (2006) suggesting effective methods of both management of indoor and outdoor pollution, recommended the establishment of a regular Environmental Pollution Court with exclusive jurisdiction to try all environmental pollution cases only.

She further recommended the introduction of a token tax or levy by government to depositors of refuse materials; incinerators, use of mini-generators to generate electricity inside the house among others to assist agencies in the task of proper household waste management to keep the environment free from pollution.

This researcher feels that recycling should be addressed specifically by the government as it would appear that many studies are not being carried out in developing countries on how cheaper and more effective recycling can be of benefits to the citizenry. It is to be expected that effective environmental chores and waste management in developing countries cannot only be achieved through environmental legislation (laws, rules, and regulations) but also through three main approaches namely: reduce, reuse and recycle it. The ultimate objective of this is to reduce the amount of urban and other wastes that must be disposed of in landfills, incinerators or other waste management facilities.

Kicklighter and Kicklighter (2008) stated that the main goal of the three R's is not to reduce the volume of solid waste and make landfills last longer but to reduce the depletion of resources and decrease the pollution and environmental degradation caused by performance of household chores and resource extraction, processing and use. The prevention approach has hierarchy of goals, which are as follows:-

i. Reduce wastes and pollution prevention
ii. Reuse and compost as much as possible
iii. Incinerate or treat waste that cannot be reduced, reused, recycled or composted
iv. Bury what is left.

Reduction Approach in Waste Management

According to Bukola (2005) reduction of waste is the best option in waste management. One means of pollution prevention is source reduction. Mark and Hurton (1995) described source reduction as the management of materials before disposal to reduce the volume or toxicity of materials. According to Awo (2007) reduction in the quantities of waste can occur in several ways.

i. The amount of materials used in the manufacture of a product can be reduced.
ii. The useful life of a product can be increased and
iii. The amount of materials used for packaging and marketing of consumer goods can be reduced.

Nigerian Environmental Study Team (\NEST) (2000) and Nigerian Medical Association (2003) outlines the following as strategies for reducing waste and pollution.

i. Buy foods that come with less packing, shop at farmers market or cooperatives, using your own container.
ii. When you have a choice at grocery store between plastic, glass or metal containers for the same food, buy the re-useable or easier to recycle glass and metal.

iii. Separate your cans, bottles, papers and plastic for recycling.

iv. Wash the reused bottles, aluminum foil papers; plastic bags etc for your personal use.

California Integrated Waste Management Board (CIWMB, 2006) emphasized that households can reduce the use of non-re-usable polythene bags to reusable and recyclable ones. Waste should be reduced in size and volume to facilitate smooth transfer to the disposal sites.

Re-Use Approach in Waste Management

This approach is cleaning and reusing materials in their present form thus saving the cost and energy of remaking them into something else. This can be done with certain goods. e.g. auto-parts are regularly sold from junkyards, while glass, plastics and bottles are usually returned to beverage producers for washing and refilling (Kicklighter and Kicklighter 2008).

The recycling approach attempts to maximize the life span of a material in the production - consumption cycle. Recycling according to Rusy (2006) is the processing of discarded materials into useful products. He noted that resources can be recycled by high and low technology methods. China for example, is the largest and most diverse company in the waste business called Shanghai Resource - Recovery and Utilization Company which was established in 1957. Its prime raw material is garbage created by Shanghai's 13.5 million people and nearly 100,000 registered companies. It even imports waste material including scrap papers from U.S.A which it turns into egg Cartons, Cardboard boxes and toilet papers (Kwon et al, 2008).

The recent industrial technologies are striving hard to ensure zero or at its worst, minimum waste generation through reuse and recycling process. Kallman (2008) observed that poor sanitation in many tropical countries was the cause of breeding mosquitoes with the consequence of malaria. Low Tox (2010) agreed that incineration, landfilling composing, recycling method, ocean dumping, physical processing and biological repossessing are some of the strategies of reducing wastes and household pollution.

Effective Information and Consumer Education

Baxter (2002) stressed the need for creating awareness on the dangers of poor methods of performing household chores in all households; in both formal and non-formal education sectors. Aina and Ohonba (2001) desired that household environmental pollution education be the type of education which aims at developing a world population that is aware of their environment and its associated problem. Awareness through education is essential because it is the only way people can become active participants in decision-making in prudent household chores performance and the disposal of wastes.

Iloeje (2004) in Coastal Non-point Pollution Control Program and Approval Guidance Published Jointly by United State Environmental Protection Agency described the ways of coping with household chores in developed countries through public education programs regarding proper use and disposal of household hazardous materials and chemicals. Public education is an important component of management measures. The provision of information on the impacts of common household chores can produce long-term shifts in behaviour and may result in significant reduction in household pollution in America, schools cumulate on watershed protection, and pollution control. They have been developed for elementary and secondary school education programs. An example is the program developed by the Washington State Office of Environmental Education.

Incorporating such programs into regular school curricula is an effective strategy to educate youth about the importance of environmentally conscious behaviour which in turn can help reduce the need for technology based pollution management. Florida Council on Comprehensive Environmental Education (2001) equally developed a comprehensive statewide plan for environmental education on household chores performance coordinated by its council through formal and informal education program to reduce pollution. Abrahams (2006) opined that U.S government has recognized the potential impacts for environmental degradation from the improper disposal of hazardous household materials and chemicals.

Many communities that implemented programs to collect these chemicals and such collection programs has been on since the early 1980s. According to Allow (2005) effectiveness of some household chemical collection programs has helped in reducing household hazardous chemicals. The majority of homeowners preferred to do their own lawn work. Only 8 - 10 percent of the households used commercial lawn companies. A similar survey conducted on long Island revealed that in affluent neighbourhoods, 75 percent of the respondents used a lawn care service. In the least affluent neighbourhoods, no one subscribed to commercial lawn care (Corned Water Resource Institute, 1985).

Potsdam (2011) identified the following strategies in properly management of land scaping and lawns.

i. proper pesticide and herbicide use and reduced applications.
ii. reduced fertilizer application and proper application timing.
iii. Ground-water contamination also may be of concern especially where interflow exist.
iv. Limited lawn watering

v. Use of minimum maintenance strategies can effectively pesticide loadings, where new development is occurring, community standards that limit the use of fertilizers can decrease NPS loading. Such practices can be promoted through public education programs for both new and existing development.

Effective IPM Strategies include:

i. Use of natural predators and pathogens

ii. Medical control

iii. Use of native and resistant plantings.

iv. Maintenance of proper growning conditions.

v. Removal of less favoured pest habitat

vi. Timing annual crops to avoid pests

vii. Localized use of appropriate chemicals as a last alternative.

Creative land scaping for decreased water, energy and pesticide inputs, can be used to reduce urban runoff and minimize the application of lawn care products that may adversely impact coastal waters. The use of xeriscaping practices can reduce required lawn maintenance up to 80 percent and reduce watering requirements by 60 percent (Potsdam, 2011). Florida has passed legislation requiring xeriscaping on the grounds of all state buildings. Other States, including New Jersey and California activity support xeriscaping efforts as follows:

Reduced Runoff Potentials in Waste Management

Rain water from roofs can be infiltrated into the ground in gravel - filled trenches in well-drained soils. Wood brick reduces runoff erosion with gardening on slopes (Mark and Horton, 2000).

Allow and Sunest (2005) explained that home composting programmes may result in municipal cost saving. He added that an average suburban yard generates 'up to 1,570 pounds of yard trimmings per year which is usually land filled. Therefore households should be encouraged to place compost piles or bins away from streams and waterways that may contribute to pollution. Recycling of grass dumping and mulched leaves should also be encouraged through education programs. Improperly disposed household cleaners containing non-biodegradable chemicals have potential to contaminate surface waters, and ground water. This should be encouraged through public education efforts (Luka, 2006).

Luka (2006) stated that in rearing and keeping pets in homes as part of household chores, there should be lawns for pets. According to Marshall and Cooper (2008). The following actions can be used to help control the problem of pet excrement

i. Enact domestic animal clean-up regulations

ii. Pass regulations controlling the disposal of excrement from domestic animals and

iii. Require commercial domestic animal operations (e g. pet stones kennels) to implement the control and proper disposal of animal excrement.

Baxter (2002) conducted a study to determine the effectiveness of parking lot sweeping as a method to abate water pollution. A computer utilizing simple and multiple regression equations, was used to stimulate the conditions of the study. Baxter (2002) explained that while street sweeping historically has been found to provide little benefit in reducing fins and pollutants associated with small particulates because of out dated sweeping equipment and irregular sweeping frequencies, litter control can be an effective strategy for improving the quality of urban runoff. Both the Bultinone and Long Island Nationwide urban Runoff program (NURP) projects found that litter control substantiality influenced the quality of runoff from urban areas. Allow and Sunest (2005) suggestions for coping strategies for litters include:-

i. Developing local ordinances restricting food establishment from using disposable food packaging, especially plastics.

ii. Implementing bottle bills and mandatory recycling laws.

iii. Provide technical and financial assistance for establishing and maintaining community waste collection programs.

iv. Distributing public education materials on the benefits of recycling and

v. Promote programs such as Adopt a stream to assist keeping ways free of litter and debris.

Ukwe (2004) identified various possible ways of enhancing effective strategies of performing household chores for sustainability of the environment. These strategies are twofold:

a. What Government should do

b. What individuals and households should do

Family Role in Waste Management

1. Families should show real commitment to household chores performance to reduce and control environmental pollution generation. This requires family resources such as time, energy, money, interest, skills, etc. Every member of the family should be involved and enlightened on coping strategies which enhances task performance. According to Ukwe (2004) all the family members should be trained in using the following protective materials when performing some household chores and these include:-

    a) wearing of face mask to protect the nose and eye from breathing in dust, smoke and offensive odours.

    b) Wearing of hand gloves when washing toilets, bathrooms, cleaning of gutters and repair of broken soak-ways.

c) Covering of hostices

d) Opening of windows for proper cross-ventilation when sweeping and

e) dusting of indoors.

f) Compound wetting to reduce dusts.

g) Wearing of boots.

2. Proper disposal of waste in private premises

3. Household should generate electricity from outside the house to avoid fire accident and fumes.

4. People living in the block of flats should cooperate in seeking the most effective way to keep premises clean and free from wastes.

5. Mothers should teach their children and house-helps on effective ways of performing household chores with minimal environmental pollution generation.

Government responsibilities in waste management

The responsibilities of government to waste management could be carried out in the following ways:

1. Control and Regulation by Legislation

According to Agboola (2005), control and regulation serve to prevent the recurrence of unsatisfactory dangerous conditions in housing. Lack of regular supervision creates physical hazards, bad health conditions, contagion, epidemics, nuisance, and community deteriorations. Coker et al (2007) stated that there is need for clear-cut boundary lines recognized by law and customs that the individual has certain sanctioned rights within his abode which are greater than those of either person, in line with the legal doctrine that "a man's home is his castle".

According to Nigerian Federal Ministry of Health Report (2007), government must look upon the welfare of its people as a matter of natural concern and not merely a personal and family matter. That is why regulations are laid down about the kind of building which is permitted in any given area, and people should not be allowed to build anyhow and anywhere. Coker et al (2007) went further to stress that health inspectors (should) help to see that the regulations about drains and sewers, latrines and water supplies are observed. They also have to inspect slaughter houses to prevent bad meat from being sold, and to see that markets, restaurants and eating-houses observe sanitary laws. According to Alabi (2005) there should be controlled regulations to make for increased provision of essential services when the economic base of a city or settlement improves.

2. Planting of Trees

Adetokun (2008) emphasized the value and advantage of preserving and planting trees to give control to light and shade; to act as a foil to groups of dwellings and to provide windbreaks especially on exposed sites. Adetoke (2007) added that tree planting enhances the attractiveness of a layout but, it is too common to find many housing schemes completely featureless and bare without these amenities. In line with the campaign against desert encroachment and erosion, trees should be retained or planted often along or adjacent to roadsides, with variety in their selections as much as possible.

3. Enforcement of Environmental Sanitation in Public Health Matters

Olatuah (2006) explained that sanitation is a field of public health which involves men's efforts to control their environment to prevent and control disease through water and sewage treatment, solid waste disposal, insect, rodent and noise control, licensing of operation of public facilities, etcetera. Marshall et al (2008) pointed out that in most larger and older cities in Nigeria, it is difficult to achieve sanitation in homes and the environment especially due to congestion and deficiency of ventilation, water supply, plumbing, sewage disposal, lack of control, etcetera. Negligence in environmental health control has resulted in irrevocable loss of materials and human resources in most cases.

It is in view of the above that the national monthly environmental sanitation exercise which unfortunately has been cancelled is viewed as a vital concern in the society. Many private and public agencies have therefore organized to improve forms of life, substances and conditions in order to influence consumers' health and welfare.

Management and Maintenance of Environmental Sanitation

According to Mark et al (2000) management is work undertaken in order to keep, restore or improve every part of a building, facility, its services and surroundings. This helps to upgrade facilities into currently accepted standards and sustain the utility and value of the facility. According to Okwu (2001), the importance of maintenance, modernization, and reconstruction of new housing schemes and of repairs of obsolete ones cannot be over-emphasized. He stated that measures should be aimed at improving and up-grading the existing housing schemes with regard to functionality, design and technical terms; with a view to creating more housing for increasing population of the low-income earners especially. With new materials, equipment and styles in housing development, old houses are bound to become obsolete and less desirable, hence, the need for repairs or remodeling.

Okwu (2001) and Mahmoud (2001) further pointed out that common deficiencies, which call for remodeling in housing, include: inefficient use of space, not enough space, lack of certain amenities, out modeled appearance, etcetera. Repairs become necessary to effect damage due to use, moisture, decay, wind, and the likes. There is a need for prompt attention by housing authorities to repair defects on houses if only to prolong their usefulness, salvage remaining values, make improvements and bring them to present day concepts of adequacy. Reports by Adejo (2000) and Abraham (2000) emphasized the responsibility of the housing authority to the community on management, maintenance and provision of means for wastes disposal with special priority given for urgent repairs of poor houses to minimize infectious diseases. It is important to note therefore, that housing management is not only aimed at general improvement of areas (which affect those dwelling there) but is also focused on environmental attributes.

Neglect of repairs impairs the soundness of structures and create hazards to lives and properties; while prompt attention often prevents damage which would otherwise lead to a greater cost for repair. For example, a minor opening on the roof causing leakage, if neglected would result into serious damage to the ceiling which would require complete replacement.

Awareness of Environmental Pollution by Residents

Everyday household chores generate numerous pollutants that affect the air, water and soil quality. Common household pollutants include paints, solvents, lawn and garden care products, detergents and cleaners, and automotive products such· as antifreeze and oil (Postsdam, 2011). The use and disposal of these products are chronic sources of household pollution. According to new findings these pollutants are typically introduced into the environment due to ignorance on the part of the users or the lack of proper disposal options. He further explained that households literally perform their daily chores with no awareness of the effects and by - product of their chores in the environment. For instance wastes and chemicals are dumped directly into the ground.

A study was conducted by Rioem (2001) on the level of awareness on household chores performance. High and vacuum density residential development had the highest loading factor of pesticides, incense and fertilizers of all land uses in the State. These results echoed the findings of another research conducted on the Chesapeake Bay watershed that identified medium and high - density residential areas as having the highest loading factor of nitrogen and phosphorus in the Bay area because of their ignorance on the consequences and the hazards on the environment (Chesapeake Bay Local Advisory Committee, 2002).

In Nigeria, environmental indicators of pollution are palpable due to ignorance. For example, depletion or degradation of forest resources, water hyacinth proliferation, pollution of· air, water and soil, gas flame, flooding and erosion, water supply/sanitation and desertification have been reported (Nwabueze, 2004). Nwabueze (2004) stated that most households are aware of the hazard done to the environment via household chores performance but social and economic factors are indicators of unsustainable practice such as poverty, low-life expectancy, and high level of unemployment and ignorance. Environmental degradation, resource depletion and species extinction impact the quality of life of the future generation who rely on the environmental resources available for production and consumption purposes.

Alabi (2005) noted that most current environmental problems are essentially as a result of people's chores and their attitudes towards the socio-cultural and natural environment; she noted that historically, individual and societal values have not always been in the best interests of preserving a high quality environment and he pointed out that the present day environmental crises are as a result of ignorance and poor habits of households. He further explained that initiatives can be taken to rescue the environment from destruction. Nchekwube (2003) reported that women are the leading group in environmental degradation. It sounds controversial but a deep thought over their close relationship with the environment as they strive to meet the needs and demands of family life would bring a conviction. He further explained that they are little foxes that spoil the riches. Unfortunately, most women, especially the illiterates are unaware of this fact, that degradation of environment includes the following:-

i. cooking with firewood.

ii. sweeping and clearing of the surroundings

iii. weeding, bush burning and other forms of farm chores.

iv. Livestock production

v. Burning 'of fuel-wood for food preparation

vi. improper disposal of waste such as attachments for hairdos, foil and water proof

vii. commonly used in wrapping foods such as moi-moi.

viii. Food production processing and storage

ix. Disposal of water containing chemicals used in washing wears as well as water used in domestic chores.

x. Use of insecticides, perfumes, and incense etc. All these chores affect the environment either directly or indirectly (Nchekwube, 2003).

From studies it is clear that environmental degradation is in a vicious cycle with poverty. Solving the problem of environmental pollution therefore requires the development of attitudes and practical skills, which help people to live in a manner that enhances environmental quality (Obeta, 2003). Obeta (2003) stated that the cause of environmental pollution include economic hardship and poverty. He added that poverty drives people to place unsustainable demands on their national resources. He also stated that the poor illiterates, especially in the developing countries, relentlessly search for free wood and cannot afford pollution abatement technology. As a result anything that is able to chase ignorance poverty and improve the economic status of people will go a long way in assisting households in fighting and reducing environmental degradation in Nigeria.

Effiong (2000) discovered from her study that ignorance of many people on chores performance have negatively shifted the perfect ecological balance thus threatening his own very existence on the planet. He explained that environmental pollution is a worldwide problem confronting humanity. The present awareness of controlling and mitigating human perturbation of the environment is an indication that the society has come to the realization of the need for a healthy and sustainable environment. Her study reveals that all environmental problems are man induced. This awareness is yet to be known by the Nigerian public. The country has attracted a lot of people who are looking forward to easier life in the cities. This and other changes have brought about phenomenal increase in the volume and diversity of wastes generated. Heaps of refuse and garbage have become common sight in state capitals, urban, semi-urban and rural areas, while effluent from the industrial and highly commercial chores have posed serious environmental threats to the society. Waste is of public health importance, since the careless handling of these waste items could lead to source of infection, pollute the soil and emit odour (Galadima et al, 2012). According to World Health Organization (2005) the environment is considered alternated as a result of the chores of man indoor and outdoor of their dwellings.

2.6 Level of Pollution

Pollution is one of the broader topic of environmental issues in Nigeria. Various forms of pollution as regards to air, water and soil have increased as the country has increased in population, more household activities globalization among others which has caused wide spread environmental health problems. Nigeria is gradually being condemned into desolation and bareness by sustained and unmitigated pollution of air, water and land pollution.

Smith (2014) reported that immense and sustained growth of the people of Nigeria since 1980s has exacted a price from the land in increased soil pollution. The Federal Environmental Protection Agency (2009) believes it to be a threat to the environment, to food safety and to sustainable agriculture in Africa. According to a scientific sampling (2012), 150 million mi (100,000 square kilometers) of Nigerians cultivated land have been polluted with contaminated water being used to irrigate a further 31.5 million mi (21,670 km^2) and another 2 million mi (1,300 square kilometers) covered or destroyed by solid waste as a result of refuse dump site that were not evacuated as when due. In total, the area accounts for one tenth of African's cultivatable land and is mostly in economically developed areas. An estimated 12 million tons of grain are countered by heavy metals every year causing direct losses of 20 billion of naira to this effect.

According to Rajjal (2010) the small level of environmental awareness has hundred of the development proper recycling systems in China's cities as the amount of waste increases due to increase in households pattern of consumption. It was also agreed that the waste generation in China was 300 million tons (229.4 kg/cap/yr). It was reported by Rajjal (2011) that China produced 2.3 millions of household waste, second largest in the world. The annual amount is expected to increase as the Chinese country economy grows.

Waste can create jobs and recycling valuable materials but also harm humans and the environment by release pollutants such as lead and which prevent the growth of crops and polluting the underground water layers. China government reported that the recycling operation in China have created many jobs for the citizens but also many health environmental problems.

According to Rollings (2011) in Nigeria, household solid waste generation and management are far from being efficient. At the household level, a lot of heterogeneous waste is generated and the volume and types have been on the increase. Virk (2012) opined that the experience of Nigerians shows that waste generation continue to be generated faster due to the level of consumption patter of households than they are disposed.

Perry (2011) stated that burning of refuse dump sites, cellophane, rags, papers also emits of environmental carbon into the atmosphere in residential areas. This increases the level of our pollution. Galadima and Garba (2012) agreed that refuse generation in Nigeria has increased more than necessary as refuse are left unevacuated to incineration designated to it. This has caused a lot of damages to humans and animals.

Scientists in many countries have even linked the level of our pollution in an environment to mortality rate and life expectancy for that area while there are currently no hard statistics available in the Nigerian cases. According to Perry (2011) it is clear that when people breathe in toxin fumes, eat food laced with toxic chemicals and drink water that has traces of toxic chemicals in it, they are bound to get sick, teeter on the edge of ill health or die prematurely.

Rajjal (2010) added that in Nigeria today, the level of emission from fire wood, coal, kerosene, saw-dust, incineration of rubbish, other harmful materials and burning of thrash dumps are at alarming rates, which if nothing is done to control the situation may be worst by 2020, destroying the health of household and causing global warming.

World Bank (2007) issues a report targeting China's policy towards household pollution. The report stated that hundreds of thousands of premature deaths and accidents of serious respiratory illness have been caused by exposure to household and pollution. According to Kahn (2007) articles about China's pollution problem stated that the level of degradation is now severe and high with start domestic and international repercussions, that pollution posses not only a major long-term burden on the Chinese public. Of the main point from the articles included:

- According to the Chinese Ministry of Health, industrial pollution has made cancer China's leading cause of death.
- Every year, ambient air pollution alone killed hundreds of thousands of citizens.
- 500 million people in China are without safe and clean drinking water.
- Only 1% of the country's 560 million city dwellers breath air considered safe by the European Union, because all of its major cities are constantly covered in a 'toxic gray shroud'. Before and during the 2008 Summer Olympics, Beijing was 'frantically searching for a magic formula, meteorological dues ex machine, to clear its skies for the 2008 Olympics.
- Lead poisoning or other types of local pollution continue to kill many Chinese children.
- A large section of the ocean is without marine life because of massive algal blooms caused by the high nutrients in the water.

- The population has spread internationally: surfur dioxide and nitrogen oxides fall as acid rain on Seoul, South Korea and Tokyo and according to the Journal of Geophysical Research, the pollution even reaches Los Angeles in the USA.
- The Chinese Academy of Environmental Planning in 2003 had an internal and unpublished report which estimated that 300,000 people die each year from ambient air pollution, mostly of heart disease and lung cancer.
- Chinese environmental experts in 2005 issued another report, estimating that annual premature deaths attributable to outdoor air pollution were likely to reach 380,000 in 2010 and 550,000 in 2020.
- A 2007 World Bank report conducted with China's national environmental agency found that "…outdoor air pollution was already causing 350,000 to 400,000 premature deaths a year. Indoor pollution contributed to the deaths of an additional 300,000 people, while 60,000 dies from diarrhea, bladder and stomach cancer and other diseases that can be caused by water-borne pollution". World Bank officials said "China's environmental agency insisted that the health statistics be removed from the published version of the report, citing the possible impact on 'social stability'".

World Bank and SEPA (2007) report stated that up to 760,000 people died each year in China because of air and water pollution. High level of air pollution in China cities caused to 350,000 – 400,000 premature deaths. Another 300,000 died because of high level of indoor air of poor quality.

Vennem (2009) cited that environmental trends were described as uneven. Quality of surface water in the South of China was improving and particles emissions were present in sources of water. But No_2 and So_2 emissions have been increasing before decreasing the last year for which data was available.

Kahn (2007) stated that in most part of the world the sewage and water waste that is produced by each household is left untreated and released into the dug-wells, boreholes and seas. The sewage water carries harmful bacteria and chemicals that can cause serious health problems. These pathogens carry inflict diseases via various forms of contacts into an individual. A very common example of this process would be high level of materials in individuals.

2.7 Empirical Studies

Ogboru (2001) conducted a study on environmental pollution and disease susceptibility: an analytical study of shallow well-water in Ondo town. The purpose of the study was to examine the nature of environmental pollution and its effect on shallow wells as a source of water supply to the people of Ondo town. The design of the study was casual comparative studies (ex-post factor). The town was grouped into four zones. Twenty four randomly sampled well water were used for laboratory test. Questionnaire, interview schedule and personal observations were employed for the study. Simple percentages was used in analyzing the data for the study. While laboratory tests were employed to determine virus and bacteria contend in the water. The result from the study revealed that shallow well water is contaminated with a lot of water borne diseases as most wells are not up to 10ft deep.

Ogboru’s (2001) study did not provide adequate information on the description of the methodology used for the study, neither did it state the sample size of the population of the study. Twenty four well waters randomly sampled in the study were too small to facilitate any conclusive generalizations on environmental pollution and disease susceptibility of shallow well waters in Ondo town. However the study provided a clue to the relationship between water pollution and disease susceptibility. The similarity between the present study and that of Ogboru (2001) lies in the household chore pollutants of water supply and disease susceptibility. The two studies examined the motivational factors responsible for environmental pollution. The result of Ogboru's (2001) study in Ondo town is useful in discussing some of the research questions in the present study.

Ogboru's (2001) study on environmental pollution and diseases sustainability focused on water pollution i.e. well water. While the present study was on household chore pollutants and environmental pollution. The study focused on environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution).

Uzoka (2001) carried out a study on environmental degradation challenges of families in Onitsha, Anambra state. The purpose of the study was to identify the common environmental degradation problems experienced by families in Onisha, Anambra State. The study was also designed to create awareness on how families contribute to environmental degradation and the strategies for managing environmental problems by families. The population for the study was 3000 home-makers from Onitsha Urban. The sample for the study were 300 hundred home makers from Onitsha urban. The instrument for data collection was the questionnaire. The data collected for the study were analyzed using the frequency counts and mean of total responses for each of the questionnaire items. The findings of the study revealed eleven (11) common environmental degradation problems experienced by families in Onitsha; Anambra State, eleven (11) ways the families contributed to environmental degradation problems, and eighteen (18) strategies for managing environmental degradation. This study though similar to the present research work, placed greater emphasis on environmental degradation and the strategies for managing environmental problems by families. However, unlike Uzoka's work was restricted to Onitsha urban while the present study intends to cover a wider area that is North West Geo-political zone, of Nigeria, and because household are clustered in nature and more populated and the type of settlement in the North might differ from those of South Eastern part of Nigeria where Uzoka study covered.

Uzoka's (2001) study was on environmental degradation challenges of families and environmental problems. While the present study was on household chore pollutants and environmental pollution. The study focused on environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution). The suggestions of Uzoka (2001) on strategies for limiting environmental pollution will be useful in the discussion of the present study.

Anyakoha and Igboeli (2003) carried out a study on household solid pollution disposal practices of women in two Nigerian Urban towns; Implications for environmental education. The research was specifically conducted in Enugu and Nsukka Urban areas of Enugu State. The purpose of the study was to determine the:

i. extent to which households in two urban towns of Enugu State are aware of the importance of the physical environment.
ii. practices which households adopt in the performance of household chores and disposal of their refuse.
iii. problems which the household encounter in the disposal of their wastes.

iv. possible strategies for enhancing household chores pollution generation.

v. environmental education needs for the households.

vi. appropriate delivery system through which environmental education can be effectively extended to the households.

The population used for the study was 400 homemakers (240 and 160 from Enugu and Nsukka respectively) and 52 government sanitation officials (30 from Enugu and 22 from Nsukka respectively). Thus, the total population for the study was 432. Questionnaire was the instrument used for data collection and data were analyzed using means and percentages. This study was limited in scope as only household solid waste disposal practices was covered. While the present study covered i.e. meal preparation activities, cleaning and washing activities, cooking technologies, household waste disposal methods, alternative sources of light and strategies employed in limiting environmental pollution in north west geo-political zone Nigeria.

The findings of the study revealed that households were aware of serious factors that affect their environment and the most efficient ways of household waste disposal. The study also revealed factors that hindered proper household chores performance by occupants and lack of government sanitation official's environmental supervision.

Anyakoha and Igboeli conducted their own study on household solid pollution disposal practices among women in two Nigerian Urban towns- Enugu and Nsukka using 432 respondents. While the present study was on household chore pollutants and environmental pollution. The study focused on environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution). Going by the outcome of the study it is possible to conclude that it was a good finding but the fact that the study did not look at household chores in relation to environmental pollution makes it different in every respect from the present study.

Nwokonkwo (2003) carried out a research on home economics, environmental education and quality of life in Port-Harcourt; Rivers State, The purpose of the study was to determine the ways Home Economics (HE) relate to Environmental Education (EE) in achieving quality of life. Home Economics teachers are aware of the relationship between home economics and environmental education; the chores in the home that affect the physical environment and how Home Economics can help protect the environment. The sample used for the study was made up of 95 NCE Home Economics teachers teaching Home Economics subject in secondary school in Port-Harcout River state. The research instrument used for the data collection was questionnaire. The data collected were analyzed using frequency counts and mean to answer the research questions. The findings of the result showed that:-

i. Home Economics and environmental education focused on quality of life.

ii. Majority of the Home Economics teachers were aware of the relationship with regard to some areas of Home Economics.

iii. Chores in the families such as cooking food. use of firewood, Kerosene Stove, use of Cellophane bags and plastics, use of packaged foods and convenience foods polluted the physical environment.

The reviewed study is significantly related to the present study as it focused on environmental education and quality of life as both studies are discussing household chores and environmental consequences. The study however differ from the present work in the sense that the focus of the present study is on relationship between household chore pollutant and environmental pollution.

The study was broad based. It was not focused on a specific problem, but the present work will attempted to look at household chores and pollutants generated through performing some household chores i.e. meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution). However, affect the environment. As the purpose of the study was to determine the ways Home Economics (HE) relate to Environmental Education (EE) in achieving quality of life, the use of descriptive statistics did not allow for test of hypotheses postulated for the study. A study population of 95 NCE students would probably serve as limitation to the study in terms of generalization.

Similarly, a study was also carried out by Ewubano and Ochaonogor (2004) on strategies for household waste management in Warri Metropolis. The purpose of the study was to determine the level of environmental sanitation awareness of residents of Warri Metropolis and the strategies employed by families in household pollution management. The population used for the study was made up of 150 adults, men and women (educated and uneducated drawn from 5 layouts of the study area totaling 150 respondents.

The instrument for data collection was questionnaire. The data collected were analyzed using frequency distribution and Chi-square statistics. The findings revealed a high level of environmental sanitation awareness irrespective of age and qualification; and the strategies employed by Warri residents in their household pollution management were dependent upon their age and qualification. The study was on causes of household waste pollution. The past study limited the work to Warri metropolis, while the present study is on North West Geo-political zone, of Nigeria

The study carried out by Ewubano and Ochaonogor (2004) on strategies for household waste management in Warri Metropolis appears too narrow given the fact that only 150 adults (men and women) were used. The sample size was too small with the magnititude of population in Warri metropolis. The present study covered the whole of North West Geo-political zone, of Nigeria. It focused on environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution).

Virk (2004) conducted a study on awareness among urban inhabitants about pollution management and its impacts on environment in two cities Barnala and Ludhiana of the Punjab State in India. The purpose of the study was to determine the pollution management practices among the people of two cities in Punjab. The population of the study was made up of 150 (75 from each city). Oral interview was the research instrument used for data collection and were analyzed using percentages. The findings of this study revealed the following:.

i. most households in both cities were satisfied with existing household chores performance practices in homes.

ii. households are aware of adverse effects of waste materials on the environment.

iii. households agreed that some chores pose problem to the environment.

iv. most household complained of dizziness due to poor condition of chores performance.

v. wastes and pollutants are not regularly evacuated.

Virk's study focused on awareness among urban inhabitants using only two cities in India while the present work will cover urban and rural inhabitants in North West geo-political zone, Nigeria. Only 150 inhabitants were used as sample in Virk's research and that is against the over 1000 urban and rural dweller were used in the past study. Virk's emphasis is on awareness among urban inhabitants about pollution management and its impacts on environment in only two cities- Barnala and Ludhiana of the Punjab State in India. The present study, apart from covering a larger area North-West geo-political zone of Nigeria is interested in pollutants generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution). The fact that in Virk's study oral interview was the main instrument of the research places certain restriction on generalization. In the present study a standardized questionnaire was used, which gave credibility to the outcome of the study rather than a kind of subjective estimation in Virk's work.

Akpan and Usoro (2005) conducted a study on problems associated with improper management of household waste in Uyo Metropolis of Akwa Ibom State. The purpose of the study was to determine types of household pollution generated in Uyo Metropolis: the various methods employed by house-holds in waste disposal and techniques that could help households in effective management of their wastes. The population used in the study composed of 150 men and 150 women totaling 300. The instrument used for data collection was questionnaire. The data collected were analyzed using percentages and chi-square.

The findings revealed that-

a) Households in the area of the study generated more solid waste than liquid and gaseous pollution.

b) The problem was also associated with improper waste management within the area was due to indiscriminate dumping and heaping on roads and in gutters.

c) Households lacked adequate knowledge on how to recycle waste and make them beneficial

d) The volume of pollution generated in households was influenced by the level of income, increase in family and condition of the building.

e) Households were not aware of the dangers of keeping dirty environment.

Though the last researcher; worked on problems associated with improper management of household waste, the purpose of the study was to determine types of household pollution generated in Uyo Metropolis. He did not look at the various household chores that led to the generation of such household wastes as the present study did. That the researcher restricted his study to only Uyo town with limited number of respondents (300) is in itself a limitation to the study, while the present study covered seven states and twenty eight Local Government Areas in the North-West geo-political zone, Nigeria. Besides, the use of chi-square statistics to analyze the data in this study is not applicable and t-test statistics could have been used to determine any difference among the variables between men and women. The reviewed study however, differs from the present study as it focuses on problems associated with improper management of household waste. While the present study focused on environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution) in the North-West geo-political zone, Nigeria.

Afolabi (2005) also carried out a study on household chores performance and its health implications to families in Taraba State. The major purpose of the study was to examine some problems posed by household chores and its health problem. The population for the study was made up of families in Taraba state. The sample size for the study were 150 families. The research instrument used for the data collection was the structured questionnaire. The data collected were analyzed using mean and standard deviation. The findings of the study revealed that:-

i. most of the surrounding sewage systems were broken and disfunctional.
ii. Households practice unwholesome pollution generation waste disposal.
iii. lack of refuse disposal containers
iv. Inadequate dump sites.
v. households are faced with problem of diseases resulting from improper performance of household chores in general.

The findings from the study provided factors that are led to polluted environment as chores are performed by households. This also have serious consequences on the family health. Such as blindness, headache, heart related problems, offensive odours. The study has implication for the present study in that it has helped to provide information on some of the health implications as a result to environmental pollution when chores are not properly performed or managed by family members.

The present study was on household chore pollutants and environmental pollution. The study focused on environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution). The past work and its findings are relevant to the present study but for its limitation in scope. It covered only Taraba State, whereas the present study covered all the seven states and twenty eight Local Government Areas in the North West geo-political zone, Nigeria.

Clatworthy, (2005) conducted a study on housing needs and residential mobility using children and youths in Canada of Aboriginal origin. The research conducted was an experimental research. The instrument used for collecting data was a structured questionnaire. The questionnaire was administered to 350 sample, drawn from the population of 350,000 which is 10% of the population used as sample. The statistical tool used for the analysis was not told. His result and findings revealed that among children and youth residing in these households are experiencing some housing needs, 84% had problems with housing affordability, 24% experienced problems of overcrowding, and 23% report housing quality (condition) issues, 36% experienced multiple problems in carrying out daily household chores. Clatworthy forgot to inform us that multiple responses were used for the study.

While Clatworthy's study was on housing needs and residential mobility among children and youths in Canada of Aboriginal origin, the present study unlike Catworthy's own intends to looked at household chore pollutants generated through performing household chores i.e. meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution). The present study is significantly different from Catworthy's own because it made use of literate households rather than children and youth. Besides, with only 350 children and youth as sample from a population of 350,000 limitation could be placed on generalization, whereas the present study used the entire North West geo-political zone of Nigeria, is likely to have a wider spread.

The topic is discussing housing needs and residential mobility while the present study focused on household chore pollutants and environmental pollution i.e. meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution). The study covers a wider scope of housing and mobility while the present study focuses on a restricted and specific scope (household that are clustered and are permanently settled in an area). The study again looked at housing needs of the people while the present research looks at already established homes, and have met the needs of the people. This is because the family are already living in the houses. The differences between the past study and the present study is that housing needs and housing mobility were treated but the present work was on household chore pollutant and environmental pollution.

Similarly, Anozie (2008) carried out a study on solid waste disposal practices of households in Asaba nutritional implications. The purpose of the study was to; 1) determine ways household solid wastes are disposed by families and 2) determine strategies for improving the solid waste disposal practices adopted by households. Two research questions were answered. Questionnaire was used to collect relevant data from a random sample of 100 households in Asaba. Data collected for the study were analyzed using frequency counts and mean to answer the research question. The past study discovered that most of the households dispose their solid wastes by dumping them in a vacant or unused plots, back of homes, along streets and drains. The study reveled among other strategies, the provision of adequate public waste disposal facilities by the local government authority.

The study of Anozie (2008) provided a description of the methodology used for the study but the two research questions were grossly inadequate to properly address the study. However, the study was observed to be partially comprehensive in addressing solid waste disposal practices of household and its nutritional implications. The similarity between the present study and that of Anozie (2008) lies in household chores pollutants from solid waste disposal practices of households and it nutritional implication to health. Although the present study differed is some of the objectives but one of Anozie's objective on strategies for improving solid waste disposal practices of households tried to be in line with the purpose of controlling environmental pollution. The results of Anozie's study is useful in discussing the research question four (4) of this presents study. Anozie's (2008) work discussed solid waste disposal practices and nutritional implications on health while the present study focused on environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution).

Usman and Raheem (2010) carried out a study on Correlation and Health on Consequences of Indoor Air Pollution among Urban Households in Ilorin. The major purpose sought to find out the relationship between the use of unclean energy and category of some selected self reported pollution related to health effect. Questionnaire and oral interview were used for data collection. ANOVA was used to analyse the data collected. The findings of the study reviewed among others that household cooking may possess some negative health implications. It also reviewed that poisonous gasses are produced from burning wood used for cooking be families. The reviewed study differ from the present study as it focused on household chore performance and its health implications while the present study focused on household chore pollutants and environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution) in the North-West geo-political zone, Nigeria.

The result from the study could be said to be relevant to this study which is also investigation household pollution. However, the relevance of the study objectives differs from the one being investigated by this researcher in the sense that the result seek to identify household pollutants and to measure the health effect of the pollutants. Furthermore, the study failed to clearly stipulate the population used for the study, sample size aside from indicating statistical tool used for the analysis, and the location of the study which is Ilorin. In the present research, not only did the researcher indicated the location of the study. The sample size and process of data collection were clearly stated.

Awo (2011) also conducted a study on solid waste disposal practices of households in Katsina State urban towns: environmental and health implications. The purpose of the study was to determine;

1. methods employed by households to dispose their solid wastes,
2. implications of irregular disposal and collection of household solid wastes
3. ways of improving the solid waste disposal practices adopted by households in Katsina state urban town.

The study adopted survey research design. Three research questions were answered. A structured questionnaire was used to collect relevant data from a random sample of 360 households in Katsina and Funtua towns respectively. Multistage sampling technique was used to select the respondents. Data collected for the study were analyzed using frequency counts and mean to answer the research question. The finding revealed among others that most of the households in the two urban towns dispose their solid wastes in vacant, or unused plots, back of homes and drains. It was also revealed among other strategies that enough dump sites and facilities should be provided by the state and local governments.

The study of Awo (2011) only covers the urban towns of Katsina state with a focus on methods of solid waste disposal, its implications and strategies to evolve that can reduce the effects of these implications on the environment and human health. The present study focused on environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution). However, the results of Awo's (2011) study were relevant in discussing the findings of the present study.

Galadima, Garba, Leke, Almustapha and Adam (2011) conducted a study on Domestic Water Pollution among Local Communities in Nigeria: Causes and Consequences. In their research, they opined that the lack of adequate sewage and waste disposal make many households potential health hazard areas for their inhabitants. The research further pointed out that the disposal of solid waste on land creates an important source of ground water pollution. The study is consider significant and related to the present research as it relates to solid waste and water pollution which is one of the objectives and important aspect of the present work.

In a study of such magnitude, one could say should have been with a clear objective and location as well as sample technique clearly specified. This was not the case with the past study as it was generalized to cover the entire country. The present study covers North-West geo-political zone, of Nigeria. The study focused on environmental pollution generated through meal preparation activities (air, land and water), washing and cleaning activities of the house (water and land pollution), cooking technologies (air), household waste disposal method (air, water and land pollution) and alternative sources of light (air, land and water pollution). The result therefore could not specifically where in the country has solid waste cause water pollution. More so, instead of relying on primary results, the study relied on secondary materials. The methodology adopted which is the reliance on secondary data that were not specifics is hereby faulted. The present study was able to bring out six specific objectives among others to determine the relationship between meal preparation activities and environmental pollution in compound houses of north west geo-political zone, Nigeria.

2.8 Summary of the Reviewed Related Literature

The literature reviewed for this study focused of three main headings; the theoretical frame work with one relevant theory, conceptual frame work with many sub-headings, the empirical studies with eight studies reviewed.

The empirical studies reviewed in Nigeria and other countries indicated the prevalence of environmental pollution by other researchers. Gaps discovered in all the works reviewed so far revealed that none of the empirical studies addressed the relationship between household chore pollutants and environment pollution. For instance the studies renewed focused on housing needs and residential mobility among children and youths pollution management practices among people of two cities; types of household pollution generated environment sanitation awareness and strategies employed by families in household pollution management; relevance of home economics to environment education in achieving quality life.

In addition, empirical studies reviewed, identified common environmental degradation problems experienced by families. Furthermore, household solid waste disposal practices of women in two Nigerian urban towns; implications for environment mental education; household chores performance and its health implications to families' solid waste disposal practices of households and its nutritional implications and solid waste disposal practices of households were also studied by past researchers.

The present study intended to close the above gaps by providing comprehensive determinants of inter-relatedness between household chore pollutions such as (meal preparation activities, cleaning and washing activities, cooking technologies, waste disposal methods, alternative sources of light and environmental pollution in the north-western geo-political zone, Nigeria.

The literature reviewed for this study addressed the following areas: concept of houses and their functions, concept of household chores and environmental pollution issues, household chores and performance; pollutants that emanate from household chores performance; level of awareness of residents as related to pollution generation: factors influencing household pollution generation, strategies for reducing environmental pollution generation household pollution effects associated with household chores and related empirical studies.

The literature showed that in the past, types of housing were determined by the availability of materials and the locality, but today due to the advancement in technology there are improved building materials in the society. Modern houses can be bungalows or storey buildings, flats, duplex and compound houses. However, income is a principal determinant of the quality of housing.

The review of literature, revealed in clear terms what constitutes household chores and environmental pollution generated, which emanates from the domestic chores of the inhabitants of particular residential areas. Household chores pollutions are the useless unwanted or discarded materials from households and residential areas with insufficient liquid content to be free flowing. These pollutants are revealed to be the cause of environmental pollution of natural resources such as air, water and soil. The reviewed literature described household chores pollution as any activity that generate poisonous substances in the physical environment which makes life unbearable resulting from domestic, commercial and agricultural chores. Household chores environmental pollution management is at the lowest ebb in most urban towns and communities in North West geo-political zone of Nigeria. Thus, the need for application of the level of residents' awareness status skills and resources in controlling, correcting and influencing chores of individuals with a view to redeeming the environment. All the literature reviewed did not highlight the variables in this present study identified, hence this forms the gap this study fulfilled.

Furthermore, there was no evidence that past researches conducted studied on particular levels of pollution in residential environment. This study was able to establish the relationship between the level of environmental pollution in compound houses in the North-West Geo-Political Zone, Nigeria.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter described the research methods and procedures for the study under the following sub-headings:

3.1 Research Design

3.2 Population for the study

3.3 Sample size and Sampling Procedure

3.4 Instrument for Data Collection

3.4.1 Validity of Instrument

3.4.2 Pilot Study

3.4.3 Reliability of Instrument

3.5 Procedure for Data Collection

3.6 Techniques for Data Analysis

3.1 Research Design

A descriptive survey design was used for this study. The design was considered appropriate because it provided an appropriate modality for obtaining information from a sample size. The use of descriptive survey research method has been attested to by Asika (2001) as being a useful means of obtaining baseline data on prevailing traits and perceptions among segments of the population and generalizing the findings to the population. Asika (2001) stressed that it is the best method suitable for studies where population is spread over a wide area. This was considered appropriate for this study, since we had to collect data from households in North-West Geo-Political Zone, Nigeria.

3.2 Population for the Study

Population, as applied to this study refers to the entire group of people to whom the findings of this study applied (Mimmer and Dominic, 2011). The targeted population for this study was made up of households in all the North West Geo-Political zone, Nigeria. This was because they were directly responsible for the carrying out household chores in their various homes. All the seven (7) states in the North West Geo-Political zone of Nigeria were involved in the study as shown in Table 3.1.

Table 3.1 Population for the Study

S/N	**State**	**Population of Households in Selected L.G.A.**				**Total**
		1	**2**	**3**	**4**	
1	JIGAWA	Roni	Gumel	Hadejia	Dutse	
		14,929	19,562	18,718	47,141	100,356
2	KADUNA	Kaduna North	Chikun	Kudan	Zaria	
		73,515	79,451	25,260	71,841	280,067
3	KATSINA	Batsari	Daura	Katsina	Matazu	
		39,308	41,980	54,965	21,751	158,004
4	Kano	Bebeji	Fagge	Kiru	Tofa	
		34,138	40,527	47,490	17,486	139,641
5	KEBBI	Gwandu	Bunza	Yauri	Zuru	
		27,740	21,916	16,421	28,670	94,747
6	SOKOTO	Gudu	Isa	Sokoto North	Shagari	
		17,911	27,067	38,216	28,777	111,971
7	ZAMFARA	Maru	Talata Mafara	Gusau	K/Namoda	
		55,672	40,525	69,297	52,283	217,777
	Total	**263213**	**271,028**	**270,367**	**267,949**	**1,102,559**

Source*:* National Population Commission, Abuja, 2012

3.3 Sample Size and Sampling Procedure

Sample for this study was gathered from four (4) Local Government Areas in each of the seven (7) states in the North West Geo-political zone of Nigeria. According to Asika (2001), “the sample is precisely a part of the population.” It is the small part of the population intended as a representative of the whole. For this study, multi-stage sampling technique was adopted in the selection of the sample for the study. This was because the population in the study was large. Multi-stage stratified sampling allowed the researcher to employ random sampling after the determination of groups. According to Sampath (2005) multi-stage sampling can be used to break down groups and sub-groups into smaller groups until the researcher reaches the desire size to work with. He stated that with multi-stage sampling method there is no restriction on how a researcher divides the population into groups but allows a large number of possibility for methods of convenience.

Stage I: All the seven states in the zone were used for the study for total coverage. The revised Krejcie and Morgan (2001) task of sample selection suggests that for a population of seven (7) all elements in such population must be used as sample. Hence the use of the seven states in the zone to bring the proportional population of household in the area.

Stage II: Random sample selection of four (4) local Government areas (LGAs) from each of the seven states making twenty eight (28) LGAs for the study. Using Aggarwal (2012) sampling technique to select samples from each state then proportional sampling was used for each local government area i.e. divide the population of each local government by the total population of the four local government area and multiply it by the total sample for the state (Aggarwal, 2012).

Stage III: However, proportional sampling method was relied upon to select households in each Local Government Area. On the whole a total of 2686 households were selected from all the seven states in the zone although the number of households differ from each state and local government area as shown in Table 3.2.

Table 3.2 Sample Size of Households

S/N	State	Sampled LGA	1	Sample Size	2	Sample Size	3	Sample Size	4	Sample Size	Total No of samples
1	Jigawa	100,350	Rano	57	Gumel	75	Hadejia	72	Dutse	180	384
2	Kaduna	280,069	Kaduna North	113	Jukun	122	Kudan	39	Zaria	110	384
3	Katsina	158,004	Batsari	96	Daura	102	Katsina	134	Matazu	53	384
4	Kano	139,641	Bebeji	94	Fagge	111	Kiru	131	Tofa	48	384
5	Kebbi	94,747	Gwandu	112	Bunza	88	Yauri	66	Zuru	116	382
6	Sokoto	111,971	Gudu	61	Isa	93	Sokoto North	131	Shagari	99	384
7	Zamfara	217,777	Maru	98	Talatamafara	71	Gusau	122	K/Namoda	92	384
	Total	**1,102,559**		**631**		**662**		**695**		**698**	**2686**

Source: Field Work (2014)

3.4 Instrument for Data Collection

The researcher designed a survey questionnaire for households living in compound houses of North-west geo-political zone, Nigeria, which was reviewed by the supervisors. As suggested by Khan (2007) only purposeful statement based upon research objectives and null hypotheses were included. All questions were closed-ended to elicit standard responses. Wording of the survey questionnaire was kept simple and unbiased and questions of trivial nature were avoided. With this in mind questionnaire was developed in relation to the objectives, research questions and null hypotheses of the study and information gained in the literature. The questionnaire was organized in two sections 'A' and 'B'. Section A contained 9 items while section B had 70 items.

Section "A" was personal information of the respondents. This section contained questions regarding the personal information of the participants which include among others age range, marital status, types of family, number of children, educational qualification, location of residence, nature of household and experience about activity that caused environmental pollution. This section helped in giving personal information of the participants which was very useful when analyzing the study.

Section "B" consisted of seventy (70) items for the households. It is divided into six parts. The statements in this section are patterned along the five (5) point Likert scale. The first part asked the respondents about the relationship between meal preparation activities and environmental pollution in compound houses of North west geo-political zone Nigeria, the second part was on the relationship between cleaning and washing in the home and environmental pollution of North west geo-political zone Nigeria. The third part was on the relationship between cooking technologies and environmental pollution of North west geo-political zone Nigeria. The fourth part was on relationship between waste disposal and environmental pollution of North west geo-political zone Nigeria. The fifth part was on relationship between alternative sources of light and environmental pollution of North west geo-political zone Nigeria. The six part was on relationship between strategies employed by households in limiting pollution and environmental pollution of North west geo-political zone Nigeria while the seventh part was on the relationship between level of pollution (air, water and soil) and environmental pollution in compound houses of North-west geo-political zone, Nigeria.

In order to measure the level of pollution in compound houses and the environment, the following instruments were used:

i. X-ray Fluorescent Spectrometer analyzer was used to measure level of pollution in the soil.
ii. Gas meter was used to measure the level of pollution in the air
iii. Nephelometer was used to measure the level of pollution in the water.

3.4.1 Validity of the Instrument

Validity relates to whether the instrument are really measuring what they are suppose to measure. The most obvious type of scientific validity evidence is based on the content. According to Ary, Jacobs & Razavieh (2002), content validity was established by having a competent team who are familiar with the purpose of the survey to vet the items on the questionnaire in order to judge whether they are appropriate for measuring what they are suppose to measure and whether they are representative sample of the opinion domain investigation.

In order to ensure the validity of instrument for the study, the original questionnaire that was drafted by the researcher was viewed by the supervisors. Three experts in Home Economics Education and researchers in the ranks of Senior Lecturer, Readers, and Professors in the Faculty of Education, Ahmadu Bello University Zaria, who were also experts from Urban and Regional planning and in Measurement and Evaluation vetted the questionnaire. Their observations and suggestions were incorporated in the instrument there by making it valid for use for the study. After that, restructuring and corrections were made based on their recommendations.

3.4.2 Pilot Study

The instrument was pilot-tested on one hundred and forty (140) households that is seventy (70) in each of the two Local Government Areas of Kaduna State (Giwa and Igabi) because they had the same characteristics with those household under study but the two Local Government Areas were not involved in participation. One hundred and forty (140) households represented ten (10) percent (%) of the sample population for this study (Gaur and Guar, 2009). Data generated from the pilot study were used to determine the reliability of the instrument. A pilot study was conducted to determine whether the questionnaire items were clear and understood by the respondent, whether there was need to add items in the questionnaire and how the respondents would react to the questionnaire items.

3.4.3 Reliability of the Instrument

For a survey data to be used, it must be reliable. Reliability is concerned with the extent to which an instrument yields consistency. The data generated from the questionnaire used for pilot study were subjected to a reliability test using the Statistical Package for Social Sciences (SPSS) version based on Cronbach Alpha reliability test. The Cronbach Alpha reliability test is commonly use as a measure of the internal consistency or reliability of attitudinal test score for a sample of respondents (Akwezuilo and Agu, 2003). As a value of thumb for this study, a Cronbach Alpha Co-efficient of 0.70 or higher was required before the instrument was used i.e. considered as reliable. A reliable co-efficient of this value implied that the instrument was internally consistent and valid for the study. Similarly, Uzosike (2008) and Guar and Guar (2009) stated that if the result of the test is obtained at the average value of co-efficient of around 0.70, it is an indication that the instrument is reliable and internally consistent and valid for the study.

The test obtained at average value of co-efficient of the pilot study was about 0.70. This showed that the instrument was reliable.

3.5 Procedure for Data Collection

For effective and smooth administration of the questionnaire the researcher obtained a letter of introduction from the Head, Department of Vocational and Technical Education, Ahmadu Bello University Zaria for permission from the local government chairmen of the four local government in each of the seven states in north west geo-political zone, Nigeria. The letter explained the purpose of the study and nature of the assistance required. The researcher recruited and trained 7 research assistants. The researcher personally took the questionnaire and a letter to the research assistants in each of the twenty eight (28) Local Governments in the seven States in the North-West Geo-Political Zone, Nigeria. The researcher and research assistants distributed the copies of questionnaire in each state. Attached to each of the questionnaire was a letter explaining the purpose of the study and instruction for completing the questionnaire. The roles of the research assistants were basically to help the researcher with the distribution and collection of the questionnaire. The research assistants were also expected to serve as guide to respondents where their assistance was needed.

The total number of two thousand six hundred and eighty six (2,686) copies of questionnaire were distributed. After two weeks the researcher and research assistants were able to retrieve about two thousand (2000). In all, the process took two weeks for each state. One thousand four hundred (1400) were duly and properly completed representing 53% of the questionnaire retrieved. This served as the primary data for the study. This was used for the analyses.

However, for research question seven (7), survey was conducted at various compounds houses in the major residential areas. Compound houses were selected at random in strategic places. Soil and water samples were collected from these living areas in all the states visited. The survey included Ex-Situ soil from refuse dump, sample collection of water and air in clustered residential areas of the studies.

X-ray Fluorescence Spectrometry (XRF) analyzers were used to delineate the polluted / contaminated Ex-Situ soil collected from the compounds.

Water sources were strategically selected in residential areas to cover the various sections of the town. These included boreholes, open or unprotected wells.

Fluoride (F), nitrite (No_3), sulphate (So_4), bicarbonate (Hco_3), iron (Fe), faecal coliforms (Fc) and total coliforms (Ttc) were analyzed. Also lead (Pb), chromium (Cr), arsenic (As), calcium (Ca), magnesium (Mg) and manganese (Mn) were acidified with concentrated nitric acid in the field.

The analytical methods adopted were based on internationally accepted methods and analytical application principles. Even though various kinds of instrument by different manufacturers were used in the course of analysis of sample, the principles employed were based on approved standard methods. The various facilities and methodologies used in the laboratory measurement and analysis of sample were summarized thus:

S/No.	Parameter	Equipment / Method Used
1	Floride (mg/l)	Wagtech photometer / colorimetric (Choride and Eriochromelcyanine)
2	Sulphate (mg/l)	Wagetech photometer / barium turbidimetric
3	Biocarbonate alkalinity (mg/l)	pH titration
4	Calcium (mg/l)	EDTA titration
5	Magnesium (mg/l)	EDTA titration
6	Iron (mg/l)	Hach spectrophotometer / ferrover
7	Manganese (mg/l)	Hach spectrophotometer / periodate
8	Arsenic (mg/l)	Wagtech arsenator
9	Chromium (mg/l)	AAS
10	Lead (mg)	AAS
	Bacteriological	
11	Faecal / coliform (CFU/100ml)	Membrane filtration
12	Total coliform (CFU/100ml)	Membrane filtration

Source: Kaduna State Environmental Protection Agency (2015)

The analysis to answer research question seven (7) was done at Kaduna State Environmental Protection Agency (KEPA) where certificates were issued (Appendix VI, V & VI), Sokoto State Environmental Protection Agency (SEPA) and Katsina State Environmental Protection Agency (KSEPA) did not issue a written certificate in this regard.

3.6 Procedure for Data Analysis

The personal data of the respondents in section A were presented in frequencies and percentages. These were used in making of summary on the respondents of subject for comparison of data. The six (6) research questions were analyzed using weighted mean. A mean of 3.0 and above indicated acceptance while less than 3.0 indicated unacceptance.

To test the null hypotheses, the Pearson Product Moment Correlation of statistical procedure was employed to analyze the data between all the variables in the six (6) null hypotheses for the study. Pearson Product Moment Correlation was used because all the items under each variable was added up in respect to the value of that variable under Pearson Product Moment Correlation.

In the analysis, if r-calculated value was greater than table r-value, the null hypothesis would be rejected and on the other hand, if the r-calculated value of any of the hypothesis was less than table r-value, the null hypothesis would be accepted. All the null hypotheses were tested as 0.05 level of tolerance.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

This chapter presented the analyses of the data collected for the study through the questionnaire in order to study the Relationship between Household Chore Pollutants and Environmental Pollution in North West Geo-Political Zone, Nigeria. This chapter was presented under the following sub-headings:

4.1 Distribution of Bio-Data Tables

4.2 Answer to Research Questions

4.3 Testing of Hypotheses

4.4 Summary of Major Findings

4.5 Discussion of Findings

4.1 Distribution of Bio Data

Table 4.1 Distribution of Respondents by Age

Age	**Frequency**	**Percent**
20 and below	269	19.2
21-30	379	27.1
31-40	152	10.9
41-50	288	20.6
50 and above	312	22.3
Total	1400	100.0

The age of the respondents as presented in Table 4.1 indicated that three hundred and seventy nine (379) which was 27.1 were 21 – 30 years old, two hundred and twenty eight (228) representing 20.6% were between 41 – 50 years of age. Two hundred and sixty nine (269) were 20 years and below. They made up of 19.2% of the respondents. Three hundred and twelve (312) which was 22.3% representing 50 and above of the respondents. The remaining one hundred and fifty two (152) of the respondents representing 10.9 were between 31 – 40 years of age. This indicated that the majority of respondents were between 21 – 30 years.

Table 4.2   Distribution of Respondents by Marital Status

Marital Status	Frequency	Percent
Single Parents	296	21.1
Married	878	62.7
Divorced	152	10.9
Widowed	48	3.4
Others	26	1.9
Total	1400	100.0

According to Table 4.2, eight hundred and seventy eight (878) which made up of 62.7% of the respondents had been married followed by (296) which were 21.1% were singles, while one hundred fifty two of the respondents, 10.9 were divorced, forty eight (48) which made up of 3.4% were widowed and twenty six which made up 1.9% were others which means that the majority of the respondents were married.

Table 4.3   Distribution of respondents by type of Family

Type of Family	Frequency	Percent
Nuclear family (husband, wife, children)	346	24.7
Polygamous family (husband, wives, children)	827	59.1
Extended family	173	12.3
Others	54	3.9
Total	1400	100.0

Table 4.3 revealed that eight hundred and twenty seven (827) of the respondents representing 59.1% the respondents representing 59.1% were polygamous family, Nuclear family is next with three hundred and forty six (346) of the respondents, representing 24.7% while One hundred and seventy three (173) of

the representing 12.3% were from extended family. The remaining fifty four (54) of the respondents representing 3.9% were others.

Table 4.4 Married and No children?

No of Children	Frequency	Percent
1 – 2	147	10.5
3 - 4	253	18.1
5 – 6	347	24.8
7 and above	542	38.7
None	111	7.9
Total	1400	100.0

Details of Table 4.4 revealed five hundred and forty two (542) of the respondents representing 38.7% were marriage with children of seven and above, Three hundred and forty seven (347) representing 24.8% were married with children between fie and six , Two hundred and fifty three (253) representing 18.1% of those having children of 3 – 4. One hundred and forty seven representing 10.5% one for 1 – 2 children while one hundred and eleven 7.9% at the respondents have no children.

Table 4.5 Highest Educational Qualification of Households

Highest Educational qualification	Frequency	Percent
University degree	124	8.9
HND	222	15.9
NCE/ND	311	22.2
WASC/SSCE/Technical Certificate	528	37.7
Non-Literate	208	14.9
Others	7	.5
Total	1400	100.0

Table 4.5 revealed that Two hundred and twenty eight 228 (37.7%) of the respondents have secondary living certificate, three hundred and eleven 311 (22.2%) of the respondents had NCE/ND Certificate, Two hundred and twenty two (222)

which were 15.9% had HND Certificate, while One hundred and twenty four (124) which made up of University Certificates were 8.9%. Two hundred and eight which made up 208 that accounted for 14.9% representing the households with no formal education and the respondents seven (7) made up 5% of the respondents have other educational qualification.

Table 4.6 Ownership of Residence

Place of Residence	Frequency	Percent
In rented house	500	35.7
In govt/employers qtrs	429	30.6
Personal house	114	8.2
Others	357	25.5
Total	1400	100.0

Table 4.6 showed a total of 500 (35.7%) of the respondents live in rented houses, 429 (30.6%) of them live in government quarters, 114 (8.1%) of them live in their personal houses and the rest 357 (25.5%) of them live in other places.

Table 4.7 Location of Residence

Location of household	Frequency	Percent
Urban area	529	37.8
Semi urban area	556	39.7
Rural area	315	22.5
Total	1400	100.0

According to Table 4.7 the houses of 529(37.8%) of the respondents are in urban areas, 556(39.7%) of their houses are located in semi urban areas and the rest 315(22.5%) of their houses are in rural areas.

Table 4.8 Type of Residence

Nature of housing	Frequency	Percent
Flat in a compound	223	15.9
Flat not in a compound	52	3.7
Single/double rooms in a compound	258	18.4
Single room/double rooms not in a compound	498	35.6
Self contain in a compound form	209	14.9
Self contain but not in a compound form	160	11.4
Total	1400	100.0

The nature of housing of the respondents is given in the Table 4.8, 498 (35.6%) of them of them live in single room/double rooms in a compound, 258 with (18.4%) of live in single/double rooms in compounds, while 223 (15.9%) they live in a flat in a compound, 209 representing (14.9%) live in self contain in compound flat, while 160(11.4%) representing household living in self contain but not in compound form, lastly fifty two representing 3.7% reside in flat not a compound.

Table 4.9 Have you experienced any activity that has caused environmental pollution around your household

Experienced Activity that Cause Environmental Pollution	Frequency	Percent
Yes	1292	92.3
No	108	7.7
Total	1400	100.0

The Table 4.9 showed that one thousand two hundred and ninety two 1292 (92.3%) of the respondents have experienced activities that has caused environmental pollution around their houses and the rest 108(7.7%) of them have not experienced any activity that caused environmental pollution around their houses.

4.2 Answering Research Questions

This section of the chapter presents analysis of data used for answering the 7 research questions raised for the purpose of the study.

4.2.1 Research Question One

What is the relationship between meal preparation activities and Environmental Pollution in compound houses of North West geo-political zone, Nigeria?

Table 4.10 Perception of respondents on relationship between meal preparation activities and Environmental pollution in compound houses of North West geo-political zone, Nigeria

S/No	Items	Response Categories					Mean	Decision
		SA	A	UD	SD	D		
1	Discarding of dirty water after washing food items before cooking can cause water pollution that affect the environment	480	222	160	188	350	3.21	Accepted
2	Discarding of food peels like yam and cassava when they decay can cause land pollution that affect the environment	472	352	111	355	110	3.51	Accepted
3	Pounding of food items can cause noise pollution that affect the environment	457	224	152	280	287	3.20	Accepted
4	Grinding food items with machines can cause noise pollution that affect the environment	358	372	382	142	146	3.47	Accepted
5	Frying of food can cause air pollution that affect the environment	507	243	177	175	298	3.35	Accepted
6	Discarding of water used for washing of cooking utensils and eating can cause water pollution that affect the environment	506	242	181	177	294	3.35	Accepted
7	Sound from mixers and bleeders of food items can cause noise pollution that affect the environment	160	161	402	385	292	2.65	Accepted
8	Discarding burnt and rotten food can cause air pollution that affect the environment	232	448	132	284	304	3.01	Accepted
9	Foul and bad odour from leftover food can cause air pollution that affect man and the environment	198	500	375	164	163	3.29	Accepted
10	Disposal of rotten food items can cause air and land pollution that affect man and the environment	229	114	503	244	310	2.59	Accepted
	Research Question 1			**Cumulative Mean**			**3.19**	Accepted

Source: Researcher's Field Work 2014

Table 4.10 revealed the frequencies of perception on the relationship between meal preparation activities and the environmental pollution in North West geo political zone. Their overall mean response on the ten items was 3.19. This is higher than the decision mean response of 2.5 implying that their responses on the relationship between household chores performed and the environmental pollution are positively significant. Specifically they're of the opinion that peeling of food crops like yam and cassava tubers can cause land pollution that affect the environment as this item attracted the highest mean response of 3.61. In the same vein they are of the opinion that frying of food can cause air pollution that affect the environment, as this attracted the second highest mean response of 3.47.

4.2.2 Research Question Two

What is the relationship between household / cleaning washing activities and environmental Pollution in compound houses of North West geo-political zone, Nigeria?

Table 4.11a Perception of respondents on extent to which cleaning in the house affect Environmental Pollution in compound houses of North West geo-political zone, Nigeria

S/No	Items	Response Categories					Mean	Decision
		SA	**A**	**UD**	**D**	**SD**		
1	Use of rakes brooms and sweeping machine have the tendency to cause air pollution which affects the environment	124	495	120	321	340	2.80	Accepted
2	Sometimes the clearing of weeds and grasses around the household that are not properly disposed have the tendency to cause land pollution which affects the environment	130	465	115	325	365	2.80	Accepted
3	The blackish substance from the back of back of utensils have the tendency to cause land pollution which affects the environment	511	250	190	183	266	3.03	Accepted
4	Sweeping the house could generate dust that has the tendency to cause air pollution which affects the environment	488	251	192	182	287	3.38	Accepted
5	Dusting the room and upholsters and other items have the tendency to cause air pollution which affects the environment	512	246	194	174	274	3.38	Accepted
6	Spraying of insecticides and other related like perfumes have the tendency to cause air pollution which affects the environment	509	249	193	175	274	3.03	Accepted
7	Beating of rugs with sticks as well as burning of refuse have the tendency to cause air pollution which affects the environment	510	248	192	173	277	2.66	Accepted
8	Cleaning of oil from the kitchen has the tendency to cause pollution which affects the environment	510	246	193	177	274	3.48	Accepted
9	Use of long brooms to remove dirt from the walls and ceiling have the tendency to air water pollution which affects the environment	454	220	178	268	280	2.66	Accepted
10	Dirty rags and towels used in dusting and cleaning can cause air and land pollution have the tendency to affect the environment	125	560	260	211	244	3.06	Accepted
	Research Question 2			**Cumulative mean**			**3.06**	Accepted

Source: Researcher's Field Work (2014)

According to Table 4.11a, cleaning of oil from the kitchen has the tendency to cause pollution which affects the environment could be the reason why there is the manifestation of environmental pollution. This view attracted the highest mean response level of 3.48 with details of response showing that 510 strongly agree while 246 agreed to this view while 193 were undecided as against 177 that disagreed and the rest 274 strongly disagreed. In summary their cumulative mean response of 3.06 is higher than the 2.5 decision mean implying that their response on the ten items of methods used in cleaning of clothes affect Environmental Pollution is positively significant.

Table 4.11b Perception of respondents on extent to which washing activities in the home affect Environmental Pollution in compound houses of North West zone, Nigeria

S/No	Items	Response Categories					Mean	Decision
		SA	A	UD	SD	D		
1	Washing of clothes with low quality detergents have the tendency to cause environmental pollution	124	494	121	323	338	2.82	Accepted
2	Washing of lavatories with washing agents have the tendency to cause air pollution which affects the environment	57	59	174	598	512	1.97	Unaccepted
3	The nature of soap and detergents used in washing utensils have the tendency to cause water pollution which affects the environment	125	599	69	391	216	3.02	Accepted
4	Dirty and waste water from sewage have the tendency to cause water pollution which affects the environment	259	529	351	145	116	3.48	Accepted
5	Allowing dirty water to stay stagnant have the tendency to cause land pollution which affects the environment	545	240	168	158	289	3.42	Accepted
6	Bathing water from the bathroom have the tendency to cause water pollution which affects the environment	3	18	196	417	766	1.63	Unaccepted
7	Lack of effective attitude of washing household articles have the tendency to cause pollution which affects the environment in the area	102	131	632	258	277	2.66	Accepted
8	The use of washing machine have the tendency to cause water pollution which affects the environment	515	254	173	170	288	3.38	Accepted
9	Hand washing solutions and agents have the tendency to cause water pollution which affect the environment	6	6	215	412	761	1.63	Unaccepted
10	Washing of utensil refuse have the tendency to cause water pollution which affects the environment	102	122	631	268	277	2.65	Accepted
	Research Question 3			**Cumulative Mean**			**2.66**	**Accepted**

Source: Researcher's Field Work (2014)

Table 4.11b revealed the respondents' level of agreement to how the use of washing methods could cause environmental pollution. They are of the opinion that dirty and waste water from sewage have the tendency to cause water pollution which affects the environment. This view attracted the highest mean level of agreement of 3.48 with details of response showing that while 259 were in strong agreement, 529 were in agreement while 351 were undecided as against 145 that were in disagreement and the remaining 116 were in strong disagreement with this view. In the same vein they are of the opinion that allowing dirty water to stay stagnant have the tendency to cause land pollution which affects the environment. This had the second highest mean response of 3.38 with details showing that 555 of them were in strong agreement while 250 were in agreement as against 178 that were undecided while 168 were in disagreement and the rest 289 strongly disagreed with this view. In summary their cumulative mean response of 2.66 is higher than the 2.5 decision mean implying that their response on the ten items of methods used in washing activities affect Environmental Pollution is positively significant.

4.2.3 Research Question Three

What is the relationship between household cooking technologies and Environmental Pollution in compound houses of North West geo-political zone, Nigeria?

Table 4.12 Perception of respondents on household cooking technologies could cause Environmental Pollution in North West geo-political zone, Nigeria

S/N	Items	Response Categories					Mean	Decision
		SA	A	UD	D	SD		
1	Cooking of food with firewood have the tendency to cause air pollution	122	481	133	324	340	2.80	Accepted
2	Cooking of food with kerosene have the tendency to cause air pollution	522	244	173	172	289	3.38	Accepted
3	Cooking with gas cooker have the tendency to cause air pollution	124	607	68	389	212	3.03	Accepted
4	Frying of oil while cooking have the tendency to cause air pollution	40	10	180	410	760	1.69	Unaccepted
5	Spoilt food have the tendency to cause air and land pollution	460	280	180	185	295	3.30	Accepted
6	Polythene materials used in cooking and not disposed properly have the tendency to cause land pollution	521	244	174	171	290	3.38	Accepted
7	The littering of food packs and wraps of seasoning pollution have the tendency to cause land pollution	134	121	619	257	269	2.71	Accepted
8	Dirty and waste water from kitchen sink have the tendency to cause water pollution	56	65	173	595	511	1.97	Unaccepted
9	Spillage from cooking fuel like kerosene and gas have the tendency to cause air pollution	130	125	618	259	268	2.71	Accepted
10	Lack of effective and hygiene cooking attitude have the tendency to cause air land and water pollution	278	258	630	123	111	3.34	Accepted
	Research Question 3			**Cumulative Mean**			**3.01**	**Accepted**

Source: Researcher's Field Work (2014)

Table 4.12 revealed the frequencies of the perception on the relationship between household cooking technologies and pollution could cause Environmental Pollution in North West geo-political zone, Nigeria. Their overall mean response on the ten items was 3.0. This is higher than the decision mean response of 2.5 implying that their responses on the relationship between cooking technologies that cause pollution and the environmental pollution are positively significant. Specifically they are of the opinion that the cooking of food with kerosene and polythene materials have the tendency to cause air pollution that cause environmental pollution as this item attracted the highest mean response of 3.38 each.

4.2.4 Research Question Four

What is the relationship between household waste disposal methods and environmental Pollution in compound houses of North West geo-political zone, Nigeria?

Table 4.13 Perception of respondents on household waste disposal methods and how it could cause Environmental Pollution in compound houses of North West geo-political zone, Nigeria.

S/No	Items	Response Categories					Mean	Decision
		SA	A	UD	SD	D		
1	Faece flowing from broken sewage system have the tendency to cause air and water pollution	130	599	64	392	215	3.58	Accepted
2	Dumping of soapy water from washing clothes and household utensil has the tendency to cause water pollution	57	59	174	598	512	3.02	Accepted
3	Indiscriminate dumping of soft drinks and other beverage containers packages and bottles have the tendency to cause land pollution	125	599	69	391	216	3.48	Accepted
4	Indiscriminate dumping of polythene bags pure water sachets and papers have the tendency cause land and water pollution	259	529	351	145	116	3.52	Accepted
5	Dirty toilets and bathrooms have the tendency to cause pollution which affects the environment in the area	555	250	178	168	289	4.12	Accepted
6	Defecating in polythene bags and dumping in the environment have the tendency to cause air water and land pollution	417	766	196	3	18	2.66	Accepted
7	Lack of clearing of solid waste when it is full have the tendency to cause pollution which affects the environment in the area	102	131	632	258	277	3.40	Accepted
8	Dirty and waste water from broken down sewer have the tendency to cause pollution which affects the environment in the area	517	256	174	170	283	3.39	Accepted
9	Dumping of refuses in waste basket and bins without disposing it have the tendency to cause land pollution	515	258	173	168	286	2.65	Accepted
10	The dumping of used clothes and electrical items have the tendency to cause land pollution	102	122	631	268	277	2.81	Accepted
	Research Question 4			**Cumulative Mean**			**3.20**	**Accepted**

Source: Researcher's Field Work (2014)

Table 4.13 revealed the frequencies of the perception on the relationship between household solid waste disposal methods could cause Environmental Pollution in North West geo political zone. Their overall mean response on the ten items was 3.20. This is higher than the decision mean response of 2.50 implying that their responses on the relationship between disposal method that cause pollution and the environmental pollution are positively significant. Specifically they are of the opinion that faeces flowing from broken sewage system have the tendency to cause air and water pollution as this item attracted the highest mean response of 3.58.

4.2.5 Research Question Five

What is the relationship between the alternative sources of light and Environmental Pollution in compound houses of North West geo-political zone, Nigeria?

Table 4.14 Perception of respondents on extent alternative sources of light could cause Environmental Pollution in North West geo-political zone, Nigeria.

S/No	Items	Response Categories					Mean	Decision
		SA	A	UD	D	SD		
1	The level of noise generated from alternative power source like generator have the tendency to cause noise pollution	125	547	112	304	312	2.91	Accepted
2	Smoke emanating from the generating sets have the tendency to cause air pollution	55	71	172	592	510	1.98	Unaccepted
3	Spillage from waste engine oils used in the generating sets have the tendency to cause land pollution	122	612	73	386	207	3.04	Accepted
4	Gaseous fumes from gasoline used in the generating sets have the tendency to cause air pollution	190	550	380	156	124	3.38	Accepted
5	Storage of generating sets in the room after usage could cause serious air pollution to the house hold	513	246	172	178	291	3.37	Accepted
6	Leakages from batteries used as alternative power source into source of have the tendency to cause water pollution	510	249	170	180	291	3.37	Accepted
7	The dumping of generator waste engine oil on land have the tendency to cause land pollution	106	132	631	257	274	2.68	Accepted
8	The dumping of used batteries and inventers have the tendency to cause water pollution	516	247	181	171	285	3.38	Accepted
9	High level of sound from generators have resulted in the increase of ear problems in the household is caused by noise pollution	515	248	180	172	285	3.38	Accepted
10	In-hailing of fumes from the gases and smoke emanating from generating sets could cause asthma and suffocation that may lead to death	97	220	583	240	260	2.75	Accepted
	Research Question 5	**Cumulative Mean**					**3.02**	**Accepted**

Source: Researcher’s Field Work (2014)

Table 4.14 revealed the frequencies of the perception on the relationship between alternative sources of light and Environmental Pollution in North West geo political zone. Their overall mean responses on the ten items was 3.02 . This was higher than the decision mean response of 2.5 implying that their responses on the relationship between alternative sources of light and Environmental Pollution in North West geo political zone are positively significant. Specifically they are of the opinion that the dumping of used batteries and inverters has the tendency to cause water pollution as this items attracted the highest mean response of 3.38 each.

4.2.6 Research Question Six

What is the relationship between strategies employed for reducing household pollution and Environmental pollution in compound houses of North West geo-political zone, Nigeria?

Table 4.15 Perception of respondents on extent strategies employed for reducing household pollution and Environmental pollution in compound houses of North West geo-political zone, Nigeria.

S/No	Items	Response Categories					Mean	Decision
		SA	**A**	**UD**	**D**	**SD**		
1	Using of noise proof cleaning and electrical appliances may have the tendency to reduce noise pollution of the environment	246	444	140	220	350	3.01	Accepted
2	The use of incinerator has the tendency to reduce air pollution in the environment	168	604	88	359	221	3.15	Accepted
3	Building a small place and placing the generator a distance away from the household have the tendency to reduce both air and noise pollution	170	602	90	358	220	3.19	Accepted
4	Cooking in a well ventilated kitchen could reduce household air pollution	180	552	380	159	129	3.35	Accepted
5	Regular cleaning of drainages could help reduce household water pollution	517	241	176	176	290	3.37	Accepted
6	Proper refuse disposal practice and management would go a long way to reduce air and land pollution to the environment to the environment	516	242	174	177	291	3.36	Accepted
7	Regular sanitation practices and disposal chores to be supervised by a body that would enforce environmental protection laws	110	129	627	259	275	2.67	Accepted
8	Household need to be sensitized and oriented on safety mode of using gaseous materials like insecticides air freshener and cooking gas in order to avoid risk to their health and environment	508	244	170	187	291	3.35	Accepted
9	Broken down water pipes and sewage should be repaired to avoid it sipping into and contaminating the available source of drinking water in the environment	500	252	170	188	290	3.34	Accepted
10	Polythene bags pure water sachet and other household waste that are organic should be destroyed to avoid it causing environmental pollution	506	246	172	186	290	3.35	Accepted
	Research Question 6	**Cumulative Mean**					**3.22**	**Accepted**

Source: Researcher’s Field Work (2014)

Table 4.15 revealed the frequencies of the frequencies of perception on the relationship between strategies employed for reducing household pollution and Environmental pollution in North West geo political zone. Their overall mean response on the ten items was 3.22. This was higher than the decision mean response of 2.5 implying that their responses on the relationship between strategies employed for reducing household pollution and Environmental pollution in North West geo political zone were positively significant. Specifically they are of the opinion that the regular cleaning of drainages could help reduce household water pollution as this item attracted the highest mean response of 3.38.

4.2.7 Research Question Seven

What is the relationship between the level of environmental pollution in compound houses of North-west geo-political zone, Nigeria?

Answer to research question seven (7) is provided in sub-headings 4.4.1 to 4.4.3.

Level of Air Quality in Kaduna, Katsina and Sokoto States

The levels of air quality as obtained from the study were presented in Table 4.16a,b,c.

Table 4.16a Air Quality in Kaduna State

		Average Results of the Areas in Kaduna State (Location)					Fed. Min.	
S/No.	**Parameters**	**P1**	**P2**	**P3**	**P4**	**P5**	**Env. Stand.**	**Comments**
1	Particulate	010	008	009	007	012	NS	Within
2	Chlorine (Cl_2)	0.0	0.01	0.01	0.02	0.02	0.03ppm	Within
3	Sulphurdioxide (So_2)	0.079	0.083	0.082	0.084	0.078	0.53ppm	Within
4	Nitrogen oxide (No_2)	0.006	0.007	0.007	0.008	0.005	0.083ppm	Within
5	Hydrogen sulphide (H_2S)	0.007	0.008	0.007	0.007	0.006	0.008ppm	Within
6	Ammonia (NH_3)	003	004	005	005	003	2.0ppm	Above limit
7	Carbon monoxide (Co)	006	077	007	008	006	5.0ppm	Above limit

Source: Kaduna State Environmental Protection Agency (2015)
Key: P1=K/Gwari, P2=K/Hausa, P3=Makera, P4=U/Television, P5=U/Barde
NS=Not Stated

Table 4.16b Air Quality in Katsina State

		Average Results of the Areas in Katsina State (Location)						
S/No.	**Parameters**	**P1**	**P2**	**P3**	**P4**	**P5**	**Fed. Min. Env. Stand.**	**Comments**
1	Particulate	006	006	005	007	010	NS	Within
2	Chlorine (Cl_2)	0.0	0.01	0.01	0.01	0.01	0.03ppm	Within
3	Sulphurdioxide (So_2)	0.077	0.081	0.079	0.080	0.075	0.53ppm	Within
4	Nitrogen oxide (No_2)	0.003	0.003	0.004	0.005	0.001	0.083ppm	Within
5	Hydrogen sulphide (H_2S)	0.007	0.008	0.007	0.007	0.006	0.008ppm	Within
6	Ammonia (NH_3)	005	006	007	007	005	2.0ppm	Above limit
7	Carbon monoxide (Co)	009	085	010	010	010	5.0ppm	Above limit

Source: Katsina State Environmental Protection Agency (2015)
Key: P1=Batagarawa, P2=Daura, P3=Katsina, P4=Jibya, P5=D/Amare
NS=Not Stated

Table 4.16c Air Quality in Sokoto State

		Average Results of the Areas in Sokoto State (Location)						
S/No.	**Parameters**	**P1**	**P2**	**P3**	**P4**	**P5**	**Fed. Min. Env. Stand.**	**Comments**
1	Particulate	005	007	008	007	090	NS	Within
2	Chlorine (Cl_2)	0.01	0.02	0.02	0.01	0.01	0.03ppm	Within
3	Sulphurdioxide (So_2)	0.074	0.075	0.083	0.085	0.074	0.53ppm	Within
4	Nitrogen oxide (No_2)	0.002	0.004	0.005	0.004	0.002	0.083ppm	Within
5	Hydrogen sulphide (H_2S)	0.007	0.006	0.007	0.005	0.005	0.008ppm	Within
6	Ammonia (NH_3)	006	008	010	010	010	2.0ppm	Above limit
7	Carbon monoxide (Co)	010	090	015	012	011	5.0ppm	Above limit

Source: Sokoto State Environmental Protection Agency (2015)
Key: P1=Gudu, P2=S/North, P3=Shagari, P4=Isa, P5=J/Allen
NS=Not Stated

From Table 4.16a, it was observed that Particulate, Chlorine (Cl_2), Sulphurdioxide (So_2), Nitrogen oxide (No_2) and Hydrogen sulphide (H_2S) were all within the acceptable standards by World Health Organization (2010) except for and Ammonia (NH_3) and Carbon monoxide (Co) which were above the stated limit. This indicated the existence of air pollution in Kaduna state (Appendix IV).

From Table 4.16b, it was observed that Particulate, Chlorine (Cl_2), Sulphurdioxide (So_2), Nitrogen oxide (No_2) and Hydrogen sulphide (H_2S) were also within the acceptable standards by World Health Organization (2010) except for and

Ammonia (NH_3) and Carbon monoxide (Co) which were higher than the stated limit. This indicated a higher existence of air pollution in residential areas in Katsina state (certificate not issued).

Also from Table 4.16c, it was observed that Particulate, Chlorine (Cl_2), Sulphurdioxide (So_2), Nitrogen oxide (No_2) and Hydrogen sulphide (H_2S) were within the acceptable standards by World Health Organization (2010) except for and Ammonia (NH_3) and Carbon monoxide (Co) which were rated higher than the stated limit. This indicated the highest presence of air pollution in residential areas in Sokoto state (certificate not issued).

Therefore, all the values obtained from the different locations were within the acceptable limits except Ammonia and carbon monoxide which were above the standard limits across the states. This can be attributed to the emission from the refuse dump sites and household cooking with fossil fuel, which can be resulted to air pollution that have health implication to humans and animals. This further affects the ozone layer by lowering the quality of the ecosystem.

Level of Water Quality in Kaduna, Katsina and Sokoto States

The level of water quality as obtained from the study were presented in Table 4.17a,b,c.

Table 4.17a Water Quality in Kaduna State

S/No.	Parameters	P1	P2	P3	P4	P5	WHO Standard	Comment
	Physical Test							
1	Ph	5.6			5.3		6.5-8.5	Within
2	Odour	O/L	O/L	O/L	O/L	O/L	O/L	Within
3	Colour	C/L	C/L	C/L	C/L	C/L	C/L	Within
4	Temperature (^{0}C)	25	25	24	25.3	24.5	<40	Within
5	Conductivity (mv)	18	22	35	50	43	NS	Within
6	Turbidity (NTU)	13	16	5	19	10	<1.0	Within
7	TSS (mg/l)	5.0	6.0	1.0	4.91	39	30	Within
8	TDS (mg/l)	18.3	22.0	14.1	18.3	23.0	2000	Within
9	Dissolved Oxygen (mg/l)	3.9	3.6	2.9	3.1	3.7	>4	Within
10	Alkalinity as $CaHCo_3$	310	734	56.7	120	46.8	NS	Within
11	Alkalinity as $CaCo_3$	Nil	Nil	Nil	Nil	Nil	Nil	Within
12	Total Alkalinity $CaCo_3$	310	734	56.7	120	46.8	150	Within
13	Hardness (mg/l)	36	34.2	26.7	38.4	32.0	NS	Within
14	Sulphate (mg/l)	01	4	2	13	15	200	Within
15	Chloride (mg/l)	37.23	38	4	81.91	39	NS	Within
16	Nitrate (mg/l)	13.67	9.32	7.41	6.0	8.53	20	Within
17	Phosphate (mg/l)	2.30	1.67	0.89	3.11	2.70	5	Within
18	Ammonia (mg/l)	0.144	0.067	0.073	0.085	0.101	NS	Within
19	Nitrite (mg/l)	0.244	0.061	0.130	0.401	0.056	NS	Within
20	Iron (mg/l)	1.1903	0.3014	1.0631	1.2781	1.0367	20	Within
21	Lead (mg/l)	0.1061	0.1130	0.0831	0.1001	0.0602	<1.0	Within
22	Copper (mg/l)	0.2201	0.1250	0.1454	0.2066	0.1092	<1.0	Within
23	BOD_5	17.0	12.31	10.03	6.12	5.87	30	Within
	Microbial Test							
24	Total Colifon (10/100mls)	40	29	37	53	19	10	Above
25	E. Coli (1/100mls)	3	4	4	7	3	1	Above

Source: Kaduna State Environmental Protection Agency (2015)
Key: P1=U/Barde, P2=U/Gimbiya, P3=Television, P4=K/Hausa, P5=Makera
O/L=Odourless, C/L=Colourless, NS=Not Stated

Table 4.17b Water Quality in Katsina State

S/No.	Parameters	P1	P2	P3	P4	P5	WHO Standard	Comment
	Physical Test							
1	Ph	5.0	4.1		4.0	5.4	6.5-8.5	Within
2	Odour	O/L	O/L	O/L	O/L	O/L	O/L	Within
3	Colour	C/L	C/L	C/L	C/L	C/L	C/L	Within
4	Temperature (^{0}C)	21	25	20	24.5	25.3	<40	Within
5	Conductivity (mv)	16	21	35	43	50	NS	Within
6	Turbidity (NTU)	10	11	4	10	15	<1.0	Within
7	TSS (mg/l)	3.5	6.2	1.1	39	4.91	30	Within
8	TDS (mg/l)	18.2	22.0	14.5	23.0	18.3	2000	Within
9	Dissolved Oxygen (mg/l)	3.0	2.6	3.0	3.7	3.1	>4	Within
10	Alkalinity as $CaHCo_3$	290	704	55.7	46.8	121	NS	Within
11	Alkalinity as $CaCo_3$	Nil	Nil	Nil	Nil	Nil	Nil	Within
12	Total Alkalinity $CaCo_3$	300	704	52.7	46.8	120	150	Within
13	Hardness (mg/l)	25	30.2	22.7	32.0	38.0	NS	Within
14	Sulphate (mg/l)	1	6	2	15	13	200	Within
15	Chloride (mg/l)	35.23	40	4	39	81.01	NS	Within
16	Nitrate (mg/l)	12.67	9.00	7.01	8.53	6.0	20	Within
17	Phosphate (mg/l)	3.20	1.00	0.09	2.70	3.11	5	Within
18	Ammonia (mg/l)	0.100	0.007	0.070	0.101	0.085	NS	Within
19	Nitrite (mg/l)	0.104	0.065	0.132	0.056	0.401	NS	Within
20	Iron (mg/l)	1.1003	0.4004	1.0601	1.0367	1.2781	20	Within
21	Lead (mg/l)	0.1001	0.1030	0.0801	0.0602	0.1001	<1.0	Within
22	Copper (mg/l)	0.2001	0.1050	0.1404	0.1092	0.2066	<1.0	Within
23	BOD_5	13.0	10.31	10.00	5.87	6.12	30	Within
	Microbial Test							
24	Total Colifon (10/100mls)	52	35	40	25	60	10	Above
25	E. Coli (1/100mls)	5	6	8	9	10	1	Above

Source: Katsina State Environmental Protection Agency (2015)

Key: P1=Batagarawa, P2=Daura, P3=Katsina, P4=Jibya, P5=D/Amare
O/L=Odourless, C/L=Colourless, NS=Not Stated

Table 4.17c Water Quality in Sokoto State

S/No.	Parameters	P4	P3	P3	P1	P2	WHO Standard	Comment
	Physical Test							
1	Ph	3.0			5.1		6.5-8.5	Within
2	Odour	O/L	O/L	O/L	O/L	O/L	O/L	Within
3	Colour	C/L	C/L	C/L	C/L	C/L	C/L	Within
4	Temperature (^{0}C)	24.5	19	20	21	25	<40	Within
5	Conductivity (mv)	43	35	35	16	22	NS	Within
6	Turbidity (NTU)	10	4	5	10	16	<1.0	Within
7	TSS (mg/l)	39	1.1	1.0	3.5	6.0	30	Within
8	TDS (mg/l)	23.0	14.5	14.1	18.2	22.0	2000	Within
9	Dissolved Oxygen (mg/l)	3.7	3.0	2.9	3.0	3.6	>4	Within
10	Alkalinity as $CaHCo_3$	46.8	55.7	56.7	290	734	NS	Within
11	Alkalinity as $CaCo_3$	Nil	Nil	Nil	Nil	Nil	Nil	Within
12	Total Alkalinity $CaCo_3$	46.8	52.7	56.7	300	734	150	Within
13	Hardness (mg/l)	32.0	22.7	26.7	25	34.2	NS	Within
14	Sulphate (mg/l)	15	2	2	1	4	200	Within
15	Chloride (mg/l)	39	4	4	35.23	38	NS	Within
16	Nitrate (mg/l)	8.53	7.01	7.41	12.67	9.32	20	Within
17	Phosphate (mg/l)	2.70	0.09	0.89	3.20	1.67	5	Within
18	Ammonia (mg/l)	0.101	0.070	0.073	0.100	0.067	NS	Within
19	Nitrite (mg/l)	0.056	0.132	0.130	0.104	0.061	NS	Within
20	Iron (mg/l)	1.0367	1.0601	1.0631	1.1003	0.3014	20	Within
21	Lead (mg/l)	0.0602	0.0801	0.0831	0.1001	0.1130	<1.0	Within
22	Copper (mg/l)	0.1092	0.1404	0.1454	0.2001	0.1250	<1.0	Within
23	BOD_5	5.87	10.00	10.03	13.0	12.31	30	Within
	Microbial Test							
24	Total Colifon (10/100mls)	30	43	42	50	30	10	Above
25	E. Coli (1/100mls)	12	12	9	10	8	1	Above

Source: Sokoto State Environmental Protection Agency (2015)
Key: P1=Gudu, P2=S/North, P3=Shagari, P4=Isa, P5=J/Allen
O/L=Odourless, C/L=Colourless, NS=Not Stated

From Table 4.17a, the parameters were in compliance with WHO (2010) standards except for total colifons and Escheria colifons which were above the stated limit for domestic drinking water standard in Kaduna State. This indicated the presence of well water pollution in the state (Appendix V).

From Table 4.17b, the parameters were also in compliance with WHO (2010) standards except for total colifons and Escheria colifons which were above the stated standard limit for domestic drinking water standard in Katsina State. This also indicated the presence of well water pollution in the state (certificate not issued).

Also, from Table 4.17c, the parameters were also in compliance with WHO (2010) standards except for total colifons and Escheria colifons which were above the stated standard limit for domestic drinking water standard in Sokoto State. This equally indicated the presence of well water pollution in the state (certificate also not issued).

Therefore, all the physiochemical parameters analyzed were WHO (2010) compliance except Total Colifons and Escheria Colifons which were higher above the acceptable limit for domestic drinking water standard. An account of the presence of these microorganisms in the water could be as a result of inflow of contaminants from either unattended refuse dump sites evaluation or underground seepage from nearby toilets, broken sewage, gutters or poor sanitation in the residential areas. This indicated the presence of water pollution in Kaduna, Katsina and Sokoto States.

Level of Soil Quality in Kaduna, Katsina and Sokoto States

The level of soil quality as obtained from the study were presented in Table 4.18a,b,c.

Table 4.18a Soil Quality in Kaduna State

S/No.	Parameters	P1	P2	P3	P4
1	Colour	RB	B	DB	RB
2	Texture	CS	FS	S	S
3	Conductivity (mv)	47	70	48	61
4	Temperature (^{0}C)	24.0	23.6	23.5	25
5	Ph	7.3	7.7	7.2	6.9
6	Porosity (%)	20	28.5	25.6	27.0
7	Bulk density (g/cm^3)	1.21	1.25	1.30	1.22
8	Chloride (mg/l)	10.92	12.5	8.67	11.77
9	Sulphate (mg/l)	37	90	26	15
10	Nitrate (mg/l)	0.581	0.884	0.638	1.575
11	Moisture (%)	1.08	7.01	4.34	4.44
12	Organic matter (%)	5.51	13.57	11.04	8.07
13	Nitrite (mg/l)	0.132	0.201	0.145	0.358
14	Phosphate (mg/l)	3.10	2.13	1.67	0.95
15	Ammonia (mg/l)	ND	ND	ND	ND
16	Iron (mg/l)	3.0701	4.1134	2.7713	1.6520
17	Copper (mg/l)	1.0022	0.9861	0.2570	1.0147
18	Zinc (mg/l)	0.1560	0.2763	1.4871	0.3035
19	Cadmium (mg/l)	0.1531	0.1602	0.0874	0.1372
20	Lead (mg/l)	0.0653	0.0578	0.0393	0.0101
21	Manganese (mg/l)	1.2015	0.4012	0.0106	1.1620
22	Nickel (mg/l)	0.0141	0.0625	0.1192	0.1777

Source: Kaduna State Environmental Protection Agency (2015)

Key: P1=U/Barde, P2=U/Gimbiya, P3=Television, P4=K/Hausa, P5=Makera
RB=Reddish Brown, CS=Course Sand, B=Brownish, FS=Fine Sand, DB=Dark Brown, S=Sandy

Table 4.18b Soil Quality in Katsina State

S/No.	Parameters	P1	P2	P3	P4
1	Colour	RB	FS	S	RB
2	Texture	CS	FS	DB	S
3	Conductivity (mv)	45	69	50	62
4	Temperature (^{0}C)	22.0	22.6	19.2	23
5	Ph	7.3	6.7	6.1	6.8
6	Porosity (%)	19	24.5	24.2	15.0
7	Bulk density (g/cm^3)	1.20	1.05	1.25	1.02
8	Chloride (mg/l)	10.00	11.0	8.01	10.70
9	Sulphate (mg/l)	35	88	23	13
10	Nitrate (mg/l)	0.581	0.661	0.038	1.005
11	Moisture (%)	1.06	5.02	4.34	4.04
12	Organic matter (%)	5.50	10.51	9.14	6.17
13	Nitrite (mg/l)	0.131	0.251	0.105	0.342
14	Phosphate (mg/l)	3.30	2.03	1.07	0.96
15	Ammonia (mg/l)	ND	ND	ND	ND
16	Iron (mg/l)	3.1701	4.1004	2.7003	1.6000
17	Copper (mg/l)	3.0122	4.1130	3.2000	4.0002
18	Zinc (mg/l)	0.1500	0.3663	1.4071	0.1035
19	Cadmium (mg/l)	0.1501	0.1622	0.0874	0.1272
20	Lead (mg/l)	0.0603	0.1518	0.0494	0.0121
21	Manganese (mg/l)	1.2005	0.4002	0.2055	1.1622
22	Nickel (mg/l)	0.0101	0.0105	0.1295	0.1272

Source: Katsina State Environmental Protection Agency (2015)

Key: **Key**: P1=Batagarawa, P2=Daura, P3=Katsina, P4=Jibya
RB=Reddish Brown, CS=Course Sand, B=Brownish, FS=Fine Sand, DB=Dark Brown, S=Sandy

Table 4.18c Soil Quality in Sokoto State

S/No.	Parameters	P1	P2	P3	P4
1	Colour	S	S	S	S
2	Texture	S	S	S	S
3	Conductivity (mv)	32	50	46	61
4	Temperature (^{0}C)	20.0	19.6	18.2	23.1
5	Ph	7.2	6.7	5.1	6.1
6	Porosity (%)	17	22.5	22.2	15.1
7	Bulk density (g/cm^3)	1.01	1.05	1.05	1.01
8	Chloride (mg/l)	8.10	11.0	8.11	10.71
9	Sulphate (mg/l)	25	88	22	15
10	Nitrate (mg/l)	0.480	0.651	0.138	1.505
11	Moisture (%)	1.16	5.02	4.00	4.14
12	Organic matter (%)	5.10	12.51	8.14	6.27
13	Nitrite (mg/l)	0.231	0.201	0.198	0.343
14	Phosphate (mg/l)	3.20	2.13	1.66	0.96
15	Ammonia (mg/l)	ND	ND	ND	ND
16	Iron (mg/l)	2.1001	4.2144	1.9003	1.6333
17	Copper (mg/l)	4.0552	4.1003	3.1000	4.5656
18	Zinc (mg/l)	0.1950	0.4664	1.4071	0.2235
19	Cadmium (mg/l)	0.2502	0.1012	0.1874	0.2272
20	Lead (mg/l)	2.0603	4.1528	3.1494	6.3321
21	Manganese (mg/l)	1.2105	0.4022	0.2155	1.6522
22	Nickel (mg/l)	0.0121	0.0125	0.2295	0.6672

Source: Sokoto State Environmental Protection Agency (2015)
Key: P1=Gudu, P2=S/North, P3=Shagari, P4=Isa
RB=Reddish Brown, CS=Course Sand, B=Brownish, FS=Fine Sand, DB=Dark Brown, S=Sandy

From Table 4.18a, all parameters analyzed were WHO (2010) compliance except copper metal in soil at Unguwar Barde and Kakuri Hausa which were 1.0022 mg/l and 1.0147 mg/l respectively above the limit in Kaduna State.

From Table 4.18b, all parameters analyzed were WHO (2010) compliance except copper metal in soil at Dauda and Jibya which were 4.1130 mg/l and 4.0002 mg/l respectively above the limit in Katsina State.

However, from Table 4.18c, all parameters analyzed were equally WHO (2010) compliance with lead in soil metal in soil at Isa and Sokoto North which were 6.3321 mg/l and 4.1528 mg/l respective above the limit in Sokoto State.

Therefore, considering the values obtained which shows a high level of copper and lead elements indicated that refuse dump in the states may be as a result of long over stay without being evacuated. This serve as threat to the underground water as the refuse dump site with its content could undergo decomposition processes which lead the end product that is leached solution which can flow into the nearby water sources, contaminating the water content. This revealed the existence and high level of soil pollution in Kaduna, Katsina and Sokoto States.

4.3 Testing of Hypotheses

4.3.1 Hypothesis One

There is no significant relationship between Meal preparation activities and Environmental Pollution in compound houses of North-west geo-political zone, Nigeria.

Table 4.19 Pearson Product Moment Correlation (PPMC) statistics on the relationship between Meal Preparation activities and Environmental Pollution

Variables	N	Mean	S.D.	Cor. Index R	Df	Sig (P)
Environmental pollution	1140	189.12	33.67	0.751**	1398	0.000
Meal preparation activities	1140	27.06	5.96			

***. Correlation is significant at the 0.05 level (2-tailed).*

The result of the Pearson Product Moment Correlation statistics of the table 4.19 revealed that significant relationship exists between House hold cooking of food and Environmental Pollution. This is because the calculated significant (p) value of 0.000 is less than the 0.05 alpha level of significance at a correlation index r level of 0.751 at df 1398. The relationship is positively proportional. Hence, the null hypothesis which states that there is no significant relationship between meal preparation activities and environmental pollution is hereby rejected.

4.3.2 Hypothesis Two

There is no significant relationship between Cleaning/Washing activities and Environmental Pollution in compound houses of North-west geo-political zone, Nigeria.

Table 4.20 Pearson Product Moment Correlation (PPMC) statistics on the relationship between cleaning/washing activities and Environmental Pollution

Variables	N	Mean	S.D	Cor. Index R	Df	Sig (P)
Environmental pollution	1400	189.12	33.67	0.854**	1398	0.000
Cleaning/washing activities	1400	27.27	5.98			

***. Correlation is significant at the 0.05 level (2-tailed).*

The Pearson Product Moment Correlation statistics result of Table 4.20 revealed that significant relationship exists between Methods used in cleaning/washing of cloths and Environmental Pollution. This is because the calculated significant (p) value of 0.000 is less than the 0.05 alpha level of significance at a correlation index r level of 0.854 at df equals 1398. The relationship is positively proportional. Hence, the null hypothesis which states that there is no significant relationship between cleaning/washing activities and environmental pollution is hereby rejected.

4.3.3 Hypothesis Three

There is no significant relationship between Household cooking Technologies and Environmental Pollution in compound houses of North-west geo-political zone, Nigeria.

Table 4.21 Pearson Product Moment Correlation (PPMC) statistics on the relationship between Household cooking Technologies and Environmental Pollution

Variables	N	Mean	S.D	Cor. Index R	Df	Sig (P)
Environmental pollution	1400	189.12	33.67	0.867**	1398	0.000
Household Cooking Tech.	1400	26.91	5.80			

***. Correlation is significant at the 0.05 level (2-tailed).*

The result of the Pearson Product Moment Correlation statistics of Table 4.21 revealed that significant relationship exists between House hold cooking Technologies and Environmental Pollution. This is because the calculated significant (p) value of 0.000 is less than the 0.05 alpha level of significance at a correlation index r level of 0.867 at df 1398. The relationship is positively proportional. Hence, the null hypothesis which states that there is no significant relationship between House hold cooking Technologies and Environmental Pollution is hereby rejected.

4.3.4 Hypothesis Four

There is no significant relationship between Household waste disposal methods and Environmental Pollution in compound houses of North-west geo-political zone, Nigeria.

Table 4.22 Pearson Product Moment Correlation (PPMC) statistics on the influence/relationship between Household waste disposal methods and Environmental Pollution

Variables	N	Mean	S.D	Cor. Index R	Df	Sig (P)
Environmental pollution	1400	189.12	33.67	0.792**	1398	0.000
Household waste disposal	1400	26.90	5.82			

***. Correlation is significant at the 0.05 level (2-tailed).*

Table 4.22 revealed the Pearson Product Moment Correlation statistics result which showed that significant relationship exists between House hold waste disposal methods and Environmental Pollution. This is because the calculated significant (p) value of 0.000 is less than the 0.05 alpha level of significance at a correlation index r level of 0.792 at df 1398. The relationship is positively proportional implying that the household disposal method adopted by households has direct relationship in the environmental pollution. Hence the null hypothesis which states that there is no significant relationship between Household waste disposal methods and Environmental Pollution is hereby rejected.

4.3.5 Hypothesis Five

There is no significant relationship between Alternative sources of light and Environmental Pollution in compound houses of North-west geo-political zone, Nigeria.

Table 4.23 Pearson Product Moment Correlation (PPMC) statistics on the relationship between Alternative sources of light and Environmental Pollution

Variables	N	Mean	S.D	Cor. Index R	Df	Sig (P)
Environmental pollution	1400	189.12	33.67	0.854**	1398	0.000
Alternative sources of light	1400	26.96	5.80			

**. *Correlation is significant at the 0.05 level (2-tailed).*

The result of the Pearson Product Moment Correlation statistics as shown on Table 4.23 revealed that significant relationship exists between Alternative sources of light/power and Environmental Pollution. This is because the calculated significant (p) value of 0.000 is less than the 0.05 alpha level of significance at a correlation index r level of 0.854 at df 1398. The relationship is positively proportional implying that the Alternative sources of light/power adopted by households has direct relationship in the environmental pollution Hence, the null hypothesis which state that there is no significant relationship between Alternative sources of light and Environmental Pollution is hereby rejected.

4.3.6 Hypothesis Six

There is no significant relationship between Strategies employed in reducing household environmental Pollution in compound houses of North-west geo-political zone, Nigeria.

Table 4.24 Pearson Product Moment Correlation (PPMC) statistics on the relationship between Strategies employed in reducing household chores environmental pollution

Variables	N	Mean	S.D	Cor. Index R	Df	Sig (P)
Environmental pollution	1400	189.12	33.67	0.846**	1398	0.000
Strategies employed in reducing household chores induced pollution	1400	27.05	5.82			

**. *Correlation is significant at the 0.05 level (2-tailed).*

The Pearson Product Moment Correlation statistics results in Table 4.24 showed that significant relationship exist between Strategies employed in reducing household chores induced pollution and Environmental Pollution. This is because the calculated significant (p) value of 0.000 is less than the 0.05 alpha level of significance at a correlation index r level of 0.846 at df equals 1398. The relationship is positively proportional implying that the Strategies employed in reducing household chores induced pollution adopted by households has direct relationship in the environmental pollution Hence, the null hypothesis which state that there is no significant relationship between Strategies employed in reducing household chores induced pollution and Environmental Pollution is hereby rejected.

4.3.7 Hypothesis Seven

There is no significant relationship between the levels of pollution and environmental pollution in compound houses of North West geo-political zone, Nigeria.

Table 4.25 Pearson Product Moment Correlation (PPMC) statistics on the relationship between Level of Pollution and Environmental Pollution

Variables	N	Mean	S.D	Cor. Index R	Df	Sig (P)
Environmental pollution	1400	189.12	33.67	0.759**	1398	0.000
Levels of Pollution	1400	27.03	5.86			

***. Correlation is significant at the 0.05 level (2-tailed).*

The Pearson Product Moment Correlation statistics results in Table 4.25 showed that significant relationship exist between level of pollution in the states and Environmental Pollution. This is because the calculated significant (p) value of 0.000 is less than the 0.05 alpha level of significance at a correlation index r level of 0.759 at df equals 1398. The relationship is positively proportional implying that the levels of pollution has direct relationship in the environmental pollution. Hence, the null hypothesis which state that there is no significant relationship between levels of pollution in the states and Environmental Pollution is hereby rejected.

4.4 Summary of Major Findings

The result of the analyses revealed the following major findings:

1. The hypothesis which stated that there is no significant relationship between meal preparation activities and environmental pollution in compound houses in north-west geo-political zone, Nigeria was thus rejected. The meal preparation activities correlated with environmental pollution ($r=0.000$ $p \leq 0.05$) (Table 4.19).
2. Hypothesis two stated that there is no significant relationship between cleaning / washing activities in compound houses in north-west geo-political zone, Nigeria. The computed correlation coefficient was 0.00 while $p \leq 0.05$ (Table 4.20). This shows that a significant relationship does exist between cleaning / washing and environmental pollution in compound houses in north-west geo-political zone, Nigeria. The hypothesis was thus rejected.
3. Hypothesis three stated that there is no significant relationship between household cooking technologies and environmental pollution in compound houses in north-west geo-political zone, Nigeria. The results showed that there is a significant relationship ($r=000$, $p \leq 0.05$) (Table 4.21). This null hypothesis was therefore rejected.
4. The result of hypothesis four shows that significant relationship exist between household waste disposal and environmental pollution in compound houses in north-west geo-political zone, Nigeria. This was because the calculated significant value (p) of 0.000 was less than the 0.05 alpha level of significance

at a correlation level of 0.792 at df 1398 (Table 4.22). Hence the hypothesis which stated that there was no relationship between household waste disposal and environmental pollution was rejected.

5. Alternative source of light has no significant relationship on environmental pollution in compound houses in north-west geo-political zone, Nigeria. This was because the calculated significant value of 0.000 was less than the 0.05 alpha level of significance as a correlation index level of 0.854 at df 1398 (Table 4.23). The null hypothesis was rejected.

6. Hypothesis six stated there is no significant relationship between strategies employed in reducing household environmental pollution in compound houses in north-west geo-political zone, Nigeria. The result showed that significant relationship exists. This was because the calculated significant P value of 0.000 was less than the 0.05 alpha level of significance at a correlation index level of .846 at df 1398 (Table 4.24). In view of this, the null hypothesis was rejected.

7. Hypothesis seven stated there is no significant relationship between levels of pollution and environmental pollution in compound houses in north-west geo-political zone, Nigeria. The result showed that significant relationship exists. This was because the calculated significant P value of 0.000 was less than the 0.05 alpha level of significance at a correlation index level of .759 at df 1398 (Table 4.25). In view of this, the null hypothesis was rejected.

4.5 Discussion of Findings

The study in Table 4.19 revealed significant relationship between meal preparation activities and environmental pollution in North Western states of Nigeria.

The level of relationship was at a correlation r level of 0.751. The overall mean perception on the ten variables of household chores was 3.1919 which is higher than the 3.000 decision mean. This implies that some meal preparation activities significantly determine the level of environmental pollution. One reason why this result is so is because of what Uko-aviornoh and Oso-Olubutola (2007) referred to as the tendency of action and reaction being the same in proportion and magnitude. That is the volume of meal preparation activities will by that principle generate corresponding amount of pollution. For instance majority of the respondents were of the opinion that frying of food, peeling of tubers like yam, cassava, fruit peels etc. can cause air, water and land pollution that affect the environment. Adetokun (2007) in his work on domestic conflicts and housing facilities once argued that the amount of pollution that occurred in an environment is a product of the meal preparation activities possible within the communities and proportionally related to effort (or lack of it) put in place to checkmate the effect that such household activities could have on the environment. Besides, meal preparation activities in which children participated Aminu (2009) reported that meal preparation activities generate substantial pollution partly because of the inability of children to control and or care for waste emanating from their meal preparation activities that is in addition to their inability or failure to understand the implications that such activities could have on the environment. It is therefore to be expected that the bigger the meal preparation activities the larger the amount of pollution generated and the more hazardous this is to the environment. That therefore explains the significant relationship discovered between meal preparation activities and house hold environmental pollution in North Western states of Nigeria.

The result in Table 4.20 also found in this study that significant relationship exists between methods used in cleaning/washing activities and environmental pollution, as the correlation was at a level of 0.854. One of the reasons this is so was because majority of the respondents in this study were of the opinion that cleaning of oil from the kitchen has the tendency to cause pollution which affects the environment. Another reason why this might have been so according to Bukola (2005) might be because dirty rags and towels used in dusting and cleaning can cause air and land pollution which have the tendency to affect the environment. Sometimes when the clearing of weeds and grasses around the household are not properly disposed off the tendency to cause land pollution which ultimately affect the environment. Besides, sweeping the house could generate dust that has the tendency to cause air pollution which affects the environment. Also, David and Micheal (2010) in their work on air pollution effects identified dusting the room and upholsters as well as other household items has having the tendency to cause air pollution which affects the environment, just as spraying of insecticides and other related substance like perfumes have the tendency to cause air pollution which affects the environment. In a study on Municipal Solid Waste Management by Broward (1995) it was reported that poor disposal method of used water in washing clothes even with washing machine could pollute the environment. It is therefore possible that all of these together might have been the reason for the significant relationship that exists between methods used in cleaning/washing of clothes and environmental pollution.

Furthermore, the outcome of this study on Table 4.21 further reveals that significant relationship exists between the household cooking technologies and environmental pollution in North western states of Nigeria. The level of relationship was at a correlation r level of 0.867. One reason for this was that most of the respondents were of the opinion that cooking of food with kerosene has the tendency to cause air pollution with its attendant effect on environmental pollution. Another reason why this result might have been so could be related to cooking methods and in terms of materials in use. For instance the use of firewood, kerosene and even gas has various degree of emission that pollutes the air. Ewuba and Ochonogor (2004) in their study on Strategies for House hold Waste Management discovered and reported that when Polythene materials are used in cooking and are not properly disposed off it normally resulted in land pollution. Ezonbasili (2006) on legal regulation of urban waste management and disposal had maintained that littering of food packs and wraps of seasoning items promotes land pollution which is common in towns and villages as found in the study area. It is also possible that dirty and waste water from kitchen could result in water pollution as found in this study. Commenting on the knowledge, attitude and practice of ideal environmental sanitation Falade (1996) had advocated sensitization of the household members which according to him is one sure way to ensure that spillage from cooking fuel like kerosene and gas which have the tendency to cause air pollution do not occur within the household. The outcome of this study is in tandem with that of Abrahams (2006) who had earlier discovered that lack of effective and hygienic cooking attitude often cause air, land and water pollution. It is therefore not out of place to discover that significant relationship exists between the household cooking technologies and environmental pollution as found in the present study.

The outcome of this study on Table 4.22 revealed that the type of house hold solid waste disposal methods has significant relationship on the environmental pollution in the north western states of Nigeria. With the level of correlation between the two variables put at 0.792 majority of the respondents were of the view that faeces flowing from broken sewage system have the tendency to cause air and water pollution. One reason why this result may be so is as a result of dumping of soapy water from washing clothes and household utensil with its tendency to cause water pollution. Another reason for the outcome of this study may also due to the fact of indiscriminate dumping of soft drinks and other beverage containers packages and bottles as this have the tendency of promoting land pollution. According to Ezeoguine (2005) in challenges of house hold waste disposal practice maintained that defecating in polythene bags and subsequent dumping of same in the environment have been known to cause air, water and land pollution which in its extreme extent could cause land degradation. Besides, Kallman (2008) was of the opinion just as discovered in this study that dumping of refuses in waste basket and bins without disposing it do cause land pollution which more often than not has been known to be hazardous.

It was also discovered in Table 4.23 that the alternative sources of light or power have significant relationship with environmental pollution in North Western states. Ono reason this was so from the opinion of the respondents was the indiscriminate dumping of used batteries and inverters in the neighbourhoods with its attendant effect of causing water pollution. Iloefe (2004) in his study on Energy and House hold reported that the level of noise generated from alternative power source like generator has been known to promote noise pollution. It is true of the present study because it was discovered that the smoke emanating from the generating sets in use within the neighbourhoods do cause air pollution. Besides, both the spillage from waste engine oils used in the generating sets as well as gaseous fumes from gasoline used have the tendency to cause air pollution. According to Low TOX Solutions (2010) both storage of generating sets in the room after usage and leakages from batteries used as alternative power source could cause water pollution. As seen in the outcome of this study and as reported by Bamidele (1991) high level of sound from generators have resulted in the increase of ear problems in the household is caused by noise pollution.

The result of the study in Table 4.24 showed that the strategies employed in reducing house hold chores induced pollution have significant relationship on the environmental pollution in North Western states of Nigeria. This is because in the opinion of the respondents regular cleaning of drainages as is being done could help reduce household water pollution. The study found that using different strategies at controlling pollution could be beneficial because it has been discovered as reported by Morton (1990) in Home, its furnishing and equipment that using of noise proof cleaning and electrical appliances may have the tendency to reduce noise pollution of the environment. In addition, it is possible that building a small place and placing the generator a distance away from the household could significantly reduce both air and noise pollution. It was discovered that individual attitude to the environment generally could go a long way in improving environmental pollution. It is no wonder then when Awo (2007) maintained that proper refuse disposal practice and management has a greater potential of reducing air and land pollution and have a sustainable environment. It is therefore against this background that the relationship between the strategies employed in reducing house hold chores induced pollution and environmental pollution should be understood.

The result of the study in Table 4.25 showed that the level of pollution in compound houses have significant relationship on the environmental pollution in North Western geo-political zone, Nigeria. The table revealed the presence of ammonia and carbon monoxides above the standard limits of WHO which resulted in air pollution and further affects the ozone layer by lowering the quality of the ecosystem. There was also presence of Total Colifons and Escheria Colifons above standard limits of WHO which resulted in dysentery, skin infections, diarrhea, etc. Equally presence of copper metal in soil was found above WHO standard limit in Kaduna and Katsina State while lead metal in soil was found present and above the standard set by WHO in Sokoto state. Therefore, considering the existence of copper and lead, this serves as threat to the underground water as the refuse dump site with its content could undergo decomposition processes which lead the end product that is leached solution which can flow into the nearby water sources, contaminating the water content.

This finding agrees with that of the Federal Environmental Protection Agency (2009) who believes that air, water and soil pollution are threats to the environment, to food safety and to sustainable agriculture. FEPA (2009) said Nigerians cultivated land have been polluted with contaminated water being used to irrigate. It was further stated that 21,670 km^2 of land are covered or destroyed by solid waste as a result of refuse dump site that were not evacuated as at when due. In total, the area accounts for one tenth of African's cultivatable land and is mostly in economically developed areas, resulting in an estimated 12 million tons of grain countered by heavy metals every year causing direct losses of 20 billion of naira to this effect.

According to Rollings (2011) in Nigeria, household solid waste generation and management are far from being efficient. At the household level, a lot of heterogeneous waste is generated and the volume and types have been on the increase. Virk (2012) opined that the experience of Nigerians shows that waste generation continue to be generated faster due to the level of consumption patter of households than they are disposed.

Perry (2011) stated that burning of refuse dump sites, cellophane, rags, papers also emits of environmental carbon into the atmosphere in residential areas. This increases the level of our pollution. Galadima and Garba (2012) agreed that refuse generation in Nigeria has increased more than necessary as refuse are left unevacuated to incineration designated to it. This has caused a lot of damages to humans and animals.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter was presented under the following sub-headings:

5.1 Summary

5.2 Conclusion

5.3 Recommendations

5.4 Suggestions for Further Study

5.5 Limitations of the Study

5.1 Summary

Households are family members who live together in an established residence. These include husband, wife, children and other relations. Family members perform their daily activities to keep the household and environment clean and healthy. Household activities are the daily routines performed by persons to maintain the house and put every part of the living house in shape. These activities are tasks performed by homemakers and other members of the family in a standard house. These activities help the family in achieving a fulfilled life. In an established house, activities are performed by the family members. The activities include preparation and cooking of meals, washing of cooking and eating utensils, sweeping and dusting of rooms, emptying of refuse bin, laundering and house polishing among others.

Although it is not in all cases or everywhere that one can find a standard house, the changing life styles today have placed a demand for increasing multi-family housing system. A standard house includes bungalows, twin flats, single - family detached house, story buildings, multi-family housing and compound houses.

The content of the activities performed by households vary from day to day and from task to task. In order to achieve the functions of a home, a wide variety of tasks are performed. These include house cleaning, sweeping, dusting, pounding, cooking, home gardening, animal rearing, and generating electricity, burning of refuse, entertainment and child care. Also included are sewing, fetching of water, collection of firewood, washing of utensils, setting the dining table, bed making, mopping, interior and exterior decoration, laundering, washing of lavatories, garbage burning, warming of vehicles, among others .

There is therefore the expectation that pollutants are released when household activities are performed in the house. Such activities include cooking with firewood, sweeping, generating light with mini generator, burning of refuse dump, burning of polythene bags and leaves, pounding with pestle and mortar. Loud playing of music, using kerosene stove, spraying of the house with insecticide, washing of gutters, washing of broken sewage systems among others significantly pollute the environment to the extent that environment becomes hazardous and by extension injurious to human beings.

This report of the study on relationship between household chore pollutants and environmental pollution (from compound houses) in North West geo-political zone, Nigeria was presented in five chapters. It looked into the background to the study which also included statement of the problem, objectives of the study and research questions, hypotheses, assumption of the study, its significance and its scope. The study reviewed related literature and made a summary on empirical studies.

The research design was descriptive survey design. It dealt with the population, sample and sampling technique adopted for the study and the instrument used. Also included were procedure for validation of the instrument used, the pilot study and reliability of the instrument. Procedure for data collection and analysis were equally looked into.

5.2 Conclusion

On the basis of the findings of this study, the following conclusions were drawn:

The study revealed that wastes generated from meal preparation were not discarded through garbage disposal rather they are thrown in the open ground degenerates and cause air pollution. The consumption pattern of the household is the reason there is the manifestation of environmental pollution affecting the environment.

The study revealed that there were no drainage systems for dirty water generated from activities such as bathing, washing of cooking and eating utensils, meal preparation equipments and tools.

The study revealed that fumes released from generators, firewood, kerosene etc. cause air pollution because fumes were not directed through chimneys.

The study revealed that solid wastes (such as polythene bags, rags, vegetable and root tubers peels) were not properly discarded. Therefore, they cause air pollution, water pollution and land pollution.

Indiscriminate dumping of polythene bags, pure water sachets and papers were major source of land and water pollution.

The study revealed that household appliances generated loud noise that created noise pollution to the households.

5.3 Recommendations

Based on the findings of the study, the following recommendations are made to check the effect of household pollutants on environmental pollution in North West geo-political zone Nigeria.

1. House builders should ensure standard drainage systems to channel the dirty water from meal preparation activities and the scraps of food remnants from the kitchen should be taken to the refuse dump designated for it.
2. Households should discard dirty water through the drain to avoid polluting the environment.
3. Dirts collected from sweeping should be dropped in waste basket for disposal to avoid littering the environment.
4. Households should use gas, electric cookers for cooking, to avoid air pollution.
5. Households should empty solid wastes (polythene bags, water sachets, empty cans, rags and other household waste) into the bigger incinerators designated for it so as to avoid littering the environment.
6. There should be enlightenment and sensitization campaign on the dangers of environmental pollution by Local and state government and federal agencies responsible for the protection of the environment
7. Households should use noise proof appliances to reduce the effects of vibration and deep noise around the home

5.4 Suggestions for Further Studies.

The following are suggestions for further studies in the related area of study:

1. Effect of socio-economic characteristics on the environmental pollution in North West Geo-political zone of Nigeria.
2. Factors contributing to environmental pollution and solutions for control in Nigeria.
3. A similar study should be conducted in other zones of Nigeria.

REFERENCES

Abbey, P., & Paulson, N. (2000). Turning Wastes to Food in the Cities, *Nigerian Tribune*, June 10th, 15-16.

Abraham, J (2000). The Sewage of Housing. *New Nigerian* June 25th, 4-6.

Abrahams, C (2006). *Housing in Modern World*. London: Faber & Faber. 114-131.

Adams, I. (2009). Expert Chide Nigerians on Drainage, Environment *The Punch Newspaper* April 20th, 6-8.

Adejo, I. (2000). KDSG & Houses for Civil Servants. *New Nigerian* Thursday, July 13th Adelasu B. (2003). *Health Magazine Nigerian Medical Association* pp. 13

Adekogbe, O. A. (2008). Safety Regulation in Nigeria Plc. A Paper Presented at a Seminar Organized for Nigerian Workers, Lagos from 8th – 10th September.

Adetoke, O.S (2008). An Assessment of Housing & Health Codes in Nigeria.(NAFAK) *Journal of knowledge Review,* 17(7):78-80.

Adetokun, O.S. (2007). Domestic Conflict & Housing facilities in Ondo Town. An unpublished M Sc Dissertation Submitted to Department of Urban & Regional Planning, University of Ibadan.

Adetolusu, B. (2003). Environmental Pollution and its Associated Health Implication. *Medical Association of Health Magazine,* 6(3):13-15

Adeyemi, P. (2008). *Essential of Economics.* New York City. 2nd Edition. Archdoldal Publication Inc. 111-113.

Afolabi, G.F (2005). Household Refuse Disposal Methods and its Health Implication on Families. Unpublished B.Sc. Thesis submitted to the Department of Geography, University of Ibadan.

Agboola, T. (2005). *The Housing Debacle.* Ibadan: New World Press.

Aggarwal, Y.P. (2012). *Statistical Method: Concepts, Application and Computation*. New Delhi: Sterling Publishers.

Ahmed, Y.A (2002). Waste Generation and Management Techniques in Jimoh, H.I and Ifabiyi, T.P (eds) *Contemporary Issues in Environmental Studies*. Lagos: Haytee Press and Publishing Company.

Aina, B., & Ohonba, O. (2001). Professional Station of Environmental Education in Nigerian Schools "*Benin Journal of Environmental Education in Nigeria"*. 99-100.

Akintoye, M. (2002). Fuelwood Consumption Patterns of Households in Ondo State and Strategies for its Effective Management. *Journal of Home Economics Research.* 3(5): 27-31.

Akpan, A.E., & Usoro, C.I. (2005). Problems Associated with Improper Management of Household Waste *Journal of Home Economics Research*. 200-205.

Akuezuilo, O.E., & Agu, N. (2003). *Research & Statistics in Education & Social Sciences,* Ibadan: Nuel Anka Centi Publishers & Academic Press Ltd. 55-58.

Alabi, O. (2005). An Assessment of Selected Environmental Parameters of Residential Buildings in Sabon-Gari Area of Zaria *Journal of Home Economics Research*, 45-49.

Allow, W., & Sunest, L.S. (2005). Working out the factors that affect Household Chores Pollution generation: *Journal of Home Economics Research.* 20-71

American Time Use Survey (2009). *Time Use in the Home*. USA (ATUS), Bureau of Labour Statistics.

Aminu, L. (2009). Environmental Pollution in cities of Nigeria in Focus. Nigerian Television Authority Programme May 17th.

Ania, C.N. (2000). Environmental Effects of some Family Waste Disposal Practices in Nigeria. *Benin Journal of Environmental Education.* 23-26.

Ann, A., & Anderson, R. (2008). *Who leaves Sweden's Large housing estates?* London: Stephen Hall & Iyan Tosks.

Anonymous (2008). Waste management Retrieved on April 27, 2000, from http://www.psc.edu/science/ALCON/ALCOA-Light/htrnl

Anozie, G.O (2008) Solid Waste Disposal Practices of Households in Asaba: Nutritional Implications. *Journal of Home Economics Research*. 3(9):72-78.

Anyakoha, E.U (2009). Towards Enhancing Effective Waste Generation & Disposal in Private Premises in Nigeria *Nigerian Vocational Journal*. 87-89. Vol. 7, No. 5.

Anyakoha, E.U., & Eluwa, M. (2010). *Home Management for Schools and Colleges*. Onitsha: Africana-FEP Publishers Ltd. 303-313.

Anyakoha. E.U & Igboeli, C.C. (2003). Household Solid Waste disposal Practices of Women in Two Nigerians Urban Towns. Implications for Environmental Education Unpublished Research Report. Funded by Nigerian Environmental Study/Action Team.

Ary, D., Jacobs, L.C., & Razavieh, A. (2002). *Introduction to Research in Education*: 6th Edition, United State: Wadsworth Thomson Learning.

Asika, N. (2001). *Research Method for Nigerian Tertiary Institution* Lagos: second edition. 5-10.

Awo, O.K ((2007). Strategies for Enhancing Solid Waste Disposal Practices of Households in Urban Areas of Katsina State. Unpublished M.Ed Thesis Submitted to the Department of Vocational Teacher Education, UNN, NSUKKA.

Awo, O.K (2011). Solid Waste Disposal Practices of Households in Katsina State Urban Towns: Environmental Health Implications. *African Journal of Natural and Material Sciences,* 5(2):110-116.

Bamigboye. P., & Odundele, A (2005). An Assessment of housing status in a typical Nigerian town *Ile-lfe Journal of Applied Sciences*. 8-12.

Bawa G. (2004). Awareness of Environmental Pollution on Housing Quality: Eat, Think and Save. Word Environmental Day *Silver Bird News* June. 5th.

Baxter, J. (2002). Satisfaction with Household Work: Explaining the Paradox. Retrieved on August 18th 2000, from http://www.aifs.au/institute/afepapersboxeter/html.

Bello. E.A. (2007). Effect of Urbanization. Waste & Disposal & Hydrological Factors on Flooding of Ogunpa Stream in Nigeria. Unpublished Thesis University of UNN Nsuka.

Brink, S. (2014). Indoor Air Pollution is Greatest Environmental Health Risk. Retrieved from http://www.who.org/indoorairpollution.pdf. July 1st.

Brodick, W.E (2006). Effective Solid Waste Management in Nigeria: A Means of Sustainable Development. An Unpublished M.Sc Thesis Submitted to the Department of Geography and Regional Planning, Delta State University, Abraka, Delta State.

Brodrick, W.E (2005). Effective of Solid Waste Management in Nigeria: A Means of Sustainable Development M.Sc. These, Department of Geography and Regional Planning. Delta State University, Abraka.

Buckle. F., & Smith, W (2008). Introduction to Solid Waste Management. Retrieved on March 20th 2005, from www.galrc.org.vem/waste/sum

Bude, F. (2007). *How to Mathematics Support the Career of Our Graduates*: A Critical Review of the Contents of Mathematics Courses for Accounting and Business Student.

Bukola, O. (2005). Pollution Issues: Focus on Nigeria Nigerian Television Authority Programme. March 8th.

Bullard, R (2007). Growing Smarter: and Achieving Liveable Communities. Retrieved on June, 5th 2010 from http://www.google.sopxfcpsxis.com.html

Bureau of Labour Statistics (2009). Household Chores on Week days & Weekend days America: (ATUS).

Cable Network News (2008). Climate Change: Recent Research Findings 28th September,2008.

Chesapeake Bay Local Advisory Committee (2001). Stockholm.

Clathworthy, F. (2005). Housing need & Residential Mobility practice in Canada. *Canadian Journal of Home Economics*, 50-55.

Coker, A., Awkola, O., Olomolaiye, P., & Booth, C. (2007). Challenges of Urban Housing equality & its associations with Neighborhood environments: Insights & experiences of Ibadan City, Nigeria. Retrieved on September, 2007 from http://www.educ.nig.com

Coker, F. (2007). Family Life Cycle line *Tribune*, May 24th. 5-6.

Courter, D.G. (2005). *Family Housing.* USA: Waley and Sons; 4-7.

Craven, R. & Hirnie J. (2003). *Nursing Theory and Conceptual Framework, and Fundamentals of Nursing:* Spain, Health publishers, 18-21.

David, C., & Michael, S. (2010). Air Pollution Effects Retrieved on April 26th 2010 from http://literacy.think.quest.org

David, O. (2010). Lonelou's Historic Peg - Soupers (http://www.epa. gov/history/topics/perspectiLondon.htm). Retrieved 2006 - 08 – 02

Dellutri, L. (2005). *Speed Cleaning.* Leeds: Menedeth Books, 25-27.

Ebrenkrranzy, F. (2006). African Environmental Issues. *CNN documentary programme* January 5

Edozien C.O. (1995). *Poverty and Some Issues In concepts & Theory.* Enugu paint publishes. 8-60.

Eftiong, K.A. (2000). Environmental Problem in the Oil Rich Niger-Delta in Nigeria. The Petrodollar oil versus the Ecosystems servile: *News line* at Green Africa September 1

Elsa, F. B. (2007). Household Environmental Pollution. Retrieved on May 8th 2010 from http://www/wikihow.com.reduce.water.polution

Enger, E. D. & Smith, B.F (2006). *Environmental Science: A study of Interrelationships.* New York: McGraw Hill. 20-22.

Ewuba, M.U., & Ochonogor, E.O. (2004). Strategies for Household Waste, Management In Warri Metropolis in *Journal of Home Economics Research,* :5-7.

Ezeabasili, N.G. (2006). Legal Regulation of Urban Solid Waste Management & Disposal Multidisciplinary *Journal of Research Development* (MULJOREO) :128 - 135

Ezeoguine, J.A (2005). Challenges of Household Waste Disposal Practice In Lagos Metropolis, *Journal of Home Economics Research* :156 - 160.

Fear, F (2009). Biomass cooking fuels & prevalence of Tubercollosis in India. *International Journal of Infections Diseases.* Retrieved on July 8th 2008 from http://www/n/tree.net.retrieved.on.08/07/08

Federal Environmental Protection Agency (2009). Review of Environmental Economies and Policy in China. Government Document.

Federal Ministry of Health (2008). National Code on Health Ethics, Nigeria.

Federal Ministry of Works & Housing (2002). Annex III: Review of the National Housing Policy, Abuja Federal Government of Nigeria

Ferro, A. (2011). *Air Purifiers Filters & Cleaners*, *Environmental Science & Technology,* USA: Ferro Pub. 9-11.

Folarin, B. K. (2005). Problems of Refuse Disposal in Warri Urban. Unpublished B.Sc. Project submitted to the Department of Geography, University of Nigeria, Nsukka from http://www.ametsco.org/soaln/cleanair).

Galadima, A., & Garba, Z. N. (2012). *"Heavy metals pollution in Nigeria: causes & consequences,* Ibadan, 70-74.

Galadima, A., Garba, Z. N., Leke, L., Almustapha, M. N., & Adam, I. K. (2011). "Domestic Water Pollution among Local Communities in Nigeria-Causes & Consequences" *European Journal of Scientific Research,* :592-603

Gaur, A. S., & Gaur, S. S. (2009). *Statistical Methods for Practice & Research.* Los Angeles: Sage Books 15-20.

Graeme, M. (2005). Environmental Pollution, its Sources & Effects in India: *News Line* February 9th.

Habib, S. (2007). Housing problems & Physical Environment. *NTA Programme*, March 15th

Hales, D. (2007). *An Invitation to Health*. U.S.A: Thomson Higher Education, 20-25.

Iloefe, O. C. (2004). Energy & Household*: Journal of Home Economics Research,* 5(3): 17-20.

Imnakoya (2006). Building Codes & the need for Semi skilled labor in Nigeria from http://technorati.com/tag/business Retrieved on 12th February 2008

Jamaki Waste Management & Research Journal 15-19

James, R., Bethany, R., & Knorr, W. (2006). “History of the clean Air Act" Retrieved on 2nd June

Jimoh, H.I & Ifabiyi, J.P (2000). *Contemporary Issues in Environmental Studies*. Ilorin: Nathedx Publishers.

Jimoh, H.I (2003). *Techniques on Environmental Studies.* Ilorin: Nathedex Publishers.

Kahn, J. (2007). *As China Roars, Pollution Researches Deadly Extremes*. New York: Air Times.

Kallman, M. (2008). *Causes of household environmental pollution consequences & solution World Resource Institute*, Canada: Resource Ltd 70-73

Kicklighter, C. E. & Kickligher, J. C. (2008). *Residential Housing*; South Holland: The Good Heart Cox Company, Inc. 7-10

Kim R. A. Ikhifa, O.G., & Oberni, O.B. (2007). Sustainable Development in Nigeria: The role of Environmental Science Education, *Journal of Knowledge Review* (NAFAK), 1(5):19-22

Komolafe, F. (2001). Satisfaction of Employed Housewives with the Division of Household Chores in Katsina. Unpublished B.Ed Thesis Submitted to the Department of Vocational and Technical Education, Ahmadu Bello University Zaria.

Kozier, B, Glenor E & Audray B & Shirlee, S. (2004). *The Nature of Nursing, Fundamental of Nursing, Concepts, Process and Practice*, India: Paul & Paul 38-40

Krejcie. R., & Morgan, O.W (2001). *Determining Sample Size for Research Educational & Psychology Measurement.*

Kwon, K.D., Jo, W.K., Lim J.H., & Jcong, W.S. (2008). Environment: Revised version 608 Science pollution Resource America; 521-526.

Larry, K. (2002). *The Big Book of Noise*. New York: A dellson Pg. 70-71

Lbi.gov (2010). Indoor & outdoor air pollution Retrieved on 2nd April 2010 from http://www.ibi.gv/education/Else/Pollution-Main-htm.c

Lewis, D. S., Buens, J. P., & Segner, E.F. (2005). *Housing & Home Management*, London: Collier McMillan Limited. 6-10

Lnidou, P.C. (1997). Poverty Reduction in Nigeria: Participatory Rural Appraisal Strategy, *Nigerian Journal of Economic & Social Studies*: 293 – 311.

Logue, T. (2012). Household Air pollution and Health. Retrieved from http://www.retrieved. May 7th 2012.

Low Tox Solutions (2010). Household Toxins: Putting you & your Family at Risk. Retrieved on 14th June 2010 from http://vvww.lowtox.com

Lufadeju, E.O., & Obatorni. F. (1995). The Impact of the Present Housing Policy on Basic Housing Needs in Nigeria. Implications for Nigerian Economic Development. A Paper Presented at a Seminar On Housing Needs at the Centre for Social & Economic Research (CESER). Ahmadu Bello University, Zaria, December.

Luka, D. (2006). Family Life cycle & social change. Family Day an *NTA Programme*. 5th April

Madu, I.A (2001). *Urban Solid Waste Problem in Nigeria.* Oweri: James Enterprises (Nig) Ltd.

Majekodunmi, D. (2014). World Environmental Day: Focus on Effect of Rise in the Sea Level. *Today STV* in June 5th.

Makinde, R. (1995). Provision of Infrastructure is Mans Basic Right *Tell Magazine* May 27th. 7-8

Mansuri, K (2009). Africa the Third World on the Map. *NTA Top show* June 6th

Mark, C. & Horton, N. (2000). Residential & Industrial (Solid) Waste disposal support package Technical Support document at the third International Conference on Principles of Environmental Enforcement Label, at Oaxaca, Mexico, April 25th – 28th

Marshall, W & Copper, T (2008). Ideal House Keeping Strategies in Developing *Housecraft Journal*. 25-27

Merriam – W.(2010). from (http://www.Retrieved. 26th September 2010

Meyers, A. K. (2009). Social Status is Power. Silicon Valley: *Core TV program*. February 10th.

Micharty G. (2007). *Family Life cycle & Social Change. Family relations* New York: Wayah 38-39

Midori, M. (2007). Global Warning, from www.jama.com. From Retrieved 5th February 2008

Miller G T (2003). *Environmental Science. Working with the Earth* California: ITP 20-27

Mohammed, B (2005). Family Garbage Disposal and the Environment. Bachelor of Science Education Project Unpublished Ahmadu Bello University, Zaria.

Mooney, L.A. Knox. D. & Schant, C. (2000). *Understanding Social Problem* U.S.A.: Wadsworth & Thomson Learning. 20-23

Musa, H.A., Kola, R.I., & Lawal. S.L. (1999). *The increasing mountain of refuse in our Northern Cities & the Growing concern for environmental protection*. Ibadan: Davidson Press. 50-59.

National Economic Empowerment & Development Strategy (NEEDS) (2005). *Nigerian & Environmental Health & Housing*. Abuja: Publication Services Washington D.C National Housing Policy. 15-16

National Population Commission (2001). Action Plan Committee on Population Matters; Abuja.

Nazaroff, W.W., & Weschler, CJ., (2004). *Atmospheric Environment*. Jenewa: 28–45.

Nchekwube, J. N. (2003). Women & Environmental Degradation A Challenge to Home Economics, *Journal of Home Economies Research*: 92 – 96.

Nigeria Environmental Study/Action Team (NEST 1995). Environmental Awareness Training Manual (EATM). Lagos: Friedrich Ebert Foundation.

Nigerian Environmental Society Nigerian (2003). National Environmental Public Awareness Programme on the Marin & Coastal Environment. Training/Orientation Manual Management - September 6th

Nigerian Environmental Study (Action Team (NEST) (2000). Nigeria's Threatened Environment: *A National Nigerian Journal for Environmental pollution*. 65-70.

Nigerian Environmental Study/Action Team (NEST, 1991). Nigerian's Threatened Environment: A National Profile Ibadan: Intec Printers Ltd.

Nightingale, F. (1986) the power of environmental adaptation and residential theory. www.slideshare.net/sanjerevmental52html

Nwabueze, C.O. (2004). Critical Role of Educational Broadcasting in Sustainable National Development Paper Presented at the Maiden Conference African Council or Communicate Education (ACCE) Enugu State Chapter Two Friday, July, 16 in Enugu.

Nwachukwu, T.E. (2002). Health and Safety Education as Essential Strategies in Prevention of Industrial hazards in Nigerian Home. *Nigerian Health Journals*. 14(1&2).

Nwaji, R. N. (2010). Solid Waste & its management in Nigeria: A paper being presented a National Conference in Ahmadu Bello University, Zaria

Nwokonwo, J. N (2003). Home Economics Environmental Education & Quality of Life, *Journal of Home Economics Research* HERAN :62- 67

Obeta M.C. (2003). *Marl's Environment & Society*. Ibadan: Chuka Educational Publishers 50-52

Obibokun A.G and Kumuyi, A.J (2006). Governance and Waste Management in Africa. International Development Research Centre http://archive.idrca/books/index.html. Retrieved on 08/09/2013.

Ocho, L. O. (2007). *Man's Relationship with the Physical Environment*, Enugu: New Generation Publishers 18-27

Odun, S.B. (2007). Affordable housing Schemes Ogun state Example, *Tribune News Paper* September 4th, 7-8

Ogboru, J.O (2001). Environmental Pollution and Disease Susceptibility: An Analytical Study of Shallow Well Water in Ondo Town. *Benin Journal of Environmental Education*. 1(1):33-42.

Oguabor, V.0. (2000). Community based Environment Education Curriculum for Social Reference *Journal of Curriculum Studies.* 10- 11.

Ogundele, B.O. (2000). Managing Solid Wastes in Nigeria: Methods Problems and Solutions. *Nigerian School Journal*. 9(101):58-64.

Oguntola, S (2007). How climate changes evaluation, genetic patterns, Revised on February 5th 2008 from www.jana.com.on.05/0208

Okeke. S.U.N. (2009). *Home Economics for School & Colleges*. Onitsha: Africana Publisher Plc. 50-56

Okorie, J.W. (2000). Causes of environmental pollution in cities of Nigeria: *Daily Times* January 20th; 7

Okoro. M. P. (2004). Household Waste & Environmental Pollution in Nsukka Urban Unpublished B Ed Thesis. Department of Geography University of Nigeria, Nsukka

Okwu, M., & Mohammed, B (2001). Use of substandard materials are dangerous "*Vanguard News Paper* November 22rd; 4

Olison, H.D. (2006). *Marriage & The Family*. London: May field Publishing Company. 20-26

Olison. O & Defrain, F.O. (2006). *House Types & Family life*, Kumasi University of Science & Technology, 11-13

Olotuah, A. (2006) A study of tenants maintenance awareness, responsibility & satisfaction in Institutional housing in Nigeria. *International Journal of Strategic property Management*, 16:

Onibokun, A.G (2006). Governance and Waste Management in Africa. International Development Research, http://archiveidric,ca/books/ index.html. Retrieved on 21/4/2006.

Onyelucheya, O.E. (2003). Environmental Education: A Priority for Sustainable Environment Protection in Nigeria. *International Journal of Environment*. 1(1) 144-145.

Osho, O.M. (2004). Household Solid Waste Generation, Collection, and Disposal and Treatment in Agege, L.G.A. Lagos State M.Sc. Department of Geography, University of Ibadan.

Osinem, E.C. (2005). *Environmental Education in Agriculture*. Enugu: Cheston Agency Limited. 17-19

Osuala, E.C (2001). *Introduction to Research Methodology*. Onitsha: Africa - Fep Publishers Limited 24-27

Perry. M. (2001). Turning up the heat: A key note Address delivered at the International Conference on Sustainable Environment for Healthy living in Lagos.

Perth, W. (2005). *The Compound House in the 20th Century*, Australian National Housing Conference Austral. 28-40

Potsdam, M.Y. (2011). Household Chores & Release of Dust. *Journal of American Chemical Society*. 19-24.

Public Health Agency of Canada (2007). How Does Literacy Affect the Health of Canadians? Retrieved on April 10th, 2012 from http://www.publichealth.gc.ca

Rajjal, Z. (2010). *Environmental Issues in China*. Beijing: Air Times.

Rao, P. V. (2000). *Textbook of Environmental Engineering,* India New Delhi: Nigeria Environmental Study Action Team (NEST) 34-37

Redmond, R. A. (2009). Education. Silicon Valley: Microsoft Encyclopedia Encarta

Rioem, W. (2001). World Carbon Dioxide Emissions & Health. Retrieved May 9th 2001 from (http://rainforests.mongabasy.com/09.carbon.emissions.htm)

Robins C. (2005). New Directions in Classic Maya Household Archeology. Journal of *Archeological Research*, 307-356.

Rodda, A. (1993). *Women & the Environment.* London: Book Limited. 15-18

Rollings, P. (2011). *What Causes Household Pollution Daily*. Chacago: Our Times Publishing Company Inc. 17-20

Ruby, M. S. (2006). Household & Institutional Respective on Solid Waste Management in

Serret,Y., & Johnstone, N. (2006). *The Distributional Effect of Environmental Policy*. Paris: Paris/Edward Elgar, Cheltenham, U.K. 25-26

Smith R (2000). *Health and Environmental of Cooking in developing countries Tell Magazine.* January 15th 11-12.

Smith, B. (2015). Devastating Effects of Level of Pollution in Nigeria. *The Ben Smith's Radio Talk Show*, WAMO-8.30AM.

Sriniuas. V (2010). Household Pollutants; Retrieved on June 4th 2010 from http://pollutionissues.com/ho-li/household-pollutants

Srinivas, H. (2004). Beyond the Waste Bin: An Urban Management Continuum Located at http://www.gdrc.org/vem/waste/continuum.html. accessed on 08/09/13.

Srinivas, V. (2010). "Pollution issues" Household pollutants. Retrieved on June 14th 2010 from http://www.pollutionissues.com/jholilhousehold.pollutants.html.

Sulman, J.O (2002). Housing problem in Nigerian Cities *Town Planning Review Journal* 56 – 60.

Taiwo H (2010). Overview of Solid waste management in Nigeria Community Retrieved on June 14th 2010 from http://www.z/ezinerticles.com

Turk. J C (1981). *Introduction to Environmental Studies*. Philadelphia: WB Saunders Company 52-56

Udo, C. (2003). *Fundamentals for Health Education*. Germany: Heinemann Books Ltd. 44-47.

Uko-aviornoh, E.E. & Oso-Olubutola, O. (2007). Household Chores handling among homemakers in Benin Metropolis. *Nigeria. Journal of Home Economics Research*, 8.

Ukpong, E. C & Chamberlain, M. P. (2011). "Material Recovery From Polythehe Recycle As An Environmental Pollutant In Nigeria," *Continental Journal of Water, Air & Soil Pollution 2*(1): 31–41.

Ukwe, U.C. (2006). Effective House hold Waste Disposal in Nigerian Homes *Journal of Home Economics Research.* (HERAN) pp 91-94

UNESCO (2009). *Environmental Education*: Paris: Module for Pre-Service Training of Teachers & Supervisors for Primary Schools. Environmental Education Series 5-10

United Nations, (2007). Working together to end Environmental Pollution. Geneva: 36-37 *United State Environmental Protection Agency Conference.*

Usman, R., & Raheem, S. A. (2010). Correlates & Health on Consequences of Indoor Air Pollution among Urban Households in Ilorin, Nigeria" *Global Journal of Human Social Science*, 80-87

Uzoezie, C. E. (2007). Constraint of Economic Empowerment of the Family: Need of Home Economic Research, *Journal of Home Economics Research* - (JHER) :27-32

Uzoka, F.A. (2001). Environmental Degradation Challenges of Families in Anambra State *Home Economics Research Association of Nigeria* (HERAN) :263-279

Uzosike, C. (2008). A Study of the Relationship Between Consumer Behavour and Acquisition of Household Equipment: Implication for Teaching Home Management in Senior Secondary Schools.

Uzumah, J.A. (2001). Effective Household Waste Management: A key to sustainable Environment. *Home Economics Research Association of Nigeria* (HERAN)

Vennem (2009). *Waste Atlas*. China: Country Data.

Veufert, P., & Ernest (2002). *Household & Environment.* England: Data Black well Science Limited 8-12

Virk, S.K. (2004). *Pollution Management Among Urban inhabitant in India*; India: Living Editors Publication 55-65

Walsh, B. (2008) How to win the war on global warming. *Time Magazine* April 26, 40 – 44.

Wimmer, R.D., & Dominick, J.R. (2011). *Mass Media Research:* An introduction of Belmont: Wadsworth Publishing Company. 19-22

Woodburn, K., & MacKenzie, A. (2003). How Clean is Your House? Retrieved on 7th September 2003 from http://www.feministezine.com/feminist/modern/The-Politics-of-Housework.html

World Bank (2004). *Energy Transition in Developing Countries*. Washington D.C. World Bank Secretariat.

World Health Organization (2005). Housing & Health Retrieved on 5th February 2009 from http://www.euro.who.int/housing.Retrieved on 05/02/09

World Health Organization (2010). Indoor Air Pollution Retrieved on 7th April 2010 from http://www.whoint/indoor.and.outdoor.ari/eh/

World Health Organization (WHO, 2007). Indoor Air pollution. National Burden of Diseases Estimates, WHO Geneva.

APPENDIX I

Letter of Introduction

DEPARTMENT OF VOCATIONAL & TECHNICAL EDUCATION

AHMADU BELLO UNIVERSITY, ZARIA NIGERIA

FACULTY OF EDUCATION

Telephone: ***069-51755, 50692***
Vice Chancellor: **Professor. Abdullahi Mustapha B.Sc. (Hons) Pharm(ABU), Ph.D (London) FPSN**
Head of Department : **Professor A.A Udoh B.Ed. (Hons) Nsukka M.Ed. & Ph.D Bus Edu. (ABU)**

Your Ref: Ph.D/Educ/00467/2008-2009

Our Ref:

24th June, 2014

Date:

Letter of Identification

FAITH KOMOLAFE – PH.D/EDUC/00467/2008-2009

This is to certify that the above mentioned name is a Postgraduate student (Ph.D Home Economics) in the Department of Vocational and Technical Education, Ahmadu Bello University, Zaria, carrying out a research topic: **Relationship Between Household Chore Pollutants and Environmental Pollution in North West Zone, Nigeria**

Please, kindly give her every assistance she may require.

DEPT. OF VOC. & TECH EDUCATION
HEAD OF DEPT
ZARIA

Professor A.A. Udoh
HEAD OF DEPARTMENT

APPENDIX II

Letter to Respondents

Department of Vocational
and Technical Education,
Ahmadu Bello University,
Zaria.

24th June, 2014

Dear Respondents,

Request to Fill Questionnaire

1 am a Post Graduate Student of the above Department embarking on a study on "Relationship between Household Chore pollutants, Environmental Pollution and Levels of pollution in North-West geo-political zone, Nigeria". Please, read and respond to this questionnaire.

Your responses will be used strictly for academic purposes only and will be treated as confidential.

Faith Komolafe
(Ph.D/Ed/00467/2008-2009)

APPENDIX III

Questionnaire for Households

Section A

Instruction for data collection

Please “Tick" [√] the option you think is most appropriate in the Box or Colum provided in each section. The keys are as follows:

DEMOGRAPHIC INFORMATION

1. Age Rage (in years)

(a) Below 20 [ ]

(b) 21-30 [ ]

(c) 31-40 [ ]

(d) 41-50 [ ]

(e) Above 50 [ ]

2. Marital Status

a) Single [ ]

b) Married [ ]

c) Divorced [ ]

d) Widowed [ ]

e) Others (Specify) …………………………………………………..

3. Types of Family

(a) Nuclear family (husband, wife, children) [ ]

(b) Polygamous family (husband, wives, children) [ ]

(c) Extended family [ ]

(d) Others

(Specify)…………………………………………………………………

4. Married and no children

1. 1 – 2 [ ]
2. 3 – 4 [ ]
3. 5 – 6 [ ]
4. 7 and above [ ]
5. None [ ]

5. Highest Educational Qualification of Households

a) University Degree [ ]

b) HND [ ]

c) NCE/ND [ ]

d) WASCE/SSCE/Technical Certificate [ ]

e) No formal Education [ ]

f) Other (Specify)……………………………………………………….

6. Ownership of residence? Please indicate

a) In rented house [ ]

b) In government quarters/employer's quarters [ ]

c) Personal house [ ]

d) Other (Specify)…………………………………………………………

7. Where is your household located?

a) Urban area [ ]

b) Semi-urban area [ ]

c) Rural area [ ]

8. Types of residence?

a) Flat in a compound [ ]

b) Flat not in a compound [ ]

c) Single/double rooms in a compound [ ]

d) Single/double rooms not in a compound [ ]

e) Self contain in a compound form [ ]

d) Self contain but not in a compound form [ ]

9. Have you experienced any activity that has caused environmental pollution around your household?

a) Yes [ ]

b) No [ ]

SECTION B

INSTRUCTIONS: Please indicate your responses by ticking the degree to which you agree or disagree to the statements in these sections

Key

SA = Strongly Agreed
A = Agreed
UD = Undecided
SD = Strongly Disagreed
D = Disagreed

INSTRUCTION: KINDLY INDICATE YOUR OPINION ON THE RELATIONSHIP BETWEEN MEAL PREPARATION AND ENVIRONMENTAL POLLUTION

1. MEAL PREPARATION AND ENVIRONMENTAL POLLUTION

S/N		SA	A	UD	D	SD
1	Discarding of dirty water after washing food items before cooking can cause water pollution that affect the environment					
2	Discarding of food peels like yam and cassava can cause land pollution that affect the environment					
3	Pounding of food items can cause noise pollution that affect the environment					
4	Grinding food items with machines can cause noise pollution that affect the environment					
5	Frying of food can cause air pollution that affect the environment					
6	Discarding of water used for washing cooking utensils can cause water pollution that affect the environment					
7	Sound from mixers and bleeders of food items can cause noise pollution that affect the environment					
8	Discarding burnt and rotten food can cause air pollution that affect the environment.					
9	Foul odour from leftover food can cause air pollution that affect man and the environment					
10	Disposal of rotten food items can cause air and land pollution that affect man and the environment					

Instruction: Kindly Indicate your opinion on Household Cleaning / Washing in the House and Environmental Pollution

2a. Household Cleaning / Washing Activities and Environmental Pollution

S/no		**SA**	**A**	**UD**	**D**	**SD**
1	Use of rakes, brooms and sweeping machine have the tendency to cause air pollution which affects the environment					
2	Sometimes the clearing of weeds and grasses around the household that are not properly disposed have the tendency to cause land pollution which affects the environment					
3	The brackish substance from the back of utensils have the tendency to cause land pollution which affects the environment					
4	Sweeping the house could generate dust that has the tendency to cause air pollution which affects the environment					
5	Dusting the room and upholsteries and other items have the tendency to cause air pollution which affects the environment					
6	Spraying of insecticide and other related like perfumes have the tendency to cause air pollution which affect the environment					
7	Beating of rugs with sticks as well as burning of refuse have the tendency to cause air pollution which affects the environment					
8	Cleaning of oil from the kitchen have the tendency to cause pollution which affects the environment					
9	Use of long brooms to remove dirt from the walls and ceiling have the tendency to air water pollution which affects the environment					
10	Dirty rags and towels use in dusting and cleaning can cause air and land pollution which have the tendency to affects the environment					

Instruction: Kindly Indicate Your Opinion Washing Activities in The Home And Environmental Pollution

2b. Washing Activities and Environmental Pollution

S/no		**SA**	**A**	**UD**	**D**	**SD**
1	Washing of clothes with low quality detergents have the tendency to cause environment pollution					
2	Washing of lavatories (toilets and bathroom and sinks with washing agents have the tendency to cause air pollution which affects the environment					
3	The nature of soap and detergent used in washing utensils have the tendency to cause water pollution which affects the environment					
4	Dirty and waste water from sewage have the tendency to cause water pollution which affects the environment					
5	Allowing dirty water to stay stagnant have the tendency to cause land pollution which affects the environment					
6	Bathing water from the bathroom have the tendency have the tendency to cause water pollution which affects the environment					
7	Lack of effective attitude of washing household articles have the tendency to cause pollution which affects the environment in the area					
8	The use of washing machine have the tendency to cause water pollution which affects the environment					
9	Hand washing solutions and agents have the tendency to cause water pollution which affects the environment					
10	Washing of utensil refuse have the tendency to cause water pollution which affects the environment					

Instruction: Kindly Indicate Your Opinion On The Cooking Technologies That Cause Pollution In The Environment

3. Household Cooking Technologies And Environmental Pollution

S/no		SA	A	UD	D	SD
1	Cooking of food with firewood have the tendency to cause air pollution					
2	Cooking of food with kerosene have the tendency to cause air pollution					
3	Cooking with gas cooker have the tendency to cause air pollution					
4	Frying of oil while cooking have the tendency to cause air pollution					
5	Spoilt food have the tendency to cause air and land pollution					
6	Polythene materials used in cooking and not disposed properly have the tendency to cause land pollution					
7	The littering of food packs and wraps of seasoning pollution have the tendency to cause land pollution					
8	Dirty and waste water from kitchen sink have the tendency to cause water pollution					
9	Spillage from cooking fuel like kerosene and gas have the tendency to cause air pollution					
10	Lack of effective and hygienic cooking attitude have the tendency to cause air, land and water pollution					

Instruction: Indicate Your Opinion On Household Disposal Methods That Could Cause Environmental Pollution

4. Household Waste Disposal Method And Environmental Pollution

S/no		SA	A	UD	D	SD
1	Faece flowing from broken sewage system have the tendency to cause air and water pollution					
2	Dumping of soapy water from washing clothes and household utensil have the tendency to cause water and land pollution					
3	Indiscriminate dumping of soft drinks and other beverage containers, packages and bottles have the tendency to cause land pollution					
4	Indiscriminate dumping of polythene bags, pure water sachets and papers have the tendency to cause land and water pollution					
5	Dirty toilets and bathrooms have the tendency to cause pollution which affects the environment in the area					
6	Defecating in polythene bags and dumping in the environment have the tendency to cause air, water and land pollution					
7	Lack of clearing of solid waste when it is full have the tendency to cause pollution which affects the environment in the area					
8	Dirty and waste water from broken down sewer have the tendency to cause pollution which affects the environment in the area					
9	Dumping of refuses in waste basket and bins without disposing it have the tendency to cause land pollution					
10	The dumping of used clothes, and electrical items have the tendency to cause land pollution.					

Instruction: Indicate Your Opinion On Household Alternative Sources Of Light That Could Cause Environmental Pollution

5. Household Alternative Sources Of Light And Environmental Pollution

S/N		SA	A	UD	D	SD
1	The level of noise generated from alternative power source like generator have the tendency to cause noise pollution					
2	Smoke emanating from the generating sets have the tendency to cause air pollution					
3	Spillage from waste engine oils used in the generating sets have the tendency to cause land pollution					
4	Gaseous fumes from gasoline used in the generating sets have the tendency to cause air pollution					
5	Storage of generating sets in the room after usage could cause serious air pollution to the house hold					
6	Leakages from batteries used as alternative power source into source of have the tendency to cause water pollution					
7	The dumping of generator waste engine oil on land have the tendency to cause land pollution					
8	The dumping of used batteries and inventers have the tendency to cause water pollution					
9	High level of sound from generators have resulted in the increase of ear problems in the household is caused by noise pollution					
10	In-hailing of fumes from the gases and smoke emanating from generating sets could cause asthma and suffocation that may lead to death					

Instruction: Please Indicate Your Opinion On Strategies Employed By Homemakers In Reducing Household Pollution

6. Strategies For Reducing Household Pollution

S/N		**SA**	**A**	**UD**	**D**	**SD**
1	Using of noise proof cleaning and electrical appliances may have the tendency to reduce noise pollution of the environment					
2	The use of incinerator have the tendency to reduce air pollution in the environment					
3	Building a small place and placing the generator a distance away from the household have the tendency to reduce both air and noise pollution					
4	Cooking in a well ventilated kitchen could reduce household air pollution					
5	Regular cleaning of drainages could help reduce household water pollution					
6	Proper refuse disposal practice and management would go a long way to reduce air and land pollution to the environment to the environment					
7	Regular sanitation practices and disposal chores to be supervised by a body that would enforce environmental protection laws					
8	Household need to be sensitized and oriented on safety mode of using gaseous materials like insecticides air freshener and cooking gas in order to avoid risk to their health and environment					
9	Broken down water pipes and sewage should be repaired to avoid it sipping into and contaminating the available source of drinking water in the environment					
10	Polythene bags pure water sachet and other household waste that are organic should be destroyed to avoid it causing environmental pollution					

APPENDIX IV

Certificate of Air Quality in Kaduna State

KEPA **(KADUNA STATE ENVIRONMENTAL PROTECTION AUTHORITY)**

No. L 10, Link Road, Unguwan Television, P.M.B. 2398 Kaduna South -Nigeria Tel: 062-236501
www.kepakad-ng

LABORATORY RESULT CERTIFICATE

Our Ref. EP/OFF/59/VOL.I/99 Your Ref. ______ Date 26th February, 2015

AIR QUALITY ANALYSIS RESULT

Name: **Faith Komolafe**

School: **Ahmadu Bello University, Zaria**

Faculty: **Education**

Department: **Vocational & Technical Education**

S/No.	Parameters	Average Results of the Areas in Kaduna State (Location) P1	P2	P3	P4	P5	Fed. Min. Env. Standard	Comments
1	Particulate	010	008	009	007	012	NS	Within
2	Chlorine (Cl_2)	0.0	0.01	0.01	0.02	0.02	0.03ppm	Within
3	Sulphurdioxide (So_2)	0.079	0.083	0.082	0.084	0.078	0.53ppm	Within
4	Nitrogen oxide (No_2)	0.006	0.007	0.007	0.008	0.005	0.083ppm	Within
5	Hydrogen sulphide (H_2S)	0.007	0.008	0.007	0.007	0.006	0.008ppm	Within
6	Ammonia (NH_3)	003	004	005	005	003	2.0ppm	Above limit
7	Carbon monoxide (Co)	006	077	007	008	006	5.0ppm	Above limit

Key: P1=Kakuri Gwari P2=Kakuri Hausa P3=Makera

P4=U/Television P5=U/Barde

Hamisu H. Isah

Help Protect the Environment

All Correspondence to be addressed to the General Manager

APPENDIX V

Certificate of Water Quality in Kaduna State

K E P A

(KADUNA STATE ENVIRONMENTAL PROTECTION AUTHORITY)

No. L 10, Link Road, Unguwan Television, P.M.B. 2398 Kaduna South -Nigeria Tel: 062-236501
www.kepakad-ng

LABORATORY RESULT CERTIFICATE

Our Ref. EP/OFF/59/VOL.I/97 Your Ref. Date: 25th February, 2015

Client: Faith Komolafe (ABU Zaria)
Sample Date: 18th – 19th February, 2015.
Sample Source: Kaduna South
Sample Type: Dug Well Water
Sample Collector: Faith Komolafe
Period of Analysis: 2 Weeks

S/n	Parameters Physical Test	A Unguwaan Barde	B Unguwan Gimbiya	C Television	D Kakuri Hausa	E Makera	WHO
1.	Ph	5.6			5.3		6.5-8.5
2.	Odour	Odourless	Colourless	Colourless	Odourless	Colourless	Odourless
3.	Colour	Colourless	Odourless	Odourless	Colourless	Odourless	Colourless
4.	Temperature ^{0}C	25	25	24	25.3	24.5	<40
5.	Conductivity (mv)	18	22	35	50	43	NS
6.	Turbidity NTU	13	16	5	19	10	<1.0
7	TSS mg/l	5.0	6.0	1.0	4.91	39	30
8.	TDS mg/l	18.3	22.0	14.1	18.3	23.0	2000
9.	Dissolved Oxygen (mg/l)	3.9	3.6	2.9	3.1	3.7	>4
10.	Alkalinity as $CaHCO_3$	310	734	56.7	120	46.8	
11.	" as $CaCo_3$	Nil	Nil	Nil	Nil	Nil	Nil
12.	Total Alkalinity $CaCo_3$	310	734	56.7	120	46.8	150
13.	Hardness (mg/l)	36.0	34.2	26.7	38.4	32.0	NS
14.	Sulphate (mg/l)	01	4	2	13	15	200
15.	Chloride (mg/l)	37.23	38	41	81.91	39	
16.	Nitrate (mg/l)	13.67	9.32	7.41	6.0	8.53	20
17.	Phosphate (mg/l)	2.30	1.57	0.89	3.11	2.70	5
18.	Ammonia (mg/l)	0.144	0.067	0.073	0.085	0.101	NS
19.	Nitrite (mg/l)	0.244	0.061	0.130	0.401	0.056	NS
20	Iron (mg/l)	1.1903	0.3014	1.0631	1.2781	1.0367	20
21	Lead (mg/l)	0.1061	0.1130	0.0831	0.1001	0.0602	<1.0
22.	Copper mg/l	0.2201	0.1250	0.1454	0.2066	0.1092	<1.0
23.	BOD_5	17.0	12.31	10.03	6.12	5.87	30
	Microbial Test						
1.	Total Colifon (10/100mls)	40	29	37	53	19	
2.	E. Coli (1/100mls)	3	4	4	7	3	

Analyst: ---------------------------- Quality Control: ----------------------------

Help Protect the Environment

All Correspondence to be addressed to the General Manager

APPENDIX VI

Certificate of Soil Quality in Kaduna State

K E P A

(KADUNA STATE ENVIRONMENTAL PROTECTION AUTHORITY)

No. L 10, Link Road, Unguwan Television, P.M.B. 2398 Kaduna South -Nigeria Tel: 062-236501
www.kepakad-ng

LABORATORY RESULT CERTIFICATE

Our Ref. EP/OFF/59/VOL.I/98 Your Ref. Date: 25th February, 2015

Client: Faith Komolafe (ABU Zaria)
Sample Date: 18th – 19th February, 2015.
Sample Source: Kaduna South
Sample Type: Soil
Sample Collector: Faith Komolafe
Period of Analysis: 2 Weeks

S/n	Parameters Physical Test	A Unguwaan Barde	B Unguwan Gimbiya	C Television	D Kakuri Hausa
1.	Colour	Reddish Brown	Brownish	Dark Brown	Reddish Brown
2.	Texture	Course Sand	Fine Sand	Sandy	Sandy
3.	Conductivity (mv)	47	70	48	61
4.	Temperature ^{o}c	24.0	23.6	$23.5^{0}c$	$25^{0}c$
5.	Ph	7.3	7.7	7.2	6.9
6.	Porosity (%)	20	28.5	25.6	27.0
7	Bulk density g/cm^3	1.21	1.25	1.30	1.22
8	Chloride (mg/l)	10.92	12.5	8.67	11.77
9.	Sulphate (mg/l)	37	90	26	15
10.	Nitrate (mg/l)	0.581	0.884	0.638	1.575
11.	Moisture (%)	1.08	7.01	4.34	4.44
12	Organic Matter (%)	5.51%	13.57	11.04	8.07
13.	Nitrite (mg/l)	0.132	0.201	0.145	0.358
14.	Phosphate (mg/l)	3.10	2.13	1.67	0.95
15.	Ammonia (mg/l)	ND	ND	ND	ND
16	Iron (mg/l)	3.0701	4.1134	2.7713	1.6520
17.	Copper (mg/l)	1.0022	0.9861	0.2570	1.0147
18.	Zinc (mg/l)	0.1560	0.2763	1.4871	0.3035
19.	Cadmium (mg/l)	0.1531	0.1602	0.0874	0.1372
20	Lead (mg/l)	0.0653	0.0578	0.0393	0.0101
21	Manganese (mg/l)	1.2015	0.4012	1.0106	1.1620
22.	Nickel (mg/l)	0.0141	0.0625	0.1192	0.1777

Analyst: ------------------ Quality Control: ------------------

Help Protect the Environment

All Correspondence to be addressed to the General Manager

APPENDIX VII

Researcher at Kaduna South Residential Area

Researcher with Gas Meters Used to Test Level of Air Pollution