**ASSESSMENT OF ENVIRONMENTAL SANITATION PRACTICES AMONG HOUSEHOLDS IN LAFIA LOCAL GOVERNMENT AREA OF NASARAWA STATE, NIGERIA**

**BY**

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**JUNE, 2016**

**DECLARATION**

I declare that the work in this dissertation entitled Assessment of Environmental Sanitation Practices Among Households in Lafia Local Government Area Of Nasarawa State, Nigeriahas been carried out by me in the Department of Geography Faculty of science, Ahmadu Bello University, Zaria, Nigeria. 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 previously presented for another degree or diploma at this or any other institution.

Mu’ azu Zanuwa AUDU **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Name of Student Signature Date

**CERTIFICATION**

This dissertation entitled ‘Assessment of Environmental Sanitation Practices Among Households in Lafia Local Government Area Of Nasarawa State, Nigeria’by Mu’azu Zanuwa AUDU meet the regulation governing the award of the degree of environmental management of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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Chairman Supervisory Committee Signature Date

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**DEDICATION**

This work is dedicated to my late father Alhaji Abdu Zanwa

**ACKNOWLEDGEMENTS**

Academic work of this magnitude and significance cannot be done properly and achieved without the assistance of other people. Many people have undoubtedly contributed to its success.

I am grateful to Almighty Allah for His grace and mercy throughout my period of study to Him is the glory and praise forever, amen.

I acknowledge the selfless sacrifice of my supervisors Dr. I.A Abdulhamid (Chairman Supervisory Committee) and Dr. (Mrs.) Binta Abdulkarim (Member Supervisory Committee) in ensuring the quality of this work for being patient enough to correct my manuscript from the start to the end of this research work, may the Almighty Allah in His infinite mercy continue to bless them and their families, amen. Also my appreciation goes to all my Lecturers in Department of Geography Ahmadu Bello University, Zaria, particularly Prof. I.J Musa, Dr. A.K Usman (Head of Dept Geog. ABU Zaria) Dr. R.O Yusuf, Dr. Y.Y Obadaki, Mallam Jibrin Gani and Mallam Mukhtar.

My special gratitude and appreciation go to my late Father Alhaji Abdu Zanwa and my Mother Hajiya Aisha Abdu Zanwa and all members of Alhaji Abdu Zanwa’s family for their moral and financial support, I love them all. I also want to appreciate all my friends and course mates for their contribution in one way or the other, especially, Salihu Abdullahi Chado, Lukman Abdulmumin, Saleh Shugaba, Ahmad Audu and Abdulkarim Danjuma.

The researcher also thanks the environmental sanitation workers in the Nasarawa State Urban Development Board (NUDB) Sanitation Unit and the household heads in the study area whose responses and co-operation had contributed to the successful completion of this dissertation.

**ABSTRACT**

In spite of many decades of development planning and assistance much of the rural and urban population in Lafia LGA of Nasarawa State has low sanitation coverage. Inadequate sanitation poses a great threat to human health, taking a heavy death toll especially on children, and degrades the environment. On the other hand, good sanitation saves lives and prevents degradation of the environment. The study assessed environmental sanitation practices among households in Lafia LGA of Nasarawa state, Nigeria. The study adopted descriptive research design limiting itself to four electoral wards namely, Chiroma, Gayam, Assakio and Adogi wards in which Environmental Sanitation Questionnaire (ESQ) and Environmental Sanitation Checklist (ESCL) were used to collect data. A systematic random sampling technique was adopted to select the respondents for the study on interval 30th house in urban ward and 20th house in rural ward. The study revealed that 65.9% of household in rural ward don’t have dustbin at home level and 62.1% of the households in the study area did not cover solid waste container. Majority (67.2%) of households in urban ward used unsafe wastewater disposal methods and did not have appropriate wastewater disposal systems, however 60.6% of household in rural ward disposed solid waste into drainage and bush while 58.3% of household in urban ward disposed solid waste through open dumping system. There is significant relationship between socio- demographic characteristics of households (Income level) and types of environmental sanitation practice (method of disposing solid waste) (at 95% CI, P=0.033). On bases of the findings, the study recommends that efforts should be made to ensure sustenance of environmental sanitation exercise at household level and the community at large. Moreover environmental sanitation agencies together with NGOs should embark on effective enlightenment of the community at large on dangers associated with inappropriate waste and wastewater disposal.

**CHAPTER ONE: INTRODUCTION**

**1.1 BACKGROUND OF THE STUDY**

Waste generation is a condition of people’s attitude towards end products. The products considered as waste are discarded or dumped in specific location (Achor, 2013). An Environmental Sanitation Day was created in Nigeria by the Environmental Sanitation Edict between1972-1973 and was revived by the Federal Military Government of Nigeria in 1980. The aim of the Environmental Sanitation Day was to increase awareness and enhance the commitment of Nigerians towards sound environmental interaction. The Edict identified one day cleaning in a month as a civic responsibility for households. Residents were mandated to clean their homes, streets, neighborhood surroundings, drainage channels, markets and public buildings in this process. To complement Environmental Sanitation project, states and local governments set up Solid Waste Management Authorities (SWMAs), agencies and units to provide guidelines and policies on how waste should be disposed of and managed through community participation (Achor, 2013).

Uchegbu (2002) defined Sanitation aspractice for theprotection of health, through removal of human, industrial and domestic wastes in the environment. It includes the processes and procedures of keeping an environment clean from waste. In addition, the World Health Organisation (WHO, 2004) posits Sanitation as the provision of facilities and services for safe disposal of human waste, including the maintenance of hygienic conditions, through effective disposal of waste waters.

Other general description of sanitation by Tilley, Urich, Luthi, Reymond and Zurbrugg (2014) includes parameters of sustainable sanitation, improved sanitation, unimproved sanitation, environmental sanitation, on-site sanitation, and ecological sanitation. A general system approach to sanitation includes collection, conveyance, treatment, disposal and re-use. To the environmentalists, thegoal of sanitation is to provide a healthy living environment, to protect the natural resources and environment from pollution, and provide a habitat for humans (Thor-Alex, 2005).

The sanitary revolution of introducing pipe water and waterborne sewage to people’s homes in 19th Century Europe was voted the most important medical milestone since 1840, beating even the discovery of antibiotics and the development of anesthesia **(**Alabi,2010)**.** It is estimated that 2.5 billion people, 40% of the world’s population, lack access to basic sanitation, estimates by the Joint Monitoring Programme of the United Nations Children’s Emergency Fund [UNICEF] and the World Health Organization [WHO](UNICEF/WHO, 2008).One of the Millennium Development Goal (MDG) targets is to reduce by half the proportion of people without access to sanitation by the year 2015.

Estimates by the Joint Monitoring Programme of the UNICEF and WHO indicated that at the current rate of progress, the world will miss the target by over 700 million people. This means that approximately 2 billion people will still lack access to sanitation in 2015. In sub-Saharan Africa, this modest target, which still denies 50% of people in need of this basic human right, will not met until 2072 if the current rate continues (WHO, 2010). In 2006, the United Nations general assembly designated 2008 as the international year of sanitation [IYS], recognizing that access to sanitation is vital to ensuring health, dignity and sustainable social and economic development for the world’s poorest citizens. Environmental Sanitation has remained consistently poor in Nigeria since 1980. Consequently, there is high morbidity and mortality from sanitation related diseases associated with impoverishment and poor standard of living among the populace. Nigeria coordinated a vision of environmental health in vision 2020 as part of ensuring sanitation among community members (Alabi, 2010).

During the pre-independence era in Nigeria (1900 – 1960), several legislative controls were put in place to address the problem of Environmental Sanitation. Among these were: Cantonment Proclamation of 1904 on the Layout and Sanitation of GRA, Public Health Act of 1909 on Environmental Sanitation; Township Ordinance No. 29 of 1917 on Sanitation and Environmental Management; Lagos Colony Ordinance of 1928 Outbreak of Bubonic Plague; Mineral Act of 1945 – Trench and Drainage Pollution; Town and Country Planning Ordinance of 1946 – cap 123 (West), cap130 (North) and cap 155 (East); Building Lines Regulation of 1948; Local Government Ordinance 1950/54-58; Public Health Laws of 1957 to Combat Overcrowding, Diseases and Squalor. During this era, adequate sanitation was maintained by enforcement of Public Health Laws through routine house to house inspection (Alabi, 2010).

The benefits of the legislative and other measures at this time were however not universal because they were restricted to privileged areas. In the immediate post-independence era (1961 – 1980), legislation and authority on Environmental Sanitation were derived from the Nigerian constitution as stated in the concurrent, exclusive and residual lists. Nonetheless, routine house to house inspection was still effective in the maintenance of environmental sanitation. However, political interference with the statutory role of Sanitary Inspectors led to the collapse of the house to house inspection programme and contributed to the poor sanitary conditions in the country (Chukwu, 2010).

The most effective sanitation strategy implemented in Nigeria was in 1983-1985 tagged as a period of war against indiscipline and corruption. Incidences of gross violation of environmental ethics ranging from indiscriminate defecation, littering of public, home, and surrounding among others by individuals or households, were compiled for fear of being arrested. A combined team of armed forces and the general public participate effectively in ensuring its success (Alabi, 2010).

The non-continuation and implementation of the war against indiscipline and corruption by successive governments and administrations has led to a rapid decline in the social responsibility and discipline among citizens especially the youths which accounts for 52 percent of the population (World Resource institute, 2006). This decline has through various ways and forms impacted significantly on the environment negatively. This programme could not be sustained with subsequent changes in Nigeria’s leadership due to weak institutional frame work in addressing sanitation issues. Cities in Nigeria were polluted, solid and liquid waste both in residential areas and public places abound around even during Sanitation Days (Alabi, 2010).

Cointreau (1992) observed that location has significant impact on environmental sanitation. This is because, in most Nigerian cities, collection and disposal of refuse is usually more frequent and efficient in Government Reservation Areas (GRAs) and in other affluent neighborhoods than in poor neighborhoods. This observation cannot be far from the truth. The residents of these neighborhoods like those in Victoria Island, Lekki Pennisula, Ikoyi and so forth in Lagos State of Nigeria for instance, are inhabited by very wealthy and with political connections in the government and as such they use their influences to ensure that, their environments are kept as free as possible from refuses.

Households are group of people living together in a common residence or apartment as consuming units in a physical environment. The daily household activities and consumptions practices are bases of waste generation which is the primary focus of this study. Solid wastes are consequences of human activities which involves the production of goods and services and the consumption of natural resources (Ukwe, 2004).

The average household size in Nasarawa state has been estimated to be 5.2. This indicates that, the average household size is bigger in rural areas than in urban areas and this is consistent with the findings from the previous surveys (NBS, 2011). The household size in Central part of the state has consistently been lower than in other part of the state (National Bureau of Statistic) (NBS 2011). Considering the regional distribution, Central part of the state had the highest proportion of households members aged 20 years and above who have never married while southern part of the state had the lowest. Polygamous marriages were more prevalent in the southern and western part of the state this is because majority of the households are Muslim and lowest in the Central part. Majority of households heads in the state were in the age group 23 -54 years and this proportion remained unchanged. The problem of child headed households still exists with about 0.4 percent of the households headed by children (National Bureau of Statistic, 2011).

Despite the various organization that are now spearheading political activism and campaigns for change in policies, laws, technology and development strategies to enhance environmental sanitation, the achievement is minimal. It is against this backdrop that it became important to assess environmental sanitation practices among households in Lafia Local Government Area (LGA) of Nasarawa State, Nigeria.

**1.2** **STATEMENT OF THE RESEARCH PROBLEM**

In spite of many decades of development planning and assistance much of the rural and urban population in most developing countries have low sanitation coverage. One dimension of low sanitation coverage is low level of solid waste and wastewater management. Solid waste and wastewater has been a major issue in all nations especially in developing countries. In many African cities, only 10 to 30 percent of household solid wastes are collected and dispose off properly (Hardoy, Mitlin and Satterthwaite, 2001).

Another dimension of this problem is low access to good and acceptable toilets. Overall, 2.5 billion people lack access to improved sanitation, more than one billion in Asia and another half a billion in sub-Saharan Africa. Open defecation continues to be practiced by almost half the population in Southern Asia and more than a quarter of those living in sub-Saharan Africa (United Nation) (UN, 2008).Water, sanitation and hygiene are also linked to environmental sanitation education (particularly among households), safety and security of women and men, and socio- economic development of communities (UNICEF, 2006; WHO, 2010; Adam, Bartram, Chartier, and Sims, 2009).

Anyasoro (2010) investigated Environmental health workers’ perception on implementation of environmental sanitation components in Anambra state, Nigeria. The investigation was carried out using questionnaire survey research design and in line with the objectives of the study, eight research questions and t- test statistical techniques was used to test the two null hypotheses. The study revealed that sanitary inspection of premises as well as solid waste management among others were not properly implemented as the mean of each environmental sanitation components fell below 2.50. The study also revealed that, with regard to gender, there was no significant difference in the mean perception of male and female environmental health workers. Also there was no significant difference in the mean perception of environmental health workers with regard to location. The researcher inferred that the components have not been properly implemented in Anambra State.

Butu, Ageda, and Bichi (2013) examined the Environmental impacts of roadside disposal of municipal solid wastes in Karu L.G.A of Nasarawa state, Nigeria. The study generated data by carrying out oral interview sand field observations for holistic and in–depth assessment of the environment, and purposive sampling method was adopted. The results of the findings showed that population growth and unplanned urban expansion has exceeded the expected limit in recent time, which result to ugly system of solid wastes disposal. Municipal solid wastes which contain both biodegradable and non-biodegradable wastes are disposed at the shoulders of major highways in temporary dumpsites and are later evacuated by a waste management agency on a weekly basis. There is no organized house to house or street to street collection of the solid wastes. The study revealed that roadside disposal of municipal solid wastes has serious impacts on the environment.

Yaw (2010) conducted a study on enhancing sanitation services delivery in the Ejura- Sekye Dumase District of Ghana. Purposive sampling technique was adopted to select the relevant respondents for the study and qualitative techniques of data processing and Statistical Package for Social Science (SPSS) was adopted. The study revealed that toilet facility coverage was low. The study again revealed that implementation of sanitation projects were driven by donors, low ownership of home toilets, low budgetary allocation to the sanitation sector and inadequate data for planning and implementation. The study further revealed poor hygienic practices, inadequate arrangements for cleaning and maintenance, no clear policy on public toilet management, no fees charged against waste dumping and preparedness of the people to pay towards an improved programme for sanitation services.

Ogah, Alhassan, Medugu, and Mohammed (2014), examined Household Solid Waste Management Methods in Lafia L.G.A of Nasarawa State, Nigeria. The study was based on the data gathered through administration of questionnaire using systematic sampling methods; the study adopted Chi –square test and Student t-test to test the hypotheses. The result showed that 61 per cent of households dumped their solid waste at public waste depots which is the most acceptable means of waste disposal at the community level. The study also revealed that there are only three functional vehicles at the disposal of Nasarawa State Urban Development Board which is totally inadequate for a town like Lafia. The results also showed that majority of household heads in the high density area are not aware of end uses and products of solid waste. It was also discovered that there is significant variation in the socio-economic characteristics of household heads in all the three study areas, and solid waste management problem is more severe in the high density area than in the low and medium density areas.

Watson (2005) investigated the impact of 3,700 projects that were part of a widespread Federal initiative to improve sanitation infrastructure on United State. And Indian reservations which took place in 1960 found that sanitation investment substantially reduced the cost of clean water for households, leading to sharp reductions in both waterborne gastrointestinal disease and infectious respiratory disease among native American infants. The sanitation programme was quite cost-effective, in part because improvements in the overall disease environment also reduced infectious respiratory disease among nearby white infants. The results show that sanitation investment led to a sizable and cost-effective reduction in the infant mortality rate of the targeted beneficiaries.

In summary, existing literature had looked at different aspects of environmental sanitation such as (Anyasoro, 2010; Butu, Ageda, and Bichi, 2013; Yaw, 2010; Ogah, Alhassan, Medugu and Mohammed, 2014; Watson, 2005).These studies ignored or at best were silent on assessment of environmental sanitation practices among households. This is the gap in knowledge this present study intends to fill. Consequently, considering the increase in world population, particularly in Lafia Local Government Area, with their potential adverse impact on the environment; coupled with the growing concern for environmental protection as a central topic of global discourse, constitute the problem of interest to this study. This research was guided by the following research questions:

1. what are the environmental sanitation practices of households in the study area?
2. what is the impact of socio-demographic characteristics of households on the types of environmental sanitation practices of household in the study area?
3. what are the effects of location on environmental sanitation practices of households in the study area?
4. what are the environmental sanitation challenges facing the households in the study area?

**1.3 AIM AND OBJECTIVES OF THE STUDY**

The study assessed environmental sanitation practicesamong households in Lafia L.G.A of Nasarawastate, Nigeria. The aim was achieved through the set of objectives. to;

1. assess environmental sanitation practices of households in the study area.
2. examine the impact of socio demographic characteristics of households on the types of environmental ethics in the study area.
3. compare locational environmental sanitation practices of households in the study area.
4. determine the environmental sanitation challenges of households in the study area.

**1.4 NULL HYPOTHESES**

The following hypotheses were tested at P<0.05 levels of significance

H01: There is no significant relationship between socio- demographic characteristic of households and the types of environmental sanitation practices of household in the study area.

H02: There is no significant difference between location and environmental sanitation practices in the study area.

**1.5 SCOPE OF THE STUDY**

The study basically focused on environmental sanitation practices among household. The study was carried out in Lafia Local government area (L.G.A) of Nasarawa state, Nigeria. The study involved four wards (4) out of the thirteen wards in the study area, namely Chiroma, Gayam, Adogi, and Assakio. Issues covered bordered on household environmental sanitation practices, challenges to environmental sanitation, and household locational environmental sanitation practices and hygienic practices at households and communities. The study considered one year, from 2014-2015. This is the period when data for the study is available.

**1.6 JUSTIFICATION OF THE STUDY**

It is clear that household environmental sanitation in developing countries is low, thus compelling a more focused attention on household environmental sanitation. It is in response to this compelling situation that this study is being undertaken. The problem of environmental sanitation practices may be as a result of poverty, home makers environmental illiteracy and the lack of legislation and enforcement. This has resulted to ineffective environmental sanitation in many urban and rural towns in Nigeria (Ahmad, 2003).The problem of household solid wastes disposal, most especially in Nigerian cities has become one of the most intractable challenges facing the country today. Refuse and other solid wastes which form the bulk of household wastes in Nigeria, pose serious environmental problems, besides unsightly appearance and stink, they also promote vector breeding and transmission of diarrhea and other parasitic infection (Ukwe 2004).

The study would again open new research possibilities and a better understanding of facts that would allow a more appropriate course of action. It would provide inputs into environmental sanitation policy formulation in the state and country in general and the study district in particular. Enhancing household environmental sanitation will boost economic efficiency as there is a high correlation between poor sanitation and human cost due to illness. Also, the finding would add to the existing body of knowledge or database both in academic and professional fields in environmental sanitation sector.

The findings on solid waste, wastewater, and immediate surrounding management would create awareness on the dangers of improper disposal of sewage so that people would provide adequate number of sewage facilities best suited to their environment. The result of the study would be useful to the government and its agencies in discovering the importance of planning adequately for environmental sanitation facilities, equipment, personnel, reward and other materials that would encourage proper household environmental sanitation practices. The outcome of the study would present an overview of recent experiences along with relevant suggestions to policy makers and general public on improving environmental sanitation practice condition of households in the study area with the community at large.

**CHAPTER TWO: CONCEPTUAL, THEORITICAL FRAMEWORK AND LITERITURE REVEIW**

**2.1 INTRODUCTION**

This Chapter focuses on conceptual, theoretical framework and literature review. Conceptual consists of environment, Sanitation, and household. Theoretical framework included; Environmental Public Relations (EPR) theory and stakeholder theory. Literature review examines Household Centered Environmental Sanitation Approach (HCES), Community Action Planning (CAP), Strategic Sanitation Approach (SSA), Community-Led Total Sanitation (CLTS), Participatory Hygiene and Sanitation Transformation (PHAST**),** Ecological sanitation (Ecosan).

**2.2 CONCEPTUAL FRAMEWORK**

**2.2.1 Environmental Sanitation**

The WHO expert committee on environmental sanitation in 1950 defined environmental sanitation as “the control of all those factors in man’s physical environment, which exercise or may exercise a deleterious effect on his physical development, health and survival” (Dwivedi and Sharma, 2007). In particular it refers to the control of community water supplies, excreta and wastewater disposal, refuse disposal, vectors of disease, housing conditions, food supplies and handling, atmospheric conditions, and the safety of the working environment (Franceys, Pickford and Reed, 1992).

The terms hygiene and sanitation can mean different things to different people (Peal, Evans and Van der Voorden, 2010). Because of considerable awareness of community water supply needs, the problems of excreta and wastewater disposal have received less attention. In order to focus attention on these problems sanitation became used and understood by people worldwide to refer only to excreta and wastewater disposal. A WHO Study Group in 1986 formally adopted this meaning by defining sanitation as “the means of collecting and disposing of excreta and community liquid waste in a hygienic way so as not to endanger the health of individuals and the community as a whole” (Franceys *etal,* 1992).

Sanitation means the prevention of human contact with wastes, for hygienic purposes. It also means promoting health through the prevention of human contact with the hazards associated with the lack of healthy food, clean water and healthful housing, the control of vectors (living organisms that transmit diseases), and a clean environment. It focuses on management of waste produced by human activities (Environmental Health Project, 2014). There are different types of sanitation relating to particular situations, basic sanitation is used to refer to the management of human faeces at the household level (Girei and Giroh, 2011). This terminology is the indicator used to describe the target of the MDGs on sanitation (Girei and Giroh, 2011).

Environmental sanitation refers to the control of environmental factors that form links in disease transmission. This category includes solid waste management, water and wastewater treatment, industrial waste treatment and noise pollution control (Environmental Health Project, 2014). Environmental sanitation comprises disposal and treatment of human excreta, solid waste and wastewater, control of disease vectors, and provision of washing facilities for personal and domestic hygiene. It aims at improving the quality of life of the individuals and contributing to social development. It has been defined by the Water Supply and Sanitation Collaborative Council as “Interventions to reduce people’s exposure to disease by providing a clean environment in which to live, with measures to break the cycle of disease. Environmental sanitation comprises both a change in behaviour and facilities to form a hygienic environment (Mmom and Mmom, 2011).

Environmental health is broader than hygiene and sanitation; it encompasses hygiene, sanitation and many other aspects of the environment. It also involves studying the environmental factors that affect health (Environmental Health Project, 2014). The WHO in Bulgaria in 1993, defined “environmental health to comprises those aspects of human health, quality of life, that are determined by physical, chemical, biological, social and psychosocial factors in the environment. It also refers to the theory and practice of assessing, correcting, controlling and preventing those factors in the environment that can potentially affect adversely the health of the present and future generations” (Gosselin, Furgal and Ruiz, 2001).

**2.2.2 Personal Hygiene**

Hygiene is the practice of keeping one’s self and one’s surroundings clean, especially to avoid illness and the spread of infection (International Federation of Red Cross and Red Crescent Societies, 2007). The focus is mainly on personal hygiene that looks at cleanliness of the hair, body, hands, fingers, feet and clothing. Most people do not usually practice hygiene for health reasons. There are other motivations such as, a general dislike of dirt, an aesthetic preference for cleanliness, a desire to protect their children and themselves from dangerous external influences, or, (most commonly of all), considerations of status, self-respect and social standing (International Federation of Red Cross and Red Crescent Societies, 2007). Though many hygiene practices can assist in preventing disease, the one with the strongest evidence for effectiveness and cost-effectiveness in developing countries is hand washing with soap (Ensink, 2007).

**2.2.3 Wastewater Management**

Liquid waste includes human waste, runoff (storm water or flood water), sullage, industrial wastewater and other forms of wastewater from different sources. The mixture of human waste with wastewater is known as sewage. Runoff is simply rainwater that collects on the ground and runs off into channels, ditches and rivers (Environmental Health Project, 2014). Sullage is domestic waste other than that which comes from the toilet. It results from food preparation, personal washing, washing of cooking and eating utensils and clothes (Franceys *etal*, 1992). Management of liquid waste focuses on finding a way to dispose of the waste in a way that is safe for human and the environment (Environmental Health Project, 2014).

Domestic wastewater can be divided into two categories: sewage and sullage. Sewage includes human waste (i.e. faeces and urine), as well as wastewater from various sources. Sullage is the wastewater that arises from domestic activities such as washing in bathrooms and kitchens, including water from food preparation and dishwashing; it does not contain human excreta (Environmental Health Project, 2014).

**2.2.4 Solid Waste Management**

According to Tchobanoglous, Theisen and Vigil (1993), solid waste is all the waste arising from human and animal activities that are normally solid and that are discarded as useless or unwanted. To keep the household and village environment clean and to reduce health risks, solid waste (refuse) should be disposed of properly. Untreated refuse degrades both the quality of the environment and the quality of life in the community. It also provides a breeding ground for disease vectors, such as mosquitoes, flies and rats. If waste is not properly disposed of, animals can bring it close to the home and children can come into contact with disease vectors and pathogens. To be effective, solid waste disposal programmes require action at both household and community levels - if only a few households dispose of waste properly, the village environment may remain dirty and contaminated (Howard, 2002).

**2.2.5** **Environment**

The term Environment to the layman can be defined as the location in place where he is at any given point in time. It is the surroundings, the condition that you live or work in and the way that they influence how you feel or how effectively you work (Ikhide, 2007). However, a wider definition of the environment is, ‘land including without limitation any building structure or receptacle in an over or under it, water including without limitation to surface, coastal and ground waters, and air including without limitation the atmospheres within any natural or man-made structure or inacceptable above or below the ground’. It can be seen from a narrower perspective as all or any of the following media; land excluding any building structure or receptacle, water excluding the high seas and coastal areas and air excluding the atmosphere within any natural or man-made structure or receptacle (Andrew and Tim, 2001).

Generally, environment can be seen as our surroundings especially material and spiritual influences which affect the growth, development and existence of living being. The United Nation Stockholm Conference on Human Development asserts man is both creature and moulders of his environment, which gives him physical sustenance and affords him the opportunity for intellectual, moral, social and spiritual growth. Moreover, for the purpose of environmental sanitation, the question of man and his surroundings do not play the definition given above. Environment has a lot more to do than with the conditions that we live and work in. One may not fulfill all the above before he can enjoy his environment. At this juncture the Cambridge Dictionary further defines environment as the quality of air, water and land in or on which people, animals and plants live. The maintenance of nature’s delicate balance is the central focus of environmental protection. Man therefore needs to protect his immediate environment, territorial waters, sea, air and forest (Amokaye, 2004). To this extent, the Black Law Dictionary defines environment as the totality of physical, economic, chemical, cultural, aesthetic, and social circumstances and factors which surround and affect the desirability and value of property and which also affect the quality of people’s lives.

**2.2.6 Household**

Household includes all the persons who occupy a housing unit. A housing unit is a house, an apartment, a mobile home, a group of rooms or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters, Separate living quarters are those in which the occupants live and eat separately from any other persons in the building and which have direct access from the outside of the building or through a common hall. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements (Ukwe, 2004).

A single dwelling will be considered to contain multiple households if either meals or living space are not shared. The household is the basic unit of analysis in many social, microeconomics and government models, and is important to the field of economics and inheritance (O’Sullivan and Steven, 2003). Household models will include the family, varieties of blended families, share housing, group homes, Boarding houses, house in multiple occupancy and single room occupancy.

**2.3 THEORETICAL FRAMEWORK**

**2.3.1 Environmental Public Relation Theory (EPR)**

Environmental Public Relations Theory (EPR) developed from the mainstream EPR literature as a theory that recognizes and accords priority to the needs of the environment and the needs of the stakeholders in the quest to sustain and protect the environment (Nwosu, 2004). Environmental Public Relations (EPR) is a holistic management process and a specialised area of public relations management that is responsible for identifying and anticipating (forecasting) the environmental needs, interest, policies, public activities, issues and programmes of any corporate entity (for example Company, Country or State Parastatals and household), and implementing sustainable programme of public relations actions and communication that will reconcile them with the environmental needs, interest, expectation, demands, activities, problems and policies of the stakeholders of that corporate entity, policies and actions as well as the perception and acceptance of that corporate entity, its products, services, policies and activities as environmentally friendly by all domestic and global stakeholders of corporate entity and the environment (Nwosu, 2004).

The Futurity element of the sustainability concept involves the adoption, in all we do as waste generators and environmental sanitation management authorities, long term perspective which gives equal consideration to the needs of the future generations and our own needs, both at the individual and corporate levels especially with respect to environmental protection or preservation.

**2.3.2 Stakeholder Theory**

The equity element calls for fairness in all we do as stakeholders to waste management and sanitation projects. A stakeholder is described as that person or interests that have a stake, something to gain or lose as a result of its activities (Clarkson, 1998).

The stakeholder maps of sanitation or Waste Management projects basically include community members, the coordinators and managers of the environment or sanitation projects (Achor, 2013). Stakeholder management involves taking the interests and concern of these various groups and individuals into account in arriving at a management decision, so that they are all satisfied at least to some extent, or at least that the most important stakeholders with regard to any given issue are satisfied. The stakeholder approach is adopted here because the managers or coordinators of waste and environmental sanitation projects must serve and coordinate the interest of its various stakeholders (particularly the household members), and it is their moral obligation to strike an appropriate balance among stakeholder interest in directing the activities of the waste and sanitation or environmental management agencies or authorities.

Most definitions of stakeholder theory assume that stakeholders are isolatable, individual entities that are clearly identified by management, and that their interest can be taken into account in the decision making process. This postulation relates to (PHAST) participatory decision model (Astrid, Tukahmal, Peter, Osterveal, and Author, 2012) and in waste management, the interest of the various community social structures that makes up the community stakeholders must be considered in the decision making process. Each stakeholder has an identifiable interest that must be taken into account by the Waste and Sanitation or environmental managers in arriving at a responsible and effective decision. This assumption stems from a philosophical position of atomic individualism that finds its origins in the scientific revolution that has characterised modern societies, and is based on the view that the individual is the basic building block of a society or a community, with society no more than the sum of individuals of which it is comprised (Buchholz and Rosenthal, 2005). Beside this atomic individualism perspective, the stakeholder theory has been advanced and justified in the management literature on the basis of its descriptive accuracy, instrumental power, and normative validity (Donaldson, 1995).

The normative, descriptive, and instrumentality aspects of stakeholder theory are set forth by Donaldson and Preston’s (1995) convergent stakeholder theory. Their principal proposition is that firms that look after the interest of key stakeholders and behave in a morally defensible fashion will, all things being equal, achieve greater success in the market place than those that do not. The convergent stakeholder theory assumes that certain outcomes will result if certain behaviours are adopted. This behaviour change is what participatory Hygiene and Sanitation Transformation (PHAST) approach is designed to promote among the various stakeholders in waste and environmental sanitation projects (Astrid, Tukahmal, Peter, Osterveal, and Author, 2012).

**2.4 LITERATURE REVIEW**

**2.4.1Case Studies on Environmental Sanitation**

A survey conducted by Mohammed (2011), on assessing environmental sanitation in urban setting of Dukem town, Ethiopia. The findings of the study basically indicated that there were good domestic environmental sanitation conditions in the surveyed households. It also emerged that the studied residents of the town were deprived from full range of access to basic environmental sanitation services, facilities and interventions in which the water, basic sanitation, waste management and personal hygiene practices of the households falls short of the required stage. The study also shows that, large proportion of households had improved private toilets; however, the majority of the facilities were traditional type of pit latrine. The large proportion of households had poorly managed household solid and liquid wastes disposal methods.

Thuita (2012) investigated the perceptions, beliefs and practices of Somali women in Kenya with regard to sanitation and the barriers they experienced in their efforts to address their needs. The study used a feminist approach that was informed by narrative methodologies that aimed to create spaces for Somali women’s voices. Findings revealed that women need privacy, safety, convenience in sanitation, and support for managing Female Genital Mutilation and child birth processes. They however experienced barriers that were related to the structures of the society which were gendered and gave men power control of decisions.

Pankaj and Sharma (2007) conducted a study on environmental sanitation, sanitary habits and personal hygiene among the Baigas of Samnapur Block of Dindori District, of Madhya Pradesh, India. They used a total of 100 households comprising of 494 persons have been studied for this purpose on a random sampling basis, by using pre tested, structured schedules, through semi-participant method. The result of study indicates that environmental sanitation through inhabitants is of an average degree, but not very much satisfactory from the hygiene point of view. The reason for this is unawareness regarding the hygienic conditions and also some of the traditional beliefs and values, or superstitions. The natural environment is quite good, but practices related to sanitation, sanitary habits and personal hygiene need awareness, through various schemes by the government and non-government organizations.

Study by Tinuola and Owolabi (2007), used data on air, water, and environmental pollution from various government’s agencies and parastatals while studying environmental Pollution in Ekiti State. They reviewed the utilization of various water dams, industrial wastes and waste from household consumables. It was found that environmental pollution increases with urbanization with highest percentage in Ado-Ekiti, the state capital, posing possible health hazards to the residents. Indiscriminate dumping of household solid wastes on streets, rivers and drainages contributes in no small measure to drainage blockage, flooded road and the spread of offensive odours and diseases.

Research finding on relationship of some socio-economic factors and house sanitation in Ado-Ekiti, Nigeria Using simple bar chat and Chi-Square, reveals that though there seems to be variations among various socio-economic classes in relation to household’s sanitation technique, the relationship is found not to be statistically significant. It is therefore concluded that the general attitude of residents of Ado-Ekiti towards household sanitation and waste disposal is indifferent. The result also shows that more people use traditional pit latrines and open field system of toilet; more people have no time to clean their toilet regularly. In spite of government efforts in providing dust bin, people still dump refuse in the gutter (Ige, and Adetunji, 2014).

Similarly Uwadiegwu and Chukwu (2013), conducted a study on strategies for effective urban solid waste management in Enugu state, Nigeria, 310 households were selected randomly for the study. Principal Components Analysis (PCA) version of Factor Analysis was used to analyze the responses of respondents. The PCA was used to reduce the 27 considered management options into 7 composite strategies which should be adopted for effective urban solid waste management. They are citizen mobilization and environmental education, strengthening of public agencies, responsible government, logistics and infrastructural improvement, legislation, appropriate technologies, monitoring and surveillance. They study recommended that all segments of the society must team up with public agency to find a panacea to urban solid waste management.

From the review in the forgoing paragraphs (Uwadiegwu and Chukwu, 2013; Ige, and Adetunji, 2014; Tinuola and Owolabi, 2007; Mohammed, 2011; Pankaj and Sharma, 2007; Catherine, 2012) it is quite clear that a lot of studies on environmental sanitation have been carried out. This present research is a continuing assessment to determine the extent of the effects of environmental ethics on environmental sanitation among households in Lafia LGA of Nasarawa State, Nigeria. In addition to the lit presented specific approaches were studied and reported on similar focus of the study. The proceeding section are highlighted

**2.4.2 Approaches to Environmental Sanitation**

2.4.2.1*The Strategic Sanitation Approach (SSA)*

SSA was the first attempt to introduce more responsive and less expert drivenframe works to environmental sanitation planning. SSA was developed by the UNDP World Bank Water and Sanitation Programme in the 1980s and documented in Wright’s (1997) review. The main underlying principle of SSA is that, its demands are responsive and incentive driven. This requires implementing agencies to make a greater effort in assessing what potential users want and can afford. Only then sanitation systems and support structures can be designed such that are best suited to their needs. (SuSan, 2008).

Key concepts of the strategic planning process are the twin principles of demand and the attention paid to incentives. This has raised the debate on appropriateness of limiting demand to economic terms only, it is the first sectorial approach that specifically addresses the issue of household demand and what people actually want and are willing to pay for (SuSan, 2008).

2.4.2.2 *Community Action Planning (CAP)*

Community Action Planning (CAP) is an interdisciplinary, collaborative, and community based planning technique. It facilitates participation in the creation and management of an entire community built environment including its sanitation facilities. The technique has evolved from practical experience in many parts of the world. It is part of an emerging group of community planning or community design approaches which make it easier for people to participate in the creation and management of their built environment. The underlying philosophy of CAP is interdisciplinary, collaborative, and community based. The assumption is that better environments can be created if local communities take the driving seat and work closely and directly with a range of specialists (WSSCC, 2010).

The main output of Community Action Planning is a development plan which includes a list of prioritised problems, strategies and options for dealing with the problems, and a rudimentary work programme describing who, when and what is to be done. Integral to the approach is the shared relation between the professional technical inputs and the community. CAP has been applied since 1988 in Sri Lanka, Bangladesh, Chile, Peru, Kenya, South Africa and Poland (Hamdi and Goethert, 1997).

2.4.2.3*Community Led Total Sanitation (CLTS)*

CLTS was initiated in Bangladesh in 1999as an innovative methodology for eliminating open defecation (Kar, 2005). The basic thrust of CLTS is to mobilise communities to change their behaviours and raise awareness of disease transmission routes. CLTS uses community development principles and a participatory approach to empower local communities to stop open defecation and promote the building and use of latrines through the creation of a sense of shame within the community. This in turn then triggers collective action to improve the sanitation situation.

The method is widely regarded as successful and has been applied across many countries in Asia and Africa. CLTS has been applied since the year 2000 in over 40 countries in Asia and Africa. In recent years, there are also innovative attempts to test CLTS in an urban context, albeit limited to informal settlement areas that have very high incidence of open defecation. Recent evidence from national CLTS programmes in rural Karnataka in India question the way the method is being replicated in some areas (Chatterjee, 2011). It is argued that the move from open defecation to improved sanitation relies on community led coercion using humiliation, fear and sensationalist scare tactics rather than democratic grass roots initiatives.

2.4.2.4*The Household Centered Environmental Sanitation Approach (HCES)*

The Household-Centered Environmental Sanitation (HCES) has been developed by experts at the Swiss Federal Institute of Aquatic Science and Technology in response to the Bellagio Principles (WSSCC, 2010; Eawag and UN Habita, 2000). The Bellagio Principles were agreed upon in the year 2000 by sector experts and define that decision making must be informed by diverse stakeholders making strategic choices, that the export of waste should be minimised, that sewage and waste should be considered resources, and that sanitation should equally pursue human dignity, human health, and the protection of the environment.

The household centered approach (HCES) is one of several planning and programming frameworks that have been developed in the past decades to improve planning and programming for delivery of environmental sanitation services. It provides a comprehensive analysis of urban environmental sanitation needs and a systematic approach to plan improvements. HCES is specifically geared towards unplanned urban and peri-urban areas. It is an area based planning approach which targets un-served or under-served urban communities. At an early stage of conceptualisation, it was realised that the specific needs of these communities cannot be effectively met by starting from the perspective of the traditional city master plan. The approach was thus developed in such a way as to concentrate on those domains closest to the residents, the household and the neighborhood. Thus, the planning approach adopted by HCES as the name implies aims to solve problems where they occur rather than exporting them downstream (Eawag, 2005).

The aim is to link expression of needs at the community level with those resources available locally and those that require additional inputs from external agencies. Like other communicative planning frameworks it provides a flexible approach for working with disparate and diverse communities to reach agreement between them and formulate a common plan.

2.4.2.5 *Participatory Hygiene and Sanitation Transformation (PHAST)*

PHAST is an innovative approach to promoting hygiene, sanitation and community management of water and sanitation facilities. It builds on people’s innate ability to address and resolve their own problems. It aims to empower communities to manage their water and to control sanitation related diseases, and it does so by promoting health awareness and understanding which, in turn, lead to environmental and behavioural improvement (WHO, 2000)

2.4.2.6 *Ecological Sanitation (Ecosan)*

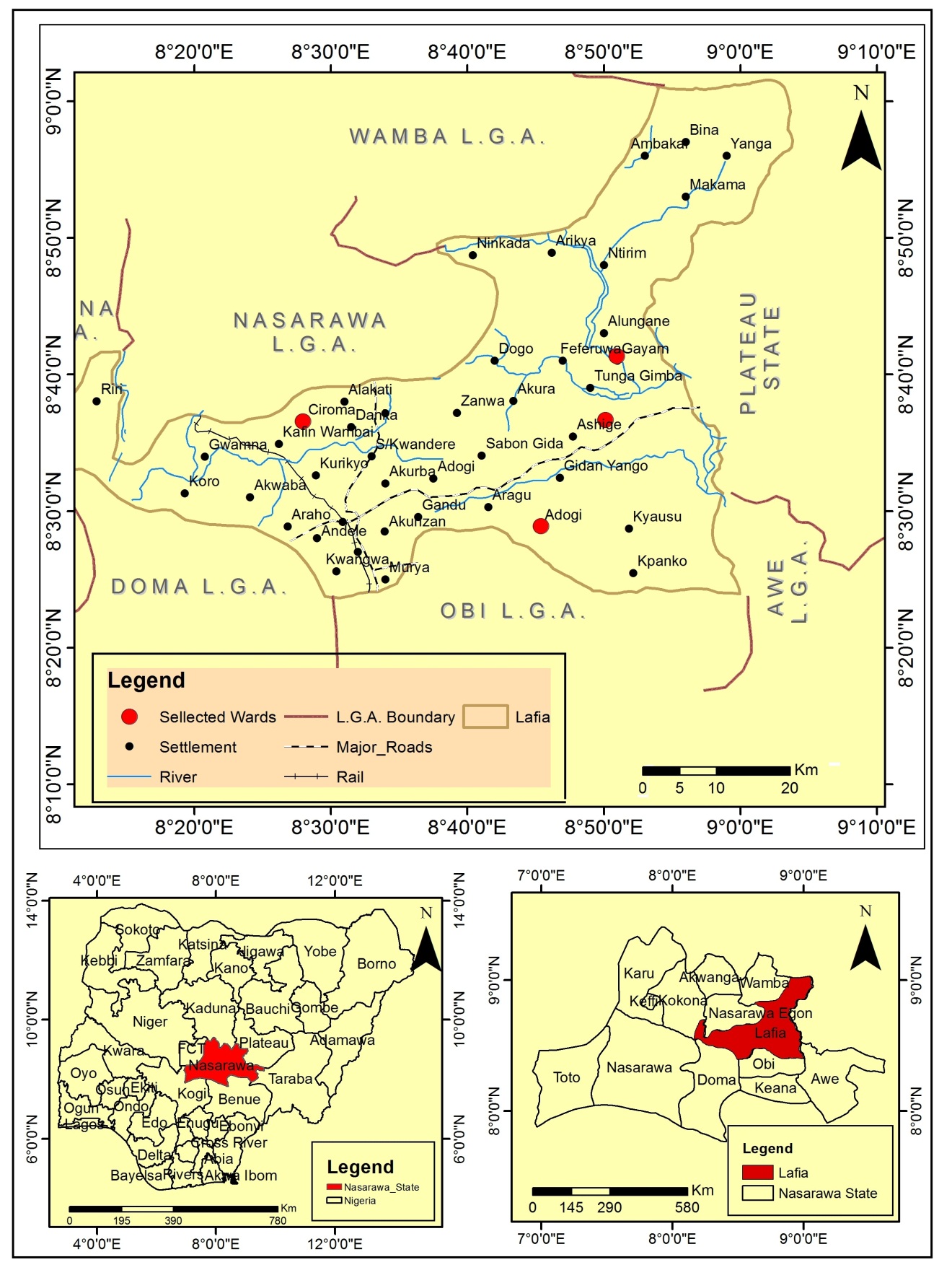
Ecological Sanitation (ecosan) is not a specific technology, but rather a holistic sanitary concept. It is based on three fundamental principles: preventing pollution rather than controlling it after the fact (the opposite of end-of-pipe systems), sanitizing of urine and feaces and using resulting safe products for agricultural purposes (Winbland and Simpson, 2004). Ideally, ecosan systems enable a complete recovery of nutrients in wastewater and their reuse in agriculture. This approach should be seen as a cycle, a closed-loop system that is sustainable. Ecosan treats human excreta as resources, which are stored, processed on site (further processed offsite if required) and the nutrients contained in excreta are recycled by using them in agriculture (Winbland and Simpson, 2004). An essential part of ecosan is to contain and sanitize human excreta prior to their recovery and reuse. The basic differences between the traditional conventional sanitary approach and ecological sanitation may be seen on the following, the principle of ecological sanitation is aiming at: providing affordable, safe and appropriate sanitary systems, reducing the health risks related to sanitation, contaminated water and waste, improving the quality of surface and groundwater, improving soil fertility, and optimizing the management of nutrients and water resources (Panesar and Warner, 2006).

**CHAPTER THREE: STUDY AREA AND METHODOLOGY**

**3.1STUDY AREA**

3.1.1 **Location**

The study area is located between latitudes 808ꞌ - 907ꞌ North of the Equator and Longitude 808ꞌ- 907ꞌ East of Greenwich meridian. Lafia Local Government Area is one of the thirteen Local Government that make up Nasarawa State. It shares boundary with Plateau State in the East, Wamba, Nasarawa-Eggon and Akwanga Local Government Area in the North and North-Eastern part and its Southern part is bounded with Obi and Keana Local Government Area, and towards the South-Eastern part. It’s also bounded with Awe Local Government Area toward the North and North-Eastern part and shares boundary with Doma Local Government Area to the South-Western (Nasarawa State Government, 2001) (NSG, 2001). Figure 3.1 shows map of Lafia LGA indicating sampled wards.



**Figure 3.1: Lafial LGA showing Sampled Wards.**

**Source: Adapted from Administrative Map of Nasarawa State**

**3.1.2Climate**

The climate of Lafia local government area is largely controlled by two major air masses, the tropical maritime air mass and tropical continental air mass. Climate of Lafia local government area is characterised by tropical sub-humid climate with two distinct seasons, the wet seasons lasted from May to October. The dry season is experienced between November to April. Annual rainfall figures range from 1100mm to about 2000mm (Nasarawa state government, 2001).About ninety percent of the rain falls between May and September, the wettest months being July and August. The rain comes with thunder storms of high intensity, particularly at the beginning and towards the end of the rainy season. Temperature is generally high during the day particularly between the months of March and April. The mean monthly temperature in Lafia ranges between 200 and 340, while the hottest months being March and April and coolest months being December and January (Nasarawa state government, 2001).

**3.1.3** **Drainage, Soil, and Vegetation**

The drainage system in Lafia local government area comprises of three major rivers. These are the Mada hills river, which flows from east to west direction given rise to river Mada Ahomo and few seasonal ones that drained to the river Benue. The second river is Ankwa Upland River which flows from south to east direction. It forms watershed for two rivers which are Akura and Dup River and other smaller ones like Arikya, Tam, Feferuwa, Akwin, Biu-Graza and Asofi. The third drainage is that of Guma watershed which flows North-South direction (Nasarawa state government, 2001). The study area has numerous streams, which get dried during the long dry seasons and as such cannot be harnessed for piped systems.

The major soil unit of Lafia local government area belongs to the category of oxisol or tropical ferruginous soils. The soils are derived mainly from the basement and old sedimentary rocks. Laterite crust occurs in extensive areas on the plains, while hydromorphic soil occurs along the flood plain of the major areas (Nasarawa state government, 2001). The large deposits of sand and laterite in the study area reduce the rate of money spend in constructing pit latrine, soak away and septic tank which may discourage open defecation.

The vegetation of Lafia local government area falls within the Southern guinea savanna zone. However, clearance of vegetation for farming, fuel wood extraction for domestic and cottage industrial uses and saw milling has led to the development of re-growth vegetation at various levels of development. Dense forests are few and far apart.Such forests are found in lowland areas, particularly where population pressure is less on the land. Gallery and forest is common along major stream and pronounced depressions. The vegetation on the hilly part of Lafia local government area is composed mainly of grasses and isolated trees. Trees of economic importance or value including locust beans, shear butter, mango, citrus and Banana are scattered across Lafia LGA, particularly lowland areas and southern part of Lafia LGA (Nasarawa state government, 2001).Various types of wood are available for the construction of traditional toilet facilities.

**3.1.4 Demographic**

Lafia Local Government Area based on the 2006 national population census exercise recorded a population figure of 330712 with 169398 male and 161314 female (NPC, 2009). Lafia LGA has a land area of 2797.53km2 with a population density of 130 persons per km2. With this figure, it is the most populated Local Government Area in the whole of Nasarawa State.

**3.1.5** **Socio-Economic Activities**

Historically, Lafia LGA constitutes part of the middle belt zone of Nigeria which is known to have been depleted of its human population during the period of slave trade, although the exact degree of the impact of this historical event is not known (Nasarawa state government, 2001). Majority of the rural people in Lafia local government area are engaged in agricultural activities. Because of the importance of farming, abundant food crops, agricultural raw materials are available in large quantities. Examples are yam, cassava, groundnut, cereals and so on. Other forms of commercial activities exist in the areas which promote more of business transaction within Lafia Local Government Area. These activities are the banking sector, commercial motorcycles and hawking of some goods and services, (Nasarawa state government, 2001). A lot of wastes are generated by hawkers; also banking sectors generate solid waste in the process of their activities.

**3.3 METHODOLOGY**

**3.3.1** **Reconnaissance Survey**

A reconnaissance survey of the study area was carried out in order to be familiar and conversant with the nature of the study area. The first point of call was the head office of Nasarawa state Urban Development Board (NUDB), Sanitation Unit Lafia. The researcher had an interaction with the director of sanitation unit, NUDB. The director provided background information on environmental sanitation in the study area. During the reconnaissance survey the researcher observed that, the residents of the study area left their immediate surrounding filthy. Also, majority of them disposed their waste in an undesignated place. The researcher observed that, wastewater were not properly disposed of during the period of reconnaissance survey.

**3.3.2** **Research Design**

A descriptive, contextual cross-sectional survey was used to conduct this study on environmental sanitation practice among household in Lafia LGA of Nasarawa State, Nigeria. A descriptive study provides more information about characteristics within a particular field of study. It purpose is to provide a picture of situation as the naturally happen.

**3.3.3** **Source of Data**

3.3.3.1 *Primary Source of Data*

The primary source of data for the study was generated from administration of questionnaire and a checklist that guided field observations.

3.3.3.2 *Secondary Source of Data*

Population figures and total number of households of the study area were obtained from NPC and NBS respectively. Other relevant information for literature review was sourced from published and unpublished text, articles, and Internet.

**3.3.4Types of Data**

The types of data that were used in this research included socio-demographic characteristic (Occupation, educational qualification and income of households, Sex, age, marital status and size of household), challenges of environmental sanitation (Economic, lack of space, and weak institutional framework), environmental sanitation practice (Distance of latrine from house, method, and stagnant water near dwelling houses), method of sanitation .These data helped to examine the impact of socio demographic characteristics of households on types of environmental sanitation practices; it also helped to examine environmental sanitation practices and its challenges in the study area.

**3.3.5Sample Size and Sampling Techniques**

Lafia Local Government Area has a total population of 330,712 (Federal republic of Nigeria, 2007). The local Government Area is made up of thirteen (13) electoral wards. Four electoral wards were selected for this study. To determine the sample size of this research, Krejcie and Morgan’s (1970) method of determining sample size was adopted, which states that, for an area with a population between 75, 00-999,999, the sample size to be used is 385. Since the projected population of the study area, which is 485,668 falls within the range, the sample size of 385 was adopted. The 1991 population figures of the communities that make up the sampled wards was adopted and projected to 2014 at 3.1% population growth rate of Nasarawa state (National population commission, 2009). This is because the 2006 population figure was not breakdown according to ward level.

**Table 3.1: Population of the Study Area**

**S/N Wards 1991 Population Projected Population 1991-2014**

1 Ciroma 32,586 67,762

2 Gayam 27,701 55,904

3 Zanwa 26508 53,496

4 Makama 25,070 50,594

5 Assakio 20,791 41,958

6 Adogi 16,995 34,298

7 AgyaragunTofa 15, 488 31,256

8 Akurba 14,442 29,145

9 Shabu/ kwandare 14,119 28,493

10 Arikya 13,928 28,108

11 KaffiWambai/ BAD 11,503 23,214

12 Wakwa 11,058 22,255

13 Ashegye 10,497 21,185

**Total** **240,656 485,668**

**Nasarawa State Government, 2001: Projected from 1991 Population Census**

**Table 3.2: Sampled Wards by Sample Size**

**S/N WardsProjected Population 2014 No of Households Percentages No Sample Size**

**1** Ciroma 67, 762 13, 031 33.8 130

2 Gayam 55, 904 10, 750 27.9 108

3 Assakio 41, 958 8, 068 20.9 81

4 Adogi 34, 298 6, 595 17.1 66

**Total199, 922 38, 444 100 385**

**Source: National Bureau of Statistics (NBS, 2011)**

The study cut across four (4) out of the thirteen electoral wards in Lafia Local Government Area of Nasarawa state, two wards from rural wards and two wards from urban wards with the highest population were selected. This is to ensure geographical spread. The target respondents were the household heads in each of the wards in the study area. Questionnaire were distributed proportionate to the population size. A total of three hundred and eighty five (385) copies of questionnaire were administered and each electoral ward was served with questionnaire depending on their population. The size of the sample population of each ward was determined by the formula

Where n = population of Wards

N= total population of Wards

Q= total no. of questionnaire= 385

**3.3.6** **Validity and Reliability Test of Instrument**

3.3.6.1*Validation of Instrument*

The questionnaire was validated as follows: The researcher submitted the instrument along with the topic of the study, the statement of the problem, purpose of the study, the research questions and the hypotheses to the team of supervisors for necessary validation and corrections. They team of supervisors critically examined the instrument for relevance of content and effectiveness to the problem under study. Their corrections which include face and content validity were effected. The instrument was finally passed to the researcher’s major supervisor who after examining it made some constructive contributions and approved it as having met the requirements as standard instrument for the study.

3.3.6.1*Reliability of Instrument*

Various measures were undertaken to ensure the reliability of the data collection instrument and to enhance the accuracy of measurements, namely;

I Standardised data collection instrument was used. The data collection tool was pre-tested by the researcher and the necessary correction was made after the pre-test among household heads that were not members of the study population and were drawn from Jos North Local Government Area in Plateau State.

II Completed data collection instruments were daily checked during data collection process for completeness by the researcher.

**3.3.7 Procedure for Data Collection**

Interview guided by environmental sanitation questionnaire (ESQ) developed by the researcher and field observation of the study area guided by environmental sanitation checklist (ESCL) developed by the researcher were the instrument for data collection. They instrument was adopted in view of the nature of environmental sanitation practice and ensure that respondents answered correctly. In each ward systematic random sampling techniques was adopted in administering questionnaire to the respondents based on the households to ensure spatial coverage. Accordingly, interval of every 30thhouse in urban wards and interval of every 20th house in rural wards was selected and the household head was requested to answer the questionnaire in each ward.

Three hundred and eighty five (385) copies of questionnaire were administered to the households head. Out of 385 distributed questionnaire only 349 questionnaire were filled and returned making a returned rate of 91 percent, while 36 copies of the questionnaire were not returned. This is because after administering the questionnaire some of the people could not be located and some traveled.

**3.3.8 Methods of Data Analysis**

Objective (i): to assess environmental sanitation practices of households in the study area. This objective was achieved using tables, percentages, to summarise the result obtained. Statistical package of social science (SPSS) version 20 was used to compute the result.

Objective (ii): to examine the impact of socio demographic characteristics of households on types of environmental sanitation practice in the study area.

This objective was achieved using tables, and percentages. Statistical package for social science (SPSS) version 20 was used to compute linear regression analysis using partial method in order to examine the relationship. The first hypothesis was tested at 95% level of significant. On the assumption, there is no significant relationship between socio- demographic characteristic of households and types of environmental sanitation practice in the study area. The factors were arrived after a rigorous examination of the research objectives and the peculiarity of the environment under investigation. For the linear regression analysis, the factors hypothesized as level of environmental ethics indicators were X1---X6

The explicit Linear equation form is expressed thus: Y = a + bx---------------------- (i)Where Y = Dependent variable (Types of environmental sanitation practice)

(ii) Where X = Independent variable (Socio –demographic characteristic of respondents)

b = Slope a = Intercept at Y

The explicit form is expressed thus:

Y= Level of environmental ethics

X1= % of households income level without functional toilet.

X2 = % of households educational status that dispose waste water freely on ground

X3 = % of households age without dustbin in their dwelling house

X4 = % of households occupation that dispose waste into drainage and gutter

X5 = % of households size with stagnant water near their dwelling house

X6 = % of households marital status that dispose young children faeces outside house premises

Objective (iii): to compare locational environmental sanitation practices of households in the study area.

This objective was achieved using tables and percentages to summarise the result obtained. Statistical package for social science (SPSS) version 20 was used to compute paired sampled t-test using partial method in order to compare the difference. The second hypothesis was tested at 95% level of significant, on the assumption, there is no significant difference between location and environmental sanitation practices in the study area.

t =

Where x and y are the means of the two sample line x minus line y is the absolute values of the difference between two means.

While nx and ny are the sample size of x and y (Rural and Urban Wards) respectively.

Objective (iv): to determine the environmental sanitation challenges facing the households in the study area. This objective was achieved using tables, percentages. Statistical package for social science (SPSS) version 20 was used to compute the result.

**CHAPTER FOUR: RESULTS AND DISCUSSION**

**4.1 INTRODUCTION**

This Chapter presents and discussed results based on the data collected. It also focuses on the testing of hypothesis through t-test, and linear regression analysis. The presentation is done in subsection including, household environmental sanitation practices, relationship between socio- demographic characteristics of household and types of environmental sanitation practice, locational environmental sanitation differences, challenges of environmental sanitation and several others.

Table 4.1 Environmental Sanitation Practices in the Study Area

|  |  |
| --- | --- |
| **Rural Ward** | **Urban Ward** |
| Wastewater disposal method (Run freely on ground, Watering Vegetable, Discharged into soak away) | Wastewater disposal method (Run freely on ground, watering Vegetable and Discharge into soak away) |
| Solid waste disposal practice (Open dumping, Refuse pit, Burning, Into drainage, gutter, and bush) | Solid waste disposal practice (Open dumping, Refuse pit, Into drainage, gutter, and bush) |
|  |  |
| Solid waste disposal at home (dustbin) | Solid waste disposal at home (dustbin) |

**Source: Field Survey, 2015**

**4.2HOUSEHOLDS ENVIRONMENTAL SANITATION PRACTICES**

**4.2.1Availability of Dustbin among Respondents**

Availability of dustbin at home is one of the methods of environmental sanitation practices of households.

Table 4.2Availability of Dustbin

**Availability of dustbin Rural Total Urban Total**

Adogi Assakio Chiroma Gayam

Frq % Frq % Frq % Frq % Frq % Frq %

Yes 20 14.8 26 19.2 46 34 52 24.2 46 21.4 98 45.6

No 42 31.1 47 34.8 49 65.9 64 29.9 52 24.2 116 54.1

**Total 62 45.9 73 54 135 100 116 54.1 98 45.6 214 100**

**Source: Field Survey, 2015**

Table 4.2 shows that majority (65.9%) of the respondents in the rural ward don’t have dustbin, they disposed their solid waste indiscriminately at home level. This showed that dumping of refuse into dustbin is more practiced in urban ward than rural ward.

With regard to cover for dustbins the researcher assessed by observation about 37.8% of the households cover solid waste container which is proper and sixty two percent of the households did not cover solid waste container and left it unprotected which might expose household members to the risk of waste contamination. Ideally, each household is supposed to have a refuse container with cover/lid to store wastes and regularly dispose at government authorised site but majority of the household did not have refuse container.

Finding from this study is in contrast with study conducted in Ijebu Ode Southwest Nigeria on a similar study by Banjo, Adebambo and Dairo (2009), that the large percentage (58%) of the waste storing container was sack. However, about three-fifth percent of the households did not cover their solid waste container and left unprotected which might expose household members to the risk of waste contamination.

**4.2.2** **Methods of Disposing Wastewater among Households**

Proper disposal of household wastewater is an important environmental health intervention for reducing disease, while poorly drained wastewater forms stagnant pools and provide breeding sites for disease vectors. Because of this, some diseases are more common in the wet season than the dry season.

Table 4.3Methods of Disposing Wastewater among Households

**Method Rural Total Urban Total**

Adogi Assakio Chirom Gayam

Frq % Frq % Frq % Frq % Frq % Frq %

Run freely on ground36 26.8 48 35.5 84 62.3 81 37.8 63 29.4 144 67.2

Watering Vegetable 15 11.1 9 6.6 24 17.7 - - 2 0.93 2 0.93

Discharged into soak away 11 8.1 16 11.8 27 19.9 35 16.3 33 15.4 68 31.7

**Total 62 46 73 53.9 135 100 116 54.1 98 45.7 214 100**

**Source: Field Survey, 2015**

Table 4.3, indicated that majority (62.3% of households in rural ward used unsafe wastewater disposal methods (thrown freely on ground) and did not have appropriate wastewater disposal systems. The households discharged wastewater into street surface or empty space outside premises, discharged within premises. Inadequate drainage and consequent accumulation of water in the vicinity of the homes has been the root cause of vector breeding and transmission of vector-borne diseases. About thirty one percent of the respondents in the urban ward discharged wastewater into soak away and only nineteen percent of the respondents in the rural ward discharged wastewater into soak away. Majority (17.7%) of the respondents in rural ward used wastewater for watering vegetable. Allowing wastewater to run freely on the ground or watering vegetable is unethical to the environment and human health. This may cause health related disease associated with improper sanitation practices like cholera. With this, the only method that is proper for disposing wastewater is to dispose wastewater into soak away or channels it into drainage system.

This finding agreed with Yaw (2010), on a similar study on enhancing sanitation services delivery in Ejura-Sekye Dumase District, of Ghana. The study revealed that most of households dispose wastewater in their premises, whilst others outside their premises. The latter wanted to avoid unpleasant conditions within their premises. The practice of reuse of wastewater is either limited or not present at all.

The finding also agreed with Beumer, Bloomfield, Exner, Fara, Scott, and Nath (2002) on a similar study in Ghana,that (75.1%) of the majority of households used unsafe wastewater disposal methods and did not have appropriate type of wastewater disposal systems, about two-fifth (39.1%) of households had discharged wastewater into street surface, over one-third (32.7%) of households had discharged within premises and (3.3%) households had used open ditch.

**4.2.3** **Methods of Disposing Solid Waste**

Solid waste disposal takes variety of forms, some can be considered environmentally friendly or otherwise. Proper management of solid waste is critical to the health and well-being of residents and communities (Nabegu 2010). The overall objective of solid waste management is to minimise the adverse environmental effects caused by indiscriminate disposal of solid wastes (Kaseva and Mbuligwe 2003).

Table 4.4Methods of Disposing Solid Waste

**Rural Total Urban Total**

**Adogi Assakio Chirom Gayam**

**Method** Frq % Frq % Frq % Frq % Frq % Frq %

Open dumping 5 3.7 9 6.6 14 10.3 68 31.7 57 26.6 125 58.3

Refuse pit 7 5.1 5 3.7 12 8.8 6 2.8 3 1.4 9 4.2

Burning 12 8.8 15 11.1 27 19.9 2 0.98 7 3.2 9 4.1

Drainage& bush 38 28.1 44 32.5 82 60.6 40 18.6 31 14.4 71 33

**Total 62 45.7 73 53.9 135 100 116 54 98 45.6 214 100**

**Source: Field Survey, 2015**

Table 4.4 shows that majority of the respondents (60.6%) in the rural ward usually disposed domestic waste into drainage channels, gutter and bushes, only 33% of household in the urban ward also disposing solid waste into drainage and bush. And majority (58.3%) of the respondents in the urban ward disposed solid waste through open dumping. Burning of solid waste is more frequently practice in rural ward (19.9%) than urban ward (4.1%). Open pit method of disposing solid waste is more practiced among rural household (8.8%) than urban household (4.2%). Majority of households obviously dispose waste through method that is unfriendly to the environment which is unconventional means. The most appropriate method of disposing solid waste is the use of government approved dump site facility. This practice of open dumping particularly around households represents a major health risk to residents. Poorly managed waste presents a health risk to communities. This is primarily because improperly disposed waste can be a source of contaminants and breeding sites.

This finding agreed with the literature and supported by Federal Government of Nigeria (FGN) (1998) which stressed the management strategies of solid wastes is through source reduction, recycling, incineration and land filling. Most of the households that are far from dump site facilities where available, find it difficult to get there and use them. They thus resort to such disposal practices of dumping wastes along the road and into drainage, gutter and bush.

The finding also agreed with Mohammed (2011) on a similar study conducted in Dukem town, Ethiopia. The finding indicates that (46.8%) households used unsafe solid waste disposal methods (open field disposal), in which more than one-quarter (28.1%) of households used burning of waste within premises, (13.6%) of households dispose their waste outside premises anywhere and (5.1%) of households dispose their waste within their premises anywhere.

**4.2.4 Methods of Disposing Young Children Faeces**

The proper disposal of children’s faeces is extremely important in preventing the spread of disease. The method of disposing young children faece is based on cost and preference. The method employed by the respondents include dropped into toilet facility, disposed into solid waste, disposed into drainage and disposed outside compound.

Table 4.5 Methods of Disposing Young Children Faeces

**Rural Total Urban Total**

**Adogi Assakio Chiroma Gayam**

Method Frq % Frq % Frq % Frq % Frq % Frq %

Dropped into toilet facility 17 12.5 23 17 30 29.5 94 43.9 72 33.6 166 77.5

Disposed into solid waste 13 9.6 15 11.1 28 20.2 7 3.2 17 7.9 24 11.1

Thrown away into drainage 11 8.1 5 3.7 16 11.8 5 2.3 3 1.4 8 3.7

Disposed outside premise 21 15.5 30 22.2 51 37.7 10 4.6 6 2.8 16 7.4

**Total62 45.7 73 54 135 100 116 54 98 45.7 214 100**

**Source: Field Survey, 2015**

Proper disposal of children faeces is important for the hygiene improvement of a household and the community at large because it lowers risk of disease pathogens in the environment as shown in Table 4.5, from households that had children. Majority (77.5%) of household in urban ward59% used toilet facility (pit latrine or plush toilet), to dispose their children’s stools were contained and dropped into toilet facility and this is the preferred method of disposal which ensures protection of the households environment from faecal contamination. It is also an indication of good environmental sanitation practices. While majority (37.7%) of household in rural ward disposed their children faeces outside compound which is not environmental friendly, this practice may result to an outbreak of diseases like cholera. Children under five years are the most at risk group for mortality following diarrhea. Hence understanding the sanitation behaviours of mothers is very important. Lack of sanitation education for mothers is a contributing factor to poor sanitation practices for young children.

This finding agreed with Bartram and Cairncross (2010) on a similar study that, 74.2% of households that had children fewer than three years of age used potty, 11.4% of households used diaper and cloth and 5.2% used in house yard for children’s defecation. (6.2%), of household children stools were left uncontained and they were disposed outside premises and (3.3%) of households thrown their children faeces into garbage*.*

This finding is in contrast with the opinion of Abbatt (2006) that the percentage of population without private toilets is between 26% and 43% in Ethopia and in most cases, public or communal toilets are present in a very small number or are not functional.

**4. 3 RELATIONSHIP BETWEEN SOCIO- DEMOGRAPHI CHARACTERISTICS OF HOUSEHOLDS AND TYPES OF ENVIRONMENTAL SANITATION PRACTICE**

The result of the relationship between socio demographic characteristics and types of environmental ethics is examined in the table below. In addition, the section tests the hypothesis that there is no significant relationship between socio demographics characteristics and types of environmental sanitation practice in Lafia LGA.

Table 4.6 Summary of Linear Regression Analysis for Relationship Between Socio- Demographic Characteristics of Household and Types of Environmental Ethics

**Variables Multiple R R2 Adjusted R Observations Standard Error F P**

X1 0.945 0.894 0.840 3 14.865 16.800 0.033

X2 0.363 0.132 -0.303 3 17.458 0.303 0.402

X3 0.615 0.378 0.67 3 31.836 1.215 0.588

X4 0.752 0.566 0.349 3 18.597 2.611 0.097

X5 0.858 0.736 0.604 3 17.544 5.572 0.978

X6 0.911 0.831 0.746 3 13.827 9.813 0.029

Regression is significant at 0.05

**Source: Field Survey, 2015**

There is significant relationship between income level of the household and owing of toilet facility at 95% significant level because the p value 0.033 is less than 0.05, this is because Occupation influences the households income and hence the amount of funds available to spend on building toilet and maintenance. People may be without toilet facility not because there is no private toilet in their area, but because they cannot afford it.

This finding agreed with the opinion of United Nation Development Programme (2005), that type of toilet facility used by households was significantly influenced by the income status of household head. Several studies (Ukwe,2004) have down the close link between poverty and household headship suggests that low income headed households have limited access to resources .While low income households needs safe and healthy sanitation facility, they may not have the money, resources, power, or confidence to ensure that their needs are met.

The educational status of households has no significant relationship with method of disposing wastewater at (95% CI, P=0.402).This finding contradicts the common notion that literacy helps in practicing sanitation that is friendly to the environment.

The findings contradicts Yaw(2010), that Households with low educational background in Ejura-Sekye Dumase district of Ghana disposed wastewater freely on the ground, especially wastewater from cooking and washing just by throwing them on the ground, wastewater from bathroom runs freely on the ground.

The finding agreed with Koskei, Koskei, Koske, Koech, (2013) that there was no significant association between educational status of household head and method of disposing wastewater used by household in Bomet municipality in Kenya. The method of wastewater disposal used by households was not influenced by the level of education of household head. There is no significant relationship between household’s age and stagnant water near dwelling house of household.

Concerning stagnant water the result showed that in thirty six percent households, there were stagnant water around the dwelling houses, which is unethical to the environment and in (63.6%) households there were no stagnant water around the dwelling house, this is generally an indication of good hygiene practices

Cleanliness of the surrounding of a house was defined as clean if areas around the dwelling is filthy by solid waste and observable faeces, kept free of animal faeces, wastewater drains are kept clear and wastewater do not contaminate the surrounding environment. The study result indicated that sixty percent of the households were observed to be clean. The rest of households (39.2%) did not keep their surrounding clean, which might cause risks to health of residents.

There is significant relationship between marital union status and method of disposing solid waste at (95% CI, P=0.029).The null hypothesis is rejected because there is relationship between marital union status and method of disposing solid waste in Lafia LGA.



**Plate I Shows disposed wastewater indiscriminately along Rimi Ukuin the Study Area**

**Source: Field Survey, 2015**

**4.4DIFFERENCES ON ENVIRONMENTAL SANITATION PRACTICES BETWEEN RURAL AND URBAN WARD**

Student paired sampled t- test was used to test the difference in the environmental sanitation practices among households.

**Table 4.7Summary of Student Paired Sampled t-test for differences in Methods of Disposing Solid Waste Between Rural and Urban wards**

**Variable Rural Urban**

Mean 33.7500 53.5000

Variance 16.42343 27.95681

Observation 4 4

Pearson Correlation 0.127

Hypothesised Mean Difference 0

df 3

t- Stat -0.646

**P (T<= t) one tail 0.873**

T Critical one tail

P ( T< =t) two- tail 0.564

T Critical two -tail

**Source: Field Survey, 2015**

Table 4.7 revealed that there is no significant difference in the method of disposing solid waste between rural and urban wards at (95% CI, P=0.87)

This result contradict Ogah, Alhassan, Medugu, and Mohammed (2014) that household in high density area (Urban area) dispose their waste in undesignated place while household in low density area(Rural area) dispose waste in designated place. The reason for no difference in the method of disposing solid waste between the rural and urban ward here may be due to lack of regular clearing of waste in the study area by government agency which encourage household to dispose their waste in any depots created by the community as final depots.

With respect to where households dispose their waste (designated or undesignated place). The researcher had assessed by observation, the result reveals that sixty nine percent of households in urban ward dispose solid waste in an undesignated place and (30.3%) dispose waste in designated place which is the appropriate means. While sixty eight percent of households in rural wards dispose solid waste in designated place and only (31.8%) dispose solid waste in undesignated place.

The findings agreed with Butu, Ageda and Bichi (2013) that urban expansion has exceeded the expected limit in recent time, which result to ugly system of solid waste disposal in urban cities than rural area.

Table 4.8Summary of Student Paired Sampled t-test for difference in Methods of Disposing Wastewater Between Rural and Urban wards

**Variable Rural Urban**

Mean 33.7500 53.500

Variance 7.55397 37.64195

Observation 4 4

Pearson Correlation 0.303

Hypothesised Mean Difference 0

df 3

t- Stat -0.547

**P (T<= t) one tail 0.697**

T Critical one tail

P ( T< =t) two- tail 0.622

T Critical two –tail

**Source: Field Survey, 2015**

From Table 4.8 it can be observed that there is no significant difference at 95% significant level in methods of disposing wastewater between rural and urban wards because the *p* value 0.697 is greater than 0.05. The result indicates that the methods of disposing wastewater might not be affected by location, since change in ward location between the two variables (rural and urban) does not make significant difference in the method of disposing wastewater in the Study area.



**Plate II. Shows dispose waste into drainage along Kurikyo road in the study area**

**Source: Field Survey, 2015**

**4.5 CHALLENGES OF ENVIRONMENTAL SANITATION**

**4.5.1** **Sanitation Challenges**

The respondents identified inadequate space, poor knowledge of waste disposal practice, financial problem and weak institutional framework (sanitation agency) as factors that hinders environmental sanitation in their respective homes.

Table 4.9Environmental Sanitation Challenges

**Rural Total Urban Total**

**Adogi Assakio Chirom Gayam**

ChallengesFrq % Frq % Frq % Frq % Frq % Frq %

Inadequate space 4 2.9 4 2.9 8 5.8 3 1.4 24 11.2 27 12.6

Poor knowledge of waste-

Disposal practice16 11.8 12 8.8 28 20.6 50 23.3 22 10.2 72 33.5

Financial problem 42.9 8 5.9 12 8.8 15 7 10 4.6 25 11.6

Weak institution-

(Sanitation agency) 38 28.1 49 36.2 87 64.8 4822.4 42 19.6 90 42.3

**Total 64 45.7 73 53.8 135 100 116 54.1 98 45.6 214 100**

**Source: Field Survey, 2015**

Table 4.9 revealed that majority (64.8%) of the households in rural ward identified weak institution (sanitation agency) as a major challenge that hindered them from practicing environmental sanitation that is sustainable to the environment. Which is due to inadequate awareness and enforcement from the institution in charge of monitoring sanitation exercise. While in the urban ward majority (33.5%) of the household pointed out poor knowledge of waste disposal practice as a major environmental sanitation challenge in their respective houses, which affect their level of sanitation to be unethical to the environment.

**4.5.2Problems of Improper Sanitation Practices**

The problems households encounter as a result of improper sanitation practices include, flooding of the environment resulting from blockage of drainage system, stench and offensive odour, and spread of communicable diseases

Table 4.10 Problems of Improper Sanitation Practices

**Rural Total UrbanTotal**

Adogi Assakio Chirom Gayam

Problems Frq % Frq % Frq % Frq % Frq % Frq %

Flooding of-

Environment 12 8.8 19 14 31 22.8 33 15.4 23 10.7 56 26.1

Esthetics of-

Environment17 12.5 9 6.6 26 19.1 27 12.6 20 9.3 47 21.9

Stench and offensive-

odour25 18.5 22 16.2 47 34.7 49 22.8 34 15.8 82 38.6

Spread of Diseases8 5.9 23 17 31 22.9 7 3.2 21 9.8 29 13

**Total 62 45.7 73 53.8 135 100 116 54 98 45.6 214100**

**Source: Field Survey, 2015**

The finding of the study showed that from the total sampled households, majority of the household in urban ward (38.6%) pointed out that stench of offensive odour in their area is caused by inappropriate sanitation practice by the localities. While in the rural ward majority (22.9%) identified spread of diseases as a major problem caused by inappropriate sanitation practice in their area. Inappropriate solid waste and wastewater disposal provides breeding site for flies and dogs, which spread germs that may causes diarrheal and other diseases, Households in the study area are quite about the problems caused by inappropriate sanitation practice but majority of the total sampled households practically disposed their solid waste in open field indiscriminately.

The study agreed by Olajide (2014) on a similar study that consequences of improper environmental sanitation practices by households in Katsina Metropolis causes mosquitoes infestation, files and rodents infestation, contamination of food, spread of communicable diseases and sources of strench and offensive odour.

**4.5.3 Strategies for Improving Household Environmental Sanitation Practices**

Table 4.11Strategies for Improving Household Environmental Sanitation Practices

**Strategies Rural Total Urban Total**

Adogi Assakio Chirom Gayam

Frq % Frq % Frq % Frq % Frq % Frq %

Sort waste 5 3.7 3 2.2 8 5.9 13 6 10 4.6 19 10.6

Reward and punishment24 17.7 38 28.1 62 45.8 67 31.3 51 23.8 118 55.1

Enlightenment by government -

at all levels and NGOs,15 11.1 24 17.7 39 28.8 28 13 31 14.4 59 27.4

Inculcation of environmental -

education in the school curriculum 18 13.3 8 5.9 26 19.2 8 3.7 6 2.8 14 6.5

**Total 62 45.8 73 53.9 135 100 116 54 98 45.6 214 100**

**Source: Field Survey, 2015**

Majority of respondents (55.1%) in the urban ward suggested that reward and punishment should be fully enforced on household sanitation in order to improve sanitation practices among households, the reward for positive household sanitation should be in form of payment of health bill or electricity bill for any household that disposes wastewater, solid waste appropriately, own functional toilet, and clean their immediate surroundings, the punishment for negative household sanitation should be informed of fines. While majority of the (28.8%) respondents identified enlightenment campaign by government and NGOs at all level as one of the strategy to improved household environmental sanitation practices in the study, the enlightenment should be inform of drama in television on the danger of improper sanitation practices. Only 11.5% of households suggested that in other to improve households environmental sanitation in the study area, the only strategy to employed is to inculcate environmental education in the school curriculum as a means of educate people from primary school to tertiary school on danger of inappropriate environmental sanitation practices, introducing environmental education in school curriculum will increase the level of environmental ethics of households in the study area.

**4. 6 TEST OF HYPOTHESIS**

**4.6.1 Test of the Relationship Between the Socio- Demographic Characteristics of Households and types of Environmental Sanitation Practices**

The first hypothesis stated that there is no significant relationship between socio- demographic characteristics of households and types of environmental sanitation practices in the study area. To test this hypothesis, linear regression analysis was employed. This was previously presented and discussed under Table 4.6. The result revealed that there is significant relationship between socio- demographic characteristics of household (income level) and types of environmental sanitation practice (method of disposing solid waste) at 0.05 significant levels in the Lafia LGA of Nasarawa state. Thus the null hypothesis of the study is rejected in this case.

However the result of the relationship between the socio- demographic characteristics of household and types of environmental sanitation practice, the result revealed that there is no significant relationship between socio- demographic characteristics of households(Age, educational status, occupation and households size)and types of environmental sanitation practice (availability of dustbin and presence of stagnant water near dwelling house and method of disposing wastewater) at 0.05 significant level in Lafia LGA. Thus the null of the study is accepted in this case.

**4.6.2 Test of difference Between Location and Environmental Sanitation Practices in the Study**

The second hypothesis states that there is no significant difference between location and environmental sanitation practices of households. To test this hypothesis Student paired sampled t-test was employed.

This hypothesis was previously presented and discussed under Table 4.7 to 4.8. The result revealed that there are no significances differences in method of disposing solid waste, wastewater between rural and urban ward of Lafia LGA. Therefore, the null hypothesis of the study is retained.

**CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

**5.1** **SUMMARY OF FINDINGS**

The study revealed that majority (58.3%) of the households in urban ward disposed their solid waste through open dumping practice, in the rural ward the situation differs where majority (60.6%) of the households disposed their solid waste into drainage channels, gutter and bush, both of the practices is not friendly to the environment.

It also emerged that majority (62.3%) of households in rural ward used unsafe wastewater disposal methods (thrown freely on ground) and did not have appropriate wastewater disposal systems. About thirty one percent of the respondents in the urban ward discharged wastewater into soak away and only nineteen percent of the respondents in the rural ward discharged wastewater into soak away. The study revealed that majority (64.8%) of the households in rural ward identified weak institution (sanitation agency) as major challenge that hindered them from practicing environmental sanitation that is sustainable to the environment ,while thirty three percent of households in urban ward pointed out poor knowledge of waste disposal practice as a major challenge of environmental sanitation in their area. However, the results of the findings indicates that thirty eight percent of households in urban ward cited that, inappropriate solid waste disposal causes bad smell (odour). And twenty two percent of households in rural ward pointed out that inappropriate environmental sanitation practice in their area lead to spread of diseases like cholera and malaria.

The study result showed that majority of households (55.1%) in the urban ward suggested that, reward and punishment should be fully enforced on household sanitation in order to improve environmental sanitation among households while majority of the respondents (28.8%) in rural ward identified enlightenment campaign by government together with NGOs at all level as major strategy to improved environmental sanitation practices in the study area.

**5.2 CONCLUSION**

Environmental sanitation practices among household in the study area have constraint. The constraints identified can be described as a combination of factors some of which are inadequate space, financial problem and weak institutional framework (sanitation agencies). It is the responsibility of all households to protect their immediate environment by ensuring that they avoid anything that is not environmentally friendly on people health. The study observed that the practices of disposing solid waste and wastewater adopted by households in both rural and urban ward of Lafia L.G.A are ineffective for a sustainable environment.

The study concludes that there is significant relationship between socio-demographic characteristics of households (income level) and types of environmental sanitation practices in the study area. However there are no significant differences in method of disposing solid waste and wastewater between rural and urban ward.

**5.3 RECOMMENDATIONS**

On the basis of the findings of the study, the following recommendations were made:

I. Efforts should be made to ensure sustenance of environmental sanitation exercise at household level, greater reward and punishment should be meted out. The reward and punishment should be in form of carrot and stick, relevant authority should reward any household that minimize the rate of solid waste and waste wastewater that he or she generates and disposes it properly in designated place, the reward should be in this ways, their water, electricity and hospital bill should be paid for keeping the environment clean, while there should be greater punishment for indiscriminate disposal of waste.

II. Environmental Sanitation agencies together with NGOs should embark on effective enlightenment of household heads and the community at large on dangers associated with inappropriate waste and wastewater disposal; this is due to the fact that good hygiene is an attribute of one closeness to his lord. This is because most people tend to obey and practice what people that are close to them do faster than government instructors.

III. Government should change the style of managing waste in the environment from unfriendly method to friendly method, this is due to the fact that inadequate temporary waste collection site in the study area contribute to indiscriminate disposal of waste in the environment. With this, government should provide street by street temporary waste collection site that is not more than 100m from each households, collection and transportation from the temporary site should not pass 3 days in a week, this will encourage household to dispose their waste properly.

IV. Ecological sanitation is the best alternative approach of environmental sanitation that is ethical to the environment. This is because improper sanitation pollutes the water source; there should be awareness and campaign to household to change from conventional sanitation approach to ecological sanitation. This is due to the advantageous of ecological sanitation, it tends to reduce the rate of health risk related to environmental sanitation, it protects surface and ground water quality and finally it improves soil quality and several others.

V. Government should embark on awareness and campaign critically on environmental sanitation issue at the community level, through enlightenment campaigns, drama on television, environmental sanitation should be compulsory course in our different institution of learning across the state, and house to house environmental sanitation education should be created in order to educate people on how to maintain clean environment, and the consequence of leaving in an environment that is not hygienic, this is because children learn faster using drama and practical.

**5.4 RECOMMENDED AREAS FOR FURTHER RESEARCH**

Areas for further Research, based on the issues raised there is need for further research on assessment of environmental sanitation practices among households in the entire local government area, the senatorial districts and the state in general which could provide a broader and varying view on environmental sanitation practices among households in the state. Study can be conducted to actualise the relationship between socio- demographic characteristics of households and types of environmental sanitation practices in the state. There is inadequate, recent, and reliable information on the existing environmental sanitation and hygiene practices among households in the state. Accordingly, there is need for further research into these areas. This would enable the state to effectively plan and budget to enhance household environmental sanitation in the state.

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**Appendice I**

**Questionnaire for Households Head in Lafia Local Government Area ofNasaarawa State, Nigeria.**

Dear sir/ma,

The researcher is an M.Sc Student in Department of Geography, Ahmadu Bello University Zaria, and conducting research on “effects of environmental ethics on environmental sanitation among households in Lafia L.G.A of Nasarawa State, Nigeria.” Please kindly answer the question below as all information supplied would be used mainly for academic purposes, and will be treated with utmost confidentiality. Thank you.

**Section A: Socio- demographic characteristics of respondent**

1. Sex, A. Male [ ] B. Female [ ]

2. Age (years); A. 20-30 [ ] B.31-40[ ] C.41-50[ ] D. above 50[ ]

3. Ward location --------------------------------?

4. Marital status? A. Single [ ] B. Married [ ] C. Divorce [ ] D. Widowed [ ]

5. Type of marital union? A. Polygamous [ ] B. Monogamous [ ]

C. Others (specify)……… ……….

6. Household Size? A. 3-5 [ ] B. 5- 9 [ ] C.9-10 [ ] D. 10 above [ ]

7. What is your highest Educational qualification? A. Informal education [ ] B. Primary [ ] C. Secondary [ ] D. Tertiary [ ] E. Others specify………………..

8. What is your Occupation? A. Farmer [ ] B. Businessman [ ] C. Civil servant [ ] D. Others specify…….

9. Income status; A. Less than # 20, 000 [ ] B. 20,000- 39, 000 [ ] C. 40,000-59,000 [ ] D.

60,000 above [ ]

**Section B. Environmental Sanitation Practices**

10. Do you have dustbin? A. Yes [ ] B. No [ ]

11. What sanitation practice did you used to garbage your waste? A .Indiscriminate and open disposal [ ] B .Bush and gutter [ ] C. Refuse Pit [ ] D. Burning [ ]

12. What method did used to dispose your young children faece? A. Dropped into toilet facility [ ] B. Thrown away to drainage system [ ] C. Disposed into solid waste [ ] D. Disposed outside premises [ ] E. Others (please specify)-----------------------------

13. Do you have a bath shelter? A.Yes. [ ] B. No. [ ]

14. If yes, what method did you used to dispose your wastewater? A. Run freely on the ground [ ] B. Watering vegetables [ ] C. Discharge to soak away [ ] D. Others specify ……………………..

15. Did you practice ecological sanitation? A. Yes [ ] B. No [ ]

16. If no why? A. Is time consuming [ ] B. No Idea about it [ ] C. Is too expensive [ ] D. Others-------------------

17. Have you ever received health education messages or lessons related to environmental sanitation? A. Yes. [ ] B. No. [ ]

18. How often is the message? A. Weekly [ ] B. Fortnightly [ ] C. Monthly [ ]

D. More than five years [ ]

19. Do you observed the end of the month sanitation exercise in your house?

A. Yes [ ] B. NO [ ]

20. If yes why did you observed? A. By force [ ] B. Voluntarily [ ] C. Others -------------------------------------------------

21. If no, what is your reason? A. Inadequate enforcement [ ] B. Inadequate awareness

[ ] C. Bad attitude to environment [ ] D. Disobedience to rule of law [ ]

22. Is there a functional toilet in this house? A. Yes [ ] B. No [ ]

23. If yes, what types of toilet? A .Pit latrine [ ] B. Improved pit Latrine with

Sanplat and dome [ ] C .Flush toilet [ ] D .Others specify…………………

24. Who use the toilet? A. Husband and wife only [ ] B. Children only [ ] C. All household members [ ] D. Others specify ……………….

25. How far is your latrine from the house? A. 5M [ ] B. 6M[ ] C. 10[ ] D. Others ---

26. Is there any stagnant water near your dwelling house? A. Yes [ ] B. No. [ ]

27. If yes why did you leave it? A. No time to clear it [ ] B. Is not my duty [ ] C. Others (please specify)

28.Do you keep animals in the house/kitchen overnight? A. Yes [ ] B. [ ]

29.If no why? A. Unhygienic [ ] B. Lack of money [ ] C. No space in the house [ [ D. Others -------------

**Challenges of Environmental Sanitation**

30. What are the major challenges of sustaining positive environmental sanitation among

households? A. Inadequate space [ ] B. Low demand from household [ ] C. Financial problem [ ] D. Weak institutional framework [ ] E. Others ( please specify) [ ].

31. What are the problems you encounter as a result of improper sanitation practices? A. Flooding of the environment resulting from blockage of drainage system [ ] B. Lowers the quality and esthetics of environment [ ] C. Constitute sources of stench and offensive odour[ ] D. Spread of communicable diseases [ ]

32. What strategy do you think to improve Environmental Sanitation practices?

A. Sorting of waste according to types before disposal [ ] B.Reward and punishment

[ ] C. Enlightenment campaign programmes by government at all levels, NGOs[ ] D.Inculcation of environmental education (EE) in theschool curriculum at all levels of Nigerian educationalprogrammes.

**Appendice II**

**Environmental Sanitation Checklist (ESC)**

1. Where do the household’s members usually take bath? A. Inside bathroom [ ]

B. Outside bathroom [ ] C. In the stream [ ]

In-house or in toilet bathing place with shower or bath [ ]

In-house or in toilet bathing place with bucket [ ]

Use neighbor’s shower [ ]

Communal/public shower facility [ ]

Open field in the compound [ ]

Open field outside the house compound [ ]

Open field in the area of water source [ ]

1. Is the latrine kept hygienic? A. Yes [ ] B. No [ ]

[OBSERVATION]

Hygienic (clean latrine)means that latrine which is not full, do not have faecal matter on the latrine floor and wall, no or few flies in or near the latrine, does not smell bad.

1. Is the surrounding of the house clean? A. Yes [ ] B. No [ ]

[Observe]

[It is clean if areas around dwellings are uncontaminated by solid waste and observable faeces, kept free of animal faeces, wastewater drains are kept clear and wastewater do not contaminate the surrounding environment]

1. Where do you usually wash your hands?

[OBSERVE]

Inside or near toilet facility [ ]

Inside or near kitchen/cooking place [ ]

Elsewhere in yard/compound [ ]

Outside yard/compound [ ]

No specific place [ ]

1. Is there any stagnant water near your dwelling house? A. Yes [ ] B. No [ ]

6. Where do you usually dispose your domestic waste? A. Designated [ ]

B. Undesignated [ ]

7. Is there container in the house use for storing solid waste? A. Yes [ ] B. No [ ]

[Observe and check]

8. Is the container covered? A. Yes [ ] B. No [ ]

**Appendice III Linear Regression Statistics Model**

% OF HOUSEHOLDS INCOME LEVEL WITHOUT FUNCTIONAL TOILET.

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | Xb | . | Enter |
| a. Dependent Variable: Y | | | |
| b. All requested variables entered. | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .945a | .894 | .840 | 14.86594 |
| a. Predictors: (Constant), X | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 3712.758 | 1 | 3712.758 | 16.800 | .055b |
| Residual | 441.992 | 2 | 220.996 |  |  |
| Total | 4154.750 | 3 |  |  |  |
| a. Dependent Variable: Y | | | | | | |
| b. Predictors: (Constant), X | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | StandardizeCoefficients | T | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 112.429 | 20.812 |  | 5.402 | .033 |
| X | -1.462 | .357 | -.945 | -4.099 | .055 |
| a. Dependent Variable: Y | | | | | | |

% OF HOUSEHOLD EDUCATIONAL STATUS THAT DISPOSE WASTEWATER FREELY ON GROUND.

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | Xb | . | Enter |
| a. Dependent Variable: Y | | | |
| b. All requested variables entered. | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .363a | .132 | -.303 | 17.45885 |
| a. Predictors: (Constant), X | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 92.377 | 1 | 92.377 | .303 | .637b |
| Residual | 609.623 | 2 | 304.811 |  |  |
| Total | 702.000 | 3 |  |  |  |
| a. Dependent Variable: Y | | | | | | |
| b. Predictors: (Constant), X | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 37.860 | 35.846 |  | 1.056 | .402 |
| X | .633 | 1.149 | .363 | .551 | .637 |
| a. Dependent Variable: Y | | | | | | |

% OF HOUSEHOLDS AGE (YEARS) WITHOUT DUSTBIN IN THEIR DWELLING HOUSE

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | Xb | . | Enter |
| a. Dependent Variable: Y | | | |
| b. All requested variables entered. | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .615a | .378 | .067 | 31.83699 |
| a. Predictors: (Constant), X | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 1231.563 | 1 | 1231.563 | 1.215 | .385b |
| Residual | 2027.187 | 2 | 1013.594 |  |  |
| Total | 3258.750 | 3 |  |  |  |
| a. Dependent Variable: Y | | | | | | |
| b. Predictors: (Constant), X | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | -46.590 | 72.831 |  | -.640 | .588 |
| X | 1.591 | 1.443 | .615 | 1.102 | .385 |
| a. Dependent Variable: Y | | | | | | |

% OF HOUSEHOLDS OCCUPATION THAT DISPOSE WASTE INTO DRAINAGE AND GUTTER

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | Xb | . | Enter |
| a. Dependent Variable: Y | | | |
| b. All requested variables entered. | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .752a | .566 | .349 | 18.59785 |
| a. Predictors: (Constant), X | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 902.990 | 1 | 902.990 | 2.611 | .248b |
| Residual | 691.760 | 2 | 345.880 |  |  |
| Total | 1594.750 | 3 |  |  |  |
| a. Dependent Variable: Y | | | | | | |
| b. Predictors: (Constant), X | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 71.509 | 24.005 |  | 2.979 | .097 |
| X | -.694 | .430 | -.752 | -1.616 | .248 |
| a. Dependent Variable: Y | | | | | | |

% OF HOUSEHOLDS SIZE WITH STAGNANT WATER NEAR THEIR DWELLING HOUSE

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | xb | . | Enter |
| a. Dependent Variable: y | | | |
| b. All requested variables entered. | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .858a | .736 | .604 | 17.54427 |
| a. Predictors: (Constant), x | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 1715.147 | 1 | 1715.147 | 5.572 | .142b |
| Residual | 615.603 | 2 | 307.802 |  |  |
| Total | 2330.750 | 3 |  |  |  |
| a. Dependent Variable: y | | | | | | |
| b. Predictors: (Constant), x | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | -.628 | 20.363 |  | -.031 | .978 |
| X | .975 | .413 | .858 | 2.361 | .142 |
| a. Dependent Variable: y | | | | | | |

% OF HOUSEHOLDS MARITAL STATUS THAT DISPOSE YOUNG CHILDREN FAECES OUTSIDE HOUSE PREMISES

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | Xb | . | Enter |
| a. Dependent Variable: Y | | | |
| b. All requested variables entered. | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .911a | .831 | .746 | 13.82782 |
| a. Predictors: (Constant), X | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 1876.333 | 1 | 1876.333 | 9.813 | .089b |
| Residual | 382.417 | 2 | 191.209 |  |  |
| Total | 2258.750 | 3 |  |  |  |
| a. Dependent Variable: Y | | | | | | |
| b. Predictors: (Constant), X | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 102.774 | 17.842 |  | 5.760 | .029 |
| X | -1.431 | .457 | -.911 | -3.133 | .089 |

**Appendice IV Paired Sampled Student t-test Statistics Model**

METHOD OF DISPOSING SOLID WASTE IN RURAL AND URBAN WARDS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Paired Samples Statistics** | | | | | |
|  | | Mean | N | Std. Deviation | Std. Error Mean |
| Pair 1 | Rural | 33.7500 | 4 | 32.84687 | 16.42343 |
| Urban | 53.5000 | 4 | 55.91362 | 27.95681 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Paired Samples Correlations** | | | | |
|  | | N | Correlation | Sig. |
| Pair 1 | Rural & Urban | 4 | .127 | .873 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Paired Samples Test** | | | | | | | | | |
|  | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
| Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | |
| Lower | Upper |
| Pair 1 | Rural – Urban | -19.75000 | 61.14123 | 30.57061 | -117.03934 | 77.53934 | -.646 | 3 | .564 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| METHOD OF DISPOSING WASTEWATER IN RURAL AND URBAN WARDS  **Paired Samples Statistics** | | | | | |
|  | | Mean | N | Std. Deviation | Std. Error Mean |
| Pair 1 | Rural | 33.7500 | 4 | 15.10794 | 7.55397 |
| Urban | 53.5000 | 4 | 75.28391 | 37.64195 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Paired Samples Correlations** | | | | |
|  | | N | Correlation | Sig. |
| Pair 1 | Rural  Urban | 4 | .303 | .697 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Paired Samples Test** | | | | | | | | | |
|  | | Paired Differences | | | | | T | df | Sig. (2-tailed) |
| Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | |
| Lower | Upper |
| Pair 1 | Rural  Urban | -19.75000 | 72.15897 | 36.07948 | -134.57102 | 95.07102 | -.547 | 3 | .622 |