

**HOUSEHOLD REFUSE DISPOSAL AND
COLLECTION: A CASE STUDY OF OKE-ERO
L.G.A., KWARA STATE**

By

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PGD/GEO/2001/2002/206**

**DEPARTMENT OF GEOGRAPHY
FEDERAL UNIVERSITY OF
TECHNOLOGY
MINNA.**

NOVEMBER, 2003

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**A THESIS SUBMITTED TO THE DEPARTMENT OF
GEOGRAPHY, SCHOOL OF SCIENCE AND SCIENCE
EDUCATION, FEDERAL UNIVERSITY OF
TECHNOLOGY MINNA, NIGERIA.**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
AWARD OF POST GRADUATE DIPLOMA (PGD) IN
ENVIRONMENTAL MANAGEMENT.**


NOVEMBER, 2003

DECLARATION

This is to satisfy that, this project, titled, House hold refuse disposal and collection, was carried out by me, **Bamikole Simeon Bamidele** in partial fulfillment of the award of post graduate Diploma in Environmental Management, from Federal University of Technology Minna, Niger state, Nigeria.



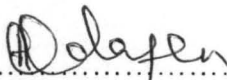
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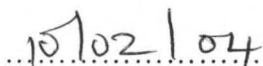
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CERTIFICATION

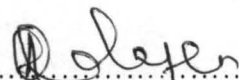
This is to certify that this Project entitled "Household Refuse Disposal and Collection: A case study of Oke-Ero Local Government Area, Kwara State" was carried out by **Bamikole, Simeon Bamidele** meets the regulation governing the award of PGD degree in Environmental Management of the Federal University of Technology, Minna.



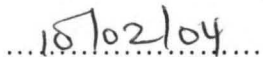
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DEDICATION

This project is dedicated to the Almighty God, the Creator of the universe; my late father Pa Chief Samuel Bamikole and my able mother Mrs. Cecilia Bamikole; including my step mother Mrs. Alice Bamikole, my wife Mrs. Florence Bamikole and my children for their moral and financial support towards my education up to this present level.

ACKNOWLEDGEMENT

First and foremost, I thank the Almighty God for sparing my life, as well as extending my greatest appreciation to my able Supervisor Dr. (Mrs.) A.E. Odafen (the Head of Department).

My profound gratitude also goes to the lecturers in the department in the department of Geography, Federal University of Technology, Minna, for their professional advice, guidance and supervision throughout the period of the completion of the project.

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Finally, my sincere thanks goes to the entire family of "Aregbesola", Mr. Gabriel Ayanwale, Mr. Anthony Akolade and Miss Theresa Akolade, for their financial and moral support for a successful completion of the programme, I say a big thanks to all.

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ABSTRACT

This project views household refuse collection and disposal as one of the environmental problem in Oke-Ero Local Government Area of Kwara State. The study examines the efficiency and effectiveness of household refuse disposal and collection in Oke-Ero Local Government Area.

Financial institutions are not at march to manage household refuse. Moreover, the federal, state and local governments are weak in monitoring refuse disposal and collection.

The recent scrapping of Federal Environmental Protection Agency (FEPA) has, in no measurable ways contributed to the low level of people participation in cleaning the surroundings.

Based on the findings, the level of clean environment in Oke-Ero local government is down too low for a standard environment. The local government authority failed to partake meaningfully in cleaning the environment, claiming ignorance of low funding. Level of public participation also falls below expectation.

In view of the foregoing, a number of policies and recommendations were given, such policies aimed to cover the area of inadequate equipments, inadequate public and local government participation in environmental activities, with a view to having a more hygienic and aesthetic environment.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The term "refuse disposal" is described as "solid waste management, that is, the development and operation by systems designed to handle community refuse in a healthful, economical and conserving manner".

With the increase rate in refuse disposal and low collection techniques and procedures the world's attention is now focused on solving the environmental problem that may be generated by refuse.

Refuse disposal seems to be the major pollutants of the environment, therefore they need a special attention for its management.

This study is carefully picked to examine the past and present ways of disposing refuse in Oke-Ero Local Government, and the likely methods of collections in order to proffer a better options.

1.2 The Study Area

Oke-Ero Local government amongst 774 Local Governments in Nigeria, was carved out from the defunct Ekiti Local Government of Kwara State on 4th December, 1996. The Local Government covers an area of 466.27 square kilometers with an estimated population of 78,891.

The Local Government consist of three political districts, within it are ten (10) wards, having Ilofffa as its administrative headquarter.





The inhabitants are predominantly farmers. The local government shares boundaries with Irepodun Local Government to the north, Moba Local

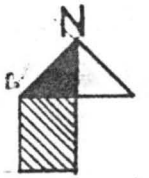
MAP OF KWARA STATE SHOWING OKE-ERO LOCAL GOVERNMENT AREA

FIG. 1-1

SCALE: 1:2000

LEGEND

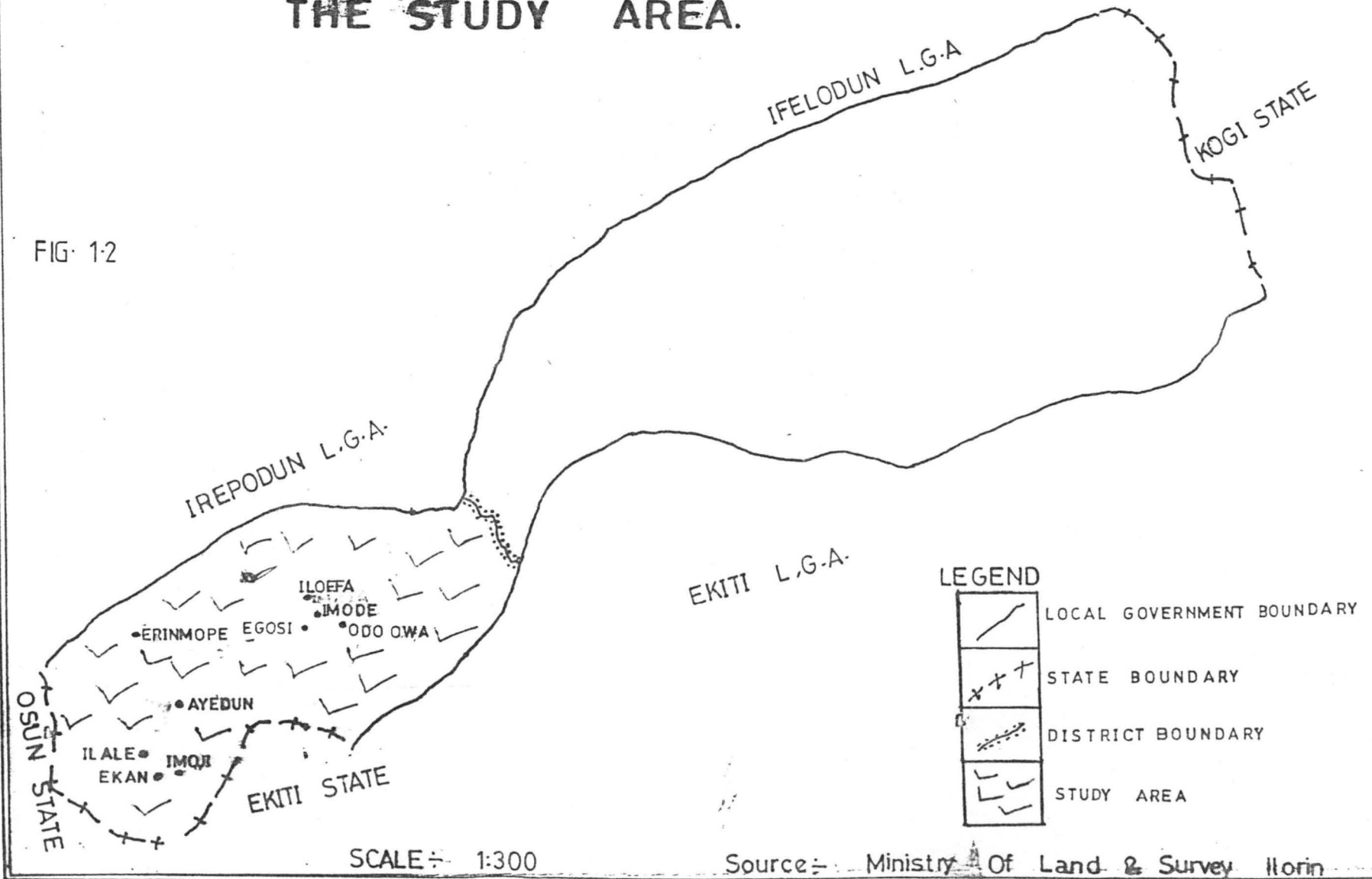
-  INTERNATIONAL BOUNDARY
-  STATE BOUNDARY
-  L G A BOUNDARY
-  STUDY AREA



Source Ministry Of Land & Survey Ilorin

MAP OF OKE-ERO LOCAL GOVERNMENT SHOWING THE STUDY AREA.

FIG. 1:2



SCALE = 1:300

Source: Ministry of Land & Survey Ilorin

Government in Ekiti State to the south and Ekiti Local Government Area of Kwara State to the east and Ifedayo Local Government in Osun State, to the west.

Since the creation of the Local Government Area, seven years ago, the population have been on the increase with or without any specific way of disposing and collecting refuse throughout the ten political wards, including the headquarter.

1.3 Statement of Problems

Refuse disposal are numerous and common, the collection of which may prove a little bit uneasy. The problem of several unplanned dump sites exists, and many are close to residential areas, blocking drainages, streams, paths, sometimes blocking the township access roads partially or fully.

Disposal facilities like refuse removing machine, tipper and a host of others are absolutely absent. Evacuation from dump site close to places of abode is also at zero rate, refuse is left to pile up and in all cases to the state of rotting and smelling, and emitting offensive odour.

Since there is no effort made so far since the inception and creation of the Local Government (Oke-Ero) some years back, there is the need to focus more attention in creating environmental hazard awareness and the likely effect of indiscriminate refuse dump to the inhabitants.

1.4 Aims and Objectives of the Study

The aim of the study is to critically examine the effectiveness of household refuse collection and disposal mechanism, with a view to making recommendation for better management.

However, the following are the specific objectives:

- i. To determine the frequency and efficiency of household refuse collection and disposal.
- ii. To identify the existing problems associated with refuse collection and disposal mechanism.
- iii. To provide a viable recommendation for better management.

1.5 Justification of the Study

Every governmental authority today, is faced with the serious problem of collection and disposal of household refuse. As population and civilization are rapidly increasing, the possibility which hitherto existed for disposing household refuse harmlessly and economically are disappearing. Household refuse in most of Nigerian urban centers are characterized by extensive deposit of refuse indiscriminately. This encourages the spread of diseases, contribute to traffic problems, offensive to sight and smell thereby complicating the economic progress.

This facts hold for Oke-Ero Local Government Area of Kwara State where household refuse presents the most pressing threat to human health and environmental aesthetics.

Refuse are being disposed off indiscriminately and hazardously. If the problem continues in such manner without new and adequate household refuse could be subjected to insanitary condition and unsightly appearance. It is therefore a point of necessity that the study be carried out.

1.6 Definition of the Topic

The term household refers to all persons who occupy a housing unit as a collectivity. A house, an apartment, or even a single room, if occupied as a separate living quarter, is considered as a household.

The term 'refuse disposal' and collection on the other hand entails solid waste management, that is the development and operation of systems designed to handle community refuse in hygienic, economic and conserving manner.

Hence, problem of household refuse disposal and collection in Oke-Ero Local Government Area is management problem of solid waste generated from individual dwelling in all the villages in the Local Government.

1.7 Scope and Limitation of Study

Refuse disposal entails the management procedure of all sorts of industrial, agricultural, commercial and household solid waste.

As spelt out from the topic, this study is examining household solid wastes in only two political districts out of the three districts that make up the Local Government Area. This is as a result of the third district being at the extreme end of the main exposed zone of the Local Government and little or non of these above problems could be recognized in the said district.

CHAPTER TWO

2.0 LITERATURE REVIEW

The term refuse disposal is described as solid waste management, that is the development and operation by systems designed to handle community refuse in a healthy economical and conserving manner. William Bento (1972) stated further that, in United States and Canada, the term previously described more narrow activities concerned with collection and disposal of food wastes, rubbish and ashes in house refuse collection. Bakacs (1975) in his own explanation described refuse as that material, normally solid which arises from animal and human life and activities and which is discarded as useless or unwanted.

"Rapidly increasing population sharply increase gross national products and have resulted in increase of old and new types of goods produced, used and discarded in the normal course of community living" Bakacs (1975).

In ancient time, primitive tribes simply migrated to another place when the environment had become overwhelmed by refuse. In the industrial countries of our age, the quantity of refuse is much increasing and the habit of discarding the objects is no longer needed. This illustrates the importance of the refuse problem, yet in many towns, refuse is simply dumped in the soil, without any treatment relying only on the mineralizing power of the soil. Also negligence in the refuse management can deteriorate the quality of the environment in and around the town and can expose the residents to the danger of epidemics, such

epidemics are human trichinosis, vesicular exanthema, foot disease, cholera, and other diseases of swine. Refuse has also been shown to be important as a breeding ground or food source for rats, flies and other potential carrier of diseases. It is also found to be significant facts in the incidence of fire outbreaks, and flooding, atmospheric and around water pollution. Potential nuisance factors such as well recognized Segun Adeola (1980).

To find an adequate solution to the problem is indispensable for the future of the local government. For a long time now, measures on how to adequately handle waste, so as to reduce global warming has a concern to many countries around the globe.

The move has led to the signing of the Kyoto protocol, an agreement which is geared towards helping nations reduce their gas emission, so as to mitigate its impact on the environment.

Back home here, the story is not different. Apart from protecting the environment, microbiologist; and laboratory scientist insist that improper waste disposal could trigger adverse health effects, such as regeneration of toxic micro-organisms into the environment; leakage and contamination of sources of drinking water, precipitation of strange diseases, among others.

The generation of solid wastes is one such problem, created by rapid population growth couple with inefficient waste disposal techniques and aggravated by inconsistent waste management policies. The problems of refuse generation, collection, disposal and general environmental sanitation are not new as a topical issue in Nigeria (Adedibu, 1983, 1984, 1986). Indeed the

national Nigerian Environmental Sanitation day, fixed for every last Saturday of the month (between the hours of 7 a.m. and 10.00 a.m), is evidence of the commitment on the part of the government to a clean environment. In 1984, the government of Kwara State enacted an additional environmental sanitation edict which make it imperative for every person to also clean their environment on every second Saturday of the month (between the hours of 7 a.m and 9. am). The main objectives of these efforts are to keep refuse of any kind of, description.

The causes of the poor environmental condition of most Nigeria cities have been attributed, among other factors to the lack of proper disposal of waste (Sule, 1981, PAI 1982; Adedibu, 1986; Fulani and Abumena unpublished). They concluded that although, waste may occur in solid liquid and gaseous states, the most conspicuous of these is solid waste because it can be seen and perceived. Indeed, solid waste constitutes a nuisance to human life and the environment, If not properly stored, collected and removed.

2.1 Solid Waste: Definition and Classification

Solid waste can be defined as useless, unwanted or discarded material with insufficient liquid content to be free flowing (Environmental Protection Agency, 1972). The Hopinsville Christian Country Commission (1976) defined solid waste as the residual from homes, business and institutions and referred to it as trash, garbage, rubbish, refuse, discards and throw aways that enter a local system, for collection and disposal. These may be in form of wrappers, papers,

tins, cans, plastics, containers and junk which includes such items as old refrigerators, stoves, lanterns, tables, beds, etc. (Ebomoyi, 1977).

In general, therefore, solid waste can be defined as the non-gaseous and non-liquid waste resulting from a wide range of communities (Adedibu, 1983).

The classification of wastes is no more controversial than waste definition. For instance, Adedibu (1985) grouped solid wastes into eight classes: domestic; municipal; industrial; agricultural; institutional; pesticide; residential and hazardous wastes. These classes of solid waste relate to their origin.

Cargo (1978) shared the same analysis but on a simpler fourfold classifications even though this was also based on the source of the wastes. From domestic, municipal, commercial and industrial sources. Berry (1979) have the same view in term of solid waste classification by origin as Cargo (1978), but went further to state that waste vary in quantity and composition in every society. It can be deduced from the definitions that solid wastes composition depends on the landuse or land-related activities within a specific area.

2.2 Refuse Collection

According to the world Health Organization expert co-committee in 1971, about 80% of the total cost of dealing with refuse goes to collection. Therefore proper planning and supervision are essential to get an effective service as possible form money available Feachem et al. (1977).

The collection of community refuse has long been regarded as a major public health and welfare services and recognized as responsibilities of local government agencies. Professor Omolade Adejuyigbe suggested that, if the problem of refuse collection is to be effectively tackled, government employee or its agencies should not do it. He further said that rather, it should be collected from individual households by refuse contractors who would be appointed by appropriate local or state government. This is because the method as well as its variant, such as attitude to government work as lateness, early closing, fake sick leave and idleness of the workers has not worked.

2.3 Refuse Disposal

"An efficient and scientific management of solid waste is an important part of any attempt at up-grading environmental quality of an urban area" Vagale (1977). Three main scientific methods of refuse disposal have been advanced in recent years, they are sanitary landfill, incineration and composting.

National Centre for Resource Recovery has described sanitary landfill as the process of disposing refuse without creating nuisance to the public health or safety. This involves utilization the principles of engineering to confine refuse to the smallest practical value, and to cover it with layer of earth at conclusion of each days operation. "If sufficient land is available within a reasonable center of gravity of the population served, the landfill method is the most economical". National Center for Resource Recovery Inc: Sanitary Landfill D.C. Health and Company Lexington (1974, pg 1)..

The Center also described incineration as the process of thermally reducing the volume of refuse, while producing in offensive gases and sterilized residue by the application of combustion process. "Incineration is a costly procedure requiring a building, mechanical equipment and expert maintenance". National Center for Resource Recovery Inc: (1974, pg 1).

T. Bakacs on the other hand described composition as a bio-chemical degradation of organic material to a sanitary, nuisance free humus like matter. Compositing method presents many advantages. However the problem is mainly economic. Compositng results in a useful product which can be put to use as fertilizer and soil conditioner in increasing the agricultural yields per unit cultivated area.

2.4 Environment and Environmental Management

Man's environment includes all the living and non-living elements in his surroundings.

The major component are: physical, biological and social. A better understanding of he environment will be obtained by studying each of the global realms, like the atmosphere, the hydrosphere, the lithosphere and the biosphere. The lithosphere which is the solid earth's wastes are dumped.

Environmental management is not management of the environment perse. It is the management of the activities with tolerable constraints imposed by the environment itself, and with full consideration of economical factors, Beale (1980). The objective is to meet basic human needs within the potentials and constraints of environmental systems.

Man-made works make impact on the environment and there needs to be a workable and economical system which will ensure that those who contemplate potentially harmful actions assess the likely impact upon the environment. In order to protect the environment, it is vitally important that environmental impact assessment be made prior to any action being taken and that it ranks equally with the technical and economic assessments with always precede development, Beale (1980).

The need for better environmental management strategies in Nigeria grows with the increasing urgency of the perceived environmental problems and the progressive nature of the threats to sustainable development that these problems posed, Olokesusi, (1994).

2.5 Environmental Problems caused by Solid Wastes

The real cost of society of dumping industrial or domestic wastes may be very much greater than the cost usually assigned/charged, Henstock (1975). Solid wastes cause pollution to air, land and water through leaching. About 85% of all U.K. refuse is dumped with no prior treatment other than the almost random removal of large of desirable items e.g. massive metal, Henstock et al. (1975).

Paper, wood, cardboard and textiles will be converted to ash and to oxides of carbon. A more scientific study carried by the then Federal Environmental Protection Agency (FEPA) in 1989 showed that toxic substances like polychlorinated biphenyl's (PCBs), gammalin 20, and heavy metals like lead, iron and copper are washed from dump sites into receiving surfaces and

groundwater, thereby constituting a great health hazard to plant and animal lives, Olokesusi (1994).

Pollution resulting from burning of refuse, poor aesthetics, well and groundwater pollution as well as health hazards are some of the environmental problems posed by solid wastes. Since Nigerians are sensitive to hazardous landfill site as exemplified by this study and this mode of wastes disposal being the most prevalent in the country, there is indeed a need for policy recommendation. Perhaps solid waste problem is the most processing environmental problem being faced by urban dwellers; urban management as well as urban planners. If the available internal municipal resources are inadequate, such municipal authorities may study the cost and benefits of contracting out waste collection and disposal operations to private sector operators. This might even turn out to be a profit making venture. Besides there is need to have competent management team at the municipal level whether or not the job is contracted out, Olokesusi (1994).

He further stated that solid waste dump site are ugly sights. They produce in most cases bad, uncomfortable odour. They also block drainage. The dump sites, especially when unchecked takes up street spaces. Some wastes decomposes and leach into streams and underground water etc. Some that leach into water are poisonous and so poison both the water and aquatic life therein. They generate airborne diseases and other health hazards. They have many negative environmental effects.

2.6 Some Housing Concepts

2.6.1 Household: "A household is a group of people collectively eating in the same pot and living in a separate dwelling unit" U.S.A. Census definition.

2.6.2 Housing Unit: "A housing unit is a limited space occupied by an household containing cooking and sanitary facilities for the exclusive use of the occupant".

2.6.3 Housing Stock: Housing stock is the number of existing unit available within a geographical setting and at a particular period of time, which is made up of habitable, fairly habitable and unhabitable housing units.

2.6.4 Housing Demand: This is the amount of housing units that will be consumed by people at a particular period and at a given price. Housing demand is determined mainly by such factor as income, taste, price, household formation etc.

2.6.5 Housing supply: Housing supply is the amount of housing units made available for occupation at a particular period of time. Since both private and public sectors are involved in production of housing units, the question of price is more basic to the private sector than the public sector.

2.6.6 Housing Market: A housing market area is the physical area within which all dwelling of substitution i.e. every dwelling unit within a local housing market may be considered a substitute for every other unit, hence all dwelling units may be said to form a single market characterized by interaction of occupancy, price, rent and other facilities.

2.6.7 Housing Need: Housing need could be defined as a planning concept which express the difference between the actual condition on the one hand and the defined minimum standard on the other hand. In a broader sense "Housing need is the extent to which the supply of adequate housing falls short of the demand of households in terms of their psychological and physiological needs" (Onibokun, 1985).

CHAPTER THREE

3.0 METHODOLOGY AND DISCUSSION OF RESULTS

3.1 Methodology

The study sought to identify the effectiveness of refuse disposal and collection with likely effects and problems through the use of the various methods.

3.1.1 Field/Photographic Survey

This involves visiting some refuse dumps sites to connote some relevant data regarding the effectiveness and efficiency of refuse disposal and collection in the study area. Alongside, pictures showing some events and actions was taken to compliment the field study.

3.1.2 Questionnaire/Sample Survey

This was done through direct interview of people from house to house taking a sample survey of thirty (30) per each ward, making a total of two hundred and ten (210) questionnaire administered.

Indeed, the questionnaire were in two folds, one for the general public through the communities and the other one for the local government authority. Attempts were made to carefully interview the Head of Department, Health on behalf of the local government authority on the topic chosen and efforts made so far to control and manage effectively household refuse disposal and collection in the local government area.

3.1.3 Updating the Map

The map of the local government was up-dated in order to map out the study area as could be seen in Fig. 1.2.

3.1.4 Literature Review

This can be categorized as a secondary data. Secondary data collected in this study includes the National Population Commission, Ilorin, the Information Unit of the Local Government, Health Department of the Local Government and the Land and Survey Unit as well.

In conclusion, the data collected from the above sources were carefully analyzed using tables, pie-chart and maps to show details of the analysis.

3.2 Discussion of Result

3.2.1 General Characteristics

At present in Oke-Ero Local Government Area, that consist of ten political wards, of which seven of it is being covered by this study, five ways were recognized in the disposal of individual household refuse. They are indiscriminate disposal, open ground dumping, dumping haphazardly in the stream, disposing in the dustbins and of course disposal by burning method which happen to be the minimal (Table 3.2.1 and Fig. 3.2.1).

It is noted however that there is no proper and efficient household refuse collection and disposal operation throughout the study area.

3.2.2 Individual Household Refuse Disposal Method

- i. **Indiscriminate refuse disposal:** At present, some of the household dispose off their refuse indiscriminately without apology to the



Plate 3.2.1 showing indiscriminate open ground dumping

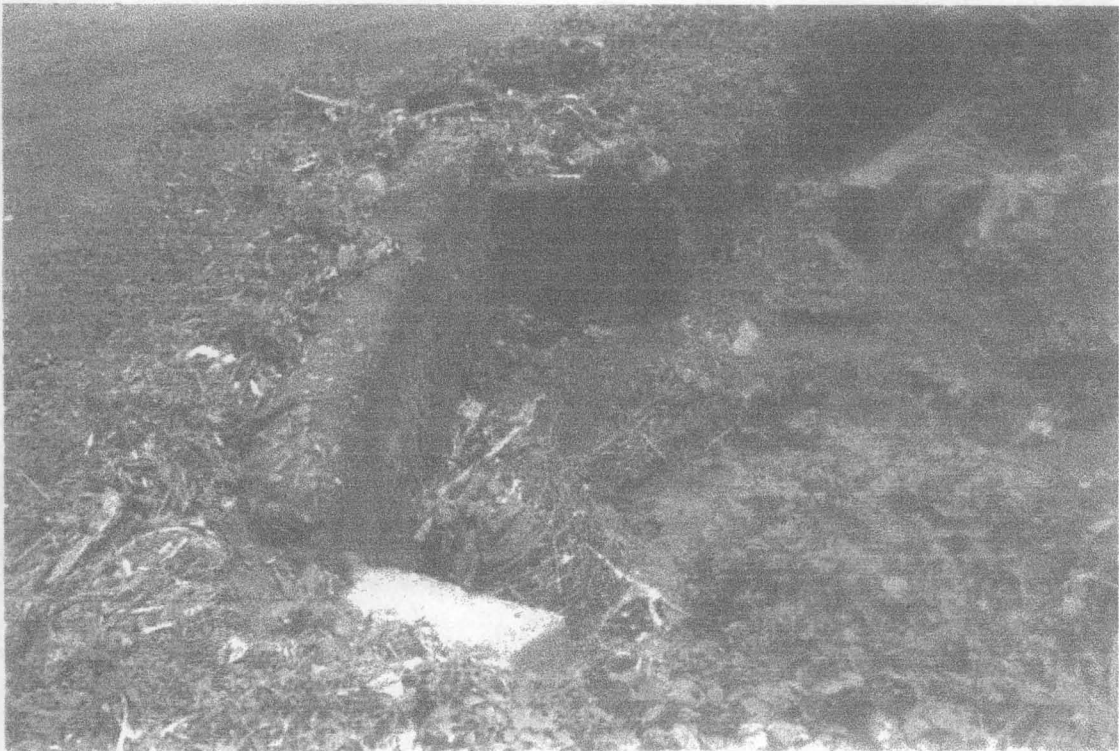


Plate 3.2.2 showing dumping of refuse haphazardly in the stream

aesthetics of environment (Plate 3.2.1). This process is uncondusive and should be discouraged.

ii. **Open ground dumping:** This is the most common method used by households in the study area as shown in table 3.2.1 and fig. 3.2.1 respectively, about 48% of the household uses this method, which actually represent 171.4° in the pie-chart. Refuse are dumped haphazardly and exposed to the atmosphere without considering its effect as regards human hygiene, pollution and environmental aesthetic. Refuse are piled in heap and are not take care of by the local government authority. The presents intolerable situation because some are located very close to a dwelling and give offensive odour. It is therefore necessary that this deplorable condition should be discouraged.

iii. **Dumping of refuse haphazardly in the stream:** Some of the households interviewed uses stream as their dumping sites especially those living very close to the township streams. This is very common in Odo-Owa Ward I, Ilale, Erinmope Imoji ward and Odo-Owa Ward II (Plate 3.2.2).

As could be seen in table 3.2.1 and fig. 3.2.1, 22.4% of the total survey uses this method, which represent 80.6° of the survey. This system could destroy the economic value of the stream, and it should be checked.



Plate 3.2.3 showing the use of (crude) dustbin



Plate 3.2.4 showing Burning of refuse

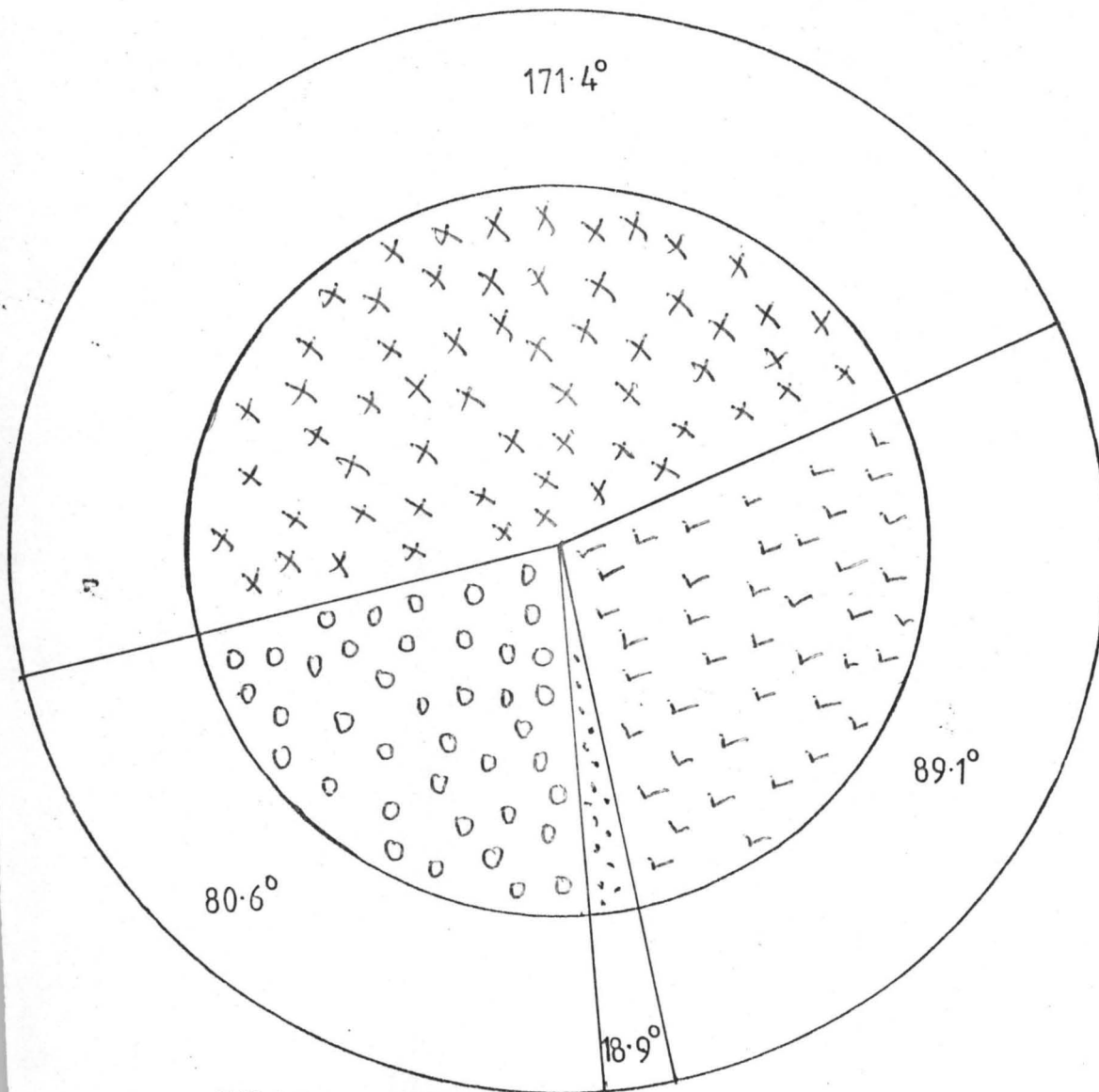
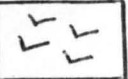
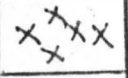
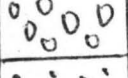
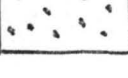


FIG. 3-21, SHOWING HOUSEHOLDS REFUSE DISPOSAL METHODS

KEY

	DUSTBINS
	OPEN GROUND
	STREAM
	BURNING

- iv. **Dustbins:** From the survey carried out almost 25% of the total household uses dustbin but very crude as could be seen in Plate 3.2.3. As shown in table 3.2.1 and fig. 3.2.1 the degree of using dustbins was estimated to 89.1. The dustbins are inform of uncovered container not well maintained. In some places, refuse in the dustbins are taken once in a month or are not taken at all. This made the refuse overfull its capacity thereafter dropping on the ground. Such condition is deplorable, moreso, those dustbins are too small for dwelling with so many families.
- v. **Burning:** Going by table 3.2.1, 5.2% of the surveyed household burn their refuse. This represent a total of 18.9° of the total survey. This shows the minimal figure of which the effect is insignificant to the inhabitant. It is quite unfortunate that this burning has no specific depot throughout the local government area. Individual, as small as the 6% burn their refuse in front or at the back of the houses (Plate 3.2.4).

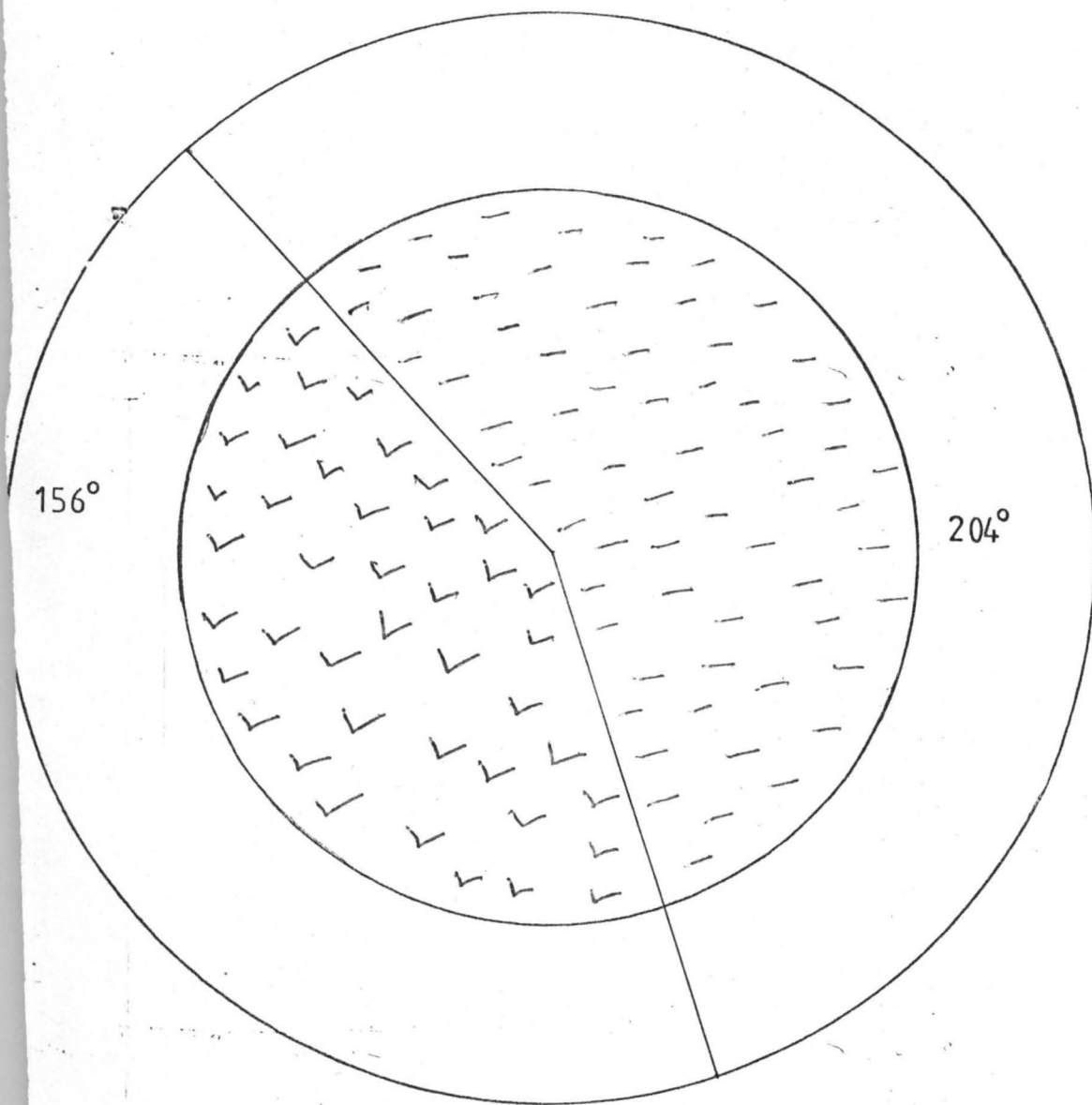
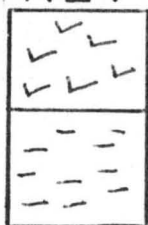


FIG 32-2, SHOWING REFUSE DEPOT CONVENIENCY
IN TERM OF DISTANCE

KEY



1-100M

100M AND ABOVE

Table 3.2.1 showing Households Refuse Disposal methods

Ward	Dustbins	Open ground	Stream	Burning	Total
Ekan	5	21	4	-	30
Imoji/Ilale/Erinmope	1	18	8	3	30
Ayedun	4	20	4	2	30
Egosi/Imale	6	17	7	-	30
Iloffa	12	10	6	2	30
Odo-Owa I	11	8	7	4	30
Odo-Owa II	13	6	11	-	30
Total	52	100	47	11	210
Percentage (%)	24.8	47.6	22.4	5.2	
Degree	89.1°	171.4°	80.6°	18.9°	

Source: Field Survey, September, 2003

3.2.3 Component of Household Refuse Disposal

Household refuse in the town can be classified into two arms: the trash and the garbage.

Trash are inorganic material and include the following (as rightly observed during the field survey) bits of papers, worn out furniture, various kinds of beverage containers such as beer cans and bottles of soft drinks, can and bottle etc. They are mostly things which have to do with eating and drinking.

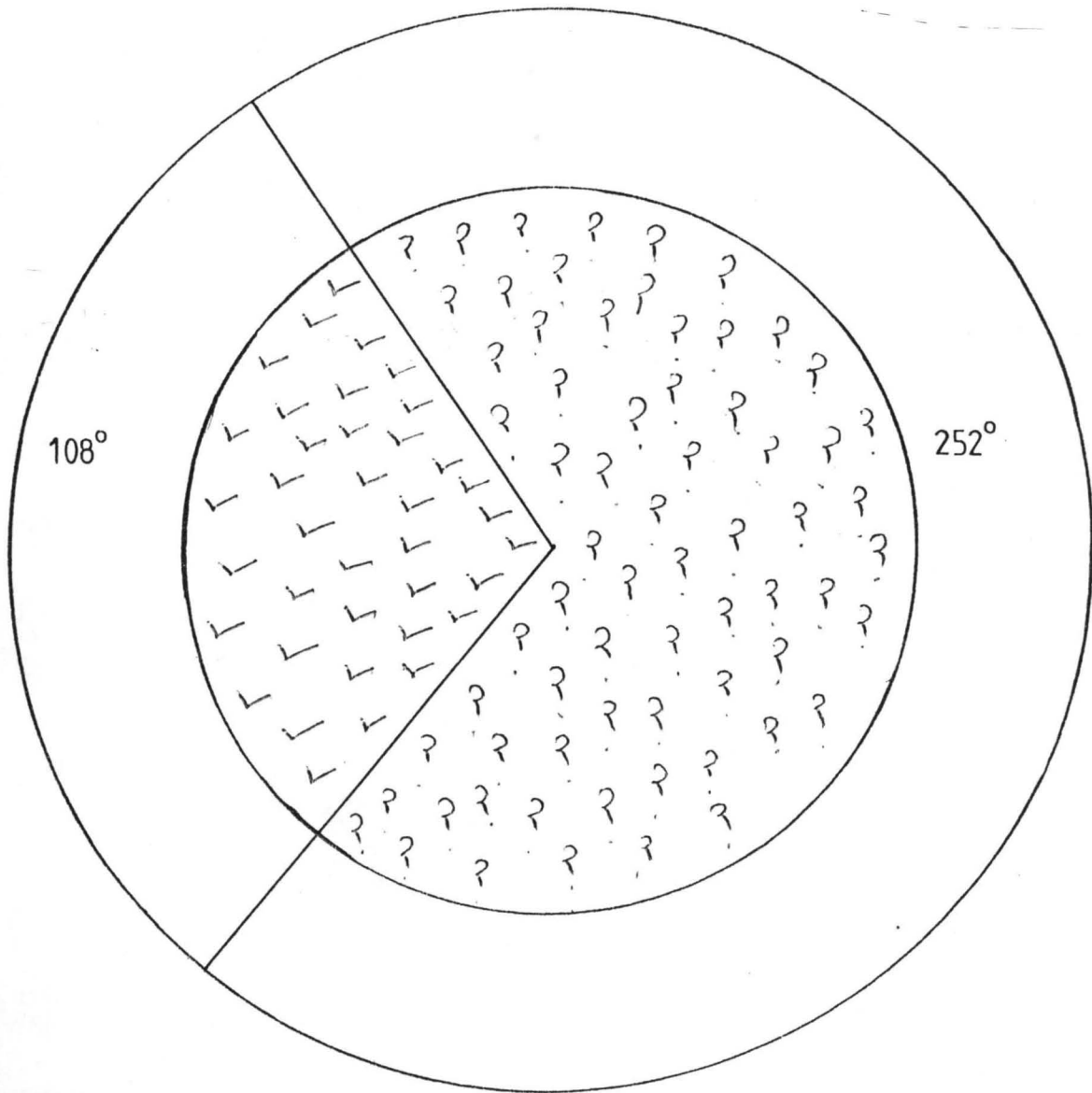


FIG-323, SHOWING REFUSE DEPOT CONVENIENCY
IN TERM OF SIZE

KEY

	ADEQUATE
	INADEQUATE

Garbage on the other hand is organic materials and includes the following: fruit peelings, melon rinds, discarded bones, dead animals, human faeces and other organic materials.

3.2.4 Problems associated with present Household Refuse Depot

Most of these depots are operated as open dumps and some are of few meters away from residential dwelling while some are a bit far from residential dwelling. From table 3.2.2, 43% of the household trek less or 100m to their various depots, while 57% have to trek along distance. This could be further explained as 156° and 204° respectively as shown in the fig. 3.2.2.

Table 3.2.2 showing Refuse Depot Convenience in term of Distance

Ward	1-100m	Above 100m	Total
Ekan	16	14	30
Imoji/Ilale/Erinmope	9	21	30
Ayedun	12	18	30
Egosi/Imode	15	15	30
Ilofffa	10	20	30
Odo-Owa I	18	12	30
Odo-Owa II	11	19	30
Total	91	119	210
Percentage (%)	43	57	
Degree	156°	204°	

Source: Field Survey, September, 2003

It was rightly observed also that those refuse depots are quite inadequate in term of size. From the survey conducted, as shown in table 3.2.3, 70% of the depots are too small and only 30% are large enough, this carries 252° and 108° respectively as shown in the table below.

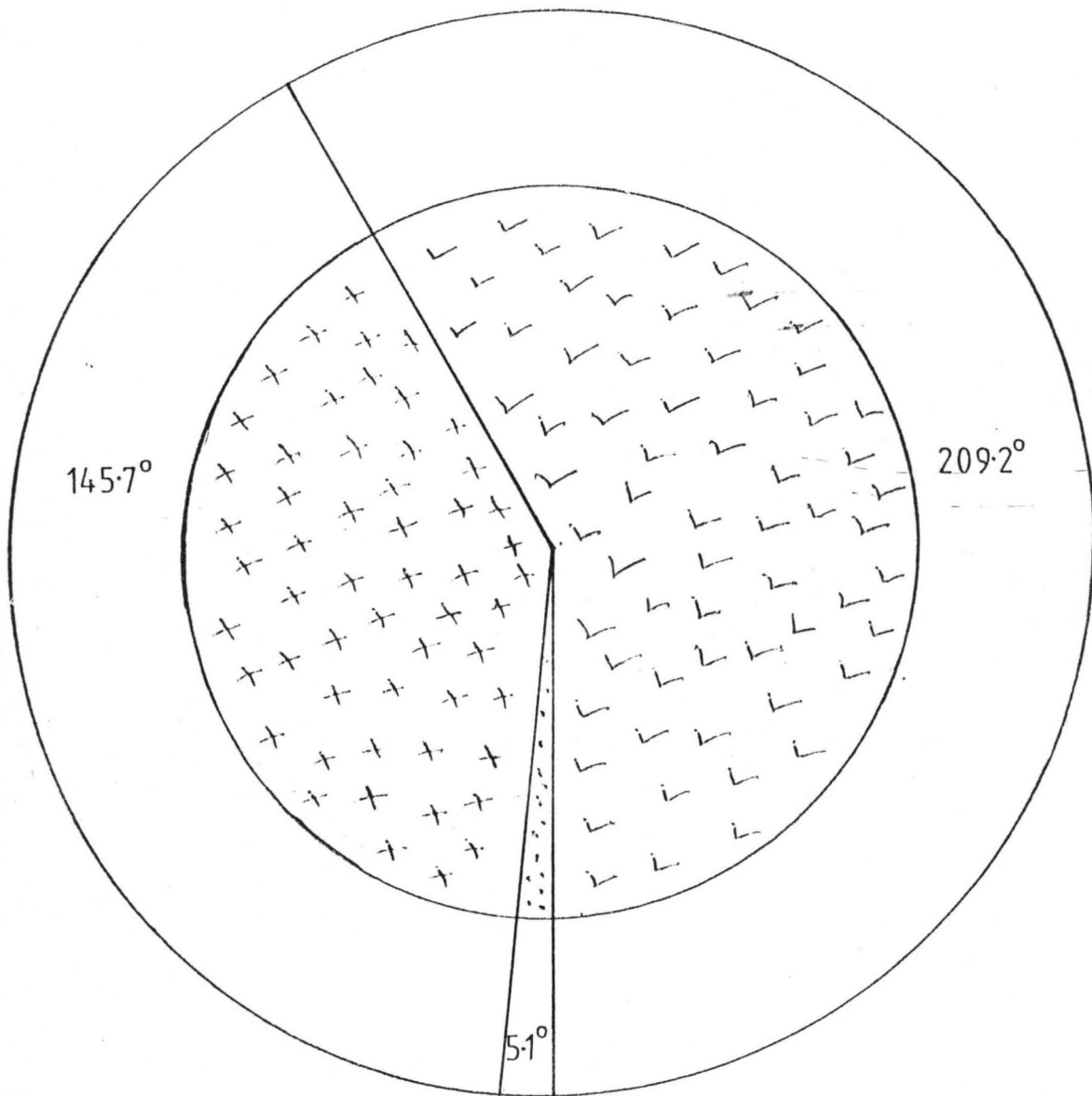
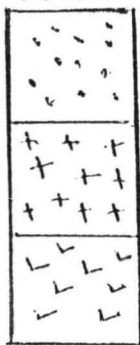


FIG-324, SHOWING AGENCIES RESPONSIBLE FOR REFUSE COLLECTION

KEY



LOCAL GOVERNMENT AUTHORITY

SELF HELP

NONE

Table 3.2.3 showing Refuse Depot Convenience in term of size

Ward	Adequate	Inadequate	Total
Ekan	6	24	30
Imoji/Ilale/Erinmope	11	19	30
Ayedun	9	21	30
Egosi/Imode	5	25	30
Ilofffa	8	22	30
Odo-Owa I	11	19	30
Odo-Owa II	13	17	30
Total	63	147	210
Percentage (%)	30%	70%	
Degree	108°	252°	

Source: Field Survey, September, 2003

In view of the problems stated above, it is necessary that a new programme be designed to improve the present condition.

3.2.5 Household Refuse Collection

Organization responsible for refuse collection the local government is supposed to be responsible for household refuse collection in the whole communities in Oke-Ero local government, but deducing from the conducted survey, they only take care of 1.4% of the total household, which is even not regular. As could be shown in table 3.2.4, 40.5% dwellings uses self help to clear their refuse depots, while 58.1% dwellings have no means of collecting the refuse generated, this could be further be broken down to 5.1°, 145.7° and 209.2° respectively. This encourage refuse been dumped haphazardly.

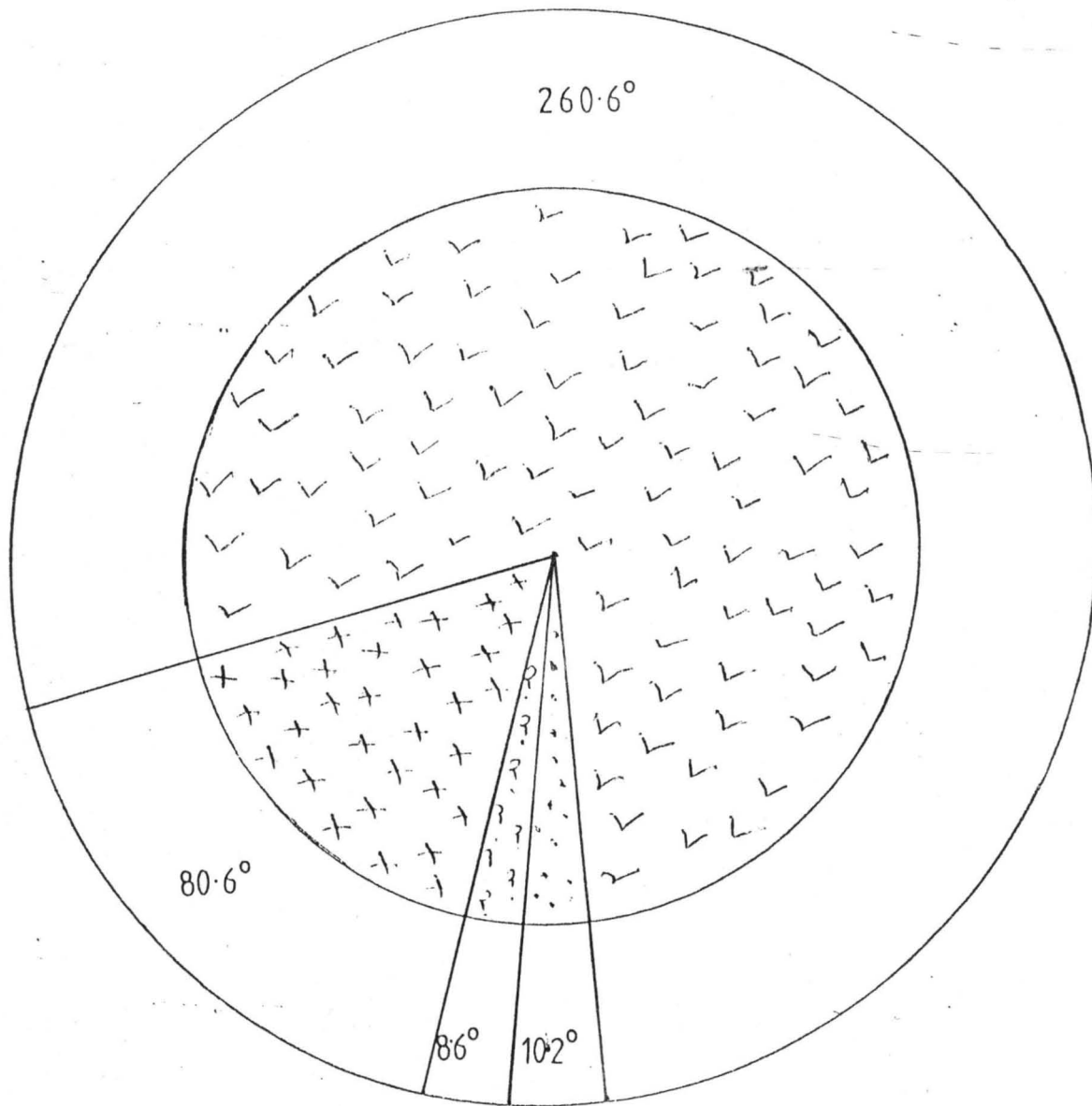


FIG 3:25, SHOWING REFUSE COLLECTION DAYS

KEY

	DAILY
	WEEKLY
	MONTHLY
	NONE

Table 3.4 showing Agencies responsible for Refuse Collections

Ward	LGA	Self Help	None	Total
Ekan	-	12	18	30
Imoji/Ilale/Erinmope	-	9	21	30
Ayedun	-	11	19	30
Egosi/Imode	-	7	23	30
Iloffa	2	16	12	30
Odo-Owa I	1	17	12	30
Odo-Owa II	-	13	17	30
Total	3	85	122	210
Percentage (%)	1.4	40.5	58.1	
Degree	5.1°	145.7°	209.2°	

Source: Field Survey, September, 2003

3.2.6 Refuse Collection day:

From the survey conducted and as shown in table 3.2.5, about 3% of the dwellings have their refuse collection done regularly, that is daily, 2.3% of the dwellings have theirs collected every week, 22.4% of the total survey are for monthly collection, while the largest percentage 72.4% of the dwellings don't have their refuse collected at all. It could be rightly concluded here that refuse are not generally collected in the study area. (Fig. 3.2.5).

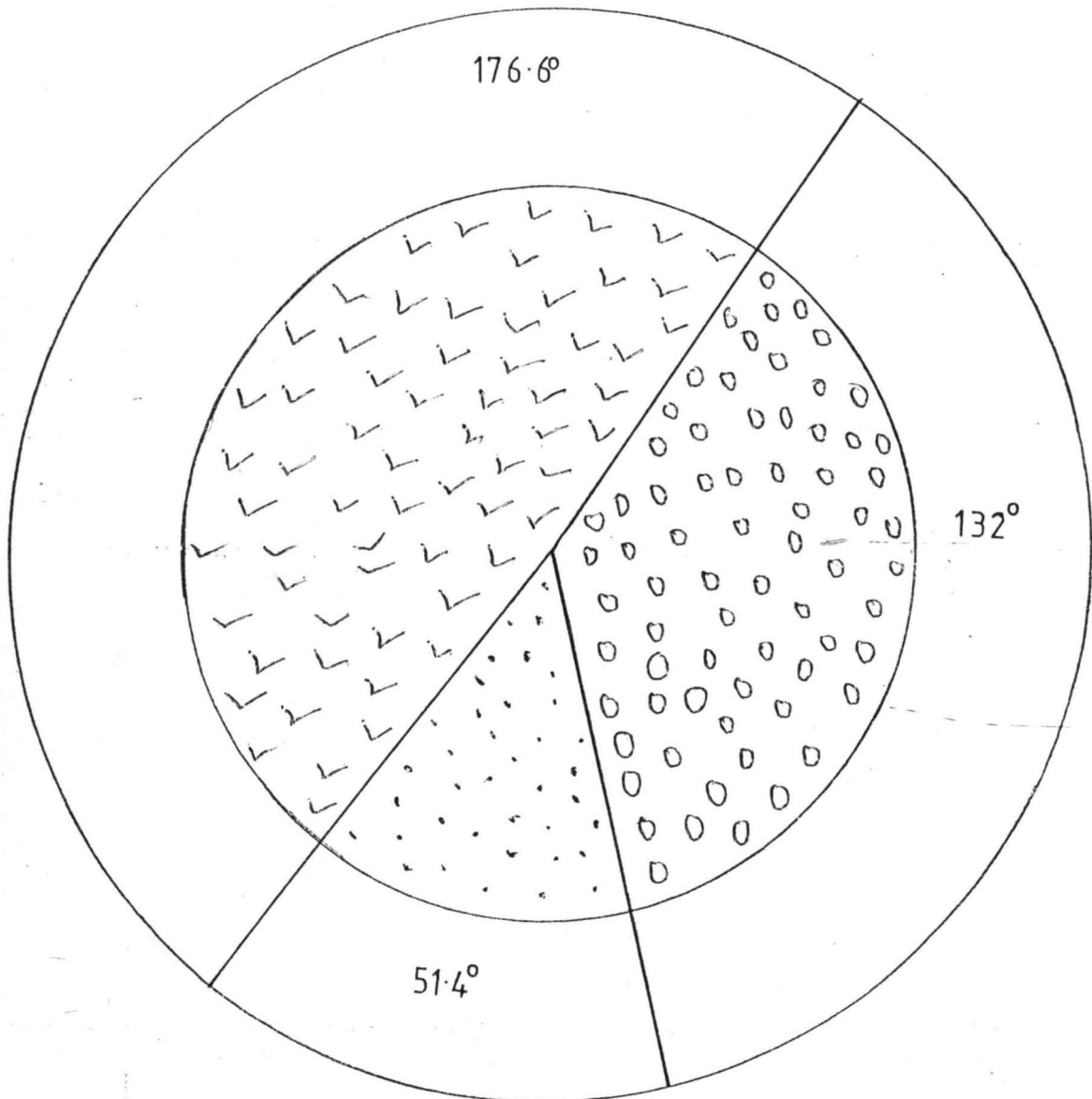


FIG. 326, SHOWING REASONS FOR USING OPEN GROUND REFUSE DUMP

KEY



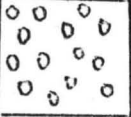
	NOT ABLE TO BUY DUSTBINS
	NO OTHER ALTERNATIVE
	NEAREST MEANS

Table 3.2.5 Showing Refuse Collection Days

Ward	Daily	Weekly	Monthly	None	Total
Ekan	1	-	8	21	30
Imoji/Ilale/Erinmope	-	2	5	23	30
Ayedun	2	1	8	19	30
Egosi/Imode	-	-	4	26	30
Iloffa	2	1	2	25	30
Odo-Owa I	-	1	9	20	30
Odo-Owa II	1	-	11	18	30
Total	6	5	47	152	210
Percentage (%)	2.9	2.3	22.4	72.4	
Degree	10.2°	8.6°	80.6°	260.6°	

Source: Field Survey, September, 2003

3.2.6 Reasons for using Open Ground Refuse Dump

From the result of the survey carried out, different opinions were gathered as regard the reasons that aid the use of open ground as refuse dump I the study area. As shown in table 3.2.6, a total of 14.3% were unable to buy dustbins, 49% fall in inability to other alternative, while 36.7% claimed open refuse dumping as the nearest means, as could be further explained in fig. 3.2.6.

Table 3.2.6 Showing Reasons for using Open Ground Refuse dump

Ward	Not able to buy dustbins	No other Alternatives	Nearest Means	Total
Ekan	6	16	8	30
Imoji/Ilale/Erinmope	4	12	14	30
Ayedun	3	15	12	30
Egosi/Imode	8	13	9	30
Ilofffa	1	18	11	30
Odo-Owa I	3	17	10	30
Odo-Owa II	5	12	13	30
Total	30	103	77	210
Percentage (%)	14.3	49	36.7	
Degree	51.4 ^o	176.6 ^o	132 ^o	

Source: Field Survey, September, 2003

3.2.7 Refuse Collection Problems

The problem of refuse collection in the study area could be viewed based on the field survey into three dimensions:

- i. **Transportation (Road) Network:** It is quite unfortunate that throughout the local government area, a single road was not tarred for easy accessibility of refuse collection. Some communities like Imoji, Ilale and Egosi were not linked with good untarred road. This has made the collection of refuse a big problem in the study area.
- ii. **Inadequate number of Equipments and Workers:** From the survey conducted with the local government authority, there are only six workers charged with the responsibilities of collecting

refuse in the whole communities of the local government. The pertinent and unfortunate issue about this section, under health department was the collection were not made at any time, even on environmental day, the only duty perform by these few workers was parading the communities and instructing them to collect their refuse themselves, claiming that they are not supplied with equipment to work with by the local government authority.

A situation like this could not adequately maintain an acceptable level of clearing tasks, this have made some part of the local government not receiving collection service at all and others that are presently receiving are on irregular basis.

- iii. **Lack of public cooperation:** Some of the people lack sanitary knowledge. They are ignorance of the essence and importance of environmental sanitation. This could have contributed to the present practice of dumping haphazardly on the streams and open spaces. From the survey conducted, it is evident that, some of the dustbins and refuse dumps are being used for dumping feaces, dead bodies of animals and wet refuse. It is therefore necessary that public enlightenment should be organized to arrest the situation.

3.2.8 Disposal Problems

- i. **Poor Disposal Method:** It was observed through the survey carried out that the exiting disposal sites are operated as open

dump rather than sanitary landfill or by composting. A visit to some of the sites show that the condition is purely objectionable, unhealthy and unsatisfactory. Lives of the surrounding residents are not safe as they are subjected to food; water contamination and epidemic.

- ii. **Burning on disposal sites:** Two factors could be responsible for the sporadic burning that takes place at the disposal sites. Lengthy time of accumulation of refuse on disposal sites generates a combustible gas called methane gas. The said refuse is deliberately set on fire by the public as earlier shown in plate 3.2.4.

3.2.9 **Management Problem**

- i. **Lack of Data:** The local government authority almost lack useful data relating to the volume and weight of refuse generated in the various communities in the past years, population, chemical composition of the refuse and its density. All these are necessary for good efficiency.
- ii. **Inadequate Fund:** The problem of finance seems to be the most striking. Under-funding has not allowed the authority to employ and increase the number of abled staff to take charge of refuse management. The available staff are not equipped for better and effective work.

- iii. **Lack of adequate legal backing:** The only existing regulatory measure operating in the local government area is that refuse should not be dumped haphazardly. This does not have any impact on the communities because it is hardly enforced. In the study area, it is evident that the local government finds it difficult to render an efficient refuse disposal and collection services.

CHAPTER FOUR

4.0 PROPOSALS, RECOMMENDATION AND CONCLUSION

4.1 Proposed Administrative Organization

In view of the existing deficiencies in the administrative framework of the local government to cope with refuse collection operation, it is suggested that consideration should be given to private contractors. It is also recommended herein that the local government authority should set up a refuse management board to coordinate the activities of the contractors. The refuse management board should comprise of a chairman, one secretary and three sanitary Inspectors each to man a district i.e. two for the study area, the Ekan-Meje district and Ilofffa/Odo-Owa district. The chairman should coordinate the overall refuse management programme, the secretary for administration and the Sanitary Inspectors to be responsible to contractors and maintain a healthy environment in the town.

Collection Operation should be in the hand of private contractors while disposal operations be left in the hand of the local government under the supervision of new refuse management board. A comparison has shown that household refuse collection processes would be more effective in the hand of private contractors than in the hand of the local government authority. Among several communities which have contracted out collection of refuse to private firms is Lagos Metropolis and the service rendered has proved effective . Therefore, the system need to be urgently introduced in Oke-Ero Local Government Area.

4.2 Refuse collection and treatment Organization

For effective sanitary administration and operational planning for household refuse collection, transportation, disposal and efficient utilization, it is suggested that the Local Government be divided into three sanitation zones for collection operations. A contractor should control each zone. The political wards should be as a basis for the proposed sanitation zones. Each zone will be for a district. Each zone should operate its own refuse vehicles responsible for household refuse collection and transportation within the sanitation zone to a treatment area. It is also suggested that disposal site should not belong to a sanitation zone alone but should accept refuse from other collection vehicles of other sanitation zones.

For smooth and efficient refuse collection and disposal operation in the study area, it is recommended that every sanitation zone be consolidated and controlled as a whole by the proposed refuse management board. These planning will enable the Local Government authority to know the tonnage, composition and calorific value of household refuse discharged.

4.3 Collection Operations

For effective household refuse collection in the towns/communities, it is suggested that the present system of open dumping, dumping in the streams, indiscriminate disposal and burning of refuse should be stopped. This is because of the unsanitary conditions and unsightly appearance, to which it could cause. It is therefore suggested that household refuse be stored in iron

dust bins in accessible areas while refuse collection depots be constructed in inaccessible areas.

Places that presently do not have any collection services should be given first priority, while second priority could be accorded areas where collection service is inadequate. Special priority should also be given to areas adjacent to streams.

Table 4.1: Proposed number of Refuse Depots required in each Sanitation Zone

Sanitation Zone	Number of Refuse Depots
Ekan-meje District	12
Iloffa/Odo-Owa District	16
Total	28

4.4 Development Control Programme

The existing uncontrolled growth taking place in the study area (Oke-Ero Local Government) will not induce effective refuse collection operation now and in the future many areas are not served with dustbins due to inaccessibility will continue to be an obstacle and major constraints to smooth and effective refuse collection programmes. It is therefore suggested and essential that the Local Government authority should ensure that physical growth of all communities in the Local Government occurs on strictly controlled basis to acceptable standards. This operation could best be handled by the Town Planning section of the Local Government authority.

4.5 Usefulness of Household Refuse

Refuse should no longer be regarded as something of no value that is only to be collected and disposed off in the cheapest manner. Instead, it should be regarded as a resource out of place to be recovered and re-use whenever possible. Apart from the fact that it could also be used to a minimum the amount of waste disposed off. In view of this, it is therefore recommended that most of the valuable product disposed should be sorted out before final disposition.

4.6 Disposal Operations

The present refuse disposal operation is unhygienic, therefore for effective refuse treatment, three disposal operation have been proposed for the study area. They are: Sanitary landfill, incineration and composting.

4.7 Planning Implementation

The success of anybody or organization in implementation of a proposal depends to a large extent on the participation received from the public, legal backing and mobilization of finance. Therefore for effective household refuse disposal management in Oke-Ero Local Government, there is need for effective public participation, adequate legal backing and good financial support.

4.7.1 Public Participation

People can be involved in household refuse collection and disposal operations through public enlightenment campaigns, involving them in decision making and also encourage self help programmes.

This could materialize through the use of community leaders who should inform the entire members of the community of the government programmes.

It is also necessary to intensify health education programmes. The whole community should be made to know not only the hazard of filth and dirt but also the effects of keeping one's environment habitable. This could be done through slogans and captions in the newspaper, television and radio. Another public enlightenment method is to get school teachers involved.

4.7.2 Finance

No matter how well refuse management programme is designed, it has future without adequate funding and way to secure the money must be determined during the planning phase. It is therefore essential that the people should contribute financially either individually or group to implement some of these projects. The proposed refuse management board should introduce a method of collecting money from the services rendered. The Kwara State Government should also help financially, since the major problem of the Local Government authority in executing an effective refuse management programme is lack of fund. It is therefore hoped that an efficient refuse management programme will evolve if there is sufficient financial support from the government and the public.

4.7.3 Legal Aspects

The only regulatory measure being enforced in the study area as a local government concerning refuse management is that it is a prohibition to dump refuse indiscriminately or haphazardly. This is not enough for efficient and effective refuse disposal management operations. It is therefore essential for

the identification of new legislation to facilitates the implementation of the proposed system.

The new refuse management board should evolve new regulatory measure as:

- i. Rates should be charged for refuse collection operations in the town
- ii. Rules and regulation should be evolved to permit sanitary inspectors to coordinate and supervise contractors handling collection operation.
- iii. Dumping of refuse into streams, drains, open spaces and indiscriminate burning should continue to be prohibited.
- iv. Rule and regulation should be evolved to serve as the framework within which contractors will operate.

It should be noted therefore that it is not enough to erect laws and ordinances; the most important factor lies in judicious and effective enforcement. Hence the new Ministry of Environment is suggested in this study that it should be extended to the local government level for efficient and effective refuse management at every tier of government.

4.8 Conclusion

The problem of refuse has been one of the major problems affecting environmental sanitation of our towns in Nigeria. For decades, solid waste, especially household refuse management has been regarded more as a nuisance and private problems rather than as a major public problem requiring

critical solution. The most important factor in determining the proper handling methods for a solid waste is the actual character of the waste. Method that define the chemical composition and physical characteristics of a waste are essential to ensuring that such materials are treated or disposed off in a manner that is protective of human health and the environment.

This study has dealt with the problem of household refuse collection and disposal in Eko-Ero Local Government Area of Kwara State. The problem could become detriment to the health of the inhabitants and could degrade the quality of the environment of the town. The study has also made a number of suggestions to improve the present system.

4.9 Recommendation

It is necessary to emphasize that no single proposal can be regarded as best plan that would guarantee good results. The success of any system depends on adequate and efficient personnel; adequate finances; sound and progressive management; adequate ordinances; reliable and sound public cooperation; minimum political interference and the ability of the recommendation to meet the existing local condition. It is therefore considered necessary that the suggestions made should related to existing local condition of the study area. The study could also be very useful to a peculiar local government; towns or villages experiencing the same peculiar problem in Nigeria.

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GEOGRAPHY DEPARTMENT
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MINNA, NIGER STATE

QUESTIONNAIRE SURVEY

**TOPIC: HOUSEHOLD REFUSE DISPOSAL AND COLLECTION IN OKE-ERO LOCAL
GOVERNMENT KWARA STATE
NAME: - BAMIKOLE S. BAMIDELE**

DATE DISTRICT WARD.....

SECTION A: - COMMUNITIES INTERVIEW

1. House address
2. No of families in the house
3. Method of disposing refuse
(a) Dustbins (b) open ground (c) others (specify)
4. If refuse dump is on open ground, state reason for such action.
(a) Not able to buy dustbins. (b) No other alternative means.
(c) Historical culture (d) others (specify)
5. Types of refuse disposed
(a) Domestic inorganic matter (specify)
(b) Domestic organic matter (specify) (c) others (specify)
6. Who is in charge of the collection of the refuse?
(a) Local government (b) The community
(c) Private body (d) No body
7. When do the above collect the refuse
(a) Daily (b) weekly (c) monthly (d) not applicable
8. If using refuse Depot, how convenience in term of
(1) Distance (a) far (b) not far
(2) Size (a) Adequate (b) Inadequate
9. What are your views about the existing refuse sites in your town _____

SECTION B

LOCAL GOVERNMENT AUTHORITY INTERVIEW

- (1) When was the Local Government created? _____
- (2) What is the function of the L.G.A. as regard house hold refuse?

- (3) Can you give a brief History of House hold refuse collection in your Local Government? _____

- (4) Are there any policies guiding the system of refuse dumping in your Local Government? (a) Yes (b) NO
- (5) If yes what are these policies? _____

- (6) Is the policies been implemented? (a) Yes (b) No
- (7) IF No Give reasons _____
- (8) Give the number of refuse dept provided by your Local Government to individual communities in the Local Government _____

- (9) How often do you collect the refuse? _____

- (10) What are the problems encountered by the L.G.A in collection? _____

- (11) How did you solve the problem? _____
- (12) What is the final method of treatment? _____
- (13) (a) Is the by-product of use to your authority? _____
(b) If yes what are the uses? _____
- (14) IS all of the above applicable in your L.G.A? (a) Yes (b) No
- (15) If No, give your advice _____
