TITLE PAGE

URBAN RENEWAL: The Problem of Refuse Disposal In Jos Township

BY

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D E C L A R A T I O N

I Zakari O. Ibrahim hereby declare that this thesis is written by me and that it was not copied from past research work.

All articles both published and unpublished, directly used in the thesis have been duely acknowledged.

D E D I C A T I O N

Dedicated to,

My Mother

Mrs. Rhoda A. Ibrahim
(Woman of Peace).

My Wife

Mrs Ruth Ibrahim

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ABSTRACT

The research is concerned with environmental sanitation with specific attention to the generation, collection and disposal of domestic refuse within Jos metropolis. The common sight of street and house litters and open refuse dump along streets have resulted to scenic problems and has become a potential source of health hazzard. The efforts of the government and it's agencies towards solving the refuse problem have failed to yeild any significant result. It is in this light that the researcher has set out to find out the facts that can best answer or explain the situation. The facts gathered have been use to recommend some policy alternatives and ways of implementing them, with the view of improving the sanitation of Jos environment.

In gathering the required data, the researcher has made use of both random and stratified sampling to select the streets and households on which the questionnaire were administered. The researcher also made use of oral interviews. Secondary informations wore gathered through the use of published and unpublished articles.

The findings show that both the government and the public have contributed to the present sanitary condition of Jos township, it is recommended that the government should intensify it's public enlightenment campaign on the dangers

of poor refuse disposal, provide convinience places or methods by which households can get rid of their domestic refuse hygienically, improve the quality of refuse disposal workers and buy more refuse disposal vehicles and equipments. The public on their own parts, must cultivate hygienic attitude by providing covered dustbins at their houses and avoid the indiscriminate throwing of refuse in the environment.

Finally, the researcher has recommended the involvement of private entrepreneur in refuse disposal and the charging of fees for refuse services.

Z.O. Ibrahim,

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C H A P T E R I

THE NATURE OF STUDY

A. Introduction.

Over the years, there has been an alarming growth rate of the movement of rural people to the cities all over the world which has led to population explosion in the urban centres. The result is the rapid deterioration of the human environment in our cities. A study by Eke on the population growth in Nigeria, showed that between 1950 census in Lagos and 1952, Lagos had experienced a sudden population increase of 5.5% and between 1952 and 1963 indicated an increase from 1.8% per annum to 2.8% per annum growth rate.[1] The externalities of these people have adversely affected the city environment.

In order to check the environment from complete deterioration, various governments have launched town planning agencies such as metropolis councils, urban development boards and city authorities. The most pain staking operation of these agencies is the task of urban renewal.

The formal concern of the U.S. government toward the improvement of neighbourhoods began with the housing act of 1937 under president Roosevelt. However, the comprehensive step towards environmental planning in regard to urban renewal was in the 1949 housing act

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1. U.I. Eke. "Population of Nigeria 1952-63", Nigerian Journal of economics and social studies. Vol. 8, No.2. P. 19.

sponsored by senator F. Robert Wagner et-al. Title 1 of the legislation allows for the acquisition and redevelopment of deteriorated areas of the cities and to provide good environment for those who would be rehoused.[2]

In Britain, redevelopment or urban renewal in most cases was a joint affairs involving private developers and the local planning agencies. Companies and individuals who wanted to redevelop their space could do so. The town planning act of 1947 empowers the local planning authorities to acquire, eliminate and replan areas with bad planning or slums. These have been carried out intensively in Birmingham and London.[3]

Coming to Nigeria, some urban renewal programmes have been carried out in a large scale. Notable among such programmes are the Lagos urban renewal scheme of Oko Awo anti-plague measures in the early thirties and the central Lagos slum clearance scheme in the 1950s. The Lagos slum clearance scheme was handled by the Lagos executive development board (LEDB). The scheme involved the clearance of a triangular area of about 70 acres in the central part of Lagos. The scheme was approved in 1952 and became operative in 1955. The Surulere rehousing scheme was later introduced to build estate and rent the houses out at subsidised rate to the displaced people.

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2. James Q. Wilson. Urban Renewal: The record and controversy. Massachusetts. M.I.T. Press, 1966 P. 74.

3. IULA (1965), "Existing Practice In Urban Renewal," International Union of Local Authorities, Vol. 11, No. 80, page 55.

The rehousing programme was intended as a temporary measure until the slum site had been cleared and rebuilt, but surulere has proved to be a permanent rather than a temporary rehousing project. The scheme however was never completed and some of the cleared areas have reverted gradually to its previous state of overcrowding and poor hygienic environment.[4]

Jos the capital of Plateau State is not left out in the attempt to save her environment from total deterioration. In order to control and direct the rate of urbanization as well as rationally and effectively manage existing urban settlement and environment, a board was established under edict number 5 of 1974, with the title Jos Metropolitan development board (JMDB).[5] The functions are stipulated as follows:

(a) to administer, execute and enforce the provision of the town and country planning law.

(b) to plan, promote and secure the physical development and environmental improvement of the state and acquisition, management and other operations and to execute works in connection with performance of all the functions listed,

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4. Ibid. pp. 56.

5. Plateau State Government owned Boards and Corporations - "Plateau Capital Development Board", government Printer, Vol. 1. No. 2, 1981, pp. 8 - 9.

(c) to carry on, in association with other bodies and persons (including companies, government authorities, township or local government) or as managing agents, activities which are necessary or desirable for the performance of its functions under this edict and to provide any technical advisory or managerial advice and assistance or plant or machinery required for this purpose.

The initial name JMDB has undergone series of changes over the years. In 1978 the JMDB was renamed, the Environmental Planning and Development Board (EPDB) with power to formulate physical development and regional development policies and plans as well as to monitor the implementation of these for the whole state.[6]

In 1979, following the review of high powered committee set up by the government, the functions of the EPDB was restructured. It's scope of function was narrowed down to Jos and Bukuru urban complex. In view of the new area of function, the board also assumed a new name titled, Plateau Capital Development Board (PCDB). Later, as a result of internal arrangement and consultations, the word "Capital' was substituted with 'Urban' and the new name became Plateau Urban Development Board (PUDB). The board presently has six departments. The department bearing direct relevance to this study is the public health department. Further discussions on the department will be

6. Ibid. page 10.

treated latter. For now, the reader should be highlighted in a 'nut-shell' about the definitions or meaning of some conspicuous terms or words used in the research.

B Operational Definitions.

For the purpose of clarity and to enhance better understanding of the thesis, it is important that certain concept and terms used in the thesis be defined.

Urban Renewal - This refers to the effort and activities carried out by the government or town planning agencies to redevelop a town or part of it inorder to give the town a 'face-lift' for the purpose of aesthetic, health, traffic or living convinience.

Refuse - Means liquid or solid waste produced or incured as a result of human externalities or activities which need to be disposed of. Refuse as used in this thesis is biased towards the solid state of it, specifically the domestic refuse.

Environment - Means the physical environment. This includes all aboitic and biotic factors (living and non-living things) including land within the area of study.

Open Dumping - Officially or unofficially selected area or spot where households dump their refuse, usually on the ground in an open space.

C. Study of Problem.

The problem of refuse disposal is not restricted to Nigeria alone but world wide. In a study of some U.S.

cities, much was said about the ills of open dumping system - especially Boston where about 40% of their refuse are dumped openly.[7] However, most of the developed countries have been able to arrest the situation to a high degree.

In the case of Nigeria, many states are yet to have the problem of environmental sanitation in their control, despite the fact that considerable amount of money has been spent in this area. Investigation by news agency of Nigeria (NAN),[8] reported in one of the national dailies indicated that three abandoned incinerators built at a cost of about ₦33 m. between 1975 and 1978 will now cost about ₦6m. to repair and another ₦6m. for yearly maintenance. The incinerators are located at Oshodi, Ebute-Metta and Victoria Island.

In the 1983 edition of the Guiness book of records, Lagos won a record of being the dirtiest city in the world. Somebody else had this to say of Lagos.

> Although it has served as the capital of one of the richest countries in Africa for many years, it is more easily remembered by visitors for its foul, smelling stagnant drains, indequate system of refuse disposal, indiscriminate littering of streets and [illegible]

[illegible]

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7. Mitchell Gordon. Sick Cities, New York. Macmillan Company 1963. page 231.
8. 'War at the filth sector,' Sunday Standard April 8, 1984 page 7.

unhygienic sewage disposal system.[9]

The fact that Lagos has been labelled as the dirtiest city in Africa justifies the above view and this is a pointer to the magnitude of the problem of refuse disposal.

Recently, the Kaduna State Military Governor Air Vice Marshal Mauzu Usman spoke on the radio and television calling on all Kaduna dwellers to keep Kaduna clean by showing sense of maturity in the way and manner they dispose their refuse. Kaduna State commissioner for health Dr. Dalhatu Sarki Tafida has informed the press that the state will soon enact a law making the dumping of refuse and human waste a punishable offence.[10] Other states like Bauchi, and Plateau have announced similar intentions. The Governor's call and the proposed act came as a result of the increasing deteriorating sanitory conditions of Kaduna metropolis.

A scholar was prompted to study the environment of Ilorin because he felt it was degenerating due to poor refuse disposal and the inability of the authorities to maintain existing infrastructures. He was also of the opinion that the solution to the problem was being inhibited by the indifference of the population to the ills due to their socio-economic or cultural background.[11]

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9. Philo Okpala. 'Lagos Fights Filth, Wastes, 'National Concord, Monday, April 2, 1984, page 5.
10. Aliyu Modibbo. 'Law on dumping of refuse soon,' New Nigerian, Friday, May 25, 1984, page 4.

The rapid population growth of Jos as previously mentioned, over the years has hatched several social problems of which the problem of refuse has reached the magnitude of great concern for any patrotic inhabitant who is fairly knowledgeable about the hazards of refuse. It is a common sigh in Jos township to see heaps of refuse openly dumped within a maximum of every half a kilometer of the crowded section of the township. The site of wide spread litters, scraps of abandoned vehicles as well as filthy mechanic shops within the town is also not uncommon. According to Dr. Olude,

> Most diseases people suffer from in the country can be prevented by a clean environment. The open pilling of refuse breeds such household pests as mosquitoes and cockroaches which inturn contamination food in the homes and bring about diseases.[12]

The view of the hazards of poor refuse disposal have also been expressed by several health officials and knowledgeable individuals in the field of health. Not long ago, a doctor pointed out the health hazards of open refuse dumping as the breeding of infections, microbes and the transmission of them by flies and insect pets.[13]

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11. Yahaya Anako. Environmental Degeneration: A case study of Ilorin, M.Sc. thesis (U.R.P.), Zaria, A.B.U., June 1983.

12. Concord (2/4/84) Op. cit. page 5.

13. D.O. Stephen. The problems and Methods of Waste Disposal in Nigeria: The case for large scale incineration. Conference paper, NISER, Ibadan, January 17-19, 1983. page 1.

Several renewal schemes have been carried out in Jos by the Plateau Urban Development Board to give the town a 'face-lift," such schemes include the general elimination of dilapidated buildings, the building of gardens and recreation spots, the phasing out of old market and the disbanding of some old parks to new and better planned space. Such redevelopment schemes would be tantamount to wasted effort if they are overshadowed with refuse dumps and filth, at Least for aesthetic reasons. This view is also shared by Wilfred when he said;

> In some of the larger re-development areas in our cities, the environmental is unnecessarily dirty - indeed positively filthy... Roads are littered with papers and all kinds of filth and rubbish. Where re-development has been carried out close to such existing circumstances, the air of depression seems after a time to overwhelm the new buildings. If however, the new development is isolated from the old, it maintains it's high standards.[14]

A positive approach to this problem should be a total war for the eradication or o rubish, dirt or filth and their associates from the environment. This can be achieved only through good management and administration of the refuse disposal system or mechanism and this bring us to the other specific problem of this study, that is the problem of administration of refuse disposal in Jos township. The problem of refuse dumps and health hazards already discussed have been compounded by the

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14. Wilfred Burns. New Towns For Old, London, Leonard Hill Ltd., 1963, page 93.

lapses in the administration of refuse disposal such as personnel, finance, equipment and Co-ordination.

Personnel - Either staff responsible for the disposal of refuse are too few or they have failed to put in their maximum. Also the problem of shortage of skill manpower could be a factor.

Finance - The role of a sound financial footing is a pre-requisite for any organization to survive and carry out its functions in order to realise set objectives. Money is needed to pay and maintain the workers, by equipments and for capital projects. However the availability of fund does not automatically mean a success, rather it is the prudent management of the fun. How prudent has the government been in the management of the fun allocated for the disposal of the refuse in Jos township?

Equipment - The question to be asked here are; whether the equipment currently being used by the government for the disposal of refuse are adequate, outmoded, are frequently serviced or whether out functioned ones are being replaced. The problems of equipment are no doubt embeded in the above questions.

Co-ordination - The problem of coordination lies in how the functions and activities of the various bodies and their staff who are responsible for the refuse disposal in Jos township are coordinated inorder to avoid, duplication of effort, redundancy, confusion

and to absorb conflicts. From the present set up, it is not only the Plateau Urban Development Board (PUDB) that has the sole responsibility of the refuse disposal. The Jos local government and the state ministry of health both have roles to play.

D. The Aim of Study.

The research study was undertaken for the following specific purposes,

(a) to look closely at the environment of Jos, to find out the quality of refuse disposal method by the individuals and government.

(b) to examine the responsibility of the inhabitants for the filthy environment and the effect on them.

(c) to find out the administrative role of the Plateau state government and its agencies in causing or trying to solve the refuse problem in Jos.

(d) to recommend planning proposals so as to alleviate or eradicate the problem as well as preventing future reoocurence.

E. Methodology.

Several steps were taken to ensure that adequate and accurate data were collected. Such steps included a general survey of the study area, the use of questionnaire, personal or oral interviews and the use of

documented information.

A tour was conducted around Jos township to observe and study the physical environment with specific attention to refuse dumping within residential areas. Photographs of particular sites manifesting the problem were taken as shown by the various plates.

In administering the questionnaire, 67 streets out of the 102 recognised streets of Jos township were randomly selected through drawing lots. About 12 households of each of the 67 streets were selected by systematic sampling, that is to say a household from every 5th house. The sample size consisted of a total of 800 people. There were both males and female among the sample.

Those interviewed orally included officials of Plateau Urban Development Board (PUDB) such as the Manager, Secretary, Chief health officer, Sanitary superintendents and refuse collectors. Also included are the permanent secretary, Chief state health officer, health superintendent for environment and sanitation of the ministry of health. Also the chief health officer and senior health superintendent of Jos L.G.C.

Documented informations related to the study were sought for from the following sources,

(a) files containing circulars, minutes classified and unclassified documents relevant to refuse disposal and environmental sanitation,

(b) state government publications such as;

(i) Plateau State facts and figures

(ii) Plateau State government owned boards and Cooperations.

(iii) Hand book on Plateau State

(c) journals and national daily newspapers and,

(d) the use of academic utilities and services, for example the University national and state libraries.

F. Limitation of study.

The study is limited to Jos township. The main criterion for choice of study area is for convinience of data collection because of the familiarity with the source of data. The study has been limited to only about 800 people selected through systematic sampling among the streets of Jos township. There was the difficulty of locating the number of some houses due to poor numbering on certain streets.

Another limitation is the topic coverage. All though refuse covers both the liquid and solid forms including human excreta, the study is limited to the disposal of domestic refuse of the residential areas of Jos township alone.

G. Significance of Study

The attitude whereby people through their refuse indescriminately in the open can be change by researches such as this, by pointing to them the hazardeous consequences of such attitude regarding health and pointing out

to the government ways by which such attitude can be changed. Also a more precise knowledge about the pattern of refuse disposal by the public and the refuse dumps would help the government develop more effective techniques for the implementation of refuse disposal plans.

It is believed that the findings, recommendations and conclusion of the study would serve as guide and source of inspiration to those in power and policy makers, to make more functional policy statements regarding refuse collection and disposal. It is also hoped that the findings and recommendations would induce the appropriate authority to critically examine the present system of refuse disposal which has proved inadequate with the intention of introducing a new system or reorganise the existing system. If this is done, the inhabitants are bound to experience the joy of living in a clean environment and the menance of open dumps and street litters may become a thing of the past.

Having treated the nature of the study and the research problem, the next area of focus is the work of past researchers which have direct or indirect relevance to environmental sanitation, especially in the field of refuse disposal inorder to point out the existing gap which has justified this study.

CHAPTER 2

LITERATURE REVIEW

A great deal of research work has been carried out in urban studies, bearing indirect relation to urban environmental sanitation. Such studies are usually titled, urbanization, urban development, urban re-development or urban renewal. Where such studies were carried out, only slight mention is usually made to the problem of deteriorating urban environment as regard the problem of refuse disposal. A lot of time is usually spent on the development of infrastructures such as buildings, roads, garden parks, motor parking space and street lighting. However, there are other relatively few studies bearing direct relation to the problem of refuse disposal. The study or urban health services and sanitary environment are like-studies. Where the latter is the case, the writer or researcher always have a lot to 'chew' as he or she had to deal with all the areas related to health including the construction, management and the financing of hospitals, health centres and dispensaries, so that at the end justice is not actually done to the refuse disposal problem.

In a study of urban settlement by Harry, he made mention of the social problem or urban environment due to the speed and magnitude of urban migration and the lagging ability of the cities to cope with the added

burden of human needs when he said,

> There is another question of grave importance in all countries today; the new shape and character of the human environment that results from urbanization and industrialization. Today, the major threat to human environment is more complex, more closely connected with the very way in which cities are built. Air pollution and noise, dorminated urban space with traffic ways and parking facilities, and creat serious problems of congestions and accidents.[1]

In the paper he stressed that these problems have persisted because of the failure to make significant innovations and the absence of comprehensive self-help schemes towards the solving of those problems. The main social problems tackled by the writer are the problem of unemployment, pollution and traffic congestion. He failed to bore deeply on other social problems like slums, refuse, litters and other human externalities.

In another study of the health services in Calabar township by Akpan, he had this to say of Calabar municipality.

> As a result of influx of people from various environmental backgrounds into Calabar municipality, and their failure to pay attention to elementary rules of hygiene, the residential and commercial area of the city are deteriorating. one sees over flowing dustbins,stagnant water in gutters choked with orange peelings, vegetable matter and paper..., solid wastes that present an eye sore in the city and car parts and trucks abandoned.[2]

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1. Harry A. Green. The Management of Urban Development In Nigeria, United Nations publications, March 1976. pages 2-5.
2. Akpan J. Ukpong. The Administration of Health Services in Calabar Municipality, M.P.A. thesis, Zaria, A.B.U., 1980, page. 51.

The study identified the following problems facing the Calabar municipal council who is charged with the study of refuse disposal among other duties.

(a) Inadequate number of refuse vehicles.

(b) Lack of funds to provide the minimum number of vehicles and allied machinery for refuse disposal.

(c) Outmoded basis of revenue allocation to the council vis-a-vis the population explosion in the municipality.

(d) Defective town planning without the provision of proper refuse disposal depots.

(e) Lack of Cooperation by the public.

(f) Apparent absence of health inspectors in the municipalities.[3]

The findings, above are peculiar or limited to Calabar municipality on which the study is based and not necessarily all other towns in Nigeria, unless otherwise proved by a study of the environmental sanitation of each of the other cities of the federation or sample study of them.

In another excercise by Mitchell, the environmental conditions of selected U.S. cities was highlighted. In this study only cities with degenerating sanitation were chosen for study. For the purpose of this review, Boston city will be used as a point of reference. It is the researcher's view that the refuse problem in

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3. Ibid. page 105.

Boston and many other cities was due to modern production technology which has enabled more goods to be produced, coupled with increased purchasing power of the people. This supports the assumption by Mitchel that consumption is directly proportional to the amount of refuse produced per capita.

> We can afford to buy more - so we have more to throw away... Many more items are wrapped in paper these days. Toys and gadgets break more easily. And, in general the life of our goods is shorter than those used by our grand father.[4]

He also proceeded to give the statistics of U.S. refuse turn out. Waste produced by U.S. in 1961 is estimated as 110m. tons of residential and commercial refuse. 1940, the residential and commercial total of refuse was less than 40 m. tons. This means that there was an increase of 70 m. tons of refuse turn out by U.S. within only twenty-one years. According to him, the cheapest way to dispose refuse in Boston between 1950s and early 1960s was simply to dump it in an open field and burn it after sometimes. The procedure cost the municipality almost nothing. Supervision was provided at big city dumps, only. About 80% of the municipalities of population less than 5,000 were as of the period (1950s-1960s) using open dumps as their principal means of refuse disposal. The gravity of the ineffectiveness of the refuse disposal method in Boston city in the early 1960s was put thus by Mitchell,

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4. Mitchell Gordon. Sick cities , New York, Macmillan Company, 1963. page 30.

5. [illegible] page 31.

> Urban sprawl, however, is making the unpleasant sight, the noxious smoke, and the menance to health of many open dumps less and less tolerable to nearby residents and public officials alike. The public health service claims the practice has long since become inadequate for the disposal problem of urban areas as they exist today, and condemns it as promoting insect and rodent infestation and as a danger to neighbouring communities.[5]

The passage continues further to stress the effect of open dumps on households.

> Those who live near open dumps are only too familiar with the damage they can do. Rats and vermin flourish on their garbage. Swarms of flies nourished by them have been known to deface the walls of houses with their droppings. Crickets bred by them have consumed wall papers of interior walls. Cockroaches that multiplied in a load of bad cotton constituted a scourage to the city of Boston, Bedford and Connecticut for a long time.[6]

Mitchell's study was based on some American cities and moreover on a time far back into the 1950s. The need for such studies to be carried out in Africa and Nigeria, particularly in Jos can not be over emphasised.

A thesis by Habibu on the health services of Kano discussed the metropolitan authority's inability to handle the environmental sanitation of Kano metropolis and the need for the government to give it a more serious attention. He said urban environment has now come to a stage that the government can no longer pay lip services to. He supported this notion with a phrase from the national development

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5. Ibid. page 31.
6. Ibid. page 251.

plan which said,

> An effective system of sewage, drainage and refuse disposal is one of the most important factors affecting human health and the environmental quality of human settlements. The prevailing situation in most Nigerian towns and cities as regards these services is still quite unsatisfactory. In many urban areas, out-moded methods are still being employed in disposing of human wastes; streets are frequently littered with domestic refuse because of the inability of township authorities to organise regular collection and disposal.[7]

He attributed the ineffeciency of the health authorities to perform well in Kano during the period of his study to lack of indecision of the government on which body to handle environmental sanitation in the state.

In 1970-'72, the function of environmental sanitation which was the function of the local government was assigned solely to the ministry of health, but they too could not cope with the task. The job was then shifted back to the local government council health authority in 1972-'74. Due to lack of enough disposal vehicles, the township authority (L.G.C.) also failed to tackle the problem of maintaining clean environments.
In 1974-'75, the function was again transfered to the state ministry of health for another chance, and in 1975-76 reverted to an arrangement whereby both the local government council and ministry of health shared the functions.

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7. Habibu Aliyu, The Administration of Health Services In Kano Metropolitan Area, M.P.A. Thesis, Zaria, A.B.U., 1976 page 79.

The unsteadiness in the allocation of function to a particular body for sometimes shows the confused state of the government at that time as a sign that the environmental cleanlingness problem was obviously getting out of control. However, observation reports have indicated signs of improvement over the years. As a result of his study, he made the following recommendations.

The appointment of a body independent of the state ministry of health and local government council assigned with the responsibility of refuse collection and disposal. He suggested that the said body should be given enough vehicles and other allied items. That the recommended body should divide Kano metropolitan area into zones and specific officers should be assigned to supervise the zones. This body he suggested should always be responsible for environmental sanitation as well as educating the general public on environmental hygiene. The board he further recommended should consist of highly professional officers and environmental engineers.

The above recommendations were however not based on an intensive study of the refuse disposal problem, rather based on observation and shallow investigation as details have not been indicated. For more comprehensive recommendations and proposals, the independent study of refuse collection and disposal method is required.

Another study of domestic refuse collection and disposal by Kenneth highlighted the implication of the prevalent arrangement for the collection and disposal of household refuse which involves the public performance of service that is financed by local general taxation. He is of the view that unless service charge is introduced for extra refuse produced per capita or household which is outside the range supposed to have been covered by local tax and subsidy, the refuse production per head would continue to rise. He puts it this way.

> The general arrangement of refuse service through tax encourages the individuals to over produce refuse. Whreas financing by general taxation promotes social economy in collection of whatever refuse households produce. It simultaneously promotes social diseconomy in abetting their over production of refuse. The argument begins once again with the understanding that the price charged for putting out additional quantities of refuse for public collection and disposal is for any one person, 'zero'. Had such costs been present, they would have provided a private economic advantage to altering one's consumption behaviour so that less waste should have been generated.[8]

It is not certain that if service charges are introduced for refuse disposal in Nigerian cities, most especially Jos, the refuse produced per head will reduce as assumed by Kenneth. In addition, his work was centred mainly on the financial aspect of refuse disposal. Other aspects

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8. Kenneth L. Wertz. "Financing the collection and disposal of household's refuse; Urban Affair journal (quarterly), Vol.9, No.4, 1973- '74. page 40.

still remain significantly unattended to, such as the general attitude of people to refuse disposal, methods of refuse disposal and degree of participation of authority in the collection and disposal of refuse. It is therefore necessary for studies to be conducted specifically to cover the mentioned areas.

A paper - presentation by the United Nations on the environmental challenge is of the view that the sanitation of urban or municipal environment can be effectively managed if only a check on population is made. The paper pointed out the threat posed by the present trend of population growth to human environment when it said,

> The need to give priority to the environment of settlements is underlined by the current trends in population growth, which suggest that by the end of the century the population of the world may be approximately double what it is today The proportion living in towns and cities may have increased from 40% to 50% of the total. In the developing world, where the greater part of these increase is expected to occur, current trends suggest that the urban population may jump from 25% to 43% of the total. These figures represent only the population of towns of more than 20,000 people.[9]

It was also noted that all available evidence and predictions based on present knowledge make it clear that to rescue the human environment, we must in the long run slow down the rate of population growth and ultimately bring it into harmony with the availability

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9. United Nations. The environmental Challenge. London, Macmillan Press Ltd., 1974, page 3.

of natural resources. It attributes the seriousness of refuse problem in the rapidly growing cities of the developing world to the inability of the municipal authorities to keep up with the tremendous amount of waste produced due to population growth. The refuse when left uncollected or dumped without proper treatment pollutes water and soil and attracts vermin and insects, thereby breeding disease.

The U.N. is therefore of the view that while seeking to further the economic and social development of our settlements, we must also seek to create an urban environment which both facilitates economic and social hapiness. This in turn means that policies and programmes concerned with promoting economic and social development must take into account the environmental consequences of the activities involved.

The relevance of the paper to the research is that both have a central concern, which is the problem of refuse. However, the main focus of the paper is that of population factor of refuse problem. The study in addition to population, covers the management facto.. and the roles of individuals in refuse disposal of Jos township.

Other areas covered by researchers which bear direct relevance to refuse disposal problem include the study of the relationship between refuse disposal or sanitation to the pattern of diseases. However,

researchers are yet to adequately prove that the sanitary condition or poor method of refuse disposal in some part of Africa, is directly responsible for the present pattern of diseases. In a concluding remark by Owen in his work on environmental predicament, he had this to say:

> Published reviews of diseases in tropical Africa repeatedly reach the conclusion that the major problem is persuading people to be sanitary. Those concerned with public health are constantly frustrated by the wide spread tendency among the people to throw waste or refuse and to urinate and defecte in public places at will, rather than at well defined places.[10]

Although one aspect of this study is to find out the effect of refuse dumps on the inhabitants of Jos township, the emphasis is not to affirm that certain disease patterns are caused by refused dumps, but to show how these open refuse dumps are potential source of health hazards, thereby directing the minds of future researchers to a critical study of the issue.

A part from the inability of the health authorities to cope with the collection of refuse produced by the inhabitants of most of the urban centres in Nigeria, which has resulted to the formation of refuse dumps, another marked problem area in refuse administration is how best to dispose of the refuse when collected. Stephen in his paper had this to say.

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10. D.F. Owen. Man's Environmental Predicament, Great Britain, Oxford Univ. Press,1973, page 103.

> One feature of the urban scene in Nigeria in recent years is the gradual 'take over' of virtually every available "open space" as refuse dumps... There is need now to evolve more effective methods, in order to be able to cope with both present and future problems of refuse disposal.[11]

In his paper, he discussed various methods of disposing refuse such as, compaction, crushing, extruding, tipping and incineration. He went further to discuss the merits and demerits of each of the methods enumerated. It is his view that there is the need for Nigeria to go in for large scale incineration, because according to him, incineration provides more advantages when compared to the other methods. Incineration he said, is highly hygienic, elination of problem of tipping like wind, pests and flies, helps to economise space through reduction of volume by burning and enables planners to cope with the industrial increase in population and human activities. The gap in his paper which has become an addition to this study is the problem of collection of refuse before coming to the disposal aspect. It is like to say, "get the meat first, before thinking of how to cook it." This research has in addition to disposal, attempted to find out the administrative lapses and the role of the individuals

11. D.O. Stephen. The Problems and Method of waste disposal in Nigeria: The case for large scale incineration, (NISER) conference, Ibadan, January, 1983, page. 2.

that has led to the formation of uncollected refuse dumps with reference to Jos township.

The next chapter discusses the historical background of Jos township on which the research is based. Among other things, the chapter will focus on the topography, climate, settlement and other centre of activities which have contributed to the rapid growth of the township.

C H A P T E R 3

HISTORICAL BACKGROUND OF JOS

Observation and experience have shown that the volume of refuse produced in a town or city is directly related to the human population. As the population continue to grow so also the volume of refuse and the problem of disposal and environmental sanitation. The relationship between population growth and environment has also been pointed out in a paper presentation by United Nations when it said, "The need to give priority to the environment of settlement is underlined by the current trends in population growth.[1]

In 1934, the population of women, children and men in Jos town was put by Leonard at 500,550 and 1,000 respectively. While in 1956 the population had grown to 2,750 women, 5,750 children and 3,000 men.[2] Going by this data, the total human population of Jos township including children in 1956 was 11,500. Seven years later in 1963, the census put the population of Jos township at 100,000 people. 1963 is about 22 years back and it is likely that the population must have doubled to 200,000 people.

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1. United Nations. The Environmental Challenge, London, Macmillan Press Ltd., 1974, p.3.
2. Leonard Plotnicov. Strangers To The City: Urban Men In Jos, Nigeria. Pittsburgh, University of Pittsburgh Press, 1967, P. 54.

The preceeding discussion focuses briefly on the history of the early settlement in Jos and some of the factors which were responsible for the rapid population growth of Jos township which has in turn led to more refuse generation within the township.

Jos is the capital of Plateau State and also a local government headquarter. It is situated approximately on latitude 9.5° North and Longitude 8.5° East and has a height of about 133 meters (4,000 ft) above the sea level.

Although the official date when Jos was founded is 1915, there were considerable number of Hausa residents by 1912.[3] As the town grew, settlement became on ethnic bases and people from the same ethnic group chose to settle together. This pattern of settlement was encouraged and even helped by the colonial administration to ease their administration. The citation below support the notion.

> From the very begining the colonial administration tried to keep culturally dismiliar groups seperate. Thus the urban centre of Jos was divided into two seperate administrative units. The local authority and the central administration.[4]

Today the people in Jos come from different tribes and prominent among them are the Birom and Angas. The former is believed to have come from the South and the

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3. Ibid. P. 41

4. Ibid. P. 41.

later from Bornu. Other tribes with fairly large population in Jos include the Jarawa, Irigwe (Miango), Rukuba, Hausa, Ganawuri, Yoruba and Igbo.

Climate - Due to its high altitude, Jos has a relatively cool wheather when compared to other parts of the country and this has served in no small measure in attracting imigrants to the town as most people will normally prefer to carry out their daily activities under a cool weather than hot one. The cool wheather has also been one of the motivating factor for white investors and missionaries' occupation of Jos and the activities of the whites have drawn some of the black natives to Jos. It is not surprising that the total white population of Jos is second to Lagos and Jos has the largest number of permanent white residents in Nigeria.[5] The yearly temperature range from 50 to 95°F and the average annual rainfall is between 40 and 70 inches.

Tin Mining - Another factors of importance to refuse generation and disposal in Jos township is tin mining. The rich deposit of iron ore of Jos Plateau and its environs was the sole magnator of Europeans to Jos in the early 19 century because they wanted to exploit its tin deposit. This view is also held by Leonard when he said,

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5. Information booklet. This is Jos, published by Ministry of Information, Jos. 1975, p.9.

> innitially Europeans were drawn to the Jos Plateau to exploit its rich tin ore resources... They determined in 1902 to send an exploratory expedition to pinpoint the deposits and obtain further samples for essay.[6]

The tin mining business did not only attract village peasants who left their farms to be employed in the mining business, but it also laid the foundation for other industrial activities. An example is the establishment of the Makeri Smelting Company. As more and more natives came to settle to work in the various mining organisations the population of Jos township kept on increasing, so also the volume of refuse generated. As the problem of where to dispose or dump the ever increasing solid refuse was still awaiting solution, the filling of the gorges and large pits created as a result of the mining activities became a handy answer. Both the government and some individuals began to dump their solid refuse or waste in these pits to fill them up. Up-till date (1985) some of these pits are still being used by Plateau Urban Development Board to dump or dispose solid refuse.

As the population of Jos town continue to grow steadily, industries started springing up to cater for the needs of the people.

Industries - The development of industries in Jos has been rather very slow when compared to some Nigerian

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6. Op. cit. (Leonard 1967), P. 42.

cities notably Kano, Aba and Kaduna. The initial problem which had greatly retarded such development was that of insufficient water and limited land. However these problems have been reasonably tackled. As industries continue to expand, the more the people coming in to seek for employment or to patronise finished products of these industries. Today Jos can boast of not less than ten well established industries, prominent among which are NASCO group of companies, Nigerian bottling company, Jos International Brewries and the Naraguta Brick Company.

Industries have contributed greatly to the ever increasing population of Jos. As we envisage the expansion of older industries and the establishment of new ones, so also we foresee the continuous increase of human population of Jos township and the increase in social problems which are concomitant to such population growth. One of such problem is the problem of refuse collection and disposal.

Tourist Attraction - Apart from permanent settlers in Jos, there are those who come in temporarily either on business trip or touring. These categories of people also contribute to the total volume of solid refuse of Jos township. One may ask what are the features that attract these tourist to Jos?

The cool weather and beautiful scenery have continue to be a major source of tourist attraction to Jos Plateau.

According to a Canadian expert on topography the Jos Plateau and its environs has one of the best scenery in the world for its land scape and topography.[7] The already mentioned features have been greased by other attractions like the Zoo, the Museum of traditional Nigerian architecture (MOTNA), Wild life park and the shere hills.

The Jos Museum is the first public museum to be opened in Nigeria and it was established in May 1952.[8] The museum is situated almost in the centre of Jos, West of the post office. It has in its custody relics of the NOK culture and scruptures. Diogonally opposite the museum is the MOTNA project comprising of characteristic typical traditional houses found all over Nigeria. Also opposite the museum is a small Zoological garden. The garden contains animals such as lions, chimpanzees, Zebras, porcupine, birds, crocodiles, and tortoise. The late in-mate of the Zoo who was the oldest animal ever kept by the Zoo was a tortoise named Williams and died at the age of 260 years. Along Miango road opposite the Commissioners quarters is the Jos Wild Life Park. The park contains similar animals as the Zoological garden except that in the Park

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7. Musa K. Ibrahim, Distribution of consumer Goods: A case study of Plateau State Supply Company. PGDM Project, UniJos, 1984, pp. 9-10.

8. Op. cit. (This is Jos) P. 80.

the animals have more degree of freedom, hence their behaviour appear more natural.

The shere hills though not in Jos township, is another source of tourist attraction. The hills are rugged and rise to the height of about 200 meters (600 ftt.

The rugged nature of the hills have been used as training facility for the citizenship and leadership training centre, the Nigerian defence academy students and many other moral and physical training organisations like the boys bridgade and the boys scout. The hills have in addition offered good opportunities to ardent hill chimbers.

The chapter has dealt on a brief historical back-ground of Jos, when it was established and the various factors which have contributed to the population growth of Jos which has consequently led to the problem of human externalities especially that of refuse disposal. The next chapter has analysed the data collected on the problem of domestic refuse disposal in Jos township as per questionnaire A of appendix B and responses to oral interviews as per appendices C to E.

CHAPTER 4

ANALYSIS OF DATA

The responses to the questionnaire have been tabulated showing frequencies and percentage analysis. Each table is presented and analysis made on it. The latter part of the chapter centres on refuse administration and discussion fueled mainly by the responses to the oral interviews.

TABLE I: About how many are you in the house?

TITLE	FREQUENCY	PERCENTAGE
1-4	246	31
Above 4	537	69
TOTAL	783	100

From the table (1) one observes that most of the houses have a population of more than four people. The relevance of this to the research is the fact that refuse production is directly related to human population because refuse is generated as a result of human externalities. Although it is not within the scope of the research to weigh the volume of domestic refuse being generated by households in Jos, the number of people per house could be used as a guide for describing the quantity considering the large number of houses in

every street, it is reasonable to say that the amount of refuse generated in a day per house of human population of above four as indicated in in table 1 can not be underated. There were several instances where a house had a population up to the size of twelve to twenty five. A typical example was the house of one Alhaji Maiwada with a family size of twenty-four and when asked why his family was so large he said he has three wives and all having issues. Another example is a house of a civil servant with a population of eleven and when also asked he said most of his households are his relations who came to the town either to look for work or school. The large family sizes of most of the houses has led to more refuse generation and has compounded the inadequacies of refuse disposal in Jos township. This observation was also made by Mitchell when he said,

> The refuse pile itself is getting more voluminous, partly because of expanding population and partly because each individual is generating more waste on the average.[1]

TABLE 2: Do you have dust bin in your house?

TITLE	FREQUENCY	PERCENTAGE
Have	614	78
Do not have	169	22
TOTAL	783	100

1. Mitchell Gordon. Sick Cities, New York, Macmillan Company, 1963. p. 230.

Before the data in table 2 was gathered, one would have easily tempted to assume that most of the people living in Jos metropolis do not have dust or refuse bins in their houses and might have been prompted to throw away their domestic refuse openly thereby leading to the formation of open refuse piles or heaps. But from the data in table 2 it is observed that three quarters of the sampled population possess refuse bins. In fact the house holds of some of the houses had up to three refuse bins, one placed in the kitchen, another inside the house and a third outside the house. It was noticed during the field trip that there are variations in the quality and sizes of the refuse bins. The use of big drums was very common while others use cartons, buckets and very few use special refuse bins provided by the health department of the Plateau Urban Development board. When asked, what had prompted them to possess or use refuse bins, three categories of answers were recorded.

Majority of the people claim they use refuse bins for convenience sake that the bins minimise their trips to the open dumps. Another group believe that the possession of bins reduce health hazards which might result from contermination of food by microboes which are transmitted by flies, rats or cochroaches. A third group said they were forced to possess bins because they needed a form of container for transporting

or carrying their domestic refuse to dumping places. To the later set of people, bins are seen as mere containers for carrying refuse and if it were possible to transport or carry the refuse they generate with their bare hands they would have jolly-well forgotten about possessing bins. It therefore implies that any health benefit they enjoy by their possession of these bins is secondary and accidental as their primary aim of possessing the bins is not health oriented. The question now is if so much of the population of Jos possess refuse bins, why then the sight of several heaps of open dumps scattered all over the township? Analysis of later data may throw light on this question.

TABLE 3: Does your bin have cover?

TITLE	FREQUENCY	PERCENTAGE
Have	171	22
Do not have	612	78
TOTAL	783	100

The possession of refuse bins as indicated in table 2 is not sufficient to prevent health hazards associated with open refuse dumps, this is because microbes which are transmissable by insects and rodents from open refuse dumps could equally be transmitted from opened refuse bins. It is this light, that the

government through one of its health agents, the PUDB has been making efforts to enlighten the public about the need to have bin covers. As can be seen from table 3 most of the households of the metropolis do not have covers for their refuse bins. It is surprising that while so many of the inhabitants have bins, only so few have covers for them. The only feasible explanation might be the fact that the design, make and sizes of the bins used are many hence everybody just use whatever container they can lay hands on as a refuse bin. Since most of such containers are not designed for that function, they are usually without covers. One respondent living at Alheri claimed that she did not see any need for providing a cover for her refuse bin as she empties it quite regularly at the open dump near her. Another respondent who prefers to be treated in confidence said his bin originally had a cover but the cover kept falling off whenever the bin was overfilled and he did not know the whereabout of the cover as of the time of the interview. When asked whether he had the intention of replacing the missing cover, he said he did not consider it necessary and if he is killed as a result of the contermination of his food due to the uncovered bin, that is his destiny as planned by God. There were several others who shared the same view with

the two respondents. There were however few who blamed their inability to have bin cover on austerity. They said they have not got enough money to buy refuse bins with covers. They complained that although the bins sold by PUDB to the public are cheap, their sizes are too small.

TABLE 4: Where do you empty your dust bin or dump your refuse?

TITLE	FREQUENCY	PERCENTAGE
Incinerator	0	0
Over the fence	31	4
Gutter	32	4
River or Stream	18	2
Open dump	692	89
Pit	10	1
TOTAL	783	100

The disposal of refuse generated domestically is in two main phases. The first is the disposal by the households and the second phase involves the disposal by the government or her agencies. The disposal pattern of the households is believed to have a positive or a negative effect on the pattern of disposal by the government. In short, a very poor or

careless method of getting rid of domestic refuse by the households can escalate or aggravate the problems of refuse disposal in general. On this, Mantell has this to say,

> ...that inefficient and improper methods of disposal of solid wastes by members of the public results in scienic blights, create serious hazards to the public health, including pollution of air and water resources, accident hazards, and increase in rodent and insect rectors of diseases, have and adverse effect on land values, create public nuisances otherwise interfere with community life and development.[2]

From the percentage analysis of table 4, it is clear that the method of refuse disposal by households is varied. Although a greater percentage dispose of their domestic refuse by open dumping, none of the four methods of disposal is free from health hazards associated with poor method of refuse disposal. Those who throw their refuse over the fence as indicated in the table not only endanger their lives but also the lives of other neighbours on the other side of the fence as both stand the danger of likely epidemics. Those who throw their's into pits or gutters may create good breeding habitas for disease causing microbes or blockage of drainage. While those who throw their refuse into streams or rivers do not only polute the water for those living down the stream but

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2. C.L. Mantell. Solid Wastes: Origin Collection, Processing, and disposal. New York, John Willey and Sons, 1975. pp. 4.

hasten the spread of diseases as the causative agents of such diseases are conveniently transported to other victims along the stream.

When asked why they have chosen their present method of disposal, their answers can be summed up to just a matter of convenience and lack of other simpler alternatives. Those who throw theirs over the fence claimed they were far from open dumps, those who throw in pits said they wanted to fill up the pits close to them, while those who throw their's in streams and on open dumps said they could not think of other alternative places.

TABLE 5: Which is your highest daily refuse component?

TITLE	FREQUENCY	PERCENTAGE
Paper	83	11
Food material	611	78
Ash and dust	39	5
Metals and Cans	29	4
Others	21	2
TOTAL	783	100

The tabulated response on table 5 by the researcher indicate that 78% of the households said that their highest refuse component is food material. However the composition of domestic refuse is a dynamic one

and has been undergoing changes in line with increasing technology. The same view was expressed by Arnold when he said,

> Growing affluence brings not only an increase in the amount of waste but also a change in its composition. It is estimated that the weight per head of domestic refuse in some metropolitan areas has almost doubled in the past twenty five years.[3]

A good knowledge of the components of domestic refuse will not only help the government agents responsible for the collection and disposal of refuse to plan a better and more effective method for collection and disposal but will in addition enable them think of effecient ways of salvaging some of the compoents for refuse. This same observation has been made by Mantell when he said,

> The failure or inability to salvage and re-use some refuse components or materials economically results in the unnecessary waste and depletion of our natural resources.[4]

Observation and answers to oral questions show that most of these food materials are wet and mainly in the form of left over food, vegetables, peals from tubers and spoilt food. The fact that about 78% of domestic refuse of Jos is food material explains why most of

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3. ARNOLD PACEY. Sanitation In Developing Countries Chishester, John Willey and Sons, 1978, pp. 46.

4. Mantell, C.L. Op. Cit. P. 6.

the open refuse dumps are moist in appearance. The most nature of those dumps further increases the health hazards which those living near such dumps are exposed to as most microbes thrive best under such conditions, as said by Hobson below:-

> moist refuse encourages the breeding of flies and rats and can be directly responsible for the dissemination of many diseases. For aesthetic reasons also, prompt removal of refuse from the vicinity of dwelling is essential.[5]

Paper which is the second highest on the other hand can lead to fire disaster as fire originating from certain open dumps have been responsible for some fire accidents in homes. One of the respondents told me that the house of a family friend living in Dogon Karfe was gutted down by fire and the cause was traced to fire from refuse dump. A burning substance was blown by wind to a field of dry grasses. The burning of the grasses subsequently led to the said fire incident.

Apart from thinking of the dangers posed by those components, a positive side of it is the introduction of a technology which can process some of those components for re-use. One may say Nigeria is not yet ripe for such tenhnology, but we already have tissue paper factory at Aba which uses wasted or used

5. W. Hobson. The Theory And Practice of Public Health London, Oxford University Press, 1969, pp. 91.

papers as her main raw material. The re-use of the papers which are disposed of in tons per year all over the country would at least help boost the state of the country's economy.

TABLE 6: How often do you empty you bin per week?

TITLE	FREQUENCY	PERCENTAGE
1-2 times	15	2
3-4 "	250	32
Daily	518	66
TOTAL	483	100

One would have thought that the fact that majority of the people possess refuse bins as in table 2 would have reduced the frequency of their disposal at the dumps per week but this has not been the case as shown in table 6. More people visit the dumps daily to empty their refuse. Houses with family population of four and above per a household in most of the streets, empty their domestic refuse at such a frequency as indicated in table 6 without a counter frequency of collection from the dumps by the health authorities. There is bound to be the problem of uncollected refuse heaps as is presently the case in Jos township.

TABLE 7: How many times do refuse collectors collect refuse from dump nearest to your house per week?

TITLE	FREQUENCY	PERCENTAGE
Zero	615	78
Once	69	9
Twice	61	8
Thrice & above	38	5
TOTAL	783	100

The sight of refuse heaps in Jos township is not unconnected with the very low frequency of collection of refuse from dumps by PUDB refuse collectors as indicated in table 7. A situation where $\frac{3}{4}$ of the respondents claim that refuse are not collected even once in a week from where they dump their domestic refuse is quite a serious situation when compared for instance with the United States of America where an average frequency of collection per week is about 48 times.[6] One Mr. Adegoke living in Apata said that government officials responsible for collecting refuse from the dump near his house have not done so for the past two months despite his repeated complain to the office concern. There were several other

6. Op. cit. (Mantell 1975) P. 49.

respondents with similar assertions. Those affected most about the non collection of refuse from dumps near them are people living in Dilimi, Nassarawa Gwom, Apata, Laranto, Alheri and some parts of Tudun Wada. When the health superintendent of the PUDB was contacted on the issue, he said work was usually assigned to specific streets daily for the purpose of refuse collection and the workers were rotated daily to cover all the streets in the metropolis hence in his own popinion it was not possible to leave refuse in some part uncollected for a period of two months as claimed by some people. However it is the researcher's view that the statement is 'face' saving statement as most of the field workers contacted agreed that there were even cases of refuse dumps uncollected for periods lasting more than two months due to lack of sufficient vehicles and workers. The inability of the PUDB workers to collect refuse regularly from dumps has been a thing of concern for those living near such dumps as they have been suffering the effect in one way or the other as shown in table 8

TABLE 8: Which is the most disturbing effect of open refuse dump near your house?

TITLE	FREQUENCY	PERCENTAGE
Smell	82	11
Insect and pest	684	87
Smoke	17	12
TOTAL	783	100

Any body who is familiar with Jos especially between 1980 and 1984 will agree that open refuse dumps are common sights, one would not require specil effort to site one. Plates 1-6 are examples of such open refuse dumps. Table 8 show that respondents regard insects and pest as their greatest nuisance, notably is the cockroach (periplaneta Americana) and housefly. The cockroach can not breed successfully on the dump due to its moist nature and exposure to sunlight, hence they go to the refuse dump in the night for feeding and come back to the nearest houses to the dump for hiding and breedihg. What makes these insects particularly dangerous is the diseases which they disseminate. According to Harry,

> Open dumps have a particular importance for health services. Cholera has reappeared in India's large cities, Typlus and dysentry are endemic in the shanty towns of Latin America and other third world countries.[7]

Apart from the breeding of disease vectors, there is also the physical and on the spot effect of smell due to the proximity to the dumps of some houses. Decaying materials on the dump emit strong ordour mixed with ammonia gas which pollutes the breathing air. One of the few respondents who complained of being distrubed by smell from refuse dump said he occasionally looses his apetite when the ordour becomes

7. Harry A. Green. The management of urban development in Nigeria , Ife. University Press, 1974, P. 36.

very strong. Few others complain of smoke as a result of burning on the dump. The effect of smoke got the least complain because the smoke gets thiner as it is being dispersed by wind, therefore only those living very close to the source of smoke are most affected.

TABLE 9: Which of the following diseases you suffered from can be associated with nearness to refuse dump.

TITLE	FREQUENCY	PERCENTAGE
Disentary	138	18
cholera	2	0
Diarrhoea	39	5
Others	0	0
No association	604	77
TOTAL	783	100

Table 8 only shows the percentage analysis of the direct effect of the open dumps on households and mentioned the fact that the insects or pests are disease vectors or carriers, while table 9 aims at showing which of these diseases do the households associate with the menance of open refuse dumps near them.

The table shows that many people are yet to understand that common ailments such as dysentary and diarrhoea could be caused by poor refuse disposal method. In table 9 $\frac{3}{4}$ of the respondents do not agree

that the dysentary and diarrhoea which they frequently suffer from have association with refuse. For instance a respondent said in a'broken' English, "Any disease I get, na from God no bi from dorti." meaning any disease she contacts is caused by God and not refuse.

The data gathered as regard this is not sufficient to link the disease suffered by any individual to refuse or nearness to refuse dumps, but it is medically acceptable that vectors such as insects and rodents are capable of transmitting or conterminating food with disease causing microbes. These microbes gain entry into human bodies and after passing through some stages may cause diseases associated to them.

TABLE 10: Has your gutter or drainage been block by refuse?

TITLE	FREQUENCY	PERCENTAGE
Yes	572	73
No	211	27
TOTAL	783	100

When refuse disposal is not properly managed or controlled, the destination of the refuse generated becomes varied. Some are blown and scattered by wind, rain, animals and sometimes even human beings help in the unorderly dispersion of the refuse and

this may result in blocking drainages. In table 10, a high percentage of the respondents agree that their drainages have been blocked by refuse. When some of them were asked why they have not removed the refuse from their drainage, they claimed to have been doing so, but fresh refuse are carried from unknown places to re-block the drainages or gutter. Others claim that some people have formed the habit of throwing their refuse into gutters and drainages which has resulted to their being blocked.

It was observed that refuse collectors push their wheel barrows along some streets removing debris and refuse from blocked gutters and frainages. Removing these debris and refuse is a good move, but mere removing them from the drainages frequently will not stop a reoccurence. The appropriate step could be to stop who or what is responsible for bringing the refuse into the gutter or drainage from doing so.

TABLE 11: Through which of this means have you been most informed about keeping your environment clean?

TITLE	FREQUENCY	PERCENTAGE
Radio	621	79
Television	94	12
News papers	18	2
Posters	42	6
Community leaders	8	1
TOTAL	783	100

It is always difficult to get the cooperation of one who does not know what you are doing and why you are asking him to carry out a particular assignment. The same goes for public cooperation in environment sanitation or refuse disposal, the public has to be well informed about the health hazards and the advantages of keeping their environment clean. The effectiveness of the informing media decides the degree of public response and cooperation.

Radio has been widely accepted for its ability to disseminate information to the grass root. Radio sets are relatively cheap and can be purchased by the common man. The acceptance is shown in table 11 and seconded by television. Less people claimed to have been enlightened through news papers and posters. Many people are not literate enough to read and interpret posters or news papers and with the austerity many can not afford to buy news paper daily.

When the PUDB health Superintendent was asked to comment why there are very few posters in circulation, he said it cost more to enlighten the public through posters and the financial status of the board is not buoyant to print enough posters. The board he said has for an alternative resulted to the use of electronic media like radio and the television which are government owned.

TABLE 12: What is the distance of your house from government approved dumping spot?

TITLE	FREQUENCY	PERCENTAGE
Near	40	5
Far	88	11
Not aware of approved spot	655	84
TOTAL	783	100

Some individuals must have reasoned logically that the indiscriminate dumping of domestic refuse by households is as a result of their distance from government approved dumping spots. However, the tabulated responses on table 12 indicate that the pattern of refuse disposal has not been so much influenced by the distance of dumping spot as only 11% claim to be living far from government approved dumping spot. Whereas over 80% claim not to know any government approved dumping ground. As a result they have decided to empty their refuse bins on open dumps near them because they saw others dumping theirs at the same spot.

When the chief health officer of PUDB was asked in connection with approved dumping spots, he said his department has actually not maped out spots where households could dump their refuse, instead the households have been instructed to put their bins infront of

their houses for collection of the refuse by refuse collectors. He however, pointed out that spots used by his department for disposing refuse could be regarded as approved dumping ground, if only the households can take their refuse to such sites for disposal. He gave an example of such site as the one opposite Tati hotel along Zaria road.

TABLE 13: In which of the following ways can you identify yourself with regard to helping the government to dispose refuse?

TITLE	FREQUENCY	PERCENTAGE
Community/Self help	45	6
Educating others	42	5
Complain/ petition	197	25
All of the above	3	0
None of the above	496	64
TOTAL	873	100

The job of refuse disposal should not be made to lie solely with the government and her agents, the cooperation, support or effort of the individuals and the community are very important.

> The public clamour for better policies because many governmental programmes simply do not work, old problems resist solutions while new problems continue to rise. This situation can be improved if only the public can be dissociated from the

> believe that only the government can do something about the most crucial problems confronting society, such as the deterioration of the environment.[8]

The individual or community's role in regard to refuse disposal in Jos township is low as indicated by the data in table 13. Many of the respondents claimed not to have done anything in the form of community or individual to aid the government in her war against filth. When those in this category were ask why they have not helped, their answers were as if rehearsed a waiting the coming of the researcher. "What is the work of the government?" Some put it in another form but still meaning the same thing. "Are we to do the work of the government for them?" Them, here implying government paid officials.

Among those who have put in some efforts, such efforts were mostly directed towards petitioning or complains rather than physical participation in clearing refuse as can be observed in table 13. This negative attitude by the general public has rendered the job of the P.U.D.B. health department more difficult.

TABLE 14: Is there a motorable road to the spot where you dump your refuse?

TITLE	FREQUENCY	PERCENTAGE
Motorable	696	89
Not motorable	87	11
TOTAL	783	100

8. Jerome B. McKimey and Lawrence C. Howard. Public Administration; Balancing Power and Accountability, Illinois. Moore Publishers, 1979 P. 63.

The non availability of motorable road to sites of open dump could compound the problem of refuse disposal as it will be difficult to get refuse vehicles to the dump spot. However the data in table 14 shows that the existence of non motorable roads to refuse dumps is minimal, as over 80% of the dumps have motorable roads leading to them. This means that the cause of refuse dumps dumps not collected for weeks in some parts of Jos township by PUDB refuse collectors can not be so much blamed on lack of access roads to the dumps as only 11% of the respondents affirm the non availability of access roads to refuse dumps near them.

The lack of regular disposal of refuse from some open refuse dumps can not be attributed to only one factor. Table 14 has shown however, that the lack of access road to refuse dumps is a trival factor when considering factors which are responsible for lack of collection of refuse from refuse dumps.

TABLE 15: Have you ever been moved from your residential area because the government considered the area filthy and wanted to redevelop it?

TITLE	FREQUENCY	PERCENTAGE
YES	63	8
No	720	92
TOTAL	783	100

The data on table 15 show that a very high percentage (92%) of the people have never experienced any displacement due to redevelopment excercise aimed at getting rid of filthy environment in their residential areas. But certain streets particularly dirty and houses in Nasarawa Gwom, Tudun Wada and Alheri are crowded and the environment very filthy. These areas need to redeveloped. Some houses in those areas need demolition and proper drainage system or construction.

One of the respondents living in Nasarawa Gwom complained bitterly that lack of disposal of refuse generated by households has foiled the air around them with smell and that the problem has been worsened by overcrowding in the area because people were building or erecting structures illegally. It is the respondent's view that the government should come in and redevelop some of areas, but he advised that proper arrangement will have to be made to accommodate temporarily those to be affected by such a redevelopment excercise. The idea of providing temporary settlement for those displaced for thepurpose of redevelopment of a filthy area is supported by Van when said,

> Where housing conditions exist, that are intolerable and constitute a threat to safety and health, they should be corrected through redevelopment while providing alternative

settlement for those affected during the period of correction.[9]

TABLE 16: Have you or any known person ever been convicted or procecuted on sanitary grounds.

TITLE	FREQUENCY	PERCENTAGE
Yes	63	8
No	720	92
TOTAL	783	100

It is assumed that the indiscrimate dumping of domestic refuse in Jos township has been encouraged by lack of appropriate enforcement of sanitary laws and prosecution of offenders. The tabulated frequencies and percentage analysis of table 16 supports this assumption as 92% of the respondents claim that neither them nor any body they know has ever been prosecuted on sanitary ground. When one of the respondents was asked why she has formed the habit of throwing her refuse in the open said, "I am not the only one who does so, other neighbours throw theirs in open too." If she had seen or witnessed the prosecution of any of her neighbours for throwing refuse in the open, her answer would probably have been different.

9. Van Hyck And G.O. Hornung. The citizens guide to urban renewal Philadelphia, Chandler Davis Publishing comp., 1962 P. 19.

Having so far analysed the data from responses to questionnaire, the next area of discussion is the administrative aspect of refuse disposal in Jos metropolis. The ensueing discussion will be based on primary data gathered mainly from oral interviews. Attention has been given to areas of personnel, equipments, collection and disposal, and the roles of ministry of health and local government council finances and enforcement of sanitary law.

Personnel - The government body directly responsible for refuse disposal in Jos metropolis is the Plateau Urban Development Board (PUDB). Since the board has other responsibilities like town planning, traffic installations and land matters, a department was created to deal with sanitation of the township. The department is the health department.

The health department of the board has a total staff strength of about 453 workers out of which 304 are directly involved with solid refuse disposal within the township while about 149 are involved with sewage disposal. A breakdown of the 304 workers show that 18 are drivers, 278 are refuse collectors and 8 are headmen. The above figures do not include senior officers. There are a total of 4 senior officers, one being the chief health officer, while the others are of health suprintendent rank but assigned to

different duties such as, complaint, work schedule, information and public enlightenment officers.

A further breakdown of the personnel strength in respect to human population per head in Jos reveals that there is one refuse collector for every 658 inhabitants. When this is compared to that of U.S.A. with solid waste handling manpower of about 340,000 and about one for every 600 inhabitants, one will obviously be tempted to conclude that the personnel strength of refuse handling of the board is adequate.[10] But considering the sophiscation and mechanised system of refuse disposal in U.S.A., less hands are actually needed than that of the PUDB where refuse collection involve alot of mannual labour.

The staff inadequacy of the board was confirmed by 98 out of the 100 refuse collectors interviewed. They said the board should increase the staff strength of the health department as the present strength can no longer cope with the disposal of the volume of refuse being generated by the public, most especially as most of them have resulted to the use of wheel barrows for the collection of solid refuse. They were also of the view that the impending plan by the board

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10. C.L. Mantell. Solid Wastes: Origin, Collection, Processing and disposal. New York, John Willey and Sons, 1975 P. 49.

to retrench some of them should be abandoned as such action they believe will worsen the present poor sanitation of Jos metropolis.

But the health superitendent incharge of work schedules held a contrary opinion. He said that the need to employ more workers may not be necessary if more refuse equipments are bought and the disposal system made more mechanised.

My interview with some of the refuse collectors reveal that none of them have been sent on training since they were employed. The qualification of most of the refuse collectors ranged between primary seven or six (first school leavers) and primary school drop outs. Their working experience fell mainly between six to ten years. The chief health officer is of the belief that the nature of the work of the refuse collectors does not warrant further training outside the board's system as their work is mainly manual and does not require special skill.

Equipment - The equipments used by health department workers of PUDB for the collection and disposal of solid waste in Jos township are, tippers or trucks, compactor vehicles, caterpilar loader, wheel barrows, rakes, forks, shovels, and bass brooms. As earlier mentioned, most of the equipments desire the use of manual labour which has given rise to high personnel

requirement. Although the labourers were not able to give the correct number of the various equipments, I was able to get the information from the administrative section of the health department.

The department has one caterpilar loader, one compactor vehicle, six partially covered refuse vehicles and four open trucks or tippers, making a total of twelve refuse disposal vehicles. Formerly the department had a total of twenty vehicles but eight became unserviceable and have been auctioned. The department in addition to the twelve vehicles have two hundred and fifty (250) wheel barrows out of which only about one hundred (100) are useable. There are also about ninety eight (98), one hundred and two(102), and sixty five (65) useable shovels, rakes and forks respectively. When the chief health officer was asked whether he felt these equipments were sufficient for the workers to carry out their work effectively, he said the equipments were far inadequate and that more compactor vehicles, loaders, tippers and mechanical sweepers are required.

It is imperative from the above breakdown of the number of vehicles that only twelve refuse disposal vehilces are not sufficient for the collection of refuse generated by the town such as Jos with about one hundred and two streets,[11] with each house having

11. Street guide of Jos township, State Ministry of information Jos. Government printing press 1982. P. 1.

an average of over five peoples.

The few number of vehicles and equipment is one of the main factors responsible for the very low frequency of refuse collection from dumps or refuse bins. In most cases, refuse is not even collected once from many open refuse dumps in a week or longer period as indicated in table 8.

Refuse collection - Domestic refuse are collected from three main sources and the sources are; from refuse bins, street litters and from open dumps. For every working day a work schedule is drafted by a senior health officer. This schedule include the particular vehicle, the driver and the workers assigned to zones of the township. Those with wheel barrows are in addition supplied with rake and brooms. These category of workers push their barrows along the streets which they are assigned and sweep road litters into their barrows and when filled, the barr ws are empitied at a spot for collection by refuse vehicles. Those attached directly to the refuse vehicles are armed with shovels and forks which they use for loading refuse into the vehicles. Also dust or refuse bins along major streets are emptied into the refuse vehicles. Where refuse heaps are too voluminous the help of a caterpillar loader is often required to load the refuse into the refuse vehicles.

The use of the compactor vehicle is of particular advantage in refuse collection when compared with the other refuse vehicles. The refuse loaded in the compactor are compressed, thus preventing the refuse from being blown or scattered by the wind while the vehicle is in motion.

However, due to the relatively few number of refuse vehicles and workers, some refuse dumps are not visited for weeks for collection. Some of the inhabitants with personal dustbins infront of their houses do not have them emptied according to the arrangement with PUDB and this often results to over filling of the bins with some of the contents scattered all around the bins.

Refuse disposal - Refuse collected by the method already described is disposed of mainly by landfill and in some few cases by composting. The option of disposing of refuse by land filling has become an obvious choice considering the several large pits and gorges in and around Jos as a result of mining activities. The reclaim of some of these wasted land will be an economic point of vantage for Plateau State as a whole.

The PUDB has been trying for about 3 years running (1981-84) to reclaim a land opposite Tati hotel along Zaria road through the land fill method of refuse disposal. Tons of refuse have been empitied there, yet

the land has not been totally claimed. Because this site is in the heart of the town many houses around the area have been inconvenienced by the smell, smoke, insects and rodents resulting from disposed refuse. The lack of sanitary precussion in the way refuse is disposed at the site makes one wonder whether it is actually a land filling method or a 'giant' open refuse dump in the making.

> Although sanitary landfilling is an acceptable method of solid waste disposal, it has not received wide public acceptance, principally because so many communities have called their open dump a sanitary landfill. The public's or some government's misconception of sanitary landfill results from the fact that vast majority of land disposal sites are not sanitary but open and burning dumps.[12]

The ideal landfill practice should be a method of disposing of refuse on land without creating nuisances or hazards to public health or safety by confiding the refuse to the smallest practical area and volume and to cover it with a layer of earth at the conclusion of each day's operation, or at such more frequent intervals as may be necessary.

The Roles of Local Government Council and Ministry of Education - The essence of this passage is to focus briefly on the Ministry of education and

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12. Ibid. PP. 71.

the health department of the local government council to see how their functions relate or interlock with that of the PUDB as regards to refuse disposal in Jos township. The Ministry of Education (MOE) is the parent body covering all health aspects of the state. While Jos Local Government Council (LGC) has Jos township in its domain and also serving as the headquarters. One might ask "since refuse disposal in Jos township has become the responsibility of the PUDB, does the Ministry of Education (MOE) or the Local Government Council (LGC) have any other role to play in this direction?"

Responding to one of the oral interview questions, the chief health officer of Jos Local Government Council (LGC) said the Local Government Council's (LGC's) health department is responsible for sanitation in the districts of Jos LGC and that the districts have sanitary labourers and inspectors. He added that although the district sanitary officers are under their control, they are answerable to the environmental health section of the state Ministry of health (MOH). He also said that although the sanitation of Jos township is the responsibility of the PUDB, they sometimes organise joint effort like cleaning campaigns where the Local Government Council (LGC) labourers and the PUDB workers join hands to keep the township clean.

Another area of cooperation between the two bodies is the secondment of workers to the LGC by the PUDB to aid the district sanitary workers. The chief health officer sited an example of the secondment of all the cementary workers from PUDB to the LGC health department to aid the department in her war against filth in the districts. However, the role of the LGC in refuse disposal in Jos township is very meagre as most of the responsibilities are being shouldered by the PUDB.

The Plateau State Ministry of health has a state environmental health section which is responsible for environmental sanitation in the state. The section oversees the activities of the PUDB. This section also has a health education unit which issues all form of propaganda and campaign on environmental sanitation. The ministry of health occassionally second workers to the health department of PUDB. The environmental sanitation officer gave an instance where 15 staff were seconded to the health department of the PUDB to help boost the strength of their sanitary workers. The ministry of health is incharge of making public health policies but with consultation with some PUDB administrative and health officials. The new edict on environmental sanitation just promulgated is one of such policy issues hatched from the ministry of health.

Although the environmental health section of the Ministry of Health (MOH) oversees the activities of the PUDB, the board is responsible for the implementation of sanitation policies in Jos township and this had made the PUDB the main point of focus in this study.

Financial Resources of PUDB - The board which is charged with the improvement and the maintainance of sanitary conditions in Jos township as one of its main functions derives its resources from three main sources. These sources are spelt out in law number 19 of 1982 and these include loan and grants from the government, power to borrow money from organisations and money generated through investments and fines.

Section 14 and 16 of the law provides for the government to give grants to the PUDB to enable it carry out its functions. "It shall be lawful for the government to make to the board: grants of any sums or property as the government shall deem fit." The same law has also made provision for the board to secure loan from the government upon such terms as to repayment, payment or interest or otherwise as the government may determine.

> If the government makes any loan to the board at any time in accordance with the provisions of this law, the board shall, if so required by the governor, issue to the government a debenture cr

debentures for the sum loaned.[13]

Apart from the loan from the government, the board is also entitled by the same law to borrow money from any source outside the government but with the knowledge and approval of the Plateau State governor.

> subject to the provisions of this section, the board may, by issuing debenture stocks or other securities, or in any other manner borrow sums required by it for meeting any of its obligation or discharging any of its functions under this law.[14]

The board in addition to grants and loans has been empowered to generate monies through charges, fees, dues and gain accruing from investments. This power is outlined in section 13, sub-section e, of law 19 of 1982 where it says that the funds and resources of the board shall consist of any investments, dues or other property whatsoever acquired by or vested in the board and all money earned or arising therefrom.

In order to enhance proper accountability, the board is expected to keep proper accounts in respect of its functions and finances and to forward a copy together with an audited copy of the said account to the state governor.

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13. Plateau State of Nigeria Gazette, P.S. Law No. 19 of 1982. P.A. 317.

14. Ibid. P.A. 37.

> The board shall:- prepare in respect of each financial year a statement of accounts in such forms as may be approved by the Governor.
>
> (a) The said annual statement of accounts shall be a fair and accurate statement of the financial position, and of the result of the operations of the board for the financial year to which it relates.
>
> (b) The said annual statement of accounts shall be audited by the auditor.
>
> (c) As soon as the said annual statement of accounts has been audited as aforesaid, the board shall forward to the Governor a copy of the statement of accounts together with a copy of the report made by the Auditor.[15]

Sanitary Laws And Edicts (Refuse) - The laws covering refuse disposal came under the general public health law of 1917 which has come under several ammendment up till 1963. Because of the vllumenous nature of the public health law, only aspects directly connected to refuse disposal will be highlighted. An edict has just been promulgated tagged environmental sanitation edict of 1985. Some aspects of the edict touching on refuse disposal will also be mentioned.

Chapter 109, section 11 of the public law empowers a health officer or sanitary inspector to enter into any premises for inspection and where nuisance is found which is injurious to health, the tenant or owner of the premises is served with a nuisance order to abate the nuisance within a given period.

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15. Ibid, P. A 38.

> It shall be lawful for the health officer to enter any premises at any time between the hours of six in the morning and six in the evening for the purpose of examining as to the existence thereon of any nuisance, or until a nuisance found to exist has been abated or the works ordered to be done are completed or the closing order is cancelled as the case may be.[16]

For contravention of the above provision of the law, the offender shall be liable to a fine of fifty naira. The above provision is a curative measure. A preventive measure to deter the public from producing the nuisance is found in section 18, subsection a and b.

> (a) Any person who:- throws or lays on any street or tenement, whether occupied or not, or on any open space (except at such places as may be set apart by the proper authority for such purpose) any rubish or any offensive or unwholesome matter, or
>
> (b) commits any nuisance in any street or in any open space or in any place being an appurtence of or adjoining a dwelling house, shall for each offence, be liable to a fine of two naira and may be taken into custody without warrant by any police officer or sanitary inspector.[17]

The provisions of the laws so far enumerated sound good, but to what extent have they been enforced on the public inorder to make them serve as deterant

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16. Public health law 1963 Law of Northern, Nig. Vol. III, P. 1803.

17. Ibid. P. 8.

to indiscriminate and unhygienic method of refuse disposal? The low level of enforcement of these laws is shown in the tabulated data of table 15. Perhaps the toothlessness of the laws has necessitated a new edict on environmental sanitation which has just been published in the state government gazette. Although the edict has just been passed in late March 1985, the edict is deemed to have come into operation on the 23rd day of July, 1984. For the purpose of clearity, extract of relevant parts to refuse disposal is provided below.

3. (1) Every owner or occupier of any tenement shall clear and keep the streets at the, back or either sides of such tenement and drains, gutters or channels by such streets free from filth, rubbish and refuse of any kind or description.

(2) The owner or occupier of a tenement shall maintain a proper drain in his tenement in such a way as to avoid the blockage of the drain and shall in addition provide a covered dustbin to be used for depositing refuse of any description.

(3) Every owner or occupier of a tenement shall remove daily, all refuse from the dustbin to a public refuse depot or dispose of it in such a way and at such a place at the sanitary officer may direct or approve.

4. (1) No person shall throw, lay or deposit on any street, gutter, open space, drain or drainage system or on a tenement whether occupied or not, any litter, refuse, waste of any description, rubbish or any wholesome matter, except at such places as may be authorised by the Authority.

5 (1) It shall be lawful for a health officer to enter upon any tenement at any time between the prescribed hours for the purpose of examining same to ensure that the tenement is kept clean in accordance with the provisions of this Edict.

6 (1) Every owner or occupier of a tenement shall provide at least one covered dustbin for his tenement and same shall be used for despositing any type of refuse within the tenement.

(3) The Authority shall designate refuse disposal sites for the purposes of disposing of the contents of a dustbin and no obnoxious or poisonous substance or waste shall be deposited in a dustbin.

7 The Authority may issue a permit to any person to deposit refuse or waste on a designated refuse disposal site and may charge such fees as it deems necessary for the permit.

16 (4) Any person who commits an offence contrary to the provisions of this section shall be guilty of an offence and shall, on conviction be sentenced to a fine of not less than two hundred naira or to imprisonment of not less than two months or to both such fine and imprisonment.[18]

The edict just like the public health law which was formerly in use is intended for good. It is not that the former laws guiding refuse disposal have failed to solve the refuse problem because they are bad, in fact some parts of the new edict are just the repeatation of the refuse laws under the public health law. The problem does not lie with the laws but method of enforcement. If the enforcement aspect is

18. Plateau State of Nigeria, The Environmental Sanitation Edict, 1985 pp. A3 to A7.

adequately or properly carried out, there is bound to be a positive change from the present habit of refuse disposal by the general public.

Uptill the point of this write up no one is known to have been convicted or punished for refuse disposal offences under the new edict.

Findings - The aim of the research has been to find out certain facts that can best explain or answer questions on why domestic refuse collection and disposal in Jos township have not been adequately handled. This inadequacy has consequently resulted in scenic and health problems. The researcher has come up with six major findings as enumerated below.

1. Although most people have dust bins, most of these bins have no covers.
2. Refuse are disposed unhygienically by households. Most of them just dump their refuse openly at unauthorised places resulting to the formation of several open refuse dumps at various parts of the township.
3. The metropolitan health authorities have failed to tell the public explicitly where to dump the refuse generated from their houses.
4. The government has not got a clearly defined hygienic method of disposing the refuse collected from street litters, dumps and homes.

5. The man power handling refuse disposal in Jos township comprises mainly of unskilled people with very few working tools and extremely few mechanized refuse disposal vehicles and equipments.

The above findings coupled with their implications have in one way or the other served as the cog in the wheel of progress of refuse administration of Jos township. For purpose of clearity, each finding will be discussed in line with the implications.

Implications of Findings - The lack of dust bin covers have some health implications, especially where the main components of refuse generated are not in the form of food materials. In the first place, insects such as flies and cockroaches and animals are usually attracted to the house by the odour emithing from the uncovered refuse. The resulting effect is that the flies might carry some conterminants from the bin on their hairy body to conterminate food which might lead to diseases such as dysentary or cholera. Some of the attracted flies may even find their way to the toilets and carrying out the same process of conter-mination.

Animals, especially dogs and sheep when attracted to these uncovered bins offset them, thereby overturning

their contents and scatterings the refuse all over the place. A part from given the area an unaesthetic look chances of bacterial growth and infecti n is increased in such a circumstance.

The unhygienic method by which the public dispose of their domestic refuse and at unauth rised spots, have three main implications. The first is the fact that refuse collectors are not aware of some of these dumps since most of the dump sites are seldcted by the public without the consent or approval of the health authorities. Time, energy and money is spent in searching for these refuse dumps scattered allover the township instead of going straight to acknowledged dump sites for the collection of refuse. The second implication is the nuisance caused by the sight of open refuse dumps at various parts of the town. This sort of sight tend to project the town as a dirty city. Thirdly, the indiscriminate disposal of refuse without consideration to hygiene and place of dumping could result to serious health hazzards such as an epidemic.

The failure of the health authority or government to tell the public explicitly where to dispose their domestic refuse is like to tell a visitor not to sent and not to stand. What does the visitor do? The government say it is illegal to throw refuse in the open and the same government have failed to tell the

public where to throw their refuse. The arrangement has been that households should put their refuse in bins infront of their houses while refuse collectors go round to collect them. But this arrangement has not been followed as bin are left uncollected for weeks until the households are forced to throw away their refuse on open refuse dumps. The absence of definite places to dump refuse is a major cause of lack of proper public cooperation with the metropolitan health authority in the disposal of refuse.

Government is not left out of the blame of unhygienic method of refuse disposal. The present method of final disposal can not be identified clearly with any standard method of refuse disposal. Just as the government expects the public to dispose their refuse in line with prescribed hygienic methods, the public also expects same from the government. But the government has not shown the public a very good example to follow. Refuse collected in refuse vehicles are dumped at a site almost in the center of the town at Gada-Biu opposite Tati hotel. The authority claim this method of disposal is the land-filling method. However, observation show that their method does not quite agree with that of land filling, rather it can be equated to a giant open refuse dumping as the refuse are just dumped at the site.

Sometimes the refuse are set on fire or just spread out by a caterpillar. Smoke from burning of the refuse not only disturb people living around the site but also obstruct the traffic by imparing vissibility.

Another area of consideration is the implication associated with the level of public education or enlightment on the effect of poor refuse disposal on health. This linkage has not been properly or clearly put to the public and this accounts for why many of the respondents in this research failed to see any association between the common ailment such as dysentary, diarrhea and stomach trouble with refuse. The news media have sort of over concentrated their effort on just telling the public to keep their surroundings clean and that filth is bad, without going into details. The shallow knowledge of the ways microbes develop, infect and cause diseases can militate against whole hearted participation in waging the 'war' against filth by members of the public.

Finally, the nature or composition of the manpower responsible for handling refuse disposal and the number or quantity of equipments available, have serious implications too. Iliterate or refuse collectors with little education may not be able to appreciate

the value or importance of their work to the public, hence may not give it the seriousness it deserves. The low level of skilled workers could pose a serious problem when the government decides to modernise or mechanise the method of refuse disposal as the unskilled workers will find it very difficult to operate under such a complex situation. This will mean the employment of new workers who are not used to the refuse problem of the township or the sending of the older unskilled workers for short time training which is likely to result to loss of time before take off.

The need for adequate and proper refuse collecting and disposing tools and equipment is an important as the personnels going to handle the job. This importance is glaring because no one can collect and dispose a voluminous amount of refuse with his bare hands. It follows then that the number and quantity of tools and equipments are reciprocate to the quantity and quality of work to be done. The inadequacy of skilled workers, working materials and vehicles are major set backs which have compounded the refuse disposal problem of Jos township.

Having discussed at length on the analysis of data and findings based on questionnaire, oral responses and on some secondary informations, the next and final chapter is based on policy recommendations derived from findings so far. The chapter also recomends likely ways of implementation of the policies so recommended.

C H A P T E R 5

POLICY RECOMMENDATIONS

Seven recommendations based mainly on the findings and implications will be discussed. These recommendations are going to be presented along with the methods by which they can be implemented. Discussion on implementation will however come after the presentation of the seven recommendations.

1. Households should be compelled to possess two dust bins for domestic refuse disposal. One of the bins should be small and the other bigger. The smaller bin should be kept inside the house and the bigger one infront of the house. Both of them should have covers.
2. Open dumping by the public should be totally demised.
3. Fees should be charged for services
4. The present landfill or reclamation method of refuse disposal by the PUDB should be made more hygienic by covering dumps with a layer of sand at the end of each day's work.
5. The method or system of public enlightenment should be re-scheduled and made more comprehensive to include the actual diseases associated with poor refuse disposal, the stages of

infection and effect on health. The present method whereby the public are just told through the news media to keep their environment clean to avoid ill health is not sufficient.

6. Refuse collectors should be exposed to vigorous training on sanitation and refuse disposal. More tools, machines and refuse vehicles should be bought to allow for the maximum utilization of the workers so trained.

7. Further increase of the present population of Jos township should be checked or minimised by the government by discouraging rural to urban migration or movement.

Having enumerated the recommendations, the next area of focus is how to implement those recommendations.

In order to ensure that all households have two dustbins of the recommended types, the PUDB should take the responsibility of the production and distribution of the bins at subsidised rates. This will allow for uniformity in the sizes and it will be more convinience to check defaulters. Those who fail to buy or possess the bins should be procecuted. The number of houses should be written clearly on each bin. Where a house has no number, the PUDB should

give that house a temporary number.

The demising of open dumping by the public can be effected by the instalment of very large metal containers at selected parts of the township. The job of PUDB refuse collectors should be only to collect refuse from these large containers with the aid of refuse vehicles for the final disposal. Contractors or private enterpreneurs should be involved in the collection of refuse from the refuse or dustbins in front of the houses and emptying them in the larger containers which will serve as refuse depots. Dr. Dare Oduola is also of the view that refuse collection should be transfered to private entrepreneurs.[1]

The charging of fees for services is a peculiar feature in public life. Members of the public are charged fees for water, electricity and postal services as such the charging of fees for refuse services is not likely to be a difficult policy to implement. The account section of PUDB should open an account ledger for every house and the account number written on the refuse bin in front of the respective house. Each house should have an entry card attached to the front wall of the house for

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1. Dr. Dare Oduola. The Problems And Methods of Waste Disposal In Nigeria. Ibadan, NISER Conference, January 17-19, 1983, PP. 7.

the private collectors to enter the number of times they have collected refuse from the house. The private entrepreneur or contractors should also enter the number of times they have collected refuse from each house in their zone on the ledger at the PUDB. At the end of each month the total bill for each house should be computed and sent to respective households.

The said land fill method currently being used by the PUDB to dispose refuse in Jos township is a good method considering the circumstance, where past mining activities have destroyed land in and around Jos by the gorges and large pits created. However the method should be properly used in line with laid down standard to avoid endagering the health of the public. Industrial refuse without poisonous contents should be used to fill in pits that are within the township while domestic refuse be used to fill pits at the outskirt of the town. Where it become inevitable to fill pits or gorges within the township with domestic refuse, a layer of sand should be spread on the dump at the end of the day's work. Burning of refuse in pits within the metropolis is not part of land filling and as such be stopped as the smoke from such burning does not only obstruct the free flow of traffic but also constitute a nuisance to people living near the burning.

For a more effective method of enlightening the public on the health hazards associated with poor refuse disposal, two sectors should be utilised to the maximum. The scholars and university dons should be encouraged by the health department of PUDB or the Ministry of health to present papers for publishing in the National dailies on refuse disposal and health. The second sector is the news media, notably the radio and television. Instead of the 30 seconds slogans during interludes, only telling the public to keep their surroundings clean because filth is bad and can cause illhealth, a more comprehensive schedule should be introduced. A 30 minutes programme on "Refuse and your health," at least once or twice a week should be formed. The presentation could be in the form of drama, films or discussions.

On the training of refuse disposal staff, arrangement should be made with health and educational establishments such as the University teaching hospital, the College of health technology and polytechnic, to help give some of the refuse collectors short term courses on refuse technology involving method of collection and disposal and the health hazards associated with refuse. Selection for such courses should be based on seniority and should be on in-service bases. A few of the workers should be sent

overseas for their training for the purpose of comparative technology and education. The need to back up such training with adequate working facilities and equipments is very important so as to utilise fully the knowledge acquired from such training. For it is said that, "A worker without his working tools is like a soldier on the battle field without his gun."[2] Old equipments and machines should be properly maintained and the buying of new refuse vehicles and equipments placed among the high priority in each years budget.

To check the movement of people is a very difficult policy to implement as human beings are always in the habit of moving from one place to the other in search of shelter, food and better jobs. However, the movement or migration of people from the rural areas to urban centers can be minimised through rural development policies. Mantell has this to say about the intricacies of population and refuse management in urban settlement.

> That the continuing concentration of our population in expanding metropolitan and other urban areas has presented these communities with serious financial, managerial, intergovernmental, and technical problems in the disposal of solid wastes.[3]

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2. Gordon Williams. Sample Social Speeches Great Britain, C. Nicholls and Comp. Ltd., 1967. pp.135.
3. C.L. Mantell, Solid Wastes: Origin, Collection, processing and disposal New York, John Wiley and sons, 1975. pp. 4.

More industries should be opened in the rural areas to provide employment opportunities for the rural community thereby preventing them from going to the metropolis to look for employment. Also social facilities like hospitals, schools, electricity and water should be provided at the grass root. The propensity of the rural populase to flood urban centres, with particular reference to Jos will be reduced if their standard of living is made better.

In the bid to arrest the present poor sanitation of Jos township, the military Governor of Plateau State, Naval Captain Samuel Bitrus Atukum has set up a task force on sanitation. The task force derives its legal authority from the recently passed edict on environmental sanitation. The task force has already descended heavily on illegal structures, demolishing them and charging offenders to court. The result of their action so far is impressive but it is too early for detail analysis. When they finally come to enforce the section of the edict covering refuse disposal, the public expect the same positive result. However, the task force is a temporary body and will demise after sometimes. When the military force is no longer there, the public might likely revert to their former ways of refuse disposal and the whole situation might be back to "square one". It is in this light that one should see the findings and recommendations of this research as

permanent remedies to the elimination of the nuisance posed by domestic refuse to the people and environment of Jos township.



PLATE 1: Open refuse dump near Gada-Biu



PLATE 2: Open refuse dump along Apata Street.



PLATE 3: Open refuse dump along Dilimi Street



PLATE 4: Refuse disposal workers in action

REFERENCES

1. Burns W. New Towns for Old. London, Leonard Hill Ltd., 1963.

2. Coleman W. Urban Redevelopment: Problems and Practices. Chicago, University of Chicago Press, 1962.

3. 2nd Development Plan - Plateau State of Nigeria, government press, 1976.

4. Fern, M.C. The Neighbourhood And Urban Renewal. New York, Alied Printing comp., 1963.

5. Green, A.H. The Management of Urban Development in Nigeria. United Nation publications, 1976.

6. Gordon M. Sick Cities. New York, Macmillan comp., 1963.

7. Hand Book on Plateau State: A general Overview, Ministry of information, Jos, 1980.

8. Hull O. Geography of Production. London, Macmillan and comp. 1968.

9. Hobson W. The theory and practice of public health. London, Oxford University Press, 1969.

10. James, O.W. Urban Renewal: The record and the controversy. Massachusettes, M.I.T. Press, 1966.

11. Law of Northern Nigeria - Public health law, Vol. III 1963.

12. Morgan M. Population and food supply. London, Collins Press, 1969.

13. Mantell C.L. Solid Wastes: Origin, Collection, Processing and disposal. New York, John Willey and Sons, 1975.

14. Mckiney, B.J. And Howard, C.L. Public Administration: Balancing power and accountability, Illinois, Moore publishers, 1979.

15. Morgan, W.B. AndPugh, J.C. West Africa. London, Nethuen and Co. Ltd., 1969.

16. Owen, D.F. Man's Environment predicament. Great Britain, Oxford University Press, 1973.

17. Peter M. Family and Social Change In Africa City: A study of Rehousing in Lagos. London, Routledge and Kegan Paul Ltd., 1961.

18. Pacey A. Sanitation in Developing Countries. Chishester, John Willey & Sons, 1977.

19. Street guide of Jostownship - Ministry of Information Jos, 1982.

20. Simons, H.J. Slums or Self Reliance:

21. Urban Growth in Zambia. Zambia University Press, 1976.

22. The 12 Administrative Divisions of Benue Plateau State of Nigeria - Jos Division. B/P. Publishing Comp., 1975.

23. The environmental challenge, United Nations, London, Macmillan Press Ltd. 1974.

24. This is Jos - Plateau State Ministry of Internal affairs and information, Jos, 1978.

25. H. And Hornung J. The citizens Guide To Urban Renewal Philadelphia, Chandler Devis Publishing Comp. 1962.

JOURNALS

1. Green, A.H. (April 1975), "Managing A metropolis: The case of Kano," Journal of Administration, Vol. 9, No.3, pp. 21-23.

2. Eke, I.U. (1966), "Population of Nigeria 1952-1963," Nigerian Journal of Economics and Social Studies, Vol.8, N.2 pp.19-31.

3. IULA (1965), "Renewal of Town And Village," Journal of International Union of Local Authories, Vol. II, No.80, pp. 40-63.

4. Onibokun, A.G. (1976), "Environmental Sanitation in Nigeria. Directions for Future Research," Journal of Society of health, Nigeria, Vol. XI, No.1 pp. 35-41.

5. Onibokun, A.G. (1970), "The slums in Nigerian cities: A fresh thinking on their rehabilitation and re-development," Journal of Society of health, Nigeria, Vol. III, No.4 pp. 139-147.

6. Okediji, F.O. And Aboyade O. (1967), "Social And Economic Aspect of Environmental Sanitation In Nigeria," Journal of Society in of health, Nigeria, Vol. II, No.1, pp.15-26.

7. "Plateau Capital Development Board," Journal on Plateau State Boards and Corporations, Vol. I, No.2 pp. 8-12.

8. Wertz, L.K. (1973/74), "Financing the collection and disposal of household refuse," Journal of Urban Affairs, Vol.9, No.4, pp. 38-40.

UNPUBLISHED MATERIALS

1. Abubakar R.I. "Jos Metropolitan Development Board", symposium on urban management in Nigeria. Zaria, 19 May, 1978.

2. Aliyu B. "The Administration of Health Services In Kano Metropolitan Area,"M.P.A. thesis. Ahmadu Bello University Zaria, 1976.

3. Anako, Y.Y. "Environmental Degeneration: A case Study of Ilorin," unpublished M.S.C. thesis Ahmadu Bello University Zaria, 1983.

4. Jauro, B.A. "Urban Planning And Management In Maiduguri," unpublished M.P.A. Thesis, Ahmadu Bello University, 1975

5. Prof. Oluwande, P.A. And Prof. Onibokun P. "Low cost Waste Disposal System For Developing Countries: Result of An Experiment," paper presentation at NISER Conference, Ibadan, January 17-19, 1983.

6. Stephen, O.D. "The Problems And Methods of Waste Disposal in Nigeria: The case for Large Scale Incineration, Paper presentation at NISER Conference, Ibadan, January 17-19, 1983.

7. Ukpong, J.A. The Administration of Health Services In Calabar Municipality, "Unpublished M.P.A. thesis, Ahmadu Bello University, 1980.

NEWS PAPERS

1. National Concord. "Lagos Fights filth, Wastes." April 2, 1984, P. 5.

2. National Concord. "Lagos To Clean Refuse With ₦100M."January 4, 1983 P. 7.

3. New Nigerian "Law on Dumping of Refuse Soon." May 25, 1984 P. 4.

4. Nigerian Tribune. "Controlling Environmental Pollutions." January 14, 1983 p. 5.

5. Sunday Standard. "War At The Filth Sector." April 8, 1984 P. 7.


JOS & ENVIRONS
MAP C
MONEDO STREET
ALHAJI HAMMA STREET
Market
N.A. Police Barracks
Cemetery
New Bra Cinema
OBEDU STREET
ENUGU STREET
MANGO STREET
Sports Ground
Convent and N.G. Girls School
Maternity Hospital
Police Office
N.A. Offices and Schools
Plateau Labour Exchange
Filtration House
Rex Cinema
Club
Market
Junior Service Qrs.
Police Barracks
Police Stn
Range
Health Offices
Zoo
Museum
Golf Course
Hill Station
TUDUN WADA ROAD
Cemetery
ST. PIRAN'S ROAD
LAWS ROAD
FOLEY ROAD
EMBERTON RD
CONSTITUTION HILL
Survey Dept
Education Office
Plateau Club
Flats
Residency
Boundary
Canteen Creek
Bus & Lorry Park
Railway Staff Qrs.
Junior Service Nurses Qrs.
General Hospital
Hospital & Staff Qrs.
Jos Tin Areas Ltd

APPENDIX B

QUESTIONNAIRE

Administered On Households

Instructions: Tick ( ) inside the box that is appropriate or applies to you.

For An Example.

Do you own a car?

(A) Yes ☐

(B) No ☐

If you tick inside box (B) as above, it means you do not own a car.

1. About how many are you in the house?

A 1-5 ☐

B 6-10 ☐

C 11 and above ☐

2. Do you have dust bin/s in your house ?

(A) Yes ☐

(B) No ☐

3. What is the nature or make of the bin/s?

(A) Carton

(B) Bucket

(C) Drum

(D) Tank

(E) Indicate if other than above.....

4. Does your bin/s have cover?

(A) Yes ☐

(B) No ☐

5. Where do you empty your dust bin or dump your refuse?

A) River or stream ☐

(B) In a pit outside the house ☐

(C) In an incinerator ☐

(D) Over the fence ☐

(E) Open dump ☐

(F) Gutter ☐

6. Which of the following refuse components is highest in the refuse produced by your house?

(A) Paper ☐

(B) Food materials ☐

(C) Ash and dust ☐

(D) Metals and cans ☐

(E) Others ☐

7. How often do you empty your bin/s in a week?

(A) None ☐

(B) 1-2 times ▱

(C) 3--4 times ▱

(D) Daily ▱

8. How many times does government refuse collectors collect refuse from refuse dump/s near your house in a week?

(A) Zero ▱

(B) Once ▱

(C) Twice ▱

(D) Thrice and above ▱

9. Which of the following nuisance of refuse dumps near your house affects you most?

(A) Smell ▱

(B) Insects and rodents ▱

(C) Smoke from refuse burning ▱

10. Which of the following ailment you have suffered? do you associate with nearness to refuse dump?

(A) Disentary ▱

(B) Stomach trouble ▱

(C) Cholera ▱

(D) Other diseases ▱

(E) No association ▱

11. Has the gutter or drainage infront or behind your house been blocked by refuse?

(A) Yes ▱

(B) No ▱

12. Through which means have you been most informed by the health authority about keeping your surroundings clean?

(A) Radio ▱

(B) Television ▱

(C) News papers ▱

(D) Community leaders ▱

(E) Posters ▱

13. Have you or anybody you know ever been convicted or taken to court for keeping the environment dirty?

(A) Yes ▱

(B) No ▱

14. If answer to above is yes, how long ago?

(A) less than a year ▱

(B) About 1 to 4 years ▱

(C) About 5 to 9 years ▱

(D) About 10 years and above ▱

15. What is the distance of your house from government approved dumping spot?

(A) Near ▱

(B) Far ▱

(C) Not aware of approved spot ▱

16. In which of the following areas can you identify yourself with regard to helping the authorities to dispose refuse?

(A) Community/Self help ▱

(B) Educating others ▱

(C) Complains/Petitions ▱

(D) All of the above ▱

(E) None of the above ▱

17. Have you enlisted for the services of a private organization or interpreneur for the disposal of your domestic refuse?

(A) Yes ▱

(B) No ▱

18. Is there a motorable road to the spot where you dump your refuse?

(A) Yes ▱

(B) No ▱

19. Have you ever been moved from your former or present house by the government for the purpose of replanning or redeveloping the area?

(A) Yes ▱

(B) No ▱

20. If yes, please answer questions A to C.

(A) where was that?.....

(B) when was that?.....

(C) what reasons were given?.....

.....

.....

APPENDIX C

INTERVIEW QUESTIONS

Administered on 100 refuse workers of PUDB through random sampling.

1. QUALIFICATION:- What is your educational qualification?.....

2. JOB DESCRIPTION: What type of job do you perform as a refuse worker?.....

3. JOB EXPERIENCE: For how long have you been in the service of PUDB as a refuse collector .....

4. EQUIPMENT: What type of equipment do you use in the collection of domestic refuse within Jos-township?.....

5. SCHEDULE OF COLLECTION: What is your schedule or method of collection of domestic refuse within the township?.....

6. OBSTRACLES OR HINDERANCES: What are the obstacles inhibiting the smooth performance of your job? .....

7. METHOD OF DISPOSAL: Which method do you use in disposing domestic refuse collected within Jos township?.....

8. AUTHORITY'S KNOWLEDGE OF OBSTACLE: Is your boss or superior officers aware of the obstacles

mentioned in number (6) above?.....

9. SOLUTION TO OBSTACLE: If answer to number (8) is yes, what steps have they taken to remove these obstacles?.....

10. COMPLAINS FROM PUBLIC: Have you been receiving complains from people about the disposal of refuse dumps near their houses?.....

11. COLLECTION FROM DUMPS: How often do you collect refuse from refuse dumps along the streets in a week?.....

12. SUGGESTIONS: What suggestions have you got to offer to the authorities for the improvement of ways and method of refuse collection and disposal in Jos township?.....

APPENDIX D

INTERVIEW QUESTIONS

Administered sectional and sub-sectional heads of public health department of PUDB

1. Rank.....

2. What are the functions of your section?.....
.....

3. What is the personnel strength of your section?.....

4. Do you consider the present staff strength of your section adequate?.....

5. What equipment and facilities are available to your section for refuse disposal and how many more would be required?.....

6. What role does your section play in the formulation of policies or laws that affect refuse collection and disposal?
.....

7. What means are employed by your section to enlighten or educate the public about environmental sanitation?

8. By which method does your section collect and dispose refuse?
.....

9. What are the main obstacles facing your section in the collection and disposal of refuse within Jos metropolis?

.....

10. What general plans does your section have for the improvement of the present system of refuse collection and disposal in Jos township?

.....

11. What job relationship exist between your section and the environmental planning section?.....

APPENDIX E

Administered on environmental health suprintendents and chief health officers of the ministry of health and Jos L.G.C. respectively.

1. How does the function of your ministry or L.G.C. relate to that of P.U.D.B. in the area of environmental sanitation?

.....

.....

2. Is there any particular effort or plan to give PUDB a helping hand? For example:

(a) organizing an environmental cleanliness campaign week.

(b) secondment of works to the board.

.....

3. What role has your ministry or L.G.C. played in the formulation of policies or regulations related to environmental sanitation with particular reference to refuse disposal?

.....

.....

4. Are there activities presently being performed by your ministry or L.G.C. independently of PUDB in respect to environmental sanitation?

.....

.....

5. What measures do you recommend for the improvement of the present system of refuse disposal in Jos township?

.....

.....

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