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Solid Waste Management in Ado municipality, South-Western Nigeria

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ABSTRACT*: Solid waste management has become the greatest problem facing many urban and semi-urban areas in Nigeria. This project is on solid waste management in Ado and it studies the sources, types of wastes and various ways in which wastes are managed in Ado using various research tools. The research reveals that wastes could be a source of wealth if managed effectively but could also cause serious health and environmental problems if not effectively managed. The study reveals the set back and factors militating against proper waste management in Ado and possible means of correcting them.*

KEYWORD*: Environment, Solid wastes, Residential waste, Waste Management.Waste recycling*

I. INTRODUCTION

The massive growth of cities in the third world has far outstripped municipal government's effort to provide basic services to their citizens. This has resulted in an extremely uneven provision of basic sanitation services facilities and other urban amenities required which may not be up to western standards in both residential and commercial districts. These service facilities are deficient in low-income areas, and practically nonexistence in squatter settlements. The accelerated rates of urbanization, which is now a common feature in most developing countries, have created serious environment problems, notably among which are solid waste. Solid waste in the broadcast sense includes all discarded materials from municipal, industrial and agricultural activities. However for the discussion to follow, solid waste will refer to only that solid waste which are the responsibility of and usually collected by a municipality, Residential and commercials area together with some industrial operations are sources of these non-hazardous solid wastes (Henry & Heinke.1989).

According to Clark (2002), solid waste management is defined as the branch of solid waste Engineering associated with waste control of generation, storage, collection and transfer, transportation, processing and disposal of solid waste in a manner that is in accordance. with the best principle of Public Health Economics, Engineering Conservation, aesthetics and other environmental consideration

In Ado, the capital of Ekiti state, and also the case in most states of Nigeria, there exist imbalance between the production of solid waste and efficient waste disposal. This is because clear priority has often been given to issues of industrial and commercial development without paying attention to solid waste disposal facilities. This has resulted to waste been piled up along street sides and at times totally blocking the driveway. This in turn puts the health of the populace at a great risk.

The waste generated in our cities comprises of both biodegradable materials such as leaves, husks peels, worn clothes and rags etc. The non-biodegradable materials include plastics, polythene bags, Styrofoam packages, bottle and metal containers etc (Wilson 1977). The non-biodegradable are very difficult to manage because when they are left on dumpsites, during the rainy season, a good percentage of the solid waste flushed into drain resulting to clogging drain and increasing flooding. Therefore appropriate laws to curb indiscriminate dumping of waste ought to be put in place.

1.1 Types of Solid Waste

Solid wastes are classified into different types depending on their sources namely, household generated waste, known as municipal waste. Industrial waste is described as hazardous waste, while waste generated in the hospitals termed infectious waste. Oreyomi (2005) classified solid waste as combustible items such as cartons, boxes, plastic, clothing etc. And noncombustible articles such as cans, ashes, glass, metals, furniture and bathtubs etc. Oreyomi (2005) further observed that garbage denotes waste resulting from growing, handling, preparation and consumption of food. It attracts and breeds flies and other insects, tats and it emits odors. Rubbish comprises of combustible and non-combustible items such as papers, plastic, cans and glass, while industrial wastes are sawdust, paper and iron. Agricultural wastes are wastes originating from agricultural products such as corncob, banana stub, skin and leaves etc.

II. PROJECT OBJECTIVES

In order to achieve these objectives, the study attempted to:

1) To identify sources and types of solid waste in urban centers.
2) To identify the nature of solid waste management.
3) To identify the problems of solid waste management in study area.
4) To make recommendation based on finding.

2.1 Justification

A casual trip to any area to sight for indiscriminate dumping of solid waste. This appalling situation would have been if we had adopted enforceable legislation in our town to guard against poor solid waste management from points of generation to disposal and also if the tax payers money is fully utilized by the government. The major consequence of poor solid waste management is that it threatens the health of the populace. Good health is both an end and a means to live hood. For poor people good health is an essential asset in the pursuit of their live hood. (Murray and Lopez, 1996). The expected result of this is to provide guideline to the state government as policy on solid waste programs and to suggest areas of improvement because the fact that proper solid waste management prolongs the life span of the citizens cannot be overemphasized.

III. MATERIALS AND METHOD

3.1 Tools Used In Research

The method employed in this research can be divided into the following:

a) An intensive literature review
b) Questionnaire survey
c) Physical observation
d) Ekiti state waste management board(ESWMB)
e) Ekiti state specialist hospital

3.1.0 Intensive Literature Review

During the course of the study libraries were consulted to search for relevant literature on the subject matter, textbooks, journals were consulted to obtain information on the subject matter. Points raised in all the textbooks, journals were made use of it in the research.

3.1.1 Questionnaire Survey

The distribution of questionnaire was carried out to obtain relevant information on the study, information and data obtained include the following collection bin, method of disposal, frequency of collection, method of disposal waste, average attitude of people towards indiscriminate disposal refuse, period in which waste are mostly generated and some other information. A total of 500 questionnaires were distributed.

3.1.2 Physical Observation

During the course of the study, I visited various places in the town, especially the resident areas. Commercial centers and some industrial places. One important place also visited was Ekiti state recycling and treatment plant and their activities were been discussed in my literature review. Observation were also made on waste generation storage facilities, collection and disposal system.

3.1.3 Waste Management Board

I visited the waste management board and I was able to get adequate information and data on expected volume of waste that can be generated daily by an individual composition of waste was also obtained.

3.1.3 Ekiti State Specialist Hospital

During the visit to the state hospital, a comprehensive detail on diseases associated with wastes was obtained.

3.1.4 Problems Encountered During the Study

During the course of study one of the problems encountered was the un-operating attitude of some respondent to provide answers to some questions.

IV. RESULTS AND DISCUSSION

4.1 Waste Generated In Ado

Working on the project population= 301,211
Solid waste generated= 0.8kg/capital/day
Total waste generated in one day=301,211 × 0.8 =240,968.80kg/day

4.2 Data Gatherred from the Survey

The information obtained through the use of the research methods as mentioned earlier are analyzed as shown below.

4.2.1 Questionnaire Response

The table below shows the number of questionnaire returned and their percentage.

Table A: Distribution of questionnaires.

Questionnaire	Number	Percentage
Number Returned	416	83.2%
Number Not Returned	84	16.8%
Total	500	100%

From table A above. 83% of the questionnaire distributed was returned. This implies that the data obtained can be worked on.

4.2.2 Response on Waste Generated In Akure

Table B: Waste Generated in Ado

Type of waste generated	Number	Percentage
Domestic/household waste(D&H)	325	65%
Agricultural waste(AG)	39	7.8%
Industrial waste(IW)	25	5%
Commercial waste	87	17.4%
Medical waste(MW)	24	4.8%
Total	500	100%

From table B, 65% of the wastes generated are domestic/house hold water, 7.8% are agricultural waste, 5% are industrial waste, and 17.4% are commercial waste medical waste account for only 4.8% of the waste generated.

4.2.3 Response on Major Waste Generated

Table C: Major waste generated in Ado

Major solid waste generated	Number	Percentage
Plastic and cellophane (P&C)	105	21%
Leaves	142	28.4%
Paper	101	20.2%
Vegetable and food left over	152	30.4%
Total	500	100

From table C, 21% of the waste generated are plastic and cellophane, 28.4% are leaves, 20.2% for ash, dust and stone, 30.4% for vegetable and food left over. From the result leaves and vegetable and food left over appears to be the major waste generated. These wastes are organic in nature and could be useful if converted to organic fertilizers. The figure shows the frequency of the major waste generated.

4.2.4 Response on Waste Collection System

Table D: Waste collection system

Type of Waste collection system	Number	Percentage
Cartoon	13	3.13%
Plastic container (PC)	93	22.36%
Sack (S)	198	47.60%
Polythene bag (PB)	61	14.66%
Metal container (MC)	44	10.5%
Other	7	1.68%

Source author's survey 2010

From table D, it can be developed that majority of the populace have waste collection bin and it can be seen that most people use sack for the temporary storage. This implies that the wastes are properly collected.

4.2.5 Response on Frequency of Disposal, Convinency and Means of Disposal of Collection Bin.

Table E: Frequency of water disposal

Frequency of disposal of bin	number	Percentage
Daily	120	24%
Weekly	223	44.6%
Fortnightly	78	15.6%
Monthly	47	9.4
Cannot say	32	6.4%

Source: Author's survey, 2010.

Table G: Conveniences of collection

conveniences of collection of time	Number	Percentage
Yes	158	31.60%
No	342	68.4%

Table F: Means of disposing waste

Means of disposal	Number	Percentage
Ekite Sate waste management	288	57.6%
Private company	68	13.60%
Nearest land space	98	19.60%
Nearest stream part	46	9.20%

Source: author's survey, 2010.

From, E, F and G It can be observed that from the respondents the collection of waste in most area in Ado takes place on a weekly basis and as a result most people are not satisfied with this and since most of the populace dispose their waste through the state waste management board, It can also be deduced that the dumping of waste into landscape & stream part is a consequence of the average weekly collection in most areas because most household collection bin get filled up on a daily basis.

4.2.6 Response on Final Disposal of Waste

Table H: Final disposal of wastes

Final disposal of wastes	Number	Percentages
Burning (B)	88	17.60%
Incineration (I)	195	39%
Land fill (L)	148	29.60%
Others (O)	69	13.80%
Total	500	100

Source: Author's survey, 2010.

From table H, 17.60% of the population feels that wastes generated should be disposed through burning. 39% by incineration, 29.60% by land fill while 13.80% by other means which included recycling, Incineration appears to be major means of final disposal of wasted in Ado municipality but the study shown that this is not carried out to the required standard and instead open burning is used in place of incineration since the incinerators at the waste disposal sites are not functioning.

4.2.7 Response on Attitude of People Towards Indiscriminate Refuse Disposal

Table I: Attitude of people towards indiscriminate disposal

Attitude of people	Number	Percentage
Feel concerned	137	33.66%
Feel less concern	234	57.49%
Indifferent	36	8.86%

Source: Author's survey, 2010.

From table I. 33.66% of the people feel concerned about indiscriminate dumping of refuse, 57.49% feel less concern while 8.86% feel indifferent. This shows that the greater percentage of the people do not feel concerned about indiscriminate refuse disposal and as a result might not be aware of the danger posed by indiscriminate disposal of refuge.

4.2.8 Communicable Diseases Associated With Solid Waste

TABLE J: Communicable Diseases Associated With Solid Waste

Fly-Borne Disease	**Typhoid, Dysentery, Diarrheas, Aseatic, Cholera, Myiasis, Onchocerciasis, Ozyard'sFilarisis, Yaws, Tularemia, Catarial Sand Fever, Conjuctivities, Salmonelloses**
Rodent – Borne Diseases	Echinostomiasis, Hemorhagic, Septicemica, Histoplamosis, Plague, Rat- Bite, Dermatitis, Rat-Bite Fever, Rat Tapeworm, Salivary Gland Virus Infection, Swine Erysipelas, Leptospirosis, Relapsing Fever, Rickettsia Pox.
Mosquito – Borne Diseases	Dengue, Encephalitis, Filariasis, Malaria, Yellow Fever
Miscellaneous	Soil fungus (associated with infected buried solid wastes)

Source: Ekiti State Specialist Hospital, 2009

Table J, shows some of the existing communicable diseases that are very common in Ado. According to the Ekiti state specialist hospital. All these disease are associated to poor environment sanitation management of solid waste. Each solid waste problem (I.e. generation collection and disposal) provide sufficient life support needs for many diseases. While dumping of solid waste allow the chances for fly and rodent borne disease to rise very sharply.

As confirmed on site, some waste do contaminates soil and ground water supply by leaching and run off dumping rains from accumulation of stored material, organic matter and toxic sludge's. Others kill valuable and rare vegetation and wildlife by dumping of oil, rubble and similar material. Some research is certainly needed to trace the nature of health and hazards resulting from improper disposal of waste. But fundamentally, the crucial issue is the important of effectively treating solid wastes in the process of disposal. It is in this matter of treatment that technology has come to play an increasingly important tole in recent times.

From the study, it is discovered that solid waste are brought to the disposal site with the minimum of initial processing whereas processing becomes important in disposal activities when solid waste are viewed as a resources.

A few individual sites have been the focus of concern about the possibility of health effects on people living close to the sites. A lot of detailed research has been carried on both at these specific sites and nationally to investigate whether waste management operations have health effect and the following were observed.

a) Land sites have been investigated as to provide increase in cancer, birth defects respiratory illness including asthma.
b) Incineration has been investigated as to possible increase in cancer, birth defects respiratory illness including asthma.
c) Composting and materials recycling facilities have been investigated for possible exposures to micro – organism and odors and lung disease like bronchitis.

4.3 Basic Problem of Solid Waste Management in Ado
From the outcome of the above study, the following problems can be deduced.

4.3.1 High Volume of Refuse
The volume of waste been generated in Ado is relatively high and problematic with the recent development, more people are now moving into the city, this increase in the gradual increase in population figures from 1996 to 2011 as a result more waste in generated without equivalent improvement management strategies.

4.3.2 Financial Problems
Financial is a major problem in the management of solid wastes because funds are usually delayed and most of the equipment's require fuel to power them and also their maintenance cost is high.

4.3.3 Indiscriminate Dumping
Indiscriminate dumping of refuse by people is another problem, In Ado where rudimentary drains exist, there are usually opened and clogged up with polythere of pure water. These waste causes flooding in rainy season due to a blockage of the major drainage channels.

4.3.4 Inadequate Refuse Vans
Due to the growing population, the refuse van in the state makes it difficult to meet with the demand of waste disposal leading to a delay in waste collection.

V. CONCLUSION

From this study it is important to note that high sanitary condition must be maintained to make the environment a better place to live. It is also important to make that environmental problems cannot be solves suddenly. High investment costs would definitely affect the speed at which is residential, industrial and commercial ventures would tackle their solid wastes pollution problems. This apparently implies that solution to environmental problems without strong financial backing by the local, state or national authority would not yield the desired result quickly.

One main fact still remain that as long there is development in the life of every man, environmental problems of solid waste will continue to exist in different forms which require different approach to solve. The solution may not be able to eradicate these problems totally but might reduce it to the nearest minimum so that the environment might be a friendly place for us and the unborn generation.

5.1 Recommendation
In order to have an efficient management of solid waste in Ado, the following recommendation are necessary.

5.1.1 Public Enlightment and Education
The public needs to be enlightened on proper waste generation and disposal practices including sorting of wastes. This can be achieved through enlightens campaign on TV, radio and postal to educate the citizen on it. (WHO 2006)

Adequate information should be made available for users at dump site on how to deposit their wastes. There is also a need to introduce solid waste management in the primary school curriculum so that they could be informed on the need to maintain a clean and healthy environment.

5.1.2 Provision of Functional Incineration
Based on this research and findings there is no findings there is no functional incinerator at the Ekiti state waste management and recycling project. Instead wastes that are not useful are burnt in the open which is not healthy for the environment. Incinerators are a source of steam for industries that require steam as their source of energy

and these industries could be located near incinerating plants (Henry and Heike 1989) which in turn serves as a source of revenue.

5.1.3 Segregation and Sorting At Source

There is need to separate municipal waste at source, this helps to reduce the time used in sorting at the wastes disposal and recycling site. It even helps to recover more material because once all these waste are collected at source it is difficult to achieve a 100% soring which implies that some useful wastes would not recover during sorting.

5.1.4 Enforcement of Certain Law

Environmental laws exist but there laws are not adequately implemented. The environmental law shall provide appropriate prohibition against illegal dumping of wastes along drainage and road paths, but this acts still appears to be on the increase

5.1.5 Increase in Waste Collection Frequency

From the questionnaire survey it was observed that majority of the waste in Ado are collected on weekly basis and at times the weekly collection of their wastes is not consistent, this has further led to an increase in the indiscriminate dumping of solid waste on road paths and into drainage paths. Therefore the frequency of collection needs to be increased and also should be consistent. To do this serious efforts should be made at raising the availability ratio of vehicle through improved and prompt maintenance services.

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