



WATER, SANITATION, ENVIRONMENT and DEVELOPMENT

Planning solid waste management in Ado-Ekiti



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Abstract

This paper relates to the general management considerations in the field of solid waste collection, transportation and disposal to Ado-Ekiti town. Emphasis is placed upon the practical aspects of problem solving with discussion of generation and characteristics of present-day solid waste in Ado Ekiti, current storage and collection methods; disposal techniques for solid waste.

Introduction

Location and population

Ado Ekiti lies on latitude 7° 18' north of the equator and longitude 5° 15' east of Greenwich meridian. It is about 360 metres above sea level. It is one of the major towns of Ondo State; situated 250Km east of Ibadan and 350Km north-east of Lagos.

The 1991 National provisional Census figure gave its population at about 160,000. (1)

Waste generated

Ado-Ekiti and Ibadan share a good similarity in terms of standard of living, local customs, food, habits, geographical location season, climate, occupation and type of business. Therefore there will be similarity in characteristics and generation of waste. Hence, in the absence of similar data for Ado-Ekiti, the weight per person of solid waste generated in Ibadan which is 0.4-0.6 Kg/d is used (2) (5). The estimated waste generated is 80,000 Kg/d ie 80 tonnes.

Current solid waste management storage

All manner of receptacles without uniformity are used for household storage of waste. These range from improvised oil drums, plastic pails or similar containers without lids and even baskets to standard galvanized steel or plastic containers with lids. It is only in the Government Reserve Area that you find the standard receptacles.

Communal containers are not available even in the markets. Many of the commercial places use big galvanised steel waste containers.

Present collection system

The Western countries type of door-to-door collection of solid waste does not take place in Ado Ekiti. The collection

system is the block collection method. It is unorganised, uncoordinated and irregular system.

It involves the use of bell to call the attention of residents to the presence of the collection crew and vehicle (1). It is neither efficient nor cost-effective. The crew and the vehicle/driver would have to wait for hours before the vehicle is full. Another socio-cultural reason while response is poor is the lack of any form of latrine in many houses. The affected people mix faeces with their waste. Sanctions were imposed on those caught. In order to evade sanctions they boycott the collection system and wait till the cover of the night to dump their waste at "convenient" but un-orthodox places such as drains, open dump and nearby vacant plots. The maximum number of trips ever made per day is three, representing an maximum of 2,520Kg/d waste collected. This is just three percent of the estimated waste generated per day. And this even occurs rarely, the most common is one trip or none.

Collection vehicles

The only collection vehicle available to the council is the standard truck with extended side-board. The vehicle is not totally devoted to waste collection and disposal as it is sometime diverted to perform other duties.

The collection vehicle is already old and it is often off the road for a long period due to a variety of problems some of which are stated below:

- Lack of interest and discipline on the part of drivers. The drivers assigned to drive the collection vehicle are unable to make illegal money with the vehicle hence the lack of interest. They devise all sorts of tricks to avoid driving the vehicle ranging from pretending to be sick to tampering with the vehicle.
- Lack of sufficient funds to procure spare-parts.
- Bureaucratic delay in releasing funds when available.
- Difficulty in obtaining genuine spare-parts in the market.
- Bureaucratic delay from the mechanics workshop even when spare parts are available.

Present disposal methods

The Council "officially" operates a disposal site which is about 15Km away from the centre of the town. It must be stated that the site is not yet legally acquired by the council. It was recently ejected from the former disposal site.

There is no sanitary disposal of the waste there. It is nothing but a crude dump site. There is no site supervisor hence the "unwilling" disposal vehicle driver willingly disposes the waste in the most unorthodox method. He dumps on vacant land, near water course or pits along the road to the disposal site.

The collection schedule when it is carried only covers about 10% of the town. It is done along the major road almost dividing the town into two halves. The residents who are never covered or who evade the collection crew eg (due to lack of toilets, receptacle) use. Crude dumping into vacant land or drains and the streets as their methods of disposal. These methods do nothing to improve the environmental conditions of Ado-Ekiti. The dumps are often set on fire especially during the dry season with the attendant potential for air pollution. And during the usually heavy torrential rains the run-off in the blocked drains overflows and floods the streets that are also littered with solid waste.

Finance

There is no separate budget for solid waste management. It is under the Health and Social Services Dept of the Council. There is no record data to indicate the amount of revenue generated monthly. The mode of collection is that the revenue clerk goes out with the collection vehicle and issues Council official receipts to those who pay. The implications are that the money so receipted goes to the central account of the council; the collection of revenue is "rightly" tied to the level of service; no household paid any money in the last six months due to breakdown of collection vehicle meaning no collection of any kind.

Manpower

There are ten Officers in the Primary Health Care (PHC) Section of the Council. Among the duties of these Officers is the maintenance of good environmental sanitation. Almost all the Officers possess the Royal Society of Health Diploma. They lack the professional and skilled technical expertise to cope with the complexity of SW management in Ado even if funding, necessary equipment and materials are provided.

There is none of the present members of staff of PHC with an background training in SWM. Whereas SWM involves a complex chain of systems that may require a number of different alternatives for every link in the chain (3). Competent professionals and skilled personnel are required for the understanding of a scientific process of analysing the alternatives and choices to achieve optimum use of scarce resources. Since the present team in PHC is very deficient in trained professional manpower, it would be difficult to carry-out any programme aimed at improving efficiency and effectiveness of SWM which would require techniques beyond their capability and understanding (2).

Suggested plan implementation for Ado-Ekiti SWM

Storage

Standard storage receptacles of 50-90 litres should be provided for every household on a cost-recovery basis. The issues of distribution education and regulations requiring proper use of containers and the method of cost-recovery are being discussed and handled at quarter chiefs, officials and residents and particularly the women levels.

Collection system

The conventional door-to-door western approach to collection is ruled out. The other systems (Block and Kerbside have application problems. The short range transfer system is planned. This system divides solid waste collection into two phases, primary and secondary collections.

The primary collection involves door-to-door collection using non-motorised vehicles such as a handcart or wheel barrow. The secondary collection involves emptying of the containers from hand-carts into trailers of capacity of 6m³ and the trailers exchange when full by a tractor which takes them to the disposal site.

Based on this system the number of tractors required is 9 while 5 supervisors would be needed to oversee 170 collectors for a daily collection of waste in Ado-Ekiti.

In order to minimize the labour and transport costs that absorb the major part of the operating cost of SWM services, the collection of waste in the town is planned to be twice weekly. And the town will be divided into three zones. This would reduce the cost of operation from about N19.4m to N9.1m as shown below.

Estimated cost of Hand-Cart, Tractor Trailer System Based on Twice weekly collection.

(Note £1.00 = N50.00).

Capital costs	N (000's)
Tractors 4 x 900,000	3,600
Trailers 5 x 50,000	250
Hand carts 60 x 1000	60
Spare parts 20%	782
Annual operating costs	
Tractors: Depreciation 6yrs (4 tractors)	600
Operating costs (fuel, oil, tyres)	385
Maintenance (15% of capital)	586.5
Drivers wages 4 x 18,000	72
Insurance	360

Trailers 4		Maintenance	150
Depreciation 8 years	31.3	Driver's wage	27
Engineer (1)	50	Insurance	100
Supervisors (2)	50	Other labour (site supervisor)	36
Labour (56) x 18,000	1,008	Overheads	6.3
Overheads (10% of labour charges)	118	Total	<u>1,744.3</u>
Administration	1,175.2		
Total	<u>9,128.0</u>		

Disposal

Sanitary landfilling is planned. Estimated costs. The comparative cost of manual and mechanical operations of tip site in Ado-Ekiti are estimated approximately below:

Manual

Labour required	Tonnes/day	m ³ /d at 330 kg/m ³	In place Vol m ³	Cover m ³ /d	Lab Req
Population					
20,000*	10	30	20	4	2
50,000*	25	75	50	10	3
100,000*	50	150	100	30	6
140,000*	70	150	100	20	6
160,000**	80	240	160	32	9

Sources: * () Flintoff (6)
 ** () Osewa (2)

	N/day	N/year
Labour 9 men	450	164,700
Cover - 32m ³	1,067	330,770
Overhead and Admin	45	13,650
	<u>1,562</u>	<u>509,420</u>

Since thirty-three percent of the estimated waste generation is expected at the tip site daily, the cost of manual operation would also go down to about N170,000 pa.

Mechanical operation

Capital cost	(N000's)
1-4 wheeled front-end loader	1,000
Spare parts	200
Site operating cost	
Mechanical (cost for 4 hours/day use)	
Depreciation (8 years)	125
Operating cost	100

Motivation of workers

The following are planned as motivation/incentives for the workers of SWM in Ado-Ekiti.

Training

The workers would be given adequate training and instructions that would make them appreciate the importance of the following issues:

- (a) the regular use of protective clothing
- (b) avoiding dangerous methods of riding on vehicles
- (c) lifting of loads without damage to the spine
- (d) maintaining good personal hygiene during and after work

Responsibility

The workers are billed to deal with complaints from people within their service areas. The workers would be allowed to leave work once their areas have been adequately serviced. Rewards are to be established for crews with routes/areas that are trouble free for an extended period. Bonus are planned for drivers that do not have their vehicles clutch burnt over a period.

Uniform

The provision of attractive uniform as a way to improve the workers self-image and boost their morale is also planned. This is expected to earn the workers additional respect from the community as the people are reputed for having respect for people in uniform. The supervisors are to be provided on cost-recovery basis with means of transportation as they might be fully mobile. Light motorcycles would be suitable. It is planned to be on cost-recovery basis so that the people concerned would be directly responsible for the maintenance. And they can also have use of it privately after close of work.

Collection agency

Although it is claimed in Britain (7) that contractors reduce costs of collection and disposal by 20-50 per cent, caution must be displayed in the Ado-Ekiti situation before awarding contracts to the private companies. Some of the reasons are due to the facts that there is no organized system in existence to compare costs with, and no profes-

sionally trained officers as in Britain who can help to introduce efficiency clauses at the tender preparation stages.

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