# ACTIVITIES OF SCAVENGERS IN SOLID WASTE DISPOSAL

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## ABSTRACT

The state and problems of solid waste recycling in Nigeria were analyzed by interviewing the scavengers who deal with recyclable in Onitsha, a heavy commercial city in Anambra State, and some other urban areas such as Nsukka and Enugu. Although their activities are sub-optimal, they can have a great impact on Nigerian economy not only with respect to resource conservation and job provision but also in reducing the magnitude of waste disposal problems. The need for Improved method of recycling and composting was also highlighted. The paper also presented the management set up that should guarantee the successful integration of scavengers activities into conventional solid waste management.

## INTRODUCTION

The problem of solid waste management in Nigeria has become more complex in the recent times due to high rate of population growth, urbanization, increasing rise in standard of living and industrialization increased amount of waste both in quantity and diversity in types is now being generated. This problem is further complicated by political, economical and sociological factors.

Solid waste is managed at the municipal level by either the state government agency or, as in a few states, contractors who are involved in waste collection, transfer and transport, and disposal. Usually waste collection and disposal is restricted to the urban areas and has not been extended to the rural areas. Urban waste management is still frought with many problems like lack of finance, collection and transportation facilities, poorly developed dumping grounds which are potential threat to public health and environmental pollution, poor management etc.

The management and operation of refuse treatment, collection and disposal systems, to provide adequate economic services to the public, consistent with the aims of public health, is an exceedingly demanding task. The magnitude and complexity of this problem have stimulated continuous and multi-dimensional search for solution. Material recycling has been proposed and adopted in some countries since it possesses various advantages over the more conventional disposal technologies (Lindeberg, 1991; RRS Newsline 1991; Stentiford 1991). In some communities recycling has become an important dimension of solid waste management; but not so in Nigeria.

The aim of this research is to present the state of solid waste rouse and recycling in Nigeria; discuss the problems; propose a recycling program and highlight how useful such a program could be in solving her solid waste problem.

## STATE OF SOLID WASTE REUSE AND RECYCLING IN NIGERIA

In the eighties when the economy was booming, technological, socio-economic and marketing considerations made people always want to buy the new and discard the old. There was general disregard for the potential reuse and recycling of waste material. In recent times, however, bad national economy has forced some people into reusing their old materials.

Waste recycling is mainly through the activities of scavengers. There are different categories of scavengers in operation such as:-

### Curbside and call-on Scavengers

This group go from house to house and from bin to bin looking for discarded but useable materials. Economic needs have motivated some homes to do a type of source separation. Used beverage cans with lids, newspapers and waste papers are stored in some homes until scavengers come around to purchase them. The scavengers usually wash the materials and resell them to market women. The market conditions always determine the type of materials purchased by the scavengers.

From the meaning of 'recycling', in the strictest sense, this category of scavengers are rarely involved in recycling. Recycling is more than mere collection of useable materials from the waste can. It involves, in addition, processing, marketing, remanufacturing and then repurchasing of those valuable materials (RRS Newsline 1991). The materials

collected may become cleaner as a result of washing before they are resold by the scavengers; yet no remanufacturing of these materials are involved. The processing is usually limited to washing, and no physical change in terms of shape and structure nor chemical change is involved. This imposes a great limitation on the quantity and type of material collected and their marketing. The percentage of the overall waste reused is too poor to be useful.

Early in the morning they leave their villages and stream into the urban area (e.g. Nsukka). Often they call at houses where other scavengers had already visited. Their operations are haphazard and are characterised by wastage of human resources. That a scavenger meets the occupant of a house does not mean that he will buy the materials. It all depends on whether the material is available, agreement reached on the price and whether or not the occupant has another special customer.

Interview carried out in Nsukka, showed that the activities of the scavengers are seasonal and highly dependent on market opportunities. For instance, most of them operate less frequently in the rainy season. During this period the market women do not usually require waste papers but use leaves collected from the bush for wrapping their wares.

**Built-Up dump Scavengers**

This group of scavengers operate within the built-up dumps found in Enugu and Onitsha. Usually they are the officials of the Environmental Sanitation Authority who are employed to look after the dumps. The typical quantities of materials that could be sold in a day and their prices are given below;

**Table I: Daily Quantities of items collected by Built-up dump scavengers and their selling prices.**

| | Item | Quantity | Unit Selling price |
|---|---|---|---|
| 1. | Beer bottles | 20 - 30 | 0.50 |
| 2. | Soft drink bottle | 30 - 40 | 0.50 |
| 3. | Gallon (Plastics) | 4 - 8 | 2.00 |
| 4. | Pomade bottles | 50 - 60 | 0.50 |
| 5. | Liquid Milk tins | 50 - 80 | 0.20 |
| 6. | Powdered Milk tins | 4 - 8 | 1.00 |
| 7. | Newspapers | 30 - 50 | 0.10 |
| 8. | Rubber Slippers | 10 | 0.20 |

Like the first group discussed, the activities of this group are limited. Sorting times are squeezed out from the official working hours, and most often only directly reusable materials are sorted out.

**Scavengers at disposal Sites**

Scavengers also operate in the final disposal sites. In Nigeria solid wastes are usually disposed off in water (e.g. some parts of Lagos), burrowed pits (e.g. Kano State), Open dumps (e.g. Enugu, Lagos and Nsukka), and Sanitary land fills (e.g. Onitsha). In Lagos State incinerators are also in use (LSWDB, 1991). Open dumps are very common in most cities and towns and the sorting activities of scavengers are similar.

At the sanitary landfill in Onitsha (located at Nkwelle), about seven persons sort out the recyclable every day, although only four come on more permanent basis. They make their living by selling the collected recyclable to a middleman. They are allowed to sort out these materials at no cost, even though sometimes the landfill officers would collect a little amount from them. The officers also control their movement about the landfill to minimise injury and infection. For example, they would usually prevent any of them who has an open wound from sorting so that he would not contact diseases.

Usually the scavengers would wait for a tipper load of waste to arrive at the disposal site. Then, they would move into the region where the

waste is dumped and begin to sort out the recyclable. As the bulldozer pushes the waste into the land-fill, they still sort out more materials.

The recycleables and prices at which they are sold to the middleman are given below:

**Table 2: Quantities of recyclable collected by disposal site scavengers and selling prices to the middleman.**

| S/No. | Component | Unit buying Prices N/kg | Unit selling prices to the middlemen /kg |
|---|---|---|---|
| 1. | Aluminium | 8.00 | 10.00 |
| 2. | Plastic | 1.50 | 2.00 |
| 3. | Rubber | 1.50 | 2.00 |
| 4. | Brass | 4.00 | 5.00 |
| 5. | A barrow full of cast iron | 25.00 | 30.00 |
| 6. | $1m^3$ bail of carton | 2.50 | 3.00 |
| 7. | 3 empty liquid tins | 0.10 | 0.20 |
| 8. | 3 empty powdered milk tins | 0.50 | 2.00 |
| 9. | 2 of hot drink (medium size) bottles | 0.50 | 1.00 |
| 10. | 1 Schnapps empty bottle | 0.50 | 1.00 |
| 11. | 4 empty small drug bottles | 0.50 | 2.00 |
| 12. | Sole of shoes | 2.00 | 3.00 |

***Prices at which the scavengers are willing to buy if they stumble on other sellers on the street.**

The average number of components recycled per day is difficult to measure as all are not weighed. Besides, the prices of the metals depend on their types. For instance, the selling price of a barrowful of cast iron of high quality may be as high as N150.00.

All the materials sorted out are usually sold except when the buyer considers the market poor. One of the scavengers interviewed earns about N200.00 from a two-days' sorting in the land-fill. Although financial problems may arise sometimes when the middleman does not pay on time since he sells before paying the scavengers, the scavengers comfortably make their living on this business. However, they would want those in Authority to improve their work by providing the following:

(1) Protective kits;
(2) Bulldozers to operate often so that as much recyclable as possible will be uncovered;
(3) Machine to help them in sorting; and
(4) In addition, they want more middlemen to participate in the business.

**Middleman**

The middleman who purchases from the scavengers was also interviewed. He depends on the business for livelihood and makes a gain of about N1,400.00 for a 2-day supply to his buyers who later sell to companies in and around Onitsha or their agents. His buyers dispose of the materials in the following manner:

**Table 3: Recyclable and Market for them**

| | Recyclable | Market | Remark |
|---|---|---|---|
| 1. | Bottles | Breweries, cosmetic and pharmaceutical companies | Usually bought in crates or cartons after they have been washed thoroughly |
| 2. | Plastics | Plastics industries | e.g Enamel Company, Onitsha. |
| 3. | Gallons | Vegetable oil Companies | |
| 4. | Beverages and Milk containers | Market women | Oil sellers etc. |
| 5. | Paper | Paper industries Market women | |
| 6. | Iron | Steel Industries | e.g Delta Steel, Okpoko |
| 7. | Slippers scraps and sole of shoes | Shoe making industries | |

Generally, bottles are used for refilling of drugs, drinks and cosmetics while plastic and rubber are remoulded. Broken bottles or glasses are sometimes bought by International glass industry, Aba through their agents. The different components have separate markets in the town.

**The flow chart for the operation of scavengers is given in Fig. I.**

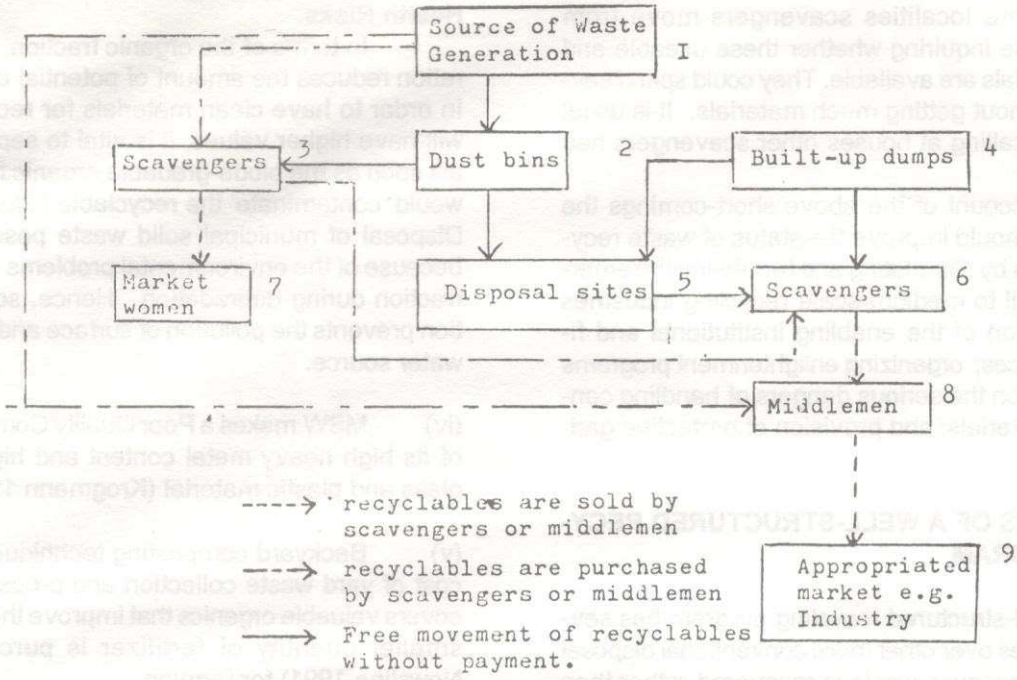



Fig I. Operations of Scavengers In Nigeria.

## NEED FOR A PLANNED RECYCLING PROGRAM

The above discussion reveals that the activities of scavengers can have a positive impact on the national economy if the scavengers are motivated and encouraged, and their activities better co-ordinated.

Currently, about eight different pathways exist through which recyclable are collected by scavengers and disposed of (Fig. 1). These pathways are: I - 3 - 7; I - 8 - 9; I - 3 - 6 - 8 - 9; I - 2 - 3 - 7; I - 2 - 3 - 6 - 8 - 9; I - 2 - 5 - 6 - 8 - 9; I - 4 - 5 - 6 - 8 - 9; I - 4 - 6 - 8 - 9. The recyclable collected from the landfill has the chance of being the most contaminated whereas those collected at home should be the purest. On the other hand, the recyclable separated at the source will be the least profitable to the scavengers because they have to buy the materials. Besides, the uncoordinated movement of the scavengers from house to house constitutes a waste of human resources.

Generally, the present state of waste recycling in Nigeria is characterised by the following disadvantages:

(i) **Low Quantity and Quality of Recovered Materials**

In most cases only a few items are recovered because of the general poor level of recycling and low technology. Besides, only a few middlemen buy from the scavengers, thereby limiting the operations of the scavengers. Far much more materials could be recovered and in higher quality of processing industrialist are encouraged.

(ii) **Areas Served by Scavengers are Limited.**

Not every home is interested in source separation. It all depends on the family economic status and interest as well as location. Some built up areas do not permit their operations.

(iii) **Health Hazards**

The salvaged material may find its way back to the market in its contaminated state. It is not uncommon to see edible food material wrapped with dirty recovered paper. Even where the paper appears neat it may still have been contaminated by toxic substances especially where the material did not undergo source separation. Some of the people involved in this business are usually illiterates who do not appreciate the ethics of hygiene and the mechanism of transmission of diseases.

(iv) **Aesthetics**

Scavengers are usually dirty in appearance. This all the more accentuates the poor public image associated with their work.

**(v) Wastage of Manpower**

In some localities scavengers move from house to house inquiring whether these useable and sellable materials are available. They could spend several hours without getting much materials. It is usual to see some calling at houses other scavengers had just left.

On account of the above short-comings the government should improve the status of waste recycling in Nigeria by stimulating and facilitating the emergence of small to medium-scale recycling industries by the provision of the enabling institutional and financial resources; organizing enlightenment programs for education on the serious dangers of handling contaminated materials; and provision of protective gadgets.

## ADVANTAGES OF A WELL-STRUCTURED RECYCLING PROGRAM

A well-structured recycling program has several advantages over other more conventional disposal technologies because waste is recovered rather than being disposed of (Lindeberg 1991; RRS Newsline 1991; Multi-family Recycling Guide 1991).

**(i) Less Expensive Than Disposal Operations and Landfills.**

Recycling is less capital intensive than landfills, incinerators, or waste-to-energy facilities. This is particularly very advantageous in the Nigerian context because of her dwindling economy which allows Waste management Government agencies only a very meager financial support. High benefit of landfill avoidance costs have been reported in cases where such programs were tested (Carman and Curcio 1991; Multi-family Recycling Guide 1991.)

**(ii) Extends the Life Span of Land-fills**

The amount of waste reduction in source separation schemes varies from as low as 30% to as high as 80% of the MSW stream (Stentiford 1991). For instance, in Leeds (North of England) a 75% waste reduction has been achieved in a source separation scheme for 12000 households. Such a reduction will help to prolong the life span of landfills, and this is very advantageous since good landfill sites are not easy to come by.

In some parts of USA, communities were forced to develop appropriate recycling methods because the landfills get filled up. Closure of East side landfill in 1983, for example, forced the city to consider techniques for waste reduction (Carman and Curcio 1991). Nigeria needs to integrate recycling into her waste management to help prolong the life spans of her limited landfills.

**(iii) Avoidance of Environmental and Public Health Risks.**

In terms of the organic fraction, source separation reduces the amount of potential contaminants. In order to have clean materials for recycling, which will have higher values, it is vital to separate materials such as the biode-gradable organic fraction which would 'contaminate' the recyclable (Stentiford 1991). Disposal of municipal solid waste poses a problem because of the environmental problems of the organic fraction during degradation. Hence, source separation prevents the pollution of surface and underground water source.

(iv) MSW makes a Poor Quality Compost because of its high heavy metal content and high amount of glass and plastic material (Krogmann 1990).

(v) Backyard composting technique reduces the cost of yard waste collection and processing and recovers valuable organics that improve the soil. Hence, smaller quantity of fertilizer is purchased (RRS Newsline 1991) for farming.

(vi) The organic waste content can be separated and used in soil regeneration (Albaladejo and Diaz 1990). This is particularly important since scant organic content is one of the characteristics which favour soil erosion (Ortiz Silla 1990), and several parts of Nigeria are seriously threatened by erosion.

**(vii) Job Opportunities**

By diversifying the types of recyclable and establishing recycling plants more permanent employment could be provided for the scavengers and other people, thereby improving the natural economy. In Cairo, for instance, waste recycling provides an income for 16,000 people while protecting the environment. Similarly, in Mexico more than 10,000 people make their living on the city's dump (safe water 2000 UNDP, 1990). This advantage could also be enjoyed in Onitsha. From the interview, it is estimated that only about 60 people actively depend on the city's waste for their income. Far more than this figure can still comfortably live on the city's waste. This will be illustrated below.

From an earlier study the per centages of waste components in Onitsha are given below (Agunwamba, 1993).

**Table 5: Percentages by weight of solid waste components in Onitsha.**

| Waste | Waste Component (%) | Waste generation rate (kg per capita per day) | Population |
|---|---|---|---|
| Paper | 23 | | |
| Glass | 9.0 | | |
| Cans | 2.8 | 0.60 | 683,333 |
| Plastics | 7.6 | | |
| Biowaste | 40.1 | | |
| Others | 17.5 | | |

If on the average the conservative unit gain is 0.50 per kg of material sold, and the capture rate is 40% then from Table 5, the gain made from the recyclable is N0.424 x 0.40 x 410 x 10 x 0.5 = N34,768 per day. For 24 working days in a month this amounts to N834,432. This will provide job for over 800 persons each earning more than what a first degree holder from a university currently earns in the public service. This fact is also supported by the information gathered from the scavengers and middlemen. As was mentioned above, a scavenger operating in the landfill zone earns N200.00 in two days. In a month of 24 working days, he will earn N2,400. The income of the middleman is even far more attractive - he earns about N16,800.00 per month.

**(viii) Other advantages include:**

Conservation of energy and natural resources, reduction of litter and improvement over the aesthetic state of the environment. Besides, it is easier to site recycling facilities than landfills.

## APPROPRIATE RECYCLING PROGRAM

In most cities of the developed countries recycling incorporation source separation is becoming popular because it leads to the highest capture rate and minimum contamination of the recyclable. Although there are various forms of it, basically source separation involves placing the recyclable in one bin and the non-recyclable in another (Stentiford 1991). The bin for the recyclable is partitioned into two to receive the non-decomposable and decomposable items separately. The non-decomposable and decomposable are sent straight to the landfill and central compost processing plant respectively while the recyclable are taken to the recycling units.

Such an approach may not be successfully implemented in Nigeria without some special adaptation with respect to social, cultural, environmental and financial conditions (Bhamidimarri 1989) prevalent in Nigeria for the following reasons;

(i) One's socio-economic status will affect the way he treats his waste. The fact that he could sell his own recyclable may prevent him from dropping them into the public bins.

(ii) Most state environmental sanitation authorities are so financially handicapped that they could not effect regular conventional collection, transportation and disposal of waste. This is evidenced by the mounting heaps of refuse scattered around Nigerian cities. It is obvious that they may not effectively manage such recycling systems since it will involve bigger initial capital investment, greater expertise and much more intensive public enlightenment programs because of the high level of mass illiteracy, than the conventional solid waste management.

These problems will be reduced by integrating the activities of the scavengers into the programs of the respective Sanitation Authorities so as to effectively collect recyclable with minimum wastage of human resources and health risk. Generally, the state of recycling in Nigeria could be improved in the following areas:

### Education

A more comprehensive and culturally oriented educational program should be adopted to increase public awareness and stimulate public participation through proper channel of mass media. Television, posters, radio stations and advertisement should be used to encourage citizen participation. Because of high rate of illiteracy community leaders could also be used for public enlightenment program in their various communities. Without an involved public the overall effectiveness of any recycling program will suffer (Carman and Curcio 1991). This aspect is very important. The start of the source separation at Leeds (Stentiford 1991) was preceded by an extensive education program within the area, aimed at different facets of the community.

Besides, the education program should be sensitive to the particular needs and the socio-economic realities of the community involved. The program should inculcate in the citizen maintenance and reuse culture, and orient them to accept products based on recycled material as good. Other information to be passed across include: type of waste to be separated or not to be separated; how to separate and store the recyclable etc. The implications of non-recycling of waste on public health, national economy and the environment should be explained to the public.

### Incentives

The government should encourage scavengers and their middlemen by giving them loan and stimulating the market for the recyclable. Besides, they should expand the range of materials that could be recycled by sponsoring researches and encouraging industrialists to go into recycling business.

Gifts and certificates could be given to companies and institutions which evolve successful recycling program for their waste. This will help promote the participation of the private sector in research.

### Training

Estimation of the required expertise to run different kinds of recycling ventures and training the required manpower.

### Market Survey

A comprehensive study of the market for salvaged and recycled material is useful to form an economic guide to the feasibility of composting and material recovery.

### Record of Data

Waste management agencies in Nigeria rarely keep complete relevant data. Complete data should be kept regularly in the following areas: population and developmental projects within the area so that future estimates of generation rates could be made; percentage by weight of components of waste and organic fraction; income and details of expenditures, etc. These data are very important for planning successful waste recovery strategies.

## CONCLUSION

The state of waste management in Nigeria needs much improvement. Collection services where they exist are costly, poorly financed and managed and almost ineffective. Suitable disposal sites are not easy to come by as cities crowd into rural areas. Leachates from improper sanitary landfills pollute ground and surface waters; and in most cities open dumping is practised which is health hazardous. The situation could be improved by waste recycling.

Waste recycling should not just be left in the hands of scavengers alone for the sake of effectiveness, economy and public health. Waste recycling as it is currently practised in Nigeria is so crude and limited in application that not much could be benefited from this system. The scavengers could be trained, properly enlightened and integrated into a more generalized, useful and scientific government-based or private-owned recycling ventures.

High disposal costs and concern for the environment, the dwindling economy that hinders the adequate funding of government waste management agencies in addition to the need to create more job for the unemployed should motivate the Nigerian government to adopt a better structured recycling program. Such a program can only be successful if, among other requirements, the public interest is highly motivated and their participation encouraged.

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