# Integration of Informal Waste Segregation (Scavenging) for Efficient Waste Management System Iin Anambra State, Nigeria

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**Abstract**

*Studies have shown that informal waste segregation otherwise known as scavenging has contributed to the economic development of many countries in the world. This study explores the costs and benefits of scavenging in two cities of Anambra State of Nigeria with a view to determine its contribution to the economy and efficient waste management. The studies were carried out through interviews and structured questionnaire. The information sought were on socio-economic characteristics of scavengers, income, risks involved, benefits, scavenged materials, challenges etc. Two hypotheses, each, were postulated for the study carried out in Awka and Nnewi based on if there are significant costs and benefits of scavenging to the environment. The validity of the hypotheses was tested with chi-square and the results showed significant costs as well as benefits of scavenging activities to the environment. This paper is recommending a formalization of informal waste segregation and building it into the operations of the Waste Management Authority. Thus reducing the costs and risks and reaping the benefits to the enhancement of the economy, provision of legal means of livelihood and efficient waste management system.*

**Key words**: Scavenging, Informal, Waste Management, Livelihood, Sorting

## Introduction

The management of rapid increasing volume of solid waste generated by the populace constitutes a serious problem in most cities of the third world countries. Wastes have thus generated considerable research interests. Waste normally defined as unwanted and discarded material, not useful to the generator, but often useful to another individual. It may not be generally accepted that solid waste are useless, unwanted or discarded materials, given the degree of scavenging on waste heaps in less developed countries by large number of poor individuals.

The serious problems of controlling and managing waste in the society are more in the developing world where there is low level of technological development (Adeyemi, Olorunfcmi and Adewaye, 2001). As the Government and its agencies are battling with waste management, certain individuals also scout for items that could be recycled for local industries who may need them as raw materials. In developing countries like Nigeria, the need to survive due to the poor economic situation has forced some of the citizens in the poor echelon to resort to scavenging as a means of livelihood (Olufayo, Olu and Omotosho, 2007).

The term scavenging is referred to as informal recovery of materials from municipal solid waste. It is an act of sorting or collecting usable waste for the purpose of recovery, recycling and reusing from dumpsites or intermediate disposal points before final treatment and disposal. Medina (1997) describes scavenging as the process of sorting or retrieving materials such as bottles, plastics and other materials or components of solid waste which can be reused. Loan (2002) in his own view sees scavenging as a process involved in the initial collection, purchase and processing of recovery materials. Scavengers are not waste workers and are not concerned with waste management, they enter into trade for socio economic reasons, and their relationship with waste is as a resource. They only collect materials for which there is market.

Throughout the cities of African, Asia and Latin America, varying number of youths survive by salvaging materials from the waste stream. They recover the materials to sell for reuse or recycling as well as diverse items for their own consumption. Thousands of people in almost all the cities of developing countries depend on recycling materials from waste for their livelihoods.

The informal recycling systems can be highly effective. Recovery rates as high as 80% were achieved by the Zabbaleen in Cairo due to intensive manual sorting and their expertise at extracting waste with high market value (Iskander, 2003). Potential profit margin is the main selection criteria for targeting materials and this depends on accessibility, convenience, ease of transporting and handing. The degree to which a particular material is recycled depends among others on the existence of local and national markets, need for local raw materials, prices of virgin materials, international trade in secondary raw materials and relevant treaties (Wilson, Velis and Cheesman, 2000). In many countries major industries have a strong dependency on the availability of secondary raw materials, either local or imported. Thus they provide a steady reliable supply and replacement of more expensive imported raw materials and stimulate the manufacture of low cost affordable products made from recycled materials.

The attitude of the formal waste management sector to informal recycling is often very negative, regarding it as a back-ward, unhygienic and generally incompatible with a modern waste management system. Yet according to the proceeding authors, one of the aims of modern waste management is to move "up the waste hierarchy" that is, reduce the reliance on disposal and increase recycling. The authors observed that it would seem ironic to move forward by eliminating a rather efficient, existing recycling system. Also it would seem counter intuitive to try to move forward by removing the means of livelihood from a major sector of the urban poor. With the focus of Millennium Development Goals (United Nations 2005) on poverty reduction, and of waste strategies on improving recycling rates, one of the major challenges of waste management in developing countries is how best to work with the informal sector to improving their livelihoods, working conditions and efficiency in recycling. The way informal recycling activities are organized has important consequences for income generation, working conditions and social status. The less organized the informal recycling sector is, the less the capability of adding value to the secondary raw materials collected and the more vulnerable they are to exploitation from intermediate dealers.

The preferred option is to integrate the informal sector into waste management planning, building on their practices and experience, while working to improve efficiency and the living and working conditions of those involved. More complicated organizations are being formed such as Micro and small enterprises (MSEs) operating with low capital investment. They provide primary collecting and processing of collected materials into intermediate or final products using creativity and innovation to respond cost effectively to market needs (Ahmed and Ali, 2004). Organizing and training informal recyclers into MSEs is a very effective way to upgrade their ability to add value to collected materials (Haan, Coad and Lardinois, 1998), and thus circumvent intermediate dealers.

There is need to recognize a number of things by those in authority, which include the economic, social and environmental benefits from informal recycling and the limited effectiveness of simply copying approaches used in more economically developed countries as they are unlikely to be appropriate. One step towards integration is to help the informal sector organize themselves to extract higher values from recovered materials. Assisting waste pickers and scavengers to form MSEs was described by the preceding authors as an important from of Public Private Partnership (PPP). A number of points of conflicts also need to be recognized and addressed in the integration of the informal recycling activities into formal waste management system (ISWA, 2002). When a collection crew also separates wastes, it increases the loading time and reduces efficiency. Similarly the presence of scavengers at transfer stations and landfill sites can interfere with vehicle movements which are both dangerous, increases vehicle turnaround times and reduces efficiency.

In Nigeria as in other developing countries scavenging among youths begins with the collection of plastic bags bottles, papers cardboards and cans and it takes place mostly in the informal sector (Okoli, 2013). Unemployed youths, men and women are seen carrying sacks and sticks roaming garbage dumps. They are also seen in their great numbers at the final dump sites.

These scavengers could be seen foraging the heaps and clamoring at every fresh truck load (Uchegbu, 2002).

According to Nzekwe (2013), the position of Anambra State Government on environmental policy is in the area of environmental sanitation, degradation and pollution control. The Government is obviously silent on the activities of waste scavengers failing to recognize its importance in terms of job creation and income generation to some of the citizens. This paper, therefore is presenting the integration of informal waste segregation and recycling into the formal waste management system as a mean of creating sustainable livelihood for some citizens as well as enhancing the efficiency of the waste management system. The rest of the paper is arranged as follow: the study area, Conceptual framework, Methodology, Finding, Recommendation/Planning Implications and Conclusion

**The Study Area**

Anambra State is found within the South East Geopolitical zone of Nigeria. The state was created on August 27th 1991. Anambra State lies within the coordinates of latitudes 6°48"Nand 5°40'N and longitudes 6°35'E and7°21'E of the Greenwich Meridian. It is bounded in the North by Kogi State and to the South by Imo State. Her Western and North Western border are shared with Delta and Edo States respectively, while her Eastern and South Eastern and extreme Sough Western boundaries are shared with Enugu, Abia and Rivers States respectively (fig 1).

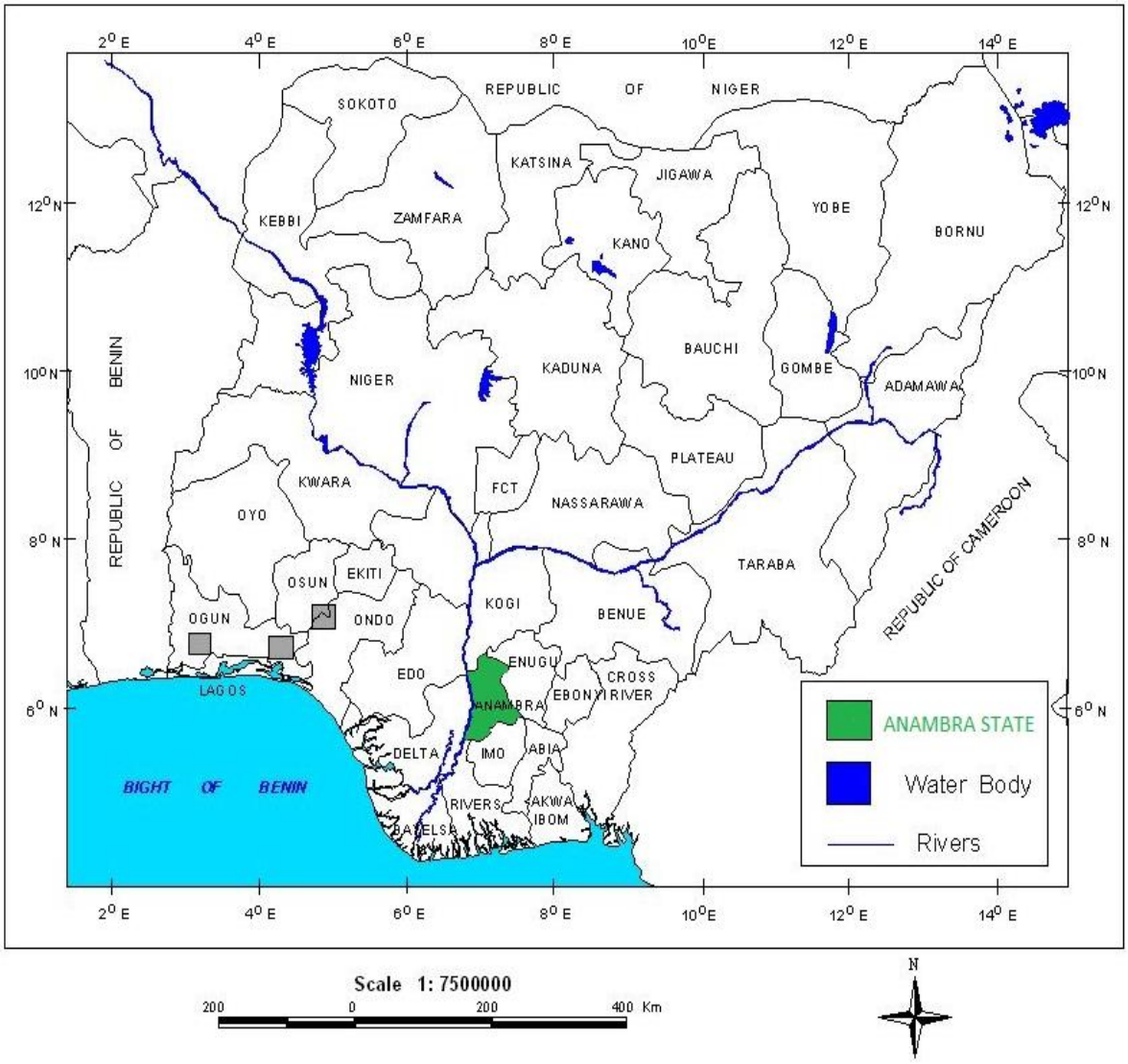


**Figure 1: Map of Nigeria showing Anambra State.**

With a land mass of over 4,120square kilometers. Anambra State has a population of 4,182,032 with a density of over 700 persons per square kilometer. The high density of population has implication for land use intensification and waste generation and management challenges. The state is made up of 177 communities accommodated within the 21 Local Government Areas. The major cities of Anambra State are Awka, the capital city, Onitsha the commercial city and Nnewi the industrial /commercial city.

Land use is dominated by housing of all types purely private residential but has been converted for multiple uses with filth, waste and poor environmental discipline. According to Habitat (2009), Anambra State has three planning areas. These are Onitsha, Nnewi and Awka. The three planning areas account for 71.56% of the population or 2.99 million people. The average annual growth rates for the selected communities vary from 2.60% for Onitsha, 3.17% for Awka and 3.57% for Nnewi.Waste Management in Anambra State is the responsibility of an

agency known as Anambra State Waste Management Authority (ASWAMA) with head office at Awka and zonal offices in selected major cities and some Local Government Head Quarters.

**Conceptual Framework: 4Rs –Reduction, Reuse, Recycle And Recovery**

For purposes of this paper the concept of the 4Rs, namely reduce, reuse, recycle and recover has been adopted. According to the International Institute for Sustainable Development (2013), a number of waste prevention techniques are available, and they are commonly summarized as the so-called 4Rs: reduction, reuse, recycling and recovery.

Businesses are being forced to change the way they manage waste. Faced with regulations, public pressure, landfill shortages and the need for increased resource efficiency, companies are moving away from the waste treatment approach and towards waste prevention.

Reduction, reuse and recycling are known in the industry as the 3Rs. Companies sometimes focus only on the first three in resolving waste management problems. In more innovative companies, 4Rs solutions often emerge as a result of industry benchmarking or technological breakthroughs.

The Canadian government has interpreted the waste management hierarchy as follows:

1. Wherever possible, waste reduction is the preferable option.
2. If waste is produced, every effort should be made to reuse it if practicable.
3. Recycling is the third option in the waste management hierarchy. Although recycling does help to conserve resources and reduce wastes, it is important to remember that there are economic and environmental costs associated with waste collection and recycling. For this reason, recycling should only be considered for waste which cannot be reduced or reused.
4. Finally, it may be possible to recover materials or energy from waste which cannot be reduced, reused or recycled.

Empirical evidence suggests that by practicing waste prevention, reusing products, recycling, and making environmentally conscious purchases, businesses can cut costs and increase profits. Cost savings take the form of:

- Lower waste disposal costs;
- Lower waste treatment costs;
- Lower energy costs;
- Savings on materials and supplies;
- A reduction in regulatory compliance costs;
- Lower storage costs;
- Cost recovery through the sale of recyclable materials;
- Cost recovery through sales of 4Rs technologies.

Scavengers can be used to reduce all these costs. They are used to achieve the above interpreted waste management hierarchy in developing countries such as Nigeria and other African countries. These people recover the materials to sell for the reuse or recycling as well as diverse

items for their own consumption. Scavenging is a labour process involved in the initial collection, purchase, and processing of recoverable material (Loan 2002).

Scavengers typically specialize in recovering only one or a few types of materials from waste. To Medina (1997), Scavenging takes place in all stages along the waste management system. Scavenging represents an important survival strategy for the world's poor, in which individuals recover materials from waste to satisfy their needs.

**Methodology of Study**

Two major cities of Anambra State, Awka and Nnewi were used as case studies in this study. Data were collected independently in the two cities through field observations, interview and questionnaire administration. Field observations were carried on the scavenging sites which are the major dumpsites and the final disposal sites. Questionnaires were also administered on the scavengers at the sites. Oral interviews were also carried out on some of the scavengers as well as the dealers (traders) on secondary/ scavenged raw materials. Some households living close to major dumpsites were also interviewed. Due to the nature of the profession, that is, no specific address and population of scavengers not known, purposive sampling method was used in administering the questionnaire. Among the information sought were on socio-economic characteristics, risks and health implications, environmental costs and benefits of scavenging. Information on nature of materials, income and market for scavenged materials as well as government involvement were also tapped.

The data were analyzed using descriptive and inferential statistics. Hence percentages bar charts and tables were engaged. Chi-square was used to test the null hypotheses that scavenging has no significant costs or benefits to the environment.

**Findings**

The findings of this study are based on the independent surveys carried out in the two main cities of Anambra State, Awka and Nnewi. For the study at Awka the scavengers were seen at major dumpsites and the final disposal site at Agu-Awka running after disposal trucks. Even children form part of this exercise at the final disposal site (Plate 1 and 2). Most of these children do this with their mothers who are engaged in this as means of livelihood for the family. Questionnaires were administered to 129 respondents (scavengers) comprising of various age groups, but majority are youths. Majority of them are males (60%) while 40% are females. About 80% of these scavengers attained formal education, even up to tertiary education (Table 1). On the issue of number of years of scavenging, about 80% have been on it between one to ten years. Only 20% of the respondents admitted to having been on it for more than ten years and they are mostly the older ones (Table 2). This shows that they are just doing it because no better means of livelihood is available. The moment they make enough money to start a trade or a more dignifying job presents itself they leave scavenging.

**Table 1: Education Level of Scavengers at Awka**

| Education Level | No of Respondents | Percentage (%) |
|---|---|---|
| Primary | 65 | 50 |
| Secondary | 32 | 25 |
| Tertiary | 5 | 4.2 |
| Formal Education | 27 | 20.8 |
| Total | 129 | 100 |

**Source: Nzekwe, 2013**

**Table 2: Number of Years of Scavenging**

| Years | Respondents | Percentage (%) |
|---|---|---|
| 1 – 5 | 65 | 50 |
| 6 – 10 | 37 | 29.2 |
| 11 – 15 | 16 | 12.5 |
| 20 – above | 11 | 8.3 |
| Total | 129 | 100 |

**Source: Nzekwe, 2013**

**Plate 1: Scavengers running after disposal truck**

**Plate 2: Children at scavenging site**

On the issue of monthly income, it varies with age, and strength, that is, ability to move from place to place and struggle/scramble for valued materials. The result of the questionnaire showed that 8% earned between N2,000.00 to N20,000.00, 33% earned above N20,000.00 to N35,000.00, while 41% earned above N35,000.00 to N45,000.00, per month from sales of materials. Only about17% earned above N45, 000.00 per month from sales of scavenged materials, yet they all complained about intimidation and exploitation from middle men, that is, intermediate dealers. Interview with middle men, that is, traders on scavenged materials, revealed that a lot of valued secondary raw materials are being recovered from it. (Plate3) Though 81% of the respondents admitted to being aware of the risks and health implications of scavenging, they however engage in it because of no alternative means of livelihood and the profit they make from it. Some of the health risks/diseases being suffered by the scavengers are skin and blood disorder, eye and respiratory infection, infected wounds, chemical burns etc.

For the study at Nnewi the industrial/commercial city of the state, 122 respondents were administered with the questionnaire at the major dumpsites. Here, they were mainly males (87.7%), only about 12% were females. They arealso mostly youths between the age of 20 to 40 years, yet about 30% of the scavengers were above the age of 40 years. On educational level, majority of them attained various levels education, only about 9% did not have any formal education (Table 3). On monthly income, it ranges from N5, 000.00 to N20, 000.00, only about 9% of the scavengers earned income above N20, 000.00 per month from sales of scavenged materials.

**Table 3: Education Level of Scavengers at Nnewi**

| Level of Education | No of Respondents | Percentage (5) |
|---|---|---|
| Primary | 79 | 64.75 |
| Secondary | 32 | 26.23 |
| No Formal Education | 11 | 9.02 |
| Total | 122 | 100 |

**Source: Okoli, 2013**

**Plate 3: Valuable raw materials scavenged**

On the number of years, spent in scavenging, majority of them also fall between 1 – 10 years. Only about 8% have spent more than ten years in scavenging and this is also confirming the fact that they are in it because of lack of any other means of livelihood and that they readily leave it the moment any better alternative presents itself. They attribute this to the risk and stress involved in the exercise and lack of government support and encouragement. The scavengers gave reasons for joining the profession as to raise income to, cater for themselves and families, save money to start a trade, save money for sponsorship of education or craft. While others still see it as last option.

At Nnewi, 86% of the scavengers admitted to being aware of the health implications and risks involved in the exercise but they engage in it as the only means of livelihood and the

necessity of survival. Some of the risks encountered here include bites ad stings, poisoning, air bone diseases and infections.

Generally, some individuals and households leaving close to dumpsites were interview about the activities of the scavengers. Though, majority agreed that they help in reduction of magnitude of waste in the dumpsites and recovery of materials for reuse and recycling, they were also accused of a number of evils. They were accused of stealing, melting and reselling of public properties like telephone and electrical copper wires. They are also said to be involved in some social vices as smoking alcohol, snatching people's valuable items etc. This confirms the scavengers response to challenges encountered in the profession as being stigmatized, harassed, molested, violated and at times injured in the course of carrying out their activities.

In the course of this paper, some officials of Anambra State Waste Management Authority (ASWAMA) were interviewed in the office at Awka and at the final disposal site at Agu-Awka, where scavengers were seen running after disposal vehicles. The interviews revealed that there is no particular programme or plan by the Agency for the scavenging activities. At the disposal site on official of the Agency claimed that it is their means of segregating the mixed waste collected by the Agency, but that is ridiculous since Anambra State Waste Management Authority(ASWAMA) is not in any way involved in training, organizing, protecting or paying the scavengers nor with the sales or recycling of the materials recovered by them.

Finally Chi-square was applied in testing the null hypotheses that there is no significant cost of scavenging to the environment and that there is no significant benefit of scavenging to the environment in both cities.

For Awka with a calculated value of 36.85 and table value15.5, the null hypothesis was rejected and it was accepted that there is a significant cost involved in scavenging. Also with a calculated value of 23.9 and a table value of 14.06, the null was rejected and the alternative accepted that there is significant benefit involved in scavenging.

Then in Nnewi, the null hypothesis was also rejected and the alternative accepted that there is significant cost of scavenging to the environment with table value of 12.5 and calculated value of 29.24. While for $H_2$, the table value was 16.92 and the calculated value 90.95, hence the null was also rejected and it was restated there is significant benefit of scavenging to the environment.

**Recommendation/Planning Implications**

Form the foregoing study it has been establish that scavenging is not just useful to the environment and waste management but that it is a means of livelihood to an ineligible proportion of citizens of this State. In as much as it has its costs yet the benefits to the society and environment cannot be over looked. With proper planning and organization the costs of scavenging can be controlled while the benefits would be reaped.

This paper /is, therefore recommending the integration of the activities of scavengers into operations of the Waste Management Authority of Anambra State. Instead of allowing the waste pickers to be foraging the waste heaps by themselves unguarded and unguided, they would be organized and trained, and a formidable programme created for them in the waste management hierarchy. Since Anambra State Waste Management Authority (ASWAMA) still collects mixed waste and bearing in mind that waste segregation is a vital aspect of efficient management with its attendant recovery of secondary raw materials, the integration of waste pickers in its operation is a right step in the right direction. In addition to enhancing the efficiency of the waste management agency, it will create job and provide a secured means of livelihood for the scavengers.

It will also protect them from the exploits of intermediate dealers as well as provide an organized market for secondary raw materials. And this will increase the revenue generation of the Agency. The health risks involved will be reduced since the Authority will introduce some healthy measures and provide the scavengers with protective clothings. They will be saved from molestations and harassments and given a sense of belonging. This is already being practiced in Lagos State.

However there is need to address the points of conflicts raised earlier from literature in the introduction by providing an area within the transfer stations and the period within which the segregation activities are done to avoid interference with vehicle movements. And of course there should be division of labour, the waste segregators should not be the collection crew to avoid increase in loading time.

## Conclusion

In conclusion, therefore, integrating the informal waste segregation activities of scavengers into the formal waste management in Anambra State will be a multiple end bullet. It is not just beneficial to the poor scavengers but also to the waste management authority, the government, the economy and the populace at large.

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