



## **THE ROLE OF WASTE PICKERS IN MUNICIPAL SOLID WASTE MANAGEMENT**

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### **Abstract**

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*Waste Pickers play vital roles in municipal solid waste management which include waste collection, separation, sorting and reuse of waste, thereby aiding recycling and reducing pressure on the environment. Waste picking which occurs mostly in developing countries is an important survival option for the poor and unemployed. Introduction of new waste management strategies such as, separation of waste in homes would most likely impact on the livelihood of the unskilled waste pickers, because waste picking activities from landfills may be significantly reduced. Studies carried out in three areas of Johannesburg (South Africa) to determine the amount of waste that may be diverted from landfills showed that: 78.6%, 68.7% and 50.6% of recyclables and compostable materials from high, middle and low - income areas respectively may be diverted from the waste stream. If translated into practice, it could significantly impact on reduction on volumes of waste being landfilled.*

*This paper seeks to establish how changes to the current system of waste collection in the City of Johannesburg will impact on waste pickers; and presents options for integrating waste pickers into a modern solid waste management system.*

**Keywords:** *Municipal solid waste, waste pickers, solid waste management, integration, waste stream analysis*



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### **1. Introduction**

Most cities in Sub-Saharan African Countries experience high rates of population growth due to increased processes of migration, urbanisation, industrialisation and modernisation (Simatele, Dlamini & Kubanza, 2017; Nzeadibe, 2009). As villages grew into towns and then cities, accumulation of waste (Figure 1) became a consequence of life. An anthropological perspective on waste explores the fact that what constitutes waste is a highly subjective

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notion (Drackner, 2005). What may be waste to one person may be a valuable resource to another.



**FIGURE 1: MUNICIPAL SOLID WASTE**

In urban cities of the developing world, the informal sector in solid waste management (SWM) plays an important role in diverting recyclable materials away from waste disposal to recycling (Sembiring and Nitivattananon, 2010; Nzeadibe, 2009). The informal sector in SWM refers to small-scale, labour-intensive, unregistered, unregulated low-technology procedures to separate usable materials from the waste stream (Agamuthu, 2010). The casual work is carried out by individuals and extended families and community enterprises (waste pickers)



**FIGURE 2: WASTE PICKERS**

Waste pickers (Figure 2) perceive waste as a resource and pick recyclable/reusable materials from outside businesses, on the streets, private waste bins, street bins, water courses, transfer  
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stations, waste trucks, landfill sites and illegal dumps (Colombijn and Morbidini, 2017). Informal waste pickers contribute to increasing the lifespan of landfills by lowering the quantities of waste to be disposed of and are key economic actors in providing inputs to the recycling market with materials that would otherwise be dumped (Dias, 2016; Scheinberg and Rachel, 2015). The recyclables can be sold as secondary materials to established local markets and to middle-man in the recycling industry, either for local use or export (Agamuthu, 2010; Oelofse & Strydom, 2010). What waste pickers have in common is that this work is their livelihood and often helps support their families. However, the methods of waste pickers (Figure 3) are considered backward, risky, unhygienic and generally incompatible with a modern waste management system (Sembiring & Nitivattananon, 2010).



**FIGURE 3: WASTE PICKERS WORKING ON A LANDFILL SITE**

The inability of the formal waste sector (either public or private enterprises) to provide adequate waste collection and transportation systems has created an environment for the informal waste sector to thrive (Noel, 2010). The situation in industrialised countries is very different, since resource recovery is undertaken by a professionally managed formal sector and often at considerable expense. Furthermore, the formal sector is driven by law designed to protect the local and national environment and public health (Agamuthu, 2010).

### **1.1 Background**

There is a high unemployment rate in South Africa, in the region of 27.6% as at the first quarter of 2019 (Statistics South Africa, 2019). The Department of Trade and Industry (DTI)

have identified the recycling industry as having a huge potential for job creation, especially in the collection of recyclables (DTI, 2009). The South African waste sector is valued at R15.3 billion or 0.51% of the country's GDP (2012) and employs approximately 30 000 people, 67% of whom work in the public sector (local government). An estimated 2-3 times this number (60 000 – 90 000 people) earn a livelihood through the informal waste sector. Every year at least R17.0b worth of valuable secondary resources is lost to the South Africa economy as waste, disposed at landfill. (Godfrey, 2018).

As in most developing countries, waste pickers in the City of Johannesburg (COJ), referred to as reclaimers; depend on recycling materials from waste for their livelihood. The potential for waste picking and livelihood of waste pickers will be affected by an improved efficiency in waste collection. The current system of waste collection in the COJ uses 240 litre wheelie bins, bulk containers, or bags, which are emptied into the back of a refuse-compactor vehicle by means of a lifting mechanism and transported to transfer stations or landfill sites.

If households begin to separate waste in their homes, for instance, into different fractions such as, metal, glass, paper, plastics and garden waste (Figure 4), it would significantly improve collection, handling, recycling and disposal as significant amount of recyclables will no longer end up in the landfill sites.



**FIGURE 4: WASTE SEPARATION**

However, it would impact on the livelihood of waste pickers at landfills, as waste picking activities would be significantly reduced. It is vital to find ways in which the informal waste pickers can potentially be integrated and incorporated into formal structures within municipal

solid waste management. Globally, Belo Horizonte and Pune in Brazil and Bogotá in Colombia are considered among the most progressive in integrating waste pickers into urban plans (Dias, 2016; Chikarmane, 2012).

## **2. The Study Area**

The study focussed on City of Johannesburg in Gauteng Province of South Africa. The City is located 550km south of the northernmost part of South Africa and 1,400km north of the southernmost tip at an altitude of 1753m above sea level (City of Johannesburg, 2010). The City has a population of 3,888,182 people living in 1,165,014 households, on an area of 1644 square kilometres, making the average population density 2365 persons per square kilometre (City of Johannesburg, 2010). The population is growing at an average of 4.1% per year (City of Johannesburg, 2010). The per capita waste generated per person per day is approximately 1.6 kilograms (City of Johannesburg, 2010).

The City fulfills its obligations with respect to waste management through its waste entity, Pikitup, State Owned Company (SOC) which performs all operational duties with respect to general waste which includes collection and disposal while the Council performs a regulatory, planning and strategic function. The City has four operating landfill sites and two recently closed landfills. These landfill sites simply cannot cope with the volumes of waste generated.

Despite the achievements that the City of Johannesburg has made in managing its waste, there are challenges on how to integrate a burgeoning number of informal waste workers. There are estimated 8,000 – 10,000 waste pickers who perform waste-collection work in Johannesburg (Menon, 2018). The general sequence of value in recyclables in Johannesburg are white paper, clear plastic followed by newspaper, cardboard and scrap metal. Waste pickers are estimated to collect 80%-90% (by weight) of discarded paper and packaging in the country (Godfrey, Strydom and Phukubye, 2016; Menon, 2018). It is estimated that this saves municipalities hundreds of millions in landfill space. Yet waste pickers receive very little for the recyclables they sell. An analysis of a study of South African street pickers' income was carried out by Viljoen, Blaauw and Schenck, 2018. The results indicated the minimum (R2.00), maximum (R500.0), mean (R94.11) and median (R70.0) incomes usually earned for a day's waste in Johannesburg.

### **3.0 RESEARCH METHODOLOGY**

Primary data was collected by means of a waste stream analysis study. Other tools used for this investigation are direct observation, discussions with waste management specialists, secondary data in the form of documents and literature search. Direct observation was used to gain an insight into the activities of the waste pickers on landfill sites.

#### **3.1 Waste Separation at Source in Homes**

A waste separation at source project of a limited number of houses in selected areas of the City of Johannesburg was carried out. The aim was to quantify the percentages of recycling and composting potential of the general waste streams generated from various socio-economic residential areas of the City. Even though a number of medium-scale household waste separation at source projects are currently taking place in the City through established recycling companies, very little formal separation at source structures that includes waste pickers at municipal level are presently in place. The results of the investigation would assist to establish how changes to the current system of waste disposal (where recyclables are reclaimed in an informal manner) will impact on the waste pickers.

##### **3.1.1 Target Population**

The target population for this study was drawn from three income level categories, low, medium and high, as proposed by the Rand Water Study carried out in 1998 (Ball and Associates, 2001a) and after extensive search of the literature revealed that people have a tendency to live in communities based on their income level. The income-groups were selected to find out whether household separation of waste was practicable across the spectrum of income categories.

The target population for a study is that group (of people or things) about whom we want to draw conclusions and the individual members of the population are referred to as units (Babbie *et al*, 2001).

##### **3.1.2 Target Areas**

Target areas for the study were Yeoville, Observatory and Bryanston East, which represent low-, middle-, and high-income areas respectively. The reason for the selection of the target areas was because they are considered virgin in that household separation of waste was new to these areas. Furthermore the target areas were mostly free of waste pickers who constituted a serious problem on collection days. The middle and high income areas are well secured with access control and security personnel.

### **3.1.3 Sampling**

Convenience sampling as a non-probability technique was used to select the participants for the study. The reasons for using this method of sampling which was found to be the most appropriate include the following.

- The sample elements were easily available, accessible, articulate and cooperative.
- To enable collection of the separated waste from the houses in one truck in minimum time.
- To avoid confusion on collection day between the waste collectors from Pikitup and the researcher's waste collectors.
- It helps to spread the word round about the study and stimulates discussion among occupants in the selected houses, which were in clusters.
- It is good to educate people about the study as a community.

#### **3.1.3.1 Sample Size**

One hundred houses from each of the study areas were earmarked for the study on the separation of waste generated by them in their homes. To ensure this number was achieved, one hundred and fifty houses per area were targeted for the study. The first one hundred houses where respondents were willing to participate in the study were taken as selected. Houses such as single-houses, semi-detached houses and cottages located on chosen streets within the targeted residential areas were included in the sample because occupants of these dwellings were required to have individual and not common bins). Other types of dwellings such as blocks of flats, offices and shopping areas were excluded because during the survey of the study areas, it was observed that residents did not have individual bins.

### **3.1.4 Data Collection**

#### **3.1.4.1 Selection and Training of Field Workers for Waste Stream Analysis Study**

The field workers used for the study were selected based on their good reading and writing skills, effective speaking and listening skills and basic knowledge on issues pertaining to solid waste management.

The workers were trained by the authors of this paper for the purpose of collecting data for the study. The training synopsis for the workers comprised the following:

- Explaining the background and objectives of the study.

- Explaining the contents of the handouts given to the workers. The handouts contained the types of waste materials that are recyclable and non-recyclable, relevant definitions such as recycling, reuse and household separation of waste.
- Showing workers samples of recyclable and non-recyclable materials, such as plastics, paper, cardboard, glass and metals and explaining how to identify the two waste groups.
- Demonstration of how to further separate the separated waste items collected from the households, weighing the separated items and recording the results in the data sheet.

#### **3.1.4.2 Waste Fraction and Composition of Waste from Selected Households**

Before commencement date of the waste separation project, the field workers had a face-to-face interaction with homeowners to explain the project to them and to solicit their cooperation. All sampled houses were given five different labelled coloured bags weekly by the field workers to separate their waste in. These were blue for recyclables (such as plastics, glass and metals), green for garden waste, yellow for household hazardous waste/e-waste, orange (Ronnie bags) for paper and black for non-recyclables (rubbish).

Field workers collected separated waste on a weekly basis for three weeks. In addition, fliers to remind households to separate their waste and the date and time to put out their coloured bags for collection were also distributed regularly.

Coloured bags containing separated waste were loaded into collection trucks provided by Pikitup. The bags were then taken to the premises of a private recycling company's sorting facility located inside the Robinson Deep Landfill site. The various components of the waste stream were weighed using a Nagata Micro PF-1 electronic weighing scale and the data was recorded.

### **4. Results and Discussion**

#### **4.1. Total Waste Materials Diverted from Landfill Sites**

Table 1 shows the average amounts of all recyclables and compostable materials (such as, plastics, glass, metals, paper, and garden waste) separated out by the study participants. The "others" fraction is the non-recyclable portion of the waste stream of all the socio-economic areas disposed to landfill sites.

Results of the waste stream analysis shows varying waste composition trends across socio-economic levels. The results show that the more affluent the area, the more valuable its waste. On average the waste stream contains 7,4% plastics, 15,6% glass, 4,6% metals, 18,6%

paper and 19,9% garden waste. The waste stream of selected houses from the high-, middle- and low- income areas can be reduced by 78,6%, 68,7% and 50,6% respectively by simply removing garden waste, paper, glass, plastics and metals from the waste stream. The “others” waste fraction includes the putrescibles. The study has shown that household separation of waste is practicable across the spectrum of income categories. If the stated quantities of waste (Table 1) are diverted from the landfills through source separation of recyclables and compostables in homes, the livelihood of waste pickers would be adversely affected.

**TABLE 1: WASTE FRACTION AND COMPOSITION OF SEPARATED WASTE ITEMS**

WASTE FRACTION	WASTE COMPOSITION PER SOCIO-ECONOMIC AREA (% BY MASS)			
	HIGH-INCOME (H) (Bryanston East)	MIDDLE-INCOME (M) (Observatory)	LOW-INCOME (L) (Yeoville)	AVERAGE
Plastics	10.0	7.1	5.0	7.4
Glass	17.9	16.2	12.6	15.6
Metals	6.0	4.8	3.0	4.6
Paper	21.8	20.5	13.4	18.6
Garden waste	22.9	20.1	16.6	19.9
Total Amount of Recyclables and Compostables	78.6	68.7	50.6	67.6
E-waste and Hazardous waste	1.5	2.0	1.4	1.6
Others	19.9	29.3	48.0	32.4

During the study period waste pickers (reclaimers) were also interviewed and asked why they became waste pickers and the responses were:

- ❖ “I am my own boss”
- ❖ “I get sufficient income”
- ❖ “doing well enough”
- ❖ “the only option” due to being uneducated, low skilled and limited opportunities in the formal labour market
- ❖ “Collecting of food and other household items “

Waste Picker Integration can be defined as the creation of an official recycling system that values and improves the present role of waste pickers, builds on the strengths of their

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informal system and includes waste pickers in its design, implementation, evaluation and revision (Samson, 2019).

Discussion by authors of this paper with solid waste management (SWM) professionals based in Johannesburg reveal their significant opposition to the integration of waste pickers into modern solid waste management systems. Only few of the SWM practitioners spoken to, supported this concept. In disagreeing, the waste professionals asked, if the integration of waste pickers is not in conflict with the philosophy of solid waste management which requires source separation to be a primary tool in waste reduction. The professionals were also of the opinion that the issue of integration of waste pickers is political and focus and energy should be channelled to the more serious problem of dwindling landfill sites and how to extend the lifespan of the existing ones, a task which according to them has no place for waste pickers. The question is: could their viewpoint be a result of self-interest, a matter of just getting more for themselves at the expense of the voiceless poor? This is because many of these unskilled people can be trained to earn a better living by absorbing them into the waste management system. The only area of consensus is that most people agree that the issue of waste picking is fraught with inherent conflicts and compromises, which impact on operating standards, health, safety and quality of life.

The South African Government has committed to promoting co-operatives as a means to “create and develop income-generating activities and decent, sustainable employment; reduce poverty, develop human resource capacities and knowledge; strengthen competitiveness and sustainability; increase savings and investment; improve social and economic well-being; and contribute to sustainable human development” (DTI, 2012). This makes it vital that any change to the current system of waste disposal must explore ways of assimilating this group of people (waste pickers) in an organized and directed way into the new system. This way the economic and environmental benefits of reducing waste to landfills through the integrated role of these workers are enhanced.

## **5. Conclusions and Recommendations**

Since developing cities usually have cheap labour but lack the required capital to manage solid wastes adequately, integration of the informal sector rather than adopting unsuitable and expensive foreign technology can be a vital step towards more cost-effective and sustainable waste management.

Pikitup or the end users of the recyclables (such as the paper and plastic manufacturing industries) should assist the waste pickers into organizing themselves into a cooperative (formal structured setting) or small enterprises. Organising is vital for improving waste pickers livelihood and establishing their place in urban waste management systems. Such associations have been shown to provide excellent results in Bangladesh, the Philippines and Brazil. In addition, waste pickers should be registered with the buy-back centres and the municipality in order to alleviate any misgivings by the households that their presence in their neighbourhood will lead to crime and litter.

From the findings of the research project on “Lessons of Waste Picker Integration Initiatives” (Samson, 2019), interviews conducted and current economic situation in the City of Johannesburg, it is necessary to design waste management systems that take into consideration the existence of waste pickers in the waste value chain and to involve waste pickers (as far as practicable possible) in the development of waste management systems. It will also be important to create a platform of regular meaningful engagement with waste pickers to discuss issues of mutual interest within municipalities. Through involving them it will stimulate economic and capacity development opportunities that are geared towards the long-term sustainability of the waste pickers and the informal sector in the waste value chain. Active participation by all waste pickers in the City’s waste picker registration efforts is needed in order to ensure the City maintains an updated database of waste pickers who contribute to the City’s recycling economy. (Samson, 2019).

Three options are recommended for integrating waste pickers into any new system.

One option is for the waste picker’s cooperative to do the collection of the separated waste materials and sell them directly to the re-processor. This method does not involve middlemen so the cooperative will earn higher prices for their recyclables, which would result in better living conditions for their members.

A second option is for Pikitup or the recycling companies to collect the separated waste materials and employ the waste pickers to further separate the co-mingled recyclables (plastics, metal, and glass) and produce compost from garden waste. The company may then sell the recyclables to the reprocessors directly.

The third and probably the best option are for the waste picker’s cooperative to sell the recyclables to Pikitup (in this case, the middleman); the company may be able to cross-

subsidize the recyclables when necessary. If the cooperative sells directly to the re-processors, they may not be able to finance cross-subsidization.

Cross- subsidization becomes necessary when the market price of the recyclable is less than what it cost the cooperative to collect and process the recyclables. This means that the cooperative cannot sell the recyclables at a profit as the re-processors will only be willing to pay the market price. Pikitup can use part of the savings it made on waste collection and disposal costs (as a result of source-separation) and profits made from selling a competitive recyclable, such as metals to cross-subsidize the non-competitive recyclable.

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