

Waste Management Key Participants in Developing Countries: A Discussion

Nhlanhla Nkosi and Edison Muzenda

Abstract—This paper discusses key role players in waste management in developing countries. The identified key players are municipal governments, informal private sector, community based organizations, and non-governmental organizations. The paper concludes by addressing key issues and constraints, informal sector integration as well as challenges faced in the management of waste.

Keywords— Constraints, integration, recycling, scavenging, waste management.

I. INTRODUCTION

RECYCLING is whereby discarded products and materials are reclaimed or recovered, refined or reprocessed, and converted into new products. It is also the complete cycle, from waste collection to the manufacturing of new products and secondary raw materials. Recycling is a waste minimization option. Waste recycling and resource recovery can effectively reduce the amount of waste disposed at landfills as well as conserving natural resources. In addition recycling initiatives can reduce pollution, manufacturing costs, litter and scavenging at landfill sites. Employment opportunities can also be created through recycling. Table 1 shows both recyclable and non-recyclable materials that have reached the end of their life.

The waste stream’s composition in an area reflects the community lifestyles. This can widely vary from urban to rural areas and from higher to lower income communities, Fig 1. The waste stream composition is influenced by disposable income and the type of fuel. Fig 2 shows the land filling and recycling trends for 2001, 2006 and 2012, Department of Environmental Affairs and Tourism [1].

TABLE I
CATEGORIES OF RECYCLABLE AND NON RECYCLABLE MATERIAL

Recyclable material		Non-Recyclable material
Common items	Unusual items	
cardboard	motor vehicles	Dirty recyclable materials
cans	white goods (e.g. old fridges and microwaves)	Laminates made of mixed materials
scrap metal	electronic products	e.g. plastic-paper, paper-metal foil laminates
plastic	batteries	Laminated glass such as car windscreens
glass	construction and demolition rubble	Materials that are uneconomical to recycle because of insufficient volumes
tyres		
lubricating oils		

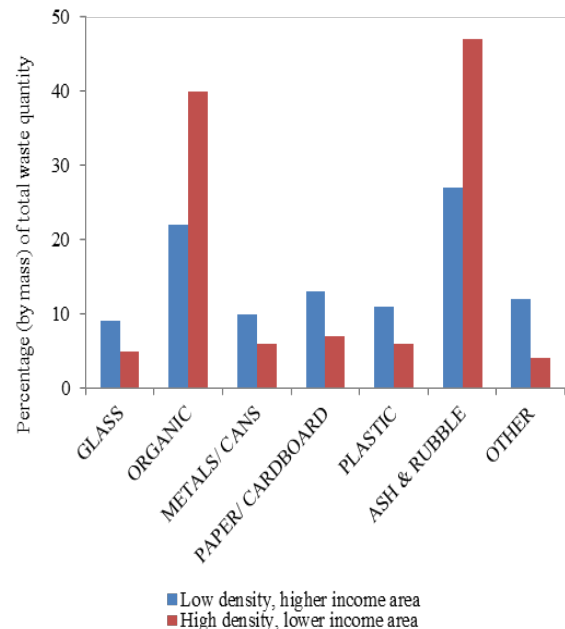


Fig. 1 Waste streams in different communities [1]

Nhlanhla Nkosi is with the Department of Chemical Engineering, Faculty of Engineering and the Built Environment, University of Johannesburg, Doornfontein, Johannesburg 2028, (email: nkosinhlahlal@gmail.com)

Edison Muzenda is with the Department of Chemical Engineering, Faculty of Engineering and the Built Environment, University of Johannesburg, Doornfontein, Johannesburg 2028, Tel: +27115596817, Fax: +27115596430, (email: emuzenda@uj.ac.za)

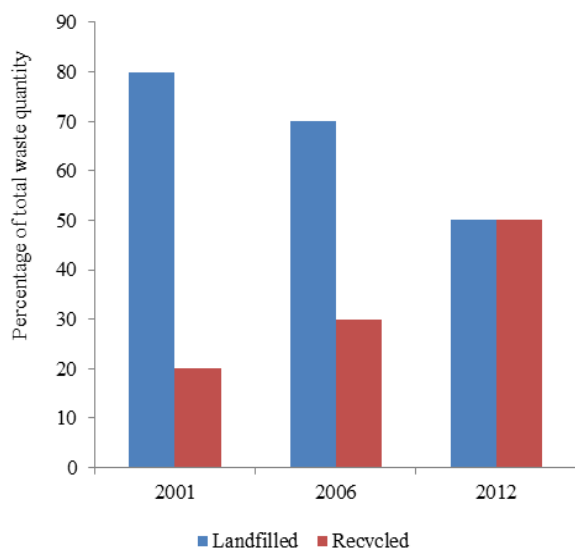


Fig. 2 Recycling progress [1]

The key role players in waste management are municipal governments, the informal private sector, community based organizations and non-governmental organizations. This paper explains the role of the key players in waste management paying particular attention to developing countries.

II. KEY PARTICIPANTS

A. Municipal governments

Local municipal governments play a role in the setting-up and operation of waste management systems. Most urban authorities in both industrialized and developing countries are empowered and tasked by central government to protect the rights of the citizens, provide waste services and to serve the common good [2]. They have to implement laws and regulations in order to fulfill their constitutional obligations. The characteristics distinctive to local governments when fulfilling their waste management responsibility include (i) mandatory obligation (ii) use of public funds to achieve their waste management objectives (iii) regulating or contracting the private sector (iv) political concerns.

B. The Informal Private Sector

The term “informal private sector” refers to unregistered, unregulated, or casual activities carried out by individuals and/or family or community enterprises engaging in value-adding activities on a small-scale with minimal capital input, using local materials and labour-intensive techniques [3]. The informal sector enterprises do not pay taxes, have no trading license and are not included in social welfare or government insurance schemes. Informal waste recycling is carried out by poor and marginalized social groups who resort to scavenging for survival.

Informal activities in waste collecting and recycling are often driven by poverty, are individually initiated and spontaneously with the sole purpose of survival although

some aim for profits. Consequently, the choice of waste to be collected is influenced by its value, ease of extraction and handling as well as the transportation required. Paper, metals and plastics, usually collected from the more affluent residential or industrial areas tend to attract more attention than organic or biodegradable waste. The role played by the informal private sector in waste is slowly attracting international recognition. Table 2 shows the various individuals who contribute to solid waste management. The informal private sector is motivated by need to make profit and survival.

TABLE II
[4] ROLE OF THE INFORMAL PRIVATE SECTOR IN SOLID WASTE MANAGEMENT

Category	Method of Work	Material
Street pickers	Recovery	cans
Landfill scavengers	Recovery	Bottles, paper, plastic bags, cans, other valuables
Collection groups	Recovery	Bottles, cardboard, cans, valuables
Dealers, neighborhood dealers or buyers	Buying (retail)	Metal, iron, steel, paper, cardboard, plastic
Small-scale entrepreneurs	Buying, trading	bottles, glass bottles, miscellaneous
Large-scale entrepreneurs	Buying and large-scale Processing technology	

C. The Formal Private Sector

This sector includes private corporations, institutions, firms and individuals operating registered and licensed businesses with organized labour, capital investment and modern technology [3]. This sector is motivated by profit making. The formal private sector is involved in wide-range of waste management activities varying from waste collection, resource recovery, incineration and landfill operation. Its participation can be through entering into waste management contracts with municipalities and individuals as well purchasing the recovered materials. The formal private sector is characterized by the potential for profits, use of private resources and municipal regulation.

D. Community Based Organizations (CBOs)

The community and its representatives have a direct interest in waste management, as residents, service users and tax payers. Communities in low-income areas generally receive minimum to zero services with regards to public transport, electricity, sanitation, drainage, and waste removal. Sometimes these communities take the initiative to organize themselves into Community Based Organizations (CBOs) with the aim to self-help and improve their living conditions. CBOs may receive external assistance in the form of technical and/or financial aid from various agencies. Groups of citizens, including those from middle and high-income areas, may start CBOs to improve waste management in their neighborhood.

Middle and high-income communities generate more valuable waste compared to the poorer areas. CBOs mainly participate in primary waste collection and separation at source initiatives.

E. Non-Governmental Organizations (NGOs)

NGOs are diverse organizations such as churches, universities, labour, environmental and lobbies as well as donor organizations. They are generally intermediate organizations linking communities and municipalities which are not directly involved in community waste projects. NGOs, beside advocating are also involved in awareness-raising, support and decision-making. They can advocate interests on a larger scale than the single community, provide support and advice to CBOs as well as marginal groups in the society, such as scavengers and street children. The role of NGOs as partner organizations in waste management ranges from serving as umbrella organizations under which CBOs operate, to providing a channel for donor financing. CBOs and NGOs are motivated by a selfless desire to improve waste management for communities and function outside the formal decision making structures of municipal governments.

III. KEY ISSUES AND CONSTRAINTS

There are several fundamental constraints that hinder the development of inter-sectorial partnerships among municipal governments, the formal private sector, the informal sector, and non-governmental and community-based organizations such as financial constraints. For all stakeholders, financial problems cover (i) for the municipal governments, constraints on the use of taxpayers' money (ii) for the formal private sector, constraints on capacity, credibility, liability and resilience (iii) for the informal private and community sectors, generally marginal access to social institutions and limited access to finance. Sectorial cooperation is hindered by the lack of belief in the legitimacy of other partners or the fear that partnerships may disrupt the status quo, especially for marginal actors such as informal sector entrepreneurs.

IV. INFORMAL SECTOR INTEGRATION

The social, environmental and economic advantages of informal sector integration are addressed in this section. Although, the income and living conditions of informal waste workers vary significantly, the majority are confronted with extremely hazardous working and living conditions. They generally lack sanitary services, health care and social benefits. Child labour is very frequent, and life expectancy is low. The departure point for informal sector integration was the attempt to improve social inclusion and protection. The integration of the informal sector will assist scavengers to gain access to personal protective gear and health care services. This will also reduce child labour as a result of the stringent laws and regulations governing the formal sector.

The informal sector can achieve high recovery rates of up to 80% [4] as the ability to recycle is vital for their survival. A

variety of recyclables are segregated and processed in accordance with new demands and technological advancements in the recycling industry. A drop in recovery rates was witnessed in Egypt following the introduction of the private sector involvement in solid waste collection [4], indicating the significance of the informal sector in running efficient recycling schemes. By recycling and composting, the informal sector contributes to the reduction of greenhouse gases. However, the negative environmental impacts caused by informal recovery activities should also be highlighted. When sorting out recyclable waste in the streets or at waste transfer stations, informal workers contribute to the dispersing of waste that might pollute the environment directly. Informal recycling activities do not obey environmental standards and also contribute to pollution. Integrating, organizing and training informal workers can help reduce the negative effects of their practices. Scavengers should be incorporated into the formal recycling industry in order to improve their livelihood. Scavengers in residential areas collect less waste daily as they have to move from place to place whereas at the landfills, waste is delivered to them. Therefore it is important to consider and include them in future waste management plans.

Although the informal sector often operates outside the formal channels, unlicensed and untaxed, it contributes significantly to the national economy. Scrap collectors are entrepreneurs who add value by collecting and transforming waste into valuable commodities. Therefore, new enterprises are formed, trading networks evolve, capital investment as well as savings on raw materials, transport and energy occurs. Employment opportunities are created through informal sector integration and this economically lifts the disadvantaged social groups.

In response, the National Waste Management Strategy (NWMS) [1999] emphasizes the need for integrated waste management, which implies coordination of functions within the waste management hierarchy. The Department of Environmental Affairs has been designated as the lead agent for integrated waste management. In addition, it is anticipated that the recently promulgated Waste Act (Act 59 of 2008) will address the various short falls previously discussed in this paper. The diversion of waste from landfills through waste minimization and recycling is a national policy objective. An example is the plastic bag levy aimed at promoting efficiency in the use, re-use, collection, recycling and disposal of plastic bags. There is also a proposal on tyre levy as well as the inclusion of other products such as batteries, and electronic equipment (National Treasury, 2006). The revenue generated is often channeled towards general government funds instead of being targeted for environmental management. The government is currently helping scavengers with protective clothing. In most landfill sites in Gauteng, management provides protective clothing to scavengers and they also encourage them to go for regular health check-ups. In addition, management provides training and education on recycling.

V. CHALLENGES

Recycling for an average suburban household is burden due to the absence the required infrastructure and services. Households have to separate their waste and deliver recyclables at municipal drop-off or buy-back centres as there is no kerbside collection. The waste is supposed to be separated at source. The benefits of recycling include reduced pollution and green-house gas emission as well as increasing landfill life spans. Over 70 percent of the garbage on South African landfills can be composted or recycled [6].

VI. CONCLUSION

Recycling for an average suburban household is an inconvenience as they have to separate their rubbish and take recyclables to municipal drop-off or a buy-back centers due to lack of kerbside collection. The benefits of recycling include reduced pollution and green-house gas emission reduction. Over 70 percent of the waste in South African landfills can be composted or recycled [6]. Increasing recycling rates helps to reduce global warming and other environmental problems as well as increasing landfills life span.

ACKNOWLEDGMENT

The authors are grateful to the National Research Foundation (NRF) of South Africa and the Council for Scientific and Industrial Research (CSIR) for financial and technical support.

REFERENCES

- [1] Guidelines on recycling of solid waste, Department of Environmental Affairs and Tourism, www.sawic.org.za Accessed 14 March 2013.
- [2] P. Gidman, I. Blore, J. Lorentzen and P. Schuttenbelt, "Public-private partnerships in urban infrastructure services" *Urban Management Programme Working Paper Series 4*. Kenya, 1995.
- [3] C. Furedy, "Social aspects of solid waste recovery in Asian cities". *Environmental Sanitation Reviews, No 30*. Bangkok, Thailand, 1990.
- [4] P. Suchada, J. Tränkler, K. Cholada. and W. Schöll. "The role of formal and informal sectors in solid waste management of developing countries" *Asian Institute of Technology Pathumthani 12120, Thailand*. 2003.
- [5] H. Fiehn, and J. Ball, South Africa Environment Outlook: National State of the Environment Project. Department of Environmental Affairs and Tourism, 2005.
- [6] D. Steyn, and E. Dlamini, "Plastics recycling in South Africa- The Realities". *Proceedings Biennial Conference and Exhibition. WASTECON*, 2000.