

Topic: Solid Waste Management

Title: Informal Waste Separation and Waste Diversion - The Guyana Experience

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1. Background

As the discussion on climate change intensifies the need for a change in attitudes towards the issues environmental management and natural resource management become more obvious. The process of development does require that among other things we utilize the earth's natural resources to sustain life and advance in the area deemed necessary for our development. The industrial revolution was a significant turning point in our ability to mass produce goods for human consumption leading to an increasing demand for material resources to feed the production lines. This has not only led to an exploitation of natural resources in many parts of the world but also resulted in increased air pollution from the industrial operations and the generation of increasing volumes of waste as consumption of goods increases.

All over the world much of the waste generated has found its way into landfills or open dumps and has presented major environmental challenges for governments. The competing priorities for land to accommodate housing, agriculture and industrial development have meant the placement of landfills further away from the communities they serve. Coupled with this there has been increasing awareness of the value of some of the materials landfilled and the potential for their reuse. These factors have served to influence a movement towards waste diversion to aid in the sustainable utilization of material resources for industry and simultaneously provided an opportunity for a lengthening of the life of landfills.

In several developed countries much emphasis has been given to formal waste separation systems so as facilitate waste diversion from landfills and promote better material resource management through the promotion of waste reduction, reuse and recycling. Agenda 21 does highlight the need for governments to collaborate with industry, households and the wider public to work towards the reducing the generation of waste and waste byproducts through the use of

recycling among other options¹. In developing countries most of the waste management systems are still in the very primary stages of development and often there is no formal waste separation system. In many instances however because of the economic value attached to some waste material due to their potential for reuse or recycling, there tends to be a pretty vibrant informal waste separation system. This informal system is however not generally given much credit for the impact they may be having in facilitating waste diversion from disposal sites.

The experience in Georgetown Guyana has been somewhat similar with regards the informal separation of waste. While solid waste management has been an integral part of the services provided by the Municipality for a number of decades a system of formal waste separation has not been implemented. Waste characterization studies show that materials in the waste streams currently being informally separated in Georgetown's collection and disposal systems account for about 24% of the waste generated. The impact/benefits being derived from the diversion of such a significant part of the waste stream deserves consideration. This paper present the findings of such an examination for waste generated in Georgetown, Guyana.

2. Informal separation and public involvement

As was earlier indicated the Georgetown Municipality has been providing solid waste management services for a number of decades, going as far back as 1940s. In those earlier years because of the nature of packaging material used for consumables, namely paper, cardboard, tin or glass there tended to much public participation in the informal separation of materials such as glass bottles and cardboard for reuse. In the case of glass bottles the separation process facilitated their reuse either at the household level or in food and beverage manufacturing industries where such mechanisms as a buy back policy existed.

While the formal sector, namely registered enterprises such as Banks DIH and Demerara Distillers Ltd encouraged customers to return beverage bottles via retailers when making purchases the return of bottles used for packaging other food items was facilitated through the informal sector, those unregistered enterprises individuals or family owned businesses who sought to make a livelihood from such activities. The separation process while not organized by the Georgetown Municipality did serve to



Figure 1 Collection truck with bag of sorted material

¹ United Nations, Agenda 21

benefit the municipality through a reduction in the quantity of waste it needed to handle, resulting in savings in expenditure and income generation for members of its community. Such was the vibrant nature of the trade in used glass bottles that even employees of the Municipality engaged in waste collection could be seen sorting the waste along the collection route to acquire the bottles.



Figure 2 Street picker selling cardboard

Such informal separation of waste is still practiced. Individuals and businesses are still involved in various aspects of the separation process, material recovery, purchase, trading, and processing for reuse or recycling. Street pickers, landfill scavengers and employees of the private collection contractors, Figure 1, could be observed on daily basis engaging in material recovery activities, while itinerant buyers and small scale entrepreneurs purchase and trade the recovered materials, Figure 2. The role of the various participants in informal separation of waste is presented in Table 1.

From observation most of the earlier waste separation practices pointed to a preference for items that could be reused. Items of particular interest were glass bottles, cardboard (particularly boxes) and metal containers. In excess of twenty years the waste separation trends observed indicate an inclusion of materials for recycling. Items being separated for this purpose included corrugated cardboard and metals such as copper, aluminum and brass.

Table 1 Role of participants in informal separation

Category	Method of work	Material
Street picker	Recovery	Cardboard, glass bottles, scrap metal
Landfill scavenger	Recovery	Cardboard, glass bottles, scrap metal, textile, and other valuables
Collection crews	Recovery (en route)	Bottles, scrap metals, other valuables
Itinerant buyers	Buying door to door and from scavengers	Cardboard, scrap metal, car batteries, glass bottles
Small scale entrepreneurs	Buying, trading	Cardboard, glass bottles, scrap metals, batteries, other valuables
Large scale entrepreneurs	Buying and large processing technology	Cardboard, glass bottles

Scrap metal dealers such as Harold Scrap Metal Stores are local enterprises which have been engaged in the business of exporting the aforementioned metals for in excess of twenty years.

Caribbean Container Inc. a local cardboard container manufacturing company has been in existence for more than thirty years and has been acquiring cardboard from the local market for recycling in its plant for the past ten years.

3. Waste composition and separation trends

The separation of waste is influenced by among other things its composition and the potential value that can be attached to the materials in the waste stream. Data collected shows that approximately eighty three thousand (83,000) tons of waste is currently generated annually in Georgetown. Of this amount about 50% is organic food and garden waste. From observation it is the remaining portion of the waste from which items deemed valuable are separated. Waste collection in Georgetown is provided by the Georgetown Municipality to approximately forty two thousand four hundred (42,400) households and about 2000 institutions and retail businesses, while commercial and industrial entities are required to arrange their own waste transport.

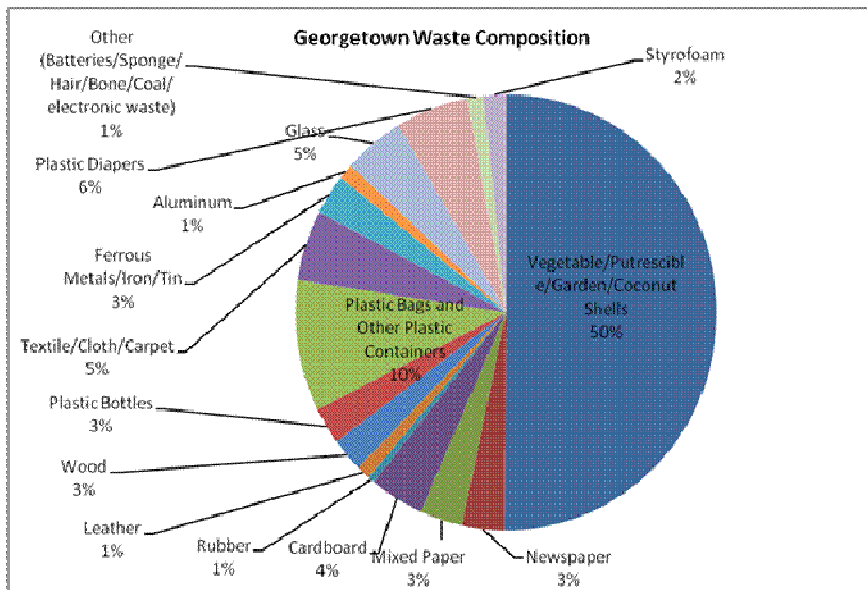


Figure 3 Waste composition 2009 data

Prior to a most recent waste characterization study conducted in Georgetown in 2009 by HYDROPLAN, CEMCO Inc.², the results of which have been summarized in Figure 3 a study was conducted in 1999 by Brown, Vence & Associates, Table 2. A comparison of the results of the two surveys shows that while there has been a significant decrease in the percentage of paper

(includes cardboard, newspapers, and paper) all other waste types have shown some increase. The waste streams which have traditionally been diverted for reuse and/or recycling activities have been paper, glass, metal and to some extent textiles. In the 1999 survey these materials

² Waste Characterization and Waste loads and Flow Draft Report, 2010,

accounted for approximately 19.4% of the waste stream while in the 2009 this was reduced to 18% of the waste stream. This reduction in the percentage of the material traditionally separated for recycling could be attributed to changes in packaging materials, with the advent of the increased use of plastic containers and Styrofoam, from 3% in 1999 to 5% in 2009.

An initial conclusion from these figures is that there is the potential given the traditional waste separation practices for 18% of the waste generated in Georgetown to be diverted away from the landfill. This 18% of the waste stream amounts to approximately fourteen thousand nine hundred and forty (14940) tons of waste per annum. However in reality this does not occur since 100% recovery materials within these waste streams is currently not possible since waste separation is not mandatory therefore not all waste generators participate in the process.

Table 2 Waste composition 1999 data

Categories	Waste Composition (%)	Ton /year
Paper	23.9%	9145
Cardboard, uncoated, corrugated		4709
Newspaper		2541
Office paper		553
Remainder/Composite paper		1342
Glass	1.7%	658
Beverage		468
Remainder/Composite glass		190
Metal	1.7%	654
Tin/Steel		516
Aluminum/other metal		60
Remainder/Composite metal		78
Plastic	10.3%	3923
Plastic containers		1125
Film plastic		2007
Durable plastic		287
Remainder/Composite plastic		504
Other Organics	48.7%	18633
Food		15890
Landscape and Agriculture		395
Bone		60
Textiles		1621
Remainder/Composite organics		667
Other	1.9%	732
Construction & Demolition		688
Soil		44
Ash		0
Special Waste	11.8%	4506
Tires		0
Mixed Residue		4481
Hazardous		25
Total	100%	38251

4. Cost and Benefits

The Georgetown Municipality currently expends an average of US\$1.5 million annually to treat with solid waste management. Of this amount US\$750,000 and US\$540,000 is expended on waste collection and disposal respectively. Present material recovery from informal separation of waste is estimated to be about 5% of the waste generated, approximately 30% of the traditional recoverable materials. The result is a cost saving of approximately US\$29,000 annually or 2% of expenditure, the details are shown in Table 3. In addition to these cost saving benefits to the Municipality landfill space is saved allowing for life of the landfill to be lengthened.

There is also the financial benefit being derived by the individuals and enterprises involved in waste separation. Table 4 indicates some of the materials in the waste stream and highlights their potential for recycling and the financial benefits to be derived there from. It would be

Table 3 Cost benefits to the Georgetown Municipality from some material recovery

Material	Composition		Estimated recovery per yr (tons)	Recovered		Estimated Cost saving to GM US\$
	%	Weight (ton)		street	landfill	
Cardboard	4	3320	1200	X	X	\$12,500
Glass	5	4150	740		X	\$3,700
Metals	4	3320	2490*	X	X	\$12,450
Textile	5	4150	35		X	\$175

*Estimated 75% recovery

observed from the information provided in Table 4 cardboard is purchased by Caribbean Container Inc at a cost of US\$70 per ton, while glass bottles are resold at between G\$10 to \$20 per bottle. Though not shown in the table scrap metal was being purchased for as much as US\$250 per ton in the local market at the high of its trade in 2008, with many dealers shipping in excess of 20 tons per month to external markets. Such export activity also served as a foreign exchange earner for the country.

5. Conclusion

While there is currently no formal waste separation requirement the informal separation of waste both by the general public and the informal sector has proven to be very useful in reducing the quantity of waste to be collected and disposed of by the Georgetown Municipality. This has allowed for waste diversion from the landfill and some cost saving from the materials not handled by the Municipality. Further the informal separation has brought about economic benefits through material recovery for reuse and recycling and had also aided in employment creation for those involved in the activities of the sector. There exist an opportunity to expand the list of items recovered to include plastic, paper and news print as highlighted in Table 4.

References

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Medina M, Eight Myths about Informal Recycling in Latin America, *Inter American Development Bank*

Material	Recycling Potential	Buy Back Price per Unit	Main Local Buyers	Recommendations
Glass Bottles	Medium to high for Banks D.I.H. Ltd. and Demerara Distillers Ltd. products Low for other bottles including products of Ansa Mc Al Ltd., which will depend on their transportation to glass manufacturers in neighbor countries.	G\$10 – 20 per bottle	Lillies Bottle Mart and Scrap Metal Dealers.	The PPPA should embark on a source separation public campaign geared toward increasing glass bottle recovery and recycling.
Plastic Bottles	Low at the moment. There is market for PET bottles only. No other types of plastic containers (PETE, HDPE, LDPE and PVC) are recycled.	G\$5 -10 per bottle	Lillies Bottle Mart and Scrap Metal Dealers.	The GOG must require all plastic bottle generators to recycle all of its products including water bottles. The GOG should prepare a policy for promoting recycling of all other plastic containers. Legislation may need to be passed that explicitly requires that all types of plastic bottles be returned to the bottlers/importers through a buy back system.
Metals and White Goods	The survey shows that there is a very active market for steel, copper, brass, and white goods. There should be a potential for greater recycling quantities of metal products due to the regional demand and price.	G\$8 – 10 per pound		The GOG should promote greater recycling of metal materials through PPPA.
Aluminum	Good regional market exists for aluminum materials but limited recyclable availability	N/A		The PPPA and the participating communities should promote source separation as the key component recycling system.
Newspaper	Low generation of newspaper material.	N/A	N/A	The PPPA and the participating communities should promote source separation of this material.
Mixed Paper	Higher quantities of mixed paper could be obtained if communities actively participate in source separation	N/A	\$200/ton	The MSWMD authority and the participating communities should promote source separation of this material.
Cardboard	Low buy back price make it a difficult commodity to transport to regional markets.	N/A	\$70/ton	The recycling of this material should be encouraged despite of the potential for financial losses because the demand for OCC materials has been growing at a healthy rate of 12% during the past few years.
Tyres	Under investigation			
Batteries	Potential for greater recycling quantities exists.	Between \$3 and \$5 per unit.	N/A	The EPA should promote battery recycling with a national campaign.

Table 4 Material Recovery potential