Comparison of Municipal Solid Waste Characterization and Generation rates in selected Caribbean territories and their implications.

By Ana Solis-Ortega Treasure

Introduction

For the past ten years Caribbean territories have been gradually changing from a culture of “dealing with the garbage” to the one of “managing solid wastes”.

Decisions in the past were not necessarily evidence based as very little technical approaches were utilized. It was common to switch personnel from the water or the environmental health sectors to the “garbage collection departments” as it was believed that only “common sense” was required.

Today, the Caribbean nations are fully aware of the importance of providing technically sound approaches to the management of solid wastes.

It has been recognized that no rational decisions on solid wastes systems are possible until data on waste characterization and generation rates are available.

The method and capacity of storage, the correct type of collection vehicle, the optimum size crew and the frequency of collection depend mainly on this data. The disposal method may be conditioned by the proportions of saleable materials that could be recycled or the vegetable content which might be compostable.

This paper analyses solid wastes characterization data for 5 Caribbean territories and compares it with US data, looking at the trends and predict the implications for sector.
**Solid Waste Characterization Data (SWCD)**

Table 1 shows Municipal SWCD for 5 Caribbean Territories.

<table>
<thead>
<tr>
<th>Category</th>
<th>St. Vincent and the Grenadines</th>
<th>Jamaica</th>
<th>Barbados</th>
<th>BVI</th>
<th>Trinidad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organics</td>
<td>49.6</td>
<td>53.96</td>
<td>59</td>
<td>6.5</td>
<td>46</td>
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<tr>
<td>Paper and Paperboard</td>
<td>22.1</td>
<td>17.34</td>
<td>20</td>
<td>33.5</td>
<td>13</td>
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<tr>
<td>Plastic</td>
<td>8.4</td>
<td>11.77</td>
<td>9</td>
<td>6.3</td>
<td>12</td>
</tr>
<tr>
<td>C&amp;D Materials</td>
<td>5.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td>5.6</td>
<td>4.27</td>
<td>18.1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Textiles</td>
<td>4</td>
<td>2.88</td>
<td>4.8</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Metal</td>
<td>3.8</td>
<td>5.29</td>
<td>8.6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Special Care Wastes</td>
<td>0.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood and Board</td>
<td></td>
<td>1.34</td>
<td></td>
<td>22.2</td>
<td></td>
</tr>
<tr>
<td>Other Wastes</td>
<td>0.3</td>
<td>3.15</td>
<td>12</td>
<td></td>
<td>5</td>
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<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

The SWCD for Barbados, Jamaica, St. Vincent and the Grenadines and Trinidad is very consistent with the data in most developing countries. Municipal Solid Waste is mainly organic showing significant consumption of agricultural and food products in the daily diet. A significant percentage of the organic component is associated to yard trimmings. This component is highly related to low density urban areas not considered in the low income bracket of the society.

Packaging material, being paper, cardboard or plastic represent the second highest type of wastes found in the municipal solid waste stream.

The British Virgin Islands’ (BVI) SWCD is not consistent with the data of the majority of the Caribbean territories. The high consumption of packaging materials (including glass) as well as the disposal in high quantities of wood and board shows the existence of a “throw away” culture motivated by high level of imports and wealth.
SWCD for the United States of America (See table 2) is used to provide a comparison on the type of wastes generated in an industrialized nation. The use of the US data was decided on the basis of the proximity to the Region and the influence of its market on the Regional consumption patterns. The figures show that while the organic component of Municipal Solid Waste had a decrease of 7.6% between 1990 and 2000, the disposal of plastic had an increase of 4.5%.

It is interesting to note that the consumption of plastics in St. Vincent and the Grenadines, Barbados and BVI are below the average household disposal of plastics in the US for the year 1990. Jamaica and Trinidad, however, present figures which are close to generation data for the year 1995.

**Generation rates**

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Waste Characterization in Selected Caribbean Territories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organics</td>
<td>49.6</td>
</tr>
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</tr>
<tr>
<td>Other Wastes</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 3**

<table>
<thead>
<tr>
<th>Wastes Generation rate for selected Caribbean Territories (kg/person/day)</th>
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</thead>
<tbody>
<tr>
<td>0.73</td>
</tr>
</tbody>
</table>
The wastes generation rate in the BVI (table 3) is affected by the wastes generated in the tourism sector which is allocated per capita. In 1996 Jamaica reported a generation rate of 0.6 kg/person/day showing today a 66 % increase.
## Implications

<table>
<thead>
<tr>
<th>Type of Wastes</th>
<th>Storage and Collection</th>
<th>Disposal</th>
</tr>
</thead>
</table>
| **Organics**         | • Require impermeable containers  
                      • Require 2 times per week collection (fly cycle)  
                      • Require seal trucks to prevent littering by leachate  
                      • High density – occupational health and safety issues to be taken into consideration  
                      • Subject to spontaneous combustion in communal containers – potential fire in the trucks  
                      • Equipment with high compaction rate is not necessary – Tipper trucks can be utilized  
                      • Corrosion Problems in trucks and storage containers | • High density waste – does not require major compaction  
                      • Low calorific value – not very good for incineration or energy production  
                      • Subject to spontaneous combustion – places demands on daily cover  
                      • Rapid decomposition – production of odours – places demands on daily cover  
                      • Production of leachate – soil and water contamination  
                      • Recyclable - Compost |
| **Paper and Cardboard** | • Low density wastes – high compaction required  
                      • High volumes difficult to store  
                      • Does not affect collection frequency due to Public Health reasons  
                      • Litter – required covered trucks | • Good calorific value  
                      • Problems with spontaneous combustion or vandalism  
                      • Litter in Landfills  
                      • Re-use and Recycle |
| **Plastics**         | • Low density wastes – high compaction required  
                      • Does not affect collection frequency due to Public Health reasons | • Non-biodegradable – reduce landfill airspace considerably  
                      • Special considerations for incineration  
                      • Re-use and Recycle |
| **Derelict Vehicles (metals)** | • High volumes require specialized equipment for lifting and transportation  
                      • Storage in communities bring Public Health problems (mosquitoes and rodents) | • Mosquito breeding sites  
                      • Shelter for rodents  
                      • Decrease airspace at landfills  
                      • Recycle |
| **Tyres (rubber – other wastes)** | • Storage in communities bring Public Health problems (mosquitoes and rodents) | • Cannot be landfilled  
                      • Potential fire risk at landfills  
                      • Reuse and Recycle |
Disposable income

It is believed that the decrease in generation of organic wastes in the US as well as in the BVI is not only related to the use of packaged food but also to the use of grinders which triturate the waste and dispose of it in the sewage system.

While this paper presents average figures for organic waste, it was noted that in high income urban settings for most countries, the biodegradable component of the waste was significantly lower than for low income communities. There is a culture of “eating out” which shifts the organics from the Municipal waste stream to the commercial waste stream.

It is obvious that the increase in the total wastes generation is directly proportional to the increase in disposable income at the community level.

Globalisation

This powerful multifaceted trend and the various policy initiatives associated with it are bound to touch every single individual in the Region, and present the societies with promising opportunities as well as formidable and daunting challenges.

Globalisation expands choices and with its enormous machinery for advertisement through the now available world-wide media encourages the societies to consume more imported products and therefore produce more solid waste.

It is expected that as in the industrialized nations the wastes will gradually move towards higher generation of packaging materials and a reduction of organics particularly food.

Producers from the industrialised nations have benefited from the ample pressure exerted by their governments to open foreign markets for them. As a result of this pressure one would expect accelerated growth in the quantities of waste – at a much faster rate than the experienced by the same industrialised nations during their development.

Globalisation has significantly reduced the cost of transactions and transportation cost. According to Jiyad (2000), freight costs and cargo costs for example, have declined by 15% and 58% respectively between 1950 and 1990. Communication and information technologies have made even more substantial cuts in transactions cost. A three minutes phone call, for example between London and New York which cost on average US$53.20 in 1950, was down to $31.50 in 1970.
and to only $3.22 in 1990. The reduction in the price of communication has seen the emerging of new type of wastes never encountered in significant quantities. Discarded computers, cellular phones and batteries, printers and toners constitute the e-waste now found in our regional landfills.

Prices for cooked/frozen food as well as non-perishable foods are now very often cheaper than the fresh products; eliminating the waste associated with peelings. However, increasing the amount of plastics and metals used for packaging. There is also the culture of the “barrel” (container with food and other provisions sent to the islands by relatives living in the USA or the UK) which contains considerable amount of non-perishable food and packaging material.

A look at the current figures and a prediction of the years to come place serious pressure on the SW professionals in the Caribbean.

Globalisation which has been very responsible for the rapid increase of packaging materials in our Region; has also allowed for the introduction of materials which are not biodegradable (e.g. Styrofoam and tetrapacks) and which seriously compromised the lifespan of landfills. Globalisation has also allowed for the producers of machinery to take advantages of the new instruments for financing made available to our people and prolong both the life-cycle of their machines and products by launching new products in the rich world first and selling us the used or reconditioned products.

The Region is now flooded with reconditioned vehicles from Japan –appropriately called in Jamaica “deportees”, as they are units which are no longer wanted in the Japanese territory. These old but reconditioned vehicles in our Region have replaced our old fleet which have accumulated in open lots, drains and landfills as our derelict units do not have re-entry in the industrialised world. Derelict vehicles significantly reduce the air space in landfills and posses a Public Health threat acting as breeding ground and shelter for disease transmitting organisms. They also contribute to flooding when disposed of in storm water drains or rivers.

**Ensuring environmental sustainability**

It is important that we respond to the new challenges and realities, reconciling objectives of economic development, environmental protection, and poverty reduction, and inserting the solid waste dimension in priority actions that seek to give impetus to competitiveness, social development, modernization of the state, and regional integration.
The UN Millennium Development Goal #7 is to ensure environmental sustainability. The current trends in characterization: high volumes of non-biodegradable materials with their significant consequences for airspace in landfills; compromise the achievement of this goal in the Region’s solid waste sector.

The natural wealth and relative abundance of the region’s different ecosystems is the main basis for the region’s economic development and international competitiveness.

The long-term sustainability of our fragile environment depends greatly in the future decisions and actions in the solid waste sector.

The sector has to work hard developing capacities in the public, private, and social realms to guarantee the quality and availability of services provided.

Throughout the last decade, the societies in the countries of the region have established institutions, laws, policies, and programs to this end. The decision-making processes behind these initiatives point to arrangements that provide for greater integration of the solid waste dimension within the productive sectors, boost technical capacities, and provide for more community participation, in both urban and rural areas. In addition, significant financial resources have been channeled, mainly from non-reimbursable grants and loans from multilateral banks to specific solid waste programs in the region. The sustainability of funding remains a significant challenge.

One of the great gaps in evidence is the scant capacity of the Regional solid waste institutions to step into the dialogue on fiscal and economic policy, and to be constructive participants in discussions on integration, foreign trade, and other significant topics in development. All this limits the possibility of internalizing the solid waste dimension in development processes, and of implementing economic and financial instruments for solid waste management, which could be more effective in complementing and/or taking the place of traditional command-and-control instruments. Furthermore, solid waste management suffers from a series of factors that have a cross-cutting impact on the quality and efficiency of public management and governance in the context of the process of state modernization. These factors include respect for and compliance with the laws, citizen participation, transparency, the processes of decentralization, prevention of politicization of issues along party lines, and professional stability, among others.

Negative environmental trends have yet to be turned around. The problem with solid waste management is not resolved solely by passing laws and creating
institutions, or by investments for mitigation or remediation. At the heart of the problem is the lack of effective incentives for reducing, reusing, and recycling which reflect the fact that the existing problems result from market failures, such as, the difficulties in finding recycling plants for our products (our inability to send the scrap metal from old vehicles back to Japan) and distorted economic policies that favour the dumping of goods in our territories with the subsequent effect on the managing of packaging materials (particularly the non-biodegradable ones).

Individual Caribbean territories particularly the very small islands need to recognize that the airspace for landfilling is limited, the cost of incineration is high and the possibilities for ocean dumping are out of the question.

Reduction, Reuse and Recycling require an adjustment in current behaviours at the community level. The programmes need to have a strong social focus, either seeking better health indicators or fostering income generation and improved living conditions.

Private investment plays also a significant role. It is important to strengthen the private initiative, including actions that generate capacities in associations, chambers of commerce, and other private actors who could make solid waste management more effective.

At present, the countries’ major needs in the area of recycling have to do with the absence of nearby markets for the raw material. Many countries have tried to organise recycling initiatives, but lack the minimum instruments needed to achieve effective management.

Recycling in the Caribbean has to become a Caribbean project, a Caribbean venture in which all territories are involved and share the cost of treating selected waste. The benefits of such an arrangement will definitely outdo the difficulties. It is crucial that Regional organizations such as CWWA play an active role in lobbing to CARICOM, taking advantages of the regional environmental initiatives.

It is important that incentives are created for Reduction, Reuse and Recycling. Perhaps in our WTO negotiations we need to insist that those who dumped their products in our territories take responsibility for sharing the cost of financing the management of the waste that their products produced. This might be achieved by incorporating incentives for world market for recycled products.

The amount of wastes to be managed is increasing; the size of our islands is not. Let us act now before it is too late and put the mechanisms in place for the integrated management of solid wastes.
References


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9. IDB (2002). Environment Strategy