



2009

## Punta Gorda Municipal Waste Report



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B. Sc. Biology

4/8/2009



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# 1. Introduction

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The research is carried out by the *Toledo Institute for Development and Environment* (<http://www.tidebelize.org/>) in collaboration with the Punta Gorda Town Council.

## 1.1. Recent Situation

Currently all municipal solid waste that is collected in and around *Punta Gorda (PG)* in southern Belize (near the *Mayan Mountain Marine Corridor (MMMC)* – a high priority conservation action site) is being dumped at an open dump that is located inside the forest and near the Rio Grande. This part of the country is one with the highest rainfalls which causes strong effluents into the groundwater and consequently into the Rio Grande that is connected to the sea and reefs.

The recent plan of the Belizean Solid Waste Authority (SWA) is to relocate and re-plan the actual dumpsite further away from sensitive ecosystems like the Rio Grande and create a controlled landfill for future use. This research hopes to provide the necessary information that is needed for planning and maintenance.

So far there is little known about exact quantities and compositions of waste in PG. The 2000 Waste Management Plan used a truck-collection approach that provides unspecific information about the overall waste production and composition in the area.

## 1.2. Expectations

It was expected that with the use of obtained data the new controlled landfill can be planned in advance with more accuracy. Furthermore the investigation should give information about recycling possibilities in the area that would allow lowering the environmental impact and economic costs of the processing of waste.



## 2. Methodology

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The methodology focuses on the estimation of the quantities of waste, its composition and the density of the collected waste from households that will end up in the residual waste stream. The collections were mainly focusing on household residual wastes and commercial wastes in the area of PG. Additional wastes such as littering were not being considered due to limited capacity.

In order to receive a 95% confidence level with a relative accuracy of 10%, 90 households have been monitored. Currently there are about 1250 households in the collected area. In a weekly cycle (Monday - Friday) the household waste is being collected by the Town Council waste trucks that collect three times a week in the commercial center (which also includes many households) and once a week in the other areas like Magoon Area, Water Supply Area, New Area, Cemetery Area and Hopville Area. Specific Stratification was not done because there was no information on income structures neither do people use regular sized waste bins. In PG commercial- and household space are most likely connected, whereby it is often difficult to differentiate between them. A possible stratification would be a similar research at a different season of the year.

The samples were collected with two pickup trucks. Altogether there were 90 samples (30 for each area) collected, individually marked (Address, Reference Code and Date of Collection) and transferred to a test-ground in town. One sample, depending on the structure of collection, was a whole representative of the waste generation behavior for one household that consisted out of a certain amount of people. At the test ground each sample was individually weighted (in kg) and then further processed. The weighting was done first to ensure an exact result of the overall waste-weight/day. The waste was mixed for half an hour and was divided by the quartering-technique. One quarter was used for studying the waste-density, that



was determined in kg/m<sup>3</sup> in a normal US sized drum (55 gallons or 208 liters) and another quarter was mixed and halved again for the composition study.

The composition study was being done by manual sorting in kg into the following 13 categories:

1. Wood
2. Paper & Cardboard
3. Plastic Film
4. Plastic Dense
5. Glass
6. Textiles
7. Metals
8. Hazardous Waste
9. Complex Products
10. Inert
11. Nappies
12. Medical Wastes
13. Fines

The different categories were collected in containers that were individually weighted and written down for further evaluation. Next to the on-source household waste collection, a questionnaire provided the following additional sample information:

- a. Household Population & consistency (children, adult, etc.)
- b. Pets
- c. Disposal Routes
- d. Willingness towards recycling
- e. Perception of PG Waste Situation

Through this information it was possible to create a detailed picture of the waste awareness of the PG population. At the end of each day the Town Council organized a waste truck to collect the remaining waste and transfer it to the dumpsite.

## 3. Results

Table 1

Source	in kg
Waste/per capita/week	1,93
Total Waste in PG	10 229
Estimate Total Waste in Toledo	
District	56 549
Waste Density (in kg/m <sup>3</sup> )	180

In Punta Gorda the average person produces 1,93 kg per week which results in 10 229 kg per week for the whole area. The calculation was done with the provided information of the Statistical Institute of Belize which states that a number of about 5300 people are recently living in PG.

The Density study was carried out on every day of the survey with a 55 gallon drum that equals 208 liters. The value displayed in Table 1.1 shows the weekly average density in kg/m<sup>3</sup>.

### 3.1. Waste Composition

Table 2.1

Material	%
Organic	46
Pampers	12
Paper & Cardboard	10
Plastics (dense)	9
Plastics (film)	5
Glass	4
Textiles	4
Metals	4
Complex Products	2
Wood	1
Inert	1
Fines	1
Hazardous Waste	
Other (Medical)	

Table 2.1 shows the percentages of the specific materials that determine the waste consistency. The categories hazardous waste and other sort of wastes like medical wastes show too little value, so they don't even represent 1% of the total composition.

Figure 2.2

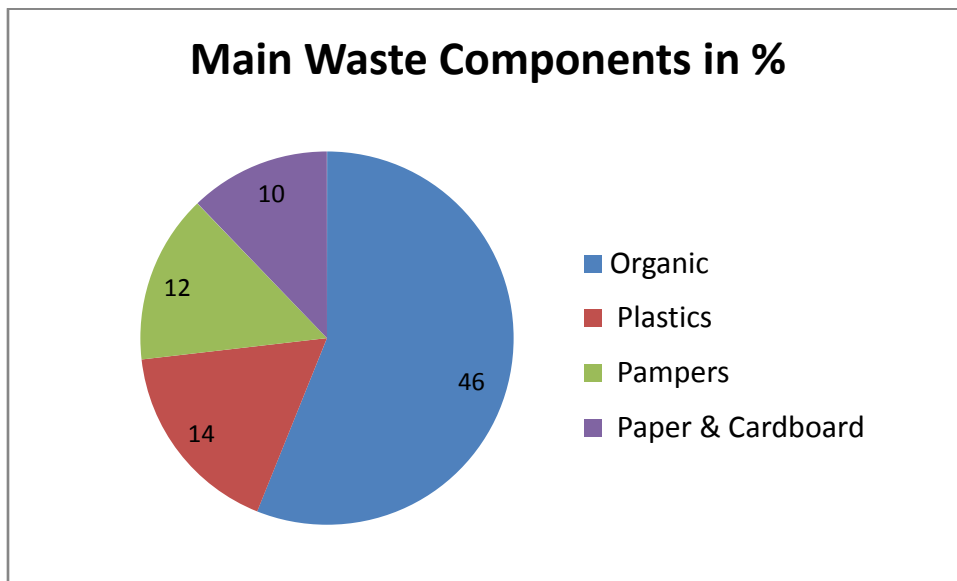


Figure 2.2 demonstrates the dominant materials that make 82% of the overall waste composition. The missing materials represent below 5 % and can be found in the Table 2.1. Plastics here show the overall amount of plastics (dense + film).

### 3.2. Questionnaire

The Questionnaire gave an overview about the people's perception of the current waste situation, their way to dispose their waste and the willingness to recycle and compost.

About 90% of the people use the municipal waste collection provided by the Town Council. The rest said they occasionally burn, bury or dump their waste into nature.

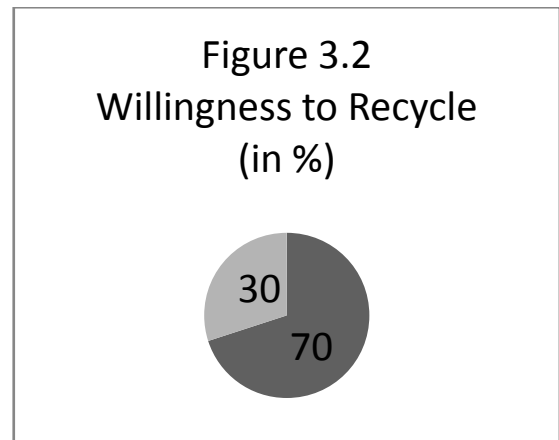
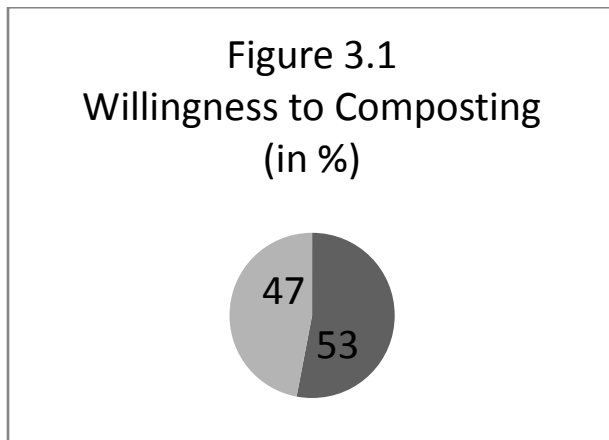


Figure 3.1 and 3.2 state that the majority of the people are willing to divide their waste for garden and recyclable materials. Nearly 70 % would participate to divide certain materials from the rest of their waste.

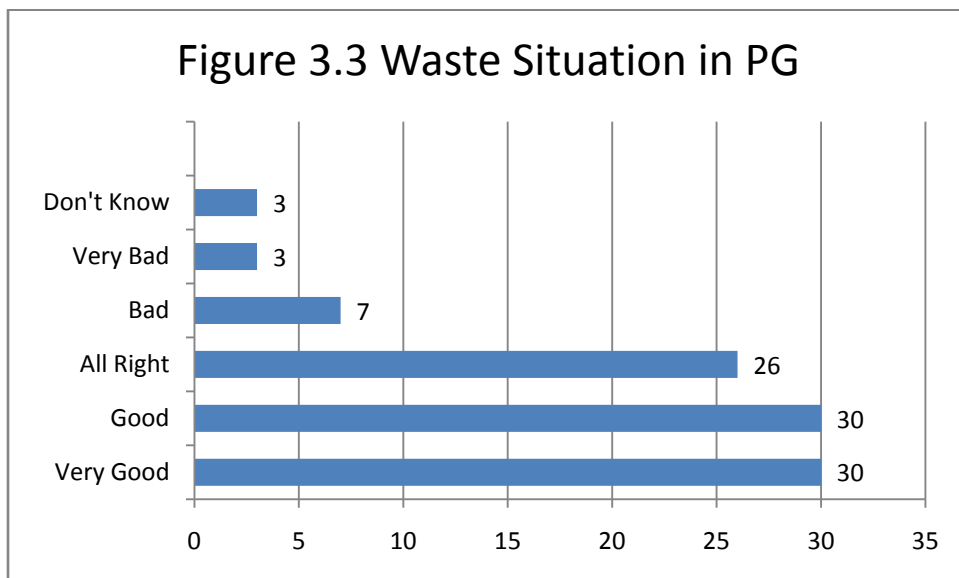


Figure 3.3 shows that about 60 % of the population thinks that the current waste situation in PG is “good” or “very good”, nearly 30% voted “All right” and about 10% think that that the situation is “bad”.

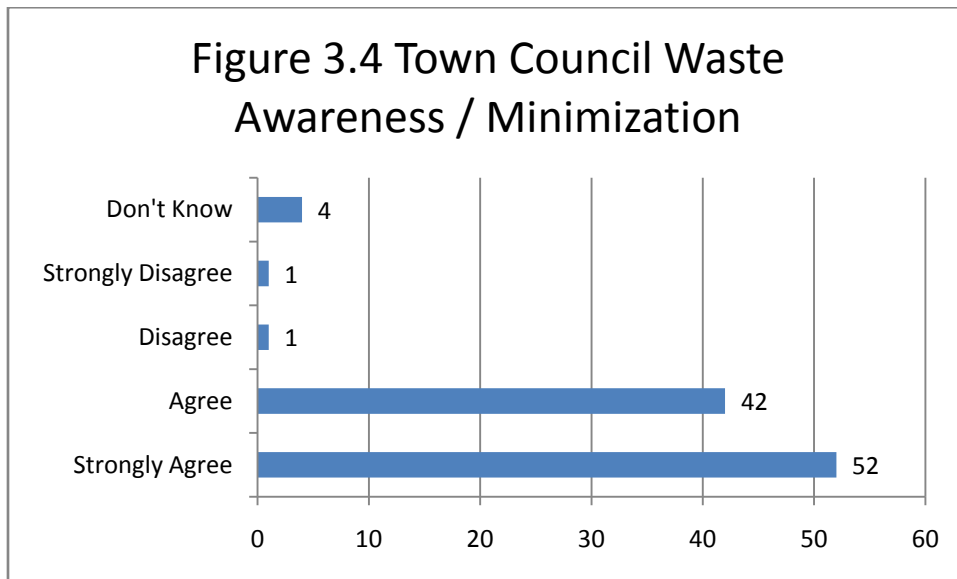


Figure 3.4 gives an understanding of how many people would like their government to improve in the future development of waste management in PG. About 95 % *agree* or *strongly agree* for more waste awareness and minimization campaigns.

## 4. Discussion

The obtained data met the expectations that were formulated before the research. The Town Council and the Municipal Waste Authority will be able to consider the amount of waste that is produced in Punta Gorda and the surrounding areas for the planning of the future landfill.

The waste-composition shows that the dominant waste source is organic which represents 46% of the overall consistency and could be interesting for composting possibilities at the nearer citrus industry. Furthermore recycling of plastics, metals and glass seem not to be sufficient for the achievement of an economic use since they occur only in small quantities. The high amount (12%) of pampers that were



found during the separation was astonishing for a socio-economic area like Punta Gorda

The most important considerations should be aimed at how to plan the next landfill in terms of coverage of a long term perspective for PG. The biggest problem here is the facilitation of the rural areas that are not connected at all to the municipal waste collection service provided by the government. Through talks with the responsible people it became clear that there is a strong need for better equipment in terms of waste trucks, which are old and need better maintenance. Currently there is just one compressor truck in action that allows loading huge quantities of waste. The other two trucks are actually not sufficient for waste collection since the trash is just being collected without any means to compress it before it is delivered to the dump site.

It will be a challenge to sustainably regulate the degradation of the current dumpsite that is threatening the Rio Grande River which flows into the ocean and fishing grounds of the MMMC. It is recommended to spend good investigations for the detoxification of the dumpsite so that the area will not be severely affected in the years to come.

Finally this investigation should also be done at least a second time in the summer seasons, since it is expected to change the waste production pattern of the PG population.