

# Solid Waste Management in San Jose Succotz

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## **Introduction**

Belize has seen much development over the past two decades, and it has resulted in the growth of many things: exports, consumerism, food production, tourism, and population. Unfortunately, this growth has led to a significant increase in the production of solid waste in residential areas. In order to avoid severely damaging the environment and public health, a plan must be established to properly deal with this household waste. While the largest towns have trash collection programs funded by the local governments, most areas have no programs in place. San Jose Succotz is home to one of the few examples of effective solid waste management at the rural level.

The group that initiated the program, Friends for Conservation and Development, is an award-winning, nonprofit organization devoted to preserving Belize's natural resources and wildlife by encouraging Belizeans to take part in conservation efforts. The organization manages and protects the large Chiquibul Forest, engages in public awareness and participation campaigns, and has recently turned its focus towards water quality and watershed management. It hopes to teach Belizeans the importance of keeping the rivers free of pollution and how they can accomplish this within the overall development process. A main part of this plan is to establish a self-sustaining rural solid waste management system for Belize. The trash collection in Succotz is the pilot program for this effort, and FCD hopes to use it as a model for the rest of the country to follow. Our group has been working with FCD to analyze this program and find ways to improve its effectiveness.

## **Background**

### *Solid Waste Management within the Development Process*

Solid waste management has increasingly been seen as a key gauge of a nation's stability and progress. It now plays a big role in the UN's Human Development Indicators, which measure progress based on several factors, including public health and the environment. According to a report done in 1999, Belize's health and sanitation is steadily worsening, mostly because of poor solid waste management (UNEP 1999). This endangers the environment and many lives and may undermine the progress that has been made by development.

The amount and types of garbage have been growing in developing areas, mostly as a result of urbanization, increased consumerism, population growth, and the greater importance of tourism in the economy. Many more disposable materials are bought and used, which makes disposing of the waste even more challenging. Because very few developing countries have recycling programs, there is little that can be done to reduce the waste mass. According to one study, over 20% of the total waste volume in Latin America is recyclable (UNEP, 1999). This means that recycling programs in the future could significantly improve the solid waste management situation in developing areas. Another obstacle is the fact that many areas do not have properly designed dumpsites that can prevent chemicals and other harmful materials from infiltrating nearby water systems. Not a single dumpsite in Belize can be considered a sanitary landfill.

Solid waste management in developing regions is usually undertaken in an unregulated, haphazard manner. If a municipal trash pick up does exist, the garbage is usually just brought to open dumps on the side of the road, with little or no precautionary

measures taken. If people are left on their own to dispose of household waste, it is either brought to open dumps, left on the ground, or burned. Local authorities and legislation very rarely address how to deal with rural solid waste.

Each of the above-referenced disposal methods poses considerable threats to public health and the environment. Burning garbage may get rid of the volume, but it also releases many harmful chemicals and particles into the air. Dioxins, furans and PCB's are some of the most dangerous. This smoke has been shown to cause asthma, troubled breathing, emphysema, cancer, and many other ailments. Leaving the trash on the ground is no better. It is sometimes eaten by small children and animals, which can cause choking or sickness. The trash also runs off into the river, where chemicals and bacteria can contaminate the groundwater that people rely on for drinking, fishing, cooking, and bathing. This not only harms wildlife but can also cause many serious, sometimes life-threatening diseases and health problems. The chemicals have especially insidious effects because they can cause long-term mental, reproductive, and hormonal abnormalities. Children are especially vulnerable, and even minute concentrations of chemicals can damage them for life (Colborn, et al, 1997; Hoornwig and Gianelli, 2007).

When creating a plan for how to properly dispose of solid waste in developing countries, many factors must be taken into consideration. Perhaps most important is economics. No matter what benefits a program might have, it cannot be successful unless the local people see it as a worthwhile investment and a strategy is in place to make sure the program generates enough funds to keep itself running. Governments and local organizations must find ways to tie economic incentives to their sanitation programs. Similarly, culture and social values must be assessed. People who do not understand the

importance of a healthy environment or how they impact it are much less likely to get involved in a waste management program. This points to the conclusion that significant education efforts must accompany any campaign to establish a management program (UNEP, 1999). Initiatives must also work to involve the citizenry in the planning process and should foster community cohesion and mobilization.

In order for an effective national system for dealing with solid waste to be established, the Belizean government must increase its regulatory and oversight efforts. Initiatives like Belize's National Solid Waste Management Program have made significant gains by encouraging public involvement and participation by local businesses and organizations (PAHO, 2003). Putting pressure on local authorities to create and enforce trash regulations is key, as is providing enough funding for collection programs. Greater emphasis must also be placed on encouraging the separation, reuse and recycling of household waste. Although legislation and funding are very important in this process, the government must also engage in public awareness campaigns to secure long-term support for programs and cooperate with NGO's (Hoorwig and Gianelli, 2007).

#### *Succotz and the Trash Collection Program*

San Jose Succotz, located just east of Benque near the border of Guatemala, overlooks the Mopan River and consists of approximately 200 houses. Like many other towns, it produces a steadily increasing amount of solid waste. Because it is a small rural village, it does not enjoy the municipal trash pick up programs that some towns, such as nearby San Ignacio, use. Instead, the people of Succotz must find their own way to dispose of household garbage. People either burn the trash in open pits in their yards, bring it to the open dump site near the highway, or simply leave it on the ground (see



Appendix G for photos). Each of these disposal methods results in the accumulation of harmful materials in the water and air, which is inevitably ingested or inhaled by the people and animals living nearby.

With this dilemma in mind, FCD initiated a trash collection program in 2004. The program employs 5 people on a part-time basis. Every Saturday they drive around Succotz in a large FCD truck, picking up garbage that has been put alongside the road by participating community members (see Appendix G for photos). The cost is approximately BZ \$2.50 per household per week. Stores pay more because of their increased volume of trash. So far this program has worked fairly well, bringing in just enough money to pay the workers and make the needed repairs on the truck. Most impressive is the fact that this is the only self-sustaining solid waste program that is not run by a municipal government in the entire country. FCD has plans to expand this program and to use it as a model for other areas in developing rural solid waste management strategies. Although there are no sanitary landfills to store the garbage, the intent is to drastically reduce the amount of trash going into the Mopan River or being burned within Succotz. This will reduce immediate health threats and foster more environmental awareness within the population.

### *The Project*

Although FCD's trash collection program in Succotz has made some impressive progress, there is still much room for improvement. The biggest challenge the program faces is a lack of participation by Succotz residents. Less than half of all the households pay for the service, which means a lot of garbage is still contaminating groundwater and air. Several ideas were suggested for why participation is so low. One is the cost. Many

people may see the \$2.50 fee as too high, especially when leaving it on the ground or burning it is free (ironically, the weekly cost could be reduced to \$1 or so if every house in the village participated). More importantly, some argue there is a disconnect between people's lives and the environment. Trash disposal is probably the least of most people's worries. They may not know that uncollected or burned trash is very dangerous, and do not understand the relationship between the health of the environment and their own wellbeing. And with no funding or support from the government, there is no one to tell them about it other than a few nonprofit organizations with many other concerns to deal with. It could also be that some people in Succotz do not even know about FCD or its trash collection.

The group's challenge was to investigate this situation. The group was asked to find out specifically why people are not participating in the trash collection program, what they think about the environment and their relationship to it, and what it would take to improve the program and get more people involved. Friends for Conservation and Development wanted the group to develop a report with answers to these questions for future use. The organization also asked the group to engage with the community and work with people to increase their awareness and support of the solid waste management program.

## **Methods**

### *Defining the Objectives*

In order to make solid waste management more sustainable and user-friendly, we need to understand residents' levels of satisfaction with the current system of trash collection. One of the group's main objectives, then, was to create a survey that investigates how much people know about the program, what prevents them from participating, what methods of trash disposals are used if the service is not utilized, and then to use the information from the survey to identify possible improvements. Before designing the questions, information was obtained from our project partner that addressed which questions he felt would be most important and what type of questions had been covered by a previous survey. With this information, the group formed a clear idea of which topics to cover in the survey to obtain the most useful data.

### *Designing the Survey*

The survey form begins by outlining the objectives. The group felt it was important to inform the participants that their identities would be kept confidential and that the survey's purpose was to collect information to improve FCD's garbage collection program. As seen in Appendix B, the survey concisely asks about the demographics of the participant, his or her knowledge of garbage collection, his or her personal practices, and includes a few open-ended questions for possible suggestions and improvements to the program. An important aspect was to create questions that would produce quantitative results that could be generalized and easily summarize the views of the sampled population. This format also enabled the group to collect information from a larger number of people and to have results that could be used as evidence to support the

survey's analysis and policy recommendations.

### *Mode of Data Collection*

Collecting information from a varied sample of the population is critical for having valid and representative information. The group's mode of data collection involved interviewing people in person at their homes. To reach a diverse section of the population, the survey was administered to at least a few households on each street in Succotz. Additionally, the group aimed to have a fair representation of all socio-economic levels and, therefore, surveying was done in the morning, afternoon, and evening in order to target people with a variety of work schedules.

### *Surveying Observations and Obstacles*

The group ran into a variety of challenges during the surveying process. One of the main obstacles was residents' limited interest in participation. Many of the people the group spoke to declined to participate even after hearing the objectives and brief description of the survey. This may add a bias to the data because the statistical information only reflects the opinions of those who were available and willing to complete the survey. People who chose to respond may have opinions and practices that differ from people who chose not to respond; however, only the participants have their responses recorded.

By surveying in person, the group may have influenced the answers of the participants. Each survey began with an introduction of the group member, a statement describing our work with FCD and the purpose of the survey. Due to the group's association with a well-known organization that promotes environmental preservation and operates a trash collection program, the participants may have felt pressured to

respond in a way would present them in a favorable light.

The language barrier, however, was by far the group's biggest challenge. Having a proficiency, but not fluency, in Spanish limited the group's ability to clarify questions for the participants and made the process a lot more time consuming. Additionally, delays were encountered because many of the Spanish and English-speaking residents were unfamiliar with concepts like "recyclable materials" and "organic/ compostable waste".

#### *Handout*

An informational handout is a useful tool to help raise awareness about the issues of solid waste and inform residents about FCD's trash pick-up service. With the handout, found in Appendix D, the group presented Succotz residents with information regarding the danger of burning trash and details about costs and the dates that garbage collection occurs. Material was presented in both English and Spanish using easily understandable language. The handout went on to discuss ways to reach FCD for more information, identified specific health risks associated with trash burning, introduced the "reduce, reuse and recycle" concept, and encouraged residents to use FCD's program. The group distributed the handout to survey participants and to people we passed on the streets. The group's hope was that this hand out would encourage participation in the trash pick-up service.

#### *Policy Recommendations for FCD*

After collecting and analyzing the statistical results from our survey, the group created policy recommendations for FCD's Solid Waste Management Program. The information gathered from the surveys helped to identify the key issues and problems

with garbage in the village and Succotz residents' opinions and suggestions on the trash collection program. The document given to FCD provides a brief description of relevant background information and research done on this topic, a summary of our survey results, and recommended courses of action to improve the program. These policy recommendations can be a tool for FCD in the future when setting goals and making necessary improvements.

### *Education Program*

The curriculum the group is working on contains facts, resources, and activities that address the need for sustainability and provide the basis for a life of environmental stewardship. As can be seen in Appendix F, the educational activities stress an awareness of the roles we each play in conserving and protecting the natural environment. Lesson plans are provided for students aged 5-14 and are a compilation of materials from different environmental organizations in the United States, primarily the Environmental Protection Agency. The younger age-group curriculum sets the basis for the students to learn and explore their roles in the ecosystem and environment. The older age group's curriculum builds on the lessons taught to the younger group by analyzing the issues of waste disposal and resource protection. Lesson plans for this group include a study of "Garbology," the 3 R's (reuse, reduce, & recycle), the environmental effects of pollution and poor resource management, and how to make their families, schools, and communities more eco-friendly. Above all, both curriculums encourage exploring, observing, understanding, and appreciating the natural environment.

The lesson plans that the group has assembled stress a hands-on learning experience. As seen in Attachment F, activities include students actively participating

and getting a firsthand look at nature. The stimulating content is meant to engage the student and foster an appreciation and greater understanding of the environment around them. All lesson plans include a learning objective, list of important vocabulary words, description of the set-up for the lesson, and discussion and questions for the students. The group hopes that from these materials can be a valuable resource for FCD's environmental outreach program.

## **Results/Findings**

### *Survey Results*

The group analyzed a sample of 62 completed surveys. Both men and women answered questions, and many different age groups were represented. The first intriguing finding was that in 72% of the cases, the mother or woman in the household is the person responsible for dealing with trash. This means efforts to increase awareness and participation in the trash collection service must focus on women.

One of the main reasons for conducting the survey was to see what people do with their solid waste. The group found that 42% of the respondents never participate in the trash collection program, 40% sometimes participate, and 18% always participate. Of those that did not always participate, 57% burn their trash, 28% bring it to the dump along the highway, and 15% leave it on the ground (see Appendix E – 1 and 2). In the open-ended questions, the group found that some of the reasons why people do not consistently participate include that the truck does not always come to their houses, the cost is too high, and that FCD does not give enough information about it. Another question asked what people consider the most important problem with trash collection in Belize. Cost was the most important factor, followed by ineffective collection services and the fact that there is no place to put all the trash once it is collected (see Appendix E – 3). While the majority of respondents are willing to pay BZ \$1 or \$2 for trash collection, willingness to pay drops dramatically with \$3 and \$4. This shows just how powerful a limiting factor for participation cost can be.





The survey results show that although FCD is located in Succotz and runs the weekly trash collection service, not everyone is aware of its presence. 37% of respondents have not heard of Friends for Conservation and Development. 21% do not know there is a trash collection service, and of the 79% who do know about it, only 52% knows where the garbage is brought after it is collected. Only 60% of the survey sample know how many days each week the collection takes place. This is a direct obstacle to participation. Many of the people said they would participate if they knew more about it. 89% responded that FCD should give more information on how to deal with household garbage.

The survey analysis also points to a lack of awareness about the environmental and health impacts of uncollected trash. 45% of respondents said that burning trash is safe, even though it clearly is not. 27% said that trash has no effect on health. 13% believe that trash poses no problems at all. Responding to an open-ended question asking

what some problems are with trash around the neighborhood, people mentioned mostly non-environmental and non-health problems like making the town look bad and the bad smell of trash (not to say that these aren't serious problems in themselves). It is reasonable to assume that if more people were aware of the detrimental health effects of improper trash disposal, more people would be willing to pay to have it picked up.

When asked to rank 5 goals according to their relative importance (family health, clean water, clean neighborhood, preservation of resources and wildlife, and recycling programs), we found that practical, every-day goals were more important than purely environmental goals. Family health came in at number one, followed by clean water, clean neighborhood, preservation of resources and wildlife, and, finally, recycling programs.

One survey question asked whether people felt FCD was doing a good job in running its trash collection service. 62% of respondents said the organization was doing a good job, and 38% said it was not. Some of the open-ended questions and conversations with Succotz residents suggest that some people disapprove of FCD's work because of the high fees and the fact that the truck does not always make it to every house.

The group also looked into what types of materials people are throwing away. Nearly 50% of all trash was reported to be food waste, and around 25% was reported to be recyclable (tin cans, paper, or glass). This means that much of the waste mass can be diverted to compost or recycling and reuse. However, about 17% of respondents did not know how much of their trash was food or recyclable materials, showing that more education will be needed for future trash diversion projects. Fortunately, there appears to be a willingness to participate in these programs, as 77% of the survey sample said they

would separate their trash if trash diversion programs were in place.

### *Importance of Education Programs*

Education about solid waste management at the primary-school level is a key tool to raise awareness about the issue and address the dangers of improperly dealing with trash. A curriculum that involves education about waste and the environment promotes environmentally conscious and responsible citizens who can lend support and make effective trash collection programs a priority in communities. Further, programs that target youth not only highlight the importance of a good trash collection system to students, but, through take-home materials and talk, the message is passed on to parents and the rest of the community.

While the final stages of creating the solid waste management and environmental education curriculum are still in progress, it can be a valuable tool for FCD in the future.

### *Policy Recommendations for FCD*

In the report given to FCD following the survey analysis, the group outlined the barriers to participation and some recommendations for how to improve the solid waste management program. The report begins with a discussion of why participation is not as high as FCD would like. One obstacle is that the disposal method that FCD uses once the trash has been collected is no more sanitary or environmentally responsible than the methods that many in Succotz use. The trash is brought to the open dump, which then sits for a while and is inevitably burned. Many people the group surveyed said that they did not see why they should pay money just to have the trash burned somewhere else. Although there is not much FCD can do about this, they can engage in a national effort to create sanitary landfills and a comprehensive system of waste management for Belize.

Lapses in the trash collection service were also identified as a potential barrier. People complained that the FCD truck did not always come to their house, so they would rather burn it than let it pile up along the road. Some people also distrusted the cost of the service, suspecting that FCD was not managing its revenues responsibly. While there is no evidence to suggest that FCD is consciously overcharging or skipping houses, this issue should be explored by the organization to make sure its program is as efficient as possible.

Cost is another obstacle. Many in the community feel that the service fee is too high, especially when the alternatives are free. FCD must keep the fees low in order to attract more participants. This will mean analyzing the entire program to look for inefficiencies or areas that can be changed, including the route and the number of people employed. This will also entail engaging with the community to convince residents that the service FCD is providing is worth the fees being charged. It is possible to offer incentives to invite more participation, such as occasionally discounted fees or awards for the cleanest yards.

The biggest barrier to participation, however, is a lack of awareness about FCD and solid waste management. The group found that a surprising percentage of the population does not know what FCD is or that there is a trash collection program. Spreading awareness to these people could increase participation by 25% or more. A campaign to advertise FCD and the trash collection program is in order. There is also a serious lack of awareness about the health impacts of improper trash disposal. FCD needs to address this deficiency by leading education efforts targeting both youth and adults. The organization needs to stress that protecting the environment is in people's best

interest, and that improper trash disposal can have devastating effects. If people understand the need for effective waste management, they will be much more likely to support FCD's program. This might also make people much more willing to pay higher fees if they know it is protecting their families' health.

There are many avenues FCD can take for its education efforts. It can develop its education programs for primary schools to help children understand the importance of preserving nature and how they and their families can protect the environment and their health by reducing waste and disposing of it properly. The youth will then be able to tell the rest of their families about what they learn. FCD can also hold community meetings to increase awareness about its trash programs and the effects of uncollected trash and can also make informational brochures and pamphlets to hand out in the village.

In general, FCD will need to strengthen its relationship with the community in order to improve its trash collection program. The more the townspeople know about FCD and trust its work, the more likely they will be to support its programs. The better FCD understands the community, the better it can respond to its needs. There needs to be more communication between the organization and the residents, and this will foster cooperation when tackling future challenges in Succotz.

A final project that FCD should pursue in the future is developing a program to promote the reuse and recycling of materials. The organization could initiate campaigns to promote the reuse of commonly thrown away materials like plastic bags, food containers and cardboard boxes. The encouragement of composting and the creation of household gardens will reduce the amount of food waste being thrown away. FCD can also look into starting a recycling or exchange program for things like tin cans, paper, and

plastic bottles. This would involve cooperation with other organizations and businesses, however. All of these measures could greatly decrease the volume of trash that is produced in Succotz. An added benefit of this could be a decrease in cost for people to have their trash picked up, as they might be able to wait longer to have it picked up.

### **Recommendations for Future Activities**

There are many possibilities for future student work with FCD on this project. One aspect that could be further developed is the educational component. Students could use the curriculum that this group created to make a series of presentations at the primary school. These presentations could promote environmental awareness and impress upon the children the need to reduce the amount of waste they produce. They could familiarize students with “green” practices like recycling and composting. Education could also target the adult population through informational handouts or community meetings. A significant part of this would involve facilitating dialogue and cooperation between FCD and the community.

Another project could involve exploring options for a recycling program. Students would have to find out more about what can and can’t be recycled in the area and what types of materials Succotz produces. This would involve significant research and work with other organizations and businesses, and would probably have to be a long-term project. However, this project could have huge benefits for the community. If a recycling program were implemented, it would have to be accompanied by educational programs to get the community involved.

Finally, future student groups could work with FCD to come up with a plan to change the way the entire country deals with solid waste. As has been mentioned, local waste management programs can only be effective up to a certain point if the trash inevitably ends up being burned or left on the ground to contaminate the surrounding area. Belize needs a coordinated plan for how to safely store solid waste, and a partnership between students and FCD could assist in this process for the future.

### Works Cited

Colborn, Theo; Dumanoski, Dianne; Meyers, John. (1997). *Our Stolen Future*. NY: Plume.

Hoornweg, Daniel and Natalie Giannelli (2007). Managing municipal solid waste in Latin America and the Caribbean: integrating the private sector, harnessing incentives, *GRIDLINES (28)*. Public-Private Infrastructure Advisory Facility, PPIAF: Washington, DC. Retrieved February 20, 2009 from, [www.ppiaf.org](http://www.ppiaf.org).

Pan-American Health Organization, PAHO (2003). Country analytic report Belize, *Regional Evaluation Municipal Solid Waste Management Services*. World Health Organization, retrieved January 30, 2009.

UNEP (2002) Regional Assessment of Toxic Chemicals, *Central America and the Caribbean Regional Report*. Global Environment Facility (GEF), retrieved February 11, 2009.



**Appendix A – Literature Review**

# Solid Waste Management in Belize: A Literature Review

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Developing a sustainable solid waste program is very difficult in any location because of the cost, weak community involvement and participation, and lack of public awareness. All of these problems are exacerbated in a developing country. There are less physical and human resources available, and communicating the importance of environmental responsibility can be especially challenging. A wide range of literature has been produced addressing some of these unique challenges. Solid waste management in developing nations like Belize requires a different approach and strategic implementation appropriate to the local economic and social context.

Recently solid waste management (SWM) has changed from “dig a hole and bury it” strategy to a higher priority, higher stakes political and environmental issue (Stokoe and Teague 1995). Although there are many challenges that SWM faces in developing countries, effective waste management programs present many economic, health and social benefits to participating communities. Only recently have rural or developing communities identified these possible benefits and undertaken efforts to create coordinated programs. This has been primarily due to increased government attention, the involvement of environmental organizations, and more coordinated public awareness campaigns.

One reason why SWM has recently gained international recognition is because it is increasingly seen as an important measure of a country’s overall progress and stability. International organizations are now using solid waste management as a key component and indicator of nation’s development. In 1999, the UNDP Human Development Indicators published a report saying that Belize’s sanitation and health was worsening. Poor waste management combined with growing population and industrialization was the

primary contributor to low ratings (PAHO 2003). The report indicated that only half of the rural population had health services available and the access to sanitary services has worsened due to the inability to keep pace with the population growth (UNDP 1999). Even though public expenditure ration of health and water investments are even larger than the expenditure for education, these areas were reported as “much worse” than the standard (PAHO 2003).

Mismanaged or non-existent SWM programs pose direct threats to public health and the environment. Trash left on the ground contains many toxic substances, which then can leach into the groundwater and accumulate in the local food chain. Consequently, people ingest these harmful materials through drinking water and by eating local flora and fauna. Uncontained solid waste also collects in rivers, which threatens animals living in them and the people who use the water for bathing, cleaning or cooking. SWM has recently become a major focus of watershed management because the harmful substances it contains infiltrates every part of the water system. If garbage is burned, the toxins it contains (such as dioxins and furans) are released into the air and are ultimately inhaled (UNEP 2002). Many health problems including asthma and cancer have been linked to pollution caused by trash incineration. These problems are made worse when the amount of garbage increases due to population increases or the modernization of society. Through a well-coordinated and integrated solid waste system, environmental damage and health risks will decrease significantly (PAHO 2003).

Solid waste management presents a staggering challenge to nations around the world, especially in developing regions. The amounts are increasing, and there is evidence that inadequate waste diversion is taking place. The estimated amount of urban

municipal waste that is produced averages about 369,000 tons/day globally (Hoornweg and Giannelli 2007). It is worth noting that larger municipalities have a higher waste generation per capita than smaller, lower income settlements primarily because of construction wastes that are roughly 31% of urban waste generation. According to a World Bank study in 2005, Latin America and the Caribbean produced 131 million tons, and this is projected to increase to 179 million by 2030 (World Bank 2006). As of 2007, only 23% of urban waste in Latin America is disposed in sanitary landfills, which is the only internationally recognized safe method of disposal (Hoornwig and Gianelli 2007). There is urgency for a focus on SWM in the region because of the rising population and the global financial crisis. Latin America has also seen growth in urbanization, the market economy, consumerism, and tourism, all of which contribute to increased production of waste (Hoornweg and Giannelli 2007).

According to a study in 2003, Belize produces an average of 112,000 tons of domestic and commercial waste annually, which equates to roughly 1.32kg/person/day (PAHO 2003). Hoornweg and Gianelli explain that compared to other regions in the world, Latin America and the Caribbean have very low rates of waste diversion (recycling and composting) and have “generally poor practices for final disposal” (2007). Because there are very few recycling facilities, nearly 20% of waste mass that is incinerated or dumped is recyclable plastic (UNEP 2002). Throughout most of Latin America and the Caribbean, urban domestic and commercial wastes are usually disposed of in landfill sites, where it either sits or is burned. Incinerators are common throughout the region, particularly for medical waste (UNEP 2002).

In rural areas, however, waste is primarily disposed of either through household burning or in open dumps because there is no municipal service provided and people are too far away from official dumpsites. Many of these illicit sites are located outside small communities and can be found along roadsides, gullies, creeks, swamps and abandoned lands (PAHO 2003). In Belize, no dumpsite meets the requirements of a “sanitary” landfill, mainly because of lack of funds for maintenance and management (PAHO 2003). The growing amount and diversity of waste crammed into dumps continues to be a threat environmentally (Bekin, Carrigan and Szmigin 2007). The impact of landfills on health and the environment depends on the composition and characteristics of the disposed waste as well as the surrounding geography (Mavropoulos and Kaliampakos 1999). The biggest challenges in dealing with these open dumpsites are their widespread preference among the public and the fact that they have been the predominant method of waste disposal for most of the region’s history (Mavropoulos and Kaliampakos 1999).

Before 1990, Belize had virtually no coordinated solid waste plan. Waste was dealt with at a local level, but usually this consisted of open dumps along the road or burn piles in people’s yards. Gradually municipal governments began creating strategic plans for waste management, and in 2000 the National Solid Waste Management Program was created to help develop a coherent strategy to deal with Belize’s solid waste. This program called for coordination between local municipal governments and private groups, has supported privatization of solid waste services, and promoted public awareness programs to inform the public of the need for good waste management practices (PAHO 2003). As Belize continues to become more populous and industrialized, the per capita generation of waste will not only increase but also diversify

in types of materials, thus adding more complexity to the solid waste sector (Hassan 2000). This will be exacerbated by the lack of resources available to SWM programs, which in turn leads to inadequate enforcement of environment and health regulations, insufficient public awareness efforts, and inadequate maintenance of dumpsites (PAHO 2003). Plans are currently under development to deal with these future difficulties.

It is extremely important to look into the reasons why communities do and do not participate in SWM programs and what it takes to make a program successful. Studies looking into this question focus mainly on the social, political and economic dimensions of participation in waste management programs. All of these must be properly taken into account when developing an effective solid waste management program.

Two European studies of social incentives within communities suggests that in small townships, waste reduction behaviors are based in people's perceived relationship to the environment and the relative importance of environmental goals within the community (Bekin, Carrigan, and Szmigin 2007). This demonstrates that the decision not to participate in SWM programs within the community is rooted in the individual's rational weighing of short-term individual benefits vs. long-term environmental costs. Many people do not see any short-term benefits from collecting trash in a responsible manner, and are more likely to ignore the long-term costs of inadequate SWM (and the benefits of effective SWM) when presented with the short-term benefits entailed with burning or dumping solid waste. Many people do not understand the negative health and environmental effects of inadequate SWM or the potential benefits of proper waste disposal. Often the personal inconvenience and cost of a SWM program are the primary barriers to participation. Responsibility towards both the community and the environment

seems to be prevalent in communities that work together on social issues, have a framework of rules and laws, and that collectively value environmental health (Hoornweg and Giannelli 2007). Given the dynamic nature of every area, the strategy and approach taken in creating a SWM program must be unique to individual regions. The community context should be taken into account and individual behaviors and social attitudes towards waste disposal in communal spaces must be directly addressed (Bekin, Carrigan, and Szmigin 2007).

Much of the improvement that needs to be made is in the government's regulation of solid waste and its communication with the private sector. Reports have called on developing nations to "improve their often inadequate oversight and coordination of solid waste management services" (Hoornweg and Giannelli 2007). A case study in Sri Lanka found that success in community-based environmental initiatives comes from a strong partnership between the local government, NGO's, and the local population that nurtures grassroots participation (Van Horen 2004). One survey taken among developing regions concluded that a lack of legislative framework, national and local agency coordination of integrated municipal solid waste, and under-funding of services are key barriers of effective management systems (Hoornweg and Giannelli 2007). Governments that set specific performance standards and control measures often have the most efficient and sustainable SWM programs. Financial stress and social unrest in developing countries make waste management a sensitive political issue. Programs with strict enforcement and participation fees are often highly unpopular in these areas. Increased communication and government support of local communities is key to resolving this problem (Hoornwig and Giannelli 2007). Another approach government can take in dealing with SWM is using

economic incentives, such as offering programs that are affordable to most families or imposing fees on local authorities who do not effectively manage the programs (PAHO 2003). Unfortunately, lack of funding for SWM and environmental protection in general hampers nearly any government initiative in developing countries.

Municipal waste is a resource that is seldom acknowledged, especially in developing countries. Community participation and efforts to recycle and re-use materials have the potential to create a new economic sector that, with proper development and continued support, will generate revenue (Hassan 2000). A focus solely on recycling does not effectively address the fundamental issue of increasing the community's capacity to absorb waste and reducing harmful levels of consumption of materials and energy. Economies with little to no recycling and reusing are linear and assume a Cornucopian mindset of unlimited supply of raw materials and energy paired with an unlimited capacity for pollution and waste absorption (Bekin, Carrigan, and Szmigin). This is a faulty model that needs immediate improvements that address sustainability. Furthermore, a circular economy emphasizes minimizing the consumption of energy and materials without sacrificing stability and well-being. This model stresses the analysis of input and output while promoting post-consumption behaviors that extend the life-cycles of products. Solid waste reduction and recycling should be integrated into Belize's future management plans so posterity can benefit from the conservation of natural resources and reduced dependencies on fossil fuels. Regulation policies are effective in promoting recycled materials and recyclable manufactured products in developed and higher income regions (Hoornweg and Gianelli 2007). Nonetheless, in



small lower-income regions regulations are important but do not harbor success and participation as social or financial incentives.

New policies in solid waste management take time to gain community acceptance and involvement, particularly in lower-income communities. Such areas, which are often rural and characterized by limited infrastructure, need strong incentives to alter their "tried and true" garbage disposal methods (Van Horen 2004). Regardless of the effort and funding used to raise awareness about solid waste on local and national levels, without benefits that out-weigh costs, individuals will continue disposing of waste in the most convenient--and often least environmentally-friendly-- ways. The policies and incentives, such as a disposal fee based on volume or weight and refunds for recyclable material, help to promote waste reduction. With a quantity based system of fees there is more incentive to participate attributed to the sense that paying for only the amount disposed is more equitable than a flat rate where high waste producers are subsidized by low waste producers (Reschovsky and Stone 1994). By providing low-income communities or households with cash or "in-kind" transfers research shows that public concerns are appeased.

In addition to economic incentives, SWM programs and policies are more likely to succeed if they explore waste generation sources including the components of open market availability, consumption style and function, and external, demographical, cultural and psychological factors (Bekin, Carrigan and Szmigin 2007). Through careful analysis and estimation of private and public cost of waste disposal planners and consultants can provide sensible and feasible solid waste reduction goals and design specific programs adhering to the affordability and willingness to pay (Reschovsky and

Stone 1994). Provided local consultation of the desired level of services, local arrangement for collection services, costs, and the final disposal of the collected waste government and local authorities are able to cooperate to determine the level of willingness and ability to pay user fees creating an on-going and sustainable collection service (Samper et al 2005). Van Horen notes, cooperation “reflects a shift away from reliance on rigid statutory planning tools such as Master Planning inherited from the colonial era, toward more performance-based strategic approach...” which is flexible and aids in the nation’s development (p.758).

Managing municipal waste in Belize has always posed problems largely attributed to inadequate availability of resources, lack of technical skills, and public awareness of the impacts of poor management (PAHO 2003). Policies and public efforts on behalf of the municipalities have existed, but the lack of an established and on-going SWM plan has largely resulted from the inability to maintain a waste collection and disposal mechanism. Partly because of the growth economically and demographically, the capacity for increased solid waste management has been limited due to a lack of managerial skill and knowledge. (PAHO 2003, p. 25). Financial management and coordination is an integral component to a successful system. Therefore, the need to develop a system locally, with outside assistance in training and specialized staff, is imperative to provide a cost-effective contract with service providers while maintaining the understanding of diversity among local operations ( Samper et al 2005).

Belize must take action and implement an effective and sustainable solid waste management system in every municipality. A recent survey by Hoornwig and Gianellii reported that in Latin America and the Caribbean the top priority in the region is to

improve waste collection and disposal and to increase the focus on source separation of waste (2007). This study investigates the current state of Belize's SWM and emphasizes areas that need to improve to create successful waste management systems. The primary objective of Belize's Solid Waste Management Authority (SWMA) is to raise public awareness about the environmental and health impacts of the present solid waste handling and disposal methods. Marketing incentives have historically been effective and efficient at achieving social goals, particularly in smaller low-income communities (Reschovsky and Stone 1994). Belize fits into the trend across Latin America and the Caribbean, and through research and case studies improvement can be made but only with the support of the private and public sectors. The roles of each sector needs to expand beyond collection and is imperative to implement integrated management systems to improve all aspects of waste materials life cycle.

## Appendix B: Survey in English

Hello! We are students at Galen University, and we are working on a project with an organization in Succotz called Friends for Conservation and Development (FCD). We are here today to conduct a survey. It's purpose is to find out what people in this town feel about trash, what people know about its effects on health and the environment, and what they do with it in their own homes. There are 22 questions. Although you do not have to participate in this survey, we would appreciate your help. All of the data we collect will be kept anonymous. The Friends for Conservation and Development will use this information to learn more about the people of Succotz and to improve its trash collection program. Thank you for your participation.

Please circle your answers

1. What is your gender? A) Male B) Female
2. How old are you? A) 15 – 20 B) 20 – 30 C) 30 – 40 D) 40 – 50 E) 50+
3. How many people live in your house? A) 1-2 B) 3-4 C) 5-7 D) 8+
4. Who in your family is responsible for dealing with your trash? A) Father/Man  
B) Mother/Woman C) Brother D) Sister E) Grandparents F) I live alone
5. Have you heard of Friends for Conservation and Development (FCD)?  
A) Yes B) No
6. Do you think it is necessary for someone to collect your garbage? A) Yes B) No
7. Did you know that there is a garbage collection program in Succotz? A) Yes B) No
8. Do you participate in this garbage collection program? A) Never B) Sometimes  
C) Always
- If you don't participate, what do you do with your garbage? A) Bring it to the dump near the highway B) Leave the trash on the ground C) Burn the trash  
D) Other
9. Do you know where your trash ends up after it's been collected? A) Yes B) No  
If yes, where does it go? A) The river B) FCD burns the trash  
C) FCD brings the trash to the dump near the highway D) Other
10. Do you think FCD is doing a good job in collecting garbage in the village?  
A) Yes B) No
11. Is it safe to burn trash? A) Yes B) No

12. How often is trash collection available each week?
13. Do you think the FCD should provide more information on how to deal with trash? A) Yes B) No
14. Are there other services or changes to the collection program that would benefit your household? If so, please explain.
15. Are you willing to pay \$1 BZ for FCD to pick up your garbage every Saturday?  
A) Yes B) No
- Are you willing to pay \$2? A) Yes B) No  
\$3? A) Yes B) No  
\$4? A) Yes B) No
16. Do you think having trash around your house and neighborhood is a problem?  
A) Yes B) No
- What are some problems with having uncollected trash around?
17. Does trash affect people's health? A) Yes B) No
18. How much of your waste is organic (food waste or paper)?  
A)  $\frac{1}{4}$  B)  $\frac{1}{2}$  C)  $\frac{3}{4}$  D) all E) I have no idea
19. How much of your waste is plastic, glass, or tin?  
A)  $\frac{1}{4}$  B)  $\frac{1}{2}$  C)  $\frac{3}{4}$  D) All E) I have no idea
20. Are you willing to separate your waste into materials that are recyclable and those that are not? A) Yes B) No
21. Rank the following from most important to least important (1 being the most important, 5 being the least important):  
Recycling program  
Clean neighborhood  
Preservation of resources and wildlife  
Clean water  
Family health
22. What do you think is the most important problem with trash collection in Belize?  
A) It is expensive B) It is difficult or inconvenient C) There is nowhere to put it  
D) The collection services are not effective E) There is no need to pick up trash

### Appendix C: Survey in Spanish

Hola. Somos estudiantes en Galen University, y estamos trabajando con una organización en Succotz se llama Friends for Conservation and Development (FCD). Estamos aquí para realizar una encuesta. Esta encuesta averiguará que personas piensan de basura, que personas saben de los efectos de basura en la salud y ambiente, y que personas hacen con la basura en sus casas. Hay veintidos preguntas. Aunque usted no tenga que participar en la encuesta, su participación será apreciada. Esta información será anónima. Friends for Conservation and Development usará esta información para aprender más de la gente en Succotz y para mejorar el programa de recoger basura. Muchas gracias para su participación.

Rodee por favor la respuesta

1. ¿Qué es su género? A) Hombre B) Mujer
2. ¿Cuántos años tiene? A) 15-20 B) 20-30 C) 30-40 D) 40-50 E) 50+
3. ¿Cuántas personas viven en su casa? A) 1-2 B) 3-4 C) 5-7 D) 8+
4. ¿Quién en su familia tira la basura? A) Padre/Hombre B) Madre/Mujer  
C) Niños D) Abuelos E) Vivo sólo
5. ¿Ha oído de Friends for Conservation and Development (FCD) en Succotz?  
A) Sí B) No
6. ¿Es necesario que alguien recoja la basura? A) Sí B) No
7. ¿Sabe que hay un programa de recoger basura en Succotz? A) Sí B) No
8. ¿Participa en este programa de recoger basura? A) Nunca B) A veces C) Todo el tiempo  
  
Si no participa, que hace con la basura? A) Traiga la basura al basurero  
B) Deja la basura en la tierra C) Quema la basura D) Otro
9. ¿Sabe donde pone la basura después de recógela? A) Sí B) No  
  
Si la respuesta es sí, adonde va la basura? A) El río B) Quema la basura  
C) Lleva la basura a Guatemala D) Lleva la basura al basurero cerca de la autopista D) Otro
10. ¿Piensa que el FCD está haciendo un buen trabajo de recoger la basura en la aldea?  
A) Sí B) No
11. ¿Es sano para quemar basura? A) Sí B) No

12. ¿Cuántos días de la semana recogen basura?
13. ¿Piensa que FCD debe dar más información con lo que se hace con la basura?  
A) Sí B) No
14. ¿Hay otros servicios o cambios al programa de colección que a usted pueda beneficiar?
15. ¿Pagaría un dólar por recoger su basura cada sábado? A) Sí B) No  
¿Pagaría dos dólares por recoger su basura cada sábado? A) Sí B) No  
¿Pagaría tres dólares por recoger su basura cada sábado? A) Sí B) No  
¿Pagaría cuatro dólares por recoger su basura cada sábado? A) Sí B) No
16. ¿Piensa que la presencia de basura sobre su casa y su barrio es un problema?  
A) Sí B) No
- Si la respuesta es sí, cuáles son algunos de esas problemas?
17. ¿Piensa que la basura afecta la salud de la gente? A) Sí B) No
18. ¿Que por ciento de su basura es biodegradable (materia orgánica como restos vegetales)?  
A) ¼ B) ½ C) ¾ D) Todo E) No tengo ninguna idea
19. ¿Que por ciento de su basura es materiales reciclables (papel, plástico, vidrio, o estaño)?  
A) ¼ B) ½ C) ¾ D) All E) No tengo ninguna idea
20. ¿Sería dispuesto separar los materiales reciclables (papel, plástico, vidrio, o estaño) en la basura? A) Sí B) No
21. ¿Cuál es más importante? ¿Cuál es menos importante? Ordena éstos de 1 a 5 (1 es la más importante, 5 es la menos importante)
- La salud de la familia
  - Agua limpia
  - Conservación de los recursos naturales y la fauna
  - Una aldea limpia
  - Programa de reciclar
22. ¿Qué es el problema más importante con recoge de basura en Belice?  
A) Es caro B) Es difícil C) No hay ningún lugar para poner la basura  
D) Programas de recoger basura son ineficaces E) No hay necesidad de recoger basura

## **Appendix D: Hand Out**

### **Friends for Conservation and Development (FCD)**

This organization is located at the top of the hill in Succotz, and is dedicated to protecting Belize's natural areas and promoting sustainable development. One of the FCD's programs is the trash collection program in Succotz, run by the Solid Waste Committee. Every Saturday a truck goes from house to house picking up garbage. It costs \$2.50 per house per week for this service.

Please contact the FCD if you have any questions about the trash collection program or about its conservation efforts. [Info@fcdbelize.org](mailto:Info@fcdbelize.org) (501) 823-1657

### **The Dangers of Uncollected Trash**

Burning trash is not a safe way to get rid of trash. It makes very dangerous chemicals and toxins go into the air. These can cause many health problems, including asthma, cancer, nausea, breathing problems, headaches, emphysema and birth defects. Children and the elderly are especially at risk.

Trash left on the ground is also very dangerous. If small children or animals eat the trash, they can choke or get sick. Trash can be swept into the river by wind and rain. When this happens, germs and dangerous chemicals enter the water that we drink, cook and bathe, and can make us very sick.

### **Solutions**

A lot of the trash that we throw away can be recycled, like tin cans, glass bottles, and paper. Things like cardboard boxes and plastic bags can be used again. This reduces the amount of trash.

Having your garbage picked up by the FCD on Saturdays is an easy way to avoid the health problems of burning trash or leaving it on the ground. The great part about this program is that the more people who participate, the cheaper it will be to have your trash picked up!

### **Friends for Conservation and Development (FCD): Amigos para Conservación y Desarrollo**

Esta organización está locada en Succotz, y se dedica al proteger el medio ambiente y promover desarrollo sostenible. Una de las programas de FCD es la colección de basura en Succotz (se llama el Comisión de Basura). Cada sábado un camion de FCD recoge la basura al borde de la calle. Este servicio cuesta \$2.50 por cada casa a la semana.

Si tiene preguntas sobre del servicio de colección de basura u otras programas de conservación, llámase (501) 823-1657 o mandase un correo electrónico. [info@fcdbelize.org](mailto:info@fcdbelize.org)

### **Peligros de Quemar Basura o Basura en la Tierra**

No es seguro a quemar basura cerca de su casa. Hay químicas y toxinas peligrosas en el humo que puede causar problemas de salud como asma, cáncer, náusea, problemas con respiracion, dolores de cabeza, enfisema y defectos de nacimiento. Niños y ancianos son muy vulnerables.

Basura en la tierra es peligrosa también. Si jóvenes y animales comen basura, podrían ahogarse o podrían enfermarse. El viento y la lluvia traen basura en el río. Cuando este ocurre, microbios y químicas entran el agua que la comunidad necesita para beber, bañar, y cocinar, y llevamos un riesgo de enfermarse.

### **Soluciones**

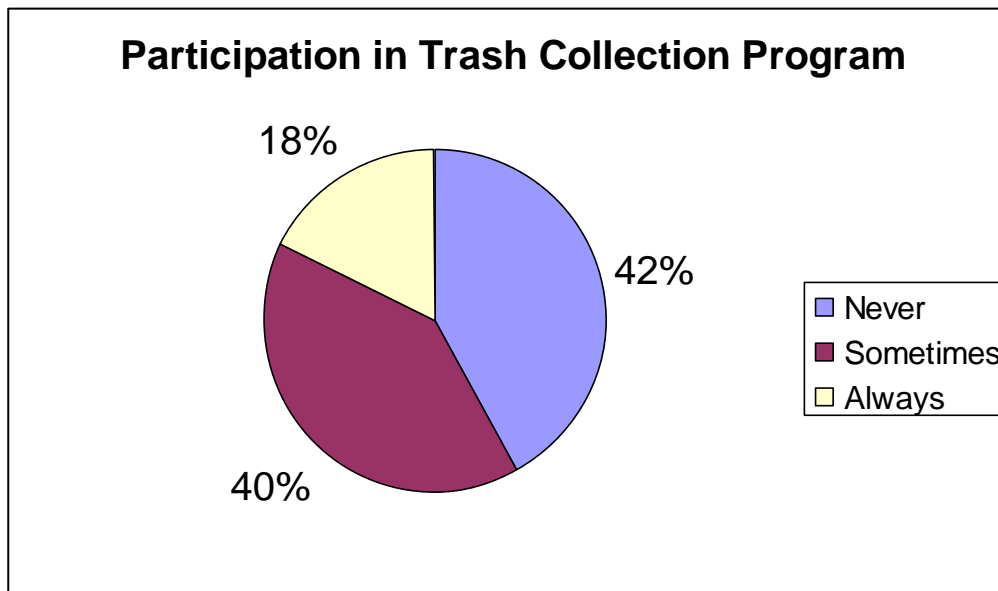
Nosotros podemos reciclar y reusar mucha de la basura, como latas, botellas de vidrio y papel. Podemos usar muchas cosas, como cajas de cartón y bolsas de plástica, otra vez. Este reduce la cantidad de la basura.

Es muy fácil para FCD recoge su basura, y este método elimina muchos problemas de salud. ¡Y esta programa de recoge basura llegará a ser menos economica si mas personas participan!

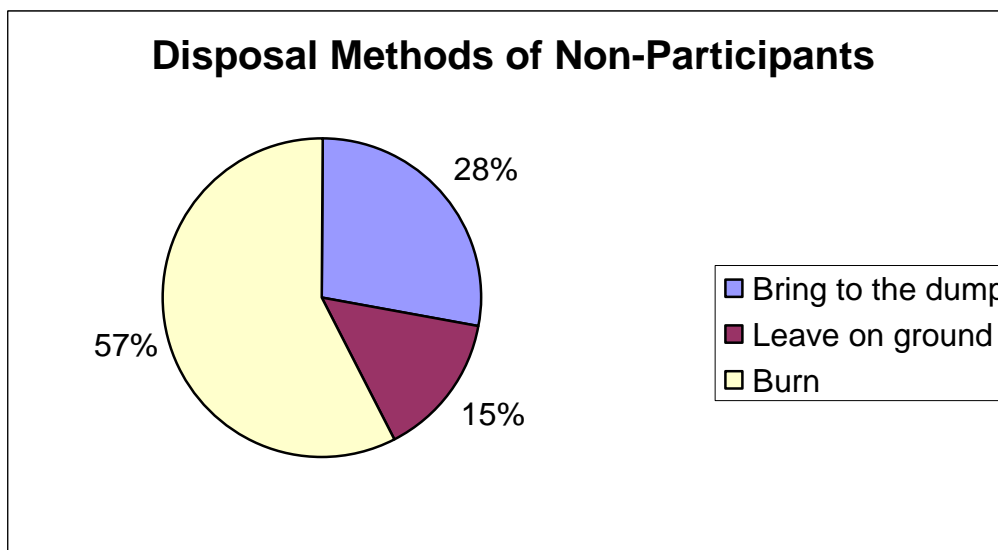


## Appendix E – Graphs

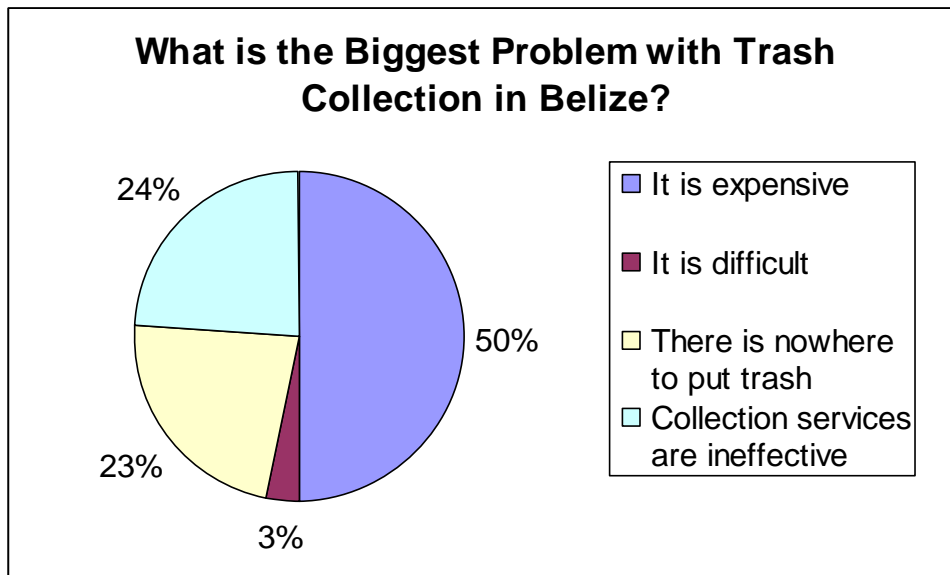
1.



2.



3.



4.



## Appendix F – Example Lesson Plans

### 1. Nature Walk and Discovery

**Objective:** To observe and discover the environment that students are part of and collect things from it to make nature inside the classroom.

**Materials:**

Glue or adhesive  
Cardboard or tag board  
Paint, glitter and decorative “frills”  
Construction paper

**Vocabulary:** Nature, Environment, Habitat

**Set-up**

Take the students outside around the school or on a mini-field trip to observe and collect the **environment** that they live in. Make sure that collecting isn't of live animals or harmful leaves, take this opportunity to discuss animals or plants that are harmful or poisonous if they come across them.

Make a chart and categories the objects that were collected and observed. For example by type of animal or plant, or by color.

*An Example chart might look like:*

<b>Rocks</b>	<b>Bugs</b>	<b>Flowers</b>	<b>Leaves/ sticks</b>	<b>Seeds or fruit</b>

After discussion and questions, or while you are discussing, have the students take a few of their items and make a nature collage of their favorite items in **nature** and their **environment** to hang in the classroom. *Be that if there are any live specimens or items that were observed but not collected that the students use the construction paper to draw and cut out for their collage.*

**Discussion and Questions:**

Ask if the students found or observed anything that they had never seen before and to describe and explain where it was and what it looked like.

Review a few specific items collected. *You might select plants or items with significant community, social, or environmental importance.* Ask them to describe the **habitat** that this item was collected in.

## 2. Groundwater Model and Where Does Our Water Come From?

Grade Levels 9-12 (ages 14-18)

### FACT:

**All water is interconnected and a fluid resource.**

### Objective:

Understand and model where groundwater comes from and how it gets to the surface through visual aids and models.

### Vocabulary:

**Leach:** contaminates washing through the soil profile of an area.

**Groundwater:** water that “originates” or can be pumped from beneath the surface

**Surface water:** Water that “originates” or can be harvested above the surface.

### Materials:

Clear plastic tumbler  
 8<sup>th</sup> piece of plastic tubing  
 disposable plastic syringe (or turkey baster)  
 beach sand  
 coffee filter  
 pebbles  
 ½-inch square piece of cloth  
 red food coloring  
 spray bottle ( squirt gun or squirt bottle)

### Set-Up:

1. Fasten piece of cloth over one end of plastic tubing with tape or a rubber band (this acts as a filter).
2. Place the covered end of plastic tubing against the bottom of the cup and tape to the side of the cup.
3. Place the pebbles or large gravel in the bottom third of the cup (this is representation bedrock)
4. Cover gravel with filter paper cut from a coffee filter.
5. Fill rest of the cup ,about 1-inch from the top, with white or light colored sand (this is representational of the soil layers)
6. With a spray bottle (or squirting instrument), “rain” on the sand until the water visibly filters into the gravel.
7. Place the syringe (or turkey baster) in open end of the plastic tube and draw the plunger out such that as water is filling up the shaft of the syringe ( your model is working !) This syringe or baster is the “pump” and the ground water model is complete.
8. Place the food coloring on the ground surface (sand), this represents the contamination.

9. “Rain” on the soil and again try to pull the colored water out. Continue this “raining” and “pumping” of the ground water. *The important part to remember and discuss is that there are some contaminants that are very difficult to leach out of the soil while others will leach readily.*

Discussion and Analysis:

Have the students write down their observations for discussion later. Have them draw a diagram of the model and label what each of the layers are actually. Ask the students if they know where their water comes from. Discuss possible contaminants and leaching in their ground water source and ask if there are ways to mitigate.

**Appendix G - Photos**



Primary School in Succotz



The Mopan River



Garbage in Succotz



Burn Pile

Trash collection day and the FCD truck

