

Waste Management in the Dominican Republic

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Abstract

I completed my 10-week research practicum from June through August in Laguna Salada, one of three municipalities that are part of the province Valverde, located in the Northwest region of the Dominican Republic. Laguna Salada is one of a few municipalities that has organized a pilot project, in an attempt to combat its growing solid waste problem, entitled “Production of Organic Fertilizer from Solid Waste”. Therefore, my research practicum focused on improving various areas of this project. Before my arrival, I intended to assist this project with education in the community and business outreach efforts, however, after having arrived, it became clear that the project was still in the process of planning a system for community outreach, education, empowerment, monitoring, and evaluation.

The project had come to a standstill and was not operating when I arrived due to various factors including unmanageable levels of solid waste at the fertilizer production facility, miscommunication with municipal waste collection employees, insufficient levels of education and support at the community level, and a transition of government municipal parties. Therefore, my main objectives became to organize a better way of educating and empowering community members, and creating a monitoring and evaluation plan for the project. Though the project was originally functioning in three pilot neighborhoods, I put my attention in only two of the them due to time constraints. My primary deliverable was a systemized approach of community organization and empowerment of the waste classification project so that the community members themselves could manage the project. Once the waste classification system is reinitiated this fall under a new municipal government, the intent is that the program will reach high levels of success with organic fertilizer production and, therefore, will be expanded to other neighborhoods and in-turn create new employment opportunities at the organic fertilizer production plant.

Introduction

The waste classification project “Production of Organic Fertilizer from Solid Waste” in Laguna Salada, Dominican Republic, though only one pilot project, in one municipality, in one island nation, is a demonstration of a huge problem facing our planet today: what to do with all of the trash we produce? Tons of plastics and other materials find their way into the ocean every day due to lack of sustainable waste management solutions on land. There is currently 5.25 trillion pieces of plastic in the ocean today because of the market failure for recycled materials we see in communities around the world just like Laguna Salada.¹ The community managing the waste classification project is frustrated with its lack of solutions to its growing solid waste problem and is trying to do what it can to clean up its community’s streets, improve health, and minimize landfill growth.

But this just isn’t their story, it is the story of millions of small and large communities around the world that feel they are overwhelmed by their production of solid waste and can’t find

¹ Laura Parker, “Ocean Trash: 5.25 Trillion Pieces and Counting, but Big Questions Remain,” *National Geographic*, last modified January 11, 2015, <http://news.nationalgeographic.com/news/2015/01/150109-oceans-plastic-sea-trash-science-marine-debris/>

a solution. The same products contained in glass, metal, and plastic are consumed day-in and day-out without even a thought of what will happen to these discarded packaging materials from the corporations that produce them. Laguna Salada is the story of a community that is fighting an uphill battle against cultural mentality, corporate profits over sustainable practice, and unsustainable consumption habits. However, Laguna Salada is also the story of a community that has a vision of creating local employment opportunities from its waste and is on its way to sustainably implementing a project that will begin to change the tide of how its current and future generations will live without leaving a trace of trash.

Background of Waste Management in the Dominican Republic

There is an estimated 354 landfills in the Dominican Republic today, in which the large majority are unmonitored and unregulated for hazardous effects on the surrounding environment and human health.² In 2012, the Inter-American Development Bank completed a study on the production of solid waste in the Dominican Republic and found “7,200 tons of garbage are produced daily in the country, 81% (5,832 tons) are deposited in open dumps, while only 18% (1,368 tons) are sent to controlled spaces, where it is covered with earth. The study counted 212 landfills as unregulated.”³ With the Dominican Republic having an area of 48,442 square kilometers, this means that on average there is a landfill every 136 square kilometers. According to the Ministry of Environment, 35% of the waste stream is organics, while 30% is paper, 9% is plastics, and 6% is metal.⁴

Plastic Problems and a Potential Solution

Though of the total waste produced only 9% is plastic, there is still 10,000 tons of plastic used a year, and only 2,400 tons are recovered, giving a 24% plastics recycling rate.⁵ This means that roughly 7,600 tons of plastics are sent to the dumps or end up in the ocean every year. At the government level there is beginning to be more of a conversation about recycling, however, the fact remains that there simply aren’t enough places outside of the major cities buying and selling into the recyclables market to make it profitable. Therefore, plastic bottles and plastics in general litter the ground in Laguna Salada.

There is a policy option that could serve as a solution for the problem with the plastic bottles. One of these solutions is to have a container deposit law or “bottle bill”. A bottle bill is where the consumer can sell back their used plastic or glass bottle to the retailer to receive a

² William Alcántara, “Un país con demasiados vertederos,” *Diario Libre*, last modified April 9, 2012, <http://www.diariolibre.com/noticias/un-pas-con-demasiados-vertederos-BIDL331321>.

³ William Alcántara, “Un país con demasiados vertederos,” *Diario Libre*, last modified April 9, 2012, <http://www.diariolibre.com/noticias/un-pas-con-demasiados-vertederos-BIDL331321>.

⁴ “Environment Ministry campaign: Reduce, Reuse, Recycle,” *Dominican Today*, last modified May 14, 2013, <http://www.dominicantoday.com/dr/economy/2013/5/14/47619/Environment-Ministry-campaign-Reduce-Reuse-Recycle>.

⁵ “El reciclaje en República Dominicana mueve más de US\$100 millones al año,” *Diario Libre*, last modified November 17, 2014, <http://www.diariolibre.com/noticias/el-reciclaje-en-repblica-dominicana-mueve-ms-de-us100-millones-al-ao-DIDL885071>.

small financial incentive. The consumer in reality is just receiving a refund due to the fact that “when a retailer buys beverages from a distributor, a deposit is paid to the distributor for each can or bottle purchased. The consumer pays the deposit to the retailer when buying the beverage.”⁶ In the case of the U.S., there are currently 10 states that have operating bottle bills.⁷ Creating a bottle bill would put more pressure on these bottling companies to implement corporate social responsibility for the containers they manufacture. The issue with plastics is that the company carries no responsibility for its product once it is bought off the shelf by the customer. However, these plastic bottles take roughly 500 years to decompose.⁸

Health Problems Related to Waste Management

Dengue is a major epidemic in the Dominican Republic. According to the Ministry of Health, “Between 2009 and 2012, it was reported annually on average in the region more than a million cases; of which 33,900 were classified as serious and 835 resulted in death; 2013 being one of the most epidemic years in recent decades, with 2.3 million patients affected by the disease.”⁹ Solid waste acts as a breeding ground for the vectors that carry these diseases due to discarded containers filling with water, that stands for long periods of time, creating breeding conditions. According to the Centers for Disease Control and Prevention, “In the Western Hemisphere, the *Aedes aegypti* mosquito is the most important transmitter or vector of dengue viruses.”¹⁰ According to an article studying the use of discarded solid waste as a breeding ground of the *Aedes aegypti* mosquito in two different sites in India, “the solid waste pollution is the major contributing factor in urban and industrial environments for the increase of the population density of the container breeding dengue mosquitoes, thereby causing annoyance as well as posing a severe threat of transmitting dengue virus.”¹¹ This paper also explains how the *Aedes aegypti* mosquito is the “most prolific breeder in solid waste materials” in comparison to

⁶ “What is a bottle bill,” *Container Recycling Institute*, accessed August 3, 2016, <http://www.bottlebill.org/about.htm>.

⁷ “What is a bottle bill,” *Container Recycling Institute*, accessed August 3, 2016, <http://www.bottlebill.org/about.htm>.

⁸ “Recycling Facts and Figures,” *Recycling Guide*, accessed August 2, 2016, <http://www.recycling-guide.org.uk/facts.html>.

⁹ “Facultad de Salud UASD organiza foro sobre Dengue: Prevención, diagnóstico y tratamiento,” *El Universitario*, last modified October 15, 2013, <https://www.uasd.edu.do/periodico/index.php/el-universitario/item/1126-facultad-de-salud-uasd-organiza-foro-sobre-dengue-prevencion-diagnostico-y-tratamiento>.

¹⁰ “What is Dengue,” *CDC*, accessed July 15, 2016, <http://www.cdc.gov/dengue/fAQFacts/index>.

¹¹ P. Dutta, SA. Khan, AM. Khan, CK. Sharma, PK. Doloi, and J. Mahanta, “Solid waste pollution and breeding potential of dengue vectors in an urban and industrial environment of Assam,” *Journal of Environmental Biology* 20, no. 4 (1999): 343.

other mosquito types.¹² In addition to dengue, the *Aedes aegypti* mosquito is also one of the two primary carriers of Zika and chikungunya, along with the *Aedes albopictus* mosquito.¹³ Both Zika and chikungunya are also common in the Dominican Republic.

Employment Relating to Waste Management

Four million people are estimated to work in the recycling sector in Latin America and the Caribbean.¹⁴ According to the organization Avina, which focuses on capacity building for recycling cooperatives in Latin America and the Caribbean, “Although these workers (independent waste pickers) are the foundation of the recycling industry value chain, recovering between 50% and 90% of recyclable materials used by the industry or exported from the region, they only receive an estimated 5% of the earnings.”¹⁵

One way to overcome the challenges of open-waste dumps and socio-economic issues faced by independent waste pickers is to support and develop businesses that increase collection of recyclable materials and organic waste used for composting to produce soil. These practices employ people, giving them better wages and better protection from hazards in the work place which is exactly what the project “Production of Organic Fertilizer from Solid Waste” in Laguna Salada is aiming to do.

Location Background

The Dominican Republic “is a middle-income country, with the largest economy of Central America and the Caribbean. The country has weathered the global economic crisis well and in 2010 experienced one of the highest growth rates in the region.”¹⁶ The Dominican Republic has a population of 10.41 million and a GDP of \$64.14 billion.¹⁷ Laguna Salada is one of the municipalities in the province of Valverde, situated in the Northwest of the Dominican Republic. Laguna Salada has 23,962 people and has an unemployment rate of 15%.¹⁸ The commercial, service, and agricultural sectors are the most economically important areas. There

¹² P. Dutta, SA. Khan, AM. Khan, CK. Sharma, PK. Doloi, and J. Mahanta, “Solid waste pollution and breeding potential of dengue vectors in an urban and industrial environment of Assam,” *Journal of Environmental Biology* 20, no. 4 (1999): 343.

¹³ “Zika – What we know,” *CDC*, accessed July 30, 2016, <http://www.cdc.gov/zika/about/index.html>.

¹⁴ “Background,” *IRR*, accessed February 2, 2016, <http://inclusiverecycling.com/irr/>.

¹⁵ “Background,” *IRR*, accessed February 2, 2016, <http://inclusiverecycling.com/irr/>.

¹⁶ “Dominican Republic,” *The World Bank*, accessed January 26, 2016, <http://www.worldbank.org/en/country/dominicanrepublic>.

¹⁷ “Dominican Republic,” *The World Bank*, accessed January 26, 2016, <http://www.worldbank.org/en/country/dominicanrepublic>.

¹⁸ Victor Polanco, Fermin Ovalle, and Juan Rodriguez, “Plan de Negocios,” Internal Document (2015), accessed August 5, 2015.

is a low income population of 51% and the population affected by extreme poverty is 10.5%.¹⁹ According to the Human Development Provincial Index which shows how the different provinces in the Dominican Republic compare against the other, Laguna Salada ranks 19 out of 31 provinces with an HDI of 0.448.²⁰ The percentage of people who are literate over the age of 15 years old is 84.5%.²¹

Background of Project

In the Dominican Republic, there are more than 150 municipalities and of those less than 10 have a waste separation system in place to sort between organic and inorganic waste. One of these municipalities is Laguna Salada, where my practicum research has taken place dealing with its waste management pilot project “Production of Organic Fertilizer from Solid Waste”. Laguna Salada has been preparing over the last four years to implement a waste separation system where the organic waste is separated from the inorganic waste in order to bring the organic waste to a small compost production plant the municipality has constructed with project funds. The compost will then be sold back to local agricultural businesses such as the large banana plantations that are found throughout the province of Valverde. Of the solid waste generated in Laguna Salada, 60%-70% is organic waste.²²

The idea of the project first began with the organization ADELVA (La Agencia de Desarrollo Económico Local de Valverde), which is a community development organization that is based in the provincial capital of Mao but works throughout the province. ADELVA then discussed the idea with APRADELASA (Asociación para el Desarrollo de Laguna Salada), the community development organization working in Laguna Salada, to select three pilot neighborhoods: La Curva, San Antonio, and Las Flores, consisting of roughly 1,000 families. These neighborhoods were selected due to their large amount of tree canopy cover and, therefore, large amount of leaves that could contribute to the compost material. Discussions were then held between the neighborhood associations of the pilot neighborhoods and the mayor, and they agreed the compost project was something the community wanted to invest in. They then applied for funding from El Programa de Pequeños Subsidios del Fondo para el Medio Ambiente Mundial (PPS), the small grants program from the UNDP, which gave them the funds to build the fertilizer/compost production plant.

Then three educational courses were offered in each neighborhood. During these workshops, both general education was given about the problems associated with solid waste along with information about the specific separation that needed to happen in each house. With the assistance of 60 students, two large burlap sacks were distributed in each house for a total of 2,000 sacks distributed and 400 extra. When the sacks were distributed, each house was

¹⁹ “Informe Final de Progreso,” *FMAM, SGP, and UNDP*, Internal Document (2012), accessed January 30, 2016.

²⁰ “Dominican Republic,” *UNDP*, accessed January 28, 2016, <http://www.do.undp.org/>.

²¹ “Dominican Republic,” *UNDP*, accessed January 28, 2016, <http://www.do.undp.org/>.

²² Victor Polanco, Fermin Ovalle, and Juan Rodriguez, “Plan de Negocios,” Internal Document (2015), accessed August 5, 2015.

also given a brochure explaining the separation along with a large sticker to place in the front of each house that stated that the house was separating.

The planning and funding preparations for the project took three years beginning in 2012. Initially, the UNDP's small grants program (PPS) gave part of the initial program funding of RD\$1,888, 504 (U.S.\$40,732) while other community organizations, including APRADELASA and ADELVA, gave RD\$2,303, 817 (U.S.\$49, 689).²³ The budget went towards constructing the small compost production facility, buying the 2,400 sacks, and buying promotional materials such as brochures for the project. The budget also went towards the salary of the two employees and one security guard at the compost facility. The actual project was only in practice for three months before it came to a pause.

Research Methodology Activities

Interviews

I began my research by selecting 31 business owners in two of the pilot neighborhoods, La Curva and San Antonio, to give household interviews about the previous waste separation project. I decided to interview business owners because I wanted to sample people from a similar socio-economic background. From these results, I found that 14 of the 31 participants did not separate during the classification project. I also found that 11 of the 31 recipients did not receive any information regarding the classification project.

House Visits

I then completed more than 200 house visits, where I explained who I was and how the project will begin again this fall and how to separate organic waste in one sack and inorganic waste in the other sack.

Environmental Education Survey

I also gave a small survey to 14 of the 30 environmental coordinators (discussed under Outreach Activities) to better understand their education and interest level dealing with environmental issues. I found that 8 of the 14 coordinators surveyed had no previous experience with environmental education classes.

Focus Group

During one of the weekly facilitated discussions between the environmental coordinators, a focus group approach was applied, discussing the areas that could be improved from the previous classification project.

Community Maps

Community maps were used to map-out where the different house groups were located and what environmental coordinators were supporting each group.

Research Findings

²³ "Resumen de la Propuesta de Proyecto," *FMAM, SGP, and UNDP*, Internal Document (2012), accessed January 30, 2016.

Problems with Communication Between Different Stakeholders

The biggest problem that I found through my research was barriers of communication between the different stakeholders. The primary stakeholders in the project were the residents who the solid waste was being collected from, the solid waste collection employees, the employees at the compost plant, the employees of ADELVA, the employees of APRADELASA, the mayor, and the leaders of the neighborhood associations. Though the initial project was thoroughly planned, it lacked some key components that would have increased its success levels. The beginning stages of the project were executed well in terms of the selection of the neighborhoods and initial educational orientation of the project. However, the project lacked aspects of community empowerment and follow-up. After the initial three workshops in each neighborhood, educational outreach stopped and there was no orientation given to the employees of the collection trucks.

This began the breakdown of the collection system. Due to the fact that many people didn't attend the three workshops offered in the beginning of the project, many houses didn't understand what was being asked or why. For the people who were separating, at times they saw the waste collectors throwing all of their trash back together again, once it was picked up; therefore, ruining any efforts they had made in the house to separate their solid waste. Then at the compost plant, because all of the trash arrived in one pile, the two employees working in the plant could not separate out all of the organic from inorganic waste from the three pilot neighborhoods. In turn, this resulted in an extremely slow process of waste separation, which eventually came to a stop after only three months.

Areas of Needed Improvement from Previous Project

During a workshop with the environmental coordinators (discussed under Outreach Activities), a focus group was held to determine what were the main areas of needed improvement from the previous project. During this conversation the main areas that were discussed were:

1. Lack of education and outreach in the community
2. Poor solid waste collection practices due to lack of education with municipal waste employees
3. Lack of community involvement and integration in waste separation project
4. Poor quality of sacks used for waste separation
5. Confusion within classification of waste
6. Lack of municipal human and financial resources to manage project
7. Lack of waste management regulations

Outreach Activities

Selection of Environmental Coordinators

In order to fix outreach and education, community integration, and community advocacy for the trash separation program, neighborhood environmental teams were created where the houses in each neighborhood were placed into a group of 20-25 houses with 1-2 environmental coordinators supporting each group. The selection process of environmental coordinators was done informally by seeking the neighborhood association's leaders' opinions of who would make a good leader for the classification problem. These coordinators will have the job of going to their assigned 10-15 houses each and clarifying any concerns the household residents have

about the project along with monitoring each house to make sure residents are complying with the separation project. After the project begins again this fall, the coordinators will also be able to assist in the evaluation process of how much organic waste is being collected from each house.

Weekly Facilitated Discussions

During my practicum, I facilitated three weekly workshops in the neighborhood La Curva for the coordinators along with one workshop in the neighborhood San Antonio. During the first workshop, a general discussion was had with participants about ways that they could reduce their consumption, including using less plastic bags when buying items in a store, and instead either carrying the item in hand or carrying a material reusable bag. There was also a discussion about advocating against littering, which in the neighborhoods littering is so common that people are rarely corrected when they litter. A discussion was also had about the culture of material changing. For example, 20 years ago plastic bags were introduced in the community instead of paper bags. However, plastic bags require an exponential time increase to disintegrate compared to paper. Therefore, people need to also change their mentality about using plastic bags.

During the second workshop, the job of the coordinators was discussed further and also had an in-depth discussion of how the coordinators will facilitate discussions inside the houses. In addition, a focus group discussion was had of why the previous implementation of the classification project had struggled to be a success.

During the workshop in San Antonio, the coordinators discussed further what had been discussed in terms of areas of the past project that needed improvement. It was also discussed about the importance of having a meeting with the incoming mayor and a separate meeting with ADELVA to discuss separation clarification. There was also an in-depth conversation about having sacks or tanks in the houses for classification.

During the third workshop in La Curva, the coordinators briefly discussed issues such as sacks versus tanks in the houses and the meeting with the new mayor was planned, including the plan for the meeting agenda. Lastly, it was discussed how the coordinators would make their first educational rounds in the houses and the coordinators decided to instead have a large educational meeting of the entire neighborhood where each house would send one resident to make sure that all of the houses were accounted for. The coordinators also decided that there was too much confusion with waste classification in the houses and that they needed to have a workshop themselves of how to separate the different types of waste with ADELVA.

Educational Workshop Given by ADELVA

During this meeting with ADELVA to discuss and clarify waste separation issues, I too became aware of how confusion with classification. Though the project only provided two sacks in each house for organic and inorganic waste, in reality the project is asking for separation among three different sacks; one for organic waste, one for reusable inorganic waste, and one for non-reusable inorganic waste. Therefore, ADELVA clarified that they wanted the houses to provide the third sack for non-reusable inorganic waste.

Workshop and Forum with Incoming Mayor and Coordinators

After the workshops were given to the coordinators and the areas of needed improvement of the previous project were outlined, it was decided that a workshop and forum needed to occur with the environmental coordinators and the incoming mayor to discuss each

area of needed improvement. During the discussion, the mayor responded to each area with the following response:

- With the assistance of the coordinators, there will be an improved education system in place in each household.
- The collection of the trash will take place at night due to a lower accident probability with the trash truck because there is less traffic at night, along with the fact that the employees will be more comfortable at night due to decreased temperatures.
- Before only two sacks were given to each house but instead the new project will have four sacks in each house, where two sacks will be collected each week and two will be left in the house.
- There will be a thorough orientation process given to the municipal solid waste collection employees.
- Better quality sacks will be given in each house.
- The waste will arrive separated at the compost plant.
- The project will begin again in October 2016.

Neighborhood cleanups

Another part of the community integration and education implementation was various neighborhood cleanups, a total of four with two in each of the two neighborhoods I was working in.

Facilitated Discussion between Organizational Stakeholders

This meeting was held between the incoming mayor, ADELVA, APRADELASA, and leaders of the neighborhood association. This meeting was held to give any final clarification of project plans for the reinitiation in October such as whether sacks or tanks would be used in the houses and how the organic waste would be collected such as a separate collection route just for the organic waste.

Neighborhood Educational Workshop

This large workshop was held to explain to the community about the reinitiation of the waste classification project. During this workshop a resident from each house in La Curva was invited to attend the meeting. The meeting was hosted by APRADELASA, ADELVA, and the municipal government to explain a clear path the project would follow and clarifying waste separation confusion to the residents.

Practicum Deliverables

Systemized Community Integration

The primary deliverable is a systemized method of community integration and empowerment. As explained previously, the pilot neighborhoods are now separated into groups of 20-25 houses that are continuously supported by their group environmental coordinators. The information about the coordinator leaders and the houses they are supporting was entered into an Excel spreadsheet which will serve as the first steps towards a larger database that can be expanded and edited, managed by APRADELASA and the municipal government. The environmental coordinators received workshops on environmental education, the classification of waste, and acted as a focus group to outline areas of needed improvement to the previous project. Therefore, the ultimate goal of educating and empowering the coordinators is that they

will play a critical role in supporting the classification project once it begins again. During the project, the coordinators will also need to be supported through continuous environmental educational classes from APRADELASA, ADELVA, and the municipal government to help support their education in the houses. An incentive such as a monthly food stipend to help keep the coordinators motivated is still being discussed.

Monthly Neighborhood Cleanups

Another deliverable was the initiation of monthly neighborhood cleanups that will be organized by the environmental coordinators. These neighborhood cleanups serve a few purposes. One purpose is to clean the streets of the large amount of trash that will either serve as breeding grounds for vectors or end up in the ocean. The other reason is to showcase to the neighborhood the message that people in the community care about its cleanliness.

Public Trash Cans

During my practicum, after a few discussions about the need for public trashcans, the International Lion's Club donated two new public trash cans to one of the pilot neighborhoods. Community members and myself also completed the construction of a trashcan made from plastic bottles to show how to build trash cans with recycled materials. This trashcan was presented at the neighborhood environmental workshop and to the incoming mayor in the hope that other similar models will be produced by the community to serve as public trashcans.

Conclusion

The biggest issue with the classification project, like so many development projects, is lack of community integration and empowerment within the project. Therefore, with a systemized approach of community leadership and responsibility, the community members will now be the advocates and act as a stronger stakeholder in the project; in turn, creating a sustainable and long-term project plan for success. With increased support and compliance of waste classification in the households, along with increased education for the municipal waste collection employees, less separation work and more compost production will occur at the production facility; meaning, there will be an increase in fertilizer sales and revenue to employ more people and increase the project capacity. The overall future goal is to keep expanding the project into new neighborhoods and, therefore, keep increasing local employment opportunities through improved waste management. With increased outreach and education in the community, Laguna Salada will not only provide more job creation at the community level but also begin to re-write its story. It will read: This is a story of how one pilot project, in one municipality, in one island nation, changed its ways of how it dealt with waste management, to set an example and acted as a leader for communities around the world.

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