

Native Community Solid Waste Management

An Interactive Qualifying Project Report
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Abstract

The project issued a plan to manage waste in the Qom community of Cerrito, Paraguay. The documentation for and recommendations in the plan were created with the use of semi-structured interviews, community educational presentations, field observations, and a community clean up event. The plan will be used by the Fundacion Paraguaya to assist in its poverty elimination efforts. The plan recommends revisiting community motivation sources, continuing education sessions that discuss the sorting of trash, scheduling consistent trash pickup, ensuring the support of community leaders, and promoting clean public spaces.

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Executive Summary

Background

Currently in the Qom community of Cerrito, Paraguay, there lacks a safe and systematic way of managing waste.

Project Goals

The goal of the project was to work with Qom community members to help them understand proper waste management techniques and create a sustainable waste management plan with them.

Deliverables

The deliverable of this project is documentation of various aspects of a waste management plan that can be implemented in the Qom community. This documentation includes details such as proposed frequency of trash pickup, and was delivered to the Fundación Paraguaya.

Methods

For this project, the team primarily utilized interviews with community members, community educational presentations, and a community-wide clean up event.

Results

The team formally interviewed over thirty Qom community members about their waste management concerns. It was identified that much of the community in fact did not express concern about how their trash is currently managed. Additionally, during community presentations, 60 community members had the opportunity to learn about trash separation and the risks of improper trash disposal. Lastly, 53 community members fully participated in the community clean up event and had their trash collected by the municipality.

Recommendations

Based on the project results, the team first recommends that the collective lack of interest in waste management in the community be evaluated to increase motivation. The team also recommends continued community education regarding proper waste management. Additionally, consistent and scheduled trash pickup is suggested. Lastly, the team recommends gaining more support from community leaders and promoting clean public spaces in addition to private household spaces.

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Section 1: Introduction

Solid waste is constantly produced on the earth, and it must be properly managed. Solid waste is defined as any discarded or abandoned materials by commercial or private entities (“Criteria”, nd). In order to manage these solid waste materials, typically they are either discarded or disposed of. Given how often solid waste is produced, it must be closely managed to ensure it is being properly taken care of.

Many developing communities, such as those in Paraguay, lack a proper waste management system for a multitude of reasons. Typically, the problem stems from a lack of either communal organization or sufficient financial resources. Even when communities attempt to establish a functional system, factors such as these often cause them to fail (Guerrero, 2013). Inadequate waste management plans of these communities are a serious problem that can cause health concerns and leave families without clean living spaces if not properly resolved (“Waste Management in Paraguay”, 2017).

This concern is prevalent in the Qom community, a small indigenous community in Cerrito, Paraguay that the project team worked with. The residents of the Qom community completed a self-evaluation survey through Fundación Paraguaya and identified their second highest concern to be their lack of a sanitary, affordable waste management system (Fundación, n.d). There was previously a waste pickup service that was run through the municipality in Cerrito. However, once this service became privatized, the residents of the Qom could no longer afford to use it.

In order to create a sustainable waste management plan with the Qom community, various considerations were made. Given the unfavorable economic conditions in the community, it was determined that the chosen system must be both self-sustainable and low

cost. However, with the relationships that were built, it was also important to gain insight into what types of waste management activities the community was willing to participate in. It was imperative that the situation was approached both through an individual family basis and through the community as a whole in order to gain complete insight and aid the Qom in managing their waste effectively.

Section 2: Background

The following section will provide the background necessary to understand the solid waste management problems in the Qom community in Cerrito, Paraguay. This background begins with an overview of the current situation in Paraguay. Then, there is a brief examination of the Qom culture. Lastly, the background delves into the various issues and ethics that affect indigenous populations in Paraguay, such as the Qom.

2.1 Current Situation for Project

In order to effectively develop a sustainable waste management plan, it is important to investigate the current waste situation of Paraguay as a whole. Currently, according to the World Bank, Paraguay is classified as a country with low income (Cunningham, 2012). The generation rate of garbage in Paraguay (Kg/capita/day) is on average 1.125. The capital of Paraguay, Asunción, has 61% of its collected trash going to a controlled landfill, and the rest going to a sanitary landfill. However, the garbage that is brought to landfills only accounts for 51% of the total waste produced in Asunción.

The overall lack of infrastructure for garbage collection creates various problems for the community. Garbage that is not collected creates pollution through the degradation of

certain plastics and chemicals that enter both soil and groundwater. In addition to pollution concerns, garbage that is burned rather than collected can lead to health complications such as cardiovascular problems and kidney damage (“Wastes”, n.d.).

2.2 Qom Culture

The indigenous communities of Paraguay have been disadvantaged by socio-economic barriers since the nineteenth century. The Qom tribe continues to speak their indigenous language, Qom, as well as Guaraní. They have limited communication in Qom with outside communities as the only other Qom speakers live in Argentina (Massineo, nd). In addition to cultural exclusion, the Qom now find themselves deprived of simple necessities such as a constant source of clean water (ABC Color, 2018), adequate housing, and infrastructure such as waste removal services and educational institutions (ABC Color, 2018). The goal of this project is to aid the Qom in its education on new-age waste removal infrastructure.

2.3 Ethics

Despite the issues many indigenous communities in Paraguay face, they still receive protection and aid from international organizations. The International Labour Organization is a United Nations agency that deals with labor problems. This organization has created the “Indigenous and Tribal Peoples Convention no. 169 of the International Labor Organization” (“Convention C169”, 1989). In Paraguay, this is also known as “NOEM.” This work recognizes developments that have occurred in the indigenous communities in various regions around the world, and adopts new international standards that remove the

assimilationist perspective of previous ones. Article 2 of the convention states that governments must share equal responsibility with indigenous people when planning actions to protect their rights. The work aims to recognize all aspirations of indigenous people to control their own ways of life and economic development without losing their identities, languages, and religions (“Convention C169”, 1989).

It is important to recognize that in many areas of the world, including Paraguay, indigenous communities lack fundamental human rights. In many cases, their original values, customs, and perspectives have been lost through assimilation. It is critical that when work is conducted with the Qom, their values, customs, and opinions always be respected. It was the job of the project team to aid the Qom in the creation of a waste management system without forced assimilation and with a strong regard for their culture and values.

Section 3: Methodology

This project aimed to assist the Qom community with the creation of a solid waste management system. This methodology section discusses how the project team strived to achieve this goal. It begins with how the team obtained information about waste management systems, the current situation in the Qom, and the needs of the community. It then focuses on how the team incorporated an educational component into the project. A community-wide clean up event is also discussed. Lastly, this section delves into ethical concerns.

3.1 Acquiring Information

3.1.1 Background Research

Effective solid waste management systems must consider the community they serve. The team read waste management handbooks to gather ideas about how a waste management system can improve. The research employed these questions: What is the culture of the Qom like? Which waste management plans are realistic and affordable in respect to the desires of the Qom people? The team also researched communities with similar socioeconomic situations to the Qom and their waste management methods.

3.1.2 Initial Meetings

The team made initial introductions with the community in zone 21 and zone 27 (the team's assigned zones) before any semi-structured interviews took place. A Fundación Paraguaya volunteer facilitated these introductions and aided with communications in Guarani. This volunteer, Walter Sanchez, has worked in zones 21 and 27 for the Poverty Stoplight initiative for the past five months. He helped the team become better acquainted and establish cordial relationships with the community, as he had already established some social capital within the community.

3.1.3 Interviews

After the team familiarized themselves with the community, they conducted semi-structured interviews in the two assigned zones. Any willing families were encouraged to participate in interviews so that the team could receive large amounts of input. Walter

Sanchez translated all interviews from Spanish to Guarani to ensure that interviewees understood the questions.

During the initial interviews, the team learned more about the community's concerns and how they currently manage waste. The team asked these questions: 1) "How do you currently manage your waste?", 2) "Did you identify "Disposición de Basura" (Garbage Disposal) as a concern when you completed the Poverty Stoplight survey?", 3) "Are you concerned about how the community manages its trash?", and 4) "Do you separate your inorganic and organic trash or recycle any trash?"

The team conducted further interviews to identify how much trash each family produces, to invite people to school presentations, and to discuss a community clean up event - all three of which are further discussed in sections 3.1.4, 3.2, and 3.3.2, respectively. These supplemental interviews allowed the team to both receive and give information that was not known during the initial interviews.

3.1.4 Trash Quantity Measurements

Prior to the implementation of a new waste management system, the team identified how much waste the community produces. To do this, the team measured the quantity of trash that community members in zone 21 produce. The team gave seven families one 100-liter trash bag each to fill for a week and instructed them to fill the bags with only new trash so that an accurate measurement could be made. The participating families received their bags on March 23rd or March 26th, and the team retrieved the filled bags on March 27th and April 2nd, respectively. The team then analyzed the contents of the bag and performed an estimate of how much non-biodegradable trash each family produced.

3.2 Presentations

To reach a large number of community members, the team scheduled five presentations to discuss waste management topics. The presentations were planned for March 26th at El Faro School, March 27th and April 4th at Kael Sat Lecpi School, April 6th at the San Francisco school, and April 11th during a weekly artisan meeting at Iglesia Adventista del Septimo Día church. The team used various methods to invite the community to the presentations. Initially, the team asked the directors of the three schools to notify families of the school presentations on Sundays at church. For the March 27th, April 4th, and April 6th presentations, teachers and the project team handed out printed invitations. The team advertised minimally for the April 11th presentation because it occurred during a weekly community gathering.

The team prepared a PowerPoint to discuss three categories in which trash can be separated (recyclables, inorganic, and organic), the benefits of recycling, and how to compost. Additionally, the team led an activity about how to separate trash where an item would be displayed and the audience had to categorize it.

3.3 Community Cleanup Event

3.3.1 Objective

In attempt to bring additional awareness to the subject of waste management, the team planned a community cleanup event. The event encouraged trash separation and included a free one-time collection. This event followed the educational presentations given

about the importance of waste management, as discussed in section 3.2, to ensure that the community could actively participate.

3.3.2 Promotion and Advertisement

The event required a large amount of participation in order to be successful. The IQP team utilized various methods of promotion. First, the team advertised the event during the community presentations. Here, the team described the details of the event and encouraged the audience to sign up and participate. Community members who signed up at a presentation provided their names and phone number so that they could be contacted if necessary.

Second, the team went house to house in zones 21, 27, and 37 on April 11 and April 12. The team gave out informational flyers to community members that contained event details and graphics on how to separate trash. The team also explained how to separate trash and the rules of the event to each community member that agreed to participate. Each participant received a designated location in the community to bring their trash to and a reusable trash bag. The team acquired 82 participants within the community. The team also identified four highly interested participants in the community, and with their agreement, chose them to be references if the rest of the community had questions.

Promotion of the event continued after participants signed up. First, the team hired a local community member to drive through the neighborhoods to advertise the event with a stereo. The announcement reminded the community that the event was occurring, what types of trash belongs in the reusable bags, and where the bags should be brought. The advertisements occurred on April 16th to serve as a final reminder before the last day of the

event on the 17th. Lastly, one team member also announced the event on a local radio show named Radio Libre with the help of a local community member.

3.3.3 Event Rules

For this event, each participating family received the same list of cleaning tasks to complete. The team notified families of these tasks on April 11 or April 12, and families had until April 17 to complete them. The rules for each family were: 1) To have no trash of any kind littered throughout their yard, 2) To have no trash of any kind littered on the street in front of their house, 3) To fill the provided trash bag with inorganic and recyclable trash, 4) To place the trash bag in one of the designated locations, 5) To separate and bury organic trash.

As previously mentioned, each family received a designated location for their trash. The team chose four locations in the community based on their accessibility for both community members and the municipal trash truck. The proposed truck route and pickup locations can be seen in Appendix D.

3.3.4 Final Verification

In order to observe participant progress, the IQP team and Fundacion Paraguaya volunteers visited the community on April 16. For this initial visit, the team visually observed yards and streets. Families still had one more day to complete their event tasks, but the team answered any questions they had. The script used for this visit can be seen in Appendix A: Example Interview Script. The team also gave each participating family an additional trash bag.

On April 17, the IQP team and Fundacion Paraguaya volunteers made final visits to participating families to see which tasks they completed. Each member of the IQP team brought with them a list of the event tasks. The team attempted to speak to every family that was present, however, yards and the streets were still visually observed if no one was home. The team also went to each of the designated trash drop off locations to observe the amount of bags of trash brought by the community.

3.3.5 Follow-up Interviews

In order to receive feedback about the event, ten individuals from zones 21, 27, and 37 completed follow-up interviews. The team asked the following questions: 1) What did you like about the community event?, 2) What improvements would you make to the event?, 3) Would you be willing to pay for future trash collections?, and 4) Did you hear about the event in the radio or through the announcement car?. The team used these interviews to gauge community opinion about the effectiveness of the event.

3.4 Ethics

The team ensured that no one felt jeopardized during this project. Interviews and photo documentation can raise concern in regards to ethics. Prior to committing to an interview, the team informed the interviewee of the subject matter. Additionally, the team ensured that the interviewee felt comfortable by allowing them to choose the location of the interview. The team also chose ethical manners of photo documentation and did not feature community members or their homes without consent as to not invade privacy.

Section 4: Results and Discussion

The team spent time in the community to determine its needs and aid in the design of an effective, long-lasting waste management system. This section provides the results and a discussion of each of the main methods that were utilized in the community: semi-structured interviews, trash quantity measurements, community presentations, and a community cleanup event.

4.1 Interviews

Throughout the duration of the project, the team had the opportunity to interview families throughout zone 21 and zone 27 in the Qom community. With these interviews, 32 community members were able to express their opinions about waste management. These interviews served to determine a baseline of what the community would like changed, their willingness to carry out these changes, and how education can help sustain these changes.

Three main ideas emerged. First, only three community members expressed a need for waste management beyond the community-wide practice of burning it. Their concerns included environmental deterioration due to smoky burning, threats to health, and a general loss of community aesthetic. In spite of some community members' desire for a trash free community, no one articulated any thoughts on how to do it, nor did they seem inclined to act. These replies appear to the team to be at odds with the findings of the Poverty Stoplight, for they suggest that there is a general lack of commitment to waste management by the community rather than its prioritization.

To address this problem, the team at best can suggest a review of the literature of individual and community motivation. Integral Theory comes to mind as it provides a means

to explain why people and communities do and don't do what they do. In the case of this project, the question would be, "Why do people in the Qom community not properly dispose of waste?"

Second, the community believes that an effective trash collection system will solve their trash problem. When the team inquired about community members' interest in having their trash collected by a truck, many indicated that regular trash pickups would be helpful. From the first interviews on this topic, the community did not indicate whether they would be willing to pay. From the last set of interviews, a few people said they would be willing to pay no more than ten thousand Guaranis (about \$1.80 USD) per month. A few more people indicated they would pay a nominal fee, and the others expressed no willingness to pay. These results led the team to explore cost effective waste management options, calculations for which can be found in Appendix D.

Third, the team discovered a lack of knowledge with regard to modern waste management. Interviewees said that they did not know how to separate trash into standard categories such as biodegradable and non-biodegradable. Many individuals included cut grass and leaves in trash, items that do not need to be collected. Due to the difference in definitions of "trash", the emphasis of the project shifted towards education, rather than the implementation of a new waste management system. Without education, a new waste management system would likely fail. The team found that education should consist of how to classify trash into categories, and why it is important to do so. The separation of trash is important because if people gather only non-biodegradable trash to be collected by the truck, the overall volume of trash will decrease. A smaller weekly volume of trash leads to less

frequent trash pickups, and will decrease the overall the cost for the community to manage their trash.

4.2 Trash Quantity Measurements

In order to estimate how often trash should be removed from the community, an experiment was carried out in zone 21, as explained in section 3.1.4. Out of the seven trash bags distributed, only four were filled. From these four bags, it was estimated that a family produces an average of 57 liters of un-compacted mostly non-biodegradable trash in five days, or 79 liters in one week. This calculation provided a total weekly estimate of 6,320 liters of trash produced by the 80 families in zone 21, zone 27, and zone 37. The known capacity of the trash collection truck is 6,000 liters; so one truck per week can handle the trash of the three zones. Two additional estimates determined trash volume when trash is completely separated and when it is not separated at all. These estimations can be seen in Appendix D.

In addition to providing an estimate of trash production, this experiment emphasized, once again, the apparent lack of interest and understanding about waste management in the community. Out of the ten families in zone 21, only seven agreed to participate in the experiment and fill a trash bag for five days. Furthermore, out of the seven original participants only four took part. This led the project team to believe that a lack of interest in waste management underlies the lack of participation. The experiment also showed that trash separation still confuses the community. Despite the fact that the team showed family members how to separate trash from their yard, biodegradable items such as leaves, branches, and grass were still collected as garbage. This reinforced the notion that trash separation education should be included in the project.

4.3 Community Presentations

Through community presentations, approximately 66 community members had the opportunity to learn about various themes of waste management. Five presentations were scheduled, three were given, and two successfully reached the target audience that included both students and their parents. Presentations at Kael Sat Lecpi School and San Francisco School did not take place due to no attendance by students or parents, and the presentation at El Faro School had only six fifth-grade students in attendance. A presentation was rescheduled at Kael Sat Lecpi School and was successful with 15 parents and 25 students in attendance. The final successful presentation took place during the community artisan meeting and there were 20 adults in attendance. All attendees learned how to separate trash, why it is important to manage trash well, and how to start a compost pile.

In spite of these successes that effectively reached a large number of community members, it is important to consider why the other presentations did not go well. The first two unsuccessful presentations were not advertised by the team's usual approach. The team did not reach out to parents and students, so there was no connection established with them. Rather, the school directors made the appeal, and there was less opportunity for one-to-one contact. The third unsuccessful presentation failed for unknown reasons. The team made their usual house visits and invitees were handed invitations. Whatever it was that caused these presentations to fail, it is clear that successful presentations were a direct method of sharing education with the community.

4.4 Community Cleanup Event

During the community cleanup event, the team made multiple observations: 1) There was a large improvement in the ability to separate trash, 2) the support of community leaders is crucial to total participation, 3) participation in the event varies by activity, and 4) there is a need for an emphasis on clean public spaces as well as private ones. These observations are discussed in the following section.

As discussed in section 3.3, 82 families learned how to separate trash from one-on-one interactions with team members. On the last day of the event the team checked homes for task completion and noted that the majority of participants successfully filled their bags only with non-biodegradable trash. This large overall improvement in trash separation led the team to believe that the educational presentations and house visits increased knowledge and participation in the community.

Even though the community participated and did well in the event, the team believes that participation could have been even higher with more support from community leaders. Minimal support from the community leaders was gained by the team for this event. The community leaders expressed little interest in becoming involved with the creation of the clean-up event. Despite this, they were willing to help advertise it. Two of the leaders promoted the event at their weekly community meeting, which may have contributed to the number of active participants in the event. Given the sociology of Qom communities, the team believes that the actions of the leaders greatly influence those of the community.

In total, 72 community members took part in cleaning their homes and yards. It is important to note the level of participation for each activity discussed in section 3.3.3 in order to identify which activities may need more emphasis in the future. The participation

breakdown for all tasks can be seen in Appendix B. The team identified that the criteria with the highest amount of participation was filling a trash bag to be collected - 73% of all event participants did this. However, only 40% of participants, or 53 in total, brought their filled bag to one of the four designated locations. Each of the designated locations had approximately four trash bags. Had the collection truck only stopped at the four locations, the majority of the bags would not have been removed. The team infers from this result that the community prefers street side pickup.

The project emphasized a need for clean homes and yards, but placed no emphasis on keeping public spaces clean. While 72 families did clean up around their own home, a large amount of trash remained in public spaces. These public spaces include shared trash piles between houses and items littered throughout the streets. This lack of attention to public spaces is likely because it was not included as an event rule. However, in order for the entire community to be trash free, emphasis on public spaces should be promoted in addition to private ones.

The team analyzed data from the community cleanup event by zone to allow for a better comparison. As a result, zone 37 had the highest collective participation for cleaning their yards, filling a trash bag, and bringing the bag to the designated location. The full breakdown of event results by zone can be seen in Appendix B. Although the team spent the majority of time for this project in the two assigned zones, zone 37 served as a source of comparison in the event. The team made visual observations of zone 37 and concluded that it appeared to be much cleaner overall than zones 21 and 27. This suggests that the residents of zone 37 simply have a higher interest in waste management when compared to zones 21 and 27. Although this analysis of the cleaning event does not show the reasoning

behind participation or lack thereof in the community, it does specify the criteria in which each zone can improve.

The team conducted follow-up interviews with ten participants at the end of the event to learn what improvements they suggest for the future. A complete summary of responses from these interviews are shown in Appendix C. Each interviewee stated that they enjoyed participating in the event and that they feel it helped the community begin to overcome its trash problem. When asked specifically what they liked, multiple interviewees stated that the individual house visits helped to explain the event, and that they were glad to see an alternative to burning trash. Furthermore, interviewees mentioned that they heard the announcement car and found the reminder to be helpful. In contrast, only two people said that they heard about the event on the radio show. Through this feedback, the team deduces that the announcement car was a critical factor in the success of this event, while the radio show was not. Most importantly, the results from this event and these follow up interviews showed a collective increase in interest and willingness to participate in a new waste management system.

Section 5: Conclusion

Community interviews and visual observations revealed a lack of interest and knowledge with regard to waste management in the Qom community of Cerrito. In response, the team developed a waste management plan. The plan includes suggestions for 1) educational sessions to increase interest in waste management and knowledge on how to separate trash, 2) how to organize a community cleanup event and 3) how to establish a regular trash collection service. The team believes that with implementation of this plan, the trash problem in the Qom communities of Cerrito will be eliminated.

Section 6: Recommendations

As a result of this project, the team recommends that the Fundación Paraguaya implements the team's waste management plan which suggests to a) ensure that community members know how to separate trash into biodegradable and non-biodegradable categories, b) establish streetside trash pickup, c) promote clean public spaces, and d) re-evaluate community commitment to address their trash problem (eg. redo Poverty Stoplight; apply Integral Theory). Additionally, the team recommends to work more with community leaders so that community members are more willing to participate.

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Section 8: Appendices

8.1 Appendix A: Example Interview Script

Hola, estamos aquí para comprobar su progreso con las actividades de limpieza para el evento de la comunidad. ¿Le importa si echamos un vistazo alrededor de su patio y le hacemos algunas preguntas?

- 1.) ¿Tienes montones de basura y si es así dónde están ubicados?
- 2.) ¿Comenzó una pila de compost?
- 3.) ¿Ha separado sus reciclables?
- 4.) ¿Vendió algún reciclable? ¿Tiene alguna pregunta para nosotros?

Gracias por su tiempo. ¡Volveremos mañana!

8.2 Appendix B: Event Results by Zone

	Clean Trash from Yard	Clean Trash on Street in Front of House	Fill the Provided Trash Bag	Bring Trash Bag to Designated Location	Separate and Bury Organic Trash
Overall % Participation	54%	67%	74%	40%	7%
Zone 21 % Participation	50%	80%	60%	20%	0%
Zone 27 % Participation	54%	65%	76%	36%	12%
Zone 37 % Participation	57%	61%	76%	55%	0%

8.3 Appendix C: Coded Interview Responses

Interviewees: 5 women and 5 men from Zones 21, 27, and 37

Conclusions:

- The top priorities are that the truck consistently comes through and there are reminders when it comes. It helped that we went house to house and explained that the truck is coming and what type of trash can be collected.
- Almost nobody is willing to pay more than 10 mil per month for the truck to pass by twice a month.
- Most people thought the parlante was useful, and most people did not hear the radio.

Interview Questions

1. Which aspects did you like and/or dislike about the community event?
2. How much, if anything, would you be willing to pay per month for a collection truck to come twice every month?
3. Did you hear the radio show we did and/or the “parlante” (loudspeaker with announcement that the truck is coming)? Was it useful to you?

Question 1 Coded Responses

“Which aspects did you like and/or dislike about the community event?”

Category	Tally
Mention that trash collection prevents burning	II
Truck was important part of activity	IIII II
Truck stopping at every house is important	I
Constant reminders of truck coming was important	I
Acknowledge that trash pickup was necessary	III
Inquired about how to get more trash bags	II
Education on trash separation was helpful	II
Didn't tell family to clean while away/didn't have time before the truck came	II

Question 1 Responses

- 1 - If the truck comes continuously, she won't burn her trash.
- 2 - The activity was necessary to clean up trash. Truck coming to every house is necessary.
- 3 - Liked that it helped pick up trash because it was a problem
- 4 - Now that we (WPI's and Walter) have gone house to house to remind/inform people of the truck coming, there's more awareness and interest in waste management.
- 5 - He hopes everyone continues to participate. Now that everyone knows how to separate trash, more might participate if the truck keeps coming.
- 6 - He saw lots of interest from his neighbors, especially because they're more informed about the process. He doesn't like when his neighbors burn trash, so it'll help a lot if the truck continuously comes.
 - He inquired about how to get more trash bags for the next time the truck comes.
- 7 - We gave him a trash bag, but he left town for a few days and didn't tell his family about the activity so nobody cleaned or put the trash out to be picked up.
 - He inquired about how to get more trash bags for the next time the truck comes.
- 8 - She usually burns her trash, but she doesn't want to anymore because it's bad for her health. If the truck keeps coming, she won't have to burn trash.
- 9 - He didn't have time to clean his yard.

- 10 - She likes that the truck came to pick up trash.

Question 2 Coded Responses

“How much, if anything, would you be willing to pay per month for a collection truck to come twice every month?”

Category	Tally
Less than 3 mil Guaranis	I
Less than 10 mil Guaranis	I
10 mil Guaranis	II
10-20 mil Guaranis	I
Willing to pay, but not sure how much	I
Not sure if they are willing to pay	II
Not willing to pay	I

Question 2 Responses

- 1 - Less than 3 mil
- 2 - “Lo que sea” (whatever it is), like 10-20 mil
- 3 - 10 mil/month
- 4 - Ready to pay, but doesn’t know how much
- 5 - Doesn’t think he’s ready to pay
- 6 - 10 mil/month, but they have to come twice a month
- 7 - No comment
- 8 - She will pay depending on cost - <10 mil
- 9 - Doesn’t know if his family is ready to pay
- 10 - Not ready to pay

Question 3 Coded Responses

“Did you hear the radio show we did and/or the “parlante” (loudspeaker with announcement that the truck is coming)? Was is useful to you?”

Category	Tally
Heard parlante, but was not useful	I
Heard parlante and was useful	IIIII

Heard radio and was useful	II
Did not hear parlante	II
Did not hear radio	IIII II

Question 3 Responses

- 1 - Parlante was useful, but didn't hear radio
- 2 - Parlante was very useful, but didn't hear radio
- 3 - Didn't hear parlante or radio
- 4 - Heard radio and liked it, and heard parlante
- 5 - Parlante was useful, but didn't hear radio
- 6 - Radio and parlante were very useful to remind people
- 7 - No comment
- 8 - She heard the parlante but she only heard it a day before the truck came so it wasn't enough time
- 9 - Didn't hear parlante (his house is very far away from the road) nor the radio
- 10 - The parlante was useful, but didn't hear radio

8.4 Appendix D: Proposed Waste Management Plan

Frequency of Pickups

It is important that the amount of trash that the community produces is properly estimated. While working in the community, the team performed an activity to estimate the amount of trash that families typically produce. Families from zone 21 were each given a trash bag and were told to place any trash they produced in it for 5 days. From this activity, we have produced a range of potential trash production amounts for the **80 families in Zone 21, Zone 27, and Zone 37**. A range has been calculated in order to take into account situations that may affect the estimation, such as improper trash separation during the activity.

- For a low estimation, we are assuming that all trash is properly separated and that only new trash is being collected. For this, we estimate that each family will produce **50 liters** of trash each week. This means that the two communities will produce about **4,000 liters of trash every week**.
- Based on the activity performed in zone 21, we estimated that the average weekly production of trash for each family is **79 liters**. From this, we believe Zones 21 and 27 will produce **6,320 liters of trash every week**.
- For a high estimate, we are assuming that trash is not properly separated by the community. We are also assuming that trash that has built up in the community over time is being collected along with new trash that is produced. For this, we estimate that

each family will produce **150 liters** of trash every week. This means that we estimate the two communities will produce about **12,000 liters of trash every week**.

Map of Proposed Truck Route

Below is a map of the Qom community, specifically zones 21, 27 and 37. On this map a proposed route for the trash collection trucks to take within the community is indicated. Also included are four designated trash collection locations that are easily accessible to a truck.

