



WPI

Food System Analysis of Cerrito

An Interactive Qualifying Project
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Abstract

The flow of food through a system can be hard to visualize. The team collaborated with Fundación Paraguaya to help make this food flow visible in Cerrito. The three flows of food the team focused on were: food imported into Cerrito, food exported out of Cerrito, and food grown and consumed in Cerrito. First, the team created surveys to obtain types and quantities of food sold at markets. The team created interviews for markets in Cerrito to understand where they bought their stock from. The team used observations to record prices of food in stock at markets. The foods chosen to focus on came from the Basic Family Basket of Paraguay, a list of the most commonly consumed foods in Paraguay. From the data collected, the team created a database that compared prices of food. The prices for each market were compared to Superseis in Los Laureles in Asunción, Vago Parador Autoservice in Cerrito, and the Basic Family Basket of Paraguay. It was found that the food prices in Cerrito were higher than other places like Asunción. The primary recommendation for Fundación Paraguaya is to find ways to lower food prices in Cerrito.

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Executive Summary

Background: Currently in Cerrito, many people are self-proclaimed in the yellow and red categories in the Poverty Stoplight indicators. This could be due to high prices, lack of supply or anything in between. However, the true reason for this is unknown.

Objective: To identify and analyze the food that enters, leaves and exists in Cerrito. This analysis was done through data collection of three food flows in Cerrito: food produced in Cerrito that is exported out, food imported to Cerrito, food produced and consumed in Cerrito. The team found information for all three flows. However, due to time limitations, the team only gathered sufficient information to make conclusions about two food flows: food produced and sent out and food imported to Cerrito.

Deliverables:

- Map that locates the places at which food can be purchased and the market sites the team visited for interviews
- A database that identifies and quantifies the food flows of Cerrito
- Interpretation and analysis of the data collected

Methods: The collection of data was completed with surveys, interviews and observation. Surveys collected the data that pertains to quantities of food in a store. Interviews obtained information about what foods were sold. Interviews showed from where the food was imported. Observation identified the prices of each item.

Results: The data showed that Cerrito has more expensive prices than those in metropolitan areas. It shows that Cerrito does more importation than exportation. The 5 most commonly bought foods are: yerba mate, rice, pasta, bread and meat. The most expensive products to buy are meat and vegetables.

Recommendations:

Based on the results, the team recommends the following:

1. Look for ways to get Asunción prices in Cerrito
 - a. Escuela Agrícola returning empty trucks
 - b. Creation of a food co-op
2. Further analysis on trucks that provided Qom communities with food
3. Further research on the peddlers who import food into Cerrito
4. A qualitative analysis of Cerrito's food system
5. Interview buyers at each marketplace not necessarily the owner
6. Investigation about bartering and Credit systems

Authorship

All group members, Corrin Courville, Matthew Robinson, and Alejandra Santos Olivarez participated in the acquirement of data and interviews conducted. All group members contributed equally to the completion of the project and the final report.

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Chapter 1: Introduction

A food system is an interconnected and complex process. Each step in a food system can be evaluated and analyzed. These steps include production, processing, distribution, consumption and waste management. Food systems analyze how food gets from its source to its consumer. The sources of food can be internal or external. The internal food sources can be gardens and farms, while external sources come from imports. In rural areas, such as Paraguay, food sources are primarily farms or imported from other areas. A food system plays an important role in health and the local economy. Food systems throughout countries share commonalities, but each local district has its own system. In rural areas, food sources are primarily farms or imported from other areas.

Paraguay is landlocked; therefore it has no access to seaports. “No reliable figures on international trade exist because a large part of that trade consists of the reexportation and transshipment of licit and illicit goods,” (Galeano 2017). However, Paraguay relies on adjacent countries for free trade ports and warehouses (Mashayekhi 2014). Paraguay uses the trade ports and warehouses “for the reception, storage, handling, and transshipment of merchandise transported to and from Paraguay,” (United States Department of State 2010). For the local food economy to thrive, the foods must pass Paraguay standards for trade. The National Animal Quality and Health Service (SENACSA) handles “standards affecting meat and by-products,” (Paraguay 2017). Meanwhile, the National Seed and Vegetable Quality and Sanitation Service (SENAVE) takes control of the standards affecting agricultural chemicals. Both bureaus of SENACSA and SENAVE are under the Ministry of Agriculture and Livestock. Specific standards relating to health and food matters can be classified under “the scope of the Ministry of

Public Health, through the INAN-National Institute of Food and Nutrition,” (Paraguay 2017). The Ministry of Public Health and the Municipality of Asunción both regulate food safety issues. They regulate processed food imports and exports for fast food Franchises. The food and beverage sectors in Paraguay account for “17 percent of investments in manufacturing in 2008,” (United States Department of State 2010).

Escuela Agrícola was founded by Fundación Paraguaya. Fundación Paraguaya is an organization that works to eliminate poverty around the world. They established a self-sustaining, agricultural school in Cerrito known as Escuela Agrícola. At this school, students are taught to farm and grow food on the campus. They learn how to produce Iberian cheese, yogurt, dulce de leche, meats, vegetables, etc. This puts the power for improvement in the hands of the people (Escuelas Auto-sostenibles).

In Cerrito, it is unclear how their food system works. To learn more about Cerrito, the team established a working knowledge of their food system. The team did this by examining food quantity. This data was obtained through interviews and surveys given to local food markets and supermarkets. Feedback received from interviews and surveys will be compiled into an initial report and database. We plan to collect the necessary data for the report once in Cerrito, Paraguay. The report will contain data on what types of foods are coming in and out of Cerrito, how much gets sold, and where the food is grown. The report will be used to gather data about the state of their food system and presented to Fundación Paraguaya.

Chapter 2: Background

Food is a basic human need. Food is a worldwide resource; without food we would not survive. Because food is a necessity, it is important to know where it comes from and how it is used. A reliable source and availability of food is what allows a society to develop. This section discusses the evaluation of a food system and its production, processing, distribution, and consumption and waste management.

2.1 Food Systems



Figure 1. The Cycle of a Food System. Adapted from “What are Food Systems?”

Figure 1 shows the main components of a food system. A food system is complex and interconnected. Food systems are a continuous cycle that begins with production and ends with disposal.

A food system is a network that integrates food into a community. This network involves five steps: production, processing, distribution, consumption, and waste management. Production transforms raw ingredients into prepared products (Cayon 2018). Processing is the step that transforms the prepared products into food. Distribution is when the processed food is delivered to the population. Consumption is the usage of a resource, in this case, food. Waste management includes the collection, transport, treatment, and disposal of waste. Food waste occurs at many stages throughout the system, not just the consumption stage (Santavanez 2017).

2.1.1 Production

Paraguay is a producer and exporter of many products such as soybeans, meat, manioc and more. People are dependent on products and “ready-to-eat food,” (Teodora 2017). Ready-to-eat-food options are typically high in sugar, carbohydrates, and usually artificially modified. Artificially modified foods extend to vegetables as they are altered with pesticides. Carbohydrates are a main component in the Paraguayan diet. Too much of any food group is not a balanced diet and impacts health. Paraguayans “rely on food sources that take a toll on their health,” (Teodora 2017). This is because healthier products tend to be expensive and are not part of the traditional cuisine.

2.1.2 Processing

Food processing is any method used to turn fresh foods into food products. This can involve one or a combination of the following: washing, chopping, pasteurizing, freezing, and packaging. Processing can be used “to extend shelf life, or to add vitamins to improve nutritional

quality of food,” (EUFIC 2019). Washing and chopping will be used for foods that are grown in gardens and farms. Pasteurization is used to prepare milk to prevent foodborne illnesses. Freezing is a method used for a lot of food, but primarily meat in Cerrito. This preserves the meat. Packaging is used for most foods that a market wants to sell. Use of a sealed package will ensure that the product has a longer shelf life. Foods that are not packaged will skip processing and go straight to distribution.

2.1.3 Distribution

Food distribution is the third step in the food system. Distribution supplies the general population with food through transportation. This transportation comes from vehicles, people, or livestock. The method of food distribution can vary relative to location. For example, the United States’ distribution system differs from Latin America’s. A network of warehouses, factories, and commercial retailers comprise the US food distribution. Several federal agencies such as the FDA and USDA oversee the US food distribution system. The Latin American food distribution system consists of four subsections: consumer purchasing organizations, consumer cooperatives, voluntary chains, and retailer purchasing associations (FAO 2019). Consumer purchasing organizations are groups of families who buy food together. The benefits of consumer purchasing organizations are reduced cost and variety in diet. Individual consumer purchases involve trade and donations. Consumer cooperative is analogous to a food union that works to secure rights of its consumers. Consumer cooperatives are not necessarily families, but groups of individuals who want reduced costs. Voluntary chains are organizations of privately-owned retailers who operate as one economic body (FAO 2019). These groups form contracts to work

under but are economically independent of one another. Retailer purchase organizations are groups of retailers who purchase products as a single buyer. Members are all involved in the purchase of goods, but do not make a contract (FAO 2019).

The Latin American distribution system is about pooling money so everyone receives benefits (FAO 2019). The benefits received in this case will be reduced cost of food for customers. The distribution system in an area like Cerrito will be different. The distribution is simple in that there will be local markets selling food to consumers. These local markets will either grow their own food, or have it imported. A market uses either of these methods based on what type of food is sold. If the food is more processed, it will be shipped in from somewhere else. If it is something that can be grown, it will be bought from town or neighboring locations. Examples of food obtained locally are fruits, vegetables, fish, or meat. Examples of food that is shipped in are snack foods and beverages. Additionally, meats like puchero, beef and pork tend to get shipped in. All canned goods found in markets, including canned vegetables and fruits get shipped in. Many flour based products, such as, pasta, rice, and bread get shipped in.

2.1.4 Consumption

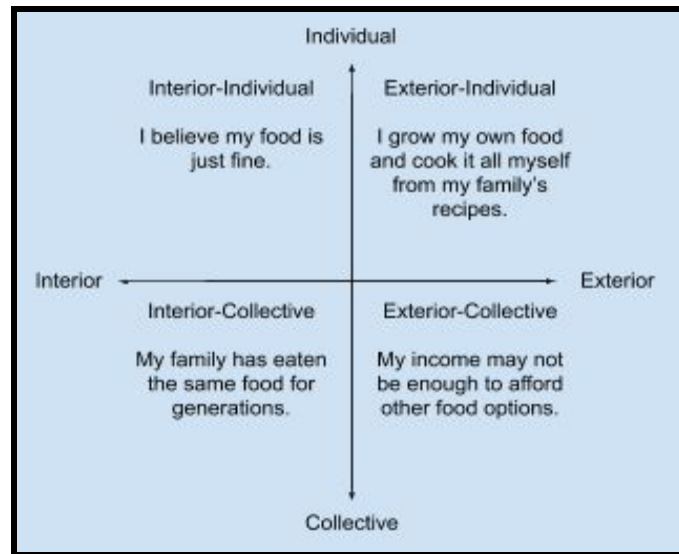


Figure 2. Ken Wilber Diagram

This diagram was constructed by taking into consideration the people from Cerrito. The Wilber diagram is used to help answer the question: “Why the people of Cerrito eat the food that they do and why keep it as is?” These responses are potential foreseen reasons people may be against change to their food system.

Food consumption is the fourth step in a food system. Consumption is defined as the use of a resource. In the case of a food system, the resource is food. Food comes in and goes out of a specific region in a food system. In rural areas, livestock, people, and pets are the consumers (Nesheim 2015). Consumption is necessary for all living organisms to survive. Most societies prepare two to three meals for consumption every day. However, in Paraguay, 5 meals a day is normal. The meals consist of breakfast, morning snack, lunch, afternoon snack, and dinner. There are also designated areas for meals such as restaurants, food vendors, and commercial

kitchens. A commercial kitchen encompasses school cafeterias and places that produce food for the masses. The issue of healthy eating is an important concern to some individuals and cultures. Some religions promote vegetarianism and consider it wrong to eat animals. Fasting is employed by other cultures, where an individual does not eat for a period.

2.1.5 Waste Management

Waste management is the final step to a food system. Waste management involves the collection, transport, treatment, and disposal of waste. Food waste collection methods vary in different countries. This waste comes in different forms, such as, a solid, liquid, or gas. The most common method of waste collection is curbside collection. Curbside collection is done in urban and suburban areas. Waste is collected at regular intervals by specialized trucks. In rural areas, instead of curbside collection, waste is taken to a transfer station. Waste transport is done by the specialized trucks that carry the waste to the landfill (EPA 2017). In tropical areas, waste is left to rot because a lot of it is compostable and decays quickly.

Waste treatment has three categories: agricultural, industrial, and sewage. Agricultural wastewater treatment refers to disposal of liquid animal waste and pesticide residues. Industrial wastewater treatment refers to the treatment of wet wastes from manufacturing industry. In a rural area like Cerrito, this will include slaughterhouses and household slaughter. Sewage treatment refers to treatment of human waste. Sewage is produced by all human communities and is left to compost naturally or dumped raw into waterways. (EPA 2017).

There are three different methods used for waste disposal. These depend on the type of waste. One method of waste disposal delivers scraps to livestock and pets. However, the most

common method of waste disposal is landfill. A landfill is a designated area for dumping waste. The waste will come from specialized trucks that take part in curbside collection. Incineration is another method of waste disposal. Incineration combusts solid organic waste into gaseous products. This method reduces the volume of solid waste by 80% to 95% (EPA). Incineration is seen as a practical method to dispose of hazardous waste like medical waste. Incineration is a controversial method of waste disposal because it emits gaseous pollutants. Recycling is another method of waste disposal. Recycling involves the collection and reuse of waste materials. The materials are then reprocessed into new products. Materials for recycling are often collected separately from general waste. The recycled materials are then sent off to a different place where they are repurposed. Re-use is the final method of waste disposal. Re-use is used for materials that are organic. The organic waste is recycled as mulch or compost for agricultural purposes. Re-use and recycling are methods that can reduce the amount of waste a community has.

A WPI group went to Cerrito in 2018 to help solve the waste management issue. They interviewed locals and conducted presentations to raise awareness for waste management. They ran a community clean up event that helped families better understand proper waste management. The clean-up event included a few families that were each given guideline. These guidelines involved how to properly separate trash (Castillo 2018). Their project will help provide background information on Cerrito's waste management.

2.2 Importance of Food System Analysis

2.2.1 Values of Food Systems

Food systems play a key role in a society. The systems are used to ensure food security and improved nutrition throughout a country. Food systems can also be used to achieve important social, economic or environmental goals. Countries benefit from the knowledge of food systems in order to assess where improvements are needed. Food systems are more efficient when one learns from and addresses the system's complex challenges. Complex challenges refer to food system nutrition, sustainable agriculture, and food loss and waste.

The value of food systems is often taken for granted in developed countries. Food systems need “well-functioning market dynamics and linkages in the food supply chain for food to move safely and cheaply from farm to fork,” (States News Service 2017). For developing countries, certain aspects of food systems are critically weak or non-existent. It is important to understand that improvements of food systems are aided by government support. The support is needed to efficiently increase the movement of foods throughout the country. Government support also creates a helpful environment in a food system. The government provides support through “adequate transport, communication and energy infrastructure, as well as legal, regulatory and institutional frameworks,” (States News Service 2017).

It is important to understand the effects that food systems have on an environment and land. Food systems reduce biodiversity. Food systems are evolving due to corporations' needs for increased efficiencies. This leads to the use of more genetically modified seeds. Food production causes a loss of biodiversity. The loss is due to monoculture farming and fewer plants and animal species that are bred and used. The diversity of life has decreased immensely, and a

major reason behind it is food. The value of food systems and sustainable practices help change local economies and empower communities (Stonebrook 2012).

Food systems have become the topic of discussion from academics to government officials. They are “discussing sustainable agriculture, the future of farms, how to feed our growing population, and food equity challenges” (Vermont Sustainable Jobs Fund 2018). An example that helps educate about food systems is the state of Vermont. Vermont has developed a comprehensive food system plan in order to fix their current food systems’ imbalance. Their plan is currently used to “strengthen the working landscape, improve the profitability of farms and food enterprises, maintain environmental resilience, and increase local food access for all the people living there,” (Vermont Sustainable Jobs Fund 2018). Vermont has a rich agricultural heritage and education about their food system has great value. Vermonters believe that food systems “will empower us to work together to grow our farm and food economy and increase access to local food for all” (Vermont Sustainable Jobs Fund 2018). Countries that share this heritage can benefit from a food system like theirs. This is why it is important to learn and understand how a food system functions. Food systems have the ability to empower communities and address challenges within them.

2.3. Analysis of a Food System

Education about food systems around the world in different countries is beneficial. Food Sustainability Index (FSI) showcases the strengths and weaknesses of other countries’ food systems. The FSI can be used by other countries to extract lessons and improve their food systems. Through the FSI, other countries can learn information such as, “Colombia scores in the

top ten for sustainable agriculture, reflecting strong performance on water management and environmental biodiversity” while “the United States scores poorly for food waste,” (States News Service 2017). These examples highlight what countries do right and wrong. Countries need tools to educate themselves on where improvements are needed. With this tool, the team compared Cerrito’s food system to others. The team identified similar food system’s to Cerrito’s. With that information, the team analyzed the strengths and weaknesses of Cerrito’s food system.

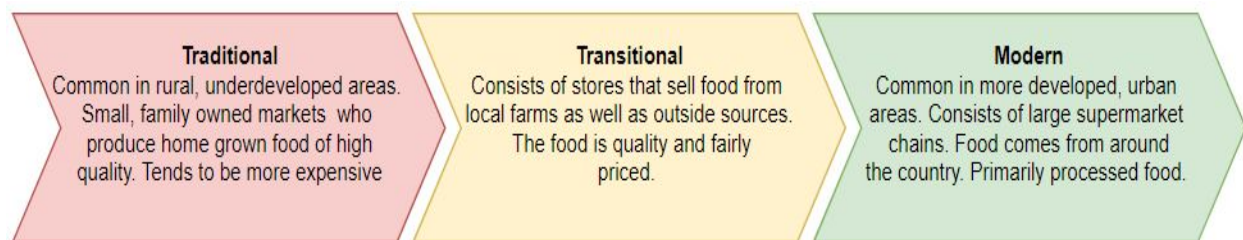


Figure 3. Stages of Food System Development.

The figure describes each stage of a food system development. The first is traditional, the second transitional, and the last modern. The figure represents the classifications for each stage of a food system. It also shows in which direction food systems tend to move as they develop. The trend is to start in traditional, then move to transitional, and finish in modern. This is common but sustainability suggests some kind of modern or traditional blend.

When a food system is classified, it is assigned to one of three categories. The first category is a traditional food system. A traditional food system is usually found in rural, underdeveloped areas. It consists of small markets run by families who usually grow the food themselves. The food is of high quality but tends to be expensive. The second category is a transitional food system. This is found in either developing areas or already developed areas.

Transitional systems consist of stores that sell food from their farms or an outside source. The prices associated with this category are the same as the quality, fair. A modern food system is represented in more developed, urban areas. The third category is known as a modern food system. It consists of large supermarket chains that receive food from around its country or locally grown foods. The food quality associated with a modern food system is processed. Therefore, the food quality is lower than that of the other two stages. The risk of disease from food in a modern system is lower than the others. The prices in modern systems are the lowest per unit of all the systems. Food systems are primarily classified as the traditional or modern systems (Popkin 2018).

When a food system is analyzed, there are criteria to follow. The cost of food per unit is first. Price matters to people of low incomes who are unable to grow their own food. The quality of food is important as it puts focus on processed foods. Product variety emphasizes the importance of a balanced diet. Employment is significant. This category of a food system allows financial benefit in the form of job opportunities. Finally, convenience is a relevant topic. Some may not want to walk a mile to get a few eggs. It is also important to keep into account the importance of each factor to the population. Efforts to optimize these factors and correctly categorize their food system will benefit a population. When a food system is analyzed, these factors must be kept in mind.

2.4. Paraguay's Food System

2.4.1. Useful to Know

A food system analysis of Cerrito is important to understand so that people's needs are met. Our analysis invoked the identification of strong and weak components in the food system. It identified whether the food there was too expensive. It identified the presence of an external or internal problem. External problems mean that there are issues within the food system. Internal problems mean there are personal or cultural reasons not to purchase nutritious foods. Therefore, a food system analysis is useful to assess the trade-offs. Trade-offs refer to different alternative decisions in a food system. Alternative decisions mean the purchase of less soda and junk food. Alternative decisions also mean the production of more local food. Alternatives like these could help improve a food system.

2.4.2 The Basic Family Basket

The Secretary of Defense of the Consumer and the User (SEDECO), a government department, weekly records the prices of 32 products, 29 of them pertain to food items. The 32 products SEDECO chooses to record come from the Basic Family Basket in Paraguay. The Basic Family Basket is defined as a set of different foods. The foods are expressed in quantities that satisfy the caloric needs of an average household. The prices of the products are taken from 6 different supermarkets in the greater Asunción's metropolitan area. The prices recorded are the most economic prices found. These prices are in guaranies and are used as references. With the reference prices, SEDECO seeks to promote market price transparency (SEDECO 2017).

SECRETARIA DE DEFENSA DEL CONSUMIDOR Y EL USUARIO
Comparativo de Variación de Precios Promedios

(Datos en Guaraníes Corrientes)					
N°	PRODUCTOS	Periodo		VARIACIÓN %	
		18/01/2019	25/01/2019	Semanal	
1	Pan Felipito (Kg.)	4,088	4,050	-0.92%	Panificados
2	Galleta (Kg.)	4,875	4,800	-1.54%	
3	Coquito (Kg.)	8,575	8,450	-1.46%	
4	Fideo (Kg.)	4,100	4,225	3.05%	A granel
5	Poroto Rojo (Kg.)	8,125	8,388	3.23%	
6	Arroz (Kg.)	2,463	2,463	0.00%	
7	Azúcar (Kg.)	4,600	4,675	1.63%	
8	Harina (Kg.)	2,700	2,717	0.62%	Cárnicos
9	Puchero de primera (Kg.)	11,150	12,367	10.91%	
10	Puchero de segunda (Kg.)	5,750	6,063	5.43%	
11	Carnaza de Primera (Kg.)	34,313	34,313	0.00%	
12	Carnaza de Segunda (Kg.)	22,370	22,933	2.52%	
13	Vacio (Kg.)	32,400	32,467	0.21%	Almacén
14	Pierna de cerdo (Kg.)	16,175	16,425	1.55%	
15	Pollo entero (Kg.)	9,800	10,500	7.14%	
16	Yerba Mate (Paq. 1 Kl.)	13,925	13,950	0.18%	
17	Aceite de soja - 900cc	7,750	7,867	1.51%	Queso y Lácteos
18	Huevos de gallina (1/2doc.)	4,013	4,050	0.93%	
19	Sal fina (500 gr.)	2,250	2,175	-3.33%	
20	Queso Paraguay (Kg.)	25,038	24,763	-1.10%	Domisanearios
21	Leche sachet - 1lt	4,100	3,963	-3.35%	
22	Lecha larga vida - 1 lt.	5,400	5,063	-6.25%	
23	Yogurt - 350 gr.	3,513	3,550	1.07%	
24	Detergente (1/2 lt.)	3,113	2,875	-7.63%	Frutas y verduras
25	Lavandina (1 lt)	3,238	2,988	-7.72%	
26	Jabón en polvo (400 gr.)	5,750	5,925	3.04%	
27	Naranja (Kg.)	3,975	3,313	-16.67%	
28	Banana karape (Kg.)	4,088	4,025	-1.53%	
29	Locote (Kg.)	4,875	5,463	12.05%	Frutas y verduras
30	Zanahoria (Kg.)	4,225	4,088	-3.25%	
31	Tomate Sta. Cruz (Kg.)	7,775	8,038	3.38%	
32	Mandioca (Kg.)	2,500	2,163	-13.50%	

Figure 4. Government Basic Family Basket Products and Prices.

The prices indicated in the figure are averages based on six urban supermarkets in greater Asunción. The SEDECO published this updated version on January 25, 2019. The list of products is categorized by the following seven items (top to bottom): bread products, items which can be bought in bulk, meats, warehouse products, dairy products, household cleaning products, and fruits and vegetables (SEDECO 2017).

2.4.2. Plan of Action

For the project, the team analyzed the production and distribution aspects of the food system in Cerrito. The attributes to analyze the food system are as follows: interviews and surveys and inventory lists acquired from locals. Interviews gathered information from the

people of Cerrito and its food vendors. Inventory lists and surveys gathered information about the food that is already in Cerrito. These attributes combine to form an analysis of the state of the food system in Cerrito. The analysis assessed the effects of the food system on the people of Cerrito. The team identified the quantities of food that comes in and out and the food exchanged in Cerrito. With that information, the team drew conclusions, comprised solutions, and gave recommendations.

Chapter 3: Methodology

3.1 Introduction

Information about incoming, outgoing and present food in Cerrito was gathered to create our analysis. This includes foods that were consumed. This information was essential to analyze, to evaluate, and to draw conclusions about the food system. With these conclusions, the team made inferences about the strengths and weaknesses of the food system.

3.2 Approaches

The team used two approaches to create a food system analysis of Cerrito. The first approach was to gain concrete information about the food imported and exported in and out of Cerrito. The second approach was to collect information about the production, distribution, and consumption of food in Cerrito. Production, distribution, and consumption are three main components the team used to analyze Cerrito's food system.

The team connected with the locals of Cerrito through conversations about their lives. These relationships were important in order to obtain information on their food system. Many Latin American Countries have different social rules and systems in place that differ from America. In Paraguay, a relationship with the locals is key. In Latin American culture, a connection with those whom you do business is important. For this reason, a connection with the local market owners was essential to the success of our project (Goldberg). The people of Cerrito comprised a portion of the data for our project. The types of foods consumed in Cerrito was important information to consider. Information obtained from local markets owners was for the content analysis of their food system. The Government Basic Family Basket was also used as a factor to determine most sold and consumed foods in Paraguay. Inventory, as well as personal accounts, were recorded. A list was acquired from Fundación Paraguaya's extensionists to identify all the different vendors in town. For example, near Escuela Agrícola, there is a local supermarket named Vago Parador Autoservice (Refer to Appendix B). Our group made connections with the Vago's market owner and other local vendors. The connections made were vital to determine where food comes and goes. The inventory gathered was used to evaluate Cerrito's food system needs and effectiveness. The inventory was also used to compare each vendor to one another. This was advantageous because it allowed the team to compare the similarities and differences among the vendors.

The acquisition of information from the sponsor determined what additional information needed to be gathered. The team held meetings with Fundación Paraguaya workers to incorporate their insight into our project. The meetings were held once a week and lasted between an hour to one and a half. The weekly meeting consisted of conversation with the

Fundación Paraguaya workers on the project's progress. Fernando Pfannl, senior advisor at Poverty Stoplight, was our contact for this project. The team met with Pfannl weekly to discuss our project and get feedback and insight from him.

3.3 Methods

The team's methods took into consideration validity, reliability, feasibility, and minimize possible bias. The first method was to conduct interviews with the local business owners and other major food sources found in Cerrito. Interviews helped the team collect data on what types of food was available, where the food came from, and whether they were locally grown or imported. Additionally, interviews of sponsors were conducted to obtain information about Escuela Agrícola. The second method was to give surveys to local market owners in Cerrito. With these surveys, the team learned from where food comes. Additionally, the surveys gathered information about the quantity of food that local markets bought. The third method utilized was observation to collect prices without interference. This helped determine prices of foods for sale at local markets.

Since Cerrito is a small town, it does not have many different food sources. The team created a map of Cerrito that labels food sources. Food sources included local markets and restaurants. Food sources even came from what locals bring from outside sources, such as nearby cities. For example, some locals bought and sold in Benjamin Aceval, Villa Hayes and Asunción. Cerrito is located within the province of Benjamin Aceval and is 15.8km from Villa Hayes.

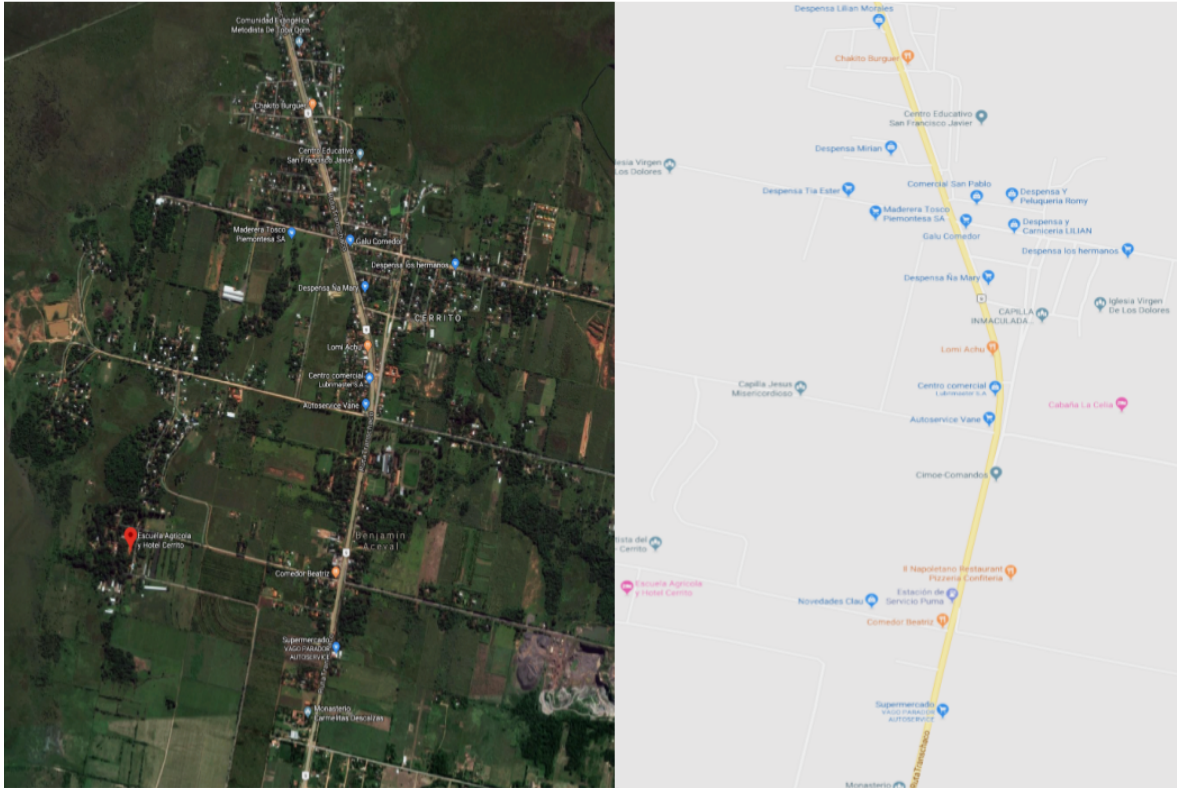


Figure 5. Map of Cerrito, Paraguay.

The figure above shows a satellite (on the left) and map (on the right) image of the town of Cerrito. The map shows the only main road in Cerrito, Ruta Transchaco. This main road is located in the center of Cerrito. Ruta Transchaco is where the major food stores, supermarkets, restaurants, and local markets are located. Some of these local food resources are featured in the map. This main road is primarily where the food comes in and out. Ruta Transchaco is the entry and exit point of Cerrito. Cerrito has no entry or access to any ports, and the west side of town is covered in forest. Food either comes into Cerrito through the main road or is grown inside. Refer to Appendix B to see a close-up version of the maps.

3.4 Techniques

The team has five techniques they used. First, sponsors were asked if there are any additional contacts that will aid us. Next, surveys and interviews were conducted to find out what food markets in Cerrito sell, what they produce, and how much they sell. For the third technique, unobtrusive measures determined food prices in local food markets. The team visited grocery stores and local markets to observe prices at which people buy food. A trend was established to determine popular food choices in Cerrito.

Spanish is one of Paraguay's preferred languages. The team communicated with the locals in Spanish as another technique. This knowledge of the culture of Paraguay gave us an advantage to gain content analysis. Conversation with the locals was insignificant if proper techniques were not used. The surveys as well as interviews were exercised in the Spanish language.

3.5 Data

The information gathered from the locals was converted into data. Quantitative data contained the amount and cost of food that comes in and out of Cerrito. This evaluated how much food enters and leaves Cerrito.

Quantitative data types were applied to analyze Cerrito's production and distribution within the food system. The surveys and interviews were used for this aspect. This form of data collection was provided quantities, prices, and from where food enters and exits Cerrito's food system. Quantitative data was used mostly to draw numerical conclusions about food. An

example involved quantities imported and exported. From data collected, the team determined the greater of the two quantities.

3.5.1 Data that Informs Food System Components

Table 1. Methods to Gather Information on Food System Steps

	SURVEY	INTERVIEW	OBSERVATION
Production	✓	✓	✓
Distribution	✓	✓	✓
Consumption		✓	✓

The table above shows the methods that correspond to the steps in a food system the team analyzed. These methods include surveys, interviews, and observations. These steps include production, distribution and consumption. The first step, production, was assessed by all methods. The second step, distribution, was assessed by all methods. The final step, consumption, was assessed through interviews and observations.

3.6 Evaluation

The success of the project depended on how much information was gathered. The information gathered through our methods was used to create a food map. The food map that the team created is part of the deliverable. This means the team plotted the locations and origins of food in Cerrito. How much the team plotted determined the percentage of success. The number of locations acquired gave information to determine the team’s success. The information

gathered through interviews and surveys helped to analyze the aspects of Cerrito’s food system. The analysis identified what types, how much, and the costs of the food that enters and exits Cerrito.

3.7 Ethics

The methodology ensured confidentiality and anonymity. The team gave subjects opportunities to decline their participation at any point throughout the process. Processes like interviews and photographs can raise unease within the locals. Before an interview commenced, the team informed the interviewee of the subject matter. Photo documentation did not feature community members or their homes without consent for privacy purposes.

3.8 Timeline

Week	Focal Event	Continuous Events
1	Start to get to know the locals	<ul style="list-style-type: none"> - Learn about the locals and the town - Strengthen relationship with locals - Visit areas that sell - Find out where, how, and how much food is coming in an out of Cerrito
	Familiarize ourselves with the town and local areas to buy food	
2	Continue planning	
	Start having casual interviews with local markets	
3	Visit grocery stores	
	Pay attention to common food choices	
4	Survey local markets and gardens.	
	Create a map of food sources	
5	Interview market owners and sponsors	

	Conduct formal interviews with the local people	- Integrate food into casual conversation
6	Start analyzing the data gathered	
7	Work on project report write-up	- Work on final report and documentation of data
	Final presentation	- Compile, organise and interpret data gathered

Chapter 4: Results

The purpose of our project is to investigate three major food flows in Cerrito, Paraguay. The first flow is food produced in Cerrito that is exported out. The second food flow is food imported to Cerrito. The last flow is food produced and consumed in Cerrito. The team found information for all three flows. However, due to time limitations the team only gathered sufficient information to make conclusions about two food flows. The first, food produced and sent out and the second, food imported to Cerrito.

We use the Governmental Basic Family Basket of Paraguay that indicates the most consumed foods and their prices. The Basic Family Basket is the baseline the team used to compare prices. The team compared the prices of the foods that the government chose with the prices of local commercials in Cerrito. Prices were also compared among the food sources in Cerrito.

4.1 Accomplishments

The team gathered food relevant information from eight different stores, six store owners, Escuela Agrícola, SuperSeis, and the military base in Cerrito. After the time spent in Cerrito, the team felt successful in the achievement of goals set previously. They mapped locations of food vendors in all six districts in Cerrito. They gathered relevant and influential data for the two food flows in Cerrito: a list of foods imported into Cerrito from individual business was created; a list of foods that leave from Cerrito was also created.

To accomplish this, the team consulted with Professor Robert Traver, Professor Dorothy Wolf, Fernando Pfannl and Celsa Acosta who referred and guided them. From there, they reached out to Fundación Paraguay's extensionist. The extensionists the team worked with were Gabriela Psicologa, Alicia Franco, Alice Serna, Mary Aguilar, Ada Sachelaridi, Walter Sanchez, and Sedy Morilla who oversaw districts 1-6, respectively. They helped to connect and plan interviews with the key businesses in each district. Interviews were primarily coordinated by the team's counterparts, Walter Sanchez and Alice Serna. They connected the team with the most popular food vendors in each of the districts. This was primarily how the interviewed businesses were chosen by the team.

The team reached out to Amalio Enciso, Luis Caceres, and Lucia Amarilla to gather information regarding Escuela Agrícola. Enciso is an engineer and Deputy Director at Escuela Agrícola. Enciso helped the team make connections with the military base through Sergeant Luis Ruiz. Caceres is a marketing professor at Escuela Agrícola, who is in charge of taking the students off campus to sell food products. Luis Caceres had the team follow Escuela Agrícola students to sell food house to house. Lucia Amarilla tracks the food and beverages that flow in

and out of the storage at Escuela Agrícola. Lucia Amarilla gave the team prices of food at the school.

The original plan was modified once in Cerrito. The team fell into a cycle instead of a linear pattern. The cycle was as follows: gather information, analyze it, compare it to already existing data, repeat. There were four main pieces of information the team looked for when at a market. These four pieces of information were the types of food sold at the market, the price of the food sold, the quantity of food the market bought from providers, and from where the food comes. Interviews were conducted to find out where the markets bought their stock. Surveys conducted found out the quantity and types of food the market had in stock. Observation was used to gather prices of the foods in each market.

4.2 Analysis of Food Flows



Figure 6. New Model for Food System Analysis.

The figure shows the team’s new schematic on the collection of data. The first arrow represents the exportation food flow. The second is the importation food flow. The third arrow is the flow of food produced and consumed in Cerrito. These flows became the way the team collected and analyzed Cerrito’s food system. The team changed the model of a food system analysis to these three food flows. The three food flows were created in order to better analyze and collect concrete data on food imported and exported in Cerrito.

4.3 Findings

	Alimentos	Unidades	Costo Promedio	Superseis	Vago's	Na Rosa Market	La Familia	San Pablo	Autoservicio Vane	Escuela Agrícola	Promedio de Cerrito
Panificado	Pan Felipito	kg	4,050Gs.	4,950Gs.	7,000Gs.	5,000Gs.		5,000Gs.	6,000Gs.		5,750Gs.
	Galleta	kg	4,800Gs.	5,750Gs.	5,000Gs.	5,000Gs.		3,200Gs.	5,000Gs.		4,550Gs.
	Coquito	kg	8,450Gs.	13,500Gs.	11,000Gs.	5,000Gs.		12,000Gs.	5,000Gs.		8,250Gs.
A Granel	Fideo	kg	4,225Gs.	4,050Gs.	5,200Gs.	5,000Gs.	5,000Gs.	6,000Gs.		1,000Gs.	4,440Gs.
	Poroto Rojo	kg	8,888Gs.		12,500Gs.			10,000Gs.			11,250Gs.
	Arroz	kg	2,463Gs.	2,550Gs.	4,500Gs.	5,000Gs.	4,000Gs.	6,000Gs.	5,000Gs.		4,900Gs.
	Azúcar	kg	4,675Gs.	5,450Gs.	5,000Gs.	5,000Gs.	5,500Gs.	5,000Gs.	5,000Gs.		5,100Gs.
Carnicios	Harina	kg	2,717Gs.	3,250Gs.	6,500Gs.	5,000Gs.	4,000Gs.	5,000Gs.	4,000Gs.		4,900Gs.
	Puchero de Primera	kg	12,367Gs.		9,000Gs.	10,000Gs.	12,000Gs.	12,000Gs.			10,750Gs.
	Puchero de Segunda	kg	6,063Gs.		9,000Gs.		6,000Gs.	9,000Gs.	10,000Gs.		8,500Gs.
	Carnaza de Primera	kg	34,313Gs.	27,950Gs.	35,000Gs.	10,000Gs.	30,000Gs.	30,000Gs.	32,000Gs.		27,400Gs.
	Carnaza de Segunda	kg	22,933Gs.	24,350Gs.	29,500Gs.		25,000Gs.	20,000Gs.	28,000Gs.		25,625Gs.
	Vacio	kg	32,467Gs.	26,450Gs.	29,500Gs.						29,500Gs.
	Pierna de Cerdo	kg	16,425Gs.	14,950Gs.	23,000Gs.			18,000Gs.			20,500Gs.
Almacen	Pollo Entero	kg	10,500Gs.	9,400Gs.	10,500Gs.	10,000Gs.	10,500Gs.	12,000Gs.	10,500Gs.	11,000Gs.	10,750Gs.
	Yerba Mate	Paq. 1 k	13,950Gs.	13,150Gs.	15,000Gs.			14,000Gs.	16,000Gs.		15,000Gs.
	Aceite de Soja	900 mL	7,867Gs.	6,650Gs.	8,000Gs.	12,000Gs.	15,000Gs.	9,000Gs.	11,000Gs.		11,000Gs.
	Huevos de gallina	1/2 doc	4,050Gs.	5,200Gs.	5,000Gs.	5,000Gs.		6,000Gs.	6,000Gs.	3,500Gs.	5,100Gs.
Quesos y Lacteos	Sal fina	500 gr	2,175Gs.	2,250Gs.	4,000Gs.	2,000Gs.		9,000Gs.	3,000Gs.		4,500Gs.
	Queso Paraguay	kg	24,763Gs.	34,700Gs.	32,000Gs.		30,000Gs.	27,000Gs.	30,000Gs.		29,750Gs.
	Leche Sachet	1 lt	3,963Gs.	3,750Gs.	4,500Gs.			2,000Gs.	4,500Gs.		3,667Gs.
	Lecha Larga Vida	1 lt	5,063Gs.	4,400Gs.	6,000Gs.	6,000Gs.	6,000Gs.	5,000Gs.	6,000Gs.	3,500Gs.	5,417Gs.
	Yogurt	350 gr	3,550Gs.	3,550Gs.	2,500Gs.	3,500Gs.	3,500Gs.	3,000Gs.	3,000Gs.		3,100Gs.
Frutas y Verduras	Naranja	kg	3,313Gs.	2,200Gs.	7,000Gs.	12,000Gs.	10,000Gs.	12,000Gs.	18,000Gs.		11,800Gs.
	Banana Karape	kg	4,025Gs.	4,650Gs.	4,000Gs.	8,000Gs.	5,000Gs.	7,000Gs.	7,000Gs.	6,000Gs.	6,167Gs.
	Locote	kg	5,463Gs.	13,050Gs.	12,000Gs.	5,000Gs.	10,000Gs.	10,000Gs.			9,250Gs.
	Zanahoria	kg	4,088Gs.	4,950Gs.	5,000Gs.						5,000Gs.
	Tomate Sta. Cruz	kg	8,038Gs.	7,950Gs.	12,000Gs.		10,000Gs.	8,000Gs.	10,500Gs.		10,125Gs.
Mandioca	kg	2,163Gs.	2,650Gs.	3,500Gs.		2,000Gs.		3,000Gs.		2,833Gs.	
Costo por una canasta		267,307Gs.	251,700Gs.	322,700Gs.	118,500Gs.	193,500Gs.	265,200Gs.	228,500Gs.	25,000Gs.	304,873Gs.	

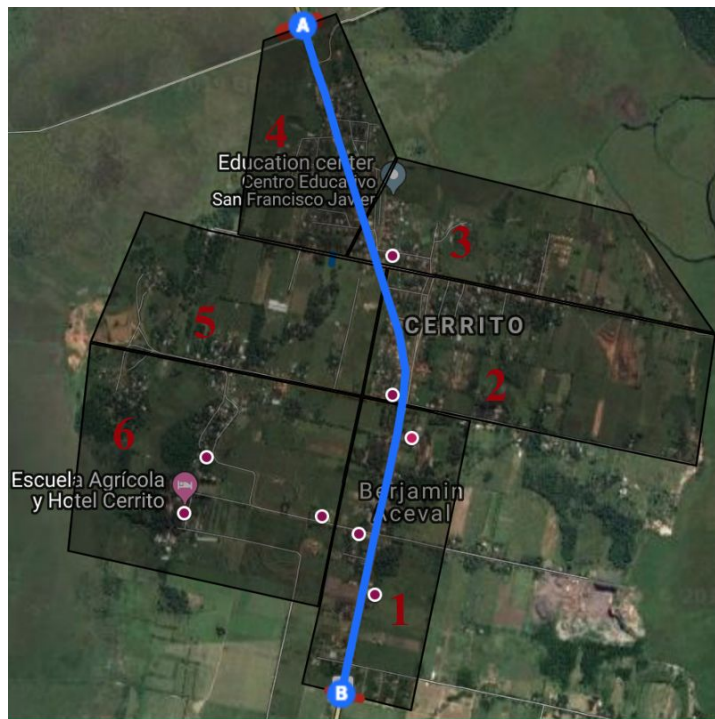
Table 2. Prices of Eight Markets in Paraguay.

With the methods used, the team found that Cerrito’s food system is in the transitional stage. This is such because it integrated imported food with locally grown food into their system.

Because of this, food prices in Cerrito are higher than those in the modern stage. The table documents food elements in the Basic Family Basket and their prices, per unit, at each market. From the data that was collected, conclusions can be drawn. The data shows that per basket, the most economical is the Superseis Basket. The data showed that the most expensive is the one from Cerrito. There is a difference of 37,566Gs. between the Basic Family Basket and Cerrito's. This is a 13.13% difference in price. There is a difference of 53,173Gs., a 19.11% difference, between Superseis and Cerrito's. This is a these statistics revealed a weak point in Cerrito's food system. As shown, all items in the Basic Family Basket are available in Cerrito but at a higher cost. This makes availability in Cerrito a strong component and cost a weak one.

Given the assumption that food purchased is food consumed, the team made conclusions about food consumed in Cerrito. Assumptions were drawn from the inventory lists of each business and interviews.

4.3 Map of Businesses



Nucleos	Tipo de Lugar	Nombre de Negocio
Nucleo 1 [Gabriela]	Despensa	Jose Luis Cattebecke
	Despensa	Celia Guerrero
	Mini Super y Comedor	Vagos
	Comedor y Almacen	Comercial Beatriz
	Despensa	La Familia
Nucleo 2 [Alicia]	Despensa	Venta de Verduras
	Despensa	Los hermanos
	Despensa	La Familia Ocampos
Nucleo 3 [Alice]	Despensa	La Sra Candida Nunez
	Despensa	Mercedita
	Comercial	San Pablo
	Despensa	Comedor Tropical
	Despensa	Maylen
Nucleo 4 [Mary]	Despensa	Don Eduardo Gonzalez
	Despensa	Tia Esther
	Despensa	Mirian
	Despensa	Lilian
	Despensa	Noelia
Nucleo 5 [Ada]	Despensa	Tia Ali
Nucleo 6 [Walter]	Despensa	Cristalina Caballero
	Despensa	Zunilda Bogado
	Despensa	Alfonso Benitez
	Despensa	Eugenia Recalde
	Despensa	Mateo Torres
	Despensa	Isidora Corrientes
	Despensa	Zunilda Galeano
Otras [Celsa]	Despensa	Dora Maria Garcia Morel
	Despensa	Noelia
	Base Militar	N/A
	Escuela	Escuela Agrícola San Francisco

Figure 7. Map Indicating Markets Visited Accompanied by a List of Local Markets.

The figure is divided by the six different districts (Nucleos) in Cerrito. After counterparts were consulted and field work was completed, the team came up with a list. Field work entailed the exploration of Cerrito to document names of local markets observed. For each district, the team has a corresponding list of local markets. The list the team created is some, but not all, local markets found in Cerrito. It is a start-up list, that maps the sources of food vendors. The eight points on the map represent local markets from where the team acquired data.

Chapter 5: Discussion

The purpose of the project was to make the invisible, visible. Before this project, the flow of food of Cerrito was hearsay and virtually unknown. The project created a concrete, definitive, objective document of the food that comes in and out of Cerrito. This is because the team compared prices between Cerrito and other locations. Through these comparisons, Poverty Stoplight will be able to tell where food prices need to be lowered. The team's project has laid the foundation and paved the road to the betterment of the food system in Cerrito.

Many of the members of the community in Cerrito have declared themselves in the red and yellow categories for nutrition in accordance with the indicators from Poverty Stoplight. The project documented the quantitative reasons as to why members of the community have self-proclaimed to be in yellow and red indicators. The reason for this comes from different factors of food like prices, demand and availability. The team investigated the problem with the use of information collection. The use of the team's research is an implication for Poverty Stoplight initiative. The project has beneficial information for Poverty Stoplight in order to help the foundation eliminate poverty in Cerrito.

5.1 Food Flows

The project's objectives were to identify and analyze the three food flows of Cerrito. The first flow is food produced in Cerrito that is exported out. Escuela Agrícola exports food that they grow. The students sell the food products to homes in Cerrito, Benjamin Aceval, Villa Hayes, etc. The second food flow is food imported to Cerrito. Through data collection and interviews,

the team learned that Cerrito has more importation than exportation. Most of the imported foods come from Asunción and the prices are lower. From most of our interviews, the team discovered a trend. The trend was that many local's imported foods are from Mercado de Abasto in Asunción.

Table 3. Comparison of the Average Cost per Basic Family Basket.

Cost per Basket		
Government	Cerrito	Asunción
267,307Gs.	304,873Gs.	251,700Gs.

If one were to buy a unit of each food in the basket, for an average household, the most expensive would be Cerrito's Basic Family Basket. The data shows that 75% of the food prices in Cerrito are higher than those of the Basic Family Basket. This shows that lower prices are possible to achieve in Cerrito.

Table 4. Comparison of the Six Food Categories.

Categorías/ Promedios	de Cerrito	de Superseis	del Gobierno
Panificados	6,183Gs.	8,067Gs.	5,767Gs.
A Granel	5,4186Gs.	3,825Gs.	4,494Gs.
Carnacios	17,365Gs.	20,620Gs.	19,295Gs.
Almacen	8,441Gs.	6,813Gs.	7,011Gs.
Quesos y Lácteos	9,889Gs.	11,600Gs.	9,335Gs.
Frutas y Verduras	8,130Gs.	5,908Gs.	4,515Gs.

The table documents the average of each Basic Family Basket category for each location. The locations are Cerrito, Superseis, and the government. Table 4 is a summary of *Table 2. Prices of eight Markets in Paraguay*. The above table is an average of each category that was compared. The categories are taken from the Basic Family Basket. The averages for Cerrito were calculated with respect to the markets the team visited. In order to delineate the prices, the team created a key using different colors. Red indicates the most expensive, green the most economic, and yellow the median price. This comparison showed how Cerrito is red more times compared to the other two averages. Meanwhile, the Basic Family Basket showed the most green for the categories.

The third flow is food grown and consumed in Cerrito. The most sold foods in the Basic Family Basket of Cerrito are rice, pasta, yerba mate, meat, and bread. Most of these items pertain to the ‘a granel’ or ‘panificados’ category where Cerrito is indicated as red or yellow, refer to *Table 4. Comparison of the six Food Categories*. *Table 4. Comparison of the six Food Categories*. shows that on average, fruits and vegetables are more expensive than foods bought in bulk. It also shows that meats are the most expensive category for purchase. Therefore, foods with the most nutritional value tended to be the most expensive. This is a potential explanation as to why Cerrito indicated itself as red for nutrition.

Many of the gardens in the Qom communities are used for auto-consumption. Auto-consumption is the concept of producing and consuming foods grown in a designated area. The team discovered that garden in the communities grow foods such as tomatoes, green peppers, madioc, and lettuce. The Qom grow the food only for auto-consumption and not for sale.

The team interviewed the military base in Cerrito and found a majority of the food they consumed was imported from Asunción. The military base grows food in gardens for consumption at the base. They primarily grow vegetables such as lettuce, cabbage, green peppers, cauliflower, etc. In the military base, 50% of their food comes from another military base in Asunción, 25% is produced in the farm, and 25% is bought from Mercado de Abasto in Asunción. The military base was one of the few places that we interviewed that gave the team exact quantities of food purchased monthly which was a great asset to the data.

In each nucleo, there are key players. A pattern the group noticed was that the key players have more variety of stock. Key players also had better documentation than smaller businesses. This meant they had more accurate accounts of the food items the store imported.

5.2 What Did and Did Not Work

For this project, some things yielded success, and some did not. First, interviews were very useful. Interviews helped in the discovery of the most popular products. Additionally, interviews helped find the sources of each market's stock. Second, surveys were a great asset in the completion of this project. Surveys helped to quantify the foods found at each market. Third, success was found in the comparison of data with the use of Google Sheets. The way the team organized the data collected helped establish concrete conclusions. There were also a few things that did not work well for the team. First, when market owners were interviewed, the majority did not know exact quantities of food. Quantities of food was a crucial piece of information the team needed. When the market owner did not know the exact quantities, it set back the project's progress. Second, communication with the Fundacion Paraguaya counterparts was subpar. Over

the course of the project, there were a few situations where this lapse was felt. Lack of communication occurred with the use of WhatsApp to contact extensionists. The weekly meetings with the advisors were also a hindrance for the team at times. This is because the team was given too many new tasks to accomplish in a week.

Food prices in Cerrito are higher than those of Asunción and the governmental Basic Family Basket. Therefore, acquirement of transportation to bring food into Cerrito at Asunción prices is a potential implementation. One potential solution is the creation of a food co-op. A food co-op is a community-run food outlet where families can purchase food for lower prices. Every week, Escuela Agrícola sends trucks to Asunción to sell the food that they grow. Since the trucks return empty, they can be filled with food from Asunción. This is a potential way to reduce prices in the local markets in Cerrito. Further research will need to be done before this potential implementation.

Through observation and conversation with the locals, the team discovered trucks that go into the Qom communities. The truck is filled with food and are their main distribution methods. Not much is known about these trucks. The whereabouts of where they come from or where the food comes from is unclear. This lack of information is a gap in the team's data that shows the data does not cover everything coming in and out. Therefore, the team was unable to make conclusions about these trucks, so further investigation needs to be determined.

The team learned about peddlers, people who import food into Cerrito that charge at their own rates. The concept of these peddlers was introduced to the group midway into the project. This was an additional source for the flow of imports. The peddlers import food to the indigenous community, the locals of Cerrito, and the markets. The peddlers who come into the

community run their own operation. The team was unsuccessful in interviewing the peddlers due to lack of connections and opposition to interviews. No connections were made, but what is known is that these peddlers do import food into Cerrito.

Due to time limitations the team could not complete a qualitative analysis. An analysis that compares the diets in Cerrito with the foods available to them. A qualitative analysis can better determine if the people eat a nutritious, balanced diet and if not, why. This will evaluate the effects of the food system on the health of the people of Cerrito.

The team was also unsuccessful in obtaining the quantity of food in each of the markets. When going into the local markets the group interviewed store owners. Store owners rarely had exact quantities for how much food they ordered or had in stock. Interviewing the buyers in each market would have resulted in better data collection for quantities. The buyer is the person who orders the food for a market. Since the group interviewed store owners, only estimates for food quantities were given. Food quantities were only obtained from some local locations due to not interviewing the buyers.

Through interviews the team learned about the barter and credit systems some local market owners implemented. The barter and credit systems the team investigated were between the customers and the market owners. From the team's documentation, these interactions were informal and were confirmed through conversations. The team knows these systems are in place but were unsuccessful in the acquirement of data.

5.3 Recommendations

7. Look for ways to get Asunción prices in Cerrito
 - a. Escuela Agrícola returning empty trucks
 - b. Creation of a food co-op
8. Further analysis on trucks that provided Qom communities with food
9. Further research on the peddlers who import food into Cerrito
10. A qualitative analysis of Cerrito's food system
11. Interview buyers at each marketplace not necessarily the owner
12. Investigation about bartering and Credit systems

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Appendix

Appendix A: Interview Questionnaire

Below is the interview questionnaire that was used for the local market owners and producers. The first paragraph is an introduction as to who the team is and why they are here. The first set of questions is geared towards market owners. The first questionnaire asks questions that pertain to what foods the market sells and purchases in addition to where they buy food from. The second set of questions is geared towards food producers. The second questionnaire asks questions that pertain to growth and preparation of food.

Introducción para las entrevistas y encuestas:

Hola, soy [nombre] y esta entrevista nos ayudará aprender sobre los alimentos en Cerrito. Nos interesan investigar información sobre los diferentes tipos de alimentos que se puede encontrar en Cerrito, cuanto está en los mercados, y cuánto se vende. Mi grupo está aquí con nuestro colegio de los EEUU. Este proyecto implica obtener información cuantitativa relacionada con los alimentos que entran y salen de Cerrito. Además de la cantidad de alimentos

que entran y salen de Cerrito, vamos a documentar los precios y la trazabilidad de los alimentos. Somos estudiantes estudiando ingeniería y estamos haciendo un proyecto para analizar los alimentos en Cerrito. Hacemos este proyecto para recolectar información para informar y dibujar el flujo de alimentos en Cerrito enfocándonos en los negocios locales, maceteros y personas locales.

Ojalá que nosotros podemos ser ayudable y necesitamos su ayuda para recoger la información para el proyecto. Su respuesta será esencial para el éxito de nuestro proyecto. Nos ayudar con la obtención de información para mejorar los alimentos en Cerrito y por extensión las dietas de la comunidad.

Todas de las respuestas documentadas serán usando para crear un documento inicial. Este documento va a contener la trazabilidad de donde viene y adónde va los alimentos. Todas de las respuestas serán anónimas, solo serían utilizado por nosotros. Todo dicho quedará anónimo y puede negar participación en cualquier punto de la entrevista.

Cuestionario de Entrevista: Dueños del mercado de alimentos en Cerrito

Pregunta de Enfoque: ¿Cuáles tipos de alimentos están en el mercado? ¿Que cantidad de cada alimento hay en el mercado?

1. ¿Qué tipos de alimentos venden más (puede ser más de una)?
 - a. Frutas, vegetales, meriendas, comida preparadas, etc.
 - b. ¿Los productos que venden, hay una variedad de alimentos?
 - c. ¿Hay muchas opciones saludables y frescas?
 - d. ¿Hay variedad de marcas?
2. ¿Qué tipos de alimentos tienen más que lo demás?
 - a. ¿Estos alimentos se venden más que los otros?

3. ¿Qué es el plato más popular? O ¿Cuáles son los alimentos más populares?
4. ¿De dónde vienen los alimentos y productos que se venden en el mercado?
 - a. ¿Fincas locales?
 - i. ¿Si sí, cuáles tipos de alimentos compran y cuáles compran de más?
 - b. ¿Otros lugares en Paraguay?
 - i. ¿Si sí, adonde?
 - c. ¿Otros países?
 - i. ¿Si sí, de cuáles?
 - d. ¿Una mezcla de estas opciones?
 - i. ¿Si sí, de cuáles?
5. ¿Aproximadamente cuántos alimentos venden cada día?
 - a. ¿Si no hay unidades de alimentos, hay en guaraní?
6. ¿Tienen referencias o personas específicas con las que tiene relaciones? ¿Como restaurantes u otros proveedores de alimentos?
 - a. ¿Si sí, de cuales (quien son)?
7. ¿Tiene un fabricante/proveedores primario para los productos vendidos? O ¿Como paga por los alimentos que compra?
 - a. ¿Con efectivo? O ¿Comerciendo los alimentos? O ¿Plan de pago?
 - i. ¿Si hace un plan de pago, hace un pago inicial y después pagas mensual o semanal?
 - b. ¿Compra sus alimentos a granel?
 - i. ¿Es más, o menos caro o barato comprando en esta manera?
 - c. ¿Cuánto tiempo espera para comprar otra vez o para programar su servicio de entrega?
8. ¿Qué determinan los precios de los alimentos?
 - a. ¿Demanda? ¿Cualidad de los alimentos? ¿Otras cosas?
9. ¿Cuántos alimentos recibe? ¿Que tipos reciben?
 - a. ¿Sabe la cantidad de cada alimento que recibe? (mensual, lo que faltan)
 - b. Sabe cuánto paga?

Cuestionario de Entrevista: Las personas de Cerrito en producción

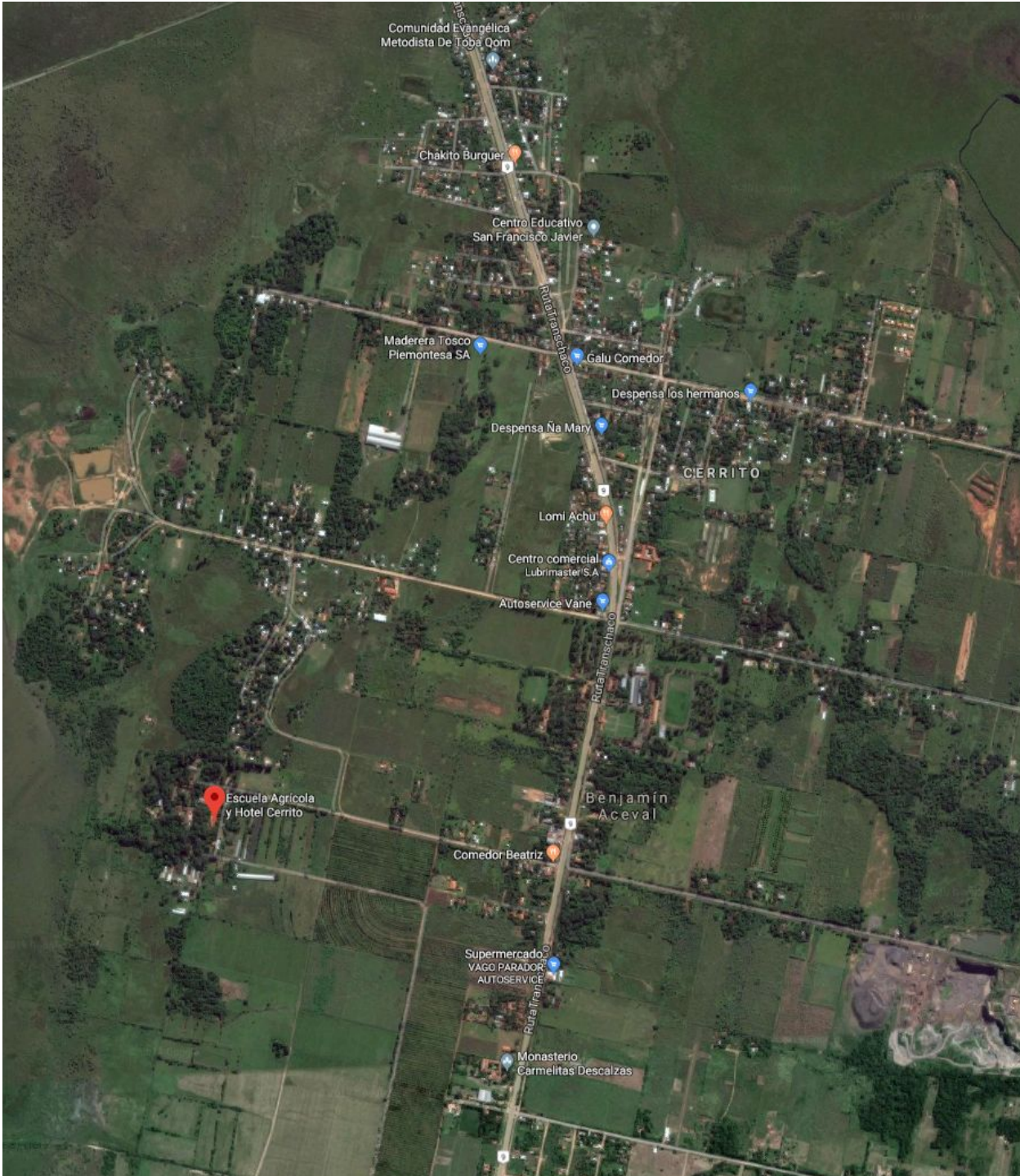
Pregunta de Enfoque: ¿Cuál es el estado actual del sistema alimentario en Cerrito?

1. ¿Cuales son los principales alimentos que come?
 - a. Cual es su comida favorita para comer?
 - b. ¿Frutas, vegetales, carne, jugo, grano, almidón, leche, soda?
2. Cuales son sus maneras principales de preparar la comida?
 - a. Crudo, frito, hervido, frito en sartén, a la plancha, en parrilla (barbacoa), al horno, asado, al vapor, etc.
3. ¿Qué hace con los alimentos y comida que no come?
4. ¿Donde compra sus alimentos?
 - a. ¿Qué tipos de alimentos compra?
 - b. ¿Sí no, crece su alimentos?
 - i. ¿Qué alimentos crece?
 - c. ¿Cómo planifican la producción? Cuantos guaraní van a generar si venden alimentos? (mensual, semanal)
5. ¿Qué tipos de alimentos tienen más que lo demás?
6. ¿Qué es el plato más popular? O ¿Cuáles son los alimentos más populares que consume?
7. ¿De dónde vienen los alimentos y productos que comen?
 - a. ¿Fincas locales?
 - i. ¿Si sí, cuáles tipos de alimentos compran y cuáles compran de más?
 - b. ¿Otros lugares en Paraguay?
 - i. ¿Si sí, adonde?
 - c. ¿Otros países?
 - i. ¿Si sí, de cuales?
 - d. Crean su propio alimentos?
 - i. ¿Si sí, de cuales?
 - e. Una mezcla de estas opciones?

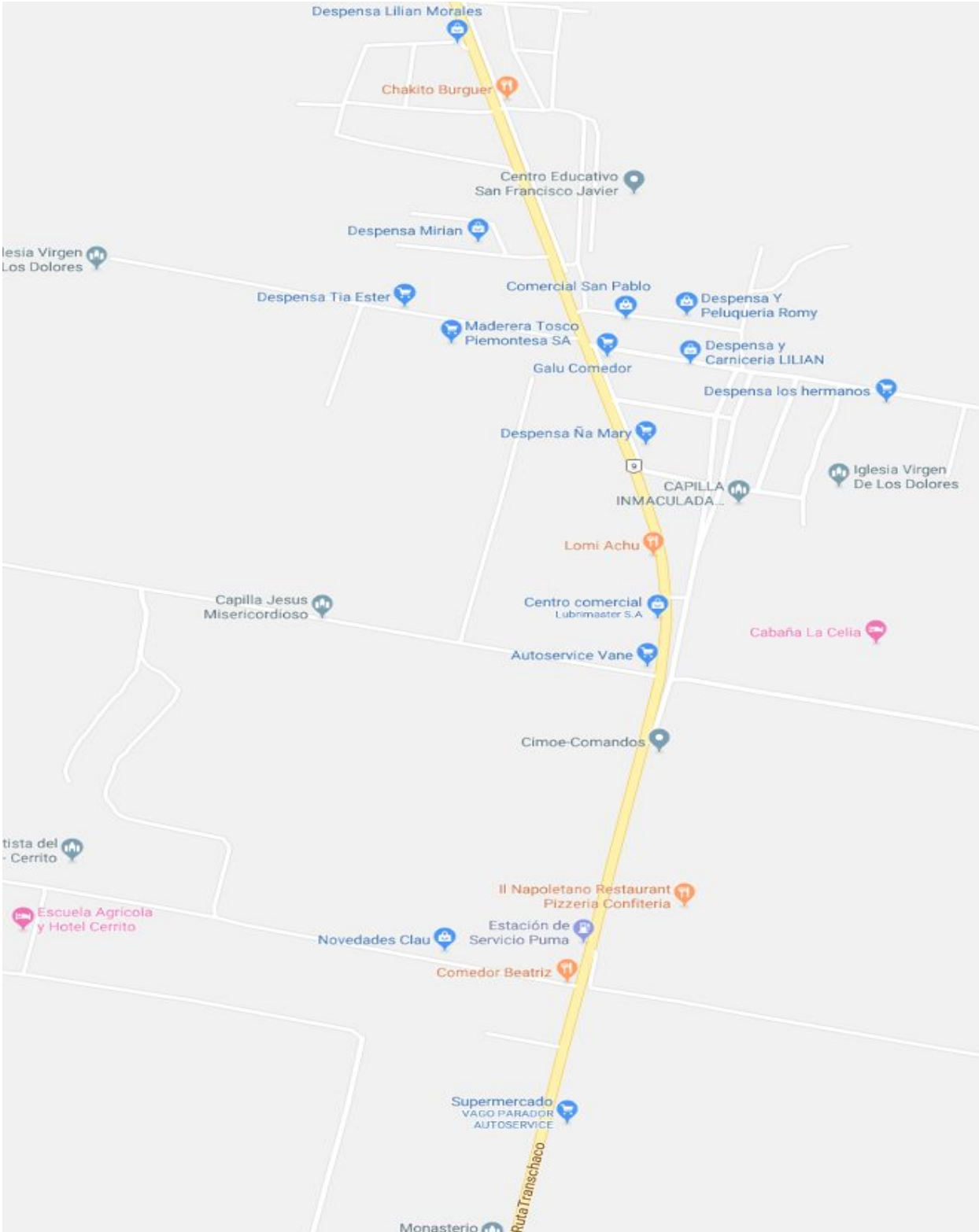
- i. ¿Si sí, de cuales?
- i. ¿Por día, semanal, mensual?

Appendix B: Food Map of Cerrito

Satellite image of local food venues in Cerrito, Paraguay.



Map image of local food venues in Cerrito, Paraguay



Appendix C: Survey

Below is the survey that was used at each local market the team visited. At the top is a short introduction the team used to explain why the survey was given. The survey acted as a checklist so the team could take inventory of the market. First, the survey asked who normally buys from the market and what types of food the market sells the most. The foods on the survey were all foods in the Paraguayan Government Basic Family Basket. In addition to acting as a checklist, the survey also asked for quantities and prices of food that the market bought from providers.

Alimentos en Cerrito

Hola, somos un grupo de los EEUU y esta entrevista nos ayudará aprender sobre los alimentos en Cerrito. Mi grupo y yo quisiéramos investigar información sobre los alimentos en Cerrito. Nos interesan los diferentes tipos de alimentos que se puede encontrar en Cerrito, cuanto está en los mercados, y cuánto se vende. Mi grupo está aquí con nuestro colegio de los EEUU. Somos estudiantes estudiando ingeniería y estamos haciendo un proyecto para analizar los alimentos en Cerrito. Ojalá que nosotros podemos ser ayudable y necesitamos su ayuda para recoger la información para el proyecto. Su respuesta será esencial para el éxito de nuestro proyecto. Todas de las respuestas documentadas serán usado para crear un documento inicial. Este documento va a contener la trazabilidad de donde viene y adónde va los alimentos. Todas de las respuestas serán anónimas, solo serían utilizado por nosotros, todos de los documentos serán destruidos después de la entrevista. Todo dicho quedará anónimo y puede negar participación en cualquier punto de la entrevista.

Nombre

Empresa (si es aplicable)

¿Qué tipos de alimentos vende (puede ser más de una)?

Azúcares y Mieles

Acietes y Grasas

Leche y sus derivados

Carnes, Legumbres, Huevos

Frutas

Verduras

Cereales, Tuberculos y derivados

Other:

¿Qué tipos de alimentos tienen más que lo demás?

- Azúcares y Mieles
- Acietes y Grasas
- Leche y derivados
- Carnes, Legumbres, Huevos
- Frutas
- Verduras
- Cereales, Tuberculos y Derivados

Other:

¿Quiéne tiende compra sus alimentos?

- Los indígenas
- Los locales

Los camioneros

Los extranjeros

Other:

¿De donde compran/vienen los alimentos?

Los jardines

Villa Hayes

Asunción

Cerrito

Su finca

Other:

¿Cuánto pan felipito tiene en el mercado y cuanto cuesta?

¿Cuánta galleta tiene en el mercado y cuanto cuesta?

¿Cuánta coquita tiene en el mercado y cuanto cuesta?

¿Cuánto fideo en el mercado y cuanto cuesta?

¿Cuánta poroto tiene en el mercado y cuanto cuesta?

¿Cuánto arroz tiene en el mercado y cuanto cuesta?

¿Cuánto azúcar tiene en el mercado y cuánto cuesta?

¿Cuánta harina tiene en el mercado y cuánto cuesta?

¿Cuánto puchero de primera tiene en el mercado y cuánto cuesta?

¿Cuánto puchero de segunda tiene en el mercado y cuánto cuesta?

¿Cuánto carnaza de primera tiene en el mercado y cuánto cuesta?

¿Cuánto carnaza de segunda tiene en el mercado y cuánto cuesta?

¿Cuánto vacio tiene en el mercado y cuánto cuesta?

¿Cuánta pierna de cerdo tiene en el mercado y cuánto cuesta?

¿Cuánta pollo entero tiene en el mercado y cuánto cuesta?

¿Cuánta yerba mate tiene en el mercado y cuánto cuesta?

¿Cuánto queso paraguay tiene en el mercado y cuánto cuesta?

¿Cuánta aceite de soja tiene en el mercado y cuánto cuesta?

¿Cuántos huevos de gallina tiene en el mercado y cuánto cuesta?

¿Cuánta leche sachet tiene en el mercado y cuánto cuesta?

¿Cuánta leche larga vida tiene en el mercado y cuánto cuesta?

¿Cuánto yogur tiene en el mercado y cuánto cuesta?

¿Cuánta sal tiene en el mercado y cuánto cuesta?

¿Cuánta naranja tiene en el mercado y cuánto cuesta?

¿Cuánto banana karape tiene en el mercado y cuánto cuesta?

¿Cuánto locote tiene en el mercado y cuánto cuesta?

¿Cuánta zanahoria tiene en el mercado y cuánto cuesta?

¿Cuánto tomate tiene en el mercado y cuánto cuesta?

¿Cuánta mandioca tiene en el mercado y cuánto cuesta?
