

LA PINTANA, CHILE

Prioritizing the Recovery of Vegetable Waste

By Cecilia Allen



Education activity showing outcomes of vegetable waste recovery. (photo: DIGA)

The Chilean community of La Pintana has found that recycling their largest segment of waste—fruits, vegetables, and yard clippings—can save them money, produce valuable compost, and reduce greenhouse gas emissions. The program cost very little to initiate and has grown steadily for seven years, through an ongoing education campaign about source separation for residents who reap benefits in the form of new trees and public parks. Though participation rates are still modest, La Pintana's vegetable waste¹ recovery program is already making a substantial contribution to the community's financial and environmental sustainability.



LA PINTANA

Metropolitan Region of Santiago

Population estimate for 2011: 210,000

Area: 30.31 km²

Population density: 6,928/km²

Average annual rainfall: 367 mm

Altitude: 635 meters above sea level

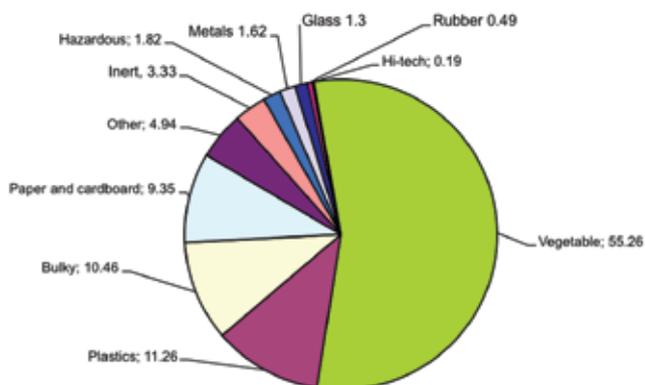
Average temperature range: 6°C to 21°C

Waste generation: >0.77 kg/capita/day

Public spending on vegetable waste management: US \$3/capita/year*

* This figure is only an estimate, based on program expenses per person covered.
Exchange rate: US \$1 = CL \$497.

Figure 1: Municipal Solid Waste Characterization in La Pintana (by percentage)



Note: The figure counts all municipal solid waste produced, including the materials recovered by the informal recyclers.

All over the world, municipalities have to manage increasing amounts of waste with scarce resources. Often, a large portion of the municipal budget for solid waste management is spent on waste collection and disposal, leaving little money for specialized programs. The situation in La Pintana—one of the communes² that constitute the heavily-populated Metropolitan Region of Chile—is no exception. Despite belonging to the national capital region, this is one of the poorest communities in the country, and 80 percent of the environmental agency’s budget is allocated to the collection and disposal of solid waste. Nonetheless, while other governments might see this as an obstacle to the incorporation of waste prevention and resource recovery strategies, La Pintana focused on making better use of the available resources and started a promising program that is already yielding significant results.

The head of *Dirección de Gestión Ambiental* (Environmental Management Agency) of La Pintana explained the municipality’s decision to take a new approach to waste management with the adage, “Insanity is doing the same thing over and over, expecting to achieve different results.” Recognizing, as well, the importance of continuing that which is working well, the La Pintana commune identified all the actors involved in waste management (e.g., businesses, formal and informal recyclers, citizens, government

bodies) and their different levels of responsibility in waste generation. The municipality understands that discarded materials are resources, and as a result, waste is viewed as an opportunity, not as a problem to get rid of. The municipality also understands that the solutions need to be local. The further waste travels from the point of generation, the bigger a problem it becomes and the more likely its management will be unsustainable. **Thus, the priority is to manage resources as close as possible to where they are generated.**

Guided by this vision, an analysis of the local situation was carried out. First, a waste audit was conducted, which showed that the solid waste generated in La Pintana is 0.77 kg/person/day. Second, a characterization of waste by source was carried out (see Figure 1). Finally, a program based on waste streams (instead of source) was developed, guided by the principle that it does not matter if a given waste stream is produced by households or businesses; the treatment depends merely on its characteristics.

Separation and Collection

With this data in hand and the system designed, in December of 2005 the municipality launched its new program. Unlike many materials recovery strategies adopted in Latin America, this one did not focus on recycling dry materials, but on recovering vegetable waste. This decision was fundamental, since **vegetable waste is the largest waste stream, the one that makes recovery of recyclables more**



Worm beds in La Pintana. (photo: DIGA)



Leaflet to promote source separation. (poster: DIGA)

difficult, and the one that creates greenhouse gas emissions and leachates in landfills. The program was built upon existing infrastructure and local financial resources. It has been steadily growing since its launch, and while it still has only modest participation rates, there is an ongoing effort to increase participation whenever the budget allows for more public education campaigns.

The government provides 35-liter bins to residents for vegetable waste. People are asked only to separate out fruits and vegetables for collection and composting, not meat or dairy products, although some end up being mixed in anyway. The consumption of meat in this poor commune is very low, however, so there is little animal product waste. Whatever meat and dairy waste is produced goes to the landfill. The government is looking into treating these materials through *hermetia illucens* (black soldier fly) in the future.

The municipality conducts a communication campaign with residents in door-to-door visits. The outreach workers—mostly college graduates in environmental fields—are hired specially for these campaigns. During the visits and in the ongoing workshops held by the

government, source separation is emphasized.

The municipality provides people both direct and indirect incentives to separate their waste. Citizens receive free compost, and their neighborhoods are improved with the construction of public parks, planting of new trees, maintenance of sports clubs, etc., that improve their quality of life and their relationship with the environment.

The system for collecting separated waste was organized by simply rescheduling existing routes. Consequently, neither the costs nor the number of trucks increased. Waste is still picked up six days a week: three days for vegetable waste and three for the rest. One third of the city is serviced by the municipality, and the rest by a private company; both collect two waste streams: vegetable and other. The separated collection system is done only in those households and businesses that have been reached by the communication program.

So far, almost 80 percent of the households have been visited, although it is estimated that overall only 28 percent of the households are separating their vegetable waste. According to the municipality, the low participation rate is the consequence of some bad experiences with the collection service (e.g., trucks that did not meet the schedule) and a lack of space to keep two bins in multi-story buildings. Expanding the collection program and treating more vegetable materials is an ongoing effort. Whenever it has the funds available, the municipality undertakes new communication campaigns to increase participation rates. On average, the amount of municipal solid waste collected daily and transported to the organics treatment plant and the landfill is 214 tons. This figure includes both vegetable and other waste coming from households, businesses, street markets, and maintenance of public areas, but does not count recyclables being channeled through other mechanisms (see below).

Payment for the collection system varies according to source. For households, the service is paid by taxes. Businesses pay a fee based on the amount of waste produced. Street markets must hire a collection service on their own, and the waste must be separated as well.

The Informal Sector

The government is focused on recovering vegetable waste, and does not run programs to recycle dry materials. Nonetheless, a portion (there is no exact estimate) of these materials is recovered through two channels. One is through “green points” built by the municipality, where non-profits place containers for people to drop off glass, plastics, and Tetra Pak containers. The non-profits manage the green points and keep the income from the sale of the materials. The other channel is through informal recyclers. The leaflets that the government hands out to citizens to encourage source separation also ask them to separate paper and metals and give them to informal recyclers. The informal recyclers collect these materials directly from households and then sell them for recycling.

Although the municipality does confer a degree of recognition upon the informal recyclers, it has also blocked their efforts to organize, and they still work in precarious conditions. The government’s perspective is that the municipality is willing to encourage people to hand recyclables to the recyclers but that it is ultimately a private business, so the informal recyclers

need to develop and maintain their business on their own. The National Recyclers Movement of Chile (MNRCH) has put effort into getting them organized, but without success. According to MNRCH, the government was not supportive of these efforts, fearing that people from other communes would join the new organizations. Early in 2011, there appeared to be some interest from the commune in working towards the organization of informal recyclers after they participated in an expo organized by informal recyclers in Brazil, but this interest seems to have waned after the person in charge left her position. The full inclusion of the informal sector in the formal waste management system—with payment for their service and the rights and protections of any formal worker—remains a challenge.

Recovery and Treatment

Once collected, the source separated vegetable waste is transported to a 7,500 m² treatment plant located within the commune. The site includes a 5,000 m² compost site that handles 18 tons of vegetable waste per day. It also includes a vermiculture area of 2,000 m², with 136 worm beds 15 meters long, that treats between 18 and 20 tons of vegetable waste per day. Total input in this plant, including vegetable waste from households and street markets as well as yard trimmings, is 36 - 38 tons per day. The waste arrives very well separated, with only 0.04 percent of impurities (mostly plastic bags that some people still use in the containers). Four people work at the site, each



Compost plant in La Pintana. (photo: DIGA)



Furniture made out of scrap wood in La Pintana. (photo: DIGA)

earning a monthly salary of about US \$600, which is above minimum wage and comparable to other similar jobs. The 2011 annual budget for maintenance and operations was US \$31,000.

Initial investments in the program were low; the original treatment plant consisted of a small compost pile and some worms. As the program has grown over time, more piles have been added to the plant and the worms have been reproducing naturally, so most of the costs have been operational costs.

The municipality also has a mulching plant, a nursery, and an “urban silviculture” program that includes a wood shop. In the shop, furniture, signs, flower pots, and crafts are made out of scrap wood, and citizens can learn woodworking skills. The exact amount of materials recovered through the silviculture program is unknown, but an estimated eight tons of garden waste are recovered daily by pruning and mulching.

Total recovery of source-separated vegetable waste is at least 44 tons per day, including residential waste, yard trimmings from maintenance of green areas, and vegetable waste from street markets. That is 20.5 percent of all the waste collected in La Pintana. From residential waste alone, the government calculates that 23 percent of the vegetable waste produced is being recovered. The remaining 77 percent of vegetable waste that is not being source-separated by residents is currently landfilled, along with other waste streams. In 2010, the commune sent 61,257 tons of municipal solid waste to the landfill, about 170 tons per day (157 tons of residential and commercial waste, 11 tons of street market waste, and 2 tons of waste from the maintenance of green areas).

In addition, about 1,000 liters of used kitchen oil are recovered daily, which are turned into biodiesel fuel for municipal collection trucks and grinders that

make woodchips to use as mulch.³ Construction and demolition waste is managed privately by the producers. Thus, the municipal investment is confined to recovering vegetable waste and disposing of residuals.

Cost Savings Through Local Solutions

The entire municipality has a budget of approximately US \$25 million annually. The breakdown of the environmental agency budget is shown below.

Table 1. Budget of Environmental Programs and Waste Management

Programs	US \$
Compost and vermiculture plant operation costs	31,036
Environmental education	69,000
Other*	611,513
Sub-total environmental programs	711,549
MSW collection**	1,632,683
MSW disposal	1,284,139
Sub-total collection and disposal	2,916,822
Total environmental agency	3,628,371

* Includes various environmental programs, such as nursery and urban silviculture, clean commune program, protective equipment, animal care, and others.

** Includes service of sweeping and cleaning in street markets.

Note: Environmental programs figures reflect the 2011 budget. The collection and disposal costs are estimated based on the expenses during the first three months of 2011.

Source: Dirección de Gestión Ambiental, La Pintana.

The new system is actually less expensive than the previous one in which all the waste was landfilled, mainly due to a reduction in transport and disposal costs. For every trip that is made to the compost plant instead of the transfer station, 22 km of travel are avoided. Also, the use of biodiesel instead of fossil fuel saves the municipality US \$100 per day. In terms of treatment costs, materials recovery in the vermiculture and compost municipal plant is far less expensive than sending waste to a private landfill. As a result of the compost and vermiculture

plant operations, daily savings in disposal costs are estimated to be US \$754.

Table 2. Cost Comparison of Waste Treatments

	US \$ per ton
Vermiculture	1
Composting	3
Landfill	19

Source: Dirección de Gestión Ambiental, La Pintana, 2011.

As mentioned above, the capital costs for the new program were low and covered by local financial resources. Most of the expenses incurred since the program started have been operation costs. The program has been expanding since it started, and current plans aim to increase the compost and vermiculture program and add new techniques such as the cultivation of larvae of *hermetia illucens* (black soldier fly). This insect is being considered as a method to process vegetable waste (it has been found to be a very fast decomposer of organic waste, particularly interesting for the treatment of meat and guano) as well as a source of fuel, given that the larvae are very rich in fat.

Despite being a very poor community, La Pintana shows that a good analysis of the local situation, the setting of clear goals, and an efficient use of resources allow municipalities to do more than just waste materials in landfills. By focusing on the largest and most problematic waste stream—organic materials—the community has made a large impact with a small budget. While the program still has ample room to grow, it has clearly established ways to reduce environmental and economic damage while recovering useful materials, which are then used to improve the local environment and promote residents' participation.

Sources:

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Endnotes:

- 1 The local government makes the distinction between vegetable waste (including food waste and yard waste) and organic waste (that would include any carbon-containing material, including paper and even plastics). To respect the approach of the local government, the term “vegetable waste” is used here instead of organic materials.
- 2 In Chile, a commune is the smallest administrative division of a territory, equivalent to a municipality in other countries.
- 3 Mulch is a cover of organic matter like woodchips, grass clippings, or straw that is placed on the soil. Among other things, mulch improves soil fertility, helps control weeds, maintains moisture, and reduces erosion.



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This case study was originally published as part of *On the Road to Zero Waste: Successes and Lessons from around the World* (GAIA, 2012). *On the Road* profiles nine diverse communities, each providing a real-world example of authentic progress toward the goal of zero waste. None has yet achieved this goal, and a few still employ practices that are incompatible with zero waste, such as incineration. Nonetheless, each community has achieved considerable success with one or more elements of zero waste and has something to teach us. For more case studies, visit: www.no-burn.org/ZWcasestudies.