

Prioritizing the Recovery of Vegetable Waste: La Pintana



Education activity showing outcomes of vegetable waste recovery. Photo: DIGA La Pintana

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 in waste collection and disposal, leaving little money for specialized programs. The situation in La Pintana—one of the communes¹ 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% of the environmental agency's budget is allocated to the collection and disposal of solid waste. Nonetheless, while other governments may see this as an obstacle to the incorporation of waste prevention and resource recovery strategies, La Pintana decided to focus 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, and adopted a strategy focused on waste prevention. Significantly, prioritizing the **prevention** of waste implicitly lowers the value placed on recycling. It also means understanding that discarded materials are resources, not waste. Therefore, 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 priorities are to prevent waste and then manage resources as close as possible to the source of generation.**



La Pintana

Metropolitan Region of Santiago de Chile, Chile
Population estimate for 2011: 210,000
Area: 30.31 km²
Population density: 8,500 people/km²
Average annual rainfall: 367 mm
Altitude: 635 meters above sea level
Average temperature range: 6°C to 21°C
MSW generation: >0.77 kg per capita per day
Public spending per capita on vegetable waste management: US\$ 4 per year*

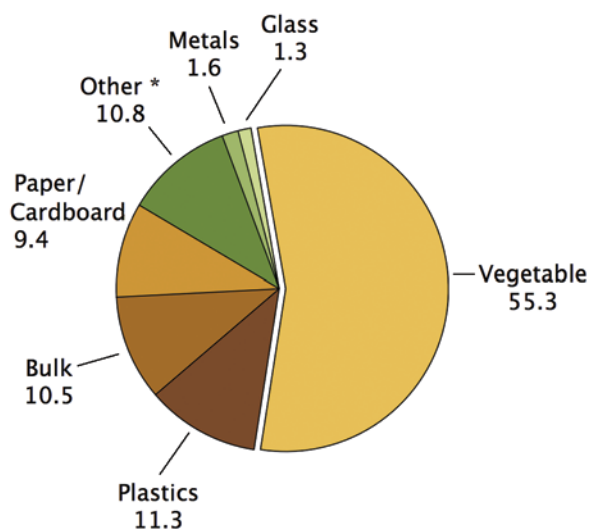


Figure 1. Municipal Solid Waste Characterization in La Pintana. (% by weight) The figure counts all municipal solid waste produced, including the materials recovered by the informal recyclers.

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 generation in La Pintana is 0.77 kg/person/day (see chart). Second, a characterization of waste by source was carried out. Finally, a program based on waste streams (instead of source) was outlined, guided by the principle that it does not make a difference if a given waste stream is produced by households or businesses; the treatment depends merely on its characteristics.

Separation, Collection, and Recovery of Vegetable Waste

With this data and the system designed, the municipality launched the new program in December of 2005. Unlike many materials recovery strategies adopted in Latin America, this one did not focus on recycling dry materials but on recovering vegetable waste.² This decision was fundamental since vegetable waste is the largest waste stream, the one that makes recovery of recyclables more 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 low participation rates, there is an ongoing effort to raise participation rates, whenever the budget allows for more education campaigns.

The government provides 35-liter bins to residents for vegetable waste. Residents are requested to separate only waste from fruits and vegetables, 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



Communication campaign with residents through door-to-door visits. Photo: DIGA La Pintana

meat waste produced. Whatever waste from meat and dairy products 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, waste prevention is emphasized.

The municipality provides both direct and indirect incentives to people 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 trips 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% of the households have been visited, although it is estimated that overall only 28% of the households are separating their vegetable waste. According to the municipality, the low participation rate is the consequence both some bad experiences with the collection service (e.g. trucks that did not meet the schedule), and 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 government is focused on recovering vegetable waste, and does not run programs to recycle dry materials. Nonetheless, part (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 individually from households and then sell them for recycling. The government's perspective is that the municipality is willing to encourage people to hand recyclables to the recyclers but that is ultimately a private business so the informal recyclers need to develop and maintain their business on their own.



Flyer. Credit: DIGA La Pintana.

The informal recyclers working in La Pintana are not organized, and still work in precarious conditions. National Recyclers Movement of Chile (MNRCH) put efforts towards getting them organized, but without success. According to MNRCH, the government was not supportive of these efforts, fearing that the situation might get out of control and people from other communes would join the new organizations. Early in 2011, there appeared to be some interest from the commune in working towards inclusion of informal recyclers after their participation in an expo organized by informal recyclers in Brazil, but this work seems to have been discontinued after the person in charge left her position. The incorporation of the informal sector remains a challenge.

In addition, 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. Construction and demolition waste is also managed privately by the producers. Thus, the municipal investment is confined to recovering vegetable waste and disposing of residuals.

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 tons per day. **The waste arrives very well separated,**



Worms used to treat vegetable waste. Photo: La Pintana

with only 0.04% of impurities (mostly plastic bags that some people still use in the containers). Four people work at the site, each 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 is US\$ 33,400.

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 8 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% of all the waste collected.** From residential waste alone, the government calculates that 23% of the vegetable waste produced is being recovered. The remaining 77% 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).

Cost Savings through Local Solutions

The entire municipality has a budget of approximately US\$ 27 million, or about US\$ 127 per capita annually. The breakdown of the environmental agency budget is shown below.

Table 1. Budget¹ of Environmental Programs and Waste Management in La Pintana (2011). Source: Dirección de Gestión Ambiental, La Pintana.

Programs	US\$
Compost and vermiculture plant operation costs	33,391
Environmental education	74,098
Other ²	656,702
Sub-total environmental programs	764,191
MSW collection ³	1,755,422
MSW disposal	1,380,675
Sub-total collection and disposal	3,136,097
Total environmental agency	3,900,288

Notes:

1. 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.
2. Includes various environmental programs, such as nursery and urban silviculture, clean commune program, protective equipment, animal care, and others.
3. Includes service of sweeping and cleaning in street markets.

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\$ 750.**

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 amount of compost and vermiculture 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 a source of fuel, given that the larvae is very rich in fat.

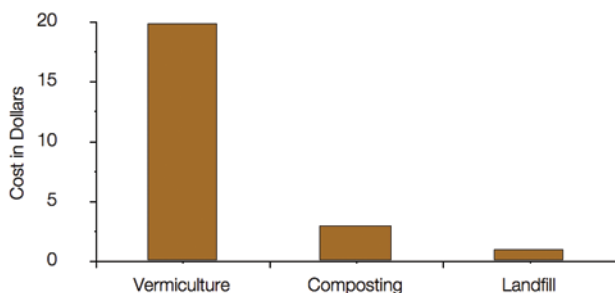


Figure 2. Treatment cost per ton. Source: Dirección de Gestión Ambiental, La Pintana, 2011.

La Pintana shows a creative and efficient use of scarce resources, invested in community engagement towards the recovery of a critical component of municipal solid waste, namely organic materials. These efforts are not only reducing waste to landfill and improving the quality of life of the community, but also saving money. In addition to the ongoing expansion of organics collection, which the municipality already has planned, an important future improvement would be the inclusion of informal recyclers into the system. This should improve both their working conditions and recycling rates. Further advances will rely on designing waste out of products and packaging and transitioning away from waste disposal.

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This case study highlights some of the many elements that constitute a Zero Waste program. Although GAIA may not endorse all the waste management strategies taking place in this locality, we believe that the elements highlighted here provide a real-life example of the practices that, together with other elements, can make Zero Waste successful.

Additional Zero Waste case studies are coming soon:

Prioritizing the Recovery of Vegetable Waste—La Pintana, Chile
Banning the Landfilling of Organics—Busan, South Korea
Seventy-five Percent Diversion—San Francisco, California, USA
Zero Waste: From a Dream to Reality—Alaminos City, Philippines
Waste Separation and Collection—Minamata, Japan
Municipal Solid Waste Prevention and Management Strategies—Taiwan
Composting Organic Waste: Taking Nutrients Back to Soil—
Dhaka, Bangladesh

Check GAIA's website to read cases as they are added to the series:

www.no-burn.org/ZWcasestudies.

To read other case studies and learn more about Zero Waste visit www.no-burn.org/zerowaste.

Sources:

La Pintana: un modelo de desarrollo sustentable. Gestión y ordenamiento ambiental local (GOAL). Presentación de Manuel Valencia Guzmán, Director de Gestión Ambiental, 2010.
Gestión Integral de Residuos: Mitos y realidades. Gestión y Ordenamiento Ambiental Local (GOAL). Presentación de Manuel Valencia Guzmán, Director de Gestión Ambiental Buenos Aires 08 de junio 2011
Interview with Manuel Valencia Guzmán, June 2011.
Díaz Mariela, García, Natalia: Innovación en la gestión local de los residuos sólidos domiciliarios en experiencias de la Argentina y Chile.
Dirección de Gestión Ambiental, La Pintana <http://www.digap.cl/>
Movimiento Nacional de Recicladores de Chile (National Recyclers Movement of Chile)
Maps: Wikipedia commons

Map notes:

* Calculated by dividing the amount of money spent on collection and treatment of the vegetable waste recovered every year plus the communication and education budget by the number of people that have been covered by the awareness campaign so far. This figure is only an estimate.

Endnotes:

- 1 In Chile, a commune is the smallest administrative division of a territory, equivalent to a municipality in other countries.
- 2 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.
- 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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