Climate Change and Informal Recycling: An NGO and Private Sector Partnership in Bogotá

This chapter illuminates the crucial and often unrecognized role that developing world informal recyclers play in reducing the risks associated with climate change. "Project Pennsylvania," a pilot program launched by four multinational corporations and a nongovernmental organization in Bogotá, Colombia, serves as an illustrative example that highlights how innovative recycling partnerships can contribute to efficient solid waste management systems in low-income countries as well as provide environmental, economic, and social risk reduction and value creation. By leveraging the expertise of informal recyclers, "pro-poor" (UN Habitat, 2010:198) civil- and private-sector collaborations reduce ecological risks by cutting greenhouse gas emissions in overstressed landfills; they diminish the social risks associated with globalization, such as stark income disparities between socio-economic groups and the further disenfranchisement of marginalized populations; and they lessen business risk by supplying firms with economies of scale through steady supplies of recycled material, thus contributing to their industrial value chain. Integrative models, such as Project Pennsylvania, suggest that when governments allow informal recyclers to become partners in private enterprises' solid waste management initiatives, firms and governments in the developing world can achieve sustainable *competitive* advantage and sustainable *development* advantage, respectively.

Introduction

The World Economic Forum recently cited ecological degradation, income inequality, and the marginalization of poor populations as the principal environmental, economic, and social challenges facing the majority of low-income countries in the 21st century's globalized landscape. Although these three parts of the sustainability trinity are intrinsically linked across the developing world, the consequences of failing to deal adequately with the first -- climate change -- are purportedly direst for Latin America. The region produces approximately 6% of the world's global greenhouse emissions (Tuck, 2009),[1] yet if worldwide emissions are not brought under control, it is forecast that Latin America will suffer a disproportionate number of negative impacts. According to a December 2009 report from the Economic Commission for Latin America and the Caribbean, if the planet were to continue at its current rate of producing greenhouse gas emissions, Latin America could see its gross domestic product reduced by almost 137% within one hundred years. Other potentially dismal outcomes for the region include: melting glaciers in the Andes mountains devastating farmlands, rising sea levels causing mangrove forests to disappear, degraded lands claiming from 22-62% of the Bolivia, Chile, Ecuador, Paraguay, and Peru, and the bio-diversity of Colombia and Brazil becoming severely depleted (Estrada, 2009).

While international organizations like the United Nations and its Kyoto Protocol have defined the perimeters of global warming and its potential negative effects on the planet, and developed and developing national governments from around the world have pledged their support to help decrease their countries' contribution to the collective carbon footprint, the successful implementation of these grand plans ultimately depends on how efficiently things can

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get done on the ground, within countries and within cities. Supra-national policy often ends up being played out in small, incremental initiatives that tend to be grass roots, political, and messy. This begs the question: How conducive is a country to enact environmental policies given the complex web of national and municipal regulatory and political regimes on the one hand, and the special interests of powerful groups on the other hand? In light of Latin America's particular vulnerability to the negative externalities associated with the climate change crisis, the programs that the region's countries establish to halt the rate of global warming take on a heightened significance, as do the sectors that are most affected by compliance.

To this effect, the World Economic Forum Report has identified the improvement of solid waste management in developing countries as one of the most effective weapons with which to prevent an environmental Armageddon (Estrada, 2009). The UN-sponsored inaugural meeting of the Regional 3R Forum in Asia, held in Tokyo, Japan, in November 2009, echoed the importance of solid waste management in meeting global sustainability objectives and specifically targeted the critical role of recycling:

> ...(At this international meeting) the need for reorienting production and consumption patterns at all levels towards sustainability have been highlighted, with (an) emphasis on waste management and giving the highest priority to waste prevention and minimization by encouraging the production of reusable consumer goods and biodegradable products and developing the infrastructure required to reduce, reuse, recycle (3Rs) and dispose

> in an environmentally sound manner… (Tokyo 3R Statement, 2009).

Anna Tibaijuka, Under-Secretary General of the United Nations, concurs and adds that "spectacular results" are possible when developing-country cities include informal sector recycling as drivers of their solid waste management systems:

> Many developing and transitional country cities have active informal sector recycling, reuse and repair systems, which are achieving recycling rates comparable to those in the West, at no cost to the formal waste management sector. Not only does the informal recycling sector provide livelihoods to huge numbers of the urban poor, but they may save the city as much as 15 to 20 per cent of its waste management budget by reducing the amount of waste that would otherwise have to be collected and disposed of by the city (UN Habitat, 2010: v).

That the incorporation of informal recyclers into a city's formal waste collection and disposal operations yields sustainability benefits seems evident. What remains less clear, however, is the reluctance with which many governments (municipal and state) in under-developed countries have drafted and enacted laws that would provide a transparent and equitable regulatory framework vis-à-vis recycling activities, thus allowing informal recyclers to gain legal recognition (and potential remuneration) as contributing members of their cities' solid

waste management efforts as well as contribute to cities' recycling objectives. A dearth of legislation that regulates, enforces, and protects recyclers and their right to work in the solid waste management sector currently defines the status quo in most developing world cities. In the majority of these, informal recycling workers (formerly referred to as scavengers or waste-pickers) are neither protected by law nor encouraged to contribute to the recovery of recyclable materials, an activity whose global impact has been estimated in the billions of US dollars (Medina, 2009).

Defining sustainable development as growth that fosters environmental, economic, and social benefits, it is difficult to imagine an economic activity that more successfully marries these three dimensions than do integrative solid waste management programs, that is, those that include informal recycling. Nevertheless, cities and countries in the developing world have struggled to come to grips with this reality. Despite the potential of a legitimized (i.e., legalized) informal recycling program's ability to reduce costs and risks for stakeholders, the entrenched interests of powerful groups, a blurring of the lines between private profit and public policy, and the historic social marginalization of and discrimination against waste-pickers have contributed to many developing countries' failure to embrace and leverage the informal recycling sector into efficient municipal solid waste management services (Dias, 2000; Guillermoprieto, 1990; Medina, 2005, 2007, 2008a, 2008b; Nas and Rivke, 2004; Schamber and Suarez, 2007).

Colombia and Bogotá are good examples of this tension. Located in the region of the world that stands to lose relatively the most if the natural environment's pollutants are not brought under control, they represent a strategic battleground where former waste-pickers (now informal recyclers) have long struggled for social inclusion legislation. This country-city duo also exemplifies, however, the contradictory national and municipal public policy toward

informal recyclers' legal status within the solid waste management sector. Colombia as a nation has recognized and legalized informal recycling (albeit in fits and starts), but enforcement mechanisms have been lax, thus paving the way for its capital city to lag in the adoption and implementation of the legally mandated measures that defend the full integration of informal recyclers into the mainstream of municipal sanitation.

Project Pennsylvania represents the type of strategic alliance in the realm of the possible in those developing-country cities where the spirit and the letter of the law allow inclusive partnerships in the solid waste management industry that cross the business and civil sectors. To better appreciate the valuable contribution of Project Pennsylvania toward Colombia's and Bogotá's recycling goals and, as or more important, to understand the significance of its social impact, I will first present an historical account of the legal trajectory of Colombia's informal recyclers, from informal garbage dump scavengers to legalized entrepreneurial recyclers, that underpins the regulatory context of Project Pennsylvania. I will then introduce the project's operationalization and collaborating actors (the Association of Bogotá's Recyclers and the four participating companies). A discussion follows of how the cooperative efforts of the alliance partners contribute to reducing sustainability risks, and the chapter concludes with an assessment of what is required to scale integrative models, like Project Pennsylvania, in other settings.

The Regulatory Framework for Recycling in Colombia

Integrative projects like *Proyecto Pensilvania* are not born in a vacuum. Municipal and national governments proscribe the legal boundaries that constrain all organizational and individual behavior within the confines of a country and a metropolitan area, and they define the competitive rules of the game for business activities within these perimeters. Further, a solid

regulatory foundation bestows legal, social and political legitimacy. In Colombia and elsewhere in the developing world, scavengers (waste-pickers) have historically occupied the bottom rung of the socio-economic ladder. Poor, marginalized, and uneducated, they have consistently been discriminated against by mainstream society and in Colombia have even been victims of criminal violence and of *limpieza social* or social cleansing campaigns. The Bogotá Association of Informal Recyclers (or ARB as it is known by its Spanish initials) has struggled for more than two decades to gain recognition and legitimacy for its members, to be allowed to compete for municipal recycling contracts, and to form legal business ventures with the private sector. Several significant pieces of national legislation have contributed to defining the legal space that today governs the informal recycling associations in Colombia and delineates the rules and regulations for their operation and for their formation of private solid waste management partnerships. These legal measures governing the ARB and other regional associations throughout Colombia while seemingly pro-informal recycling, however, have yielded an ambiguous and confusing regulatory space with counterproductive results on more than one occasion.

In the 1990s a trend was becoming prevalent in Latin America for solid waste management to change hands from the public sector to the private sector (Johannessen and Boyer, 1999). This privatization became formal in Bogotá in 1994; Law 142 privatized public sanitation in Bogotá, from the collection, transportation, and disposal of solid waste to the cleaning and sweeping of city streets, to the oversight of the cleanliness of public squares. In 1999-2000 Law 511 and Decree 2395 were passed by the Colombian Senate, mandating that informal recycling or "scavenging" as it was still known be legalized. That is, Colombian law recognized the human right of scavengers to earn a living wage by going through the discarded

waste in garbage dumps or on streets and selling the recycled goods for profit. In 2002 then President Pastrana issued Decree 1713 which subsumed and regulated all previous national norms relating to informal recycling and conferred legal status once again on informal recyclers. The decree went further by recognizing the value the informal recycling actors contributed to the environment. What this decree did not include was specific guidelines on the incorporation of informal recycling associations into cities' Master Plans on Solid Waste Management[1] (Medina, 2007; Parra, 2007; Samson, 2009a).

Despite the national level pro-informal recycling laws and the fact that Bogotá's informal recycling associations are responsible for recycling approximately 600 tons/day of the city's waste (Parra, 2009: 65), the ARB was still excluded from participating in city-wide competitions for municipal waste management contracts. In 2003 when Bogotá sponsored its first "open" competition for the city recycling concession subsequent to Decree 1713, the ARB planned to submit a bid to cover part of Bogotá's recycling needs. To its dismay, the association learned that it was banned from participating in the public tender for various reasons. For large urban areas like Bogotá, only incorporated entities could provide residential waste collection and disposal; associations like ARB were relegated fit only for rural areas or large towns. Further, only those legally formed companies with verification of US$5 million financial backing and with at least 3 years experience in large solid waste management projects would be allowed to offer their tender. This ruling virtually eliminated the ARB's chances to compete for municipal solid waste management projects. In effect, the law was a Catch-22; the ARB did not have any experience in organizing and operating a large-scale recycling project at the city level because

[1] It did include, however, a controversial article later appealed by the ARB and overturned by Colombia's Supreme Court stipulating that all trash left on the streets became the private property of the consortium owning the recycling concession to that locale, insinuating that if an informal recycler were to take any of it, s/he could be accused of stealing.

the municipal government had never allowed them to organize and operate a large-scale recycling project at the city level. The ARB was particularly frustrated by the city government's attitude toward informal recyclers because when called upon to help out the city when the then state-run street cleaners and trash collectors went on strike in 1994, the ARB answered the government's call to step in and clean Bogotá's streets and to pick up and transport its garbage to the city dump, collecting about 700 tons of waste per day of the strike.

The ARB and its pro-bono legal team appealed what they perceived as discriminatory exclusion not only in the application of the 2002 law to municipal recycling contracts but also in the application of the original 1994 law that privatized solid waste management. Citing their basic human right to be able to compete as any other legally organized entity, they brought their case to the *Corte Constitucional de Colombia,* Colombia's Supreme Court, and eventually won. The *Corte Constitucional* ruled, however that the ARB would have to wait until the next public tender for the city's recycling contracts, set for 2010-2011. Another ruling by Colombia's Supreme Court affecting the informal recyclers of Cali was also decided in that city's Association of Informal Recyclers' favor, but implementation has been slow and inconsistent (Samson, 2009b; Ruiz, 2011).[1]

Project Pennsylvania

It is against this backdrop of ambiguous public policy that the innovative, private- and civil-sector joint project, *Proyecto Pensilvania* (Project Pennsylvania or PP), was launched in March 2010. For the first time ever in Bogotá, four multinational companies and the Bogotá Association of Informal Recyclers formed a partnership to establish and operate a recycling center on the outskirts of the seven-million inhabitant city. In broad strokes, Project

[1] The information in this section was gleaned, in addition to the cited references, from personal conversations with leadership of the ARB and other informed sources in Bogotá, Colombia, January 2011

Pennsylvania organizes the recycling of discarded materials and sells them directly back to industry, thus reducing costs through the elimination of recycling intermediaries. The motivating idea behind the project is to leverage the recycling experience and know-how of the ARB with the business expertise of the four partner companies to mutual advantage. The synergistic partnership leads by example and showcases the efficiency gains of recycling, demonstrating that informal recyclers, working together with industry, can provide a practical, affordable, and sustainable solution to the city's solid waste management strategy.

Project Pennsylvania's (PP) operational model is simple. About fifty recyclers, members of the ARB, form the core of PP's employee base. They collect six types of materials from their habitual recycling routes in the city's residential and business neighborhoods (paper, aluminum, glass, cardboard, tetra paks, and other cartons) and store their goods in their own *bodegas* or small warehouses. Three times a week an ARB truck stops at the 50-odd different recyclers *bodegas,* pick ups and weighs the bags of recycled goods, records their weight and type, and transports them to the *Centro de Acopio Pensilvania*, the Pennsylvania Warehouse and Transfer Station, located about 15 miles southwest of Bogotá's city center. If the individual recyclers or their associations do not have small warehouses where they can temporarily store their weekly cache of recyclables, then the ARB truck makes arrangements for pick up at designated times and locations at no cost to the recycler. By transferring ownership directly from the recyclers and transporting their goods to a large warehouse, the ARB replaces the traditional middleman in the informal recycling value chain, the intermediary who pays recyclers pennies on the dollar for their individual bags of recycled goods which he later consolidates into large quantities and sells for a profit to industry, thus exploiting economies of scale.

Once the materials arrive at the Pennsylvania warehouse, approximately fourteen workers, also employed by ARB, prepare the goods for industry purchase. They verify their weight, sort them into groups (glass, cardboard, etc.), then wash, clean, and compress the recycled goods into compact blocks resembling bales of hay. The companies who have signed contracts with PP to purchase determined tonnages of the recycled materials send their trucks daily to pick up their agreed-upon type of recyclable.[1] The partner companies pay according to total weight upon pick up. For their part, all ARB employees of the PP are paid in cash weekly on Saturday mornings, an unusual system for workers accustomed to receiving payment by intermediaries almost immediately after collecting their day's worth of goods. In addition to the free transport of their goods to the *centro de acopio* and a living wage, the PP-employed recyclers also receive full benefits (including health insurance), uniforms, "dignified treatment, and professional status."[2] And as of early 2011, they are also given a weekly bag of groceries donated from a Catholic Church-sponsored food bank that serves as a link between recyclers' needs and donor firms.

The turn-around time at the Pennsylvania Warehouse and Transfer Station is twenty-four hours; it is filled and emptied daily.

The Bogotá Association of Recyclers (ARB)

The Bogotá waste-pickers' transformation from independent, self-employed scavengers who eked out a livelihood in the cities' landfills and streets into informal recyclers who lobby aggressively and tirelessly for government legislation and social inclusion policies and who can

[1] Seven companies currently have contracts to buy recycled materials from the Pennsylvania Project: Caronal. Co-Recicladores, Diaco, Empacar, Familia, Fibras Nacionales, Peldar, and Tetra Pak.

[2] These words were said to the author in a personal conversation with the manager of the Pennsylvania Project, January 2011.

participate as equal partners in solid waste management projects grew out of a confluence of events starting almost three decades ago that mirrored other cities' initiatives. Medillin and Cali, for example, both witnessed the formalization of their informal recycling workers in the mid-1980s as the Colombian government began to shut down open garbage dumps and construct "sanitary" landfills (banning access to scavengers and using more modern techniques for waste disposal and treatment). In Medellin the government's closure of one of the city's largest dumpsites eliminated a source of income for approximately six hundred families who had worked there. Thus was born the first scavenger – now recycler – cooperative of the country, made up of those ousted waste-pickers who were willing to establish and operate within the confines of an organized movement. Today Medillin enjoys one of the most expansive, government-supported informal recycling organized movements.

Bogotá's informal recycling movement followed a similar path toward legitimacy. The closing of one of Bogotá's largest landfills in 1990 was the catalyst for the establishment of four recycling cooperatives and for their joining forces with *Fundación Social*, a Catholic NGO that provided financial, educational, and moral support to help scavengers organize.[1] Together the newly-formed cooperatives and NGO protested the landfill's closing. Although they did not succeed in this aim, they were successful in establishing the ARB as a collective in 1990 and subsequently in giving the city's informal recyclers a strategic direction with specific objectives: improving their earnings, eliminating predatory intermediaries, removing the social stigma associated with their vocation, and becoming legitimate contributors to the city's solid waste management solutions. The founding of Colombia's National Association of Informal Recyclers (ANR) soon followed with a current national membership upward of ten thousand. Many of

[1] *Fundación Social* was an active proponent of the informal recycling movement, providing loans, training programs, and subsidies until it closed its doors in 1996 due to financial problems (Medina, 2007: 156-159).

Colombia's city-level associations (such as the ARB) have signed formal contracts with the ANR so that their activities can be coordinated at the national level (Medina, 2007).

The ARB is now an association as cooperatives are no longer legal. Its membership is currently comprised of twenty-four other associations whose individual members represent about 10-15% of Bogotá's 18,000-20,000 informal recyclers[1]. The organizational chart reveals an elected president and a top management team who conducts training sessions, oversees projects, monitors recycler compliance on designated recycling routes, builds membership, and foments and participates in national and international events, in Latin America and other regions of the developing world. The ARB's responsibilities for the Pennsylvania Project include hiring, overseeing, and paying personnel, maintaining close communication with the on-site director of the warehouse to solve problems as they occur, to act as a liaison between the warehouse recycling operations and the clients' needs, and to guarantee that all contractual agreements are met. Driven by industry requests, additionally the ARB negotiated with the government to allow its members to take training courses in handling industrial recycling and hazardous waste, knowledge they can apply to PP and elsewhere.

While Project Pennsylvania represents one of the ARB's achievements with industry, it is also involved in an ambitious, citywide recycling project with the Bogotá municipal government. Located at the city's largest transfer station called *La Alqueria*, members of the ARB recycle there about fifteen tons/day out of the six to seven hundred tons of trash that are recycled daily in Bogotá.[2] The ARB aspires to have all of the large-scale recycling of residential waste in Bogotá follow the model currently in use at the *Alqueria.*

[1] No one knows for certain how many informal recyclers work on the streets of Bogotá, but Parra (2007) and sources with knowledge of the sector concur that the figure lies within this range.
[2] This figure was told to the author by Silvio Ruiz, former president of the ARB.

The Multinationals[1]

The launching of Project Pennsylvania as a pilot program in partnership with the ARB was the brainchild of four multinational corporations: Carrefour, Grupo Familia, Natura Cosméticos, and Tetra Pak. All are members of CEMPRE, a socially oriented business organization founded in Brazil in 1991 and established in Colombia in 2008. Its vision focuses on raising public awareness of the benefits of recycling, helping former waste-pickers and informal recyclers become formalized into society, and fostering projects that require partnerships with informal recycling associations (CEMPRE, 2011). What these four firms have in common is a deep belief in their firms' corporate social responsibility mission, values that are upheld with financial and human capital.

The stated corporate objectives of the Pennsylvania Project confirm this philosophy. The companies agreed that this project should reflect an efficient recycling model created by recyclers themselves with firm-level support in the background. The firms strived to build a recycling infrastructure that removed the role of intermediaries to the direct benefit of the recyclers. The corporate objectives also included introducing training programs for interested recyclers so that they could become certified in functional areas such as accounting and handling hazardous wastes. Each company gave financial support to establish the project and to organize the logistics. An appropriate space was found and rented; a truck was bought. Out of a start-up budget of US$90,000[2], Natura Cosméticos contributed a little over half. The remaining corporate partners donated the rest. Originally uncertain of the project's ultimate realization of its goals, the firms initially committed for one year, but in view of its success -- almost all goods are sold and the project is now self-supporting -- neither the corporate partners nor the ARB foresees

[1] The information for this section was gleaned from publicly available sources and from personal conversations with company executives.
[2] The equivalent in the local currency is $180 million Colombian pesos.

an expiration date, as long as the municipal government of Bogotá continues to allow them to operate in this competitive space. To the contrary, the partners hope that this type of project will be duplicated by other firms elsewhere in Bogotá and in other cities in Colombia.

The four companies that comprise the PP partnership are:

Carrefour The French international hypermarket chain is one of the largest discount retail operations in the world with over 1400 stores worldwide and second in industry revenues only to Wal-Mart. With a presence in four Latin American countries, the company has been involved in efforts to promote sustainability for more than twenty years, focusing on two main areas: integrating sustainable development into its business activities and promoting sustainable development to its customers. Its programs in Bogotá have been both creative and successful. Among them was a store-sponsored recycling campaign in which ARB representatives worked at store sites to encourage shoppers to deposit their recyclable used products. Incentives were awarded to the consumers who deposited the most recyclable goods.

Grupo Familia Familia is another example of a firm that has institutionalized its approach to sustainability and its deeply held social responsibility principle. A Colombian joint venture (50% Colombian ownership; 50% Swiss), it has a presence in over twenty countries around the world. It manufactures disposable personal hygiene products, and it describes itself as a "leader in the design, innovation, production, and distribution of personal care products."[1] One of the key areas of concern in its social mission in Colombia is to dignify the life of informal recyclers, assign due value to their work, and to help achieve their social inclusion. The company dovetails

[1] Taken from the firm's webpage at: http://www.familiasancela.com/irj/portal/anonymous?guest_user=exusren

this social mission with its business objective of securing recycled materials to use in its production. With a deficit of paper for their manufacturing plant in Brazil (where all their products are made), they currently have to import recycled paper for reuse in production. Familia is one of Project Pennsylvania's industrial customers; it purchases used paper.

Natura Cosméticos Arguably one of the most environmentally-aware corporations in the world, Natura has been an industry leader in respecting and in propagating respect for the natural environment since its founding in Brazil in 1969. In the cosmetics and personal care direct sales sector, Natura is considered a sustainability pioneer, from its upstream innovative sourcing of raw materials in the Amazon to its downstream inventive reuse and recycling of the plastic bags its associates (sales representatives) use to deliver customers' orders. According to one of the founder-owners, Natura "has worked hard to integrate sustainability into its core strategy."[1] Its mission in Bogotá, where it opened a facility in 2008, underscores the firm's steady and serious focus on its responsibility to society, concentrating specifically on the plight of one of this city's most marginalized populations, the informal recyclers. As well as its leading role in spearheading Project Pennsylvania, Natura has also initiated several in-house programs that advance the work and ameliorate the lives of Bogotá's informal recyclers.

Tetra Pak A privately held company founded in Sweden in 1950 and headquartered in Switzerland, this company supplies hundreds of types of "bric" carton packaging to its industry customers. Operating in more than 170 markets around the world, seventy-five percent of the company's paper products are made from reused, recycled paper and recently Tetra Pak has begun manufacturing furniture and other items materials made from recycled paper. Best known

[1] Taken from: http://www.ethicalcorp.com/content.asp?ContentID=6067

for its milk and juice cartons, Tetra Pak also has a deserved reputation for its sustainability projects and recycling practices. For sustainable Development Week 2010 Tetra Pak partnered with Carrefour in France to promote responsible consumption by announcing the arrival of a certified eco-friendly carton package that will help protect biodiversity and foster responsible forest management. It has also partnered with the World Wildlife Federation, with the United Nations, and with the Prince of Wales International Business Leaders Forum to marshal through several of its international initiatives. In Colombia, its environmental sustainability focus is evident. Of the 14,000 tons of Tetra Pak that are recycled per year, 2-3,000 tons are recycled in Colombia. Project Pennsylvania represents one of this multinational corporation's first programs in Colombia aimed at helping informal recyclers. Along with Familia, it, too, purchases recycled goods from PP, in this case, used tetra pak containers.

Project Pennsylvania's Contribution to Risk Reduction

Project Pennsylvania has clear societal implications. The fact that four multinationals came together with the ARB to establish the PP partnership implies that they have a deep understanding that socially desirable solid waste management solutions in developing countries need to create income opportunities for society's poorest subgroups. Concomitantly the project helps the four participating firms meet part of their social responsibility objectives, and, more important, it directly improves the lives of the informal recyclers that it employs. And, arguably it sets the bar higher for future private, civil, and public joint programs. PP also decreases some the countless risks inherent in their informal profession – unhygienic conditions, risk of accidents, exploitation by middlemen, below minimum wage pay, uncertain working conditions, improper handling of hazardous waste, possible exposure to toxic substances – and provides a

clean and safe work environment, legal employment, and a steady livelihood (with benefits). For many who work at PP, it is the first time they have ever been paid a lump sum for a week's work and been faced with the challenge of learning about personal finances. Project Pennsylvania also provides a logistical infrastructure that supports workers' day-to-day recycling collection, transportation, and disposal; it incorporates them into a formal economic activity that is valued and recognized by law. PP further legitimizes the claim made by informal recyclers that their vocation is part of the solution in making the world more sustainable, not part of the problem. The project denotes an important step among many for the gradual recognition and eventual acceptance by society at large of ARB members as well as of non-member, independent informal recyclers as crucial contributors in addressing one of the modern world's most pressing problems: climate change. In addition to the societal benefits that accrue to the informal ARB recyclers who participate in the program, Project Pennsylvania also reduces business and environmental risks.

Business-related risks

The main business risk reductions that Project Pennsylvania garners for its industrial client firms are a) a guaranteed steady flow of recycled materials; b) lower prices for these recycled goods since there is no middleman at PP; c) indirect cost savings of using recycled goods versus virgin (primary) raw resources; and d) aid in achieving an industrial ecosystem as all incoming goods are recycled and used in the transformation/manufacturing of new products. Like all client firms that purchase recyclables from PP, the recycled materials for reuse in manufacturing processes that Familia and Tetra Pak buy are secondary inputs that they would otherwise have to purchase on the open market at a steeper, more value-added price. The firms

also have *a priori* knowledge and informed expectations of the amount of paper or tetra pak containers that they can expect from the consistent recycled supply that Pennsylvania handles over time. These two operation management-type risks (quantity and quality) are not trivial and the cost reduction is significant. It is estimated that using virgin raw materials requires 50% more energy usage relative to manufacturing products from recycled materials (Tellus Institute, 2008). Moreover, the Pennsylvania Project also contributes to the other purchasing firms' environmental sustainability targets and their ability to adopt an industrial ecosystem model. An increasing number of environmentally conscious firms that seek to incorporate sustainability measures into their production facilities are adopting this approach. The industrial ecosystem refers to a closed value chain loop; the waste produced in the manufacturing process is captured for reuse and recycled into the production of new products (Medina, 2007:96). Instead of recycling in-house, a process most firms are not equipped to implement, the Pennsylvania Project does the recycling for its business-to-business customers, allowing them more planning confidence as they create industrial ecosystems with discarded material. While reusing 100% of materials may be an unattainable goal, more realistic objectives can still translate into cost savings.

Furthermore, if taken as a separate organization entity that utilizes an integrative approach to the role of recycling in solid waste management systems, the Pennsylvania Project itself can be viewed as an industrial ecosystem. Although not a manufacturing facility that reuses its own recycled waste, it functions as an input-receiving site where raw recycled goods are transformed into usable, clean, classified tons of recycled materials ready for industry to reuse them as inputs in their transformation process. In this light, PP fulfills all the criteria as an independent, closed-loop, ecosystem.

Environmental risks

The environmental risks that Project Pennsylvania tackles are twofold and related. First, it contributes to Colombia's overall sustainability goals and its efficiency targets for improving nationwide recycling rates. While not as low as other Latin American countries' rates (Colombia's is about 20% compared to Mexico's 15% and Chile's 14%), they fall well below developed country standards.[1] (Godoy, 2010; EPA, 2009; UN Habitat, 2010). Additionally, as one of the 192 nation states that signed and ratified the Kyoto Protocol's UN Framework Convention on Climate Change (UNFCC, 2011), since 2005 Colombia has pledged its commitment to combat global warming through limiting or reducing greenhouse gas emissions. The efficient collection, separation, transportation, cleaning, packing and selling of recycled materials for industrial use is part and parcel of any city's successful environmental sustainability requirements. The key components of solid waste management -- reducing, reusing, and recycling -- all contribute to reducing the risks associated with climate change. In Latin America and the rest of the developing world, however, recycling has not historically been a widespread practice, despite the developing world's rising use of disposable consumer goods that use more wrapping and packaging and thus create more waste. The result is that more trash is deposited in landfills, generating higher levels of methane, a greenhouse gas that is 21 times more toxic than carbon dioxide, and putting a strain on already limited space in landfills.

The second environmental risk that Project Pennsylvania addresses relates directly to this last concern. Landfills in the developed world tend to utilize modern, state-of-the-art techniques that address the dangers associated with garbage dumps by complying with strict government regulations (EPA, 2011). In contrast, landfills in the developing world are likely to have little to

[1] The recycling rate in the U.S. stands at approximately 34%; Denmark's approaches 70% (EPA, 2009).

no government regulation and are often "open" (allowing entry by scavengers). Spontaneous methane-induced fires and myriad health hazards are the norm (Cointreau, 2006). Although the trend toward modernization in the developing countries is to replace open garbage dumps with closed, sanitary landfills, a lack of government oversight is still a challenge. How much waste is dumped, what kind of waste, how it is treated to avoid toxic pollutants and leachates from seeping into the water and air, what the tonnage limits that the space will allow – these remain concerns in so-called sanitary landfills. A growing population that increasingly mimics the developed world's production and consumption habits exacerbates these problems.

Bogota's main landfill, Dona Juana, drives home this point. Doña Juana, has been operating since 1988 and is the destination of approximately two and one-half million tons per year of household waste from the capital's population of seven million inhabitants or about 6-8,000 tons of solid waste a day (PDDF, 2009). The waste typically is buried in cells and the leachate (the toxic-filled liquid that spontaneously is created from decomposing waste), often untreated, is later discharged into a nearby river (Hendron, 2006). Prior to the mid-1990s, the guiding municipal logic rationalized that every kilo of trash that was deposited in its final destination (Doña Juana) translated into one less kilo of trash on the streets (Parra, 2007: 75). A systematic recycling program was not a top priority. A tragic landslide at the privately owned and operated landfill in 1997 changed this reasoning. Almost two million (1.8 million) tons of solid waste flowed to the river. While no injuries were reported, the environmental catastrophe (extreme pollution of the river, foul odors, illnesses, epidemics) was massive enough to spur politicians into re-conceptualizing their solid waste management policy for the city. They realized that landfills have a limited capacity and that alternative solutions to waste collection and disposal needed to be studied. At about the same time the world was beginning to become

united on the climate change front and the important role of recycling and of informal recyclers was starting to gain legitimacy in Brazil as well as in Colombia. The labyrinthine laws and decrees that the Colombian national government and the Bogota city government enacted and enforced over the next decade (previously commented on in this monograph), however, would appear to contradict the single-mindedness of their sustainability goals and of the city's recycling programs within that national legal context.

While there have been recent pronouncements by leadership in Latin America's cities to embrace recycling as one of the principal strategic responses to global warming (UN Habitat, 2010) the legacy of public policy on solid waste management systems in the hemisphere make this call to arms especially challenging. Colombia's lackluster progress in leveraging the informal recycling sector into sustainable, municipal solid waste management schemes until very recently belies this intent, as does the fact that Doña Juana remains today Bogota's only landfill in use. It has been calculated that the majority of the waste that still arrives at Doña Juana could be recycled, if more efficient recycling programs were in effect.[1] These pronouncements render the effects of partnerships like Project Pennsylvania even more impressive. By making its small, incremental dent in the amount of waste that reaches Doña Juana's gates, it is lessening the inherent risks presentat all landfills, especially in under-regulated developing countries and perhaps most especially at large, unwieldy ones like Doña Juana.

Concluding Remarks

Bogotá's checkered legal trajectory with regard to the inclusion of informal recyclers into a sustainable solid waste management agenda has been inconsistent and sometimes resulted in negative externalities for the principal stakeholders (e.g., confusing regulations for businesses,

[1] Conversation with Silvio Ruiz, past president of ARB; also mentioned in Parra, 2007.

for tax-paying residents of Bogotá, and for the informal recyclers themselves), in trash collection and disposal inefficiencies, and in the undermining of nation- and city-wide sustainability goals. Nevertheless, this chapter has demonstrated that notwithstanding legal setbacks, the indefatigable efforts of the Association of Recyclers of Bogotá gave birth to a unique collaborative partnership with socially responsible private enterprises. Could a Project Pennsylvania work in other locales?

Several prerequisites are imperative before a Project Pennsylvania-type initiative can be imitated successfully in other developing country cities for a sustainable development advantage. First, landfills where waste-pickers openly pick through trash and are exposed to many health and environmental dangers should be closed and replaced by "sanitary" or closed landfills. More important, since this change from open to closed landfills almost always involves displacing the waste-pickers whose livelihoods depend on their daily collection of potentially recyclable goods, it has proven an opportune moment for waste-pickers to unite and organize themselves. This trend has been occurring in Latin America for some time. In fact, the history of Bogotá's informal recycling associations is linked to the closing of the open garbage dumps that, once closed, spurred the desperate waste-pickers from around the city to join forces, form collectives, and attempt to achieve alternative sources of employment with a unified voice.

This leads to the second requirement for potential private sector ~informal recycling partnerships. It is essential that a city's informal recyclers be organized. That is, there needs to be a formal organizational structure, such as an association or a collective, that fulfills all legal requirements for an entity to operate and compete. This includes elected leaders with clear authority lines, a formal mandate for what the association's objectives are, as well as the strategies are for achieving them. According to Nohra Padilla, the current president of Bogotá's ARB, the formation of associations was "profoundly important" in laying the foundation for

social inclusion (2009a: 37). She adds that "Each group (of waste-pickers) by itself is fragile and vulnerable, but united we have more weight and are more capable of carrying on an organized struggle" (Samson, 2009a: 37).

A third crucial component that a developing country needs to have in place if partnerships like Project Pennsylvania are to thrive is an adequate regulatory regime. The evidence suggests that legalizing waste-picking and informal recycling activities at the national public policy level is a *sine qua non* toward bettering the lives of the recyclers and toward efficient and integrative solid waste management systems (Medina, 2008b). That said, having the appropriate laws on the books is a necessary but not sufficient pre-condition. What is key to any municipal solid waste management partnership, whether it be private~civil like PP, or civil~public, like other partnership the ARB has formed with Bogotá's government, is that the legislation be consistent at the national and municipal levels, transparent, easily interpreted (to avoid potential misinterpretations) and that it be enforced. Like any government decree, if what is on paper is not enforceable then there is little likelihood that it will be upheld.

The legacy of the Pennsylvania Project is not so much what it is but what it implies about the recycling capability and the tenacity of a city's informal recyclers. Despite public policy setbacks, social marginalization, extreme poverty and all its implications, a two-decade struggle that seems never to end, social cleansing aimed at poor populations, and seemingly insurmountable odds, the Bogotá Association of Recyclers has managed to survive and flourish. I follow other scholars and practitioners who have argued that not only are the city's and the country's recycling and sustainability achievements enhanced by the ARB's existence, but also that an integrated municipal solid waste management system, one that incorporates local informal recyclers and their grass-roots associations into its formal business model, is the

smartest way for developing countries to grow in a sustainable way (Birkbeck, 1978; Breslin, 2002; DeSoto, 1989; Easterly, 2006; The Economist, 2009; Hoornweg and Giannelli, 2007). It is smart for a globally warming planet, it is smart for the elected leadership who can take credit for improved recycling rates, it is smart for municipal solid waste management system efficiency, it is smart for firms looking for socially-responsible partnerships, and it is smart for society to recognize the environmental contribution of informal recyclers and to welcome them and their expertise into the 21st century.

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