

Risk and Place: The Place of Risk

Urbanization, Industrial Pollution, and Environmental Discourse in Santiago, Dominican Republic

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Neither world city nor entrepot, Santiago de los Caballeros enjoys a reputation as a small, quiet place whose residents are civic minded, progressive, and orderly, in contrast to their counterparts in the capital. But despite its tranquil, insular image, Santiago's participation in a national and global economy is making the city a risky place for the majority of its inhabitants. In recent years, urban environmental quality has entered municipal development discussions, but these discussions seldom address the new risks that urban residents face as a consequence of this participation. Risk is associated with basic sanitation and water-borne disease crowding. It is attributed largely to lack of education and rural habits brought by migrants to the city, rather than to the global economy as it is experienced in Santiago.

This paper argues that linking urban environmental hazards to "backwardness" rather than growth and to settlement rather than industrial location and sociospatial segregation has enabled urban and economic policy makers to continue on a development path that favors largely unregulated industrial growth and unchecked pollution. In the first part of this paper I outline the pattern of economic and urban growth in Santiago. Second, I address the spatial distribution of urban environmental risks, efforts to monitor and control these risks, and the effectiveness of

¹ This research was supported by a grant from the Ford Foundation for comparative research on urban environmental problem identification, monitoring, and management in the Dominican Republic and Cuba. The contributions of Maria Paniagua and Pedro Juan del Rosario are central to this analysis. Rafael Emilio Yunén helped with the research design; Jose Miguel Hernández, Marcia Hawa, Jose Tavares, James Platner, and Maria Paniagua carried out interviews with community and business leaders and with technical agency staff. Cesar Perez and Any Selman and Andres Navarro of *Ciudad Alternativa* helped me to understand urbanization as a Dominican phenomenon. The discussions of solid waste management and environmental controls owe much to the work of Andrea Yang and James Platner, respectively.

environmental programs in reducing risks faced by poor urban residents. Finally, I ask about how different urban environmental risks are addressed in Santiago urban environmental discourse.

Economic Growth and Urbanization in Santiago

In Santiago, as in other smaller Latin American cities, demographic and economic expansion has generally outpaced investment in basic services and infrastructure and the development of municipal capacity or financial resources to manage growth. Santiago developed as a commercial center for the Cibao's relatively prosperous tobacco sector (Baud 1996; San Miguel 1996). Demographic growth and commercial development of the city slowed following the U.S. Marine intervention (1916-24). Beginning in first decade of his regime, dictator Rafael Leonidas Trujillo undertook a set of urban initiatives designed to turn the capital into a primate city and to enforce a stricter separation of classes within the capital (Derby 1998). In the 1940s, he embarked upon a program import substitution industrialization which resulted in a 33 percent increase in the number of industrial plants (Ceara Hatton 1996; Chantada 1996; Espinal 1998). Trujillo's urban and industrial policies resulted in a relative decline of Santiago vis-à-vis the capital in terms of public investment. Nonetheless, a modest industrial sector grew up in the Cibao in the postwar period, and Santiago plants dating to the Trujillo period include factories for cement and building materials, food processing plants, distilleries, and tanneries. These tended to be located along the Rio Yaque del Norte at what was then a modest distance from the city center. Santo Domingo continued to grow faster than other cities during the 1960s, and the 1968 Law of Industrial Incentives and Protection (Ley 299) favored industrial development in the capital at the expense of growth in the Cibao (Espinal 1998). However, in the past quarter

century, the growth of the capital has tapered off relative to that of Santiago (Pérez 1996), which has experienced rapid population growth, export-platform industrialization, physical expansion, and the development of active land markets.²

Zona franca Industrialization. With an estimated population of 500,000 inhabitants, Santiago remains the economic center for the Cibao, but its growth since 1972 is largely due to the installation of *zonas francas*, or export-processing zones which have come to occupy a large fraction of the urban and periurban landscape. At present, there are three *zonas francas* in the municipality of Santiago, and another in an urbanizing agglomeration stretching from the western edge of Santiago, eastward to Moca, Salcedo and La Vega. In 1993, these five parks housed 95 enterprises (Reyes Castro and Dominguez 1993). The largest and oldest (1972) park, located downstream from the city's center near the Santiago barrios of Rafey and Cienfuegos, housed 75 *maquiladoras* and employed 35,525 workers in 1995 (Corporación Zona Franca 1996). About 70 percent of the firms manufacture textiles and apparel; the remainder producing leather goods, electronic equipment, cardboard boxes and tobacco products.

While the majority of plants in the *zonas francas* are dedicated to assembly, an increasing number house earlier stages in texture manufacture, like thread dyeing and laundering cloth. In addition, some *zona franca* plants receive raw materials from domestic sources, including hides for tanning, wood products, agricultural products (notably tobacco), and some chemicals (Castro and Dominguez 1993). The parks are owned either by the Dominican state or by private landowners (in some cases former rural land barons); the industrial enterprises are tenants. Park

² Portes et al. (1997: 19) find that this pattern of second city demographic growth is typical of nations where export processing plays a major role in the economy.

owners are responsible for basic infrastructure and service provision, while enterprises handle the removal of solid wastes generated in the plants.

The growth of the *zonas francas* has gone hand in hand with rapid growth in the informal sector. Informal enterprises, including auto repair shops, food vendors, and small retail outlets on the fringes of the *zonas francas* augment the waste stream generated by the *zona franca* enterprises (Santana 1994). The endemic unemployment that attracts multinationals in search of cheap labor also means that a large proportion of the urban population is engaged in household-based informal production or in “*chiripeo*” or odd jobs. Given the dynamism of the informal sector, it is hard to know just what kinds of activities are taking place in the city and how these activities relate to production in the formal sector.

There are signs that the export processing phase of Santiago’s development may be drawing to a close due to competition from Mexico and Asian nations in the textile sector. *Zona franca* industries in Santiago and La Vega laid off 12,000 workers in 1995 and another 60,000 in the following year when 38 companies closed their doors (Green 1998:22). This may mean that new industrial parks will not be built, although with decreasing earnings and plant vacancies, park owners may be less likely to respond to calls for installation of waste water treatment plants. Also, we observed that in 1997 migration and commuting for employment continued, even if jobs were less secure and shorter term than they had been in the past.

Patterns of Urbanization. Three landscape-level phenomena can be attributed to Santiago’s economic growth since the 1970s: (1) urban sprawl at the expense of the local foodshed, (2) the close juxtaposition of different kinds of land uses, and (3) residential polarization (del Rosario n.d.). The *zonas francas* are a major feature in the organization of

urban space. In addition to creating their own large footprints on what was once rural land, the parks have stimulated migration from rural parts of the Cibao, which in turn has meant the growth of new settlements on the city's edge and in its interstices. New migrants have little choice but to settle in neighborhoods lacking in services and urban infrastructure (CEUR/PUCMM 1991), preferably close to the workplace, but at times in new communities strung out along the highways leading into the city (Santana 1994). In addition, more than 100,000 commuters travel to Santiago for work (del Rosario n.d.).

A second force for landscape change has been real estate speculation and development. The Santiago real estate boom began in the 1960s, on the flat eastern edge of the city. According to Hernández (1997:8) urban development east of the city began with the appropriation of municipal lands by politically well connected speculators, allied with construction companies and financial interests.³ Construction companies, then built subdivisions and housing projects which were then sold to middle and upper class home buyers, particularly returning migrants from the United States.

The construction companies used their clout to ensure that their subdivisions would enjoy preferential access to urban services like garbage collection. However, developers paid less attention to basic infrastructure, allowing sewers and storm drains to empty directly into gullies and the river.⁴ Hernández concludes that urban sprawl resulting from real estate development has

³ Derby (1998: 28) suggests that urban expansion in the Dominican Republic was undertaken for political as well as economic motives. Referring to Trujillo's urbanization policies in Santo Domingo, she argues that "the regime preferred that symbolic rewards such as urban improvements went to uncolonized areas, where entrenched barrio memories and identities would not interfere with sentiments of gratitude to the regime." And indeed, where urban public works bisected existing neighborhoods, ingratitude toward the Balaguer regime was palpable.

⁴Hernández (1997) argues that of the eight sewage treatment plants in the city, only one was constructed by the private sector.

placed an ever greater burden on scarce municipal and central government resources. In the absence of a strong commitment to social justice, competition over resources for basic infrastructure has led to their deployment in wealthier areas, leaving densely settled urban neighborhoods under served. What is ironic about this pattern of service delivery is that local water authority engineers argue that it would be more efficient to provide water and sewer to the dense settlements of the poor than to the wealthier, spread-out subdivisions on the urban periphery.

In sum, real estate development produced a typical North American pattern of an urban sprawl, devouring prime agricultural lands on the city's eastern fringe and consuming an inordinate share of scarce municipal resources in its demand for urban services (see Rosario n.d.). In the absence of land use planning, industrial and real estate development have intensified spatial inequality in Santiago.⁵ By the early 1990's 30 percent of the urban population occupied 75 percent of the residential area of the city, while the remaining 70 percent occupied 25 percent of residential space (Yunén 1992).

Of Santiago's 200 plus barrios and housing developments, 54 are considered poor, although even among these dense settlements, permanence and exposure to risk varies. About 20 poor urban neighborhoods enjoy a certain degree of permanence and limited access to urban services (Rodriguez, et al. 1993, Ponton 1995). These neighborhoods are generally located outside of the urban nucleus, are somewhat less densely settled than the *barrios marginales* (see below) and generally enjoy access to urban services, although this access may be limited and

⁵Analyzing 1980 census data, Yunén (1992) found that of the city's 38 census tracts, each containing several neighborhoods, the 12 that identified as "popular" accounted for 58 percent of the urban population, and 15 Km² or a density of 107 persons per square block. The average density for census tracts comprising middle and upper class neighborhoods 19 persons per square block.

unequal within a given neighborhood. Dominican land titles are notoriously insecure, but in these neighborhoods rights to land and improvements are secure enough to encourage solid, if simple construction with wood, concrete blocks and tin roofs. Formal streets and alleys facilitate service provision. Water and sewage systems are being gradually extended into these neighborhoods, and garbage is picked up by municipal trucks, although not always on a regular basis.

Rodríguez et al. (1993) distinguish between the poor neighborhoods described above and what they call "*focos de miseria*" or *barrios marginales*. While these "informal" settlements appear to spring up overnight, it is more useful to think of them as integral to Dominican industrialization and urbanization policies that specifically consign migrants and growing fragments of the urban popular classes to informality, and often illegality, both in employment and in housing. These recent settlements, characterized by buildings crafted from reused or found materials--cardboard boxes, sheet metal, cans, palm, thatch, plastic or wood--are confined to lands considered undesirable and therefore left behind by the real estate boom. Where they are reasonably close to the city center, they are generally located on geologically unstable sites or under the plume of polluting facilities.

These settlements generally lack garbage collection, clinics, schools, or legal access to drinking water and electricity. Truck and car access is the exception. Informal garbage dumps are a highly visible feature of the landscape, and attract the attention of development workers. The absence of basic services and infrastructure in these settlements may be due in part to their newness, in part to the perception or perhaps hope on the part of municipal elites that these settlements will be temporary, and in part to the failure of municipal authorities to reallocate funds away from the formal subdivisions.

Perhaps more an important reason for the lack of basic services and infrastructure is the fact that residents have no property rights. The lack of property rights in their principal residence makes leaves residents of the poorest neighborhoods vulnerable to two kinds of takings. First, as land prices rise and building technologies advance, land that was once considered unusable may come to have value and pass into the hands of real estate interests. Second, as municipal authorities seek to make the city more competitive, they may resort to razing informal settlements that are considered unsightly, viewed as degrading to urban environment, or deemed to house “undesirable” elements.⁶ Thus, the poorest settlements occupy remnants of the public domain where the threat of eviction is always present.

The poorest settlements in Santiago suffer not just from the absence of urban services, but from the presence of polluting facilities. The impacts of industrial pollution are not distributed evenly over the urban landscape, and not surprisingly, they are more severe in poor and marginal neighborhoods. Not all poor neighborhoods occupy high-risk sites. Some are disadvantaged by their distance from the city and by their lack of access to basic services, but enjoy a pollution-free environment.⁷ However, some neighborhoods close to urban workplaces also abut polluting facilities and occupy unstable terrain. Of the thirty-four Santiago barrios labelled marginal (Ponton

⁶Vainer’s (1998:9) analysis of the strategic planning process in Rio de Janeiro shows how the competition of Third World cities for foreign investment in tourism and industry leads to an emphasis on a “clean, welcoming, competitive city that attracts tourists and businessmen.” In this vision, “poverty does in fact constitute the chief environmental problem. As a group, the poor constitute discomforting surroundings that have to be controlled or removed.” The city of Santo Domingo offers several well-chronicled examples of evictions and threatened evictions of poor and informal settlements as components of campaigns to transform the city into a magnet for tourism. Of these, perhaps the most egregious is the case of La Cienega and Los Guandules, settlements along the Ozama which suffered from an official embargo of building materials during the 1980s. For discussions of Santo Domingo evictions and their impacts, see Morel and Mejía (1996).

⁷For example, los Guandules , a new, legal subdivision was created on state lands for victims of flooding in the early 1990s. Los Guandules women complained that the cost of transport to the *zona franca* made it impossible for them to eat three meals a day..

1995), four directly about the *zona franca* and other industrial installations. One of Santiago's densest barrios lies adjacent to the main municipal garbage dump and sewage treatment plant. Others are located next to informal dumps for industrial and hospital wastes, adjacent to or downstream of industrial discharge outlets.

To conclude, the combined processes of industrialization, demographic growth and urban differentiation created an urban landscape in which resources and services are concentrated in the wealthier areas of the city which account for some 75 percent of the urban area, and in which environmental hazards are concentrated on the remaining portion the land base on which many poorer residential areas are located. In this segregated landscape, the urban poor are vulnerable to pollution, to natural hazards, and to eviction.

Placement of Risk in the Urban Landscape

This means that in Santiago the distribution of environmental risk is a function of (1) location on inherently risky sites, (2) unequal access to basic urban services, including relatively safe drinking water, sewage lines, and garbage collection, (3) a total lack of pollution controls. All three phenomena can be traced to Dominican urban and industrial policies.

Risk and settlement. As noted in the previous section, while real estate developers appropriated relatively flat, fertile lands for middle-class subdivisions, poor migrants seeking homes close to work in the *zona franca* built where they could--in arroyos, on flood plains and steep slopes, where the likelihood of floods and landslides is relatively high. The problem of flooding is especially severe in low-lying barrios along the Rio Yaque del Norte, which is dammed in its upstream reaches to provide electricity to the city and irrigation water. Water is

systematically released from the dam following heavy rains, flooding low-lying lands in the river's urban reaches. or occupy low-lying lands along the river, subject to periodic floods, whether due to heavy rainfall or periodic releases from the dams that supply hydroelectric power to the city.

Some informal settlements have been established in *cañadas*--arroyos formed by deeply entrenched intermittent streams--that feed into the Yaque del Norte. The *cañadas* are viewed as point sources of pollution for the Yaque del Norte in several studies (INDHRI 1993, Peralta and Fulcar 1994), but it is more accurate to think of them as collectors of industrial discharges and solid wastes from their own micro-watersheds. In any case, the *cañadas* present particularly severe pollution problem after heavy rains.

Risk, infrastructure and urban services. As noted above, the territorial expansion of Santiago is outstripping the ability of state and municipality to provide basic urban services, and those services that are provided are generally concentrated in the city's wealthier subdivisions. The urban environmental problem in Santiago is generally equated the lack of adequate sewage and solid waste disposal.

Perhaps the most visible urban environmental problem in the city is the large number of informal solid waste dumps, a problem that appears to be concentrated in marginal and working class neighborhoods. Solid waste management is the primary function of Dominican municipalities (Cobb et al. 1991). In Santiago, garbage collection covers at best some 40 percent of the municipality, and this maximum is seldom achieved due to problems with equipment. Because municipal and private services are concentrated in upper and middle class subdivisions, piles of waste accumulate in poor neighborhoods. These piles are comprised of household wastes, which are mostly organic, these dumps are unsightly and attract rats and domestic

animals. As I note below, the solid waste problem has received considerable media and NGO attention, although it is not the only, and certainly not the gravest risk associated with poor neighborhoods. Access to domestic water supply is far from complete.⁸ Although water drawn from the river drawn from a point above the city is trucked into some neighborhoods that lack infrastructure, river water burdened with urban domestic and industrial effluents is used for bathing and domestic use in downstream settlements. And, at best, water at the source is contaminated by uncontrolled discharges of agricultural and domestic wastes above the takeoff point for the municipal water supply. Most notably, agroexport enterprises discharge pesticide-laden waters into the upper reaches of the river. Just before it reaches the edge of the city, the river receives wastes from newly installed industrial hog operations.

In short, even before it gets to the city, river water is highly contaminated, and, even in the best neighborhoods tap water is not considered fit for drinking. The wealthy buy bottled water, while the poor must rely on the city supply for domestic use and are routinely advised to treat it with chlorine bleach. The poorest barrios in the downstream reaches of the urban watershed and who lack access to domestic water must make do with water that is also contaminated by urban industrial discharges.

Risk and industry. Santiago presents a palimpsest of risks associated with successive Dominican development strategies and their associated industrial policies. As noted above, patterns of sociospatial segregation mean that these risks also have a differential effect on the wealth and the poor. Import substitution industrial (ISI) development began along the banks of the Río Yaque del Norte. It is here that we find tanneries, two distilleries, and feed lots that are

⁸1997 has been an extremely dry year and CORASAAN has been unable to keep its entire command area supplied.

responsible for some of the city's most visible environmental problems. Untreated effluents from ISI industries (notably tanning, cement, distilling and food processing) are discharged into the urban reaches of the Rio Yaque del Norte.

A major focus of *zona franca* industrial growth in the past two decades has been the area around Cienfuegos and Rafe, poor urban neighborhoods in the Southwest of the city. The textiles and apparel, cardboard and paper, leather goods, cigars, and electronic equipment plants are not typical smoke stack industries, but they do produce wastes that require special handling. This is becoming increasingly true as fabric dyeing, laundering and finishing operations move into the *zona franca*. Some plants, like Levis and Sara Lee, are multinational branch plants which benefit from support service of the home office and are subject to scrutiny from transnational advocacy networks. Others outsource to multinationals, but maintain a separate identity. These plants have fewer incentives to maintain reasonable working conditions or environmental standards and fewer resources with which to monitor the workplace environment. The privileges accorded to export-platform industries in the 1970s and 1980s have meant a total absence of control over effluents and solid wastes from the *zona franca* industries.⁹

The land and *zona franca* infrastructure are typically managed by a corporation, which in principle is responsible for waste water treatment, but as of this writing the Santiago *zona franca* still lacks a waste water treatment plant. Castillo (1996) reports that 30 percent of Santiago's waste water receives no treatment and is discharged directly into the river. Of that 30 percent, a substantial fraction is industrial. He notes that while the Rafe sewage treatment plant is capable

⁹A notable exception to this general condition has to do with scrap materials and spent equipment deemed to have commercial value. These cannot leave the industrial parks and, in principal, should be returned to the country of origin. Because in many cases return is not economically viable, much solid waste accumulates within the parks.

of handling the volume of industrial effluents, the chemical burden of these effluents exceeds the maximum permissible if the plant is to function properly.

Zona franca industries also produce 30 metric tons of solid wastes daily (Garrido et al. 1997), not including spent materials and equipment or industrial byproducts that are deemed to have value. The latter are reexported to the home country or stored on site. They may not be exported from the *zona franca* without Dominican government authorization--a costly and cumbersome process. While well-connected enterprises may ship their by products or used equipment to the U.S., other plants simply warehouse any potentially reusable materials. Industrial solid wastes--whether from *zona franca* or local industrial plants--that are not potentially reusable examined by customs inspectors and hauled in open trucks by private contractors to the municipal garbage dump at Rafey.¹⁰

While it is likely that some recycling takes place before the garbage reaches the dump, no effort is made to control disposal on the dump site itself. Pigs and cows graze on the dump, while “buzos” or garbage pickers recycle on site (del Rosario 1997, Ponton 1995). Eventually the unsorted remainder is burned in an open fire. In their report assessing environmental problems associated with the *zona franca*, a group of plant managers identifies toxic fumes as a serious problem. According to their report, “the most dangerous gases are created by leather used in the manufacture of shoes and by different plastics.” The authors go on to describe the Rafey dump as “Dantesque:”

Aquella convivencia de basura, fuego, moscas, cerdos enormes y seres humanos

¹⁰ The 69 industries in the Rafey *zona franca* pay for 1190 truckloads per month, or an average of 17.5 trips to the dump per month per enterprise. Waste is not compacted in the trucks, and an estimated 15 percent is lost en route to the dump (Garrido et al 1997). While the contribution to the total municipal waste stream is high, the volume of garbage is reasonably low owing to the nature of assembly and to customs regulations.

afecta a toda persona con un poco de sensibilidad. Ojalá esto cambie algún día no muy lejano sea por decisión de las autoridades o por presión de organismos defensores del medioambiente (Garrido et al. 1997:8).

Thus the distinction between *zona franca* and the so-called traditional industries has little meaning when it comes to waste generation and disposal. In no case is waste water effectively treated, and, with the exception of spent equipment and potentially reusable materials, wastes are handled in the same way.

Quite apart from the risks associated with living in neighborhoods located on steep slopes, gullies or flood plains and those that result directly from inadequate urban services, a significant proportion of Santiago residents are directly exposed to hazards associated with industrial production. Tannery workers talk about “losing their skin” as a result of long-term exposure to chromium (Paniagua 1998); local health care workers report that many residents of poor neighborhoods in the vicinity of the local cement plant suffer from acute asthma and are at high risk for tuberculosis (Paniagua 1998; Platner, personal communication); an unknown number of consumers eat pigs fattened in the main city dump--a mountain of largely unsorted, untreated, and sometimes toxic solid waste much of which comes from manufacturing plants (del Rosario 1997).

Monitoring Capacity. Our initial research objectives in Santiago were to map potential sources of pollution in the city, to identify monitoring and control efforts, and to ascertain whether these efforts were appropriate given the likely sources of risk. Interviews with regional public health authorities revealed a fairly strong focus on incidence of infectious disease and diarrhea, but no data on disease related to toxic exposures. Technical staff working for CORAASAN, the Water and Sewer Corporation for the Municipality of Santiago, expressed considerable concern about industrial pollution and sought to improve their monitoring capacity.

When the project began in 1996, the agency had no capacity to monitor the city's water supply for substances other than dissolved oxygen, chlorine, and coliform bacteria. By the summer of 1997, however, they had acquired some simple analytical instruments that would give them the capacity to test for heavy metals. Four analytical laboratories in the Dominican Republic had access to mass spectrophotometers, instruments essential for detection of a broad array of pollutants. Of these laboratories, one was outfitted with USAID funds and controlled by an industry association. While the capacity of this laboratory to report accurately on water pollution appeared adequate, its main function was to ensure that export crops met U.S. Department of Agriculture standards for pesticide residues, and its staff had no history of or interest in running samples for municipal authorities on a pro bono basis. Yet, given the municipality's limited resources, it remains unlikely that Santiago municipal staff will be able to pay for sampling and testing on a regular basis. A second laboratory, located in Santo Domingo at the Dominican Institute for Technology (INDOTEC), displayed an interest in working with municipalities, but lacked the volume of samples required to produce accurate data.¹¹ A third facility, supported by GTZ technicians and staff was located within the Institute for Hydraulic Resources, INDHRI, but none of our several interviews with INDHRI staff suggested that this laboratory was functional. A fourth facility, located in Santiago's Instituto Superior de Agricultura had no trained staff and was not in operation during the research period. Ongoing monitoring programs supported by the international development community focused almost exclusively on routine testing for coliform bacteria and the presence of chlorine in the domestic water supply. The single attempt to

¹¹ These assessments of laboratory capacity are based on interviews conducted by industrial hygienist and toxicologist James Platner, senior extension associate, Cornell University, College of Industrial and Labor Relations.

encourage local enterprises to report on their emissions had yet to meet with success. Monitoring efforts did not appear to reflect the hybrid nature of risk, but focused solely on fecal contamination of the water supply.

In sum, residents of Santiago's poorest neighborhoods face simultaneously both the risks associated with poverty and those associated with economic growth, the risks associated with human settlement and those associated with rapid, largely unregulated industrial development. And this is true because urban policies of the last half-century have encouraged the appropriation of low-risk municipal lands for upper and middle-class real estate development. The risks associated with poverty have as much to do with the poverty of the municipality as with the poverty of exposed Santiago residents. The risks associated with growth are particularly risky because they are poorly understood and poorly monitored. Export-platform industrial activity has brought with it a transfer of production technologies and processes from center to periphery in the absence of a transfer of knowledge about how to identify and control their associated risks.

Urban Environmental Discourse and the Placement of Risk

Industrial pollution in Santiago has not gone unnoticed. A local environmental NGO director refers to his organization as "the department of environmental complaints for the city of Santiago," and his organization's archives are stuffed with protests against pollution and toxic releases coming from neighborhood associations. "Ecos de la Comunidad" local news column in the Santiago daily, *La Información*, documents similar complaints from low-income neighborhoods in the city's industrial belt. Municipal sewage treatment plant staff use fish kills as indicators of industrial contaminants in waste water at levels that render the plant non-functional by killing bacteria intended to digest domestic wastes. Interviews with women's groups and

neighborhood association members in poor barrios revealed considerable concern with water quality, air quality, noise and garbage. Paniagua (1998) found that residents of riverine barrios identified the lack of proper sewer outlets and industrial waste as main sources of water pollution. In particular, they pointed to effluents from the tanneries, rum factories and pork feed lots located on the banks of the Yaque del Norte. But, while the city as a whole and poor neighborhoods, in particular, suffer *both* from the risks associated with an absence of basic urban services and those associated with industrial pollution, Santiago urban environmental discourse emphasizes the risks associated with domestic waste management and generally ignores those associated with toxic exposures and industrial contamination.

To understand the reasons for this, we need to look at discussions of environmental risk taking place in the international development community, at the national level, and among municipal leaders. International urban environmental discourse has a profound impact on the nature of urban environmental debates in Santiago because of (1) the history of collaboration between prominent environmental spokespersons at the municipal level and international donor agencies, (2) the economic power of aid givers, and (3) the career aspirations of educated Santiago residents who are increasingly seeking careers in the better-funded NGOs favored by international development assistance providers.

Urban Environmental Risk in International Development Discourse. The urban environmental discourse that prevails among international development assistance agencies working in Santiago as reflected in publications like the 1996 World Resources Report on Urban Environment is little more than an elaboration of Rostow's (1960) modernization framework. The analytical foundations of this approach to risk are set out in Smith and Lee (1993) and in

McGranahan et al. (1996). Smith and Lee (1993) distinguish between traditional and modern risks in Third World cities. They associate traditional risks with infectious disease, which they link to very dense human settlement in the absence of water and sewer provision. Modern risks are those associated with industrial pollution, automobile traffic, and inadequate toxic waste management. Smith and Lee argue that modernizing cities undergo a risk transition: as economic growth enables them to attend to hygiene and control of epidemic disease, the risks of modernity assume increasing importance. As they see it, Third World cities have progressed to an unfortunate phase of development during which the traditional and modern risks overlap. This overlap accounts for many of the problems that impress northern visitors to Third World cities.

McGranahan et al. (1996), in contrast, posit a ripple model of urban environmental risk: for those living in poor neighborhoods and workplaces, particularly those in the South, major environmental hazards are exposure to diarrhea, mosquito borne and respiratory diseases and air pollution from smoky kitchens; as affluence increases, environmental hazards at the neighborhood level are displaced and experienced at the municipal level. For example, with a shift from wood fuel to electricity, household air pollution may abate, while ambient air pollution increases. In still more affluent cities, local pollution is controlled, while the economic growth that provides revenues for abatement technologies contributes to environmental degradation on a global scale.

This construction of urban environmental risk associates “traditional” risks with neighborhoods: limited water supply, shared toilets, lack of home garbage collection, indoor air pollution from wood fuel or charcoal, and flies in the kitchen. Risks of modernity associated with uneven distribution of wealth that are expressed at the neighborhood level--exploding propane tanks, unsafe, informal hook-ups to electric grids, localized industrial air pollution, and toxic and

hazardous materials storage facility siting-- are not addressed. The ripple model differentiates among Third World cities, taking into account differences of wealth and industrial development among and within them and adds a spatial dimension to the notion of risk transition, echoing Beck's (1992) portrayal of environmental risk as pervasive and unsettling, associated with class at one level, but severed from it and equalizing at another. But the ripple model, like Beck's concept of "reflexive modernization" and the more technically oriented arguments of Smith and Lee and the World Resources report, contains assumptions about the evolutionary nature of economic growth that do not fit with the seemingly contradictory processes we find in Santiago, where risks associated with industrial development and those associated with service-deprived settlements are increasing simultaneously.

Dominican Perspectives on Urban Environmental Risk. We might expect that, given this lack of fit, a new discourse would emerge at the national and local level that would better reflect the hybrid nature of risk in Santiago. However, this is not the case: national and local environmental writing most often couches the urban environmental problem in Santiago in terms of health risks due to bacterial contamination of the water supply, open sewers and informal solid waste dumps.¹² As I suggest above, one reason for this may be the preponderant role played by the international development community in setting the urban environmental agenda and in funding projects and programs. But there is another element in national and regional urban environmental discourse as well--a lingering distaste on the part of local elites for peasants drawn

¹² Paniagua (1998) demonstrates offers a general panorama of the role of international development institutions in shaping Dominican environmental agendas. In Santiago, USAID, the GTZ, the United Nations Development Program, the Kellogg Foundation, and the Ford Foundation have played important roles.

to cities by employment opportunities.¹³ Denigration of recent migrants to the city takes two forms in environmental discourse. One is identification of “crowding” as an environmental problem in and of itself. A second is an emphasis on instructing the urban poor on ways to clean up their neighborhoods. A third is popularization of the notion of “pulmones verdes” or green belts in urban watersheds that would serve as lungs for the city.

This emphasis on “traditional” risks at the national and municipal level and the tendency to blame poor migrants for urban environmental problems are significant. Urban environmental deterioration is associated with human settlements rather than industry have led to policy statements tying environmental improvement to the physical removal of marginal human settlements cañadas, river banks, and other central locations. At the same time, municipal officials and educational institutions have paid relatively little attention to monitoring and the development of methods to provide reasonably accurate information about toxic releases.

Cleaning Up. When we look at the way in which regional environmental rhetoric informs clean-up efforts, these implications become clear. Water pollution in Santiago has been the subject of international development as well as regional concern, and the Rio Yaque del Norte has been the focus of increasing media attention and regional dialogue. In 1991, the Ecological Society of the Cibao hosted a seminar on the “Past, Present and Future of the Rio Yaque del Norte” and published a nostalgic and passionate call for cleanup (Veras 1991). In 1992 a presidential decree accorded to the Instituto Superior de Agricultura (ISA), stewardship of the river. ISA is chair of the Commission for Safeguarding the Yaque del Norte Watershed. In this

¹³ Derby (1998:42-44) traces this phenomenon to early twentieth century Dominican social critic José Ramón López, who describes the rural migrant as “a poorly attended exotic flower.” Derby finds that twentieth century social reformers fixed on the *turgurio* or shanty as a key instrument in the production of deviance. It would appear that this characterization has been “environmentalized” by Dominican elites.

capacity it issued a preliminary report attributing water pollution to the presence of human settlements on the river's edge or on the steep banks of the cañadas and pressing for evictions (Carrasco et al. 1993). CONORDEN, a body created by Santiago's elite Asociación para el Desarrollo for the specific purpose of improving environmental quality in the municipality, has drafted a proposal for management of effluents flowing into Santiago's cañadas or sub-basins of the river and is seeking funding for its plan from USAID and the World Bank. In 1995, the Asociación para el Desarrollo called together local professionals in a seminar to discuss the future of the river basin. Their recommendations included installation of industrial treatment plants and a strengthening of the capacity of CORAASAN, Santiago's parastatal water and sewer corporation, to carry out effective water resources planning. In July 1996, ISA declared "El día del Río Yaque del Norte amid great publicity, hoping to build support for its model of pollution control. But dialogue and publicity have produced little in the way of monitoring or remediation. Outside of a one-shot GTZ-funded study (INDHRI 1993), we found no systematic efforts to monitor effluents going into the Río Yaque del Norte or in the *cañadas* that feed it.

In some quarters, we find considerable faith in the private sector's ability to clean up its act. In 1996, the ethics committee of AIREN, the Association of Industrialists for the Northern Region, asked its members to report on types of chemicals used, discharges and treatment plants. We learned that six months after circulation, no one had returned out the questionnaire. Within the *zonas francas*, several enterprise managers associated have written to industrial park managers calling for the installation adequate waste water treatment facilities. The managers most concerned with the zona franca's environmental image represent branch plants of multinational corporations like Levi's and Sara Lee, potential targets of transnational advocacy

network campaigns. But to date, pressure from these highly exposed firms has not produced any significant changes in waste management.

The one public agency at the municipal level directly concerned with water pollution levels at a municipal level and on a continuing basis is CORAASAN. CORAASAN cares about water quality in the urban reaches of the watershed, because industrial discharges can compromise the ability of bacteria to digest sewage in its antiquated treatment plant. At a national level, the Commission for Ecological Sanitation (CNSE), was created by presidential decree (Decree Law No. 226) with the primary function of controlling industrial discharges into the nation's rivers. CNSE established series of norms, which for a brief period in 1992, were enforced with somewhat misplaced zeal. Factories were closed, and advisors sent to recommend treatment plant installation. In some well publicized cases in Santiago, CNSA staff recommended installation of treatment plants that were totally inappropriate for the purpose. The CNSA campaign was quickly delegitimated, and its architect, the once powerful Forest Service director, Col. Pedro Candalier, removed from office. But, even at its peak, the CNSA campaign focused exclusively on plants from the ISI era and had no impact on *zona franca* waste production, despite growing evidence of problems in this sector (Cobb et al. 1991). Since that time, government attention to industrial pollution has been sporadic, at best.

International interest in urban water quality also peaked the early 1990s, and was equally ineffectual. As noted above, the Gesellschaft für Technische Zusammenarbeit (GTZ) and USAID helped to equip laboratories for water analysis, but the presence of instrumentation has not led to monitoring efforts. Thus, despite a growing awareness of brown issues in international agendas, we find little evidence that international programs, with the exception of the Pan American

Health Organization's probe of lead exposure in Haina, have improved Dominican capacity to monitor industrial effluents (Platner 1997).

Solid wastes have received more attention, perhaps for symbolic reasons. The period immediately following PLD president Leonel Fernandez' election in 1996 was marked by an emphasis on clean-up. Garbage in the streets of Santo Domingo's peripheral barrios became a metaphor for corruption, a metaphor symbolized by Attwoods, the company awarded the lucrative contract for waste hauling during latter years of the Balaguer administration. Photographs of mounting garbage piles accompanied reports on the Attwoods scandal in the daily press. Immediately after his inauguration, Leonel concluded an agreement with the company for a massive cleanup with high levels of community participation, which in this context meant contributions of free labor.

Solid waste also received substantial coverage in the Santiago press. This was largely due to the efforts of two companies bidding for waste management contracts. But the media focused on domestic, rather than industrial solid wastes. And, indeed in Santiago, garbage is a growing problem. Only 62.5 percent of the solid waste stream is collected, and 40 percent of the urban population has no access to garbage collection whatever (Ponton 1995). But, the emphasis on visible, informal dumps is indicative of a perspective that emphasizes tidiness and order, rather than long-term ecological impacts and of an ethic that places responsibility for environmental degradation squarely on the shoulders of its victims. For example, a Peace Corps Volunteer and a community organization funded by the Kellogg Foundation and supported by local researchers have made valiant attempts to improve garbage collection in the working class neighborhoods of Barrio Lindo and La Yaguita del Pastor. But these efforts reveal what I call an *Alice's*

Restaurant approach to solid waste management: because Santiago lacks sanitary landfills or systematic recycling programs, pilot projects in poor barrios have helped local residents to remove trash from visible sites in their neighborhoods to less visible informal dumps. This type of small project, limited in scope and carried out with community labor contributions and limited technical and financial assistance, has come to be equated with urban environmental action. Transport and treatment of industrial solid wastes--particularly those coming from the *zonas francas*--have received no attention from NGOs, government agencies or international donors.

To conclude, Santiago's rapid economic and demographic growth has resulted in a close juxtaposition of varied and at times incompatible land uses and the emergence of under-serviced and environmentally precarious neighborhoods--inhabited in the main by the urban poor. While the risks faced by residents of Santiago are hybrid in nature, urban environmental discourse has emphasized risks associated with or, more accurately, posed by human settlements. Clean-up efforts have in the main been confined to small sewer and solid waste collection projects carried out with local labor contributions. Sporadic efforts have been made to identify and control water contamination associated with ISI industrial activity, but these have had no lasting impact. Even less effort has been made to understand or regulate the environmental impacts of *zona franca* production or of the informal industrial activities that support major sectors of the local economy.

The introduction of new technologies to Santiago is occurring without a parallel transfer of knowledge about how their use should be monitored and regulated or how their byproducts should be handled. Because the changing nature of risk has much to do with international economic policy and its emphases, it could be argued that the international development community ought to support these activities. But one significant barrier to this transfer is the

persistance of stadial explanations of urban environmental risks and the consequent emphasis on infectious disease, domestic waste, and small-scale, self-help remediation projects. In this context, the multiplying risks associated with industrial pollution, which can only be effectively addressed at the municipal or national level constitute a significant and growing, but largely concealed problem.

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