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## Water Degradation in Morelia Got problems? Find a wishing well

BY WILLIAM F. FOOTE

MEXICO, Morelia

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On the rim of a cloud-capped river basin, a donkey sinks lifeless, sucked against an iron grate covering a water intake pipe. The carcass had floated downstream in an open-air canal from the Cointzio reservoir. As the animal disappears under brown detergent foam, water gushes past, pouring underground, en route to the Santa Maria treatment plant. Built in 1952, designed to remove mild infectants like algae, the plant generates 420 liters per second (l/s) of non-drinkable "drinking water."

In the valley below, two rivers, the Rio Chiquito and the Rio Grande (not the Texas one), flow through urban sprawl like toxic stews: pea-soup green in color and texture, laden with excrement and carcinogens. They carry human and industrial wastes past schools and tumbledown neighborhoods, then merge and empty with impunity into *Valle Querendaro*, some 13,000 hectares of fertile farmland.

In San Pedro de los Sauces, a rural downstream community, Maria Luisa Lopez arranges flowers before an outdoor altar to the Virgin de Guadalupe, Mexico's patron saint. A stench rising from the ground below mocks the scent of roses adorning the Virgin, caretaker of Mexico's national well-being. Beside Mrs. Lopez's adobe house, raw sewage oozes through a system of muddy ditches, flushing the town's liquid refuse on toward the nearby river.

These three waterscapes, observed recently in Morelia, Michoacan, are punctuation marks in two decades of the declining fortunes of the city's most important natural resource. As faithful Catholics like Mrs. Lopez make annual offerings to the Virgin of Guadalupe, cleaner rivers and safer faucets rank high on their wish lists.

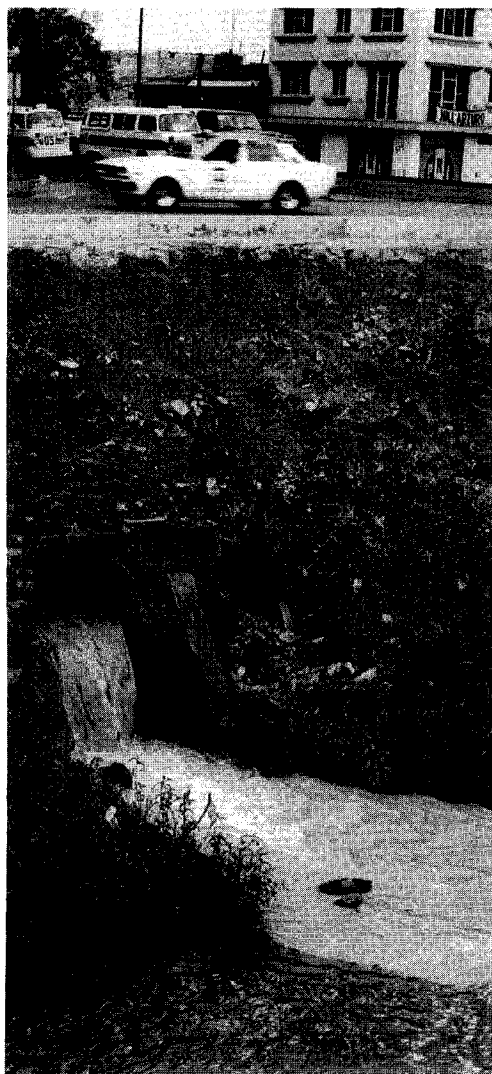
Such prayers find echo elsewhere. Indeed, millions of Mexicans who suffer the effects of water degradation join billions more in other developing countries, where most rivers in and around cities and towns are little more than open, stinking sewers. The World Bank claims one billion people still lack access to adequate supplies of water, and 1.7 billion do not have adequate sanitation facilities. These shortages account for a staggering 2 million deaths per year from diarrhea alone.<sup>1</sup>

In general, providing infrastructure services — also including power, transport, telecommunications — is one of the major challenges of economic development. Unfortunately, history suggests that when times are hard — as they are now in Mexico — governments cut infrastructure spending first (it's always easier to slash capital expenditures than to lay off public employees or lower wages).

In Mexico this held true throughout the debt crisis of the 1980s, the so-called lost decade. Consequently, in the 1990s President Carlos Salinas de Gortari's

1. Ismail Serageldin, *Water Supply Sanitation, and Environmental Sustainability: The Financing Challenge*, (World Bank) 1994, p.4.

*William F. Foote is an Institute Fellow examining the economic substructure of Mexico.*



Dumping raw sewage into Rio Chiquito.

administration prioritized infrastructure development. However, emphasis focused on investment in the economic superstructure (e.g., toll roads) rather than the social substructure (e.g., sewage treatment plants).

Today, the effects of this are perhaps most clearly reflected in medium-sized cities, the focus of Mexico's demographic and economic growth in recent years. Across the Third World, in fact, rapid urbanization and industrialization outside the mega-cities promises to increase pressures on basic-services provision.<sup>2</sup> Unfortunately for Mexico, local governments have too often lacked the central planning tool for galloping urban growth: social infrastructure investment.

This newsletter looks at one such place, Morelia.

The city sits in "one of the richest regions in the world in terms of variety of water sources,"<sup>3</sup> but suffers from a drinking water deficit of 500 liters per second. It's just one drop in a bucket of problems that has turned Morelia's backwater bliss into urban blight.

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"I would be hard pressed to find a better, more convenient place, given these rivers, so close to all the other needs of the population..." These words, written by Spanish Viceroy Antonio de Mendoza, who founded Morelia in 1541, garnish a plaque on a monument downtown.

Circling the viceroy's statue, taxis hug the roundabout with doors flashing the company logo: an aqueduct. Just blocks away, down cobblestone streets lined with colonial facades, stands the real thing. Fifteen-foot-high pink limestone arches lunge across the city toward the outlying mountains. Built in the 17th century, the aqueduct is the crowning architectural jewel of colonial Morelia, which UNESCO proclaimed "Patrimony of Humanity" in 1993.

"The city has everything you need for ordered urban growth," said Mario Ballesteros Figueroa. His office faces a 350-year-old Spanish-style courtyard. "Manageable topography, good access roads, solid land for construction, a reservoir, a water treatment plant — what any city in the world would want," added Ballesteros, local representative of the Federal Environmental Protection Agency. "The problem is we grew too fast."

That's an understatement. Figures from the National Institute of Statistics, Geography and Information (INEGI) report that Morelia's population stood at 161,040 in 1970. By 1980, it had jumped to 297,000 people. During approximately the same period (1975 to 1985), the *mancha urbana* (urban stain) swelled by over 100 percent. In 1990, INEGI's official census logged 490,000 inhabitants; yet today, local academics whisper one million-plus.<sup>4</sup>

"You can estimate the population by the amount of

#### Population of Morelia (1541-1995)<sup>5</sup>

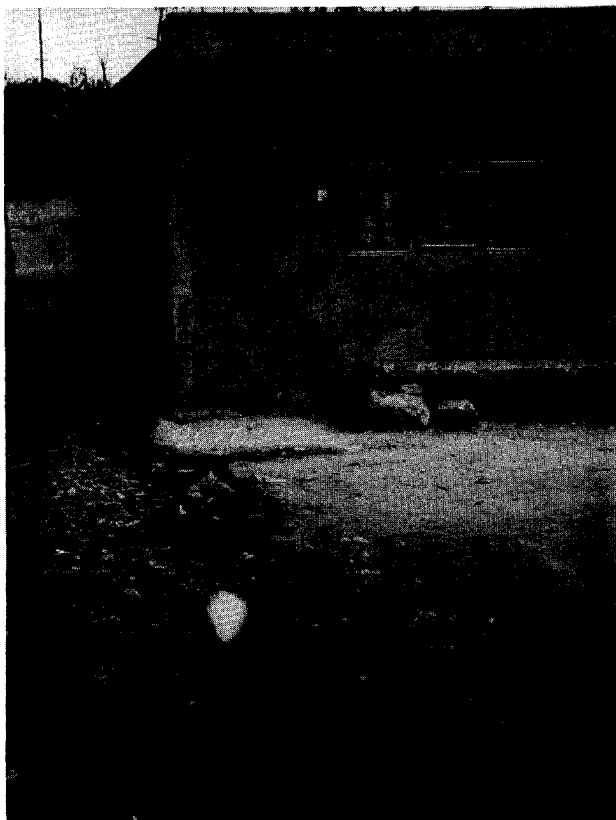
YEAR	POPULATION
1541	500
1793	17,093
1900	37,278
1940	44,304
1960	100,828
1970	161,040
1980	297,000
1990	489,756
1995	1,200,000 est.

2. For example, between 1950 and 1990, the number of cities in the world with populations of more than 1 million nearly quadrupled from 78 to 290. Ismail Serageldin, *Toward Sustainable Management of Water Resources*, (World Bank), 1995.

3. Carlos Saenz de la Calzada, *Hidrologia Medica general y del Estado de Michoacan*, 1974.

4. Figures recorded at a presentation INEGI offered during a conference held at the University of Michoacan in December.

5. Population figures from article published in *Revista del la Universidad Michoacana*, Oct.-Dec., 1993.



Stone-age drainage ditch in San Pedro de los Sauces.

trash the city generates per day," said Juan Manuel Villanueva of Michoacan state's Department of Urban Development and Ecology. "The World Health Organization estimates that each person produces approximately 750 grams to one kilo of trash per day. In Morelia, we collect some 1,200 tons a day. Hence, we could have 1.2 million people."

Arturo Chacon Torres agrees. A biology professor at the University of Michoacan, he suggests the federal government deflates population figures in order to reduce regional fiscal allocations, which are proportional to local population size. "Purposefully underestimating real growth destroys city planning," he lamented. "Imagine working under the assumption that 500,000 people need water, when really you have twice that — it's crazy!"

Why did Morelia grow so fast? The 1985 earthquake in Mexico City offers one explanation. Following the devastating tremor, virtually all cities within a five-hour travel radius of Mexico City overflowed with people, according to Mateo Castillo, a water-quality en-

gineer with Morelia's Environmental Research Center. "Places like Morelia were close enough to the capital for quick communication, but far enough for a psychological safe haven," he said.

Professor Chacon called the earthquake a "catalyst that accelerated an ongoing process of decentralization of the federal bureaucracy." The seism leveled a large number of important government buildings in Mexico City, including the National Medical Center, the Ministry of Transport and Communications and the Naval Ministry. Spooked, the central government rushed to disperse federal offices and bureaucrats to nearby cities. The emergency pace at which this ensued created mayhem for receiving municipalities.

"Local authorities were told to make space, now!," explained Chacon. "In Morelia, the government expropriated *ejidos* [communal farms], forcing thousands of *campesinos* to move to the peripheral slums. At the same time they passed legislation to facilitate construction of low-cost housing units for incoming bureaucrats and official union members,<sup>6</sup> institutional changes that shady developers later used to build shoddy housing developments all over the place."

Patricia Avila challenged Chacon's theory. "I don't think the earthquake was so important," said the Ph.D. student, pulling on a cigarette over expresso at *La Libreria*, Morelia's version of Starbuck's coffee shop. "Most of the *chilangos* [Mexico City residents] who arrived here during the 1980s were victims of the 1982-3 debt crisis. When the government defaulted [on foreign loans], 6,000 factories closed and 250,000 industrial jobs disappeared," added Avila, who is writing her dissertation on local water problems.

She insisted, however, that local population pressures stem mostly from rural-urban migration within Michoacan. Indeed, the state's *campesino* population is shrinking. Michoacan's rural masses dropped from 54 percent of the total population in 1970 to 34 percent in 1995. (Still considerably larger, however, than the country's rural population at large, which dropped from 41 percent to 17 percent between 1960 and 1990.) Meanwhile, Michoacan's agricultural production fell from 8.3 percent of Mexico's national gross domestic product (GDP) in 1981 to 5.2 percent ten years later.<sup>7</sup>

What explains the contraction? Falling federal farm support certainly had an impact. During Mexico's crisis years (1982-89), national agricultural investment dropped from 2.4 percent to 0.2 percent of GDP.<sup>8</sup>

However, Alfonzo M. Urbina of the Municipal Support Center in Morelia blames Michoacan's backward-

6. Bureaucrats arrived in Morelia from, among other agencies, FIRA (second-tier agricultural bank), the Ministry of Agriculture, and the Federal Commission of Electricity.

7. Ruben Quintero Sanchez, "Desilusion y Miseria en el Campo Michoacano," *Revista de Universidad Michoacana*, Jan.-March, 1994 and *La Voz de Michoacan*, Dec.28, 1995.

8. Alan Gilbert, *The Latin American City*, (Russel Press), 1994, p.32



Morelia's 17th century aqueduct.

ness relative to other agricultural states. "Take Sinaloa, for example, over one million hectares irrigated, covering 90% of cultivable land. They plant all year round. In contrast, Michoacan irrigates less than 500,000 hectares out of two million total. That means low-productivity, seasonal agriculture."

Urbina described *campesinos* from up North as "*hacendados* (ranch owners) compared to our peasants, who could survive if they had 20-hectare, or even 10-hectare *ejidos* (communal farms), as many do in Baja California, Sonora or Sinaloa. They don't, however, because as time passes, land is divided between father and sons and *ejidos* dwindle to a fraction of a hectare. Without alternative sources of employment, hope runs dry. So, they come to Morelia."

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Perched on a ridge south of town, the patio of Hotel Villa Montana affords a panoramic view of Morelia's urban sprawl. In the center of the valley, cathedral steeples tower above red-tiled roofs marking the colonial district. To the east rises the modern middle-class suburb with its brutal architectural idioms of the 1970s. To the west lies the University of Michoacan, its white arched buildings resembling a fallen radiator. These areas, along with a sprinkling of public housing projects, comprise 40 percent of the cityscape. The rest: a brick ocean of homemade neighborhoods flooding the outreaches of the river basin, splashing the ankles of surrounding foothills.

It's a familiar sight in Latin America. Over half of the region's urban population live in so-called self-help

neighborhoods, or *colonias populares*, communities that begin as a rudimentary form of shelter lacking all kinds of service. Newcomers — earthquake victims, unemployed, *campesinos* — occupy land that lacks planning permission or has been invaded. Initially, they steal what's necessary, illegally tapping into water and electricity lines. Eventually, in exchange for political loyalty, local governments introduce services and infrastructure (see WF-2). That is, assuming they have money.

"We're a poor municipality relative to other middle-sized cities," said Avila, back at the coffee shop. "Our productive plant hasn't expanded in two decades." She mentioned other medium-sized cities up on the U.S. border, for example (Tijuana, Ciudad Juarez, Nuevo Laredo), and nearby in the heartland (Guanajuato, Leon, Toluca), that have experienced explosive demographic growth coupled with economic expansion. Like Morelia, they have big problems. But they also have more flexibility to finance urbanization costs.

In a December survey on Mexico, *The Economist* wrote: "Tijuana's economy is already out of recession," and pointed to "dollar industries which between them inject some \$U.S.130 million a month into the city — tourism, *maquiladora* assembly plants, remittances from cross-border commuters."<sup>9</sup> While Tijuana remains the world capital for making television sets, Michoacan's neighboring state, Guanajuato, has cashed in on nearly 60 *maquiladora* plants, which employ more than 600,000 people across Mexico. Leon, the capital of Guanajuato, is the country's capital of shoe production. In contrast, Michoacan has *maquiladoras*, not one company that

9. *The Economist*, Oct. 28, 1995.

even trades on the Mexican stock exchange.<sup>10</sup> Its capital, Morelia, features a weak industrial base, generating little tax revenue to finance growth.<sup>11</sup>

Nevertheless, Morelia harbors 320 *colonias populares* that multiply like rabbits. In 1991, there were just 230. In an article published that year, Patricia Avila summarized their water services: "Of all the *colonias* in Morelia, 44 receive water two or three times a week for several hours, 47 have one shared public spigot, and 139 have regular service."<sup>12</sup> The water deficit that year was a whopping 1,200 l/s. Today, the government calls it 500 l/s. Is this cause for optimism? "Don't get your hopes up," said Avila. "Our water supply has lots of enemies."

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A winter's-afternoon breeze is imbued with the smell of hydrogen sulfide ("rotten-egg gas") that wafts above the mouth of La Mintzita, a natural well-spring. Tucked in the western edge of the Valley of Morelia, La Mintzita gushes over 1,200 liters of pristine water per second, providing a quarter of Morelia's drinking water and feeding the Rio Grande. Two hundred yards from the resulting lagoon lies CRISOBA, a paper mill, Morelia's most profitable industrial concern. Between here and there, sunk beneath



*CRISOBA spewing soot and hydrogen sulfide into the Valley of Morelia.*

the ground, runs a jumbo intake pipe. It captures nearly 50 percent of La Mintzita's flow (550 l/s), the equivalent of Morelia's current water deficit.

"We wanted industry and we got our worst nightmare," said Professor Chacon, who also directs the Natural Resources Institute at the University of Michoacan. "CRISOBA is a very aggressive outfit. They



*Washing clothes near La Mintzita springs.*

10. *La Voz de Michoacan*, Dec. 6, 1996.

11. An explanation of the roots of local industrial underdevelopment falls outside the scope of this newsletter. Suffice it to say that Morelia's Ciudad Industrial (Industrial City), founded in the 1970s and comprising 35 small companies, never grew. Perhaps, as Urbina suggested, the city lies "too far outside of the industrial triangle formed by Monterrey, Guadalajara and Mexico City, ... and had no superhighway running nearby until in 1994." Perhaps, as Avila said, "our problem has been a conservative business elite that insists on speculative, non-productive investments, like Multicinas (a national theater chain headquartered here)."

12. Patricia Avila Garcia, "Estudio preliminar sobre el deterioro socioambiental en la ciudad de Morelia: el caso del Agua," *Urbanizacion y Desarrollo en Michoacan*, (Colegio de Michoacan), 1991, p.244.

contributed to the great deforestation of our state.<sup>13</sup> They consume huge quantities of clean water and employ archaic technology, using mercury and other highly contaminating chemicals in their production process. From the beginning, it was a mistake to allow the mill to set up there, an error merely compounded by the drinking water issue.”<sup>14</sup>

Today, CRISOBA belongs to Mexico's second largest paper-products group of the same name. In 1973, after several years of solicitation, the company received a one-year permit from the Secretariat of Water Resources to use the spring waters of La Mintzita. “It was never a concession, however,” emphasized Avila. “The municipal government granted temporary water access on condition that the company look for an alternative supply. Twenty-two years have past since then; I guess they're still looking.”

Having scoured Morelia's historical archives, Avila claims La Mintzita was always considered to be a vital water reserve for eventual urban growth. Before the 1970s, however, the city didn't need it. When Morelia's population exploded, CRISOBA had already dug in.

During the early eighties, after a decade of 6.7 percent annual population growth and accompanying water shortages, local authorities put their foot down. In 1983, Robles Garnika, an opposition mayor, took CRISOBA to court, demanding La Mintzita's waters for domestic consumption only. Surprisingly, that same year, a presidential decree granted his wish. Garnika left office months later, however. His successor, a P.R.I. politician, buried the issue. The resolution languished in a statute book.

“The government has pretty much left CRISOBA alone since then,” said Avila, adding that the company's only vocal opponents today are poor farmers in *Valle Querendaro*, who claim their crops won't sell thanks to industrially polluted irrigation water.

Teresa Huato Quintana, a water-quality engineer with the P.R.I.'s outgoing city government, sees no reason to hassle CRISOBA. “Nobody has proven that they're contaminating the river,” she stated. “CRISOBA uses water and then treats it. The real problem, you see, is that people swim in La Mintzita, wash their clothes there. In general, contamination in our rivers is biological (*e.g.*, fecal matter), not chemical.”

The local representative of the Federal Environmental Protection Agency, established in 1994 to put teeth into Mexico's NAFTA-induced environmental codes,

also supports the paper mill. “CRISOBA reports full compliance with federal environmental standards. We understand the company's waste-water treatment system and air-pollution controls are as advanced as any other in the world,” asserted Mario Ballesteros. But he qualified himself: “Of course, the paper industry generates a lot of contamination... It's clear that when you take water straight from a spring, compared to residual waters, there's a contrast.”

Mateo Castillo of the Environmental Research Center in Morelia, a private institution, confirmed that CRISOBA does have waste treatment facilities, but called them “inefficient: sometimes they dump clean water, other times dirty.”

Juan Villanueva, who tests air quality for the Secretariat of Urban Development and Ecology, was more blunt. “Give me a break,” he said. “If they haven't been able to clean their air pollution, a much simpler process than purifying liquid waste, well, much less the water.”

If CRISOBA does dump toxic waste untreated into Rio Grande, it's not alone. In November, 1995, the National Ecological Institute reported that a majority of Mexico's industries do not comply with environmental regulations and estimated that companies clandestinely dump 90 percent of the country's industrial wastes into municipal drainage systems or federal bodies of water.<sup>15</sup>

Professor Chacon worries about the long-term consequences for Morelia. “CRISOBA is causing a generational environmental impact,” he said, concluding ruefully: “It's a balance-sheet issue for them. Their costs would increase by 30 percent to 40 percent if they assumed the real environmental price of paper production. What's more important: clean water and forests, or cheaper paper? Unfortunately, we're not in a position to decide that. What seems certain, though, is that one of these days CRISOBA will stop turning a profit. They'll close the plant and leave us with 1,100 unemployed workers, contaminated aquifers and deforested mountains.”

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A government housing project built in 1987, Lomas de Morelia straddles the treeless eastern slope of the Valley of Morelia. Viewed from a distance, its 1,500 identical buildings resemble a forest of Q-tips because of the round white water tanks on the rooftops. Beneath one, Alejandro Cazares, 46, a public employee, complains bitterly about the contaminated crud pouring from his faucet. “We've had skin rashes and intesti-

13. Deforestation in Michoacan began in the 1960s, and intensified during the early 1970s, when CRISOBA began operations. Between 1958 and 1978, the forested surface area in the region of Morelia decreased by approximately 60%. Only 2% of affected areas have been reforested. Guillermo Vargas Uribe, “El Deterioro Ambiental en la Cuenca del Rio Grande de Morelia, *Revista de la Universidad Michoacana*, June-Sept., 1992.

14. The production of one ton of paper requires felling 17 mature trees, consuming 26,500 liters of water and 1,440 liters of gas. *El Financiero*, Dec. 10, 1995.

15. *El Financiero*, Nov. 30, 1995.





*The neighborhood of Lomas de Morelia behind abandoned sewage collector pipes.*

nal troubles," says the father of three. "The water's so dirty it stains the bathtub and our drinking glasses."

In the mid-1980s, during Morelia's rush to resolve immediate housing problems, the city sank the neighborhood well too close to the Rio Grande, according to Cazares. Subsequently, industrial and human waste from the river filtered through fault lines in the bedrock beneath the valley, contaminating the well. Since 1989, Lomas de Morelia has received water intermittently from a neighboring well. But, said Cazares, "when that pump shuts down — more often than not — and ours kicks in, you don't want to see or smell what comes out."

Interestingly enough, Morelia had no wells before the 1980s. Today there are 80. They provide 70% of the city's potable water. With industry guzzling spring water, rivers collecting sewage, and the Santa Maria water treatment plant covering only 30 percent of households (mainly the historic district), wells seemed the obvious solution. Makes sense, right? Not necessarily. Professor Chacon claims too many wells have overtaxed the valley's aquifers, causing water pressure to drop precipitously. "Before long, city authorities will have to cut service to the east and west of Morelia to build enough pressure to administer water from south to north," he predicted.

Furthermore, steep electricity bills related to pumping ground water to the surface helped to bankrupt most of Michoacan's local governments, according to *El Cambio de Michoacan*, Morelia's opposition paper. In December, the mayor of Puruandiro told reporters his administration was "flat broke, along with most of the other 113 municipalities in the state, and the other 2,378 across the country."<sup>16</sup>

Pressuring local officials for service payment, the Federal Electricity Commission (CFE) has begun to cut off power to municipal water systems. On December 9th, CFE shut down 14 wells servicing La Piedad, a city of 170,000 in Michoacan. Water authorities there owed CFE 129,000 pesos (U.S.\$17,200). Local residents lacked water for several days.<sup>17</sup> Meanwhile, in Lazaro Cardenas, a port city on Michoacan's Pacific coast, citizens protest regularly over constant interruptions in water service attributed to payment delays to CFE.<sup>18</sup>

However, the worst effect associated with well proliferation in Morelia appears to relate to removing and treating sewage. As the World Bank writes of developing countries at large: "There is a tendency to expand water supply (e.g., sinking wells), without adequate attention to sewer or sanitation, which cannot handle the increased wastewater created by the expansion...New water is brought into urban areas, which creates large amounts of untreated, polluted wastewater that is often then used by the urban poor."<sup>19</sup>

Mateo Castillo, who tests water quality for a living, said Morelia fits the description well. "We treat nothing. Our river waters are entirely contaminated, totally useless. There's no denying it."

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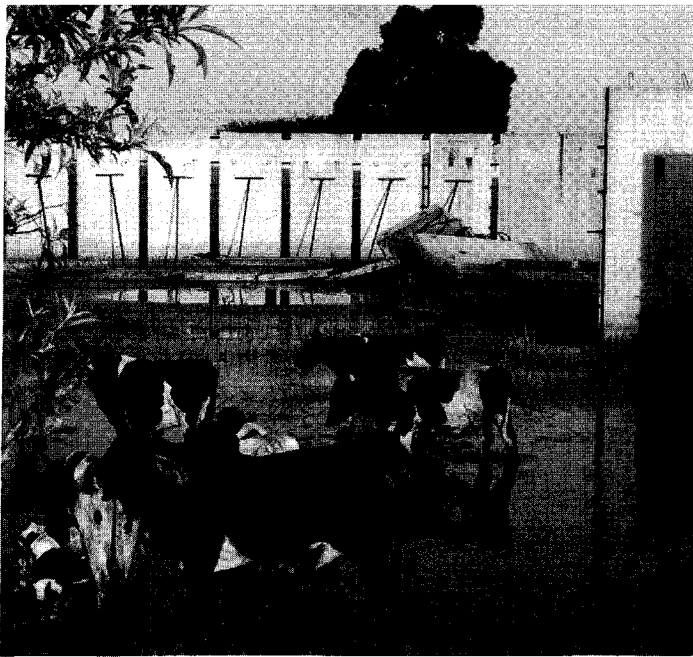
Like a skeleton rising from the tomb, rebar stays creak and sway with the breeze above an industrial sarcophagus of poured cement. Beneath the rusted ribs and within stony walls, a herd of angus cows waters in the "digester bed" of what was to be a high-tech sewage treatment plant. From nearby cornfields, little boys approach to bounce on abandoned plastic tubes. Beyond them, alongside the Rio Grande, a chain of broken waste-collector pipes parallels the river's

16. *El Cambio de Michoacan*, January 5, 1995.

17. *La Voz de Michoacan*, Dec. 8, 1995.

18. *El Financiero*, Nov. 29, 1995.

19. Ismail Serageldin, *Toward Sustainable Management of Water Resources*, (World Bank), 1995, p.8-10.



*Cows watering in the ruins of Morelia's sewage treatment plant*

course like a concrete esophagus rotting under the sun.

In 1985, under Governor Cuauhtemoc Cardenas, Morelia commenced construction of a sewage treatment plant. BANOBRAS, a state development bank, provided a loan to begin the project. Swiss technology promised to resolve the city's growing waste disposal problem. In the previous five years, World Bank money had enabled the installation of most of the piping needed to bring raw sewage from Morelia to the treatment facility. During 1985, plant erection had progressed smoothly. In January, 1986, however, the state government changed hands. The project was dropped.

"A typical example of *El Borracho* (the eraser)," said Avila in obvious disgust. "Wiping the slate clean, abandoning the outgoing administration's projects, it's a political rite of passage in Mexico. This policy was strictly adhered to regarding that treatment plant, too, because outgoing Governor Cardenas was at loggerheads with the P.R.I. [the incoming party], [and was] about to found the P.R.D. [main opposition party], in fact."

The BANOBRAS representative in Morelia, Mario Sanchez, worked on the project. "I think the suspension of the treatment plant was a real shame, an enormous amount of wasted money," he said. Asked whether he believed the cessation was politically motivated, he

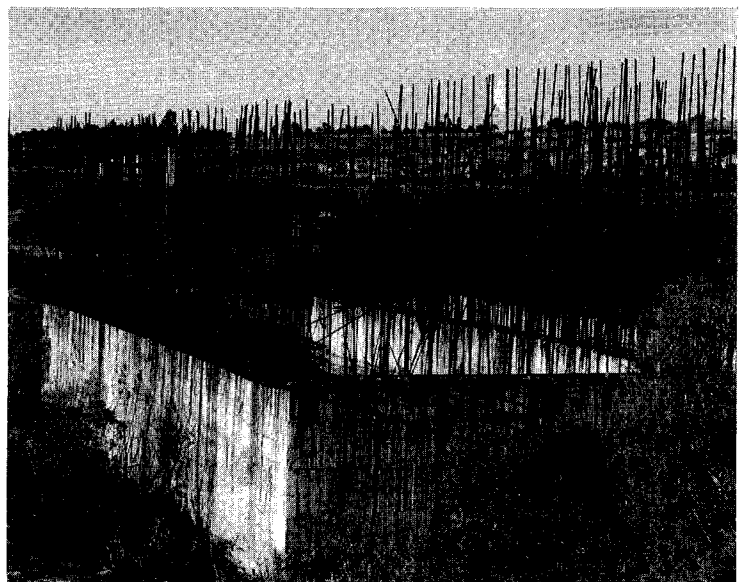
answered, "yes, I suppose it was."

Ballesteros at the Federal Environmental Protection Agency disagreed, faulting financial problems instead. "The new government didn't have the funds to finish the project. They needed more credit. Yet inflation indexes were soaring. Financing costs were just too high."

Today, the city government still carries on its books 20 million pesos (U.S.\$2.6 million) of that debt, according to Sanchez. With total liabilities of 32.5 million pesos (U.S.\$4.3 million) for the water system alone, BANOBRAS has refused to extend any credit to the municipal government since 1992. "It's unfortunate we cannot work with Morelia on any of its large infrastructure projects, particularly in the area of water," said the banker.

In 1995, BANOBRAS administered a total of 5.8 million pesos (U.S.\$773,333) in Michoacan under the so-called Potable Water and Drainage Program for Urban Areas (APAZU). A national campaign launched in 1990, APAZU aims to make municipal water operators more efficient by lowering costs and increasing revenues through the introduction of computer systems, consumer registries, water meters and administrative training programs. Over the past five years, APAZU's national budget totaled 2.7 billion pesos (U.S.\$360 million).<sup>20</sup>

That's not much money, however, if you consider that the federal subsidy for water and sewerage services to Mexico City alone amounts to more than \$U.S.1 billion a year, or 0.6 percent of GDP!<sup>21</sup> Alas, the



*The ghost of Cardenas's treatment plant*

20. Figure from interview in Mexico City with Eduardo Ibanez, head of BANOBRAS's water finance division.

21. Ismail Serageldin, *Water Supply, Sanitation, and Environmental Sustainability*, (World Bank), 1994, p.12.



word is out: public water utilities in Mexico are high-cost, low-quality producers of services. Morelia's is no exception.

Alfonzo M. Urbina, 55, who built a career in Michoacan's state-level water services, summarized why the city lacks resources to meet growing demand for water. "First, the system's expensive: lots of wells, high electricity costs, steep tariffs. Second, nobody feels they should pay. With electricity, for example, even the poorest settle their bills on time. If not, power's cut off and the Mrs. can't watch her soap opera. Same for the phone. But, not water, it never shuts off. Why doesn't someone force them to pay? Because that would cause political problems."

Reluctant water officials guard Morelia's current consumer data. In 1991, however, we know that of a total of 107,764 water taps in Morelia, 82,764 were registered and 25,000 were clandestine. Of all users listed, only 25 percent paid for water service.<sup>22</sup> Patricia Avila, who gathered the data, suggested today's figures would be similar, if not somewhat improved. That confirms what BANOBRAS said: that Morelia's water system, like most across Mexico, can barely cover administrative costs, electricity bills and debt payments, much less finance new capital improvements.

Stuck in such financial straits, Mexicans are understandably receptive to those who would offer help, like the World Bank, say. The latter claims to have studies, for example, revealing that per-capita water production costs are four times higher in centralized than in fully decentralized systems.<sup>23</sup> Their advice? Decentralize. So what has Mexico done? You guessed it.

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"Current water legislation in Mexico is a virtual carbon copy of World Bank policy," said Avila. "Commitment to privatization and decentralization is clear at the federal level. In this respect, Mexico is quite advanced and has been since the early nineties."

With little question, Mexico's greatest success has been the program to decentralize the irrigation sector and to transfer management responsibility for irrigation operations away from the public sector. As the World Bank boasts: "By the end of 1994, full or partial management responsibility for fifty-five irrigation districts, or about 2.5 million hectares, had been transferred to local water-user organizations."<sup>24</sup> So there may be hope for the farms, after all. But what about the cities? What about Morelia?

"We've made a lot of progress," said Teresa Huato Quintana inside Morelia's new water authority offices.



*Beautification of Rio Chiquito shoreline.*

She reviewed recent efforts to decentralize the water sector:

"In Michoacan, we've created 80 Potable Water and Drainage Systems [called SAPAS]. Until the mid-eighties, there was just one, right here. The Feds controlled the rest from Mexico City; very inefficient. All our cities and towns today manage their own SAPA, each with a separate budget and administration. At the state level, an organism called COMAPA oversees the 80 SAPAS. COMAPA, in turn, reports to the National Water Commission (CNA), a federal office with a representative in Morelia. CNA answers to the maximum water authority: the Secretariat of Environment, Natural Resources and Fishing (SMARNP)."

"All these organisms have roots in the New Federalism of President Carlos Zedillo," explained Mario Balasteros, who works for the Federal Environmental Protection Agency, another decentralized organization pertaining to the SMARNP. "Each one is autonomous and exercises real authority. You see, we're pushing responsibility toward the people."

On the financial side, Morelia's SAPA has begun to transfer the onus of capital investments to the private sector. "For the first time ever, the municipal government has turned to private companies for water provision, granting concessions for two important water projects this year," said Sanchez of BANOBRAS.

During 1995, in competitive bidding processes, local

22. Patricia Avila Garcia, "Estudio preliminar sobre el deterioro socioambiental en la ciudad de Morelia: el case del Agua," *Urbanizacion y Desarrollo en Michoacan*, (Colegio de Michoacan), 1991, p.145.

23. *World Development Report 1994: Infrastructure for Development*, (World Bank), 1994, p. 75.

24. Ismail Serageldin, *Toward Sustainable Management of Water Resources*, (World Bank), 1995, p.24.



*Abandoned drainage pipes in San Pedro de los Sauces.*

contractors won concessions to build and operate 14 new wells, as well as to construct a facility expected to capture an additional 500 l/s of La Mintzita's water flow currently lost to leakage.

The year before, a modification of state water laws created a window for such private-sector participation. Michoacan adopted the concession model, which works as follows: a private operator pays for project construction, and in return is given management and ownership with a guaranteed amount of business for 15 years under the so-called Build-Operating-Transfer (BOT) blueprint.

"We're inaugurating the La Mintzita project this week," said Huato Quintana. "We expect it to capture enough drinking water to cover Morelia's entire deficit," she added, beaming. Something changed, however, as she listed SAPA's other recent achievements: a new office building, the beautification of the Rio Chiquito shoreline, an "amazing truck" that sucks drainpipes clean. Her voice inflected sadness now. Something was wrong.

"I'm distraught," she confided. "All of us have to leave soon. We're on our way out. The municipal government's changing hands." She paused, lit a cigarette. "Don't get me wrong, I'm not saying the *panistas* [incoming opposition party] aren't good people. They just don't have any water-management experience. What'll happen to all our hard work? Three years just isn't enough time."

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In the rural community of San Pedro de los Sauces, beside a one-story schoolhouse, an assemblage of chipped concrete pipes stands on end, looking like a

Flintstones' church organ. Christmas '95 marked their tenth month there, abandoned just off the main street, a dirt road. Winter gusts fail to wobble them, yet carry a stench that reminds everyone in San Pedro how the municipal government failed again to fix their stone-age sewage system.

"The outgoing politicians canceled our budget," said a bristling Maria de los Angeles Fuentes, the local schoolteacher. Her story, a typical one, went as follows: December, 1994, authorities approve drainage project. February, 1995, they set the budget at 17 thousand pesos (U.S.\$2,266). The community agrees to pitch in 40 percent, as usual. Spring to fall, 1995, economic crisis pushes up costs by 100 percent. The town cannot pay. The supplier of construction materials refuses to sink any pipes until they do. October, 1995, a solution nearly reached, San Pedro readies to begin construction. November, 1995, outgoing municipal government cancels budget, permanently.

"That story reflects clearly the short-term vision built into Mexico's political system," said Professor Chacon, back at the University of Michoacan. "Municipal governments last three years. At the beginning, they clean the slate, erase their predecessors' programs [*"El Borracho"*]. Then they fill the coffers: collect taxes, subsidies, etc., and set budgets. They prioritize projects that come to fruition near the end of the term, stuff the newspapers will qualify as 'objectives achieved.' If one doesn't work out, then cancel it, use the money elsewhere. Spend, spend, spend until elections — time's up. In comes the next government, coffers empty. The cycle begins again."

Carlos Padilla Massieu, a local environmentalist, views the San Pedro story differently. "I'm not sure those people couldn't have paid for their share of the drainage pipes if they really wanted to. Not that they're lazy, it's just that the government has fed us for so long on subsidies and paternalism, we've become flaccid, forgotten how to help ourselves, be productive. So today, when the old system obviously can't deliver any more, what do we do? Nothing, usually, except pray to our protector, the Virgin of Guadalupe."

On December 12th, I watched them pray. A crush of Mexican faithful crawled through Morelia's colonial streets toward the Church of San Diego, a shrine to the Virgin. With bleeding knees and anguished faces, they made their way across the cobblestones. Many passed under the old aqueduct, with its 17th-century arches that march so gracefully across town, so high above the city and the chaos of modern urbanization. I was, as always, struck by its elegance, its perfect design...for a sleepy river basin.



*Worshipping the Virgin de Guadalupe. A pilgrim in Morelia*

## Institute Fellows and their Activities

**Hisham Ahmed.** Born blind in the Palestinian Dheisheh Refugee Camp near Bethlehem, Hisham finished his A-levels with the fifth highest score out of 13,000 students throughout Israel. He received a B.A. in political science on a scholarship from Illinois State University and his M.A. and Ph.D. from the University of California in Santa Barbara. Back in East Jerusalem and still blind, Hisham plans to gather oral histories from a broad selection of Palestinians to produce a "Portrait of Palestine" at this crucial point in Middle Eastern history. [MIDEAST/N. AFRICA]

**Adam Albion.** A former research associate at the Institute for EastWest Studies at Prague in the Czech Republic, Adam is spending two years studying and writing about Turkey's regional role and growing importance as an actor in the Balkans, the Middle East and the former Soviet bloc. A Harvard graduate (1988; History), Adam has completed the first year of a two-year M. Litt. degree in Russian/East European history and languages at Oxford University. [EUROPE/RUSSIA]

**Cynthia Caron.** With a Masters degree in Forest Science from the Yale School of Forestry and Environmental Studies, Cynthia is spending two years in South Asia as ICWA's first John Miller Musser Memorial Forest & Society Fellow. She is studying and writing about the impact of forest-preservation projects on the lives (and land-tenure) of indigenous peoples and local farmers who live on their fringes. Her fellowship includes stays in Bhutan, India and Sri Lanka. [SOUTH ASIA/Forest & Society]

**William F. Foote.** Formerly a financial analyst with Lehman Brothers' Emerging Markets Group, Willy Foote is examining the economic substructure of Mexico and the impact of free-market reforms on Mexico's people, society and politics. Willy holds a Bachelor's degree from Yale University (history), a Master's from the London School of Economics (Development Economics; Latin America) and studied Basque history in San Sebastian, Spain. He carried out intensive Spanish-language studies in Guatemala in 1990 and then worked as a copy editor and Reporter for the Buenos Aires Herald from 1990 to 1992. [THE AMERICAS]

**Sharon Griffin.** A feature writer and contributing columnist on African affairs at the *San Diego Union-Tribune*, Sharon is spending two years in

southern Africa studying Zulu and the KwaZulu kingdom and writing about the role of nongovernmental organizations as fulfillment centers for national needs in developing countries where governments are still feeling their way toward effective administration. She plans to travel and live in Namibia and Zimbabwe as well as South Africa. [sub-SAHARA]

**John Harris.** A would-be lawyer with an undergraduate degree in History from the University of Chicago, John reverted to international studies after a year of internship in the product-liability department of a Chicago law firm and took two years of postgraduate Russian at the University of Washington in Seattle. Based in Moscow during his fellowship, John is studying and writing about Russia's nascent political parties as they begin the difficult transition from identities based on the personalities of their leaders to positions based on national and international issues. [EUROPE/RUSSIA]

**Pramila Jayapal.** Born in India, Pramila left when she was four and went through primary and secondary education in Indonesia. She graduated from Georgetown University in 1986 and won an M.B.A. from the Kellogg School of Management in Evanston, Illinois in 1990. She has worked as a corporate analyst for PaineWebber and an accounts manager for the world's leading producer of cardiac defibrillators, but most recently managed a \$7 million developing-country revolving-loan fund for the Program for Appropriate Technology in Health (PATH) in Seattle. Pramila is spending two years in India tracing her roots and studying social issues involving religion, the status of women, population and AIDS. [SOUTH ASIA]

**Teresa C. Yates.** A former member of the American Civil Liberties Union's national task force on the workplace, Teresa is spending two years in South Africa observing and reporting on the efforts of the Mandela government to reform the national land-tenure system. A Vassar graduate with a *juris doctor* from the University of Cincinnati College of Law, Teresa had an internship at the Centre for Applied Legal Studies in Johannesburg in 1991 and 1992, studying the feasibility of including social and economic rights in the new South African constitution. While with the ACLU, she also conducted a Seminar on Women in the Law at Fordham Law School in New York. [sub-SAHARA]

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