

Sustainable Mega-cities: The Case of Mexico City*

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The problem of harmonizing nature with human settlement ultimately must be confronted in cities, since such a large proportion of people on this planet now live in urban areas. In 1950, there were eighty-three cities with populations exceeding one million; by 2019, this number had risen to 548. Demographic projections suggest that the world's urban population of 4.2 billion will grow to about five billion by 2030; by then, three out of five people will live in cities, and there will be over 700 cities with more than one million inhabitants.¹ Between 1950 and 2000, Latin America's population increased from 160 million to about one-half billion. By 2019, Latin America had grown to about 650 million, some eighty two percent urban, or slightly more than 530 million.

The Valley of Mexico encloses one of the largest metropolitan agglomerations in the world. Some twenty-one million people live in and around this valley and its primary center, Mexico City. During the pre-Hispanic period, the basin of Mexico City was the capital of the Aztec empire and prospered. The Aztecs built an intricate system of canals, causeways, dykes, and aqueducts to harness the abundant water in the basin. To grow food, they built "chinampas," or land plots, which they floated and drew water and nutrients for directly out of the lake, rather than trying to pipe lake water to the dry land beds around the lake. The chinampas were built from canal silt and marsh weeds.

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¹ United Nations, Department of Economic and Social Affairs, Population Division (2019). World Urbanization Prospects: The 2019 Revision.

When the Spanish conquered Mexico City, they immediately destroyed most of the ecological infrastructure the Aztecs had put in place. The Spanish wanted open roads for their armies and space to build neighborhoods for colonists. They demolished causeways and aqueducts and filled in canals. By the early 1800s, local water was running out, so the Spanish (and later Mexican) government made one of the biggest blunders in urban environmental history—they began drilling into the aquifer beneath the city to find water. During the late nineteenth century administration of Porfirio Diaz, the Mexican president hired engineers to build a giant canal, draining water out of Lake Texcoco for Mexico City residents.² In the twentieth century, the government continued to draw water from aquifers deep within the basin beneath the city. The drilling of the lakebed on which millions now live has permanently altered the subsoil foundation of one of the largest cities in the world. This has led to increasing instability, as evidenced by the events of the 1985 earthquake. This raises the question—can a mega-city of this size sustain itself on the silt-like, shaky plates of a former lake bed?

Modern Urban Growth: Three Critical Environmental Problems

Greater Mexico City grew from 3.1 million in 1950 to 13.9 million in 1980, and by 2020, the metropolitan region will have over 21 million people, making it the fifth largest metropolitan area in the world. This growth has occurred, in part, because the national political system favors the concentration of industry, banks, commerce, and political power in the national capital, Mexico City. For many decades, national investment has favored energy, highway, water and drainage facilities, and other infrastructure in the Mexico City basin, thus encouraging more

² Jonathan Kandell, *La Capital, The Biography of Mexico City* (New York: Random House, 1988).

centralization. Urban experts refer to this phenomenon as “primacy”—when one city has an overwhelmingly high concentration of population and economic activities of an entire nation.

The expansion of Mexico City and the surrounding valley has had serious impacts on the ecosystem in three areas:

Air pollution

The Mexico City basin is 6800 feet high and enclosed by mountains. There is less oxygen at this altitude. Auto pollution, unregulated industry, household stove usage, and massive dust created by draining the soils of what was once a lake are the main sources of air pollution. There are some 3.5 million private autos in the city—and daily traffic congestion makes pollution worse. There are also 35,000 factories in the city, generating noxious gases. Intensive sunlight transforms these gases into a thick smog, which chokes residents. When mixed with the altitude and low oxygen levels, polluted air has become elevated to a national public health crisis. Emphysema, pneumonia, bronchitis, asthma, and cardio-vascular illness have all been scientifically linked with toxic air in the Mexico City basin.

Water scarcity

Mexico City’s water supply lies more than sixty miles from the city and 3000 feet lower. It costs nearly \$100 million a year to produce the energy needed to transport distant water into the city. Meanwhile, only 75% of all households have in-house water, while nearly one third of all homes lack adequate sewage facilities, mainly in the poor colonias on the outskirts of the region. Water is extremely expensive because it is so far away; ironically, by continuing to extract it, the city is also causing further ecological damage. Draining the aquifer lake creates more dust, and thus more air pollution. Further, as mentioned earlier, the city’s geological base

has become more unstable (certain parts of the city are literally sinking, for example), in part due to constant drilling into the soils beneath the city. This instability drew worldwide attention during the 1985 earthquake, when sandy and unstable soils caused neighborhoods to shake violently, while tall buildings subsequently toppled. The most damaged zones in the city were those in the bed of the historic Lake Texcoco, where the prevailing silt and volcanic clay sediments amplified the shaking. Over 10,000 people died, 30,000 were injured, and 100,000 were left homeless. Major hospitals, hotels, and residential tower buildings were destroyed. Two decades later, the city is still rebuilding and reinforcing existing structures.

Housing shortages and human settlement

The housing shortage in Mexico City amounts to nearly three million families without homes, according to the government. The high cost of land forces poor people to seek alternative shelter in “irregular settlements” or unregulated colonias on the periphery of the metropolitan region. These often occur on plots of land illegally subdivided by landlords, real estate companies, or even “ejido” (land communes) land owners. The resulting giant peripheral settlements are poorly serviced and mostly unregulated. The worst colonias are located in high-risk, heavily polluted areas in the north and east, near industrial zones, the airport, and other less attractive neighborhood amenities. Residents generally have questionable property titles. Irregular settlements constitute roughly one-half of the Mexico City urbanized area and house more than sixty percent of the population.

Although federal government planning strategies strive for the decentralization of growth away from Mexico City, tax subsidies and other public policy decisions often make the nation’s capital a more attractive place to live and work than smaller cities in other regions. Furthermore, Mexicans who desire to remain in Mexico City are influenced by numerous social, political,

educational, and cultural factors, and they often equate living in Mexico City with the image of personal success.