Urbanization, Environmental Protection, and Democracy:
The Case of the Xochimilco Ecological Zone

by

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Introduction

Xochimilco is an important historical and cultural symbol of Mexico (Gonzalez Pozo 1995: 221-25). This lacustrine area of ancient canals and *chinampa* agriculture (raised agricultural plots in a shallow lake) is visited by millions of Mexican and international tourists annually. Xochimilco has been continuously inhabited for some 3,500 years (Parsons 1991, 26). *Chinampa* agriculture originated about 1000 B.C. (Rojas Rabiela 1991: 276). The preHispanic lacustrine area covered some 400 square kilometers (Asamblea Legislativa 2003). The Spanish conquered and inhabited Mexico City and Xochimilco simultaneously beginning in the 1520s. Xochimilco is located in the southern part of the Federal District (DF) of Mexico, some 20 kilometers from downtown Mexico City. After the conquest, the lacustrine zone shrank in size as more and more lake area was drained to provide for cattle raising and flood control. By 1960, only 70 square kilometers of lake area remained. Since the 1950s, population pressures have accelerated urbanization in Xochimilco, including the canal zone. Despite significant urbanization and modernization, some 25 square kilometers of lake area exist, including some 12 square kilometers of *chinampa* agriculture. Historically, Xochimilco was a separate city. In 1929 the Xochimilco area was included as a *delegacion* (administrative district) of the Federal District. In the 1970s Xochimilco became a fully integrated part of the urban area of the DF.

Xochimilco is an important ecological resource for Mexico City. The DF derives some eight percent of is potable water from Xochimilco’s aquifers (Mansilla Menendez 1995: 203). And because this zone is forested, it is an important source of oxygen for the city. Persistent urbanization has resulted in deforestation as well as degradation of
Xochimilco’s aquifers due to bacterial contamination from septic systems. In 1987, Mexico declared the area of canals and chinampas, as well as the surrounding hills and mountains, and all non-urban land as an ecological reserve in which additional housing and commercial development was prohibited. However, strong pressures persist for housing development in this part of Mexico City. As one official indicated in a public forum, “None of the plans to rescue Xochimilco has worked because they do not address the fundamental problem: there is a tremendous demand for land in Mexico City, and farmers (chinamperos) need to sell land that is no longer productive in order to gain value from it” (Rescate Integral de Xochimilco 2002).

In 1987, in order to encourage Mexico to protect Xochimilco, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) designated Xochimilco as a “World Heritage Site” or “Patrimonio de la Humanidad.” At the same time, the DF government declared 80 percent of Delegacion Xochimilco as an ecological zone (XEZ) to protect it from further housing development. Since 1987, urbanization has persisted due to illegal land sales and housing and commercial construction in the XEZ. Some government officials are involved in non-enforcement of laws that outlaw land sales and settlements in the XEZ. In the Fall of 2002, UNESCO announced that continued urbanization of Xochimilco would place the “World Heritage Site” designation of Xochimilco at risk (El Universal 10 December 2002: C8). This announcement echoed a World Bank report of August 2002, warning that population growth, deforestation, and excessive exploitation of water resources in Mexico City would create an ecological crisis in the future (El Universal 23 August 2002: C1).
Since the late 1980s, the Mexican government has undertaken a number of steps to advance democratic processes in the DF. Elected leaders of all parties have pledged to eliminate government corruption. The XEZ provides a useful case study to examine policymaking in a democratizing city of a less developed country (LDC). The policy is the environmental protection of an important ecological urban resource.

**Research Questions**

1. What progress has been made in protecting the XEZ?
   a. How has the level of urbanization changed since 1987?
   b. How successful has the government been in implementing programs designed to improve the ecology of the XEZ?

2. How does a democratizing city government of a LDC improve policies regarding protection of an important ecological area?

3. What are the processes that thwart the application of regulations designed to protect an important ecological resource?

4. What role do citizen pressures, political parties, interest groups, and the media play in democratic policymaking to protection of the XEZ?

**Changes in Democratic Governance of the Federal District**

Traditionally, the DF was ruled by the national president through an appointed administrator, known as the *regente*, who then appointed district (*delegacion*) administrators, known as *delegados*. In the 1980s, public demands for democratic rule in the nation’s capital led to the creation in 1988 of a city council, *La Asamblea*
Representativa del Distrito Federal (ARDF). The ARDF was initially granted advisory powers. Interest groups, media pressure, and the ARDF, pressured the government to expand the ARDF’s powers. In 1996, the ARDF was granted powers to review the budget and enact local laws, and this body’s name was changed to La Asamblea Legislativa del Distrito Federal (ALDF). In 1997, the government provided for the popular election of the mayor, called jefe de gobierno del Distrito Federal. Beginning in 2000, the district administrators, jefes de la delegacion, were elected for the first time (Bauer de la Isla and Wirth 2002; Bassols Ricardez, 2000; Gomez Tagle 2000; Rodriguez Araujo 2000; Ziccardi 1998).

In addition, DF election processes were improved during the 1990s and most observers conclude that DF elections are now far more honest than in the past. For example, surveys by this author in 1993 and 2002 revealed that the percentage of city council members who rate DF elections as honest, jumped from 40 percent in 1993 to 65 percent in 2002 (Bauer de la Isla and Wirth 2001: 34; Wirth 2002).

Despite these changes, weaknesses remain in democratic processes in the nation’s capital. By national statute, the ALDF remains dependent on the national government for budgetary revenues and lacks policymaking authority in key areas. The author’s interviews with 45 DF city council members in 2002 reveal that the main change that city council members would like to see in the ALDF is to have the full powers of a city council or “local congress.” In 2002 the ALDF unanimously passed the “Reforma Politica” which was designed to give the ALDF the full powers of a city council, but this reform was rejected by the national senate. Thus in the 2002 ALDF survey, 55 percent of the city council members agreed with notion that the federal government has more power
than the ALDF in the major decisions of the DF. Interviews with city council members in 2002 also reveal that democratic policymaking has been undermined because executive agencies and the mayor ignore laws passed by the ALDF, and corruption in many areas of governance thwarts the will of the ALDF. For example, only 35 percent of the city council members felt that the ALDF has had success in supervising regulations of the DF agencies. Eighty percent felt that the DF police are involved in criminal activities, and 42 percent indicated that they are “afraid of the DF police.” Similarly, 64 percent indicated that corrupt government officials assist in the acquisition of housing in the ecological zone of Xochimilco. The newly elected jefes of the delegaciones wield considerable power over management and administration of their delegaciones, including management of public works, basic service delivery, and economic development. But many city council members felt that the jefes of the delegaciones often serve the interests of the jefe of the Federal District or their party’s interests, rather than those of their constituents. In sum, since the late 1980s the DF has made great strides in improving democratic elections and structures of democratic governance, but limited powers of the ALDF and government corruption circumscribe democratic governance in Mexico’s capital.

**Population Growth in Xochimilco**

The rapid of population growth in Xochimilco is demonstrated by comparing the annual population growth rates for Delegacion Xochimilco with growth rates for the DF, as shown in Table 1. These data reveal since 1970 annual growth rates for Xochimilco were at least four times greater than those of the DF. And between 1990 and 2000 average growth rates have been eight times greater than those for the DF. These high growth rates are realized in large population increases, as shown in Table 2. Between
1950 and 2000, the population of Delegacion Xochimilco increased by a factor of nearly eight times. Academic and governmental demographers estimate that total population in Delegacion Xochimilco will increase to between 440,000 and 470,000 in 2010 and between 490,000 and 577,000 in 2020 (Porras Macias 1999; Porras 2000).

The Attractiveness of Xochimilco for Residents

The lack of housing in Mexico City generates housing pressures in Xochimilco. According to government figures, sixteen percent of the DF’s housing is overcrowded, 19 percent is deteriorated, and 21 percent is located in areas that are unsafe (such as in gorges or in areas where there is land subsidence from mining) (Programa General de Desarrollo Urbano del DF 1995).

In comparison to the other 15 delegaciones, Xochimilco scores in the lower group of four delegaciones, (Iztapalapa, Milpa Alta, Tlahuac, and Xochimilco) on several criteria of quality of living: income, housing conditions, and basic services. Only on the education factor does Xochimilco rank above the four poorest delegaciones. On the education criterion, Xochimilco scores above the median of the 16 delegaciones (Blanco Gil, Lopez Arellano, and Rivera Marquez 1999). In comparison to the quality of life measures in the municipalities surrounding the DF, however, Xochimilco provides a high quality of life. Extensive areas of the metropolitan area of Mexico City lack transportation services, schools, police services, and water and sewerage services (Iracheta Cenecorta 2000: 225-26). In contrast, Xochimilco provides piped water to 93 percent of the residents, sewerage service to 89 percent, and electric service to 100 percent of its residents. Delegacion Xochimilco is the home of 173 public schools, 47
private schools, a prestigious National High School, a School of Plastic Arts of the National University (UNAM), three hospitals (including a pediatric hospital), 11 public markets, 25 local (tianguis) markets, 4,500 business, 12 social and cultural centers, 17 libraries, 19 community centers, 7 sports centers, an archaeological museum, a museum of history, art, and archeology (Dolores Olmeda Museum), 27 bus routes, 12 minibus routes, a colonial historic center, recreational boat rides (*trajineras*) in the canals, canoeing in Cuemanco canal, tram service (*tren ligero*) to the Metro, and a major ecological park (Vidrio Carrasco and Avila Jimenez 2000: 639-41).

**Government Activities, Urbanization and Environmental Protection**

Government activities have had profound negative impacts on the ecology of Xochimilco. In 1913, the DF government capped the springs which supplied water to the canals of Xochimilco. This water was piped to the center of city located 20 kilometers away (Morena Mejia, 1987). In the 1950s the federal government drilled a series of deep wells in the Xochimilco zone to meet the water needs of the city. An examination of the water resources for the Mexico City metropolitan area reveals that there were alternative sources for water development, but Xochimilco was the least expensive source due to its proximity to the city center (Merino, 2000). Water extraction has damaged the ecology of the lacustrine area of Xochimilco extensively for several reasons. Fresh spring water no longer flowed into the canals, the water table was lowered, and the original lake area has been sinking at a rate of some 40 centimeter per year. In the 1980s the canals and lagoons of Xochimilco were desiccated or left with stagnant water. In order to provide *chinampa* farmers with water for irrigation, the DF pumped raw sewage water (*aguas negras*) into
the canals (Lopez Escalente, 1995: 249). In the late 1980s the government constructed two treatment plants (Cerro de la Estrella and San Luis Tlaxialtemalco) to improve the quality of water pumped into the canals (Canabal 1997: 232).

A number of government activities have accelerated urbanization in Xochimilco. In 1908 the federal government initiated electric trolley service to Xochimilco (Vidrio Carrasco and Avila Jimenez 2000: 637). In the 1970s, the DF constructed: the outer ring highway (Anillo Periferico); Viaducto de Tlalpan highway and an extension of Division del Norte highway (which together connect Xochimilco with the downtown); the Mexico-Xochimilco-Tulyehualco highway, which skirts the chinampa zone to the south; and Avenida Nuevo Leon which crosses the chinampas. In 1988, the DF completed tram service (Tren Ligero) from Xochimilco to the Metro at Tasquena station (Gonzalez Poro1990: 111; Ziccardi, 1989). Rodriguez (1987: 321) concludes that these improvements facilitated transportation to the city, stimulated migration to Xochimilco, and generated housing construction in the central area of Xochimilco, as well as in the area of canals and chinampas along the Mexico-Xochimilco-Tulyehualco highway and Avenida Nuevo Leon.

The construction of the Mexico-Xochimilco-Tulyehualco highway and Avenida Nuevo Leon represent government activities which hastened the degradation of the canals and chinampas of Xochimilco. Until the late 1980s, protection of this historic canal zone can be viewed as a non-issue, or an issue which is important, but which fails to rise on the public agenda. Because it is not on the public agenda, the government of Mexico never provided the canal zone of Xochimilco with a special designation such as “national park.” Because the land of Xochimilco is privately owned, it can be argued that a national park
designation for the *chinampa* zone of Mexico City would not be appropriate. But the national government could have passed laws to prevent road construction on and near the canals, and laws could have been provided to prevent housing construction in the canal zone. It is beyond the objectives of this paper to speculate on the reasons for the lack of governmental interest in protecting this national treasure. It is clear, however, that the government did not act to protect Xochimilco, rather, the government acted in a manner that was destructive of the nation’s physical and cultural history.

In 1987, the United Nations agency UNESCO designated the canal zone of Xochimilco as a place of “Universal Human Patronage.” This designation recognized the importance of Xochimilco as the only area in the world where *chinampa* agriculture is currently practiced. By accepting the UN’s designation of *Patrimonio de la Humanidad* for Xochimilco, the Mexican government was required to invest in the protection of the Xochimilco.

In 1989 the government of President Salinas de Gortari announced the *Plan to Rescue the Ecology of Xochimilco*. Many observers also feel that the Mexican government was forced into action to placate *chinampa* farmers who were organized against the government for policies which had damaged the agricultural economy of Xochimilco (Canabal Cristiani 1997, 213-71; Wirth 1997: 8). This plan provided for protection and improvement of land in the XEZ through major hydraulic works. After pressure from *ejidal* (communal farms) organizations, the plan was altered and then implemented between 1990 and 1993 (Canabal 1997: 252-82).
The general objectives of this plan are as follows (Canabal Cristiani 1997: 230):

1. Reverse the ecological degradation caused by the extraction of water for more than 20 years.
2. Protect the XEZ from further urbanization.
3. Provide incentives for agriculture production.
4. Improve the green areas of Xochimilco, which had suffered from deforestation.

The specific objectives of the plan are as follows (Canabal Cristiani 1997: 230):

1. Prevent urbanization in the swamps and zone of *chinampas*.
2. Recharge the aquifers and preserve existing springs.
4. Construct lakes to regulate floods and reduce land subsidence.
5. Improve the ecology of the lakes and canals of Xochimilco by providing treated water from two new treatment plants.
6. Improve the agricultural land in the *chinampas*.
7. Conserve the archeological heritage of the zone.
8. Provide reforestation of green areas and provide recreational areas.

In 1993, the administration of President Carlos Salinas de Gortari declared that the *Plan to Rescue the Ecology of Xochimilco* was a success and had accomplished the following: 3,000 hectares of canal and *chinampas* had been protected; 1100 hectares had been expropriated; 200 kilometers of canals were now navigable, 1000 hectares of land were desalinized and now productive; 1200 hectares of *chinampas* were newly planted; 50,000 more residents had drainage; and 20,000 fewer residents discharged domestic wastes into the canals; construction of two water treatment plants to provide good quality
water for the canals; construction of four lagoons to regulate flooding; creation of an ecological park to preserve flora, fauna, and aquaculture; the construction of 2,000 earthen water reservoirs, 20 dams, and 5,000 square meters of soil and rock fill were placed in the canyons of the Sierra de Xochimilco; and 13 kilometers of sewage line were constructed for the towns in the mountainous area above Xochimilco (Excelsior 6 June 93: 1,28, 37). These assessments of President Salinas de Gortari were based on a 1993 report of the DF entitled El Rescate Ecológica de Xochimilco (DDF 1993) which reviewed the progress of government’s programs to improve and protect Xochimilco (quoted from Wirth 1997: 10).

Although the specific claims of President Salinas de Gortari are accurate, many important objectives of the 1989 Plan were not achieved. As discussed below, urbanization has not been controlled; the aquifers have not been improved; the water quality of the canals has improved in comparison to the use of raw sewage water, but the water quality is not adequate; and the agricultural land of the chinampas has deteriorated in productivity. From the completion of the Rescue Plan in 1993 and until 2002, the government did not provide any significant programs to improve or protect the XEZ.

In 2002, UNESCO provided the stimulus for the Mexican government to focus on Xochimilco once again. First, UNESCO indicated that the “World Heritage” status of Xochimilco was at risk. Second, UNESCO initiated a conference, Rescate Integral de Xochimilco on November 11 and 12, 2002 to develop an integrated master plan to rescue Xochimilco (Rescate Integral 2002). As this paper is written, a commission is developing the specifics of the master plan.
Settlements in the Xochimilco Ecological Zone

By the time the government established the ecological zone for Xochimilco in 1987, considerable urbanization had occurred in the zone. Canabal (1997: 186) found, for example, that in 1987 the XEZ contained some 9,700 families. Invasions of the XEZ continued, however, after the designation of the line of conservation had been drawn in 1987. Land sales and construction of new dwellings have been illegal in the XEZ since 1987, but they continue. In a 1998 study by the ALDF Housing Commission found that the number of families living in the XEZ had risen to 20,000 (La Jornada 3 March 2003). Of these 20,000 families, some 2,000 live in irregular settlements in the zone of chinampas (Reforma 7 October 2002).

Land invasions have continue into the current period. For example, in a September 2, 2003 press conference held in the ALDF, the director of Fuerza Democratica Revolucionaria (a Xochimilco interest group opposed to housing settlement in the XEZ) announced and he had reported to authorities that there had been numerous recent invasions of XEZ land and that the personal secretary of the DF jefe de gobierno was involved in these land sales (La Jornada 3 September 2002: 38). In the same press conference, the leader of the DF Green Party (Partido Ecologico Verde de Mexico), stated that several DF officials (including the sub-secretary of the DF government, the DF environmental secretary, and the jefe of Xochimilco) had recently toured the canal zone, that they had witnessed environmental violations, had been provided the names of those responsible for these violations, and that they had not acted to prosecute the violations. The leader of the DF Partido Accion National also criticized the jefe de gobierno for his private secretary’s involvement (La Jornada 5 September 2002: 42). On October 6, 2002,
a leader of owners of chinampas announced that he had reported to authorities that 20 of 110 hectares of chinampa land in his area had been invaded in the last five years, and that the government had taken no action (Reforma 7 October 2002: 1B) (through the jefe de gobierno, the PRD has controlled the government for these five years).

The PRD responded to these criticisms by admitting that members of the PRD were involved in the invasions. The jefe de gobierno recognized that his party, the PRD, had invaders among the party membership and he indicated that he would not tolerate the practice (La Jornada 5 September 2002: 42; Reforma 6 October 2002: 2B). And the jefe of Xochimilco, Juan Gonzalez Romero, requested that his own party (PRD) name those who are responsible for the invasions (El Universal 6 September 02: 6). In addition, the jefe of Xochimilco ordered a highly visible eviction (desalojo) of some 800 people and the destruction of 78 homes in a settlement in the Amalochico area in the canal zone (Reforma 5 October 2002: 1 and 1B-4B). The government has ordered no similar evictions since this time. Finally, the jefe of Xochimilco has requested $300 million dollars from the federal government for rehabilitation of the canal zone and central historic zone (El Universal 18 December 2002: C4).

Interviews (Wirth 2002) with city council members of the ALDF outline several factors which generate illegal land sales in the XEZ. First, there is a strong demand for land and housing in Xochimilco. Second, Mexico has a long tradition of providing land for the poor for housing construction. Third, chinampa farmers benefit economically from selling agricultural land that is increasingly non-productive. Fourth, patronage politics facilitates connections for buyers and sellers of land in the XEZ. Two of the major political parties, PRD and PRI exchange party work from organizations, such as
“Francisco Villa” and “Asamblea de Barrios” for connections with prospective sellers of land. Finally, government regulations and inspections regarding illegal land sales and housing construction are diluted by those officials in Delegacion Xochimilco who are political party members acting in the interest of generating votes for their party. Finally, the interviews underscored the notion that members of all parties at all levels of government are involved in the facilitation of land sales in the XEZ.

Degradation of the Xochimilco Environment

According to the Dirrecion General de Construccion y Operacion Hidraulica, land subsidence persists at a rate of 40 centimeters in the canal zone of Xochimilco and that the land has sunk eight meters between 1900 and 2000 (Mazari-Hiriart and Noyola Robles 2000: 455; El Universal 20 October 2002: 1). The cause of continued land subsidence is excessive pumping of water from Xochimilco’s aquifers. Pumping water desiccates clays which results in shrinking as the clay loses moister and compacts. Due to land subsidence, the sewerage lines that were constructed as a part of the 1989 Plan to Rescue Xochimilco are no longer functional (due to breakage caused by land subsidence). The quality of water in the aquifers of Xochimilco declines every year. Between 1988 and 1998 the coliform bacteria level has increased four times (Mazari-Hiriart and Noyola Robles (2000: 457). In December 2002, researchers at the National University (UNAM) announced that the bacteria helicobacter pylori, was found for the first time in water tested from the canals, wells, and aquifers of Xochimilco (Mazari 2002). This bacteria represents a life-threatening health risk for infants and the aged. Experts warn that contaminated water can generate public health problems of “enormous proportions” and that the aquifers in the south of the Mexico City are most vulnerable to
this type of contamination (Preciado, Rodriguez and Garza 1999: 252). Because the city’s
demand for water is expected to increase by some 20 percent by 2010, it is certain that
the city will continue to extract water from Xochimilco’s aquifers at the maximum
possible rate (Mazari-Hiriart and Noyola Robles 2000: 458). As more water is pumped
from aquifers, the clay in the ground dries, causing small fissures, through which organic
material from septic systems and leachate from solid waste dumps can seep into aquifers.
Researchers are concerned that as the clay continues to dry, large cracks could extend
directly from the ground surface to underground water supplies. If this occurs, water in
Xochimilco’s aquifers could be contaminated directly from both above and below ground
sources, including: leaking sewage lines, septic systems, solid waste dumps, farm run off
(with fecal material), and storm drains (Mazari and Alberro 1990). In this event, the
water in aquifers could be contaminated with bacteria, viruses, protozoa, and could carry
typhoid, cholera, dysentery, and hepatitis (Vogel Martinez and Rivas Rodriguez 1997:
405).

Due to deforestation over the last 50 years, the precipitation in the lacustrine zone
of Xochimilco has decreased almost 30 percent and the ambient temperature has risen.
The water level in the canals is very low and the water in the canals is contaminated from
household sewage and an invasive lily plant (lirio acuatico). The treated water in the
canals is contaminated with acids (high Ph levels), salts, and phosphates. Hundreds of
dwellings in irregular settlements discharge household waste and sewage into the canals.
The water in the canals does not sustain agriculture because it is slowly contaminates the
soil through crop irrigation. Every year less soil in the chinampas is of productive quality
(Vidrio Carrasco and Avila Jimenez 2000: 641-2; Rescate Integral de Xochimilco 2000; Reforma 23 September 2002: 10B).

**Discussion**

The history of Xochimilco for the last century shows that the government has been responsible for the transportation changes which augmented urbanization in the XEZ and on the chinampas, and the government is responsible for the excessive water extraction which has damaged the ecology of the lacustrine zone and the chinampas. The 1989 Plan to Rescue Xochimilco improved the water quality in the canals, but the water is not of adequate quality for sustainable agriculture. Most important, except for the area of the Xochimilco Ecological Park, this Plan did not provide for a mechanism to control housing development in the XEZ, nor did it provide for limits on water extraction from Xochimilco’s aquifers. Except for this brief period of 1989 to 1993, the Mexican government has virtually ignored the environmental protection of Xochimilco.

Despite improvements in the elections and structures of representative democracy in the DF, there are few tangible signs that the government has reduced the corruption that facilitates land sales and housing construction in the XEZ. Indeed, this corruption has persisted for decades, including both before and after the political reforms of the 1990s in the DF which improved structures of democratic government. Interest groups are active in reporting and highlighting incidents of housing settlement in protected areas. Similarly, the news media regularly report on ecological infractions in the XEZ (as demonstrated by the newspaper articles cited in this article). The ALDF passed laws which are designed to protect the XEZ (Gaceta Official 2000) and the ALDF focuses attention on environmental violations in the XEZ. In this sense, democratic processes of
representative governance are functioning well. But federal laws and ALDF regulations that are designed to control housing settlement are not enforced by Delegacion Xochimilco. The ALDF lacks the authority necessary to enforce the implementation of the laws and regulations that it passes. Clientelism and patronage politics undermine democracy. In the case of the XEZ, democracy fails at the implementation phase of the policymaking process.

The case of environmental protection of the XEZ is an example of a non-issue. Because the issue is complex in nature and requires considerable study to understand the seriousness of the risks for Mexico City, the public is not aware of the seriousness of this issue. The environmental protection of Xochimilco lacks a single focal point. The environmental problems of Xochimilco have many causes, each of which is complex in nature. The most important problems are excessive water extraction from Xochimilco’s aquifers and land sales and housing construction in the XEZ. Extraction of water from the aquifers of Xochimilco is virtually invisible to the public. The main impacts of excessive water extraction are aquifer depletion, land subsidence, and canal desiccation. The specific problems that result from these impacts include desiccation of the canals, sewerage line breakage, and damage to the road beds of the tram (tren ligero) due to uneven land subsidence. These problems, however, have developed over a period of years, without a specific focal point. Similarly, land sales, settlements, and housing construction take place incrementally over a period of time, without a clear focal point of change. Interest groups, the media, and the public have no single temporal or geographic point to focus attention on regarding the environmental degradation of the XEZ. The problems of Xochimilco are complex and diffuse. It is possible that a public health crisis
from contaminated water could focus public attention on the problems of the XEZ in the future. While it is possible to control urbanization in the XEZ, it would be difficult to slow water extraction and reverse the damage caused by excessive water extraction.

Manuel Castells (1977: 191-233) describes cities as “economic systems in space” because the mass provision or consumption of services determines the allocation of scarce resources. He emphasizes that these processes are important in determining economic equity. In the case of the XEZ, the pumping of water from Xochimilco has benefited the general population of Mexico City but damaged the agricultural economy of the chinamperos of Xochimilco and degraded the quality of water for Xochimilco residents and other residents of Mexico City who drink the water that is pumped from Xochimilco. Similarly, the sale of land and construction of housing in the XEZ benefits land owners who sell their land, realtors, certain political parties, and the careers of certain politicians. However, urbanization of the XEZ costs the entire city in reduced levels of ambient oxygen and polluted drinking water.

Paloma Bauer de la Isla and Wirth (2001: 42) have observed that, “National urban policy is often explained in terms of ‘non-decisions,’ in which policies that could provide for equitable distribution of resources are avoided at the national level and are devolved to market forces at the local level.” The lack of a national policy for Xochimilco has resulted in a policy vacuum in which local government and private decisions have resulted in the degradation of an important national resource. This situation has benefited wealth politicians, realtors, and land owners. At the same time, the poor (chinamperos) have suffered economically.
Henry Teune (1988: 372) has noted that government corruption is common in the cities of the LDCs. Teune distinguishes between “structural corruption” of major policies and “day-to-day corruption” such as bribery or patronage politics. Both types of corruption, he concludes, skew government policies to benefit the affluent. In the case of Xochimilco, the major policy is non-enforcement of environmental laws and the day-to-day corruption is the illegal sales of land and patronage politics which dilute the application of government inspections of land sales and housing construction.

UNESCO has taken a leading role in initiating projects to protect Xochimilco. UNESCO initiated both the 1989 Plan and the Rescate Integral plan which was initiated in 2002. Future research will have to focus on the results and implementation of the master plan. If implementation of this plan results in significant improvements in the quality of water in the canals, improved agricultural land in the *chinampas*, as well as effective enforcement of prohibitions of settlement in the XEZ, we might be able to attribute some of these improvements to democratic governance of the DF. If the source of such controls and improvements, however, comes from private groups funded by outside sources, such as the World Bank, it would be difficult to argue that democracy is functioning to protect Xochimilco.
### TABLE 1

Annual Population Growth Rates for the Federal District and Delegacion Xochimilco

<table>
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<tr>
<th>Period</th>
<th>Federal District</th>
<th>Delegacion Xochimilco</th>
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<tr>
<td>1930 – 1950</td>
<td>4.5</td>
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<tr>
<td>1950 – 1970</td>
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<td>1970 – 1990</td>
<td>0.9</td>
<td>4.2</td>
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<tr>
<td>1990 – 2000</td>
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<td>3.2</td>
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Table 2

Total Population for Delegacion Xochimilco, 1950 to 2000

<table>
<thead>
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<th>Year</th>
<th>Population</th>
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</thead>
<tbody>
<tr>
<td>1950</td>
<td>47,082</td>
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<tr>
<td>1960</td>
<td>70,381</td>
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<td>1970</td>
<td>116,493</td>
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<td>1980</td>
<td>217,481</td>
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<td>271,151</td>
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<td>1995</td>
<td>332,314</td>
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<td>2000</td>
<td>369,787</td>
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