Toward Comparative Study on Spatial Planning Issues and Approaches in Diverse Megacities - Tokyo and Megacities around the World - (Discussion Paper)

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1. Introduction

More than 300 cities in the world contain population of more than one million. Excluding some matured megacities such as Tokyo, London and Paris, most of these megacities are growing at different rate and have diverse spatial planning issues according to their unique conditions such as the stage of development, the history of urbanization and policies, and the role in the global society. Tokyo, the largest megacity in the world with around 32 million inhabitants in 2004, has experienced a rapid growth in the twentieth century with various spatial planning issues. Leaving many of them unsolved, Tokyo is now facing new challenges as it left the phase of rapid growth and entered the phase of no- or low-growth, depopulating and aging society. In this respect, Tokyo can be considered as the leading megacity in the world. Through international comparative study, the authors hope that some experiences of Tokyo, both successes and failures, on spatial planning issues and approaches can be referred to other megacities around the world. It goes without saying that the diverse megacities can also learn from each other from the comparison.

There have been many attempts to compare megacities. For example, van Susteren (2005) in Metropolitan World Atlas has compiled a set of basic data for 101 metropolitan areas in the world including population (core and periphery), employment, average income per capita, unemployment rate, crime rate, public transport / private vehicle share, average commuting time, pollution, and many more. While this kind of data set gives us a good overview of demographical, social or economical aspects of megacities, we cannot get into the details of spatial planning issues and approaches. Urban Age, a worldwide series of conferences investigating the future of cities, organized by The London School of Economics and Political Science and Alfred Herrhausen Society, is an ongoing initiative to compare labor market & work place, mobility & transport, public space & urban space, and housing & neighborhood in New York, Shanghai, London, Mexico City, Johannesburg and Berlin.
Center for Sustainable Urban Regeneration, The University of Tokyo, Japan is initiating a comparative study on spatial planning issues and approaches in diverse megacities with particular focus on (1) spatial structure and urban form (macroscopic view), and (2) diverse types of urban space (microscopic view). The goal of this presentation and the following discussion is to provide a tentative framework to compare spatial planning issues and approaches of diverse megacities based on our preliminary case studies, and to start an international discussion with interested colleagues. To begin with, this paper tries to give hints to answer the following questions:
- How can megacities be categorized to start our study? Which megacities should we study?
- What are major spatial planning issues and approaches that are emerging to megacities?

2. Categorization of the 60 Largest Megacities

Categorization of megacities itself is not a final purpose of the study. However, it is important to know the positions of case study megacities. Figure 2-1 shows the recorded and the projected population growth of the 60 largest megacities in the world. While Tokyo, Osaka, Paris, Moscow, London, Essen and Saint Petersburg will see almost no or low growth after 2000, most megacities will expect moderate to rapid growth toward 2015. Figure 2-2 shows the relationship between the megacities’ projected population in 2015 and population growth rate from 1985 to 2015. Based on the figure, the megacities can roughly be categorized into the following nine groups (underlined: preliminary case study cities):

A. Matured cities with more than 20 million inhabitants: Tokyo and New York
B. Matured cities with 5 to 10 million inhabitants: London, Paris, Seoul, etc.
C. Growing cities with around 20 million inhabitants: Mexico City and Sao Paulo
D. Growing cities with around 10 million inhabitants: Los Angeles, Rio de Janeiro, Shanghai, etc.
E. Rapidly growing cities with 10 to 20 million inhabitants: Istanbul, Jakarta, Manila, etc.
F. Rapidly growing cities with 5 to 10 million inhabitants: Toronto, Bogota, Hanoi, etc.
G. Ultra rapidly growing cities with around 20 million inhabitants: Lagos, Mumbai, etc.
H. Ultra rapidly growing cities with around 10 million inhabitants: Kinshasa, etc.
I. Ultra rapidly growing cities with around 5 million inhabitants: Guatemala City, Luanda, etc.

This is a tentative categorization of the megacities. Other data sets and methodologies should be explored to better explain the relative positions of diverse megacities.

Figure 2-1: Recorded and Projected Population Growth of the 60 Largest Megacities (Data Source: UN-HABITAT)
In the following two chapters, major spatial planning issues and approaches in Tokyo (Chapter 3) and other megacities including Mexico City, Los Angeles, Shanghai, Toronto and Bogota (Chapter 4) are introduced based on our preliminary case studies. While the case of Tokyo is explained comprehensively to help provide a tentative framework for the comparison, cases of other megacities are explained fragmentarily due to the limitation of presentation time and information acquired. Spatial planning issues and approaches are organized in the following format:

(1) Spatial Structure and Urban Form (macroscopic view)
(2) Diverse Types of Urban Space (microscopic view)
   (a) Prevention of Urban Sprawl and Protection of Natural Resources and Farmlands
   (b) Efficient Transit System with Effective Land Use Strategies
   (c) Intensification of Urban Centers and Redevelopment of Brownfields
   (d) Conservation of Historic Areas
   (e) Improvement of Informal (Popular) Settlements
   (f) Maintenance and Improvement of the Suburbs
3. Major Spatial Planning Issues and Approaches in Tokyo

3-1. Spatial Structure and Urban Form

The 20th century Tokyo has experienced a significant urban expansion due to rapid population growth (Figure 3-1). The population of Tokyo region (Tokyo Metropolitan Government Jurisdiction, Kanagawa Prefecture, Saitama Prefecture and Chiba Prefecture covering 13,551 km²) grew from 7.5 million in 1920 to 32 million in 2004. It goes without saying that the major planning issue of the 20th century Tokyo was to expand or intensify the urban area in order to accommodate growth.

Tokyo's urban expansion was largely led by railway constructions and developments around railway stations (Figure 3-2). Railway construction was one of the national modernization policies, and the national railway network connecting Tokyo and other cities in Japan was established as early as in the end of the 19th century. Beginning in the 1920s, private railway companies purchased huge areas of land in the suburbs of Tokyo and developed housing estates. Private railway companies were able to pay for the railway constructions from the profits they made from selling or leasing the developed housing estates and commercial areas around the stations. Also, there were large-scale housing estate developments by public corporation along the railway lines in the suburbs such as Tama New Town and Chiba New Town. On the other hand in central Tokyo, the subway network has been developed continuously since 1927. As a result, 73% of morning commuters to central Tokyo (Tokyo 23 Wards) use railway while only 9% of them use private automobiles. Others use bus, bicycle or foot.

Thus, Tokyo has grown to a transit-oriented, mono-centric region. However, with the decrease of working population, it would become more difficult to maintain such a sophisticated railway system. In addition, suburbs without sufficient public transit services have already become automobile-oriented.
Figure 3-4 shows the mono-centric structure of nighttime population density in Tokyo region. The mono-centric structure was more significant in the past before motorization and suburbanization. This mono-centric structure is much more significant in daytime due to the concentration of offices in the very center of Tokyo (Figure 3-5).

Figure 3-4 (Left): Nighttime Population Density of Tokyo Region by Municipalities in 2000
Figure 3-5 (Right): Daytime and Nighttime Population Density by Distance from Central Tokyo in 2000

<table>
<thead>
<tr>
<th>Area of Land Use Designation (ha)</th>
<th>Area (ha)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Area</td>
<td>1,439,660</td>
<td>73%</td>
</tr>
<tr>
<td>Urbanization Promotion Area</td>
<td>421,410</td>
<td>22%</td>
</tr>
<tr>
<td>Urbanization Control Area</td>
<td>885,649</td>
<td>46%</td>
</tr>
<tr>
<td>Agricultural Area</td>
<td>1,108,265</td>
<td>56%</td>
</tr>
<tr>
<td>Forestry Area</td>
<td>346,884</td>
<td>32%</td>
</tr>
<tr>
<td>Natural Park Area</td>
<td>379,676</td>
<td>18%</td>
</tr>
<tr>
<td>Natural Reserve Area</td>
<td>14,911</td>
<td>1%</td>
</tr>
<tr>
<td>Undesignated Area</td>
<td>6,634</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3,596,114</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Actual Land</strong></td>
<td>1,564,722</td>
<td>100%</td>
</tr>
</tbody>
</table>

Figure 3-6: Land Use Plan for Prefectures in Tokyo Region (Tokyo Metropolitan Government Jurisdiction, Kanagawa Prefecture, Saitama Prefecture, Chiba Prefecture and Ibaraki Prefecture)
Regarding the current land use planning, (1) Urban Area, (2) Agricultural Area, (3) Forestry Area, (4) Natural Park Area and (5) Natural Reserve Area are designated (Figure 3-6) based on National Land Use Planning Act and the five land-use related laws: City Planning Law, Law Concerning the Improvement of Agricultural Promotion Areas, Forest Law, Natural Park Law and Nature Conservation Law. Land use in these area is controlled by the regulations of their respective laws. In fact, this land use plan is not really a plan with particular strategies but a map just showing where each law is effective.

Urban Area consists of Urbanization Promotion Area, Urbanization Control Area and Undivided Urban Area. Issues in these areas are explained in the following section. Agricultural, Forestry, Natural Park and Natural Reserve Areas have “special areas” within themselves to further strengthen land use control. Roughly speaking, natural resources and farmlands are protected in the “special areas”. On the other hand, developments that meet certain conditions are permitted in areas outside “special areas”, often causing the destruction of natural resources or farmlands.

3.2. Diverse Types of Urban Space

3.2.1. Prevention of Urban Sprawl and Protection of Natural Resources and Farmlands

There are several problems of urban sprawl in Urban Area. Urban Area consists of Urbanization Promotion Area (UPA) where development is promoted, Urbanization Control Area (UCA) where development is not permitted in principle, and Undivided Urban Area (UUA) that does not belong to either UPA or UCA.

Firstly, in UPA, not only large-scale planned developments but also small-scale or individual developments are permitted as long as each property is attached to a street which width is 4m or wider in principle, causing urban sprawl of “mini-developments” (Photo 3-1). Secondly, in UCA, certain developments such as housing for farmers’ sons, retail facilities for the locals or public facilities are permitted, contributing to urbanization (Photo 3-2). Thus, urban sprawl can be observed both in UPA and UCA (Photo 3-3). Thirdly, in UUA where land use regulation is generally loose, various kinds of developments including large-scale commercial developments are possible.

As a response to continuing urban sprawl and downtown decline, City Planning Law was recently amended to prohibit large-scale commercial developments in UCA and UUA, and permit them exclusively in commercial, neighborhood commercial and quasi-industrial districts within UPA. This response might have been too late since many large-scale commercial developments have already occurred.

Thus, Tokyo could not prevent urban sprawl or protect natural resources and farmlands well by land use regulations. However, Tokyo is relatively compact because of transit-oriented development.
2. Efficient Transit System with Effective Land Use Strategies

Transit-oriented development in terms of a whole spatial structure or urban form was explained in the previous section. Urban areas around railway stations are generally high density and pedestrian-oriented. Major transit terminals such as Tokyo, Ueno, Ikebukuro, Shinjuku, Shibuya, Shinagawa, Kawasaki, Yokohama, Omiya and Chiba stations are surrounded by high-density mixed-use area of retail, commercial and office uses (Photo 3-4), and suburban stations often have supermarkets and shopping streets around them (Photo 3-5). However, road infrastructure around many of the suburban stations is not well provided, making buses, taxis and private automobiles difficult to access. In addition, lack of reasonable bicycle parking facilities often results in illegal bicycle parking on narrow sidewalks, destructing pedestrian environment.

Photo 3-3: Urban Sprawl in Urbanization Promotion Area and Urbanization Control Area (Kawagoe City)

3-2-2. Efficient Transit System with Effective Land Use Strategies

Transit-oriented development in terms of a whole spatial structure or urban form was explained in the previous section. Urban areas around railway stations are generally high density and pedestrian-oriented. Major transit terminals such as Tokyo, Ueno, Ikebukuro, Shinjuku, Shibuya, Shinagawa, Kawasaki, Yokohama, Omiya and Chiba stations are surrounded by high-density mixed-use area of retail, commercial and office uses (Photo 3-4), and suburban stations often have supermarkets and shopping streets around them (Photo 3-5). However, road infrastructure around many of the suburban stations is not well provided, making buses, taxis and private automobiles difficult to access. In addition, lack of reasonable bicycle parking facilities often results in illegal bicycle parking on narrow sidewalks, destructing pedestrian environment.

Photo 3-4 (Left): Urban Area around a Major Transit Terminal Station (Shibuya)
Photo 3-5 (Right): Urban Area Near a Suburban Station (Kasumigaseki in Saitama Prefecture)
3-2-3. Intensification of Urban Centers and Redevelopment of Brownfields

The population of central Tokyo (Tokyo 23 wards) had increased continuously since the end of World War II until 1986, but decreased from 1987 to 1996 due to skyrocketing land value by the bubble economy and its aftereffect. Since 1997, population of central Tokyo as a whole has been recovering, activating various housing developments that often make the most use of various housing incentives prepared by government.

Significant among those are super-high-rise residential towers and small-size three-story single-family housing. Super-high-rise residential towers are often developed on former industrial sites in the Tokyo Bay waterfront (Photo 3-6), or on large lots (sometimes assembled from several smaller lots) in existing urban areas (Photo 3-7). In some cases, the former is accompanied with the issues of insufficient infrastructure and public services particularly public schools, and the latter by neighborhood conflicts aroused by landscape or sunlight destructions. A series of small-size three-story single-family housing is often developed after a large property was divided into smaller pieces, leading to the loss of large single-family housing properties in central Tokyo (Photo 3-8).

Recently, constructions of one-room (studio) apartments, either high-rise or low-rise, are also becoming active in central Tokyo, responding to the increasing number of singles. High-rise residential apartments are being constructed around suburban railway stations as well for people who put high priority on the convenience of commuting. Besides housing development, many mixed-use (mix of office, commercial and residential uses) redevelopment projects originally planned during the bubble economy in the 1980s have been completed in recent years such as Roppongi Hills or Shiodome Sio-Site (Photo 3-9).
In Tokyo region, industrial areas of various sizes are dispersed throughout the region, but the largest concentration is in Tokyo Bay Waterfront Area that holds Keihin Industrial Area (4,400 ha) and Keiyo Industrial Area (4,700 ha). These industrial areas were the engines of Japan’s economic growth in the twentieth century, but they are now experiencing a gradual change as they entered the globalizing 21st century.

Recently, there has been a drastic movement among companies in these industrial areas such as the mergers of oil and steel companies or relocation of plants to foreign countries, which result in the generation of potential sites for redevelopment. On the other hand, research and development institutions have been located, introducing new land uses to the industrial areas. Thus, these areas call for the integrated methodology of brownfield (property with contaminated soil) regeneration and planning as they gradually evolves from the heavy industrial base to a new urban area that potentially accommodates research and development institutions, light industry, business and commercial facilities, housing and other uses.

3-2-4. Conservation of Historic Areas
Based on the Law for the Protection of Cultural Properties, preservation districts for groups of historic buildings can be designated by local municipalities to provide technical and financial support from government. There are only two preservation districts in Tokyo region: Sawara in Chiba Prefecture (7.1ha) and Kawagoe in Saitama Prefecture (7.8ha), both a merchant town.

While these districts are well conserved, there are many other areas in Tokyo region that are not eligible to be designated as preservation districts but have certain levels of historic or vernacular environment. These areas often confront with high pressure of redevelopment since land use and building regulations in Japan are generally loose, and neighborhood conflicts never stop. Such examples are Yanaka and Kagurazaka in central Tokyo. In these areas, future vision based on local consensus and implementation measures including regulations or incentives by City Planning Law, recently enacted Landscape Law or local ordinances are necessary.

3-2-5. Improvement of Informal (Popular) Settlements
Population growth and urban expansion of Tokyo in the 20th century was so rapid that most of the urban areas are not provided with sufficient infrastructure such as well-planned streets and parks. The improvement of such informal or popular settlements continues to be a great challenge.
Tokyo Metropolitan Government has designated eleven major improvement areas totaling around 2,400ha where improvement projects are promoted to mitigate potential earthquake disasters in a low-rise high-density wooden environment. In Higashi Ikebukuro (Photo 3-13), one of the designated major improvement areas, the collaborative work of residents, consultants and government officials since the mid-1980s have completed ten plaza projects with fire extinguishers and hydrants, several fire-proof cooperative housings and one 6m-wide disaster-proof street.

Dealing with ongoing and established “mini-development” urban areas is another set of issues. For ongoing “mini-developments” in residential-agricultural mixed-use areas such as Tagara in Nerima Ward, Tokyo (Photo 3-14), district plan that designates future streets, wall setbacks, minimum lot size, building design and fence structure seems to be the most effective. On the other hand, it is very difficult to improve an established or already built-up “mini-development” urban area.

Recently, illegal “Blue Tent” settlements can be observed in large parks or riverbanks in central Tokyo. They started from homeless concentrations but now form one type of a settlement. So far, no effective measure has been set for this kind of informal settlement.

3-2-6. Maintenance and Improvement of the Suburbs
As Tokyo entered the phase of no- or low-growth, depopulating and aging society, with people moving back to central Tokyo after the bubble economy, maintenance and improvement of the suburbs has become a new issue. Many suburban housing estates, both multi-family (Photo 3-16) and single family (Photo 3-17), were developed in the 1960s and the 1970s, the age of rapid growth. Baby-boomers who purchased those housing estates are now retiring and most of their children have already left home. It is questionable if these suburbs will be socially and economically sustainable in the future. Measures to maintain the suburbs might include provision of various community services to support the lives of the aged population, regeneration of multi-family housing estates to attract diverse population and local management of vacant properties.

Parts of Tokyo suburbs not well served by public transit have automobile-oriented urban structure and landscape. Improvement of landscape in commercial strips along arterial roads (Photo 3-18), for example, might be an issue particularly from the aesthetic point of view.
3-2-7. Illustrating the Distribution of Diverse Types of Urban Space

As Tokyo is a patchwork of diverse types of urban space, it is difficult to illustrate the distribution of diverse types of urban space. Figure 3-7 is a simplified image of how we would like to illustrate. The work is underway.

Figure 3-7: Simplified Image of Illustrating the Distribution of Diverse Types on Urban Space
4. Examples of Spatial Planning Issues and Approaches in Other Megacities around the World

4-1. Spatial Structure and Urban Form

Growth Plan and Greenbelt Plan in Toronto: Toronto region, The Greater Golden Horseshoe Region, now has the population of around 8 million and is expecting around 1.8 million more in the next thirty years. To accommodate this future growth, Province of Ontario has developed Proposed Growth Plan for the Greater Horseshoe (Figure 4-1) based on Places to Grow Act enacted in 2005. The proposed plan aims to accommodate considerable portion of future growth in downtowns, brownfields, arterial road corridors and areas around public transit stations to slow down the pace of greenfields development and to protect natural resources and farmlands. If adopted, official plans of cities and counties must follow the Growth Plan. The proposed Growth Plan incorporates the already adopted Greenbelt Plan that sets clear policies to protect natural resources and farmlands, and to promote sustainable development of farming industry and rural economy.

Master Plan of Shanghai: Comprehensive Planning of Shanghai Metro-Region (1999-2020) developed by Shanghai Urban Planning and Research Institute lays out a future land use map (Figure 4-2). According to the map, Shanghai Central City that consists of commercial and public facilities, residential area, industrial and warehouse areas, etc. is surrounded by eco-sensitive area. Outside Shanghai Central City and eco-sensitive area are farmlands, 10 new towns and 21 central towns each surrounded by small greenbelts. The land use plan clearly aims to prevent urban sprawl and protect natural resources and farmlands. However, whether or not this land use plan can really accommodate rapid population growth of Shanghai is questionable.

4-2. Diverse Types of Urban Space

4-2-1. Prevention of Urban Sprawl and Protection of Natural Resources and Farmlands

Sub-Divisions in Los Angeles: Los Angeles region is expecting a population growth of additional 6.3 million by 2030, resulting in a total population of nearly 23 million. To mitigate future growth impacts such as traffic congestion, air pollution and heat island phenomenon, Southern California Association of Governments which consists of cities and counties in the region adopted the growth vision, “2%
Strategy. The idea of the strategy is to attract growth in regional or town centers and corridors that cover about 2% of the region and are well served by public transit. On the other hand, in unincorporated areas of the region, private developers can easily develop low-density automobile-oriented housing estates as long as they provide sufficient infrastructure. This system of sub-divisions cannot prevent continuing urban sprawl and destruction of natural resources and farmlands. One example is Rancho Cucamonga, west of San Fernando (Photo 4-1).

**Popular Settlements and Luxury Apartments in the Periphery of Mexico City:** Mexico City has also experienced a rapid growth in the 20th century. The population grew from 0.35 million in 1900 to 19 million in 2000. Most of the population growth was accommodated in popular settlements that now occupy more than a half of the region. Urban sprawl by popular settlements still continues in the periphery of the city (Photo 4-2). In addition, the construction of luxury apartments can be observed in the northwestern periphery of the city (Photo 4-3). No effective measure has been set to protect natural resources from urban sprawl.

**Metrovivienda in Bogota:** Urban sprawl by informal or popular settlements has also been a major issue in Bogota. To prevent unplanned urban sprawl and reduce the cost of improving informal settlements later, the city has created an agency called Metrovivienda. It acquires land in the periphery of the city where urban sprawl is expected, provide necessary infrastructure such as electricity, sewage and telephone, and sells the divided lots to developers who then build and sell affordable housing (Figure 4-3). In the process, some portion of the acquired land is reserved for parks, greenways and schools. In this way, urban sprawl in Bogota seems to be controlled to some extent.

![Photo 4-1: Example of Sub-Divisions in LA (Rancho Cucamonga)](image1)

![Photo 4-2 (Left): Urban Sprawl by Popular Settlements in the Periphery of Mexico City](image2)

![Photo 4-3 (Right): Urban Sprawl by Luxury Apartments in the Northwestern Periphery of Mexico City](image3)

![Figure 4-3: Image of Metrovivienda's Project](image4)
4-2-2. Efficient Transit System with Effective Land Use Strategies

Proposed Railway System in Shanghai: As a growing megacity, Shanghai is investing in both road and rail facilities. Road investments include building main arterial road network in the central city, improving the hierarchy of major highways in the suburbs, and increasing the traffic capacity of junctions. Rail investments include building rail transit system in the central city, constructing regional express rail system for passengers, and connecting national railways with city rail transit (Figure 4-4). By 2020, rail transit network of about 540km that consists of Regional Express Rail (R line), Urban Metro (M line) and Light Rail (L line) will be completed, which will be the main mode for passenger transport. New railroad transit lines including M4, M7, M8 and R4 will be constructed, and M3, R1 and R2 will be extended. MAGLEV, which travels at the maximum speed of 430km/h, was already built to connect the central city and Pudong International Airport.

Metro Liner in Los Angeles, Metrobus in Mexico City, and Transmilenio in Bogota: Bus Rapid Transit (BRT) is a flexible, rubber-tired rapid transit mode that combines stations, vehicles, service, running ways, and intelligent transportation system elements into an integrated system. BRT has greater operating flexibility and potentially lower capital and operating costs than light rail or subway. Metro Liner in Los Angeles (Photo 4-4), Metrobus in Mexico City (Photo 4-5) and Transmilenio in Bogota (Photo 4-6) are the examples of BRT. These BRTs connect high-density residential areas, retail, commercial and office centers.

Photo 4-4 (Left): Metro Liner in Los Angeles (LA County Metropolitan Transportation Authority)
Photo 4-5 (Center): Metrobus in Mexico City
Photo 4-6 (Right): Transmilenio in Bogota
4-2-3. Intensification of Urban Centers and Redevelopment of Brownfields

Bando Dos in Mexico City: In 2000, Mayor of Mexico City issued Bando Dos (Informative Decree 2), a policy initiative to promote the re-densification of the urban center. This was a response to concerns including population loss in the urban center and sprawl in the urban peripheries where land should be protected. By Bando Dos, stricter growth controls were set for areas outside the urban center and building permit process was streamlined for developments in the urban center. As a result of this initiative, housing construction boom occurred and housing price rose rapidly in the urban center (Photo 4-7).

Development of Pudong New Area in Shanghai:
The development of Pudong New Area, a 523km$^2$ triangular area to the east of Huangpu River and to the west of Yangtze River estuary, started in the early 1990s. By the end of 2004, the area had a population of around 1.8 million. Pudong has given priority to urban development projects including the Pudong International Airport, Metro Line 2, Waigaoqiao Power Plant and MAGLEV. By the end of 2004, more than 86 countries and region had invested in 11,839 projects in the area. Lujiazhu Financial and Trade Zone across the river from old downtown has grown to the largest central business district in Shanghai (Photo 4-8). By the end of 2004, there were 1,082 skyscrapers either completed or under construction in the zone, with an occupancy rate of 91.7%. Free trade zone, export-processing zone and high-tech park have also attracted many industries from all over the world. There are also numerous super-high-rise developments outside Pudong New Area (Photo 4-9).

Waterfront Redevelopment in Toronto: In 2000, Government of Canada, Province of Ontario, and City of Toronto created the Toronto Waterfront Revitalization Corporation (TWRC) to oversee and lead waterfront renewal. TWRC creates waterfront parks, public spaces, cultural institutions and diverse sustainable commercial and residential communities with the participation of citizens as well as public and private sector partners. Waterfront redevelopment is important in regenerating brownfields (properties with contaminated soil) and accommodating growth near downtown. Mixed-use redevelopment projects include East Bayfront (90 acre) and West Don Lands (80 acres) (Figure 4-5).
4-2-4. Conservation of Historic Areas

Historic Center Revitalization in Mexico City: Since the 1970s and especially after the earthquakes in 1985, the historic center of Mexico City (Photo 4-11) has suffered from serious decline. The historic center lost about 40% of its population between 1970 and 1995. In 1990, Historic Center Trust was established to revitalize the center and to restore its valuable but rapidly vanishing architectural heritage. The restoration plan has various objectives: to attract private investment, reactivate unused building stock, to ensure economic revitalization, to generate formal employment, to improve the livability of the historic center, attract residents back and to solve security and congestion issues caused by overwhelming large number of street vendors. The plan is said to have shown positive outcomes.

Heritage Preservation in Toronto: The Ontario Heritage Act allows municipalities in the province to designate the whole or any part of an area as a Heritage Conservation District. The designation will allow a municipality to protect and enhance the special character of groups of properties. The character is established by the overall heritage quality of buildings, streets and open spaces as seen together. In the case of Toronto, after examination and approval by the Toronto Preservation Board, City Council passes a by-law that establishes the heritage conservation district. There are currently 12 designated and 2 proposed heritage preservation districts in Toronto (Figure 4-6, Photo 4-12).
Historic Conservation Strategy in Shanghai: Shanghai’s historic conservation strategy consists of three parts. Historic Conservation Areas, designated in 12 areas in the center city covering about 27km$^2$ (Figure 4-7), pay close attention to the conservation and continuity of the unique styles and features. Excellent Historic Buildings involves not only a single building but also a whole block or a street. Famous Historic Towns protect historic towns such as Zhujiajiao (Photo 4-13).

**Figure 4-7 (Left): Historic Conservation Areas in Shanghai**
**Photo 4-13 (Right): Protected Historic Town of Zhujiajiao**

### 4-2-5. Improvement of Informal (Popular) Settlements

Programma de Mejoramiento de Vivienda (PMV) in Mexico City: PMV was established in 1998 by the city government and representatives from various Non-Governmental Organizations of the Habitat Coalition Mexico to improve housing problems in popular settlements that cover more than half of the urban area. PMV grants loans to low-income families and provides technical assistance concerning spatial arrangements and design issues of individual housing units. It accelerated self-help constructions, but did not solve structural problems of housing stock and overcrowded living environments (Photo 4-14).

**Ciudad Bolivar in Bogota**: In addition to infrastructure development through Metrovivienda, providing adequate education for children was essential to improve informal settlements from the base. Penalosa administration (1998-2001) built more than a hundred nurseries for children under five-years-old and assured resources for their operation. It also increased children’s enrollment in public schools by more than 200,000, a 34% increase in four years, while improving more than 150 school buildings and building 50 new schools (Photo 4-15). 14,000 computers were provided in public schools that are connected both to the Internet and the network of libraries. Particular effort has been made connect Ciudad Bolivar to the rest of the city by extending Transmilenio, a bus rapid transit, to the area giving people sense that the government cares about them.

**Photo 4-14 (Left): Informal Settlement in Mexico City**
**Photo 4-15 (Right): School in Bogota**
4-4-6. Maintenance and Improvement of the Suburbs

**New Urbanism Development in Toronto:** Recently, much effort have been made by planners, urban designers and architects to increase density and to provide sense of place in suburban developments of North American cities, the movement of “New Urbanism”. Cornell in Toronto region is one of many examples of new urbanism suburban development (Photo 4-16). While housing development seems to have been successful, attracting neighborhood business is very difficult and automobile-dependency cannot be altered without major public transit investment.

**Safety Issues in Mexico City:** Gated communities (Photo 4-17) and “caged cars” are not uncommon in the suburbs of Mexico City. Safety is another issue of the suburbs.

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![Photo 4-16 (Left): New Urbanism Suburban Development in Cornell, Toronto](image1)

![Photo 4-17 (Right): Gated Community in the Suburb of Mexico City](image2)

**Landscape of Commercial Strips in Mexico City, Los Angeles and Toronto:** Common to Mexico City, Los Angeles and Toronto is a landscape in commercial strips along arterial roads in the suburbs (Photo 4-18, Photo 4-9). Chaos of billboards and signs, and automobile-oriented planning and urban design could be improved.

![Photo 4-18 (Left): Commercial Strip in the Suburb of Mexico City](image3)

![Photo 4-19 (Right): Commercial Strip in the Suburb of Los Angeles](image4)
5. Conclusion: Tentative Framework for Comparative Study

5-1. Case Study Megacities

Tokyo, Bogata, Los Angeles, Mexico City, Shanghai and Toronto were selected as preliminary case study cities based on the accessibility to information and the existing research network. These cities will be studied more in detail. Besides these cities, we are considering to include Sao Paulo, Istanbul, Manila and Mumbai to cover almost all categories of the 60 largest megacities. Other megacities will also be considered upon individual requests for research collaboration.

5-2. Items to Cover

Table 5-1: Matrix of Case Study Megacities and Items to Cover

<table>
<thead>
<tr>
<th>Case Study Megacities</th>
<th>Tokyo</th>
<th>Mumbai</th>
<th>Sao Paulo</th>
<th>Mexico City</th>
<th>Manila</th>
<th>Shanghai</th>
<th>Los Angeles</th>
<th>Istanbul</th>
<th>Bogota</th>
<th>Toronto</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Spatial Structure and Urban Form (macroscopic view)</td>
<td>Transit-Oriented, Mono-Centric</td>
<td>Region, Plan for Mumbai Metro, Region</td>
<td>New Master Plan</td>
<td>Master Plan</td>
<td>2% Strategy</td>
<td>Growth Plan, Gmbelt Plan</td>
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<tr>
<td>(2) Diverse Types of Urban Space (microscopic view)</td>
<td>Mini-Devs, Large-Scale Commercial, etc.</td>
<td>Informal, Luxury</td>
<td>Sub-Divisions</td>
<td>Metrovivienda</td>
<td>New Urban. Dev.</td>
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<tr>
<td>(2a) Various Types of Urban Sprawl</td>
<td>Urban Area around Transit Terminals and Suburban Stations</td>
<td>Metrobus Corridor</td>
<td>Railway System</td>
<td>Metro Liner Corridor</td>
<td>Transmilenio Corridor</td>
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<tr>
<td>(2b) Transit-Oriented Development</td>
<td>Super-High-Rise Residential Tower, Small-Size Three-Story Single-Family Housing , Mixed Use, etc</td>
<td>Bando Dos</td>
<td>Dev. of Pudong</td>
<td>Waterfront Redev.</td>
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<tr>
<td>(2d) Conservation of Vernacular Urban Space (Not Necessarily Historic)</td>
<td>Major Improvement Areas, Mini-Devs, &quot;Blue Tent&quot; Settlements</td>
<td>PMV</td>
<td></td>
<td>Ciudad Bolivar</td>
<td></td>
<td></td>
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<tr>
<td>(2e) Improving Informal (Popular) Settlements</td>
<td>Depopulating and Aging, Landscape in Commercial Strips</td>
<td>Safety Issues (Gated Comm., Caged Cars)</td>
<td></td>
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</tbody>
</table>

May add more items
Table 5-1 shows the matrix of case study megacities and items to cover, with keywords partially filled in based on our preliminary case studies. Our goal is to compare spatial planning issues and approaches of diverse megacities by explaining each item for each city, i.e. completing the matrix. The following questions are laid out to guide the study of each item.

Questions for Each Item

(1) Spatial Structure and Urban Form (macroscopic view)

(1a) History of Population Growth and Patterns of Urban Expansion
- How did the population grow since the beginning of the 20th century?
- How did the urban area expand as it accommodated the population growth?
- What were the major factors that directed that pattern of urban expansion?
  (Topography, public transit, road network, land use regulations, etc.)

(1b) Overall Strategy to Accommodate Future Growth
- What are the major features of the current regional (land use and transportation) plan?
- How is the plan implemented? (Zoning, incentives, projects, etc.)

(2) Diverse Types of Urban Space (microscopic view)

(2a) Various Types of Urban Sprawl
- What are the major types of urban sprawl?
  - Sub-division with sufficient infrastructure (Los Angeles, Toronto, Tokyo)
  - Informal settlement without sufficient infrastructure (Mexico City, Bogota, Tokyo)
- What are adequate ways to deal with different types of urban sprawl?
  - Possibilities of new urbanism developments (Los Angeles, Toronto, Shanghai)
  - Providing sufficient infrastructure in prior to informal sprawl (Mexico City, Bogota, Tokyo)
- How can we approach to the transportation issues associated with urban sprawl?
  - Automobile-dependency and traffic congestion (Los Angeles, Toronto, Mexico City, Tokyo)
  - Public transit for people who cannot afford automobile (Mexico City, Bogota)

(2b) Transit-Oriented Development
- What are the major forms of transit-oriented development?
  - High-density urban areas around railway stations (Tokyo)
  - High-density corridors along rapid bus transit lines (Mexico City, Bogota, Los Angeles)
- What are the problems associated with transit-oriented development?
  - Poor infrastructure around railway stations (Tokyo)
  - Congestion of public transit (Tokyo)
  - High cost of investment in railways (Shanghai, Toronto)
  - Capacity of bus rapid transit and limit of corridor density (Los Angeles, Mexico City, Botoga)
  - Resistance to high density (Los Angeles, Toronto)
- To what extent can transit-oriented development reduce automobile use and commuting time?

(2c) Shaping Attractive Urban Centers
- What kinds of visions are there to shape attractive urban centers?
- What are the problems associated with the intensification of urban centers?
- What are the major types of housing in urban centers?
- What kinds of lifestyles can be realized in urban centers?
- How can brownfields be converted into mixed-use urban area?

(2d) Conservation of Vernacular Urban Space (Not Necessarily Historic)
- What kinds of vernacular urban space are confronting with modern urban redevelopment?
- What are the rationales for conserving such vernacular urban space?
- What kinds of measures are available to conserve vernacular urban space?

(2e) Improving Informal (Popular) Settlements
- How much area is covered by informal (popular) settlements?
- How can we categorize different types of informal (popular) settlements around the world?
  - Current infrastructure
  - Ownership
- What exactly are the issues of informal (popular) settlements?
  - Vulnerability of individual building to disasters
  - Vulnerability of entire area to disasters
- Quality of Life: More than minimum standard
- What are different approaches to improve informal (popular) settlements?

(2f) Maintenance and Improvement of the Suburbs
- Are the suburbs really in crisis? Or, is it just Tokyo?
- What are the issues of the suburbs?
- Is landscape of commercial strips a big deal?

In addition, we would like to make a set of key diagrams for each city showing (1) spatial structure and urban form, and (2) distribution of diverse types of urban space. The formats for these diagrams are currently being explored. It is not easy to come up with formats compatible for diverse megacities.

5-3. Final Product

The final product of this comparative study will be a book written in English on spatial planning issues and approaches of diverse megacities.

[References]

Introduction
- Urban Age <http://www.urban-age.net/>

Tokyo
- Junichiro Okata, Akito Murayama, Hiroshi Ota, Yoshiro Morita, Satoshi Ishii and Noriko Akita (2005) 21 Profiles of Tokyo, SUR (Sustainable Urban Regeneration), Vol.2, pp.10-31, Center for Sustainable Urban Regeneration, The University of Tokyo
- Ministry of Land, Infrastructure and Transport, Government of Japan, Data from Land Use Control Back-Up System and Prefectural Land Use Master Plans
- Department of Urban Development, Tokyo Metropolitan Government (2003) Disaster-Proof Urban Improvement Promotion Plan
- Tama New Town Society <http://tama-net.or.jp/>

Bogota
- Metrovivienda <http://www.metrovivienda.gov.co/>
- TransMilenio <http://www.transmilenio.gov.co/>

Los Angeles

Mexico City
- Alfonso Valenzuela (2006) Mexico City Interim Report, Center for Sustainable Urban Regeneration, The University of Tokyo

Shanghai

Toronto
- Ontario Ministry of Municipal Affairs and Housing (2005) greenbeltPLAN 2005
- Toronto Waterfront Revitalization Corporation <http://www.towerfront.ca/>
- City of Toronto Heritage Preservation Services <http://www.toronto.ca/heritage-preservation/>