Recent Suburbanization and Environmental Implication in Beijing

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1. Preface

- The capital of China, Beijing is a famous ancient city in the world and a modern international metropolis;
- Beijing total area: 16,800 square kilometers;
- total population: 13.833 million;
- in the urban area: 8.6143 million;
- temporary population: 2.628 million.
northwestern part is mountainous areas and accounts for 38% of the city’s total territory; southeastern part, making up for 62%
1. Preface

Figure 5. Bird’s-Eye-View of Beijing Downtown Area
2. Beijing City General Planning

- 1953: Beijing worked out the “Key Points of the Draft Plan for Reconstruction and Expansion of Beijing City”;
- 1958: drew up the “Initial Plan of the Beijing City Construction General Planning (Draft)”; 
- 1983, State Council approved the “Plan of Beijing City Construction General Planning”;
- 1993, the State Council approved the newly-revised “Beijing City General Planning (1991-2010)”. This is the major regulation guiding the urban planning and construction of Beijing in recent years.
2. Beijing City General Planning

Figure 3. Map of Beijing territory General Planning
2. Beijing City General Planning

Figure 4. Map of Beijing Urban Area General Planning
3. Development of Beijing Municipality and Problems Encountered

- 3.1. Recent Development of Beijing
3.1.1. Urban population and land used

In 2001, since 6 counties were upgraded to the urban districts, the urban population and land used have reported substantial increases.

- Population in the urban area:
  - 1990: 624.40
  - 2000: 690.00
  - 2001: 861.43

- The urban construction land:
  - 1990: 397.4
  - 2000: 490.11
  - 2001: 747.8
3.1.3. Economy maintains sustained, high growth

GDP (100 million yuan RMB)

Fixed Assets Investment (100 million yuan RMB)

Per Capita GDP (Yuan RMB/Person)

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP (100 million yuan RMB)</th>
<th>Fixed Assets Investment (100 million yuan RMB)</th>
<th>Per Capita GDP (Yuan RMB/Person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>500.82</td>
<td>136.84</td>
<td>4883.23</td>
</tr>
<tr>
<td>2001</td>
<td>2817.6</td>
<td>1530.50</td>
<td>25300.00</td>
</tr>
</tbody>
</table>
3.1.4. Substantial progress was made in the readjustment of urban industrial structure.

Between 1990 and 2001, the ratio of the primary industry and the secondary industry dropped from 9.26% and 52.39% to 3.3% and 37.8% respectively. The ratio of the tertiary industry rose from 38.35% to 58.9%.
3.1.5. Accelerate the construction of urban infrastructure facilities

Between 1990 and 2001, investment in this sector increased from 1.338 billion yuan RMB to 16.392 billion yuan.
3.1.6. Accelerate the construction of Zhongguancun Science and Technology Park.

- Zhongguancun is located at the northwestern part of Beijing where there are many universities and research institutes under the Chinese Academy of Sciences;
- In May 1988, the State Council approved the « Provisional Regulation on New Technology Development Experimental Zone of Beijing Municipality » ;
- In June 1999 set the development planning for the “Zhongguancun Science and Technology Park”.

3.1.6. Accelerate the construction of Zhongguancun Science and Technology Park

- the central area
  - Haidian District,
- the Electronic Park,
- Yizhuang Park,
- Fengtai Park
- Changping Park

Since the Zhongguancun Science and Technology Park was approved by the State Council in 1988, it has gained rapid development. Especially in the past 10 years, the park always maintained an above 30% growth rate.
3.2. Construction of Beijing Satellite Town and Small Towns

3.2.1. The process of satellite town development.

- In 1958, Beijing put forward the issue to establishing satellite towns and planned to build 60 industrial projects at some places around the city.

- In 2000, the construction area of the 14 satellite towns has covered more than 200 square kilometers with more than 1.3 million persons.

- In 2000, Beijing has set the target to develop 33 central towns to be integrated with the readjustment of industrial layout of Beijing.
3.2. Construction of Beijing Satellite Town and Small Towns

Figure 11. Layout of the Town System of Beijing
3.2.2. Abolish counties and establish districts to accelerate the readjustment of industrial layout and promote the construction of satellite towns

- In the 1990s, Beijing was composed of the 9 districts in the urban area.

- By April 2002, the six surrounding counties were upgraded to districts. Beijing Municipality planned 10 city-level industrial development zones proper to form the suburban round-city industrial development belt.
3.2.3. Accelerate the construction of transport facilities and infrastructure facilities

Figure 21. Demonstration Map of Beijing’s Urban Rail Transportation System Planning
3.2.5. Reform the household register system to promote the development of small towns.

• The peasant living in 14 satellite towns and 33 central towns, can apply for the urban resident status and enjoy the same right as all other residents of the urban. For example, to join the social security system.
3.3. Problems Encountered in the Development Process of Beijing Municipality

- 3.3.1. The town system and layout set by the “General Planning” have not been formed yet;
- 3.3.2. Too many people in the urban area result in heavy density of population, the population density is 14,078 persons/square kilometer;
- 3.3.3. The capacity and service functions of infrastructure facilities exist many problems;
- 3.3.4. The quality of urban environment needs further improvement;
- 3.3.5. Construction of the urban ecological system needs further research and improvement.
4. Air Pollution and environment pollution

Control in Beijing

4.1. Target and Measures to Control Air Pollution

- Coal has been the main energy source in Beijing for a long time.
- In 1998, Beijing Municipality decided to take urgent measures to control air pollution and drafted the « Target and Urgent Measures to Control Air Pollution in Beijing »;
- The main measures adopted:
  - spread the use of low-sulphur coal and clean energy;
  - strictly check and control the automobile emissions;
  - continuously reduce industrial pollution;
  - control dust pollution at construction sites.
4.1. Target and Measures to Control Air Pollution

- The continuous implementation of such measures have achieved remarkable results:

  - Between 1998 and 2000, Beijing renovated 54,000 coal-fueled boilers;
  
  - the tail emission of the 1.8 million vehicles in the city had reached the European I standard;
  
  - more than 100 heavy pollution enterprises had either removed to other places or had reached the discharge standard through renovation;
4.1. Target and Measures to Control Air Pollution

- The target of air pollution control:

- In 2000, 45% (165 days) of the year should have above grade 2 fine air quality;

- In 2002, the rate should rise to 55% (200 days).

- According to the monitoring of the State Environment Protection Administration, the target has been realized ahead of the schedule.

- It is planned that the above grade 2 fine air quality days should reach 60% (219 days) in 2003.
4.2. Sewage Water and Garbage Treatment

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment (100 million yuan RMB)</th>
<th>Rate of Sewage Water Treatment (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>182 million</td>
<td>1.0%</td>
</tr>
<tr>
<td>2000</td>
<td>1,440 million</td>
<td>39.4%</td>
</tr>
<tr>
<td>2001</td>
<td>1,222 million</td>
<td>42.0%</td>
</tr>
</tbody>
</table>
According to plan, Beijing will build 16 sewage water treatment plants by 2007.
4.2. Sewage Water and Garbage Treatment

- At present in Beijing, there are 9 garbage treatment plants with a daily disposal capacity of 5,180 tons (sanitary landfill);
- the rate of harmless disposal of garbage has reached 80% ;
- a large garbage burning plant will be built in the eastern suburbs of Beijing and the plant with a daily capacity of burning 1,300 tons of garbage to generate electricity. the rate of harmless disposal of garbage will be reached 90% .
For many years, Beijing is often attached by duststorms from the northwest in Spring season;
In recent years, over cultivation and browse of the grassland have damaged the ecological system; desertification is getting more and more serious; An analysis shows that about one third of the duststorm sources come from the Gobi desert areas in China; and the other two thirds come from other northern and northwestern countries.
4.3. Harnessing Duststorms

Chart 16. Statistics of Duststorm Days in Beijing
4.3. Harnessing Duststorms

A series of measures to harness the duststorms:

• Turn the cultivated land and ley into forests and grassland;
• Establish seed-breeding bases;
• To change the traditional nomadic herding style into fixed closed area;
• On a large scale to launch planting trees projects in the northwestern mountainous areas of Beijing and the Inner Mongolia.
• established the “National Duststorm Experts Committee” in 2001;
• The Chinese Academy of Sciences has also launched the international duststorm research program and held the “International Symposium on Duststorms”. 
The public green land increased from 3,583 hectares in 1991 to 7,069.6 hectares in 2001;

the per capita public green land increased from 6.4 square meters to 8.21 square meters.
4.4. Greening Beijing Action

Greenery Coverage area

1991: 13,458 hectare
2001: 28,785 hectare
4.4. Greening Beijing Action

- There are 5 nature reserves and more than 10 famous scenic areas in Beijing.
- Beijing will build 5 major green ecological function areas in the northwestern mountainous area.
5. Future of Beijing Municipality’s Planning and Construction

- **Target and Key Task of Beijing’s Planning and Development in the Near Future:**
  - Accelerate the construction of satellite towns and small towns to form a perfect, rational city-town system;
  - Further enhance the construction of the infrastructure facilities of urban transportation, energy resources and telecommunications;
  - Harness and restore the historic and cultural sceneries in Beijing and the river water systems, well protect all the world cultural heritages and nature heritages;
5. Future of Beijing Municipality’s Planning and Construction

- Stress pollution control and environment protection;
- Continue to do well the work of construction of the “Zhongguancun Science and Technology Park” and the “Central Business District”;
- Implement the “Beijing Olympic Action Plan” and promote the development of urban construction.
6. The Several Issues of the Beijing Urban Planning and Construction

6.1. Sequence of Beijing in the Development Evaluation of Chinese Cities (See Appendix 1):

- China has recently put forward the “Development Index System of Chinese Cities”.
- Five index supportive systems; 19 kinds of condition key elements and 104 items of basic quotas;
- According to the quota system, Beijing Municipality ranks the second after Shanghai in terms of the comprehensive urban strength and development potential.
6.2. Expansion of Beijing Municipality

- China adopted the policy of “control the development of large cities” for a long time.
- In 1956, the State Council pointed out that:” it was inappropriate to develop large cities ”;
- In 1978, a central government document required that “the scale of large cities must be brought under control”;
- In 1990, China’s first« City Planning Act » still stipulated the strategy of “strictly control the development of large cities”;
- Until 2001, central government put forward “need to implement the city-town strategy; large, medium and small cities should develop in a coordinated way with small towns; and large cities should play a radiation role in promoting economic development”
6.2. Expansion of Beijing Municipality

- The urban efficiency and returns increase along with the scale of cities.

![Graph showing urban efficiency and returns increase with scale of cities]

Figure 22. Comparison between the Returns and Scales of Chinese Cities
In the past decades,

- Beijing filled large water areas of lakes, pools and rivers, dammed and renovated the original river water systems;
- overused the underground water in large areas;
- city also discharged large volumes of pollutants into the land, the rivers and the air;
- some of the cultivated land in its suburban areas has become desert due to overuse.

These problems must be studied and solved in the future planning and construction so as to help restore the ecological system.
3. Ecological System Construction in Beijing

Proposition:

- Carry out in-depth study of the current situations and changes of the ecological systems in Beijing; and try for making quantitative evaluation of ecological products and services;
- Define the ecology sensitive areas and the carrying capacity of life supporting systems in the areas;
- Popularize the use of clean energy and renewable energy and make efforts to recycle substance resources;
Proposition:

- Develop ecological technology that suits the condition of Beijing area and adopt various comprehensive measures to promote the development of the recycling economy;
- Draft the policy and regulations to encourage investment in urban ecological system construction and collect taxes from those activities that harm the urban ecological systems;
- Work out feasible education and training plans to improve the environment and the restoration of the ecological systems;
- Encourage the public involvement in the planning, management and restoration of the urban ecological systems.
6.4. Restore and protect the style and features of the ancient capital Beijing

- Beijing is an old city with a history of 3,000 years and has formed the characteristics of traditional style and features of an ancient city;
- In the past several decades, Beijing went across the crooked road;
- Beijing government worked out the “Historic and Cultural Famous City Protection Plan”.

6.4. Restore and protect the style and features of the ancient capital Beijing

- Well protect the general pattern of the old city with the Forbidden City and the Imperial City as the center, well deal with the relations between the renovation of old housing blocks and the protection of the ancient city’s style and features;
- Further restore and harness the river and lake water systems;
- Protect and restore the world heritage sites, ancient buildings and their surrounding environment, and well protect many other cultural relics;
- Continue to enhance the publicity, planning and legislature to protect the old city.
6.5. Strengthen multilateral co-operation and make joint efforts to reduce the water pollution and harness the duststorm weather

To harness the water and air pollution and duststorm weather, Beijing should gain the support from further enhance the construction of its infrastructure facilities and ecological systems in the Beijing area.

Moreover, Beijing should also launch co-operation with its neighboring provinces and autonomous regions in broad areas and co-operate with China’s neighboring countries to make joint efforts.
Thank you for attention