

Challenge of City Environment Construction and Strategy of Green Space System

Wang, Bingluo* · Cao, Juan**

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Abstract

The city environment construction of China is facing many difficulties and challenges. Through the concerted exploration in the recent years to find the way of improving city environment that is suitable to Chinese situation, the result is to plan and construct a complete green space system, supplement the defective conditions by the system's superiority and produce the integrated effectiveness. The article dissertates on the composition of green space system, some important issues in the planning and construction and corresponding measures. The fact illustrates the effectiveness of city green space system in solving the city environment problems. However it needs some research and continues improving.

Key Words : City Environment, Challenge, Green Space System, Composition, Multifunction, Strategy

Since 1980's, with the development of production and construction, China is facing the acceleration of urbanism. City economics and population are increasing rapidly, which cause that backward city infrastructure cannot bear the pressure, and city public facilities are in emergency. Under the man-made exploitation and interference, city environment deteriorates quickly, and natural ecology is badly destroyed, which is even threatening human's survival and development. The contradictory is sharper than before from the end of 1980's to the beginning of 1990's. China announced the policy of "economics, construction, city and country construction and environment construction are to be planned, carried out and developed simultaneously" on the World Environment & Development Conference in 1992. It said that attention should be paid on forming a

complete set of construction, and turning back the situation step by step. Landscape architecture is undertaking the mission of city environment construction and duty-bound. It should act actively.

I. THE REAL SITUATION OF ENVIRONMENT CONSTRUCTION

The mission is hard, but there are difficulties in reality and it is in a passive situation.

1. Low Standard of Urban Construction Land

Big population and little field made us carry out the strategy of low standard of urban construction land. The administration manages the urban land strictly.

and order the urban construction land per person is 75~100m² and not higher than 120m² in special situations. Some city even cannot reach up this standard. For example, it is 54 m² per person in shanghai. It restricts the scope of city open space and the size of city green land.

2. Uneven City Green Land Distribution and Imbalance between Different Regions

Because of historical reasons and the differences of development degree, city green lands distribute unevenly in the city. The differences of green level are obvious too. The differences of environment quality show the imbalance between different regions.

It is obvious from the investigation data of some districts in Beijing and Guangzhou. (Table 1, 2)

3. The Number of Parks is Insufficient and Their Locations Distribute Unevenly. It Can Not Meet the Need of Citizens

There are 660 administrative cities and 5200 public parks, but there are less than 10 parks per city. Because of the lacking of laws and regulations as foundation, there is no restriction on parks ranking, classification and distribution in China. For example, there are 166 parks' in Beijing, one park per 6.28 km²; 151 parks in Shanghai, one park per 3.64 km²; 144 parks in Guangzhou, one park per 3.84 km². Because

Table 1. Greening index of some districts in Beijing (2000)

District name	Ratio of green space(%)	Ratio of green coverage(%)	Public green land (m ² /per person)
East District	23.79	26.18	2.38
West District	24.71	25.54	3.56
Chongwen	31.43	30.72	7.88
Xuanwu	17.42	21.75	1.98
Chaoyang	38.44	32.68	6.26
Haidian	45.19	39.92	10.74
Fengtai	35.09	31.53	9.04
Shijingshan	60.93	38.39	19.50

Table 2 greening index of some districts in Guangzhou (2000)

District name	Ratio of green space(%)	Ratio of green coverage(%)	Public green land (m ² /per person)
Yuexiu	21.00	27.00	3.80
Liwan	8.14	15.00	1.22
Dongshan	23.00	28.00	3.40
Tianhe	31.00	34.00	16.97
Baiyun	46.68	35.64	8.37
Fangcun	26.00	30.00	7.50
Huangpu	30.78	32.29	10.60

the numbers are insufficient, all the parks are full of people.

4. Low Quality of City Green Lands and Low Ecologic Effect

There are not abundant plant materials suitable for greening currently (less than 200 in north area, 500 in downstream of Yangtze River, 1500 in Guangzhou, which is the most) and the level of design, construction and maintain is low, which cause the monotone of plants and low ecologic effect.

5. Weak Protections of Natural And Cultural Heritage and City Traditional Cultural Landscape

In the rapid development of cities, less attention was paid on the protection of city traditional cultural landscape. The existing natural and cultural heritages are lack of rejuvenation and improvement. It causes that traditional landscape of many cities disappeared, and took on similar characters.

City environment construction is facing the challenge of above situation seriously. Through the practice and exploration, it proves effective to plan and construct complete city green space system which is suitable for Chinese situation and supplement the disadvantage by the advantage of system.

II. COMPOSITION OF CITY GREEN SPACE SYSTEM

1. Park Green Land System of Different Ranks And Types

Basic parks of different sizes distributed according

to service radius and special parks of different types compose convenient city green lands with high level of gardening and greening. According to the national standard, the area will be up to 8% of urban construction area. In the planning of city green space system of Beijing, Shanghai, Guangzhou, the service radius of parks of different rank and different types is regulated as follows: Municipal Park and special park ≤ 2000 or 5000m , district park ≤ 1000 or 3000m , residential park ≤ 500 or 1000m , band park and small park ≤ 300 or 500m . If the plan is carried out, the distribution of parks will be balanced in cities. Especially those small parks whose area is less than 3000m^2 may be distributed according to radius of 300 to 500m, convenient for neighbor residents.

2. Classified City Green Space System

City green space system are composed of park green land, residential green land, affiliated green land of institutional units, productive plantation green land, protection green land, scenic forest land and road & transport land which classified by function. All of these will be 30%~40% of urban construction land or even more. Thus makes green solid space become the main composition in cities.

The total size of park green land restricted by urban land standard is defined as mentioned above.

Residential area takes great ratio of city land, whose greening level has more affection on city environment. Ratio of green space in new built residential area should not be less than 30%; ratio of green space in rebuilt residential area should not be less than 25%. If the standard is carried out, the basic green space of city residents can be assured.

According to the regulations, ratio of green space of different institutional units should not be less than 20%~50%. Many additional green lands in public facilities such as schools, stadiums, pleasure parks,

transport center (railway stations, ports and airports) science park areas, commercial center and administration center have public function and should be constructed according to the standard.

2%~3% of urban construction land should be productive plantation green land under the situation of plan economics before. Now the situation has been changed. Advanced city of plants and seeds business exceed the standard. However, common cities cannot reach up the standard. Because city green rely on natural conditions and specimens, productive plantation green land should be developed to some extent in every city. The introduction, training and seed business should be developed to strength their substance base.

Both green lands planned for protection, security, health and isolation and outside isolated green land planned for preventing infinite spreading are the important composition of green space system. Some cities planned isolated green band with equal width around the city, which did not combine with the fact of topography and existed features and realistic function and need. It is just for style.

Greening the road and transport land. Moreover, enlarge the green lands relying on these greening. It includes transport center, environment green lands of the entrance of the city.

Above system of green lands composes the main body of city green space system. It is the basic infrastructure of modern city, and harmonizes with other facilities. It is important composition of city society service and has relationship with all the business. The citizens should take part in the construction and enjoy the achievements. Administration government should enhance society management. Thus it is a nonprofit business.

3. Juncture System of Green Lands

Green lands could be planned as belt beside the

road, river and waterfront. With reasonable layout, a green corridor network could be formed. It connects the basic units of green lands and composes the whole system to make it a passage of airflow circulation and landscape belt full of city character.

City green corridor is the juncture of green space system. Ratio of green land of roads is high in Chinese cities. High ratio of green land are regulated in the planning and design regulations of road greening (landscape road $\geq 40\%$, width of road line $> 50m \geq 30\%$, width of road line $40 \sim 50m \geq 25\%$, width of road line $< 40m \geq 20\%$). If it is carried out according to the standard, the green corridor net will be formed. Because of the restriction of land area standard, it is difficult to form the boulevard system for walk and non-motorized vehicle lane. It emphasizes on the auxiliary roads with low motor circulation as a passage for fresh air in Guangzhou city green space system. If river net are made good use of and the planning and construction of waterfront green belts are enhanced, they can form excellent green corridor. It is a pity that rivers are polluted seriously and insufficient green lands, which needs to be improved.

4. Unity System of City and Suburb

City green system can be connected with suburb's natural mountain, forest, field and pasture to form a integrated natural environment. All the active factors which can improve the ecology should be aroused. We carry out the system that city is the center and counties are controlled by municipals. We can regard the city and suburb as a whole according to the need and improve the ecologic environment.

When planning Shanghai's green space system, it is found difficult to reach the goal of improving ecologic environment in the scope of the planned area. Thus they carried out the planning in the area under control

and even larger areas to solve the problem integrally. This effective way is followed by many cities. According to the regulations of Legislation for City Planning, the planning area is "city proper, nearby suburb and the area needed to be planned and controlled according to city construction and development in the administration area". It is an explanation from the existing laws.

5. Environment System of Urban and Towns System

The area under control of some big cities has formed urban and towns system. We should think about the unity of separate city and suburbs, also form an integrated green space system of the whole urban system.

6. Zone-Dependent Plant Planning for City Greening

Thorough investigation and research and conscientious planning should be made for zone-dependent planting materials. Introduction and cultivation of plant should be done too. They are the substantial base of city greening. Excellent new planting materials should be supplemented to support the development.

The city green space system is assured by city's natural conditions, topography characters, basic plantation (natural plantation) and zone-dependent plants according to national regulations and city's conditions. The planned and existing green lands of different ranks and classifications should be activated according to the plant group and should be connected reasonably to form an intact and organic system. This system is connected with natural environment of mountain, river forest, field and pasture to form a unity of ecologic system. It is a site for recreation and

a main index for city landscape character. It is an effective strategy against the challenge of city environment construction.

III. MULTI-FUNCTION AND EFFECTIVENESS OF CITY GREEN SPACE SYSTEM

1. Main Body To Improve City Ecologic Environment

City green space system connects the second nature with natural mountains and rivers. It includes main natural factors in cities and distributes the most widespread plant species. It is the place for wild organism, and undertakes the task of protecting endangered specimen at transferred place. The system is the active producer of city ecology and solid solar power and promotes the growth of circulation of living substances. It also can retain the water resources, keep the soil and adjust the microclimate. The condition of ecologic environment is decided by the intact of the system, and can be examined as follows ways:

- (1) Suitable size and quality of green lands
- (2) Not only for pollution treatment, but also to improve city environment.
- (3) Lyses city hot island
- (4) Promote airflow circulation
- (5) Stable city ecologic system and abundant bio-diversity

2. The Main Supporter for Recreation and Leisure Activities in The City

In the wake of economics and cultural development, leisure and recreation occupy a considerable part of

time in people's lives and leisure expenses take up a considerable share of the consumption market. Enjoying recreation and leisure in a pleasant natural environment has become the fashion for modern people. Urban green space system has become the place people go most frequently at leisure. All kinds of scientific, cultural, sports, social and amusement activities require to be arranged and carried out in the green space system. This inevitable trend of development in turn will help the formation and refinement of green space system.

3. The Predominant Factor in Creating Distinctive Features of Cityscape

The geographic structure and geomorphic features inherent in the green space system are unique to each city. Regional plants and the ecosystem they constituted possess local characteristics naturally. Historical and cultural legacies and their environment, setting better together with the landscape framework shaped by traditional scenic culture, if organized into the green space system, will fully reflect the local cultural vein and characteristics. These elements merging, alternating, continuing and repeating throughout the city will compose the main melody of the cityscape and highlight features unique to the city.

In the recent years, many cities are drawing up or modifying the green space system plan. Shanghai has a series of scientific topic research for it. On the basis

of this, every plan in three times modified plan has brand-new idea, and guides rapid advance of city environment construction. Guangzhou mobilizes all the units to investigate and research collectively, with "open space first" as the guiding thoughts, draws up city green space system and give feedback to master plan. Under the guide of city green space system, city green lands construction is undertaken consciously. It is meeting better opportunities. Many cities are in the same situations.

There is dense population, prosper productive forces, advanced science and complete facilities in cities, whose environment needs to be improved at first. Though the land of city is limited (built area is only a small part of total national area), we should focus on improve the ecologic environment of the city. In fact, although the trend of environment deteriorating is continuing, some cities are improved firstly as a part of national area. From 1996 to the end of 2003, three indexes of city greening in municipal cities are: ratio of green coverage is increased from 24.43% to 31.15%, ratio of green space form 19.05% to 27.20%, and public green land from 2.76 m² to 6.49 m². Of course, there are still some problems to be treated and solved seriously.

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