

## Ecological Civilization City Construction under New Urbanization Strategy: A Case of Chengdu City

Tingting Xu<sup>1\*</sup>

<sup>1</sup> School of Public Administration, Southwest Jiaotong University

Room 0403, Floor 4, Building 0, No. 111, Nor. Sect. 1, 2<sup>nd</sup> Ring Road, Jinniu District, Chengdu 610031, P. R. China

\*Corresponding Author: Tingting Xu; Email: [15982261412@163.com](mailto:15982261412@163.com)

**Abstract:** The new urbanization has become one of the strategic focuses of social and economic development in China and Chengdu in the future, but it will have a great effect on natural resources and environment, too. The key to solve this problem is to vigorously promote the construction of ecological civilization city. Based on current ecological hotspots, this paper gives an a case study of Chengdu city on the importance of the construction of ecological civilization city. Paper analyzes the specific contents and characteristics of urban ecological civilization, and gives policy recommendations to build an ecological city from economic, ecological and social aspects, which could promote interactive development of ecological civilization city and new urbanization.

**Keywords:** urbanization, new urbanization strategy, ecological civilization

### INTRODUCTION

Ecological civilization is a substitute for industrial civilization in whole process of human development, which follows the developmental principles that human, nature and society can be coordinated to operate for the pursuit of ecological balanced and sustainable scientific developing mode. It is an advanced human civilization form [1-3].

In the "Man and Biosphere" program of UNESCO in 1971, author firstly proposed eco-city as the ideal city model. Eco-city is a comprehensive concept including natural environment and cultural values. It pursues not only to increase the green area of the natural environment in the city, but also to organically combine the targets of people-oriented, harmonious and pleasant environment construction [4]. Relying on the natural environment to build economic, social, environmental harmonization collection system to maximize the comprehensive benefit for nature and society. At physical geography, social function and cultural awareness levels, it is proposed to maintain a balance and coordination in ecosystem, which could promote the organic integration of urban structure and culture personal ecological awareness, reflecting an ecological form of comprehensive development.

Since the reform and opening up, as China's economy continues to soar, the level of productivity has been significantly improved. However, with the rapid development of urbanization, environmental issues have become increasingly prominent, for example, population expansion, traffic congestion, environmental pollution, depletion and waste of natural resources,

wealth gap, garbage siege and so forth. In the 667 cities of China, only less than 1% of atmospheric quality meet the World Health Organization (WHO) standards. There are 10 the worst air-polluted cities in the world, of which China accounted for 5. In solid waste pollution, the annual output of urban waste in China has reached 150 million tons, increasing at the rate of 8% to 10% every year. 200 cities in the country have been besieged by garbage, which seriously damage the urban environmental health and worsen the living conditions of our settlements[5-6].

What's worse, municipal waste contains many toxic chemicals and heavy metals such as mercury in batteries, paints and pigments, etc., polluting water and soil to poison plants and threaten food security, even to harm the next generation who will live in these cities because of long-term presence in environment. In addition, in recent years, there have some new sources of environmental pollution, strong electromagnetic pollution and visual pollution, including urban light pollution, fog and haze that are also increasingly prominent.

In a word, humanity is facing an unprecedented existential crisis. Therefore, it is imperative to explore a new way for cities to develop [7]. Just under this background, ecological civilization takes its place as an ideal mode for the construction and development of future urban and it is also a tendency for cities in the world to develop. To construct eco-civilized cities with reasonable structure, efficient functions and cooperative relationships is the goal and tide of international urban development. New-type urbanization emphasizes

people-oriented development goal, which incorporates eco-civilized construction into our national construction to promote the harmonious and sustainable development of economic society[1].

#### **DEVELOPMENT PROFILE FOR CHENGDU**

Chengdu is located in the center of Sichuan province and western Sichuan Basin. Whole city is 192 kilometers in length from east to west and 166 kilometers in width from south to north. It has a total area of 12,390 square kilometers, accounting for 2.6% of the whole of Sichuan province, of which 6.36 million mu are arable land. Its northeast is adjacent to Deyang City, its southeast to Ziyang city, its south to Meishan City, its southwest to Ya'an City and its northwest to Aba Tibetan and Qiang Autonomous Prefecture. There are 1600 km away from the East Sea, 1090 km away from the South Sea and it belongs to a land-locked area.

#### **The status of natural resources for Chengdu**

There are significant differences in the city's topography with its northwest high and its southeast low. Chengdu has many types of land resources, which can be classified into plains, hills and mountains according to landform. Its plains are 4,971.4 square kilometers in area, accounting for 40.1% of the total area of the city, which is far higher than the national average of 12% and the provincial average of 2.54%; The hill area account for 27.6% and the mountain area 32.3%. Chengdu has fertile land, mild climate, high cultivation index and convenient irrigation conditions. The proportion of available area reaches 94.2 percent, and the average cultivation index in this city reaches 38.22%, which are much higher than 10.4% of whole country. Chengdu is located in the transition region from northwestern plateau to Sichuan Basin and there are significant differences in climate between east and west. With its winter hot and its spring early, Chengdu is rich in calorific capacity. The annual average temperature is around 17.5°C. It has a rational combination of climate resources, which is very beneficial for creature to reproduce. According to preliminary statistics, as to animal and plant alone, there are 11 classes, 200 families, 764 genera and more than 3,000 species. Furthermore, there are rare animals under the protection of our country such as giant panda, red panda, golden monkey, wildebeest and so forth.

Rainfall in this area is very plentiful, with its average annual precipitation 1124.6mm, and what's more, the annual precipitation in each year are relative steady, with the ratio of the maximum to the minimum about 2:1. Besides, the total amount of average annual water resources is 30.472 billion cubic meters, including 3.158 billion cubic meters of underground water. In 2004, effective irrigated area reached 345,000 hectares. Chengdu locates in the upper Yangtze River area and its river with a little pollution, being composed

of atmospheric precipitation, underground flow and snowmelt and as a result, its water quality is rather perfect, most of whose indices meet national secondary standard on surface water. In addition, mineral resources are abundant in this area, with demonstrated coal reserves 146 million tons and natural gas reserves 1.677 billion cubic meters. What's more, the glauberite reserves are ranked number one in China, up to 9.862 billion tons.

Chengdu is an ancient city with a history of 2300 years, which is one of 24 noted historic and cultural cities in the first batch announced by the State Council of China. Tourist interests and ancient monuments in Chengdu are well-known in the world with beautiful and diverse natural scenery, and therefore, it has unique tourism resources and distinctive Chengdu's characteristics. In November 2000, the 24th World Heritage Committee under UNESCO listed Qingcheng Mountain and Dujiangyan into the World Heritage List. In July 12, 2006, the 30th World Heritage Committee under UNESCO listed Sichuan Panda habitat into the World Heritage List and listed Qingcheng Mountain-Dujiangyan, Xiling Snow Mountain, JiGuan mountain-Jiulong ditch and Tiantai Mountain into the range of World Natural Heritage .

#### **The status of economic and social development**

Since the foundation of the new China, Chengdu underwent several adjustments of administrative areas, and its area have experienced an expansion from 29.9 square kilometers to 12,100 square kilometers. In 1952, Chengdu County was canceled, part of which was classified as Chengdu suburbs. After 1953, Dongcheng District, Xicheng District, Jinniu District, Qingbaijiang District, Longquan District and a district office, namely Huangtianba, were established. In 1976, Shuangliu County and Jintang County in Wenjiang district were classified into the control of Chengdu City Government. In May 1983, a system of city with the county was implemented and as a result, the ten counties in wenjiang district are incorporated into Chengdu. In October 1990, approved by the State Council, Chengdu witnessed a zoning adjustment, and then five districts were classified into seven districts.

In 2002, approved by the State Council, the original Metropolis County, Wenjiang County were canceled and then created as district, forming today pattern of 9 Districts, 4 Cities (country-level cities) and 6 counties, namely Jinjiang District, Qingyang District, Jinniu District, Wuhou District , Chenghua District, Longquan District, Qingbaijiang District, Metropolis District, Wenjiang District, Dujiangyan city, Pengzhou city, Qionglai city, Chong City, Jintang County, Shuangliu County, Pi County, Dayi County, Pujiang County and Xinjin County.

**Table-1: Basic status of economic and social development in Chengdu**

	2008	2009	2010	2011	2012	2013
Total population (Thousands)	11249.6	11396.3	11490.7	11632.8	11733.5	11880.
personal capita residential area (sq m)	27.82	29.24	29.52	30.68	32.94	-
Urban population (Thousands)	6120.8	6293.8	6509.1	7056.6	7167.2	-
GDP (bn yuan)	3900.98	4502.6	5551.3	6950.6	8138.9	9108.9
Total fixed assets investment (bn yuan)	3012.90	4012.45	4255.37	4995.65	5890.10	6501.1
Tourism revenue (bn yuan)	375.45	501.30	603.87	805.01	1050.78	1285.4
Urban disposable income (yuan)	16943	18659	20835	23932	27194	29968

From 2008 to 2013, the average annual growth rate of economy in Chengdu is 18.6%. In 2013, Chengdu's GDP has reached 910.89 billion with a growth rate of 10.2% over last year. Its investment of fixed assets has reached 650.11 billion, increasing by 10.4% over last year. Among them, investment in Tianfu new area has reached 142.55 billion, increasing by 1.8%. Total sum of consumption goods in retail has reached 375.29 billion Yuan, increasing by 13.1% over last year. Its general financial revenue has reached 280.98 billion, increasing by 19.2% over last year. The average disposable income of urban residents has reached 29.968 thousand Yuan with a growth rate of 10.2%. The per capita net income of farmers has reached 12.985 thousand Yuan, increasing by 12.9%.

Within six years, increase in the number of total population all over this city has been over 630,000. With the continuous promotion of urbanization, the rate of increased number of urban population surpassed 61% in 2012. The continuous development of unique tourism industry has been unceasingly promoting growth in total tourist incomes of Chengdu, increasing from 37.545 billion Yuan in 2008 to 128.54 billion Yuan in 2013. Near 100 billion rise symbolizes its continuous growth in tourism industry of Chengdu (see Table1).

#### MEASURES TO CONSTRUCT ECO-CIVILIZED CITY IN CHENGDU

Chengdu's Urban Master Plan (2003-2020) suggested that Chengdu should be developed into a giant central city, with optimal building and launching-out environment among western cities in China and the best residential environment to be and the strongest comprehensive power. Its layout of space strategy is to take the advanced technology research and development and unique industries as the main developmental impetus, to emphasis the construction of ecological environment, to strictly restrain land use in a way of blind expansion and to improve the quality of development.

#### Economic Countermeasures

To begin with, to construct urban service industries taking tourism industry as the core to form regional tourism service center. In recent years, with the continuous increase in tourist population, the tourists' demands for urban landscape and the world cultural heritage increases correspondingly, too. The development of urban tourism becomes the focus of attention of the government and society [8]. They proposed the concept of travel urbanization, where the development of tourism should be in line with the development of city [9]. In order to form cultural region with Sichuan feature, Chengdu should expand the regional history and culture, the ancient village cultural heritage tourism and construct tourism commercial districts, which are dominated by feature attractions.

Secondly, cultural consumption industries should be cultivated to provide services for life in metropolis. Industrial structure should be advanced and extroverted, including developing advanced technological industries and cultivating information hub, etc. The technological transformation and upgradation in traditional industries should be strengthened and the scale of service industries itself should be enlarged stage by stage. Moreover, service quality should be improved. According to the regional industrial structure, industrial space recombination should be accomplished, and space structure of regional industries should be constructed. Chengdu should seize the chance to build high speed railway, and enhance the integration of high-end elements and comprehensive service function. Chengdu should improve its autonomous innovative ability, the ability of sustainable development and the core competitiveness of city. Chengdu should spare no efforts to build regional central city of west-China and improve space planning in whole city.

Finally, Chengdu should depend on tourism industry to promote the mutual fusion, and then form general space structure of Chengdu's central towns, which

depend on each other and are closely connected. Chengdu should closely keep pace with plans for industrial development in the district of dense industries in Chengdu, and promote the transformation and upgradation from traditional industries to modern industries, and should introduce high technology to upgrade and recreate traditional industries, and promote transformation from traditional superior industries to modern dense industries. Also, Chengdu should completely improve Chengdu’s integral power and comprehensive competitiveness of urban economy as a whole. Chengdu should accelerate the transformation and upgradation of industrial structure and make service industry the main impetus to promote economic development, and make autonomous innovative ability the inner impetus to optimize and upgrade industrial structure. In a word, Chengdu should optimize its industrial structure.

In 2013, whole city's GDP has reached 910.89 billion Yuan with a growth rate of 10.2% over the previous year. Among them, the incremental value of first industries was 35.32 billion Yuan increasing by 3.6%, and the incremental value of second industries was 418.15 billion Yuan increasing by 12.2 %, while the incremental value of tertiary industries was 457.42 billion Yuan with a growth rate of 8.8%. Comparing industrial structure in 2009 with that in 2013, the proportion of tertiary industries (service industry) has been increasing continuously (see Fig. 1). To calculate according to permanent population, per capita GDP is 63,977 Yuan, increasing by 9.3%. Local fiscal revenue all over the year is 89.85 billion Yuan increasing by 16.6% over the previous year, while tax revenue is 66.57 billion Yuan increasing by 16.5%.

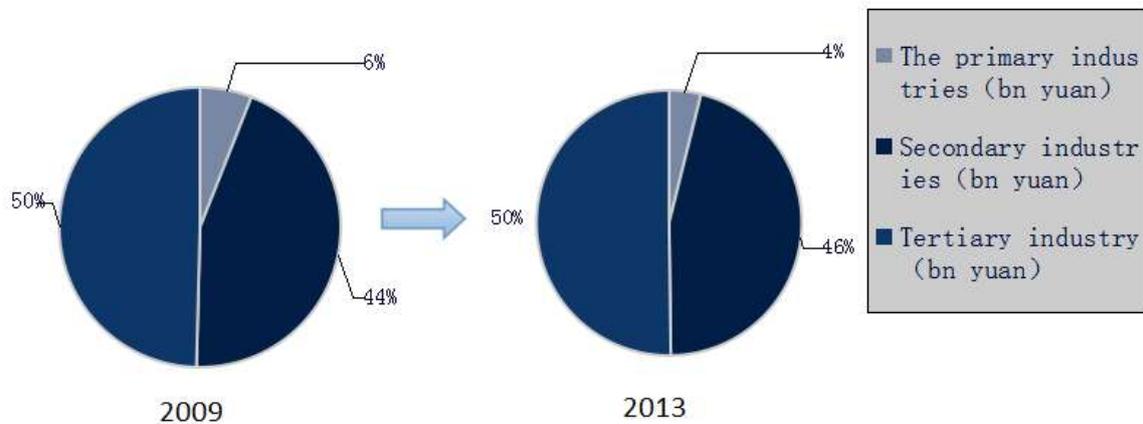


Fig-1: Chengdu’s industrial structure change from 2009 to 2013

**Ecological Countermeasures**

Chengdu should optimize the layout of regional industries, accelerate the upgrading of industrial transformation, vigorously develop the circular economy, and actively develop clean energy and enhance resource conservation and utilization to accelerate ecological and economic development. To promote low-carbon life and low-carbon transportation for creating a low-carbon city, the government can support the residents for the use of energy-efficient appliances and water-saving equipment, and resist high energy consumption and high emission products to eliminate high energy consumption industries with backward production capacity. Chengdu should increase the proportion of the use of natural energy sources and strengthen management in key sectors of energy, raw materials, water and other resource consumption to implement cleaner production. Chengdu should develop cycle economy to strengthen the reuse

of scrap materials and electronic products, daily necessities and other renewable resources, too [10]. Striving to 2015, ecological economy has become a new growth point of Chengdu.

Chengdu should further accelerate the construction of ecological road and transportation systems, strengthen forest protection, and promote the green space ecosystem of city. In recent years, Chengdu in response to the national call, strengthens green construction gradually (see Fig. 2). The rational planning of the layout creates a good urban greening environment. At the same time, the government strengthens water pollution remediation and integrates the protection of ecosystem, makes the comprehensive improvement of air pollution, and promotes waste collection to turn Chengdu into one of the cleanest cities.

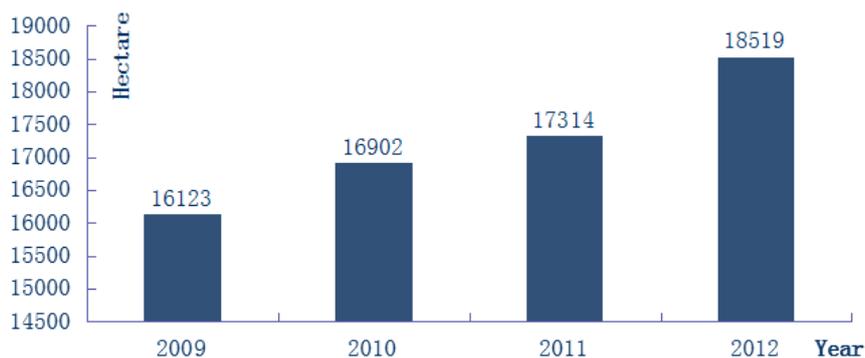


Fig-2: 2009-2012 landscaping green area

### Social Countermeasures

The government strengthens the historical and cultural relics protection, and develops and utilizes rationally to create "human Chengdu" [11], strengthening the construction of ecological civilization from the regulations, behavior, and consciousness. Ecological civilization construction system is the fundamental guarantee of the construction of ecological civilization, and its purpose is under a variety of regulations of environmental protection, clean production and green consumption to regulate the production constraints of everyday life and make people more consciously follow the law of natural ecosystem to give a guarantee on systems, policies, and regulations of ecological civilization powerfully.

Guided by the ecological consciousness of civilization, the construction of ecological civilization and civilized behavior for the protection of ecological systems is a direct way to the construction of ecological civilization city. Through a series of ecological development behavior, the government makes ecological civilization construction from the theory to the practice.

In a word, the government should take the scientific concept of development and comprehensive use of legal, administrative, economic and other means to strengthen guidance on the construction of ecological civilization with the pursue of green GDP. Common development of environment and economy needs to be fully considered when formulating policies and strengthening environmental education, ecological advocacy, the rule of law ecological construction to make ecological civilization so popularly that whole society develops good ecological and moral consciousness.

### POSITIVE INTERACTION DEVELOPMENT OF ECOLOGICAL CIVILIZATION CITY AND NEW URBANIZATION

#### Through ecological civilization city construction to promote new urbanization

Urbanization is whole rural life style constantly into the process of urban life styles [12]. However, different

from the expansion of traditional urbanization style, the new urbanization tends to be a highly intensive development as an important part of current reform. It raises new requirements for economic development and environmental carrying capacity to strengthen the pollution and pollutant emissions monitoring and management, and actively promote the development of water, energy, materials and other high technology to conserve resources, and the introduction of advanced urban construction and management in the key aspects of technology, providing strong protection for the construction of ecological civilization city to give an effective support for the building of source-saving and environment-friendly towns to further promote the construction of ecological civilization city.

#### Through ecological civilization city construction to improve urbanization

Eco-city is an inevitable outcome of human society developing to a certain stage as well as a symbol of modern urban civilization. It is a stable and mature state for city ecosystem and a beautiful realm of social and economic development, social civilization and cultural harmony. Ecological civilization city construction is a new mode from the previous industrial civilization to modern ecological civilization, and it establishes a sound, safe and efficient environmental technology, focusing on urban ecosystem management and control technology to provides system support for the construction and development of new urbanization.

#### Coordinated development of new urbanization and urban ecological civilization construction

New urbanization and ecological civilization construction have always been mutually promoting and common developing by the people-oriented guidelines, which is on the basis of high resource capacity and good ecological environment. It is guided by the awareness of ecological civilization, the scientific development, sustainable development and other scientific theories to follow natural and social laws of development. It may use the advanced scientific and ecological technology, promote green innovation and build reasonable and healthy industrial systems for economic development arrangement to form

comprehensive development with good pattern of harmonious urban-rural continuum by regional social, economic and physical coordination and balance.

In a word, eco-cities should unify social, economic, natural coordination and sustainable development, the harmony between man and the environment for integral symbiotic coexistence, which can not only achieve economy development and social prosperity, but also ecological protection with high harmony. Eco-cities as an important part of wisdom city, actively promote the construction of new urbanization by keeping urban and rural environment clean, beautiful, comfortable, with full integration of technology and nature, and exert the greatest artificial abilities to create complex ecological recovery systems to improve the stability of the city for sustainable development.

### CONCLUSIONS

If Chengdu wants to be an ecological civilization city, and take the path of sustainable development, it must emphasize the importance of economic, social, natural and harmonious unity and the natural harmony between man and the environment, too. In view of the existing conditions in Chengdu, the key point to the construction of ecological civilization in the process of new urbanization is to strengthen the construction of tourism industries with its own characteristics focusing on the development of related services industries to promote industrial transformation, and enhance high-tech industry innovation taking the city center playing the dominant role to drive the cultural and entertainment industries to develop to increase consumption. Chengdu should set up the system of ecological civilization and awareness to promote it forward to the construction of ecological civilization fundamentally.

### REFERENCES

1. Huang JC, Fang CL; Regularity and mechanism of urbanization and ecological environment analysis. *Geography Research*, 2003; 2: 211-220. (in Chinese)
2. Liao FL; Construction of ecological civilization and a harmonious society. *Journal of Fujian Normal University*, 2006; 2:1-9. (in Chinese)
3. Wang XF; Thought resources of ecological civilization—review of green literature in modern China. *Journal of Nanjing Forestry University (Humanities and Social Sciences Edition)*, 2009; 1. (in Chinese)
4. Richard Register; *Eco Berkeley-Building cities for a healthy future*. California: North Atlantic Books, Berkeley, 1987.
5. Roseland; *Dimension of the eco-city*. Elsevier Science, 1997; 14(4):197-202.
6. Song XL; Urban garbage disposal and sustainable development. *The Journal of Changsha University*, 2001;(4):36-40. (in Chinese)
7. Julian Simon; *The Ultimate Resource*. Princeton University Press, New Jersey, 1981.
8. Lew AA, Hall CM, Williams AM; *Urban tourism: between the global and the local*. Blackwell, Oxford, 2004; 223-234.
9. Mullins P; *Tourism urbanization*. *International Journal of Urban and Regional Research*, 1991; 3:326-342.
10. Xu TT, Dou XS; *New uses for newspaper: using waste newspaper to make fule ethanol*. *Jokull Journal*, 2007; 7: 166-179.
11. Ni TH, Zuo YH; *Priorities and difficulties of Ecological urban planning*. *Planners*, 2005;7:83-86. (in Chinese)
12. Louis Wirth; *Urbanism as a way of life*. *American Journal of Sociology*, 1989; 49:46-63