Chapter 1
China's New Urbanization and Development Bottlenecks

After 63 years of rather complex development process, urbanization in China has entered a period of rapid development. In the meantime, the nation is entering a critical period of restructuring for urbanization. This specifically embodies in the following aspects. China now has over 50 % of its vast population living in the cities. The so-called "urban diseases" problem becomes a significant issue in urban planning and urban development, which calls for a transition from old views/practices to a "new" mindset. China's urbanization often gave inadequate consideration for preserving the environment and resources, which leads to unsustainable development. Moreover, this is also the key time for balances among urbanization, industrialization, modernization of agriculture, and information technology development.

Scholars argue that the fate of China's urbanization might very well determine not just the future of China's urbanization, but the global urbanization as well [1]. As a matter of fact, Dr. Stiglitz, the 2001 Nobel Prize Laureate stated that there will be two most important events that will have significant impacts on the development of human society. The first is the new technology revolution led by the United States; and the second is China's urbanization. Realizing the importance of a sustainable urbanization in China, the Chinese government started to promote the concept of New Urbanization, which focuses primarily on the quality instead of quantity of urbanization, and stresses urban sustainability. The promoted concept of New Urbanization incorporates the principles and ideas of ecological civilization and is characterized by compactness, intelligence, green and low carbon [2]. The promotion of New Urbanization is not only a sustainable response to China's traditional urbanization, but also a step forward contributing to the global sustainability. More importantly, under the current developmental background, promoting New Urbanization is also a critical approach to extend domestic demand. Some even argue that the successful implementation of New Urbanization might provide potential solutions for a series of economic and societal issues China is now facing, such as the compound issue of urban diseases, underemployment, and environmental/ecological degradation in both urban and rural regions. For this

C. Fang and D. Yu, *China's New Urbanization*, Springer Geography,
DOI 10.1007/978-3-662-49448-6_1

regard, it is crucial and necessary for us to reexamine the developmental stages and status, and promote necessary strategies to facilitate the transition to the New Urbanization in China.

1.1 Stages of China's Urbanization

1.1.1 Change of View of China's Urbanization from Three-Stage to Four-Stage

After careful studies of the stages of urbanization in various countries, in 1975, Ray M. Northam summarized that the progress of urbanization could be represented as a slightly stretched "S" curve [3], and demarcated the three stages of urbanization based on urbanization levels (measured as the percentage of the population living in cities). The initial stage is when urbanization is less than 30 %, in which the cities are gradually growing and population starts to accumulate in cities. The trend will continue to the middle stage when urbanization level is between 30 and 70 %, yet the rate of population moving into the cities is much faster. After urbanization level reaches 70 %, the rate of urbanization will gradually slow down and stabilize. The three stages correspond roughly with the initial, middle and post stages of industrialization. The elegant theoretical summation of urbanization and its link with industrialization gives fairly reasonable accounts for population dynamics, career organization, industrial structure, and urbanization levels, especially in the later 1970s to the early 1990s. The three-stage theory, though aligns well with the three stages of industrialization, falls short to agree with the four stages of economic development. In particular, the second stage of the three stages seems to be unnecessarily long comparing to the other two. By splitting the second stage into two stages, and matching each stage with the four stages of economic development, then we have a four-stage urbanization theory, or a modified Northam Urbanization *S* curve. In particular, the first stage of urbanization, corresponding to the initial stage of economic development, is when urbanization level is less than 30 %, characterized as slow yet steady growing of population in the cities. The middle stage is when urbanization level is between 30 and 60 %. We term it the growing stage. This stage is characterized with rather rapid population increase and high economic growth rates. In the third stage, when urbanization level is between 60 and 80 %, the cities enter a relatively mature and stable status. Economic growth and development rate start to slow down. Though population continues to incerease to slow down. Though population continues to increase in cities, the increasing rate is much lower than the previous stage. The last stage of urbanization, we termed the terminal stage of urbanization, is when there are more than 80 % of the population living in cities. Economic growth and development remain dynamically stable. Growth rate is low or even none, and the economy is dominated by information and high-end service-oriented industrials [4]. A summary of the four stage urbanization

and various characteristics corresponding to each stage is presented in Table 1.1 and Fig. 1.1. We briefly discuss the characteristics of each stage of urbanization below.

1.1.1.1 The First Stage: Initial Stage of Urbanization with Slow Growth Rate

The first stage of urbanization is roughly during the same period of initial industrialization and economic growth and development. This stage is characterized with slow but steady growth for cities, economic scales, and the industries. In this stage, the rate for urbanization is fairly low, often less than 1 % annually. The majority of population still lives in the rural areas. The economic structure is heavily skewed towards the primary economy (agriculture), which usually account for over 70 % of the region's economic activities. Over half of the population is employed in the agricultural section, and industry account for only less than 30 % of the region's GDP. In this stage, industrialization is the primary driving force for urbanization. The number of cities as well as the size of the cities is limited. Cities distributed sporadically as points in the vast regions.

1.1.1.2 The Second Stage: Rapid Urbanization and Population Increase

This stage corresponds roughly to the middle stage of industrialization and the growing stage in economic development. In this stage, population, economy as well as the size of cities is all growing in a rather rapid rate. Urbanization grows at a rate of 1–2 % annually. There are more people living in the cities than the rural areas. Industrial sectors start to dominate the economy (30–70 %) while agriculture accounts for less than 30 % of the economy. Industrialization is still the primary force for urbanization, but the rapid development of the tertiary section (service section) emerges to be another driving force. Number of cities increases rapidly in this stage, while large and megacities start to appear. The spatial pattern of cities gradually changes from sporadic points to continuous "bands" or even "planes" structure.

1.1.1.3 The Third Stage: The Mature Stage of Urbanization

This stage corresponds to the later industrialization stage and mature stage of economic growth. Urbanization enters a slowing down phase (rate between 0.5 and 1 % annually). Urbanization level gradually increases to between 60 and 80 %. In this stage, urban population and industrial section become overwhelmingly dominant. Agriculture section continues to decrease to be less than 20 % of the economy. In the meantime, the importance of industrial (secondary) section starts to decline in the economy, while the information and service section (tertiary), which now

Table 1.1 Comparison of the basic characteristics of urbanization's four stages

Stages of urbanization	The first stage	The second stage	The third stage	The fourth stage
	Initial stage of urbanization	Middle stage of urbanization	Mature stage of urbanization	Terminal stage of urbanization
Urbanization level/%	1–30	30–60	60–80	80–100
Industrial level/%	1–30	30–70	70–30	<30
Industrial structure (primary: secondary:tertiary)	50:25:25	25:45:30	15:40:45	10:30:60
Employment structure (primary:secondary:tertiary)	80:15:5	50:30:20	20:40:40	10:30:60
Urbanization rate/%	Slow, <1.0	Accelerating > 1.0	Slow down, <1.0	Stabilized, ≈0
Economic growth rate/%	Slow	Fast	Slow down	Stabilized
Drive for urbanization	Industrialization dominant	Industrialization dominant, with tertiary industry supplements	Tertiary industry dominant, with industrialization supplements	Tertiary industry dominant
Dominant economic type	Agricultural economy	Industrial economy	Industrial/commercial economy	Service-oriented economy
Urban spatial pattern	Point structure	Band or plane structure	Network structure	Balanced network structure
Rate of urbanization	Low rate	High rate	High rate but slowing down	Zero rate
Economic development stages	Initial stage of industrialization	Middle stage of industrialization	Later stage of industrialization	Post-industrialization
Economic growth stages	Taking-off stage	Growing stage	Maturing stage	Top stage

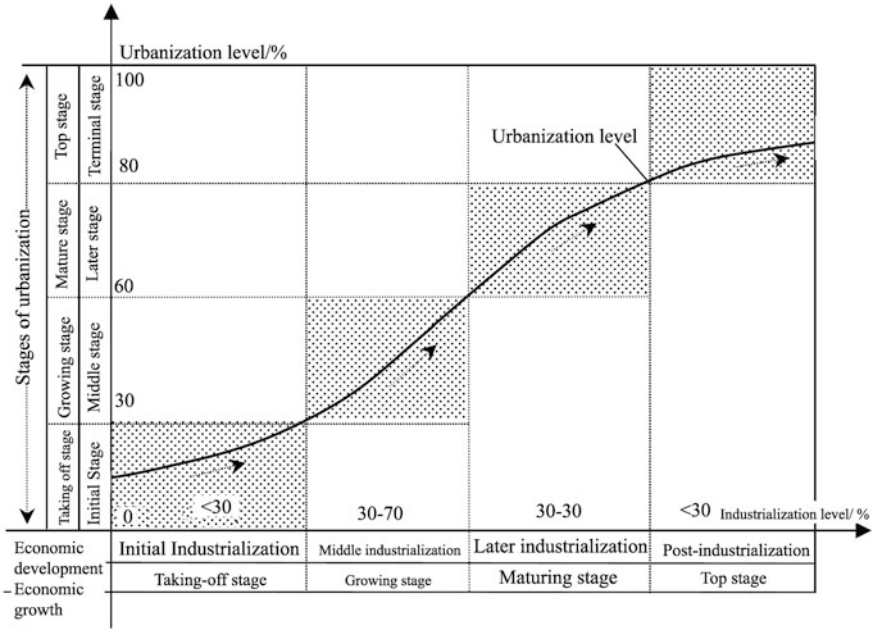

Fig. 1.1 Illustration of the corresponding stages between urbanization

accounts for 35–45 % in the economy, becomes the primary force driving urbanization. The number of cities as well as their scale continues to increase. The spatial pattern now appears to be more like a network instead of separated bands and planes.

1.1.1.4 The Fourth Stage: The Stable Terminal Stage of Urbanization

This stage again corresponds to the post-industry stage and the top stage of economic growth. Urbanization level reaches between 80 and 100 % (almost everyone lives in cities now). This stage is often characterized as being stable or even stagnant in that the growth rate of urbanization (as well as economic growth) is close to zero. Since the majority of the population now lives in the cities, the difference between cities and the rural areas starts to diminish. Urbanization might even be countered by suburbanization or even exurbanization. The primary section (the agricultural section) now accounts for very little (less than 10 %, but must remain above 5 % to ensure food security) in the economy. So is the decreasing industrial (second) section, which now accounts for less than 30 % of the economy. The tertiary section now accounts for more than 60 % of the economy, and becomes an inseparable agent for urbanization. The spatial pattern of cities is now a rather balanced hierarchical network structure.

1.1.2 Urbanization in China Experiences Faster than World's Average Development

As with any other countries in the world, urbanization in China follows closely the four-stage model detailed above. Different from countries in Latin-America, urbanization in China is often heavily influenced by national policy, economic system and industrialization levels. As such, urbanization in China expresses even more stage-like characteristics. Based on data from 1949 to 2012, we see a clear distinction in 1995 when China finally moved into the middle stage of urbanization, after 47 years of initial stage of urbanization (mainly due to the government enforced household registration system). After almost two decades of development, urbanization in China is still in the rapid growing middle stage (second stage, see Fig. 1.2).

From Fig. 1.2, it is obvious that the overall urbanization level in China is increasing, and it does have rather distinctive stage-like patterns. As a matter of fact, the changing curve of China's urbanization during the past 60 plus years is a distinctive reflection of China's socioeconomic development, household registration system, migration policies, organizational standards of towns and municipalities, strategic guidelines for urbanization, and population census and data organization [5]. Based on this curve and the indicators used to demarcate stages of urbanization, we argue that there are two primary stages for China's urbanization, namely, the initial stage (1949–1995), and the middle stage (from 1996 to now). We will discuss these two stages of China's urbanization in details below.

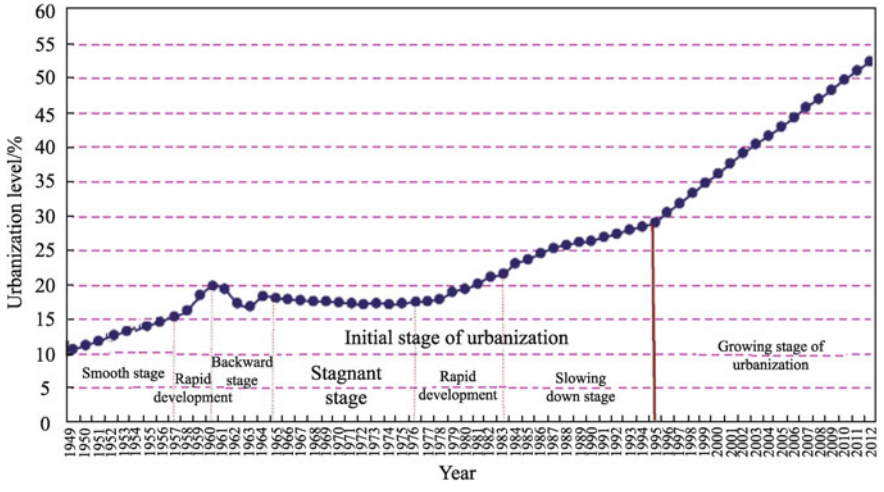

Fig. 1.2 Urbanization stages in China from 1949 to 2012

1.1.2.1 The Initial Stage of Urbanization (1949–1995)

Based on the four-state theory of urbanization, the nation (region) is in initial stage of urbanization when the urbanization level is less than 30 %. From the official statistics, urbanization level in China was 10.64 % in 1949. It reached 20.16 % in 1981, and 29.04 % in 1995. It exceeded 30 % in 1996 (30.48 %). Hence we deem the entire 47 years from the establishment of the People's Republic of China (PRC) until 1995 as the initial stage of urbanization in China.

Needless to say, China staying almost half a century in the initial stage of urbanization is a combined result of the then national politics, economic system, societal turmoil and relevant policies (especially urban and rural development policies). Urbanization in China during this period was characterized by high volatility, depression, stagnation, back-and-forth, and low-speed, experiencing unprecedented long and complex development process. If, however, we delve further into this lengthy and complex process of urbanization in China, we could still subdivide the initial stage into six sub-stages, which provides a more detailed and accurate image of China's urbanization in this unusually long initial stage. The first sub stage is from 1949 to 1957 when urbanization level reached 15.39 %, which could be termed as a "normal initiation stage" when urbanization started from a rather low level (10.64 %) but developed as expected. The fast urbanization period is from 1958 to 1960 when urbanization jumped to 19.75 % due to relaxed rural-urban migration policies and national policy for promoting industrialization. The retrogressive stage was from 1961 to 1965 when urbanization level dropped to 17.98 % due to the national policies to balance between large inundation of rural migration and the lagging urban infrastructure. Urbanization stagnated at 17.44 % during the "cultural revolution" period (1966–1976) when the entire nation was experiencing a tremendous social turmoil. The end of the "cultural revolution" and the beginning of China's economic reform in the later 1970s to the early 1980s (1977–1983) witnessed a boost of almost every aspect in China's social and economic development. Urbanization level also increased to 21.62 %. It slowed down a little for the next decade (1984–1995) and reached 29.04 % in 1995 when China was adjusting and adapting to the new market economy.

1.1.2.2 The Middle Stage of Urbanization (Since 1996): Grows Steadily and Exceeds World's Average

1996 marked the year when China's urbanization level first exceeded 30 % and entered the middle stage of urbanization per the four-stage theory. The relatively smooth and successful transition from a previously planned economy to the market economy enabled China's cities to become hot spots for socioeconomic development. This is especially true in 2000 when the central government altered the urbanization polices from "strictly control city sizes, especially large and big cities, but reasonably develop medium and small sized cities" in 1989 to encourage a "coordinated development" among large, medium, small sized cities and townships.

The goals of the New Urbanization policies were to boost economic development in the rural area and gradually eliminate the legacy dual (urban–rural) socioeconomic structure due to the planned economy. Developing and improving the infrastructure and carrying capacity of medium and small-sized cities and townships became of particular importance since they could serve as the primary destinations for expected large inundation of rural migrants in the foreseeable future. The government was very keen to reform policies and system barriers that might prevent this coordinated urbanization effort. In the 16th Congress Report, the concept of "diversified and coordinated urbanization" was proposed. It was further clarified that "the Chinese-characterized urbanization must gradually improve urbanization level and insist on the coordinated development among large, medium, small-sized cities and townships. The current county level cities and towns shall be the primary focuses and destinations for encouraging urbanization. The development must follow scientific planning strategies and have a rational and strategic spatial distribution." In the Outline of the Eleventh Five-Year Planning of National Socioeconomic Development (the Outline henceforth), the concept and framework of New Urbanization based on coordination and harmonization started to emerge. Specifically, the Outline indicated that "urbanization must follow an ordered and sustainable path, and insist on coordinated development among large, medium and small-sized cities and townships. The primary purposes of urbanization are to improve cities' carrying capacity, gradually eliminate the urban-rural dual socioeconomic structure in China based on the principles of step-by-step and intensive development, land preservation, and rational distribution." "Urban agglomeration will become the primary form for urbanization in China. The spatial pattern of China's urbanization will be highly coordinated and sustainable, with a few large urban agglomerations as the principal nodes, other sized cities and townships distributed in an orderly and rational pattern, and permanent cultivated lands and ecological function areas in between." In September 2012, the 18th Congress Report and Central Government's Economic Working Conference further stressed that China needs to firmly and steadily promote urbanization, focusing on improving the quality of urbanization in which the principles of ecological civilization and sustainability are inherently embedded. China's urbanization (the New Urbanization) must follow an intensive, intelligent, green and low-carbon path. All in all, China's rapid urbanization in this particular period reflects the combined effects of the full-bloomed socioeconomic development in China, a steady national policy promoting urbanization, and the relatively successfully economic system reform.

By 2012, the official statistics indicated that China's urbanization level reached 52.6 %, which was slightly over the global average in 2011 (52 %). Considering the rate of China's urbanization is almost 1 % more than the world's average, it is foreseeable the China's urbanization level will further increase rapidly. The policies emphasizing rational and sustainable urbanization will also encourage more sustainable and higher quality of urbanization in the future [6].

1.2 Overall Evaluation of China's Urbanization

From a sustainable development perspective, to assess whether or not a nation's urbanization is rational and healthy is to see whether or not the progress of urbanization agrees with the nation's industrialization and economic development level, the cities' public service capability, resources and environmental carrying capacity, employment level, and construction of new rural areas [7]. From 1953 to 2013, China's policies regarding urbanization experienced quite a few times of adjustment and transition. Specifically, in the First Five-Year Plan, urbanization was driven by various new construction projects, and developed quite freely. In the Second Five-Year Plan, urbanization experienced fairly chaotic development due to conflicting urbanization policies. During the Third and Fourth Five-Year Plans, urbanization basically stagnated because of the unprecedented societal turmoil (the Cultural Revolution). The Fifth Five Year Plan marked the reform and recovery of rational urbanization. In the Sixth Five Year Plan, urbanization policies based on "controlling large cities, but encourage small cities and urbanizing rural regions" were promoted. During the Seventh and Eighth Five Year Plans, though "controlling large cities" remained in effect, a diversified urbanization route was proposed. In the Ninth Five Year Plan, the concept of a healthy urbanization started to attract governmental and scholarly attention. In the Tenth Five Year Plan, coordinated development was added to the previous ideas, and the frameworks of New Urbanization gradually emerged. In the Eleventh and Twelfth Five Year Plans, urbanization that takes into consideration China's specific socioeconomic background and the ideas of active but stable urbanization were further embedded to the New Urbanization. The path of China's urbanization is by no means a typical one that follows any prescribed theories. During the past three decades, however, it gradually became more diversified, coordinated, and rational.

1.2.1 China's Urbanization Is Sub-healthy, "Urban Diseases" Prevail

Although urbanization in China during the past 63 years went through a fairly complex path, the general trend followed closely the "S" curve, like most of the countries in the world. The initial stage of China's urbanization took 47 years due to various political, societal, and economic reasons. By 2010, however, China's urbanization level reached 47.6 %, which was very close to urbanization levels in the medium income nations. It is forecasted that by 2025, China's urbanization level will reach 60 % (60 % of the population lives in cities), hence entering the mature stage of urbanization (Fig. 1.3). China will then become a true urban society, though still falls far behind the urbanization levels in the developed countries. The unique social, economic, cultural and historical characteristics of China suggest that urbanization in China will not be able to reach that of the

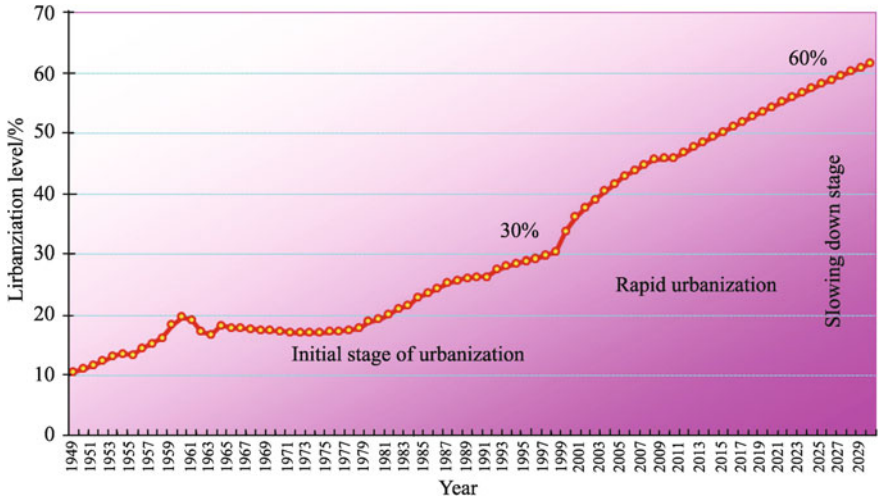

Fig. 1.3 China's urbanization stages and future development

developed countries in the relatively short term, which shall not be the goal of China's urbanization, either.

More importantly, from the literature and our previous studies, China's current urbanization is more of a sub-health status than a sustainable one. There are 7 primary manifestations indicating the sub-healthiness of urbanization in China, i.e., it is mainly "calculated" (a number's game), driven by "comparison" (to achieve political goals), highly "consuming" (involves tremendous amount of material consumption), highly "polluted" (air, water, and soil quality degraded drastically), often involving "massive demolishing" (demolish old buildings for newer ones often without much consideration of the integrity of urban layout and local residents compensation demands), "crowded," and "forced" [8] (Fig. 1.4). We'll discuss these 7 manifestations in details below.

1.2.1.1 A "Calculated" Urbanization

After the establishment of the People's Republic of China in 1949, China has conducted six different population censuses (1953, 1964, 1982, 1990, 2000 and 2010). In each census, the standards for determining urban and rural population were rather different from one another. In some censuses, urbanization was calculated based on non-agricultural population, but on city dwellers alone in some other censuses. Still in some other instances, the non-city dwellers who have lived in the same city for more than 1 year (some cities use more than half a year) will also be counted as urban population hence enter into the calculation of urbanization. The lack of a uniform standard makes the results of urbanization fairly different based on different standards. More often than not, the calculated results tend to be

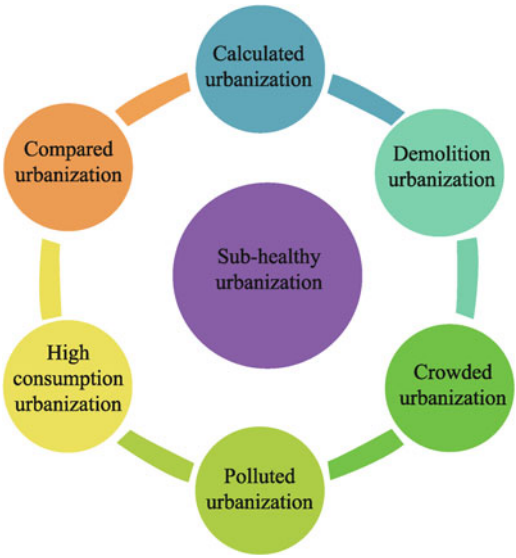

Fig. 1.4 The sub-healthiness of China's urbanization

higher than the actual levels. In the most recent census (the sixth census in 2010), there were 665,575,306 people living in non-rural lands (the demarcation between rural and non-rural land use is determined using the National Bureau of Statistics' 2008 *Provision of Urban and Rural Divide in Statistics*). Using this number, urbanization level in China was actually 49.68 % by the end of 2010, which is more than 2 % of the urbanization level announced by the National Bureau of Statistics (47.6 %). The dilemma indicates that over 26 million people can't be determined whether they live in the cities or in the rural villages. In 2011, the *China Statistical Abstract* published by the National Bureau of Statistics adjusted the 2010 urbanization level in China to be 49.95 %, while in the same time the level of urbanization reached 51.27 % in 2011, and again to 54.6 % in 2014 (Table 1.2), making China an "urbanized society," at least by numbers. How reliable such numbers are, however, is a golden question that can't be answered due to the chaotic standards used by various agencies. The fundamental reason behind such chaos is a typical legacy of the planned economy that "higher numbers mean higher possible allocation of resources from the central government where all the resources are concentrated." Apparently such "calculated" urbanization will provide little if at all guidance for sustainable urbanization and urban plan.

1.2.1.2 An Urbanization Driven by "Comparison"

Another legacy from the period of planned economy is that higher rank (like higher numbers) often indicates more allocated resources as well, especially if the comparison was made with the developed economies. Comparison and ranking of

Table 1.2 China's urbanization level from 1949 to 2013

Year	Urbanization level/%	Year	Urbanization level/%	Year	Urbanization level/%
1949	10.64	1971	17.26	1993	27.99
1950	11.18	1972	17.13	1994	28.51
1951	11.78	1973	17.20	1995	29.04
1952	12.46	1974	17.16	1996	30.48
1953	13.31	1975	17.34	1997	31.91
1954	13.69	1976	17.44	1998	33.35
1955	13.48	1977	17.55	1999	34.78
1956	14.62	1978	17.92	2000	36.22
1957	15.39	1979	18.96	2001	37.66
1958	16.25	1980	19.39	2002	39.09
1959	18.41	1981	20.16	2003	40.53
1960	19.75	1982	21.13	2004	41.76
1961	19.29	1983	21.62	2005	42.99
1962	17.33	1984	23.01	2006	43.90/44.34
1963	16.84	1985	23.71	2007	44.90/45.89
1964	18.37	1986	24.52	2008	45.8/46.99
1965	17.98	1987	25.32	2009	46.5/48.34
1966	17.86	1988	25.81	2010	47.80/49.6/49.95
1967	17.74	1989	26.21	2011	51.27
1968	17.62	1990	26.41	2012	52.6
1969	17.50	1991	26.94	2013	53.7
1970	17.38	1992	27.46		

urbanization became a common practice by local governments (which also explains partially why calculating urbanization tend to generate over-estimation). Apparently, such practices tend to yield inflated urbanization levels which could even be harmful to a sustainable urbanization in China. We outline two primary reasons as follows:

First, it is not feasible to compare urbanization level in China with that in the European and American countries (developed or developing countries alike). The specific cultural, historical, societal and economic characteristics of China render the comparison between China's urbanization and any of the countries in Europe and America a rather fruitless action. As a matter of fact, although China experienced a relatively rapid urbanization process, and urbanization level reached about the same as the global average (52.9 % in 2011, see Fig. 1.5) in 2012, urbanization quality lags far behind those of the developed nations in Europe and America. Simple comparison between the numbers (urbanization level that is based on the amount of city dwellers vs. non-city dwellers) would be rather misleading. Moreover, one of the primary reasons for comparison is to reach and surpass the target level than anything else. From the International Statistic Yearbook (2009–2012), however, it's easy to calculated that in 2011, China's urbanization level is

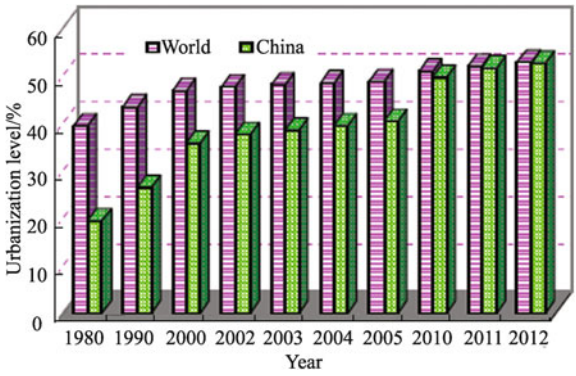

Fig. 1.5 Urbanization level in China and the world average. *Source* 1981–2013 China's statistical yearbooks, and World Bank WDI database

only 57.1 % of that of the UK's, 62.6 % of the United States', 57.8 % of Australia's, 62.1 % of Korea's, 56.2 % of Israel's, 63.9 % of Canada's, 65.6 % of France's, 68.1 % of German's, 69.9 % of Russia's and 74.1 % of Japan's (Table 1.3, Fig. 1.6). Even with the relatively rapid urbanization rate, it will take rather long time and require rather unnecessary land use change and other relevant socioeconomic contribution for China's urbanization level to catch up with the rest of the developed nations. Comparing with these nations would risk being a waste of resources.

From Table 1.3 and Fig. 1.5, we can easily see that as of 2010, there were more than half of the world's population lived in cities. The world was gradually and relatively rapidly entering an urbanized era. Urbanization rate during the past decades was about 0.4 % per year. Urbanization in China, however, experienced an annual growth rate in between 1 and 1.4 % during the same period, which is almost half to 1 % point more than the world's average. The result suggests that although comparing blindly China's urbanization level to that of the developed nations' would be rather futile, the fast urbanization in China would not only determine the future of China's urban development, but also impact significantly the global urbanization trend.

Second, the fundamental conditions for comparing urbanization levels across various regions in China are missing. In China, urbanization is not merely land use change and socioeconomic development. More often than not, the level of urbanization was used as a political achievement for the mayors, county executives or even provincial governors. This is especially true when the central government decided to actively promote urbanization across the nation. Many a time, the local governments were eager to "urbanize" the land under their jurisdiction without much consideration of local conditions and eco-environmental carrying capacities. Urbanization level without much urbanization quality was even praised to be great achievements for local officials. This apparently is a rather unhealthy practice of urbanization. Such a trend started in the "Eleventh Five-Year Plan," and is still pervasive even during the "Twelfth Five-Year Plan."

Table 1.3 Urbanization level in the world and some countries (regions) from 1980 to 2011

Country/region	1980	1990	2000	2002	2003	2004	2005	2010	2011
World	39.5	43.4	46.8	47.6	48.0	48.4	48.8	50.9	52.0
China	19.4	26.4	35.8	37.6	38.6	39.5	40.4	49.7	51.6
China Hong Kong	91.5	99.9	100	100	100	100	100	100	100
China Macao	98.1	98.7	100	100	100	100	100	100	100
India	23.1	25.5	27.7	28.1	28.3	28.5	28.7	30.1	31.3
Indonesia	22.2	30.6	42.0	44.4	45.7	46.9	48.1	49.9	50.7
Iran	49.6	56.3	64.2	65.3	65.8	66.4	66.9	68.9	69.1
Israel	88.6	90.3	91.4	91.5	91.5	91.6	91.6	91.8	91.9
Japan	76.2	77.4	65.2	65.4	65.6	65.7	65.8	66.8	69.7
Kazakhstan	54.0	57.0	56.3	56.7	56.9	57.1	57.3	58.5	59.6
DPRK	56.9	58.4	60.2	60.8	61.0	61.3	61.6	63.4	63.5
Korea	56.9	73.8	79.6	80.1	80.3	80.6	80.8	81.9	83.2
Malaysia	42.0	49.8	61.8	64.0	65.1	66.2	67.3	72.2	72.7
Mongolia	52.1	58.0	56.6	56.6	56.7	56.7	56.7	57.5	68.5
Pakistan	28.1	31.9	33.1	33.8	34.2	34.5	34.9	35.9	36.2
Philippine	37.5	48.8	58.5	60.2	61.0	61.9	62.7	66.4	68.7
Singapore	100	100	100	100	100	100	100	100	100
Turkey	43.8	61.2	64.7	65.7	66.3	66.8	67.3	69.6	71.4
Canada	75.7	76.6	79.4	79.7	79.8	80.0	80.1	80.6	80.7
USA	73.7	75.2	79.1	79.8	80.1	80.5	80.8	82.3	82.4
Argentina	82.9	86.5	89.2	89.6	89.7	89.9	90.1	92.4	92.5
Brazil	66.2	74.7	81.2	82.4	83.0	83.6	84.2	84.3	84.6
France	73.3	74.0	75.8	76.2	76.3	76.5	76.7	77.8	78.7
Germany	82.6	85.3	75.1	75.1	75.2	75.2	75.2	75.8	75.8
Italy	66.6	66.7	67.2	67.4	67.4	67.5	67.6	68.2	68.4
Russia	69.8	74.0	73.4	73.2	73.2	73.1	73.0	73.7	73.8
UK	88.8	89.1	89.4	89.5	89.6	89.6	89.7	90.1	90.5
Australia	85.8	85.1	87.2	87.6	87.8	88.0	88.2	89.1	89.2

1.2.1.3 A Highly Consuming Urbanization

The rapid urbanization during the past decades doesn't come out free. As a matter of fact, since urbanization level (instead of quality) was one of the standards assessing the local officials' achievements, a rather unique Chinese phenomenon, i.e., rapid urbanization was observed in many regions regardless of regional differences, conditions and other fundamental necessities. Because of that, rapid urbanization in China has incurred ever-increasing conflicts between urbanization and resources/environmental carrying capacities. Some American medium even estimated that under the current rate of urbanization, the demand for energy will double, while demand for water will increase 70–100 % in the next decade in

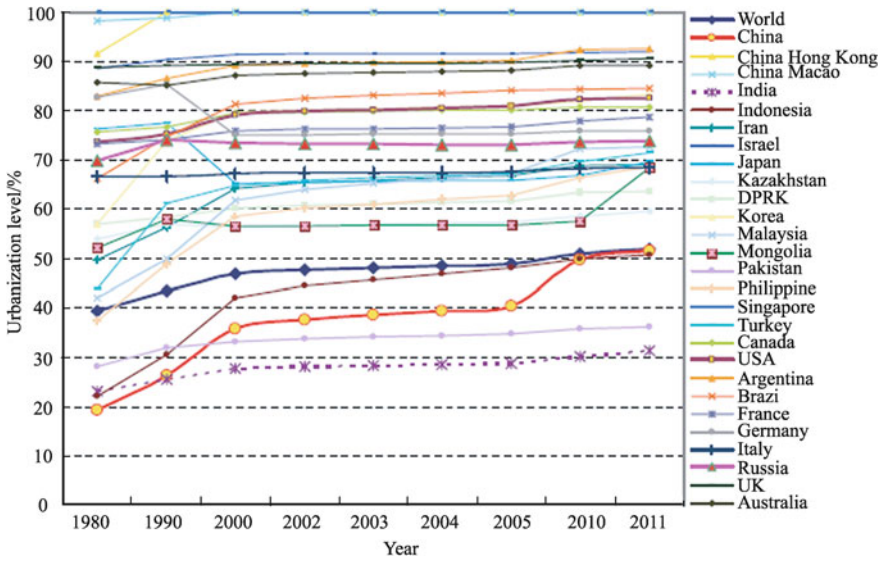

Fig. 1.6 The annual change in urbanization levels of China and other major cities in the world

China. Moreover, for the past 25 years (1980–2005), every single percentage's increase of urbanization in China consumes 1.7 billion cubic meter of water, requires 1004 km^2 of land, and 69.66 million tons of standard coal. For the next 25 years (2006–2030), however, the numbers increase to 3.2 billion cubic meter of water (1.88 times of previously), 3459 km^2 of land (3.45 times), and 227.38 million ton of standard coal (3.26 times) [9]. The numbers indicate that maintaining a high rate of urbanization would become increasingly difficult in China. In the meantime, the conflict between urbanization and required land, water and energy will further intensify in the foreseeable future (Fig. 1.7) [10].

This traditional mode of urbanization is apparently a highly consuming process that requires enormous amount of energy, water and land inputs. Some argue that urbanization is really a process that "moves" the entire people from the rural area to the cities because resources are abundant. For instance, the British economists in the Victorian time, William Stanley Jevons described the urbanization in Britain was fast and possible because "North America and Russia are our corn land; Chicago and Odessa are our barn; Canada and the Baltics are our timberland; and Australia is our pasture." Such argument, however, is as outdated as Jevons himself as of now since the world doesn't have the luxury to offer that many resources to support the urbanization of a single island as in the Victorian time, even if we ignore the absolute arrogance of the then colonists' arguments. Yet China produces the largest repetitive construction, and waste enormous amount of resources in demolition and reconstruction. It wouldn't take a genius to figure it out that such a highly consuming urbanization process in China would never last long.

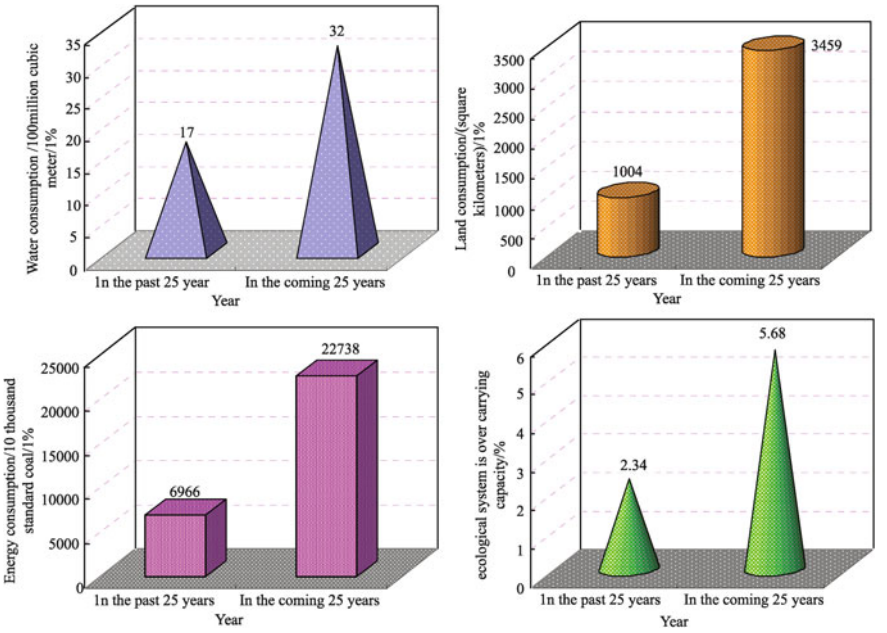

Fig. 1.7 The change in resource and eco-environmental stress in the urbanization of China

1.2.1.4 A "Polluted" Urbanization

China has experienced not only rapid urbanization, but also rapid industrialization during the past three and half decades (after the economic reform in 1978). As a result, China's socioeconomic development has made remarkable achievements, and China became the second largest economy next only to the United States. In the meantime, however, China's economic development followed a rather bumpy and extensive mode, which renders China the largest (and also the fastest growing) country of waste water discharge. Many studies have suggested that the degradation of environmental services and environmental carrying capacity will become the strictest bottleneck for China's holistic socioeconomic development in the future.

In 1980, the total waste water discharge in China was about 31 billion tons. It reached 59.6 billion tons in 2009. In addition, 1/3 of the monitoring stations indicate the water quality to be grade-five inferior, losing their ecological functions. Cities were where the pollution concentrates. In addition, data indicates that 20 % of the cities have air pollution. Among the 113 major cities, air quality in 67 % of them can't reach the national grade-two level. The fast increase of automobiles is the primary sources for air pollution. Moreover, the rapid urbanization and industrialization also cause the southeastern coastal regions to experience an annual 0.05 °C increase in temperature since 1979. The strong tie between urbanization and industrialization indicates that China's urbanization is a "polluted

urbanization." The price for unhealthy and unsustainable development is enormous, for instance, the cities in Northern China have experienced continuous severe haze. The ensuing health problem of the citizens, and loss of labor hours and economic losses due to that are hard to estimate without adequate data, but a simple guess would suggest its enormousness.

1.2.1.5 Urbanization from Demolition

One of the rather unique characteristics in China's urbanization is that it is a process with constant demolition and reconstruction. As a matter of fact, rapid urbanization encourages rapid urban upgrade, old city renewal, land use expansion, function exchange, and constructions of major projects. Conflicts between property owners (or users in China's context) and the demand for urbanization often lead to extreme actions such as self-immolation. The government has been trying to issue a variety of policies and regulations in order to mitigate the intensifying situation. The primary cause for conflicts is that the price tagged for the land by the developers is often very different from what the property owners' expectation, and it changes very little during the past decades. The old version *Urban Housing Demolition Management Regulations* became actually the regulatory basis for violent demolition. Urban demolition under the name of rapid urbanization became a disguised game of wealth transfer, authority versus rights, and the administrative power of the powerful interest groups versus the property owners' insecurity. From incomplete sources, we found that from October 2009 to May 2011, due to the lack of regulation or flaw of it, there were 22 reported self-immolation incidents that involved 33 individuals and led to more than 20 deaths [11]. The central government has realized the seriousness of such conflicts, and started to implement more rigorous regulation and laws to curb such conflicts and mitigate the damage. *The Ordinance of Housing Levy and Compensation on State-owned Land* (Draft) has been issued and shall be followed to the words. The Ordinance was hoped to facilitate smoothing the relationship between urbanization and land acquisition, and protect citizen's legal private ownership. The proper ways of urbanization and necessary land acquisition and demolition shall follow very strict legal procedures. Negotiation shall always be preferred over conflicts, and the government shall present to the citizens clearly the acquisition and demolition of land are necessary and beneficial to both parties. Proper compensation shall be negotiated and agreed upon by all sides instead of being forced by the more powerful groups. The entire process shall be straightforward, universal, specific, restrictive, and fair to all participants.

1.2.1.6 Crowded Urbanization

China is currently the most populous country in the world with a total population size over 1.3 billion. Although China measures very similar in size to that of the

United States and Canada, its population density is far more than the latter two. Cities are by definition more dense than rural areas. Chinese cities are even more so. Since now there are over half of the population (close to 700 million people, twice the size of the entire United States of America) living in cities, in many of them, especially large, mega and super cities, the space becomes even more crowded. The crowdedness is almost everywhere: traffic, housing, living space, health care, employment, shopping, education, etc., which renders shortage in water, electricity, labor, food, clean air, and in psychological discomfort. The limited resources in cities cause prices of almost everything, from necessities to luxuries to be sky-rocketing, which reduces the residents' feeling of happiness dramatically. This crowdedness is one of the fundamental reasons for the so-called "urban diseases" characterized by traffic congestion, environmental pollution, supply shortage, rampant crime, and overburdened urban infrastructure. Urban scholars argue that such "urban diseases" are inevitable consequences after the relatively uncontrolled Great Jump in Urbanization during the later 1990s. Among all the "urban diseases," high housing price is one of the most devastating aspects in the contemporary Chinese cities, which might eventually "kill" cities' sustainability in the long run.

1.2.1.7 Forced Urbanization

In the process of China's urbanization, real estate is not only one of the most benefiting industries, but also the industry that garners most of the conflicts. Real estate industry in China is almost solely dependent on China's rapid urbanization. The huge inundation of rural population to the cities causes extremely heightened demand for housing/shelter. No speed of urbanization in terms of residential construction could ever match that of the population moving to the cities. Consequently, housing (apartment) prices in Chinese cities, specifically in large, mega and super cities (the ones that attract most migrants), rose to the highest in the world. The benefit of the real estate industry, however, concentrates only to a small group of real estate developers and the original city dwellers, while the majority of city residents (mostly new immigrants) become the so-called "housing-slaves." The huge profit of real estate in large, mega and super cities (and even in many medium-sized cities) encouraged the developers and even local governments to expand the urban proper via demolition and reconstruction under the name of "urbanization." In such sense, urbanization is actually a "forced" urbanization, forced by the seeking of maximizing profit for real estate industries. Some even argue that the real estate industry actually abducted China's urbanization.

In this process, we observed that the local government played a significant role, sometimes even the leading role in promoting the development of real estate industry, but under the name of urbanization. This is because under the current financial system, the local financial income often can't balance off well with the expenditure. Since in China, land is owned by the state, it is almost a no-brainer for the local governments to implementing the so-called "land finance." The local governments rent out the land to various developers for real estate development,

which in some cases even become the primary source for local financial incomes. From a rough estimate based on officially released data, in 2012, the governments and banks gained over 4791.7 billion Yuan (RMB) from renting the land, which is almost three quarters of the 6400 billion Yuan from real estate sales of that year. Among them, 40 % of the housing price was used to pay off the government's land rental fee. Some local governments even "created" the so-called "one house four earnings" strategy to maximize their profits. The first earning is from land rental fee. The second earning is from the 20 % property transfer tax (if the property was sold in the market). The third earning is from property tax. The fourth earning is from inheritance tax. Apparently, in this mode, the local governments have benefited enormously from the development of real estate abducted urbanization, the majority of the citizens, on the other hand, doesn't.

1.2.2 The Sub-healthiness of China's Urbanization Does not Indicate Pseudo-urbanization

The above discussion suggests that China's urbanization is not entirely a "healthy" urbanization (or full urbanization that follows the expected social, economic, and spatial paths). One of the important manifestations of such sub-healthiness is that the quality of urbanization is not on a par with the level of urbanization. From the experiences of developed countries, the level of urbanization was often used to measure the progress of urbanization and socioeconomic development in a specific country/region. One of the important features for such measurement to be possible is that the levels of urbanization always agree almost perfectly with the levels of industrialization in the capitalized world (Europe and North America). This is understandable considering the long history of urbanization and industrialization in the West for over 200 years. This is not the case in China, however. Although it took 47 years for China to finish the initial stage of urbanization, it was not due to the coordinated development of urbanization and industrialization, but rather a combined result of a variety of socioeconomic and political factors (most notably the unique household registration system). The economic reform in 1978 released the enormous economic and societal developing forces in China. Although the household registration system wasn't relaxed, restrictions on migration from the rural areas to the cities were largely lifted. Urbanization progressed at an unprecedented rate, while industrialization lagged behind. As of now, the level of urbanization is 2.49 % above industrialization. More alarmingly, the rate of urbanization is 3.1 % higher than the rate of industrialization. The direct impacts include (but not limit to) insufficient employment opportunities, low level public services, low urban management efficiency, difficulty of converting rural dwellers to city dwellers, increasingly prominent shortage of water, electricity, land, housing, and labor, and declining resources and eco-environmental security. These all kept the quality of urbanization low. Urbanization becomes an empty shell without the support of proper industrialization.

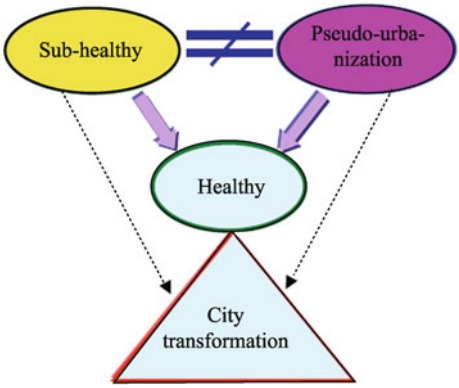

Fig. 1.8 Urbanization sub-healthiness and pseudo-urbanization

On the other hand, we must also admit that China's urbanization, though is sub-healthy, progresses in the right direction. Urbanization rate in China is above the global average. The rapid urbanization would occasionally lead to incomplete urbanization, inaccurate urbanization level hence low quality urbanization. Moreover, the strict household registration system, which was designed to prevent rapid urbanization in the early 1960s, has now generated a so-called "semi-urbanization" phenomenon. Semi-urbanization refers to the scenario that although there are large amount of industrial workers who live and work in the cities but are not registered as urban residents (*Chengshi Hukou*), they often receive limited public services than their urban peers. This is the primary manifestation of the sub-healthiness of China's urbanization. The phenomenon though has its historical reasons, can be dealt with and eliminated eventually. In recent studies and media reports, however, such phenomenon was used as a proof to support a so-called "pseudo-urbanization" in China (Fig. 1.8). We disagree with such a proposal and argue that sub-healthy urbanization is not pseudo-urbanization [12].

1.2.2.1 Why the Concept of Pseudo-urbanization

The argument that China is not really urbanizing but pseudo-urbanizing has its deep root in four specific aspects, i.e., the institution, construction, statistics and political achievement. We will outline these four aspects in details below.

First, Institution level: the legacy of the household registration system. As aforementioned, the household registration system was designed to prevent free movement of a nation's population in order to control rapid urbanization. It was supposed to be a make-shift for cities to take a break and prepare their industrial development and infrastructure bases to accommodate ensuing urbanization. However, the household registration system remained in effect even after the socioeconomic system in China has changed drastically from planned economy to

market economy. The direct consequence of the household registration system is to generate an urban-rural dual structure with increasing inequality between the urban and rural areas. Citizens are divided artificially into urban and rural dwellers. The urban dwellers enjoy many more public services and societal management opportunities than their rural counterparts. Quality of life for rural residents is often far lower than that of the urban residents (around 31.9 % to be exact). An often-observed and exposed fact is that there are more than 158 million migrant workers in cities who lived there for at least 6 months, and 140 million residents living in the township but working in the farmland. These 298 million citizens (almost the size of the United States of America) enjoy much less (if at all) social benefits and public services than the urban registered citizens living in the same cities or towns because they are registered as rural household. Most of them are already an integrated part of the cities and towns they now live in, yet the institutional barrier (household registration system) artificially makes them inferior. Such facts are the basis for the term "pseudo-urbanization" in that urbanization counting this part of the urban residents is not necessarily urbanization per se.

Second, Construction level: the phantom urban population increase due to "migrant" workers oscillating between rural and urban regions. Urbanization in China, as aforementioned, is often accompanied by extensive land use changes due to governmental land requisition system. One of the primary problems in implementing land requisition is that the infrastructure construction rate and level falls far behind the rate of land requisition. One of the conditions of land requisition is to convert farmers who used to work (not own, though) on the land to be city registered residents. The reality is that although these former rural registered citizens are now city residents (registered), the urban infrastructure (housing, road, public services, etc.) can't meet the increasing demands of this group of newly added urban population. In China, there are more than 50 million so-called "three-no" population, namely, no land, no employment, and no security due to the rapid urbanization and rural to urban registration conversion. In addition, China has adjusted its administrative divisions numerous times which converted many of the rural villages to be small townships (as well as the household registration from rural to urban). Due to the strict household registration system, such conversion almost immediately increased China's "urban" population because the "villages" they were living now became "towns" due to administrative changes. Such changes are mostly nominal without significant improvement in urban infrastructure including education, health care, housing, employment, transportation and social relief services, which leads to the argument of "pseudo-urbanization."

Third, Statistical level: non-uniform statistics of urban population leads to various results of China's urbanization level. After the establishment of the People's Republic of China in 1949, China has conducted six censuses in 1953, 1964, 1982, 1990, 2000 and 2010. The problem is the standard for urban-rural division in each of the six censuses is different, which causes the calculation of China's urbanization rather unreliable. Most scholars argue that the numbers calculated from the censuses tend to be higher than the actual urbanization level. For instance, the most recent (sixth) census in 2010 indicated that China's urbanization level reached

49.68 %. The number from the National Bureau of Statistics, however, suggested it was only 47.6 %, yet it jumped to 51.3 % in 2011. Such a "game of numbers" is a direct legacy from the planned economy in which higher statistics often means higher allocation of national resources since that's the only way to get resources. The lack of a standard way to obtain China's urbanization level hence leads to the argument of China's pseudo-urbanization.

Fourth, Political achievement level: another legacy from the planned economy that faster, higher level of urbanization is one of the local officials' political achievements. Local governments actually use the level of urbanization as an assessment means to evaluate officials' political performance. Such a "higher and faster are better" mindset almost immediately leads to policies that encourage the increase of urbanization level (increase of urban population) without much consideration of environmental carrying capacity, urban infrastructure carrying capacity, and other urbanization quality aspects. We term such a mindset as the so-called "political achievement sickness" of urbanization. Such mindset also leads to the argument that China's urbanization during the past decades are but pseudo-urbanization.

1.2.2.2 Rational Discussion of the "Pseudo-urbanization" Phenomena

From the above discussion, we do see that the term pseudo-urbanization has its root in China's current urbanization process. We contend that China's urbanization, though with various problems and fluctuation, is not "pseudo." We do agree, however, it will not be an easy task to eliminate the falsehood and retain the truth of China's urbanization and distinguish it from pseudo-urbanization. There will still be issues from the institutional and political levels, especially the phantom influence of planned economy will linger for quite a while. We intend to provide a few rational thoughts in the debate and discussion of China's urbanization, and hopefully the discussion will contribute to a sustainable future of China's urbanization.

First, China's urbanization does gain significant momentum during the past decades, especially after the economic reform in 1978. It will be both irresponsible and inaccurate to describe the progress of China's urbanization as "pseudo." The harm the term "pseudo" does to China's urbanization process is not just descriptive, but could lead to a total reject of the actual achievements and improvements cities in China gained during the past decades. Moreover, the wide use of such term, especially by the semi-professional news media, could lead to significant underestimate of China's economic drive and urbanization progress, which could sway potential investors and businesses from entering China's cities, hindering their sustainable development. It is hence urgent to warn scholars and news media the harm such term could do to China's urbanization.

Second, we propose to experimenting reform of China's household registration systems, and establishing uniform automated registration system nationwide. Our discussion of China's urbanization and reasons why "pseudo-urbanization" gain its popularity very much lead to one particular legacy item in China's unique

urbanization process, i.e., the household registration system. Voices of reforming the household registration system have been uttered for quite some time. A quick removal of the household registration system would incur more chaos; yet it also becomes crystal clear that the existence of the system will almost always lead to harmful terms such as "pseudo-urbanization." In addition, the household registration system is also the fundamental reason for unequal rural-urban division, and the fairly unique Chinese urban-rural dual structure. Reforming household registration system is way past due. We do suggest, however, to reform the system gradually and slowly to avoid abrupt changes and unnecessary chaos like many of the socioeconomic "shock remedies" tend to do. The first step, we propose, is to replace the terms "city residents" and "farmers/peasants" with a single term "residents." Any Chinese citizen, as long as he satisfy certain basic conditions, can register as a resident in any places, be it cities or villages. Once the individual registered as a "resident" in a specific location, s/he shall be eligible for the same rights and benefits as residents in that location. Apparently, the pre-condition for successful implementation of such plan is to improve the public benefit and service levels across the entire nation, regardless of cities or villages. A nationwide implementation of such reform doesn't, at least for now, have such necessary pre-condition. Hence, for the second step, we propose to choose a few experiment spots, especially the ones with relatively highly developed socioeconomic status and relatively diminished urban-rural division, such as Guangdong Province, Chongqing Municipality, for pilot implementation. The goals are to eliminate the inequality introduced by the household registration system, remove the urban-rural dual structure, and promoting social fairness. The results from the experimentation could then be examined, studied, and if successful, gradually spread to other parts of China. In practice, the implementation could follow a gradual process. The original household registration can be preserved. The total amount of "resident" registration can be increased gradually with increasingly relaxed conditions. The ultimate goal of the reform would be to gradually meet the demands of migrant works in urban employment, fair payment, children schooling, public health, housing and social security, and ensure they are treated the same as local residents. Successful implementation of such reform would eventually convert the urbanization in China from urbanizing the elements to urbanizing the people.

Third, it is crucial to develop a standard way of assessing urbanization instead of being led by various political goals. The first and most important step of establishing a standard assessment for urbanization is to build a relatively complete database of various indicators to assess the society, science and technology, resources and environment. A uniform urban and rural resident survey shall be created for census purposes. Calculating urbanization shall avoid relying on the household registration system; instead urbanization level shall reflect the actual amount of people who (permanently) live in the cities, regardless of their household registration. Development and construction of urban infrastructure and other public service establishments shall then be based upon this actual urbanization level instead of what was reflected by the household registration system. In so doing, urbanization will gradually agrees with industrialization, employment

opportunities, and public services level. The same principles shall apply to other fields of city management and governance, including financial, education, taxation resources, and quota for People's Representatives, (Communist) Party Representatives and Chinese Congress Members.

Fourth, the new mode of urbanization shall start to look beyond the sheer number of urbanization level to incorporate urbanization quality within. As of now in China, the most important step to take for a successful and complete implementation of New Urbanization is to re-educate governmental officials, and change their mindsets that urbanization is more than just how many people living under their jurisdiction, but how well such living is. Actions of blindly seeking higher number of urbanization level need to be curbed. The growth rate of urbanization shall be based on sustainable urbanization principles. For current stage of China, a 0.6–0.8 % increase annually would be suitable. Evaluation of governmental officials and their performance shall downplay the number's games, but focus more on "quality" genre of indicators, which includes the quality of living, resources and environment conditions, sustainable urban infrastructure construction, intensive and efficient land use mode, increase of employment, urban environmental quality, urban social security system and other relevant public services for residents in the cities. This is critical for demystifying the "pseudo-urbanization" phenomena, and changing China's urbanization from sub-healthy to the fully healthy, sustainable New Urbanization.

1.3 Resource and Environment Constraints for China's New Urbanization

The New Urbanization in China is an ultimately sophisticated socioeconomic process. Moreover, urbanization is also an interaction between human beings and the resource bases and environments. New Urbanization seeks sustainable and harmonious relationships between the human and the land. Two principles, namely, "people-oriented" and "land-fundamental," shall always be followed when implementing New Urbanization developmental strategies. How to follow these two principles, maintain a harmonious and sustainable interaction between human and land, and deal with the fundamental resources and environmental restrictions, will be the most imminent issues New Urbanization in China faces in the immediate future.

1.3.1 The Four Increasingly Severe Resource and Environment Constraints

From in-depth analysis via simulative models of the relationships between China's urbanization and resources and environment security from 1980 to 2030, we conclude that China's New Urbanization will face increasingly stringent resources and

environmental restriction. It is forecasted that Chinese cities' energy demand will be doubled, and water demand will increase 70–100 % in the near future. The Chinese Academy of Sciences also predicted that China's future urbanization will need 1.89 times the energy currently consuming, and 88 % more water. The pressure to the ecosystem and environment will be 1.42 times the current level (Tables 1.4 and 1.5). Apparently, if we cannot have secured resources and environmental services in

Table 1.4 Urbanization and required resources in China from 1980 to 2030

Year	Urbanization level/%	Water/100 million cubic meter	Land/km^2	Energy/10,000 standard coal
1980	19.39	88.34	6720	60,000
2005	42.99	502.06	29,636.83	224,682
2020	60.00	870	72,552	404,640
2030	65.00	1150	118,180	600,000

Note Energy consumption is calculated based on the 4 % maximum growth rate regulated by the *energy efficiency and long-term special plan* (2004)

Table 1.5 The amount of resources required for every 1 % increase in urbanization from 1980 to 2030

Items	From 1980 to 2005, the amount of resources required for every 1 % increase in urbanization	From 2006 to 2030, the amount of resources required for every 1 % increase in urbanization	How many times the future is comparing to the past	Resource consumption trends and the resources and environment security levels
Water/100 million cubic meter	17	32	1.88	Water consumption increases rapidly as urbanization level increases. Water security level decreases rapidly
Land/km^2	1004	3459	3.45	Land consumption increases rapidly, and land security level decreases rapidly
Energy/10,000 standard coal	6966	22,738	3.26	Energy consumption increases rapidly, it becomes increasingly hard to obtain sufficient energy

the near future, the New Urbanization will have very little chance of success [13]. We will detail the four most significant restraints that might hinder the successful implementation of China's New Urbanization if not adequately addressed.

1.3.1.1 Water Restriction in the Rapid Urbanization Era

Water resource is one of the fundamental life-support resources. Sustainable urbanization can never progress without water and sustainable management of water resources. During the recent years, when China's urbanization picks up the speed, average urban water demands increase at a rapid rate as well. Urbanization and industrialization levels in China will undoubtedly further improve in the future, which renders water security to be a critical factor for future urbanization/industrialization. Our calculation indicates that from 1980 to 2005, every 1 % increase in urbanization level requires an additional 1.7 billion cubic meters of water. Among them, 940 million cubic meters are for domestic consumption, and 760 million cubic meters are for industrial consumption. We detail the relationship between water usage, various types of water usage and their relationships with urbanization below.

First, in 1980, urbanization level in China was around 19 %, the total water usage was 8.834 billion cubic meters. When urbanization level reached 43 % in 2005, the total water usage increased to 50.206 billion cubic meters, which corresponds to a 172.4 million cubic meters increase per 1 % increase of urbanization level. The relationship between urbanization level and water usage, of course, is not linear. When urbanization level is less than 30 % (the initial stage), total water usage increases rather dramatically per 1 % increase of urbanization. Once urbanization enters rapid development (after 30 %), the increasing rate for total water usage per 1 % increase of urbanization actually decreases. Simulative model suggests that during and after the rapid urbanization, on average, total water usage actually decreases per every 5 % increase of urbanization.

Second, unlike the total water usage, domestic water usage increased dramatically regardless of which stage urbanization is in. In 1980, the urban domestic water usages was 3.391 billion cubic meters, which increased to 24.374 billion in 2005, an average increase of 889 million cubic meters per 1 % increase of urbanization, over five times that for the total water usage. This is understandable. As urbanization level increases, not only population size increases, but also quality of life, and other relevant services have to increase as well, which directly linked to ever more domestic water usage.

Third, industrial water usage, however, follows closely the trend as the total water usage. From 1980 to 2005, industrial water usage increased 760 million cubic meters per 1 % increase of urbanization. The increase rate of industrial water usage decreases after urbanization entered a rapid developing stage. Again, this is understandable since urbanization often accompanied by development in science and technology, which would eventually improve industrial water usage efficiency, hence the reduced amount of water usages per 1 % of increase of urbanization.

Fourth, our simulative model suggests that from 2006 to 2030, every 1 % increase of urbanization demands 3.2 billion cubic meters of water. Among them, domestic water will need 2.3 billion cubic meters more, while industries need 960 million cubic meters more. Comparing to the previous 25 years, water requirement per 1 % increase of urbanization increased rather rapidly. More importantly, getting enough water to support urbanization will become increasingly difficult. It is estimated that there will be 15 billion cubic meters of water shortage by 2020. Urban water security decreases as urbanization level increases. Spatially, the eastern coastal cities will be on the top of water shortage list. This is because water usage is also related with economic growth, while more developed cities often requires higher amount of water, especially domestic water.

1.3.1.2 Urban Land Shortage

If water is the guarantee for life, land is then the fundamental carrier for urbanization. Urbanization is meaningless without adequate land supply. The limitedness of land indicates that urbanization can't expand in space endlessly. For China, as the country is entering the rapid urbanization era, the conflict between land demand and land shortage is salient. This is especially true in the relatively developed east and south coastal cities. China has set the lower limit for the cultivated land to be 1.8 billion mu (120 million ha). By law, this number can't be breached for no matter what reasons. The previous mode of urbanization by claiming adjacent cultivated land becomes increasingly difficult.

From 1980 to 2005, every 1 % increase of urbanization required 1004 km^2 land for urban expansion. A simulative model suggested that from 2006 to 2030, every 1 % increase of urbanization will need more than three times that number, 3460 km^2. This clearly indicates the current mode of urban land acquisition is not sustainable and might very well not even be possible due to the "red line policy" regarding cultivated land (the 1.8 billion mu cannot be sacrificed). Our simulative model suggested that by 2020, the total urban land use will reach 72,550 km^2, but the available land for urbanization will only be 64,813 km^2, a gap of 7740 km^2. The majority of the land shortage concentrates on the coastal developed regions, as urbanization tends to be the fastest, and land demand the most prominent. Apparently, land availability in the short term will become the strongest bottleneck for rapid urbanization. It is hence imperative to find ways to coordinate fast urbanization and stringent land supply. Recent discussions on "smart growth," "vertical urbanization" might provide promising solutions.

1.3.1.3 Ever-Increasing Energy Shortage

From 1980 to 2005, every 1 % increase of urbanization requires on average energy level equivalent to 69.66 million tons of standard coal. While from 2006 to 2030, our simulative model suggests that every 1 % increase of urbanization requires 3.26

times that number, namely, 227.38 million tons of standard coal. China has recently signed on the global emission reduction task force, and is committed to reduce its emission of greenhouse gases, and actively promotes the low-carbon economic development and life style. Increasing energy demand by urbanization is almost in direct contradiction against such commitment and is certainly not sustainable. Again, the energy shortage (both actual and political) is the most prominent in the coastal regions where economy is highly developed. Ways for low-carbon, and low energy consumption urbanization will become one of the pressing tasks for the New Urbanization in the near future.

1.3.1.4 Increasingly Degrading Eco-environmental Quality

From the statistics, during 1950–2010, based on ecological footprint calculation, every 1 % increase in urbanization increase the per capita ecological footprint by 0.08 hm^2, the intensity of ecological footprint drops 1.15 hm^2/Yuan, and the ecological system is over carrying capacity by 2.34 %, the synthetic index of eco-environmental quality drops 0.0073. Our simulative model further suggests that for the next 40 years, for every 1 % increase of urbanization, the per capital ecological footprint will increase 0.11 hm^2, its intensity will drop 0.06 hm^2/Yuan, over carrying capacity by 5.68 %, and the synthetic index will drop 0.0064. If urbanization proceeds as it is now, by 2050, the ecological system will be severely overburdened, and eco- environmental quality will keep worsening [14].

1.3.2 Suggestions to Relax Resource and Environment Constraints for China's New Urbanization

The above discussion clearly indicates the current mode of urbanization is not sustainable. If China continues its urbanization without changing its high demands for water, land, energy and eco-environmental carrying capacity, urbanization will eventually stop and regress, or even collapse due to severe limitation of water, land, energy and drastically deteriorating ecological services and environmental quality. Cities will no longer be centers of wealth and prosperity, but "natural" exhibitions of deterioration and depression. It is under such circumstances that we propose the people-oriented New Urbanization for which a scientific concept of development is the core. New Urbanization will be sustainable urbanization in that human development will be within the carrying capacity of resources and environment basis. New Urbanization focuses more on urbanization quality instead of quantity. Under the principle of New Urbanization, the rate of urbanization will be maintained and managed to accommodate the rate of internal infrastructure and public services development. In summary, the New Urbanization will be resource conservative, environment friendly, economy efficient, and society harmony. We propose a few

suggestions below in a hope to alter the current mode of urbanization and transition to New Urbanization.

1.3.2.1 Urbanization Shall Proceed Within the Resource and Environment Carrying Capacity

One of the lingering legacies of the planned economy in today's China is that quantity almost always needs to be stressed over quality. New Urbanization, however, needs to focus more on urbanization quality than sheer numbers of urbanization (level, speed, etc.). New Urbanization must realize the severe constraints posted by limited water, energy, and land resources, and eco-environmental carrying capacity. The rate of urbanization shall be managed within the resource and environment carrying capacity, and agree with the economic quality, social quality and environmental quality. For the entire nation, our simulation and calculation suggest an annual urbanization rate of 0.6–0.8 % would be appropriate, though regional variation is possible. Local governments shall alter their mindsets of quantity over quality, and shall avoid blind comparison of speed or other quantitative indices without proper consideration of the reality. Instead, governments shall stress more on urbanization quality, stick to the principles of compactness and efficiency, focus on urban infrastructure construction and efficient utilization of existing urban land, facilitate urban job market, improve urban environmental quality, enhance social security system, and provide the most fundamental public services to their citizens (residents). In so doing, the nation is able to urbanize sustainably, and with high quality.

1.3.2.2 Urbanization Shall Incorporate Resource and Environment Security

Unlike the developed nations in Europe and North America, or the developing nations in the Latin America, China since the late 1980s faced the dilemma of "huge population, very limited resources." Such unique characteristics dictate that China's urbanization (the New Urbanization) will not and cannot follow the same route as being followed by those countries. Apparently, resource and environmental carrying capacity shall be the one critical quantity that all the city governments need to evaluate annually. Not only individual cities shall have their resource and environment carrying capacity evaluated, the entire nation shall have an overall estimation as well. This quantity will then be used as the fundamental "red line" for sustainable urbanization. No cities shall develop beyond this "red-line," nor will any city bypass their red-lines and encroach on other region's carrying capacity. The principal concept of New Urbanization is to urbanize with low resource consumption and low environmental degradation. In this regard, urbanization in Germany regarding energy and land conservation could be good examples that we can follow. In addition, New Urbanization will heavily rely on the development of

science and technology to promote water, land, and material conservation. Future cities will be water, land, material, energy conservative and low-carbon. The resources and environmental security for urbanization will eventually integrate to the national security of resources and environment.

1.3.2.3 Incorporate the Resource and Environment Constraint and Carrying Capacity Indicators for Urbanization to China's Long Term Development Plans

China has been regularly designing its "Five-Year" plans at the national level. Many provinces, counties and even municipalities also have their own "Five-Year" plans. These "Five-Year" plans, though a clear legacy from the planned economy, do provide useful and effective guidance to local socioeconomic development since it sets various goals and proposes specific actions to achieve those goals. Urbanization has long been incorporated in such plans, but only the urbanization level and its growth are mentioned. For successful implementation of New Urbanization, it is necessary to borrow the popularity and effectiveness of these "Five-Year" plans to set goals to recognize urbanization's resource and environment constraints. Moreover, the water, energy, land consumption, and waste discharge per 1 % increase of urbanization shall be incorporated in these plans. They shall belong to the same category as water, energy consumption and waste discharge per unit GDP; hence goals to reduce them can be set. In addition, these indicators shall also be used to evaluate local officials' performance, so that the officials will gradually develop a mindset that will focus more on urbanization quality instead of just the quantities (level of urbanization, speed of urbanization, etc.).

1.3.2.4 Establish the Dynamic Transfer Mechanisms of Urbanization Development Tailored to Local Conditions to Protect Resources and the Environment

With the dynamic transfer mechanism, we shall be able to monitor resources consumption and environmental degradation information over time, and adjust the speed and mode of urbanization to avoid over-consumption and over the environmental carrying capacity. In general, for regions with relatively abundant resource supply and generous environmental carrying capacity, urbanization can speed up accordingly; while for regions with limited resources and environment capacity, urbanization shall slow down to ensure the development is within the limits. For regions with low resource and environment capacity, yet still urbanize fast by encroaching into other region's resource and environment basis, we shall stop the urbanization process, and transfer (dynamically) the population that is over the capacity to other regions with relatively higher capacity. This dynamic transfer mechanism shall be able to ensure that urbanization across the entire nation is within capacity hence sustainable. In the meantime, it is also important to actively

establishing storage system for strategic resources and protection system for the eco-environment to further improve the resource and environment security for urbanization.

Looking to the future, China is bound to be a highly urbanized country. To ensure such high level of urbanization to be prosperous and sustainable, urbanization shall always proceed within the national resource and environmental carrying capacity and support capacity.

1.4 The Paradox of New Urban District Construction Versus New Urbanization

China is now in the rapid urbanization stage. Under the principles of New Urbanization, China's urbanization will be efficient, low-carbon, ecological and environment friendly, creative, intelligent and peaceful. On the other hand, land shortage is almost inevitable. Under such circumstances, some regions attempt to obtain more lands via development of new city districts [15]. As a matter of fact, the success of Shanghai's Pudong New District development encouraged other regions to follow suit, which led to a boom of new urban district development across the nation [16]. On one hand, new urban district development indeed addressed largely the urgent land shortage issue. On the other hand, however, the somewhat blind mimicry also exposed many practical issues that need to be taken care of. As of the time of this writing, we believe there is more than enough new urban districts development than needed and sustainable. Yet many regions are waiting eagerly for the new National Urbanization Development Plan to be issued so that they can propose for more new urban district development via the excuse of promoting New Urbanization. Most of such new urban district development proposals lack top-level planning and design. Some new urban districts were never fully developed after being approved. Still, local governments are proposing for more new urban district development plans nonetheless, attempting to obtain more land in so doing. Apparently, the mindset of "more is better" without tailoring to local conditions is behind this zest of new urban district development, which needs to be curbed in case the New Urbanization falls back to the old urbanization tracks. In this concluding section, we'll outline the new urban district development in China, its current status, development mechanism and ways to guide this development to be within the sustainable New Urbanization principles.

1.4.1 The Great Achievements of New Urban District Construction in China

Starting from the construction of Pudong New District, Shanghai, new urban district construction has served as an extremely important component of the New

Urbanization, and has contributed significantly to China's industrialization and urbanization. Specifically, this can be explained in four aspects.

1.4.1.1 Construction of the New Districts Provides Accommodation for the Increasing Population and Improved Urban Living Conditions Considerably

One critical contribution of the new district construction is that it solves the immediate problem of the contradiction that there are more than enough job opportunities but less than enough living spaces in cities. This is especially true in Shanghai prior to the Pudong New District opening to business. As of now, Shanghai's Pudong New District gathered 5.452 million people, accounting for 22.9 % of Shanghai's total population, and is now the largest district in Shanghai. Chongqing, another provincial level municipal, experienced similar success in new district construction. As of 2013, the Two Rivers New District has gathered 2.97 million people, and it is planned that over half of Chongqing's 30 million population will be living in this new district. In Tianjin, yet another provincial level municipal, its Binhai New District gathered 2.55 million people, accounting for 18.2 % of the municipal's total population. Examples as such are abundant in China during the past decade. These newly established districts attract both population and job opportunities, contributing significantly to local economic development. Comparing to the old districts, these new ones often have higher standard and better infrastructure, which improved the living conditions dramatically.

1.4.1.2 New Districts also Promotes Urban Industrial Transformation and Upgrading, Improves the Efficiency and Quality of Urban Development

The above mentioned Pudong, Binhai, and Two Rivers new districts are the new growth poles for Shanghai, Tianjin and Chongqing. Their success enables them to become national level strategic locales for new, high-tech, and advanced manufacturing industries, and modern service industry clusters, innovation demonstration areas and experimental free trade zones. They are indeed the new portals, new bases, new experimenting areas and new engines to cities' development, and contribute significantly to national economic development and the cities' economic transformation and upgrading. For instance, in 2013, GDP in the Pudong New District accounted for 30 % of Shanghai's total, with 2.6 % more developing rate than the municipal total. Import and export accounted for 56.6 % of the municipal total, with 2.9 % more increasing rate than the municipal. Similarly, GDP in Tianjin's Binhai New District accounted for 55.8 % of the municipal total, the growth rate was 5.0 % more than the municipal average. Import and export accounted for 69.6 % of the municipal total. Although Chongqing's Two-River New District's GDP accounted for 13.03 % of the municipal total, its growth rate

was 3.7 % more over the municipal growth rate. Apparently, many such new districts act as the vanguard for urban socioeconomic development, and will continue to do so in the foreseeable future.

1.4.1.3 Urban New Districts Effectively Shared Many of the Old Cities Functions, Mitigating the Increasingly Severe "Urban Diseases"

During the economic globalization and ensuing rapid urbanization, cities in China, especially large and mega cities have attracted huge amount of migrants. Fast population growth quickly saturated the capacity of cities' infrastructure, such as housing, transportation, environment capacity, energy supply, health care, and public safety measures. The imbalance between fast growing population and limited and slow growing urban infrastructure capacity created the so-called "urban diseases," mostly manifested as traffic congestion, housing shortage, environmental pollution, and increasing difficulties to get necessary public services. Construction of new urban district provides an immediate solution to all these issues via providing much needed urban infrastructure and functions. More importantly, via active interaction with the old city districts, the new districts are even able to facilitate industrial upgrading in the main cities, providing a quick remedy to urban diseases and promoting possible sustainable urban development.

1.4.1.4 New Districts Expand the Urban Development Space and Optimize the Urban Spatial Structure

New urban districts, if planned appropriately and built scientifically, will provide spaces to accommodate increasing urban population, create job opportunities, ease overburdened urban functions, and improve urbanization quality. Moreover, the added spaces of the newly constructed urban districts enable more beautiful urban ecological spaces, more compact and efficient production spaces, and more comfortable living spaces. Apparently, successful implementation of new urban districts is able to expand the development potential of the old cities, and provide physical spaces for sustainable urban future.

1.4.2 New Urban District Construction Characterized as "Too Much" and "Too Big"

One critical point that needs to be stressed here is that successful implementation of new urban district construction requires one essential resource, namely, available lands. At least with the current science and technological development, all new districts must consume certain amount of land, which might not be available

everywhere or every-when. One prominent issue in China's urbanization is that one good example could generate a style or trend for many to follow, regardless of local conditions and restrictions. This is unfortunately the case for new urban district constructions, while Pudong, Binhai, Two-Rivers seemingly tell successful new urban district stories, everyone else is eager to follow suit, which eventually leads to more problems than solutions.

1.4.2.1 New Urban District Often Suffers from Being "Too Big" and "Too Many"

Oftentimes, construction of the new urban districts lacks scientific planning and rational guidance. As a new approach to mitigate increasingly severe urban diseases, urban new districts construction became a primary source to support urbanization and economic development after the economic reform and open door policies were issued in 1978 [17, 18]. By the end of January, 2014, there were 106 various new urban districts under construction (Fig. 1.9). Among them 13 were approved at the national level, 38 were approved at the provincial level, and 64 were approved at the municipal level. 19 such new districts occupy total land area over 1000 km^2 each, 10 are within 500–1000 km^2 and 40 are within 100–500 km^2.

At the national level, there were only 3 new urban districts approved prior to 2010, namely, Shanghai's Pudong New District (1992), Tianjin's Binhai New District (2006), and Chongqing's Two-Rivers New Districts (2010). The Zhoushan Islands New District in 2011, and Lanzhou New District and Nansha New District in 2012, and Xi'an-Xianyang New District and Guiyang-Anshun New District in 2014 were added afterwards in a hope to replicate the successful experiences in the three previous new districts. At the provincial level, Henan province is among the most active. From February 2010 to January 2013, in less than 3 years, there were 14 new provincial districts approved. With the existing Zhengzhou and Luoyang new districts, there were 16 approved new urban districts in Henan Province alone (over 40 % of the national total).

Except for Beijing, all the provincial municipals have their new urban districts. In addition, the Separately Listed Cities and Capital Cities have their own new districts. Most prefecture-level cities and even some county-level cities either had new urban districts or are in the process of considering the construction of new urban districts. Not only are many cities seeking to expand their development spaces via the proposal and construction of new urban districts, but also do the ones that have already got approved seek further expansion of their new districts. From our field survey, we found that the Lanzhou New District, with 806 km^2 approved land area, started to ask for more in less than a year. This is not unique in Lanzhou, however, many cities deem new urban district construction as a golden opportunity to expand their urban spaces, hence accelerate their urbanization rate (again, a typical "more the better," "quantity over quality" mindset from the planned economy legacy). Some cities even have more than one new urban district. The planning and implementation of these new urban districts often lack scientific feasibility

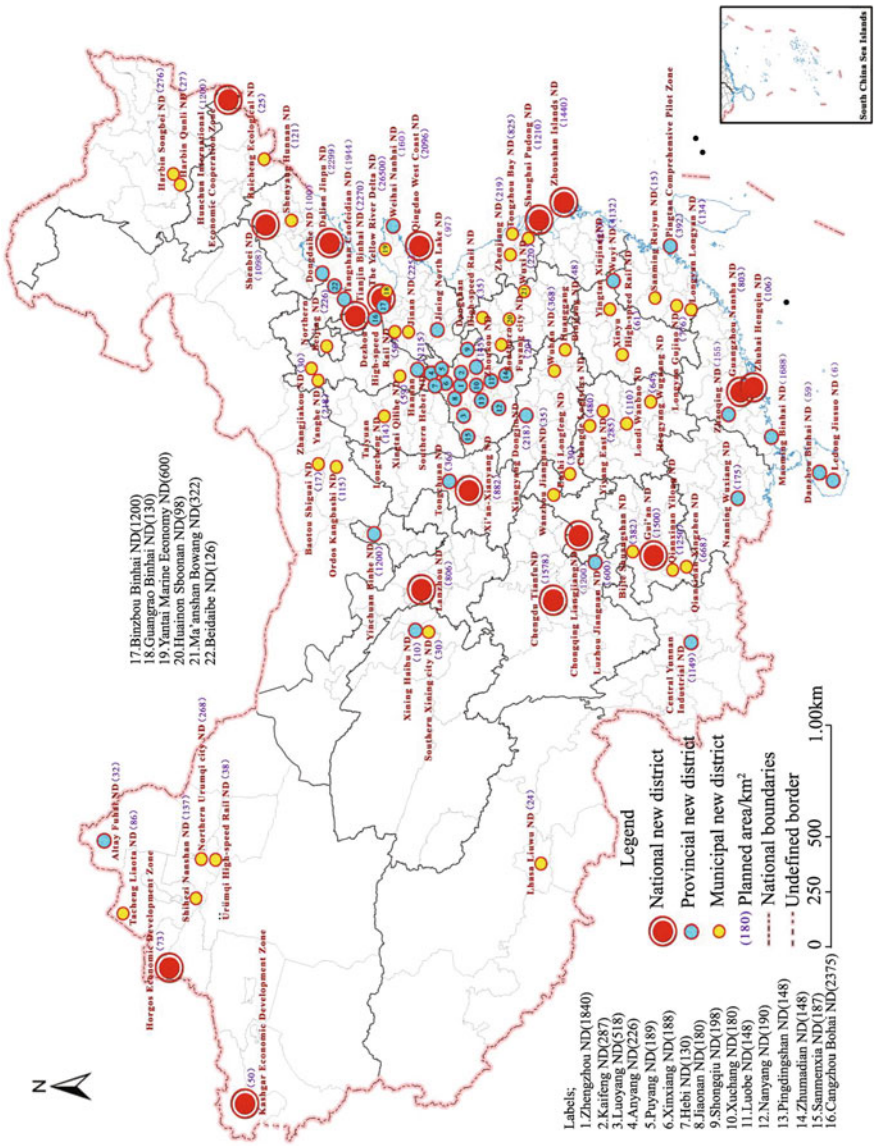

Fig. 1.9 Latest distribution of new district (ND) construction in China

studies and appropriate evaluation and guidance. The immediate consequences are that there are more new urban districts than needed. The new districts are often under-constructed, lacks in necessary urban infrastructure and public services. In some extreme cases, the new urban districts became not a solution to the existing urban diseases, but part of the diseases themselves in that they led to real estate bubbles and forced the local governments to be heavily dependent on land finance. Moreover, construction of new urban districts also over-consumed very limited land resources. Some of the new urban districts were actually not necessary as there really weren't many urban diseases or needs for expansion, which renders these new districts to be approved and abandoned. In addition, since there wasn't strong demands for a new urban district, many such new districts were often left empty of people, economic activities and urban infrastructure constructions.

1.4.2.2 Many New Urban Districts Tend to Ask for More Land

It seems to the local municipal governments that new urban districts construction is one great way to acquire as much as possible land resources for rapid urbanization regardless of whether such expansion is needed or even possible considering the resources and environmental capacity. Up until now, there is over 73,000 km^2 land that has been approved for new urban district construction, which is almost twice the land area than the existing urban proper area in China (38,000 km^2). By the end of 2012, there were 30 new urban districts that had land areas over 400 km^2, 20 were over 1000 km^2. Among them, the Yellow River Delta Efficient Ecological Economic District (New District) is the largest with a total land area of 26,500 km^2. Among the 20 new districts that are over 1000 km^2, 13 are in the eastern coastal regions, 6 are in Western China, only 1 in Central China, which does agree with the general urbanization spatial pattern that the eastern coast develops far more rapidly than the rest of China.

In the constructed new urban districts, the areas tend to be too large as well. For instance, in 2010, the planned Jinan New District of Hebei Province eventually covers 1215 km^2. Chengdu's Tianfu New District (planned in November, 2011) reached 1578 km^2. The Guizhou-Anshun New District (planned on March, 2012) was 1500 km^2. Maomin Binhai New District (planned in April, 2012) was 1688 km^2. Dianzhong Industrial New District (planned in October, 2012) was 1149 km^2. Guizhou Yilong New District (planned in November, 2012) was 1324 km^2. Yinchuang Binhe New District (planned in March 2013) was 1200 km^2. Fuzhou New District (planned in January 2014) was at least 2500 km^2, which is more than tens of times that of Fuzhou city's proper area.

1.4.2.3 Construction of New Urban Districts Often Is Too Hasty

Sometimes the urban Master Plans have to be forced to accommodate to the new districts to legalize its existence or associated activities. Since most new urban district eventually exceeded the approved land area limits, the local governments

have to "repair" their Master Plan to legalize the exceeded land area. In so doing, it often makes the new urban districts larger than the old cities, wasting limited urban land resources. For instance, the Datong Xudong New district construction (approved for 42 km^2) reached 180 km^2, which is even more than the 127 km^2 land use limit by 2020 approved by the State Council. To legalize the exceeded land use, in 2011, Datong city "repaired" its Master Plan, and adjusted land use standard by 2020 to be 195 km^2. Such "forced repair" of the Master Plan is not unique in Datong, but becomes a semi-standard way to attempt to accommodate unsustainable activities to the legal framework, which strongly suggests that legalizing and enforcing urbanization related land use and construction legislation is imminent and critical. Otherwise, sustainable urbanization will become just words.

1.4.2.4 The Construction Systems of the New Urban Districts Are Often Rather Complex, and Often Contradict with the Main Cities and Their Functions

The general developing mode for new urban districts follows a standard procedure. First, some city development and investment company (owned or share held by the local governments) served as a principal investor. The Party Committee and Management Committee were established as government agencies to manage and give land acquisition, bank credit, tax and other financial benefits and support policies to these investors. In reality, there are different management modes, which often have rather complex relationships with the main cities. Most new urban districts broke the original administrative divisions, complicating the coordination between the new districts and the main cities. Such complication somehow intensified the conflict of interests and management between the new and old urban districts. From a geographical point of view, the majority of China's existing new urban districts are close to the main city to maintain close ties with the divisions and functions. There are also the so-called "enclave" new urban districts that are far from the main city, such as the Ordos Khambashi District, Lanzhou New Area etc., mainly due to the lack of land resources in the immediate vicinity. From the perspective of administrative division, there are a few different modes between the new and old urban districts. The first is the "one" mode, such as Shanghai Pudong, Tianjin Binhai, Zhousan Islands, etc., that the new districts are but newly added districts of the main cities. The second is the "nested" mode in that the new districts are actually within existing old districts, such as East Zhengzhou New District, West Teilin New District. The third is the "integrated" mode because the new district actually is a combination of different parts of various existing districts, such as the Two-Rivers districts, which contains part of Jiangbei, Yubei, and Beipei districts; or Xi'an-Xianyang and Tianfu New Districts, both covers over multiple existing counties, municipals and districts.

1.4.2.5 New Urban District Constructions Are Often Mistaken as People-Oriented Platform for New Urbanization

Many local governments are still mistakenly believe that the New Urbanization is to "rush" the farmers into the city, which would mean more land will be needed for construction, and the added construction land means that new urban districts are needed. Following this train of thoughts, the local governments hence believe building new urban districts is the Silver Bullets to promote New Urbanization. Such outdated thinking patterns of urbanization naturally led some local governments eagerly to be included in the national pilot projects of New Urbanization. They would attempt to advance their urbanization level by expanding on new urban districts via being in the pilot projects. Once the State urban development plan was introduced, the local governments would begin to compile the overall urban planning or new master plan to expand the construction areas. Some local governments even consider New Urbanization as a "golden opportunity" to acquire even more lands for urban uses. In so doing, construction of new urban districts is mistakenly considered important carrier and platform for "New Urbanization." Under the auspices of New Urbanization, the proposed new urban districts often consume large-scale land resources, which eventually results in large number of high quality arable land being occupied and wasted, and large number of farmers being driven into the city and became the so-called "three noes" farmers (no land, no job and no social security). Few have attempted to understand the connotation of New Urbanization from the start and even fewer treat the elevation of urbanization quality as a top priority. Apparently, these approaches are directly against the principles of New Urbanization as proposed in the Party's "Eighteenth Congress Report" to go intensive, green, and low-carbon, and actively and steadily push forward people-oriented development mode.

1.4.3 Reasons for Unplanned Constructions and Expansions of New Urban Districts

1.4.3.1 Analyzing the Principal Contradictions of Blindly Building and Expanding New Urban Districts

Construction of the new urban districts in China has entered a new stage. New urban districts are generally large in numbers, multi-level, and widely distributed. There was a certain degree of "new urban district frenzy." While we do admit the positive role of new urban districts construction in China's urbanization and urban development, we must also face the existing problems, attempt to solve them, and guide effectively the new urban district construction to achieve healthy and sustainable urban development. These problems are as follows.

First, some of the new districts are proposed and approved, but never get constructed, which are in direct contradiction to the land use master plan. In the new

round of new urban district construction, the planned new district area keeps increasing. Some even covers land that are more than the existing urban built-up area, reaching thousands of square kilometers; while still some also propose the development of multiple new urban districts at the same time. Some of these new constructions are inconsistent with either the overall urban planning, or the land use planning. Such constructions often take up a lot of agricultural land, arable land and basic farmland. Many large-scale new urban district constructions continue to follow the traditional "overspreading" type of extensive development mode, causing both the loss of arable land, and wasteful and inefficient use of land resources [19]. In addition, planning of large area new urban district often leads to the prevalence of occupying instead of building upon the lands. Many cities even seek favorable national policies in terms of taxation and land use etc. under the disguise of construction of the new urban districts, ignoring the global and long-term interests.

Second, the new districts tend to copy instead of extend the functions of the main cities, which is against the principles of the urban Master Plan. Many a time, constructing new urban districts in contemporary China is but a misnomer. "New" is not necessarily new in terms of supporting and complementing the main city. The "new" districts and the main cities have great resemblance. Construction of the new urban districts is largely just a strategic makeshift to ease the housing, transportation, and the enormous resources and environment pressure of the old town. The functions of the new districts and the main city are gradually converging. In the strict sense, it is hard to completely distinguish the new and the old. Apparently, this phenomenon is causing serious repeated construction and tremendous waste of resources, thus gives the local governments heavy burden on local finances, commuting, and management. Some of the new urban districts are far away from the city center, resulting in extended working related commute, increasing traffic pressure. For example, the Khambashi new district of Ordos is 30 km away from the city center, Dongsheng District. This separation results in a large part of the urban residents "living in the old district, but work in the new district." The situation has greatly increased the urban commuting time and urban traffic volume. Severe traffic congestion and car exhaust pollution are directly related with this scenario.

Third, the construction of the new urban districts is often ahead of being necessary, which then leads to severe waste of infrastructure capacity. Comparing to the enthusiasm of constructing new urban districts, oftentimes the total population size in the new urban districts is fairly small except for a few national level new urban districts. Most of them have population in the hundreds of thousands range. Some new urban districts have fewer than one hundred thousand people. In extreme scenarios, there are less than ten thousand people living in the new urban district. The small population size not only restricts the construction of transport, water supply, electricity, information, sewage and waste disposal and other infrastructure, but also causes the existing infrastructure to be wasted and inefficient. Moreover, the small population size doesn't help business, education, health care, catering, and entertainment facilities enter the new districts. It is also difficult to meet continuously expanding and upgrading consumer and service demands, resulting in a lack

of popularity and commercial atmosphere in a very long time, contrary to the goals of building the new districts to start with.

Fourth, the industrial foundations in the new urban districts are often too weak to support sustainable economic growth. For the new urban districts that are currently under construction, their industrial foundations fall within three categories. The first category relies on the industrial base of the main city and expands on it. The second category relies on various levels of industrial development zones. The third category has no industrial base, and needs to build their industrial systems from scratch. Although the local governments have formulated detailed development plans for the new urban districts, there are always uncertainty and risk factors in investment, industry selection, competition with the main city, etc. A considerable amount of the new urban districts have difficulty to form a competitive industrial system right away due to relatively poor infrastructure, lack of industrial supporting capacity, or poor correlation with existing industries. This creates a vicious cycle that the new districts cannot create stable jobs and attract enough people to stay, which causes the production and service functions hard to be developed, again this leads to the development of the new districts to be lack of intrinsic motivation and effective support [7].

Fifth, aimless investment and construction seriously increased local governments' debt risk. The development of the new urban districts involves a full range of infrastructure constructions, including land acquisition, house demolition, road construction, water, electricity and heat supply, information networks, sewage and garbage, ecological greening, etc. It will always generate huge demand for investment. At the same time, both developing new industries and upgrading traditional industries require large amount of capital investment, which requires the new urban districts to have innovative ways to attract them. Some cities frequently ask for several hundred million or even several hundred billion RMB Yuan to finance the construction and development of their new urban districts, far beyond their own financing capacity. This hence forces the cities to finance through local government financing platform companies, leading to explosive increase of such companies, soaring debt scale, and increasing risk of local debt. According to research statistics, as of the end of 2010, there were more than ten thousand local government financing platform companies. The local government debt balance was over ten trillion RMB Yuan. The large projects in the new urban districts often involve a long payback period of investment. Some industries and fields have large scale of debt liabilities. Some local governments are fairly weak in terms of revenue generation and assets realization. Still some local governments rely heavily on land transfer income to pay off the debt. Some even have to borrow new debt to pay off the old ones, inevitably increasing the potential risks of local governments' debt [19].

Our field studies found that many local governments applied the so-called Chinese-style urban development mode (i.e., selling the land and developing with debt) to the extreme. Some local government leaders do not have sufficient knowledge of the investment. Some projects were approved and launched without adequate scientific feasibility studies, creating many so-called "impulsive" new urban districts. Selling land usage to finance (land finance) new urban district construction has become a common development model in China in recent years. However, due to the

huge amount of required investment to successfully construct the new urban districts, land finance alone is not sufficient. Loans and financing via other platforms are required, which results in drastically increased debt risks of local governments. By the end of 2010, according to data released by the audit department, the debt ratio of many provinces may have exceeded 100 %. In 2011–2012 years, there are nine provincial capital city governments having debt ratio over 100 % that they are responsible to repay. The highest is 189 %, far exceeding the 20 % debt ratio suggested by the Audit Commission and international conventions. Other cities also have various debt ratio, but most of them are way above the 20 % cordon. For instance, the government of Datong has a debt ratio of 200 % due to construction of new urban districts. Xi'an Qujiang's debt ratio reached 66 %. Tangshan Caofeidian's new urban district has a debt over 60 billion RMB Yuan, resulting in forced shut-down of many large-scale projects. The growing amount of local debt leads to increasing risk of debt crisis, which might further exacerbate the already tight capital chain to the breaking point. Proposing the mode of New Urbanization needs to pay very close attention to such potential crisis. After all, the bankruptcy of the US city, Detroit serves as a good example if we are not fully prepared.

1.4.3.2 Reasons Why New Urban District Constructions Are Often Too Large, and Too Rushed

From our studies, there are in general five reasons.

First, lack of authoritative regulatory agencies leads to too much freedom in proposing and launching new urban district constructions. One critical issue in China's new urban district construction is that many extensive and wasteful new city district construction plans still get approved without slowing down. This is because as of now, China doesn't yet have an authoritative regulatory agency to oversee new urban district construction. Questions like, "which cities really need to build a new district?" "how much should be built?" "where to build?" "which cities need to build national level districts?" "which need only provincial and municipal level districts?" "how many are needed?" and the like, were never asked, answered or monitored. Due to the lack of such authoritative agency to monitor and evaluate, answers to all the above questions are often determined impulsively by the local governments, with plenty of room for expansion discretion, which leads to very arbitrary and random decisions regarding new district constructions. The fact that many cities have to adjust (forced repair) their Master Plans after the new urban districts were built up is but one example of such arbitrariness and randomness.

Second, urban planning failure also leads to new urban district construction to bite off more than it can chew. Driven by a strong local government, many of the planning and design departments simply took orders from the leader's will without sufficient scientific analysis or feasibility studies. The so-called urban planning is but a reiteration of the new urban district that has been delineated by the government beforehand. Questions like how much is the reasonable size; how many people the new district will be accommodating, what will be the economic output,

and whether there is appropriate resources and environment carrying capacity, etc., were either never asked or ignored because the government doesn't have sufficient knowledge to care. In the planning and design process, the government often keeps changing the size and scale of the new district, sometimes even imposes personal intent, resulting in impulsive and failed planning which eventually leads to the new district construction to be out of control.

Third, local governments rely too much on land financing, which also expedites the new district construction. Our studies found that, under the existing fiscal system, about 30–35 % of prefecture-level cities' revenue, and about 50–70 % of the county-level cities and county's revenue comes from land and real estate development income. This is typical land finances. Once the government stops to transfer land usage right, the government could be "weaned" and the local fiscal system could even crash. In order to avoid financial crisis, the government will do everything possible to sell the land through a variety of ways. Since the old town often has very little land to transfer, developing new district become a natural choice, which also leads to rapid construction of new urban districts. From this aspect, it can be seen that a vicious cycle of land finance dependence and the debt crisis is the fundamental motivation for building more and big new urban districts.

Fourth, the regulatory loophole also encouraged and spawned the constructions of new urban districts. The national New Urbanization plan proposed that by 2020, the average national urbanization level will reach 60 %. To provinces, cities and counties that currently have lower urbanization level, 60 % became a benchmark. The simplest way to reach the benchmark, to these local officials' understanding, is to quickly move the farmers into the city, which makes construction of the new urban districts necessary. In general, there are two ways to increase construction land: The first is a proper way by revising the overall urban planning, which is regulated by *Town and Country Planning Act*. Once the revision is properly evaluated it can be determined whether it will be approved. Even if it is approved, the revision cycle is long, slow, and the total increase is limited (this is because during the planning period, new construction land area cannot exceed 20–30 % of the current built up area). So the proper way was rarely used. The second way is to bypass the *Town and Country Planning Act* and other regulatory constraints, the government will determine the revision in the form of the minutes of government executive meetings. The decision to start building all types of new districts will then need no assessment, no approval, everything is then "what they say goes." This government monopoly procedure of first acquiring and occupying the land, then attract the investors, and then start the production, and finally fill out construction land approval procedures is the very source of all of the chaotically proposed new urban district construction. If this loophole was not blocked, the chaotic and blind expansion and construction of new districts would not stop [20].

Fifth, the impulsive action due to performance evaluation and the inertia thinking of image project also facilitate the chaotic launch of new urban districts. For a relatively long period of time, China's cadre performance evaluation and career advancement are closely associated with major economic data and economic indicators. Driven by this evaluation mechanism, the inertial thinking of

government-led district construction was deeply ingrained. Under such mindset, many governmental leaders dare to make final decision of new construction without proper analysis and feasibility study. Some might even stuck in a "vicious circle" of expanding the new construction and finding ways to financing it. In addition, various administrative units (at the same level) tend to compete with one another in terms of new district construction without any consideration of local conditions. They often treat the construction as image project, "number 1 project," and even "political tasks." This leads to the new district construction to be severely detached from reality, and causes serious waste of land and financial resources.

1.4.4 The Scientific Path for Appropriate New Urban Districts Construction in China

From the above discussions, we can see that new urban district construction is an important means of promoting the New Urbanization, but not the only means. For successful and meaningful construction of new urban district, we need to plan from the national strategic level with scientific guidance and propose rational distribution. Construction conditions vary widely across cities in China. The imbalance is very prominent. It is then necessary to prohibit a "one size fits all" strategy in constructing the new urban district. On the other hand, however, random and arbitrary construction needs to be curbed as well so that the new urban district will not become another excuse for local government to exploit land finance. To achieve such goals, we propose six approaches and suggestions.

1.4.4.1 Establishing a National Level Comprehensive Evaluation Agency and Mechanism for New Urban District Construction, with Strict Examination and Approval Procedure that Everyone Must Follow

From a strategic perspective of the security of national socioeconomic development, a good and uniform national top-level planning and design procedure for new urban district construction is critical. Important questions such as how many national level new urban districts are really needed from the perspective of the whole country; what would be the construction standards; and what national and/or regional functions the new districts will be charged with, shall be considered prior to launching any new constructions. We hence recommend the establishment of a review mechanism and comprehensive assessment review committee for new urban districts. The primary tasks for the committee are to evaluate the necessity, rationality and feasibility of constructing new urban districts based on rigorous scientific principles and analyses. The committee will generate reports to provide decision support as to which new district constructions shall be launched, and

which ones shall be put on hold. In addition, the committee will also provide suggestions to the goals, scales, strategic layouts and investment priority for the national level new districts. Each province can establish similar review mechanism and provincial level review committees to determine the goals, scales, spatial layouts and investment priority for the provincial level new districts. In so doing, the local governments can avoid the commonly existed "impulsive" decision as to whether new districts shall be constructed or not. We must learn the lessons from Caofeidian, Hebei Province's failure to ensure that constructions of the new urban districts are well managed and under control.

1.4.4.2 Develop Practical Measures for Rectification of the Various New Districts that Are Either Under Construction or Planned to Be Launched

China is now facing a new wave of "expanding and launching new districts," which would eventually lead to various problems as outlined previously. To avoid such consequences, we suggest that governments at various levels shall follow strictly the review reports produced by the comprehensive assessment review committee for new urban districts. They shall take timely measures to straighten out various new districts based on the needs of urban and industrial development, and local resources and environment carrying capacities, be they under construction or planned to be launched. If the new districts are deemed worth constructing, their functions, construction scales and leading industries shall be determined based on scientific analyses and feasibility studies. The new districts shall be included in the land use planning and urban master plans in strict accordance with *Land Management Law* and *Town and Country Planning Act*. Construction of the new urban districts shall be precisely converged to the build-up area as outlined in the urban master plans. For any new districts that exceed the prescribed area, they must be rectified within set period of time. For any new districts that are about to exceed the planned area, their construction shall be stopped immediately. The individuals who ignore the carrying capacity of regional resources and environment, enlarge at will the construction area, arbitrarily acquire the basic farmlands or change the basic farmlands to be regular farmlands and then acquire them for new urban district construction will be punished accordingly. To ensure that the insurmountable red line of 1.8 billion mu basic arable lands will not be encroached, we propose that the urban planning and land administration departments at all levels apply strict measures on land use change clearance and expansion, and implement the most stringent land management system. The measures must be strictly followed and independent from the leading officials' personal influence to prevent them from occupying land for new district construction or changing counties (rural administration) to districts (urban administration) based on the excuses of rural-urban integration or practicing scientific development. In so doing, the measures will also prevent the leading officials from depriving of the rights for development of the

grassroots local governments, and the so-called "building but not operating, occupying but not using" phenomena from happening.

It is absolutely critical to further unify and clear the type and definition of urban new districts. Strict measures must be taken to prevent arbitrary set-up, claim or rename new urban districts at various levels. In addition, it is also necessary to establish scientific processes and approval procedures, and stress the importance of assessment and public announcement for developing new urban districts. Higher level governments shall take necessary responsibility to approve and monitor the applications for new urban districts constructions. In principle, only the State Council and provincial governments shall have the authority to approve or disapprove proposals for new urban districts construction. Other levels of governments shall not have such authority. In so doing, we are able to control the number of new urban districts from the institutional perspective. Governmental departments of planning, land, environmental protection, industry, development and reform at the same level shall establish a consultation and countersigned system. The supervision functions of the same level People's Congress, People's Political Consultative Conference, social organizations and news media need to be strengthened to ensure the democracy of new urban district construction, hence improve the quality of the approved ones.

1.4.4.3 Scientifically Plan the New Urban Districts, Follow the Principles of "Launching if Needed, Implementing Within Limits, and Building According to Available Land"

On one hand, we suggest the central government compiling a national level master plan for new urban districts, completing its top level design, strictly setting up the scale and number of new urban districts at various levels. On the other hand, the national level comprehensive review assessment agency shall be able to determine the cities that are in urgent need for new urban districts under the guidance of the master plans. They shall then be able to provide high standard scientific plan suggestions for those cities. Under the guidance of such plans, it shall be possible to properly handle the industrial spillover and expansion, functions complementation, transportation connection, population diversion, and interdependence of infrastructure and public service facilities between the old and new urban districts. The plans shall also provide guidance to deal with the complex administrative relationships between the old and new districts to prevent the recurrence of the phenomena that "new districts empty out the old cities or new districts become empty cities." [21]

One important point for new urban district construction is that it can serve as an important experimental platform to coordinate the so-called "three-planning," namely, regional development planning, land use planning and urban master planning. Successful implementation of the new urban districts will provide promising guidance to mitigate the lack of coordination among the "three-planning." It will also suggest new approaches and technology paths for

coordinated guidance of urban new district construction, and eventually improve the industrial concentration and land use intensiveness in the new urban districts.

1.4.4.4 Optimize the Construction Land of the New Urban Districts by Rational Use of Land Change Link Mechanism

Land change link mechanism was originally designed to promote coordinated development of urban and rural land use changes, improve the land use efficiency and mitigate urban land use shortage. It was misused, however, by some local governments as an important mechanism to change the new urban district areas arbitrarily. Using this land change link mechanism, some local governments pour all the vacated lands from the county-level cities and townships towards new urban districts, which somehow induces the land use conditions for new urban districts. We suggest that the local governments using such mechanism reasonably. Instead of concentrate all the newly added lands onto new urban districts construction, they shall be reasonably reallocated among the new urban districts, county-level cities, townships and even rural communities.

The new urban district construction shall effectively integrate the various scattered land use functions. This way, it will be able to properly deal with the prevailing problems of extensive land management and low extent of spatial accumulation in new urban district constructions. The spatial distribution of the new urban districts shall follow the principles of relative concentration with proper dispersion, and utilizing the public transportation to guide urban development [22]. In addition, the new urban district construction shall follow a smart growth mode that emphasizes on mixed land use and intensive development strategies, and focuses on compact urban construction land planning. New development should make full use of existing urban space and strengthen the redevelopment of existing built-up areas. In so doing, it is able to reduce the cost of infrastructure and public service facilities, and protect open spaces. By integrating various types of urban land, building compact new districts, it shall improve the efficiency of intensive land use for the new urban districts [23].

1.4.4.5 Build the New Urban Districts to Be an "Integrated City and Industry" Area

For a long time in various cities in China, the various industrial development zones are often built with a general lack of personalized services and residential functions. Such zoning setup hardly satisfies the citizens' overall development needs, and is also not conducive to intensive and economical use of land resources. The new urban district is not a development zone. Construction of the new urban district shall take the route that integrates urban and industrial, housing and working, and focus on the coordinated development of urban functions and industrial capabilities. The new urban districts will eventually become an integrated space of New

Urbanization and new industrialization. Experiences from overseas suggest that industrial development is increasingly valued as a primary support for urban development. For instance, new urban districts in London, Tokyo, Hong Kong, Paris and many other cities have developed under the government planning guidance to become new cities with strong industrial capability. Development of the new urban districts needs to quickly form integrated urban community functions. The core is to promote industrial growth within the city. Therefore, we must cultivate the industrial clusters of the new districts for the agglomeration effect and build the core area for the new urban district development [24]. The new urban district should be committed to developing modern tertiary industry such as real estate, finance, insurance and consulting, and high-tech industries. In the meantime, the new urban districts shall also promote the upgrading of existing industries and become the city's new economic growth pole.

1.4.4.6 Establish a Scientific View of Political Performance; Curb the Political Impulse to "Hasten" New Urban Districts

For a long time, driven by the economic indicators, and the one-sided view of achievements and evaluation mechanism, the inertia thinking and practices of government-led impulsive urban construction are yet to be broken. In order to curb such trends of blind and impulsive construction, we propose to reform the current performance evaluation system. Combined with the ongoing practices of mass public education, and the democratic meetings among various levels of government leaders, it is important to change their perspectives of political performance. In so doing, it is hoped to convert the negative effects of the impulse to positive energy to promote scientific development and improve citizens' livelihood. If we are able to correctly understand the connotation of "people-oriented" nature of the New Urbanization, rationally, gradually and orderly guide the construction of the new urban districts, gradually defuse the debt risk for local governments, and continually improve the quality of urban development, construction of new urban districts will then play an important role in promoting the New Urbanization in China for the following decades.

References

1. Fang Chuanglin, 2013. Debate of "pseudo-urbanization." China reform, 4: 44–46.
2. Fang Chuanglin, Fang J W. 2013. Understanding the resource and environmental bottlenecks in the process of urbanization. Chinese national conditions and strength, 243(4): 33–34.
3. Fang Chuanglin, Lin X Q. 2009. The Analysis on the Coupling Relationship between Urbanization and Eco-environment and the Eco-environmental Guarantee. Journal of geographical sciences, 19: 95–106.
4. Fang Chuanglin, Liu X L. 2008. Rectification of China's urbanization development stages and analysis of its geographic distribution. Geography of arid region, 31(4): 512–523.

5. Fang Chuanglin, Ma H T. 2013. New urban district construction and intensive land use in China under the background of new urbanization. Chinese land science, 27(7): 4–10.
6. Fang Chuanglin, Ma H T. 2014. New urban districts: how to make the city a better place. Guangming Daily, July 1.
7. Fang Chuanglin, Yang Y M. 2012. Self-immolation triggered by urban demolition and its prevention strategies. Urban and rural planning, 2: 33–37.
8. Fang Chuanglin, Liu X L. 2009. Analysis on dynamic differences and imbalances of regional urbanization level in China. Journal of geographical sciences, 19:643–656.
9. Fang Chuanglin. 2009. China's urbanization and urban development after 30 years of reform and opening up. Economic geography, 29(1): 19–26.
10. Fang Chuanglin. 2009. Resources and environmental protection issues and suggestions in China's rapid urbanization. Journal of Chinese academy of sciences, 24(5): 468–474.
11. Fang Chuanglin. 2010. Report on China's urbanization and resources and environmental security. Beijing: Science Press.
12. Fang Chuanglin. 2010. Urban sub-healthiness. People's forum,6: 7–8.
13. Fang Chuanglin. 2011. Reflection and warning of the sub-healthiness of China's urbanization process. Modern urban studies, 59(8): 6–11.
14. Gao B, Ge Y, Huang X J. 2002. Policy recommendations and strategies for new urban district development. Nanjing social science, 11: 13–18.
15. Gao G L. 2012. Scientifically manage and guide the development of new urban districts. China development observation, 12: 36–39.
16. Hu J T. 2012. Unswervingly advance along the socialism with chinese characteristics, and working hard to build a well-off society. Beijing: People's Press.
17. Liao H Z, Zheng C M. 2003. Urbanization in Western China – research report of Yunnan's urbanization and economic development. Beijing: Science Press.
18. State Bureau of Statistics. 2012. China's Statistic Yearbook 2012. Beijing: China Statistic Press.
19. Wang H. 2011. Discussion of urban new district construction under the rapid urbanization. Engineering and construction, 25(4): 451–453.
20. Wang Q. 2008. Discussion on large public facility–oriented new urban district development. Modern urban studies, 11: 47–53.
21. Yan Y. 2010. Launching if needed, building according to available land–Professor Fang Chuanlin's view on new urban district construction. China Land, 8: 11–14.
22. Zhai W X, Huang X J, Zhang, Q, et al.. 2006. Study on intensive land use in urban development zone–case study of typical development zones in Jiangsu. Resource science, 28 (2): 54–59.
23. Zhu M Y, Zhou C S. 2012. Studies on the evolution, characteristics and mechanism of urban new districts since the reform and opening up. Modern urban studies, 9: 80–85.
24. Zhu M Y. Zhou C S. 2013. Research on the development of urban management and spatial organization in China. Tropical Geography, 33(1): 56–62.