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Viewpoint

Challenges and the way forward in China's new-type urbanization

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ABSTRACT

China's urbanization has been a notable global event. The National New Urbanization Plan (2014–2020) unveiled by the Chinese Central Government revealed a new path for urbanization that accommodated unique Chinese characteristics. The most notable aspect was the transfer from land-centered urbanization to people-oriented urbanization. Given that land urbanization was the key to the previous orbit, this manuscript aims to analyze the evolution and challenge for land-centered urbanization, and way forward for people-oriented urbanization in China. With increasing urban populations and expanding industrial activities, China has experienced vigorous land urbanization and an uneven population distribution pattern since 1978. Land-centered urbanization has created some economic and social benefits, but has also posed many adverse impacts. The issues of the loss of arable land, the phenomenon of "ghost cities," and the urban heat island effect have become critical challenges. Eight suggestions from two perspectives are recommended in this manuscript for achieving new-type urbanization in China. We should give priority to this issue of the citizenization of peasant migrants. Government, scientists, and the public can all combine to influence the development trajectories of China's new-type urbanization.

China's urbanization has been a momentous event that has attracted wide international attention (Yang, 2013). In March 2014, the Central Committee of the Communist Party of China (CPC) and the State Council jointly released a "National New-type urbanization Plan (2014–2020)" (Zhu, 2014). This was the first official plan to regard new-type urbanization as a national policy, and it pinpointed the problems that had emerged in the previous accelerated urbanization mode; this plan is expected to explore a new path toward sustainable urbanization. The most notable aspect is the transfer from land-centered urbanization (Long, 2014) to people-oriented urbanization. Given that land urbanization was key to the previous target, greater clarification is needed on the size, growth, distribution, and challenges in China.

1. China's land urbanization in the past three decades

Fig. 1 provides a timeline of China's land urbanization trends from 1981 to 2012. The main features can be summarized as follows: (i) China's rapid economic growth and dramatic urbanization process since its reform and opening-up brought immense urban land expansion. The total urban built-up land area expanded by 513%, from 7438 km^2 to 45 566 km^2, and the annual rate of increase reached 6% between 1981 and 2012; (ii) the urban built-up land area has grown faster than its urban population, and the increase has been particularly rapid since 2000, which implies that urban population density has been declining for the past 30 years, especially in recent years; (iii) the number of cities had reached 657 by the end of 2012, an increase of 431 compared to 1981 (NBSC, 2013). However, the growth rate was not identical between the two different periods. The salient turning point occurred around 1996, prior to which the number of cities had been rapidly increasing. Since 1996, the number of cities has remained roughly stable.

1.1. Urban agglomeration

In recent years, many emerging urban agglomerations, built with an increasing competitiveness, have expanded. In 2012, the total urban built-up land area of 22 urban agglomerates was 32 192 km^2, accounting for 71% of China's total urban built-up land area; however, the share of the total land area of these urban agglomerates, compared to the whole of China, was only about 22%. The three biggest urban agglomerates are Beijing–Tianjin–Hebei, the Yangtze Delta, and the Pearl River Delta. According to the "National New-type urbanization Plan," urban agglomerates in China will be developed as the main type of new-type urbanization in coming years.

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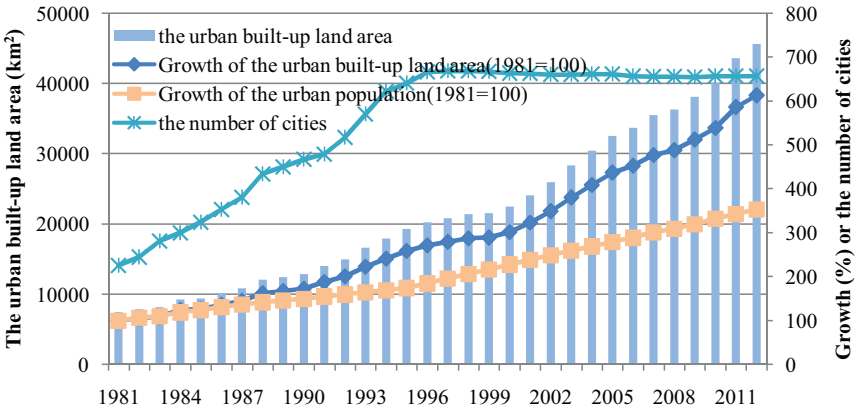

Fig. 1. Land-centered urbanization in the last three decades (NBSC, 2013)

1.2. Rank-size distribution

Lorenz curves were used to measure the inequality in the rank-size distribution of urban built-up land area. Fig. 3a shows a cumulative percentage curve of urban built-up land area on the vertical axis plotted against the cumulative percentages of the number of cities by rank size on the horizontal axis. The 45° line represents a perfect size equality of urban construction land in different cities. As shown by the features of the curves, the spatial distribution of urban built-up land area demonstrates inequality. The cumulative proportions of construction area in urban areas are 50%, 63%, 79%, and 89% at 11%, 20%, 40%, and 60% of the cumulative proportions of number of cities, respectively.

1.3. Four economic regions

China can be divided into four regions based on economic management systems: the East, the Northeast, the Central, and the West (Fig. 2 in Long et al., 2010, page 462). The East coast is a booming region with the fastest and highest rate of urbanization; it is also the most economically developed. Fig. 3b confirms that it is the most developed region of China, comprising 46% of the country's urban built-up land area, with 9% of the overall land. The Central and the West regions both accounted for 21% of China's urban area in 2012. The share of the Northeast was the smallest, at 12%.

2. Challenges facing China's vigorous urban sprawl expansion

2.1. China's vigorous urban expansion is facing three major challenges

First is the loss of a substantial amount of high-quality arable land, leading to risk associated with food security and safety. In 2012, the population of mainland China was 1.36 billion, accounting for 19.1% of the world total. China, having the world's largest population, and a per capita arable land far below the world average is therefore facing a great challenge of scarcity of arable land (Long et al., 2012). Accelerated urban expansion has further worsened the shortage. Even the strict arable land protection policies (the red line of 1.8 billion mu (a unit of area, 0.0667 hectares) of arable land and the balance of arable land requisition-compensation) aimed at preventing a decrease in the area of arable land, have not affected the growth of urban built-up land (Liu et al., 2014). These policies have had limited success in local implementation, and in some cases, adverse consequences have occurred (Chen, 2007). For example, it is common for high-quality arable land to become occupied and newly reclaimed arable land or inferior quality land to be given as compensation (Zhan You Bu Lie in Chinese). Increasing concern over food security and safety raised by land scarcity and land pollution is expressed in terms of soil availability for agricultural production, which has worsened due to the rapid urban expansion over the past three decades (Bai et al., 2014).

Second is the vigorously growing phenomenon of "ghost cities." Not unexpectedly, some "ghost cities" received a great deal of attention from the media for their empty apartment buildings and magnificent squares. For instance, the Kangbashi district began as a new urban project in Ordos, a wealthy coal-mining city. This area is filled with office towers, government buildings, theaters, new neighborhoods, and sports fields. The district was originally designed to house a million people, yet hardly anyone lives there (Michael, 2014). These "ghost cities" are a result of excessive housing supply and infrastructure construction outpacing the actual needs, along with business speculation on property demand. The emergence of ghost cities is a direct consequence of China's land-centered urbanization. This urbanization mode was rooted in unreasonable evaluation on local government performance based on a single index of local gross domestic product, which in turn resulted in aggressive development, and further induced social injustice and the financial risk of the real estate bubble. The question then became, how to tackle such daunting challenges facing China's current governments?

Third is the overall and continuously increasing influence of urban expansion on the urban heat island (UHI) effect and global warming. With a background of rapid urbanization and population agglomeration, numerous natural environments have been destroyed or modified in the creation of urban areas. Impervious surface area (ISA) is generally defined as any artificial surface resulting from urban development that water cannot penetrate. It includes roads, parking lots, building roofs, and others. The first global ISA spatial distribution at 1×1 km spatial resolution indicated that China has the largest ISA data in the world (Elvidge et al., 2007). Rapid urban growth is responsible for many environmental changes in the urban environment, and its effects are strongly related to issues of global climate change (DeFries et al., 2010; Chao, 2009). A remarkable phenomenon for urban climates is that the temperatures of urban areas and their surrounding regions are different. The acceleration of urbanization, such as increased ISA and population density, would increase the UHI, which in turn would significantly increase energy consumption and atmospheric pollution (Cocheo et al., 2000)

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