Environmental Development ∎ (∎∎∎∎) ∎∎∎–∎∎∎

Contents lists available at ScienceDirect

Environmental Development

journal homepage: www.elsevier.com/locate/envdev

Wasted cities in urbanizing China

Guizhen He [a,b,1], Arthur P.J. Mol [c,1], Yonglong Lu [a,*]

[a] State Key Laboratory of Urban and Regional Ecology, Research Centre for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, China
[b] The Earth Institute, Columbia University, New York, NY 10027, USA
[c] Environmental Policy Group, Wageningen University, Hollandseweg 1, 6706 KN Wageningen, The Netherlands

ARTICLE INFO

Article history:
Received 10 July 2015
Received in revised form
21 December 2015
Accepted 30 December 2015

Keywords:
Urbanization
Urban planning
Environmental impacts
Wasted cities
China

ABSTRACT

Urbanization is a characteristic of the 21st century, especially in countries with developing economies and a large amount of rural-to-urban migration. In China, the emergence of "wasted cities and towns" has paralleled urban expansion; large newly built areas that remain unpopulated and have created significant economic and social costs. We conducted a systematic investigation into the prevalence and geographical distribution of these "wasted cities and towns" through an analysis of spatially-detailed data from 1992 to 2014, and by estimating the environmental impacts of these "wasted" cities using available data in mainland China. Between 2008 and 2012, at least 28 ghost cities/towns were documented within 16 provinces, with severe effects on land use and the ecosystem, creating a waste of resources and energy. These cities contributed to poor air quality and climate change, and created unneeded construction and demolition waste. To prevent a further increase in wasted cities, and to turn existing ones into sustainable cities, China has to dramatically change its urbanization and housing policies in tandem with strengthening environmental policies, while taking long-term prevention and short-term execution strategies. Knowing how to manage the phenomenon of "wasted cities" in China is not just an environmental question, but also has strong effects on urbanization and sustainability. Developing reasonable management plans may establish an example for developing countries, and emerging economies in particular. The sustainability of urbanization might be affected if the problems identified here are not resolved. China's experiences with the environmental challenges of urbanization may provide valuable lessons for other emerging economies if the measures recommended here are implemented successfully.

1. Introduction

Half of the Chinese population currently lives in cities. The economic importance of China's urban real estate property market cannot be underestimated because it accounts for roughly 15% of the nation's gross domestic product and directly affects other sectors such as banking and construction. Because more than 75% of the Chinese population is expected to reside in cities within the next twenty years, the establishment of new cities and extension of existing ones is expected to continue. National and local policies have always 'guided' urbanization (Table S1), but only recently a national urbanization

* Corresponding author.
E-mail address: yllu@rcees.ac.cn (Y. Lu).
[1] These authors contributed equally to this work.

http://dx.doi.org/10.1016/j.envdev.2015.12.003
2211-4645/

Table 1
Main indicators of urbanization in China's National New-type Urbanization Plan for 2014–2020 (Issued by the Central Committee of the Communist Party of China and the State Council, March 16, 2014).

Indicator	Sub-indicator	Real status in 2012	Planning objectives in 2020
Urbanization level	Urbanization rate of permanent urban residents (the proportion of permanent urban residents to China's total population)	52.6%	About 60%
	Urbanization rate of registered urban population (the proportion of registered urban population to China's total population; registered urban population are those who hold a "hukou" under China's household registration system)	35.3%	About 45%
Basic public services	Rate of migrant rural workers' children achieving compulsory education		≥ 99%
	Rate of urban unemployed, migrant workers, and new comers to the work-force that received basic free vocational skills training		≥ 95%
	Rate of permanent urban residents that participate in basic endowment insurance	66.9%	≥ 90%
	Rate of permanent urban residents that participated in basic medical insurance	95%	98%
	Rate of permanent urban residents that live in indemnificatory apartment	12.5%	≥ 23%
Infrastructures	Share of public transport in cities with more than one million population	45% (in 2011)	60%
	Percentage of households coverage by water supply in cities and towns	81.7%	90%
	Percentage of urban domestic sewage treated	87.3%	95%
	Percentage of urban domestic garbage treated	84.8%	95%
	Broadband internet access of urban households	4 Mbps	≥ 50 Mbps
	Percentage of households having access to public service facilities in urban communities	72.5%	100%
Resources and environment	Urban developed land per capita (m^2)		≤ 100 m^2
	Percentage of urban renewable energy consumption	8.7%	13%
	Share of urban green buildings in all new buildings	2%	50%
	Ratio of urban green space to total urban space	35.7%	38.9%
	The percentage of cities (at and above prefectural level) where urban air quality attains the national standards	40.9%	60%

policy has been formulated aiming to create less one-sided and more balanced urbanization. China's official urbanization plan (The State Council, 2014), unveiled in March 2014, details ambitious goals for 2020 in steering the country's urbanization into a human-centered, urban-rural coordinated, and ecologically sound path (Table 1). However, an emerging phenomenon has arisen from this ceaseless urbanization, the sprouting of so-called "ghost cities/towns (or wasted cities)" across the country (Yu, 2014). The 2014 plan should also cope with an increasing number of ghost cities that have come into being along with rapid urbanization.

No generally accepted national inventory exists for the current and potential future wasted cities in China. The China Investment Times (*Tou Zi Shi Bao* in Chinese), a newspaper, has issued a 2014 Ghost City Index, listing 50 cities with a strong probability of becoming ghost cities (Su, 2014), while others have also listed existing ones (e.g. Table S2). In most countries (Thomsen, 2012) ghost cities are either *old* residential areas that had been constructed more than 30 years ago and were abandoned because the quality of life had deteriorated (Detroit, MI, USA being an important example), or rural villages – especially in poor, remote, and undeveloped regions – that have been depopulated following emigration to urban centers (Liu et al., 2011). Ghost cities in China are unique because they form a third type, which we label as wasted cities. Wasted cities are largely un- or under-populated and under-used *new* urban districts and towns that have generally never been inhabited after they were constructed. Only very rarely in other countries do a large number of new buildings (or complete neighborhoods/city districts) remain empty to the extent currently witnessed in China. In 2013, around 22.4% (49 million) of the newly constructed residential buildings in urban areas remained empty (China Household Finance Survey, 2014). Vacant apartments, buildings and neighborhoods come with poor or no public infrastructure, lack public services and therefore generate major economic, social, and environmental effects. The economic and social impacts include huge economic losses, property devaluation, governmental financial risks, deterioration in the investment environment, shrinking employment and labor markets, social injustice and protests, poor public health, and psychological effects (Batty, 2008; Chen and Wen, 2014; Lin and Chen, 2011; Yusuf and Saich, 2007).

Empty newly-built office buildings can be seen in many countries, especially after the financial crisis of 2007/2008. However, in very few countries one can identify large volumes of recently-built empty real estate. The rise of "wasted cities" in China has attracted global attention and incidental examples started to be reported in the Western media five years ago, with a fear that a collapse of the Chinese housing market may intensify the then-current world economic crisis and significantly prolong the world-wide recession, given China's increasing role as an engine of global economic growth. While China's leadership has placed Ecological Civilization on the top of its political agenda and aims to construct a "Beautiful China," the emerging ghost cities contrast this as they come with severe environmental costs as "wasted cities." In an unusual critical editorial, the official People's Daily railed against the wasteful trend for building new cities, stating, "Empty towns and wasted cities are redundant developments that do not generate much economic benefit…. They are a huge waste of resources which create debt pressure onto local governments" (People's Daily, 2013).

Please cite this article as: He, G., et al., Wasted cities in urbanizing China. Environmental Development (2016), http://dx.doi.org/10.1016/j.envdev.2015.12.003