

# The effect of land use planning (2006–2020) on construction land growth in China



Yan Zhou<sup>a</sup>, Xianjin Huang<sup>a,b,\*</sup>, Yi Chen<sup>a</sup>, Taiyang Zhong<sup>a,\*\*</sup>, Guoliang Xu<sup>c</sup>, Jinliao He<sup>a</sup>, Yuting Xu<sup>d</sup>, Hao Meng<sup>a</sup>

<sup>a</sup> School of Geographic and Oceanographic Sciences, Nanjing University, Nanjing 210023, China

<sup>b</sup> The Key Laboratory of the Coastal Zone Exploitation and Protection, Ministry of Land and Resources, Nanjing 210023, China

<sup>c</sup> School of Tourism and Urban Management, Jiangxi University of Finance and Economics, Nanchang 330013, China

<sup>d</sup> School of Territorial Resources and Tourism, Anhui Normal University, Wuhu 241000, China

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## ABSTRACT

Land use planning is a comprehensive instrument for managing non-agricultural land growth in China, and the evaluation of its implementation effect on growth control is of great significance for policy improvement. However, little empirical research has been done to estimate its implementation effect at the city level of the whole country. This study aims to evaluate the effectiveness of land use planning on construction land growth control at the city level in China. Taking 288 cities as the research object, an econometrics model was built to estimate the effect based on socioeconomic and land use data from 2006 to 2012. The results show that the implementation of land use planning has a certain effect in curbing the expansion of construction land, and that the incremental amount of construction land decreases by 107,449 ha due to the planning implementation. In addition, the implementation effect of land use planning presented significant differences among cities, which shows that there is a weaker effect in megacities and large cities than in medium-small cities. Besides, the implementation effect of land use planning also shows temporal differences: its effect is better in 2007–2009 than in 2010–2012. Furthermore, considering both planned goals and effectiveness, planning implementation is judged to be able to slow but not fully prevent the rapid expansion of construction land. Finally, to further improve efficiency and success, this research puts forward some suggestions such as improving the existing quota system, delineation of the urban development boundary and integrating the special plan system.

## 1. Introduction

Conversion of natural and agricultural land to non-agricultural use has become the major feature of land-use change in most urbanized areas of the world, especially in developing countries (Liu, Wang, & Long, 2008; Angel, Parent, Civco, Blei, & Potere, 2011; Lambin & Meyfroidt, 2011; Liu, et al., 2014; Zhong, Huang, Ye, & Scott, 2014). With its unprecedented economic development since 1978, China's urbanization level increased to 52.57% in 2012 from only 17.92% in 1978, which made China one of the fastest urbanizing countries (CSSB[a], 2013). The quick boost of urbanization caused a high rate and massive scale of construction land expansion, and the area of built districts increased by 7.73% annually from 13,148 km<sup>2</sup> to 35,633 km<sup>2</sup> during the 1990–2012 period (CSSB[b], 1991, 2013). It is estimated that China's urbanization level will reach 70% in 2035 (CSSB[c], 2008), which will further

promote the expansion of urban land. The rapid increase of non-agricultural land and quickly shrinking natural ecological space have led to serious socio-economic and environmental consequences (Foley et al., 2005), such as ecological environment deterioration, land erosion, arable land loss, traffic congestion, and housing shortages (Sarzynski, Wolman, Galster, & Hanson, 2006; Zhao et al., 2006; Kim & Pauleit, 2007; Schetke, Haase, & Kötter, 2012;), which are threats to regional sustainable development. To mitigate these negative effects and promote regional sustainable development, many countries have applied policy tools such as land use planning (Smith & Giraud, 2006; Halleux, Marcinczak, & van der Krabben, 2012), master plan (Sharifi, Chiba, Okamoto, Yokoyama, & Murayama, 2014), green belts (Keil & Macdonald, 2016), urban growth boundaries (Dempsey & Plantinga, 2013; Tannier & Thomas, 2013), zoning (Bourgoin, Castella, Pullar, Lestrelin, & Bouahom, 2012), market regulation (Brueckner, 1990), and

\* Corresponding author at: School of Geography and Oceanography Sciences, Nanjing University, Xianlin Avenue No. 163, Nanjing, Jiangsu, China.

\*\* Corresponding author.

E-mail addresses: [zhy555ylp@163.com](mailto:zhy555ylp@163.com) (Y. Zhou), [hxj369@nju.edu.cn](mailto:hxj369@nju.edu.cn) (X. Huang), [yichen@nju.edu.cn](mailto:yichen@nju.edu.cn) (Y. Chen), [taiyangzhong@163.com](mailto:taiyangzhong@163.com) (T. Zhong), [xuguoiliang210@126.com](mailto:xuguoiliang210@126.com) (G. Xu), [heliu2009cn@hotmail.com](mailto:heliu2009cn@hotmail.com) (J. He), [18900531575@163.com](mailto:18900531575@163.com) (Y. Xu), [menghao09@163.com](mailto:menghao09@163.com) (H. Meng).

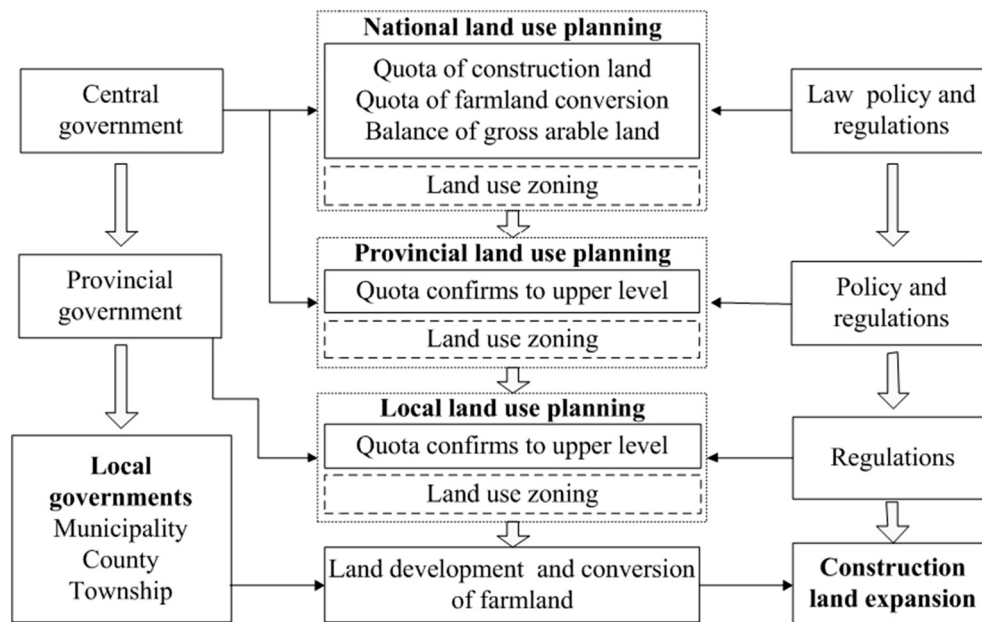


Fig. 1. Analysis framework for land use planning's effect on controlling construction land growth in China.

fiscal and taxation policies (James & Windsor, 1976; Anderson, 2005) to manage non-agricultural land growth (Fig. 1).

As one of China's growth management policies, land use planning plays an important role in controlling the expansion of construction land by regulating land use from the outset. Land use planning is formulated to coordinate the scheduling, spatial distribution, and scale of land growth, aiming to guide sustainable, healthy, and orderly urban development. Since the State Land Administration was established in 1986, three land use plans have been implemented to control construction land growth and protect arable land. The first planning was not effectively implemented (Cai, Zhang, Zhao, & Shi, 2009); therefore, the second planning was put forward to replace it in 1999. However, the second planning could not effectively curb the rapid increase of non-agricultural land and prevent the rapid loss of arable land (Zhong, Mitchell, & Huang, 2014). In 2006, the third land use planning (2006–2020) was implemented, and it further enforced the controlling of the total scale of construction land. With the third planning implemented, although it was designed to rigorously control construction land growth, the actual amount of newly-added construction land increased by 3.43 million ha from 2006 to 2012, which exceeded the planned goal of *The Outline of National General Land Use Plan in China (2006–2020)* in the same period (SCC, 2008). Therefore, it is vital to assess the implementation effect of land use planning in this midterm period.

As a land use management tool, land use planning plays a comprehensive role in controlling construction land, and its effect has attracted scholars' attention. Till now, most research on the effect of land use planning has concentrated on housing and land markets (White & Allmendinger, 2003), housing supply and prices (Bramley, 1993; Monk, Pearce, & Whitehead, 1996), land fragmentation (Kim & Pauleit, 2007), exurbanization (Esparza & Carruthers, 2000), and so on. Only a few studies focus on the evaluation of land use planning's effectiveness on construction land growth management, while they always study a single city or several cities (Qian, 2013; Long, Han, Tu, & Shu, 2015). Therefore, it is necessary to provide general recognition of city implementation across a whole country, which can not only provide insight into the effect discrepancy among cities but also provide evidence for improving the effectiveness of planning and management. Thus, taking 288 cities as the research object and using econometric models, this study aims to assess the

implementation effect of land use planning in different cities. There are three crucial questions solved: (1) whether land use planning has an effect in curbing construction land growth; (2) if so, to what extent it can effectively control the expansion of construction land; and (3) whether differences in effect exist among cities, and what those differences are.

## 2. Theoretical framework

China has established a top-down land use planning system. Currently, it is divided into five levels: nation, province, prefecture, county, and township. National planning is the guideline for other land use planning, and the lower-level government planning should conform to the upper-level government planning. The quota-based and zoning models are the core of China's current land use planning management system, and always work together to regulate land use and control farmland conversion (Cai et al., 2009). The quota system acts as a basic management method through which national land use planning determines the total quotas of land for a planned period (usually 15 years), mainly including the maximum amount quota of construction land, the minimum amount quota of cultivated land protection, and the quota of farmland permitted to be converted to newly-added construction land (Tan & Beckmann, 2010). All these quotas are allocated by central government to lower levels of government and then divided gradually down to the township. The land use planning is implemented through the annual land use plan, which regulates the annual quota of farmland conversion and non-agricultural land according to land use planning (Wang, Tao, Wang, & Su, 2010). In addition to the quota system, zoning is also used in land regulations. The national and provincial zoning determine the strategies and guidelines of land use zoning. The specific zonings, such as ordinary agriculture, settlement, and prime farmland protection, are regulated by municipal-county-town planning. The prime farmland protection zoning is exclusive and strictly restricts construction land in its coverage. Since municipal land use planning is on the scale of 1:100,000, land use zoning is difficult to implement directly. Land use zoning—especially the permanent basic farmland protection zoning—is further delineated and implemented by the county-town level land use planning, which determine the usages for each piece of land and rigorously restricted the conversion of farmland (Zeng, Shao, & Xie, 2016; Chen et al., 2017; Ma et al., 2017). Therefore,

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