



Construction land expansion and cultivated land protection in urbanizing China: Insights from national land surveys, 1996–2006



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ABSTRACT

The remarkable construction land development in urbanizing China has been rarely investigated within the context of the multi-track urbanization process and its relationship with farmland protection has remained vague because of the lack of accurate and reliable data. To fill these gaps, this research analyzed systematic data from the 1996 land survey and the land use change surveys that were conducted annually in the subsequent decade. Driven mainly by the widespread establishment and continuous expansion of economic development zones (EDZs), construction land in China expanded by 2.04 million hectares in 2001–2006, which was approximately twice of that in the previous half-decade. Cities have not grown faster than towns until recently. In rapidly urbanizing China, rural construction land did not shrink but expanded rapidly, especially in the western provinces with a decreasing rural population. Spatially, the eastern coast has maintained its leading position in the construction land distribution and expansion in China; however, the inland regions have contributed an increasing share of national land development. Land survey data did not support the prevailing view that closely connected farmland loss with construction land growth, but showed that only less than 20% of the lost farmland was converted to construction sites. Moreover, this farmland was occupied mostly by EDZs, followed by transportation and rural settlements, whereas the most frequently criticized city and town expansion contributed the least. In this sense, the real challenge of urbanization to farmland protection lies not in the necessary growth of urban areas, but in the irrational expansion of rural settlements that carry increasingly fewer people. Chinese land policies that aim to control construction land growth and prevent cultivated land loss were proved to be a double failure. The control–protection relationship is not simply “control for protection,” as claimed in official discourse; rather, farmland protection is also a slogan and excuse used by the government to restrain the excessive land expropriation in the urban fringe to avoid or mitigate farmland degradation, urban land waste, and social unrest. After reexamining the Chinese urbanization model dominated by the massive floating population and strict and rigid control over urban expansion, we call for more efforts to develop a trans-regional linkage between urban and rural construction land management, which may be a reasonable and effective means for sustainable land development in China.

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Introduction

The rapid urbanization of China in the reform era has been extensively documented from the perspectives of industrialization, globalization, rural-to-urban migration, and urban spatial expansion (Fan, 2008; Lin, 2011; Ma, 2002; Zhang, 2008). Despite the important role played by foreign investment in China's

urbanization process (Sit & Yang, 1997; Zhao & Zhang, 2007), recent studies have increasingly emphasized the indigenous forces and internal dynamic of China's urbanization (Friedmann, 2006). Although the importance of rural industrialization and small town development in China's urbanization has long been highlighted, large cities and metropolitan regions have increasingly become the locomotive of urbanization in recent years (Cao, Liu, Liu, & Miao, 2012; Ma & Fan, 1994; Song & Zhang, 2002). Although the influence of market forces has been strongly felt, the central and local governments have never lost their control over urban and regional development because they are responsible for infrastructure investment, taxation, and land supply as well as administrative

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changes (Ding, 2003; Lin, 2011; Pannell, 2002; Xu, Tang, & Chan, 2011; Zhang, 2008). The complex nature of Chinese urbanization has been recognized by scholars and has resulted in the development of dualistic or pluralistic models of contemporary Chinese urbanization that blend and integrate multiple tracks of urban development with different origins, natures, and characteristics (Lin, 2011; Ma, 2002; Ma & Fan, 1994; Shen, 2006; Sit & Yang, 1997; Zhang, 2008).

This ongoing process of urban transformation is essentially grounded upon land and has profoundly reshaped the pattern of land use change in China. However, until recently, the majority of studies on Chinese urbanization have focused on its demographic, economic, and social aspects with little knowledge about its precise effects upon land utilization (Fan, 2008; Lin, 2014; Liu & Lin, 2014; Shen, 2006; Zhang, 2002). Existing studies on construction land expansion in China have examined and summarized the spatio-temporal patterns of the remarkable and continuous growth of construction land at the national, regional, and city levels (Ji et al., 2001; Tan, Li, & Lu, 2005; Wang et al., 2012; Yin et al., 2011), explored the institutional, economic, and social forces underlying the dramatic expansion of construction land (Deng & Huang, 2004; Deng, Huang, Rozelle, & Uchida, 2010; Tian et al., 2005), and evaluated its substantial effects on farmland protection, ecological security, and social stability (Cartier, 2001; Chen, 2007; Xi et al., 2012). These studies have employed either the construction land as a whole or the city land in particular as the research object. Nevertheless, industrialization and urbanization have been undertaken not only in cities but also in many small towns and villages in China. Moreover, land development in cities has been closely associated with that in rural areas because these are the two sides of the rural-to-urban transformation in this urbanizing country. For these reasons, construction land development in urbanizing China cannot be understood adequately without investigating its internal structure and the urban–rural interaction and connecting these aspects with the hybrid dynamics of the multi-track urbanization of China.

Spatial unevenness has always been a heated topic in literature on the land use change in vast China. The dominant role played by the coastal region in promoting construction land expansion has been reported in numerous studies (Lin & Ho, 2003; Liu, Zhan, & Deng, 2005; Tian et al., 2005). However, the fact that the spatial disparity of China's regional development as a combined result of policies, locations, and different local cultures has been changing constantly presents a need to investigate how changes in state policies in recent years have altered the landscape of uneven development. In particular, the central government has recently proposed new national development strategies to promote economic and social development in the interior region and narrow the coast–inland gap. Empirical studies on population urbanization in China have suggested the rising role of inland regions as a response to these development strategies (Cao & Liu, 2011; Lai, 2007). The effects of these inland-oriented policies and their associated infrastructure development on the spatial patterns of land use change remain important subjects that require a systematic assessment.

In addition to the expansion of construction land, the continuous shrinkage of cultivated land in China has also received considerable scholarly and political attention in recent years. The concern on the dynamics of China's cultivated land has increased since the publication of Brown's work that questions the capability of the most populous country in the world to feed its people (Brown, 1995). The protection of cultivated land has since become the first priority and responsibility of Chinese land managers (Lichtenberg & Ding, 2008). More importantly, cultivated land shrinkage has often been closely connected with construction land

expansion by policy makers, planners, and scholars.¹ However, until now, very little has been written on the precise contribution of construction land expansion to cultivated land shrinkage, the temporal and spatial variation of this contribution, and the underlying cause-and-effect relationship between these two major characteristics of land use change in China.

To fill the aforementioned gaps, this study attempts to analyze the temporal, structural, and spatial patterns of construction land expansion in China over the past decade, understand these changing patterns by situating them into the context of Chinese multi-track urbanization, and evaluate the effects of construction land expansion on farmland protection and food security in this populous country. The remainder of this paper is organized as follows. The paper begins with a clarification of data and methodological issues concerning this study. This clarification is followed by a systematic analysis of the temporal, structural, and spatial patterns of the dramatically expanding construction land in China, with a particular focus on its relationship with China's various urbanization models. A detailed analysis is then performed to identify the sources of expanded construction land and its effects on farmland protection. Finally, the relationship between urban growth control and farmland protection is reexamined based on the facts revealed in data analysis. This paper concludes with a summary of major findings and a discussion of policy implications.

Data and methodology

Research on land use change in China has long been limited by the shortage of reliable data that are spatially and temporally comparable. The 1996 National Land Census was an important landmark in the collection of reliable and comparable data about land use in China (Feng, Yang, Zhang, Zhang, & Li, 2005; Lin & Ho, 2003). Since then, land use change has been surveyed annually by the newly established Ministry of Land and Resources and its vertically managed subordinate bureaus at the provincial, prefectural, and county levels. The relatively independent operating system and sufficient financial support ensured the availability of systematic, accurate, comparable, and coherent land use data in the subsequent decade until 2006. Based on remote sensing images, these data were manually verified by local professionals. Moreover, the handling of land data by local governments was mostly figured out since the release of the 1996 survey data (Lin & Ho, 2003). However, these systematic data were interrupted by the second national land survey conducted from 2007 to 2009, from which the latest data have not been released for political reasons. Moreover, the land use classification employed by the second land survey was different from that used by the first survey in 1996. As a result, the decade from 1996 to 2006 is the longest and latest period for which comparable land use data are available in China. This study will analyze China's land use change, with particular focus on the expansion of construction land and its encroachment on cultivated land using the systematic data derived from the first national land survey (*diyici quanguo tudi liyong diaocha*) and the subsequent land use change survey (*tudi liyong biangeng diaocha*). Chinese land use classification has changed twice since 1996; thus, the data on land use change are reclassified into the categories established in the first land survey. The two sets of data are both summarized into

¹ For example, "to effectively protect the cultivated land" (*qieshi baohu gengdi*) was clearly stated as the main purpose of two of the most important regulations on construction land development, namely, the Measures for Regulating the Annual Plan of Land Utilization (*tudi liyong niandu jihua guanli banfa*) and the State Council's Circular on Promoting the Intensive Utilization of Land Resources (*guanyu cujin jieyue jiyue yongdi de tongzhi*), which were introduced in 2004 and 2008, respectively.

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