Rapid Urbanization in Eastern China: Roles for SEA

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1. Introduction In this paper we explore possibilities for an expanded role for Strategic Environmental Assessment (SEA) in addressing and preventing problems caused by rapid urbanization in coastal areas of China.

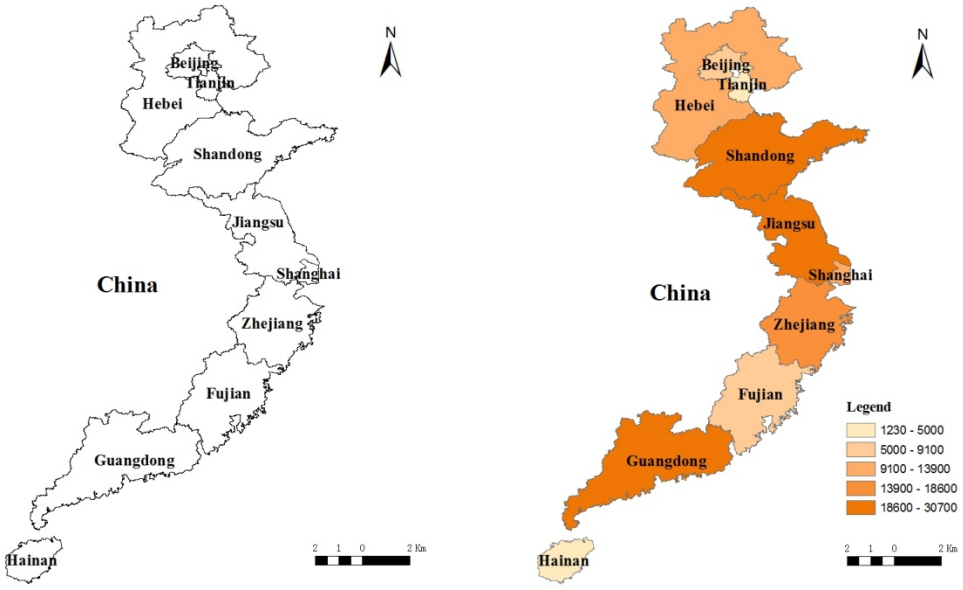
2. Context The torrid pace of economic development in many parts of China is well recognized, and its accompanying array of ecological and social impacts is increasingly well documented. Despite attempts to identify, avoid or minimize these negative effects through EIA, policy and related planning processes, irreversible impacts occur, often in cumulative ways that are not understood completely. This syndrome is particularly acute in China's coastal regions, where rapid urbanization is transforming landscapes and ecosystems at an unprecedented pace.

There is considerable hope that SEA can help improve planning and development processes, thus overcoming some of the characteristic shortcomings of more conventional forms of environmental assessment. The premise that SEA can be a proactive, sustainability-focused process is undeniably attractive. However, the gathering literature on SEA suggests strongly that there are still many implementation challenges to be overcome before this relatively new form of EA can reach its potential. SEA has been practiced in China since 2003. Bina (2008) has identified several recurring problems with the early implementation of SEA in China: it tends to be applied late in the planning process, and is therefore reactive to plans instead of influencing their formulation; like conventional project-driven EA, it is mostly mitigation-focused; there is little public participation; and there is a strong natural sciences and engineering bias in the process. Bina notes that these problems are not exclusive to SEA in China – they certainly occur to a significant degree in many other countries where SEA is being implemented.

Given these characteristic problems and challenges, what contribution can SEA be expected to make in addressing a phenomenon as complex and formidable as rapid urbanization in sensitive coastal regions? We argue that if it is to be more than a modest or incremental role, the forms of SEA that are practiced must be based on two principles: 1) in addition to its key interventions in the formulation of plans, policies and programs, SEA should effectively address longer-term time scales, making effective use of scenarios and related processes; 2) SEA should assume a greater role in analyzing cumulative effects at the regional level. We discuss these principles and challenges below, but first we highlight some of the key impacts of rapid urbanization in coastal China.

3. Rapid urbanization in coastal China Eastern coastal China is a booming region that includes Beijing, Tianjin, Hebei Province, Shandong Province, Jiangsu Province, Shanghai, Zhejiang Province, Fujian Province, Guangdong Province, and Hainan Province. It is the most economically developed, most densely populated and fastest

urbanizing region of China. Fig.1 reveals that overall it is the most developed region of China, comprising 58.7% of the country's GDP, with 36% of the overall population and 9% of the land. Guangdong, Shandong, and Jiangsu are the most developed provinces in eastern coastal China. The 2007 GDP of Guangdong, for example, was 438 billion dollars, which accounted for 12.4% of China's GDP in 2007. Shandong and Jiangsu followed closely, with 2007 GDP's of 370 and 365 billion respectively.



Location of the eastern coastal China GDP of the eastern coastal China

Fig.1 Study area: coastal provinces and 2007 GDP in China

(Data source: China Statistical Yearbook)

China's rate of urbanization increased rapidly from 17.9% in 1978 to 44.9% in 2007 due to economic development, population growth and resettlement, with the eastern coastal region absorbing much of the growth. Fig.2 compares the rate of urban population growth rate in eastern coastal China with the rest of the country in the period 2000 – 2007. Guangdong at a rate of 2.94 percent/year, followed by Shandong at 2.81 percent /year – both much higher than average. In the entire region, only the growth rates of Zhejiang and Hainan are less than 1.5 percent /year. Outside of the eastern coastal region, only Xizang's growth rate is higher than 1 percent /year.

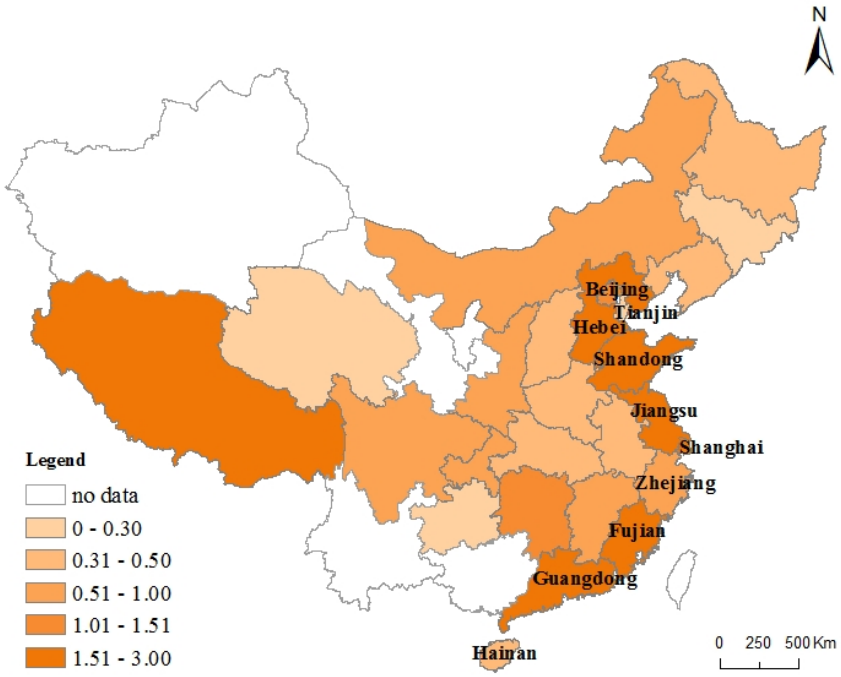


Fig.2 Growth rate of population urbanization rate from 2000 to 2007 in China

(Data source: China Statistical Yearbook, various years)

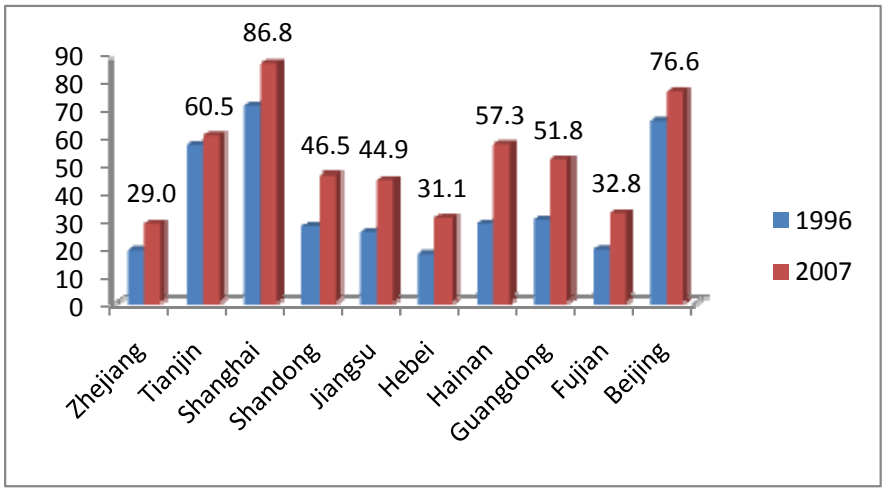


Fig.3 Urban population comparisons in 1996 and 2007

(Data source: China Statistical Yearbook, various years)

Fig. 3 further shows the rapid rate of urbanization in Eastern coastal China over a decade, comparing 1996 and 2007.

A typical result of the rapid urbanization is the destruction of coastal wetlands and the degradation of adjacent areas. Fig.4, for example, depicts a former coastal marsh transformed into an industrial park. Coastal areas such as these, with dense, highly populated cities and high levels of economic development, are highly vulnerable to a range of ecological impacts (Li and Zhu, 2010).

Fig. 4 Transformation from coastal marshes to industrial park in Lianyungang, Jiangsu Province, China (Li et al., 2006)

Results of simulations and calculations show that the total area of urban built-up land in the Lianyungang bay area increased by 42.4% between the years 2000 and 2006, while the average annual growth rate of urban land exceeded 6%. Urban cover in the study area expanded by 1.3 times from 2000 to 2006, with a rate of spread of 12.8 km^2/a (absolute) and a 21.3% average annual growing rate (relative) (Li et al., 2009).

The spatial configuration of wetland cover types changed during the analysis period. Related research shows that the area of salt wetlands sharply decreased by 54.4 km^2 - the most area lost of any cover category. The majority of salt wetland areas were converted into industrial lands, with the most extensive and intensive construction occurring in the north in the Taibei salt wetland. Portions of a reservoir located in the study area were also backfilled, thereby decreasing it's surface area by 10.7 km^2, and areas of shallow marine waters were reduced by 10.3 km^2, corresponding to development in preparation for expansion of the port (Li et al., 2009).

Since most ecologically sensitive areas affected by this urban sprawl are highly aggregated in the central city districts (Xinpu district, Haizhou district, Lianyun district and development zone), regional Environmental Impact Intensity (EII) was calculated and spatially simulated during 2000-2006 in these areas. Driven by urban planning and regional development strategies, the EII indicator distribution and dynamic are in

accordance with the intensity and direction of urban sprawl. The most fragile and disturbed ecosystems are also the key regions for present and future development. (Li et al., 2007)

4. What needs to be done If EA is to play an effective role in supporting the transition to greener economies, the ability to influence more sustainable patterns of urbanization is vital. The rapid process of urbanization that we have discussed appears to outstrip the capacities of conventional EA. If, in this context, EA is largely reactive, focused primarily on mitigation, and lacking a regional scope, it is likely that current unsustainable patterns of urbanization will continue, with negative impacts on large scales. On the other hand, more ambitious and visionary approaches to SEA could make a substantial contribution. SEA could examine present and future patterns of urban development at wider regional levels in eastern coastal China, and thus address cumulative effects more effectively, while at the same time generating alternatives that would help avoid the most severe impacts. In a context of complexity and irreducible uncertainty, the use of scenarios could generate plausible overviews of ecological and social futures in the coastal regions, at various time scales, with valuable applications of GIS and remote sensing. While these approaches clearly have limits, they would complement the more mitigation focused approaches by identifying alternative development options before they are foreclosed by the rapidity of urbanization. In this brief IAIA conference paper our purpose is to provide an overview of the problem and opportunity. In future research, we intend to explore specific applications of more ambitious SEA in eastern coastal China, using scenarios, remote sensing and spatial analysis, and examining the role of SEA in ecological governance and urban planning policy. (Wang et al, 2009)

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