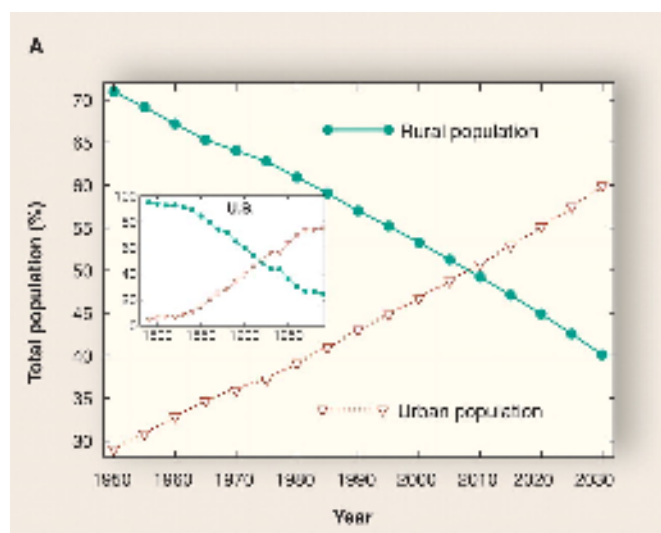


Urban Environmental Evolution and Its Health Implications in China

Xuemei Bai
CSIRO Sustainable Ecosystems

*X.M. Bai
Feb. 25, 2008 OxHA Summit, Sydney*

Fig. 1. (A) Change in world urban and rural population (%) from 1950 to 2030 (projected)



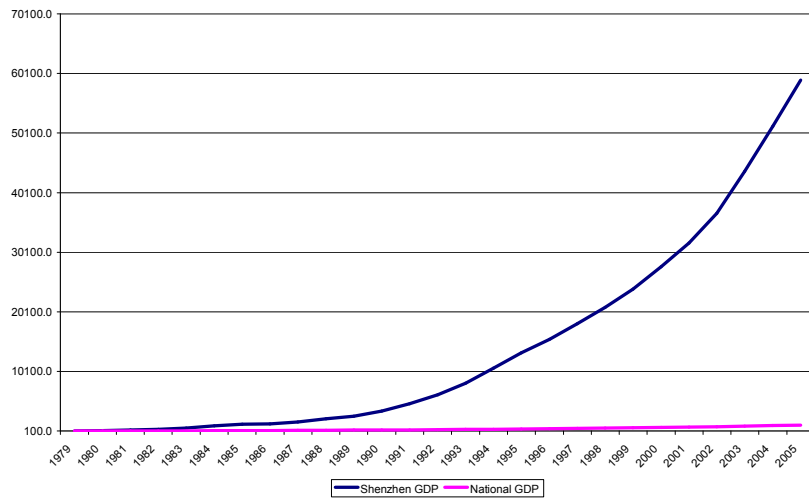
N. B. Grimm et al., *Science* 319, 756 -760 (2008)

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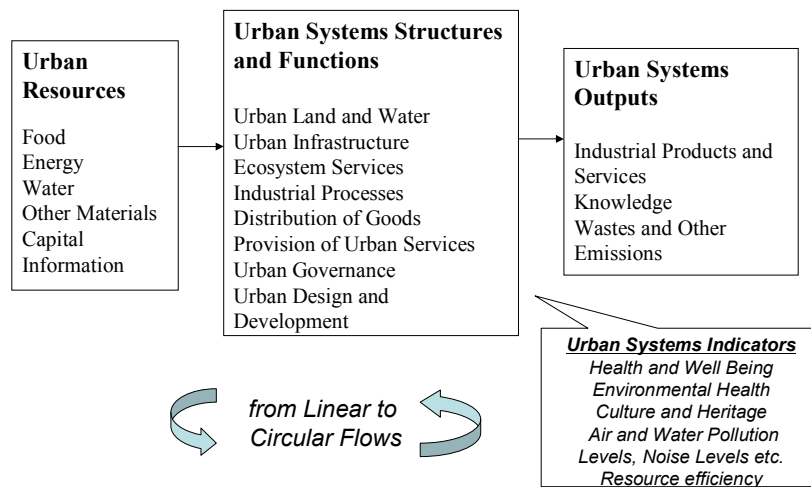
Economic Activities



Total GDP Growth Trend: Shenzhen vs. China
(1979 as 100)

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Feb. 25, 2008 OxHA Summit, Sydney

Urban Metabolism



X.M. Bai
Feb. 25, 2008 OxHA Summit, Sydney

Table 3-1 Causes and impacts of major types of urban environmental issues

Type	Typical Issues	Causes	Major Impacts	Spatial Extent of Impacts
Type I: Poverty related issues	Low access to safe water, lack of sanitation facilities, organic pollution of water bodies	Low infrastructure, rapid urbanization, income disparity	Sanitation related health impacts, such as diarries, infections	local
Type II: Rapid growth related issues	Air pollution (SO _x , particulate etc), water pollution (heavy metallic subjects, BOD, COD) industrial solid waste pollution	Rapid industrialization, low rate of emission treatment, lack of effective management	typical industrial pollution disaster, Minamata Disease, Onsan Disease; deterioration of regional ecosystem,	local and regional
Type III: Wealthy lifestyle related issues	High consumption, concentration, municipal waste, Dioxin, etc.	High consumption lifestyle, low local incentive for improvement	Global warming, chemical ingredient and dioxin caused abnormality in infant, over-extraction of resources, etc.	regional and global

(Source: Bai and Imura, 2000; Bai 2006)

*X.M. Bai
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Urban Environmental Evolution (1)

- Cities can be viewed as complex systems that are subject to constant change, which can be viewed as a dynamic evolutionary process
- Urban environmental profiles of cities are diverse, but there are certain commonalities in the evolutionary trajectories among different cities

• (Source: Bai 2003)

*X.M. Bai
Feb. 25, 2008 OxHA Summit, Sydney*

Urban Environmental Evolution (2)

- However, the environmental evolution of cities exhibit a strong non-linearity in their trajectories, instead of following a fixed, stylized pattern;
- Each trajectory is shaped by a unique combination of endogenous and exogenous forces, reflecting both pressures from outside the system and the responses from within the city.

• (Source: Bai 2003)

*X.M. Bai
Feb. 25, 2008 OxHA Summit, Sydney*

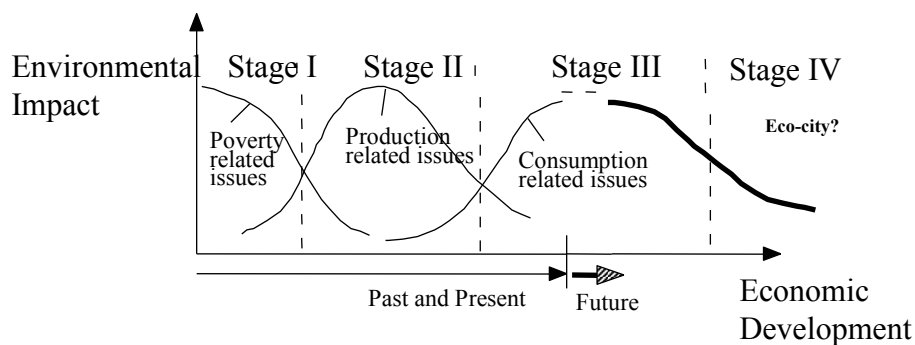
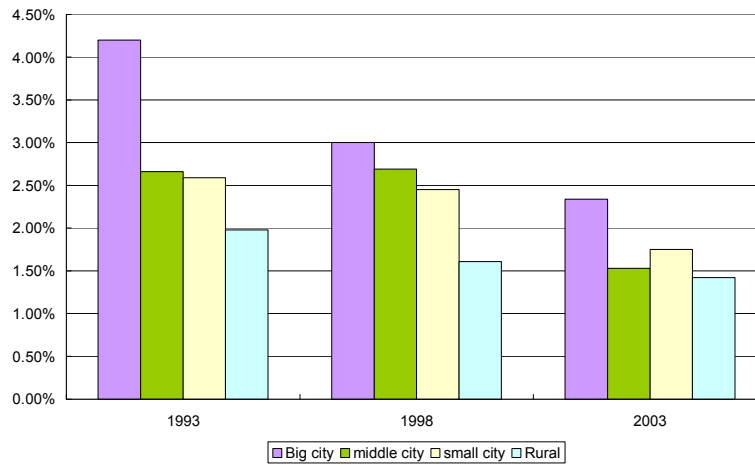


Fig. 5-Conceptual illustration of a typical evolutionary trajectory of environmental problems in developed country cities, and an optimistic future projection in relation to economic development
(Source: Bai and Imura, 2000)

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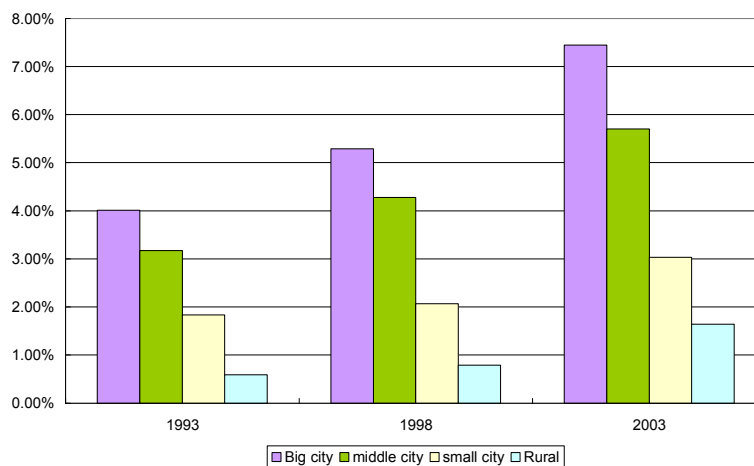
Respiratory disease rate



Source: 2007年中国卫生统计年鉴

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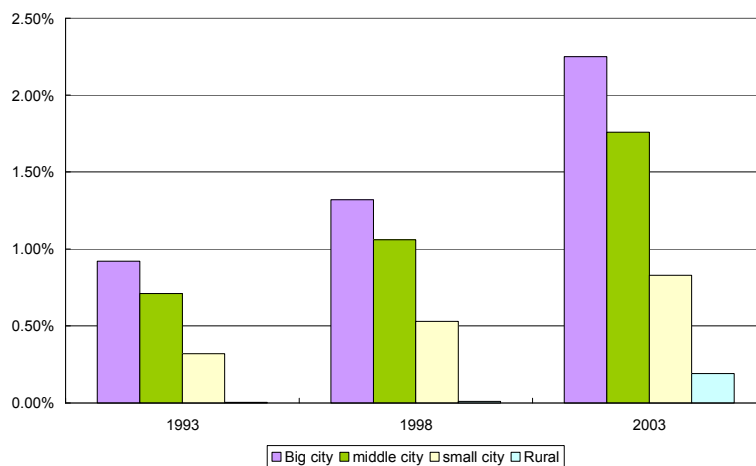
Hypertension rate



Source: 2007年中国卫生统计年鉴

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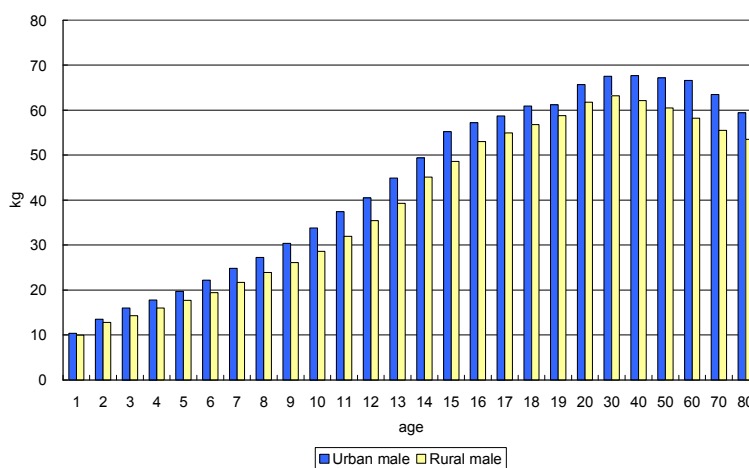
Diabetes rate



Source: 2007年中国卫生统计年鉴

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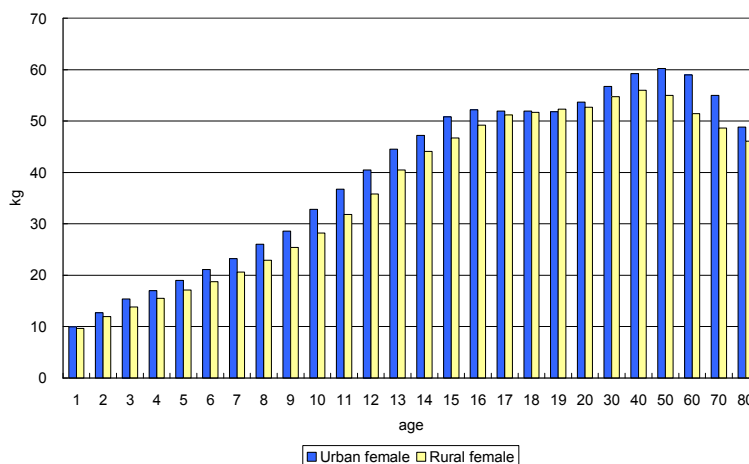
Weight of male residents in China 2002



Source: 2002年全国营养与健康调查

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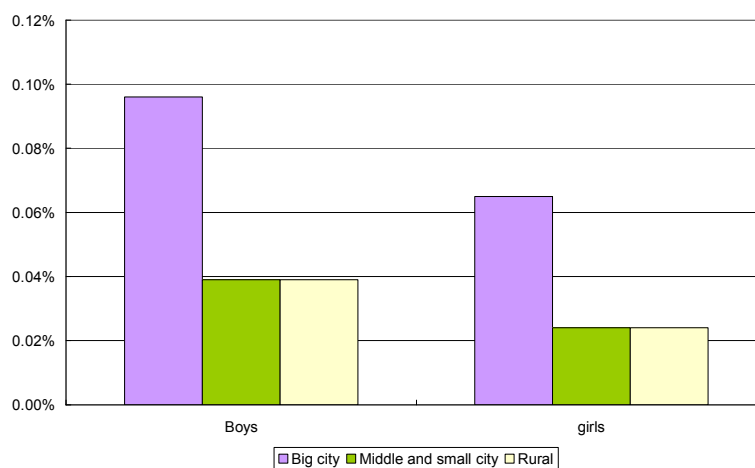
Weight of female residents in China 2002



Source: 2002年全国营养与健康调查

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Obesity rate in age 7-17



Source: http://www.nwccw.gov.cn/show/showddyjlNews.jsp?belong=%E8%B0%83%E7%A0%94%E4%B8%8E%E4%BA%A4%E6%B5%81&alias=ztyj_dyyl&news_id=59722

X.M. Bai
Feb. 25, 2008 OxHA Summit, Sydney

Focusing on Synergies

- Environment, both local and local, and health
- Urban planning and design for environmental and health benefit

*X.M. Bai
Feb. 25, 2008 OxHA Summit, Sydney*



Solar energy use in Rizhao, China

*X.M. Bai
Feb. 25, 2008 OxHA Summit, Sydney*

For the birds. Dongtan aims to protect an adjacent waterfowl refuge
CREDIT: D. Normile / SCIENCE



Dennis Normile, Science 319, 740 -743 (2008)

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