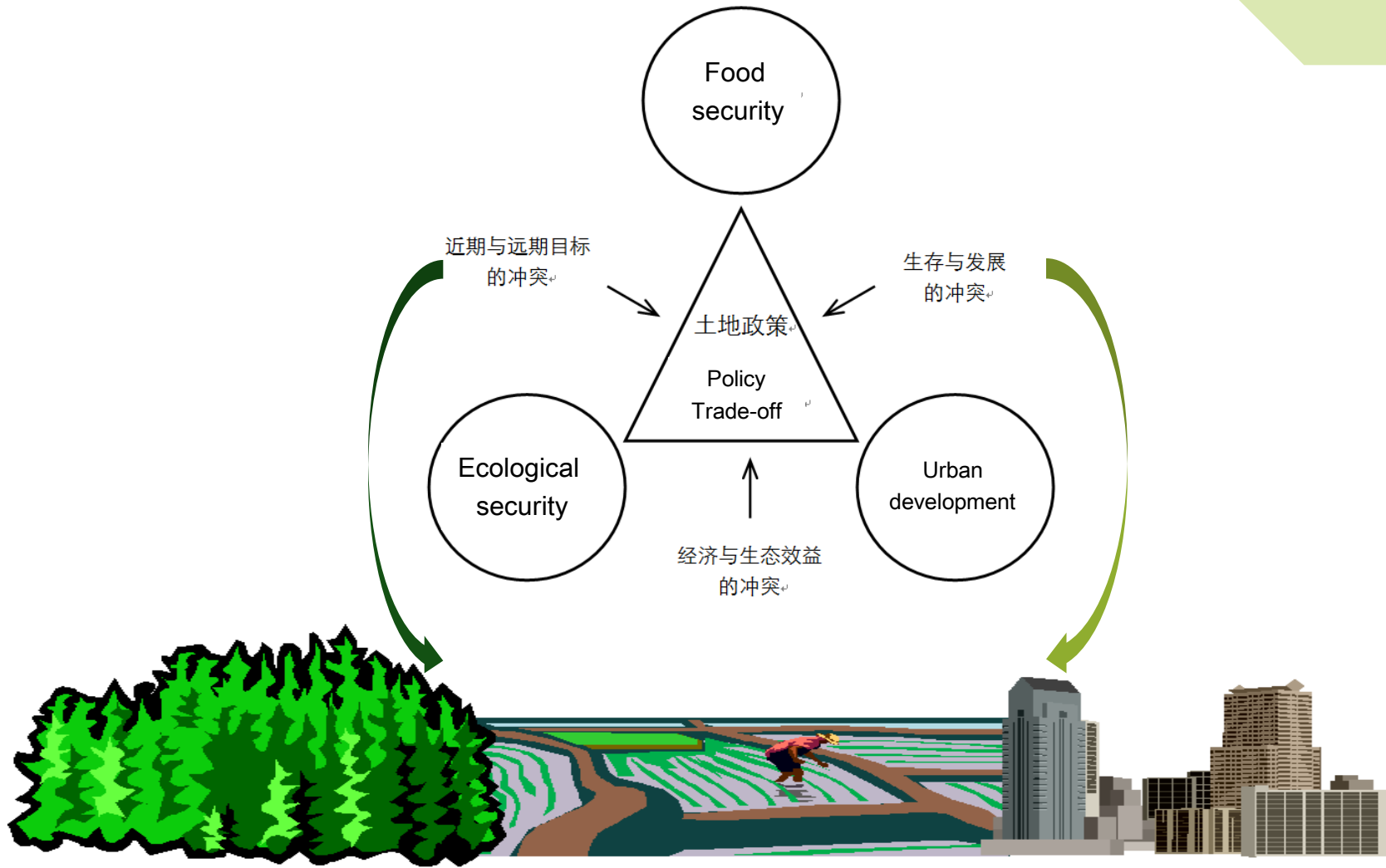


# Land use transitions and their implications for ecosystem services

LI Xiubin (CAS - IGSNRR)

**International Conference on Science and  
Technology for Sustainability 2011: Building up  
regional to global sustainability-Asia vision.  
14-16 September 2011, Kyoto**

# Trilemma in land use policy



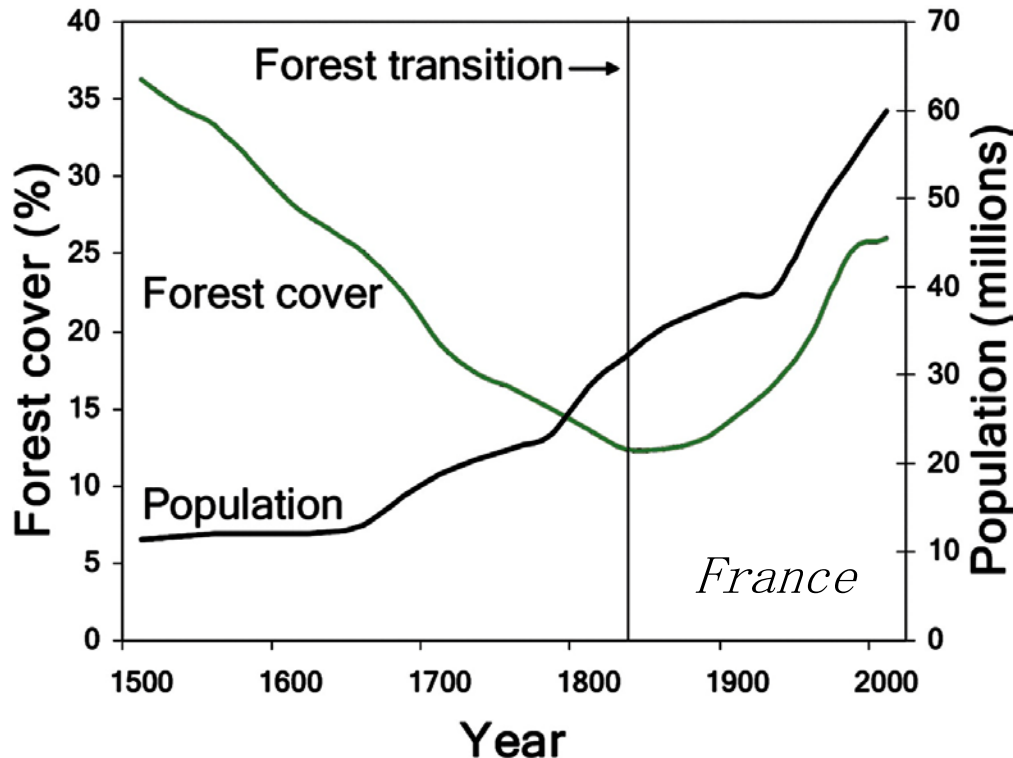
$$\text{Land for nature} = \text{Total land area} - (\text{Agricultural area} + \text{Settlements})$$



# Land use Transition or Forest Transition (FT)

—A. Mather

The passage, in modern times, from net deforestation to net reforestation in a defined area, usually a country.



Forest transition started from 1800, e.g:

Denmark—early 19 century;

France—mid 19 century;

Portugal—1870s;

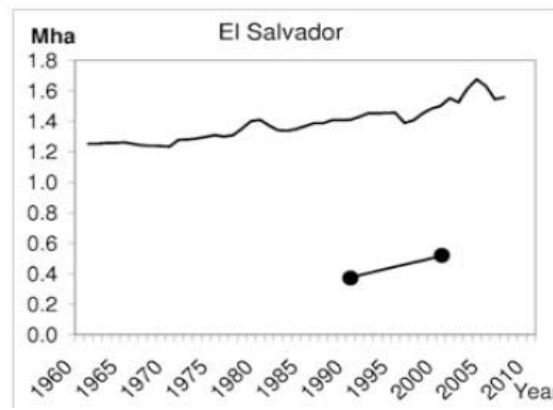
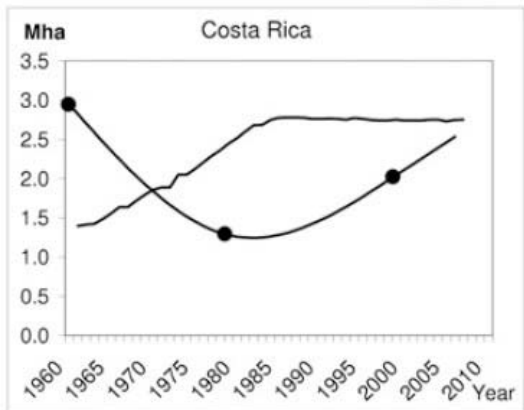
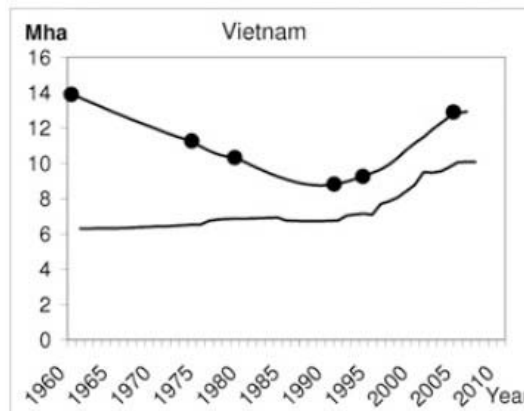
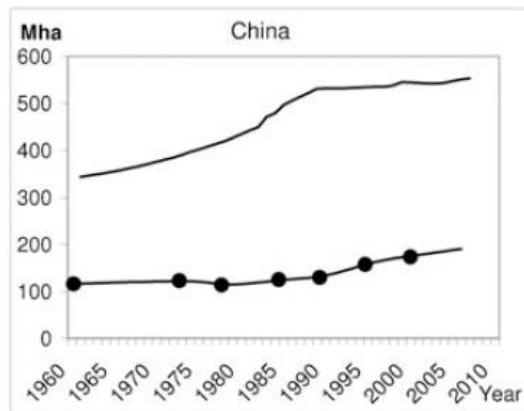
Northeast US—early 20 century;

Japan—probably 18 century



# Forest transition in emerging economies

Some developing countries have recently achieved a land use transition with a simultaneous increase in food production and forest cover.



Others include:

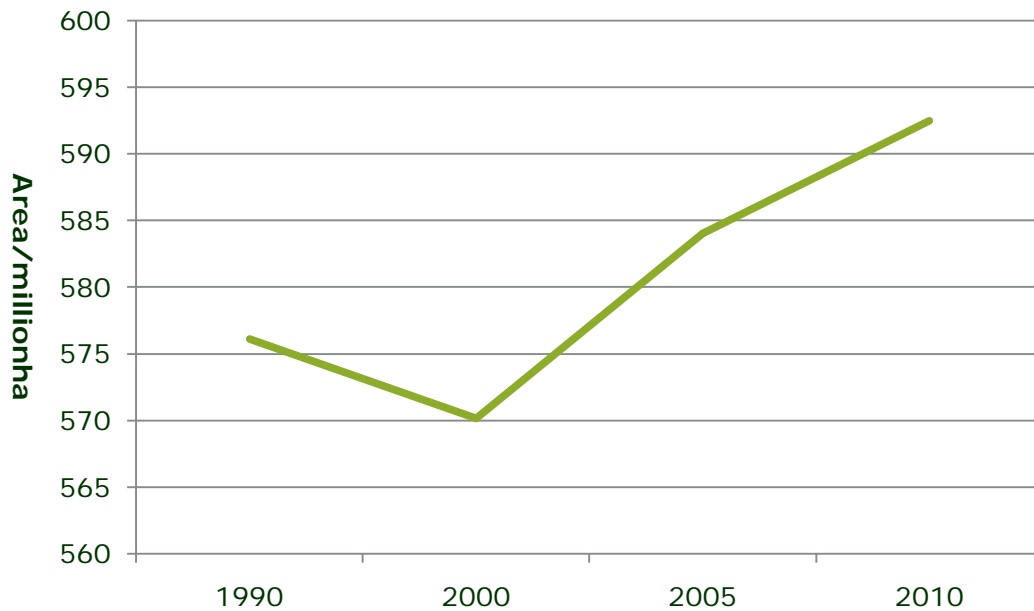
India,  
Bhutan,  
Chile,  
Western  
Honduras, Puerto  
Rico, Southern and  
Central Mexico



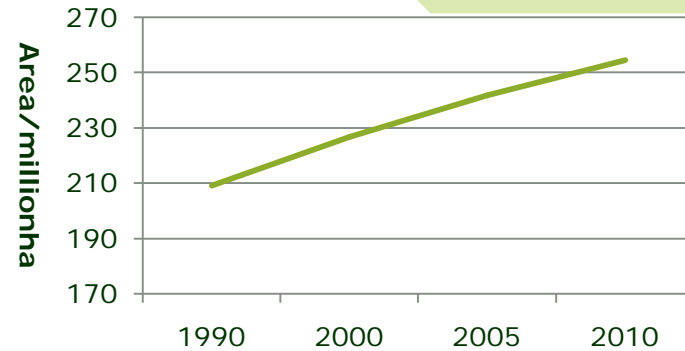
# Forest transition in Asia

Asia ushered its forest transition in the turn of the century thanks to the slowdown of deforestation in southeast Asia.

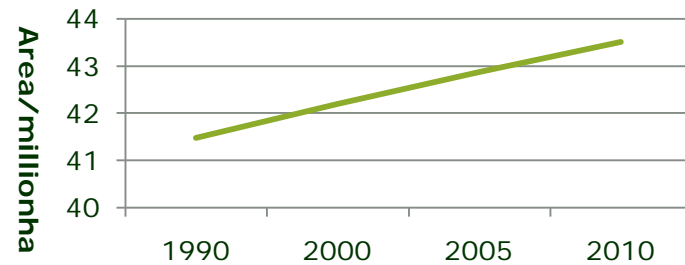
## Asia



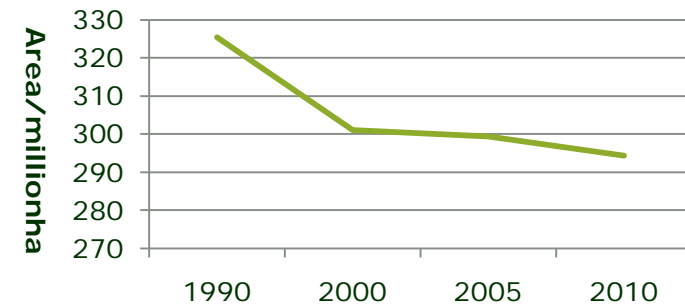
## East Asia



## Western and Central Asia



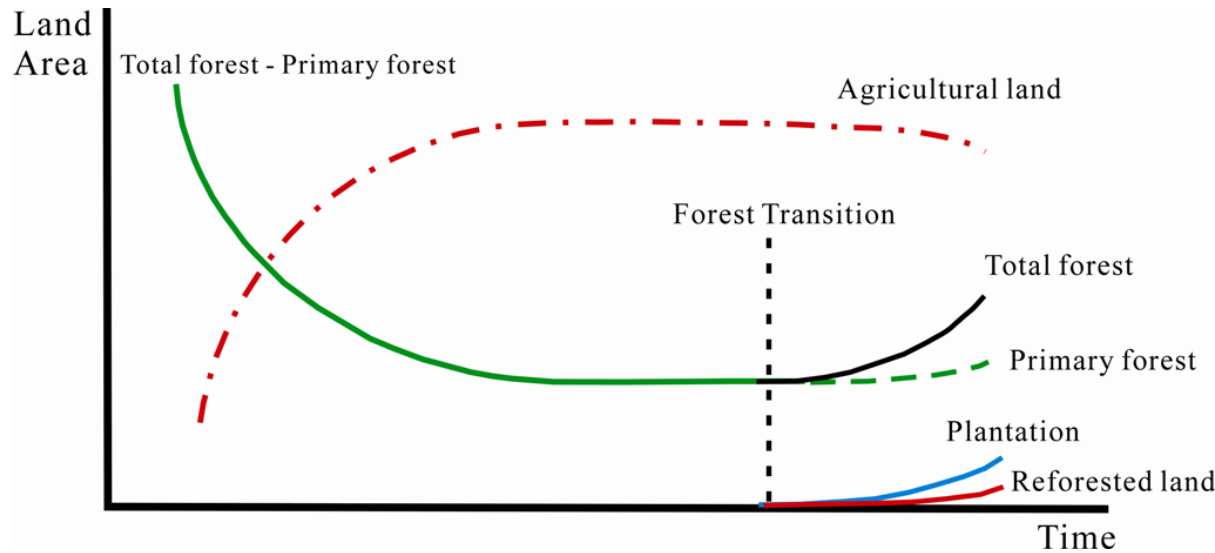
## South and South-east Asia



Data sources: FAO/FRA2010



# Driving forces: Two paths of FT



*Economic development path*

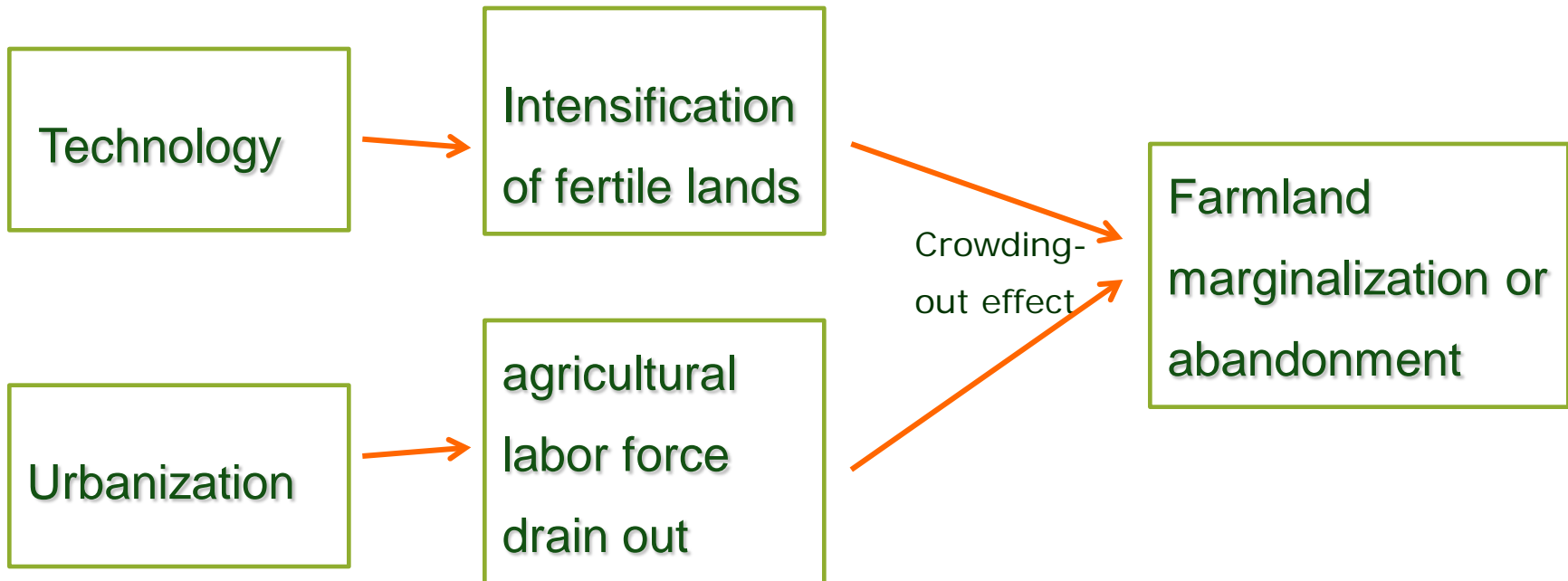
*Forest scarcity path*

Barbier, E. B. et al, *Land Use Policy* 27 (2010) 98–107  
Rudel, et al. 2005



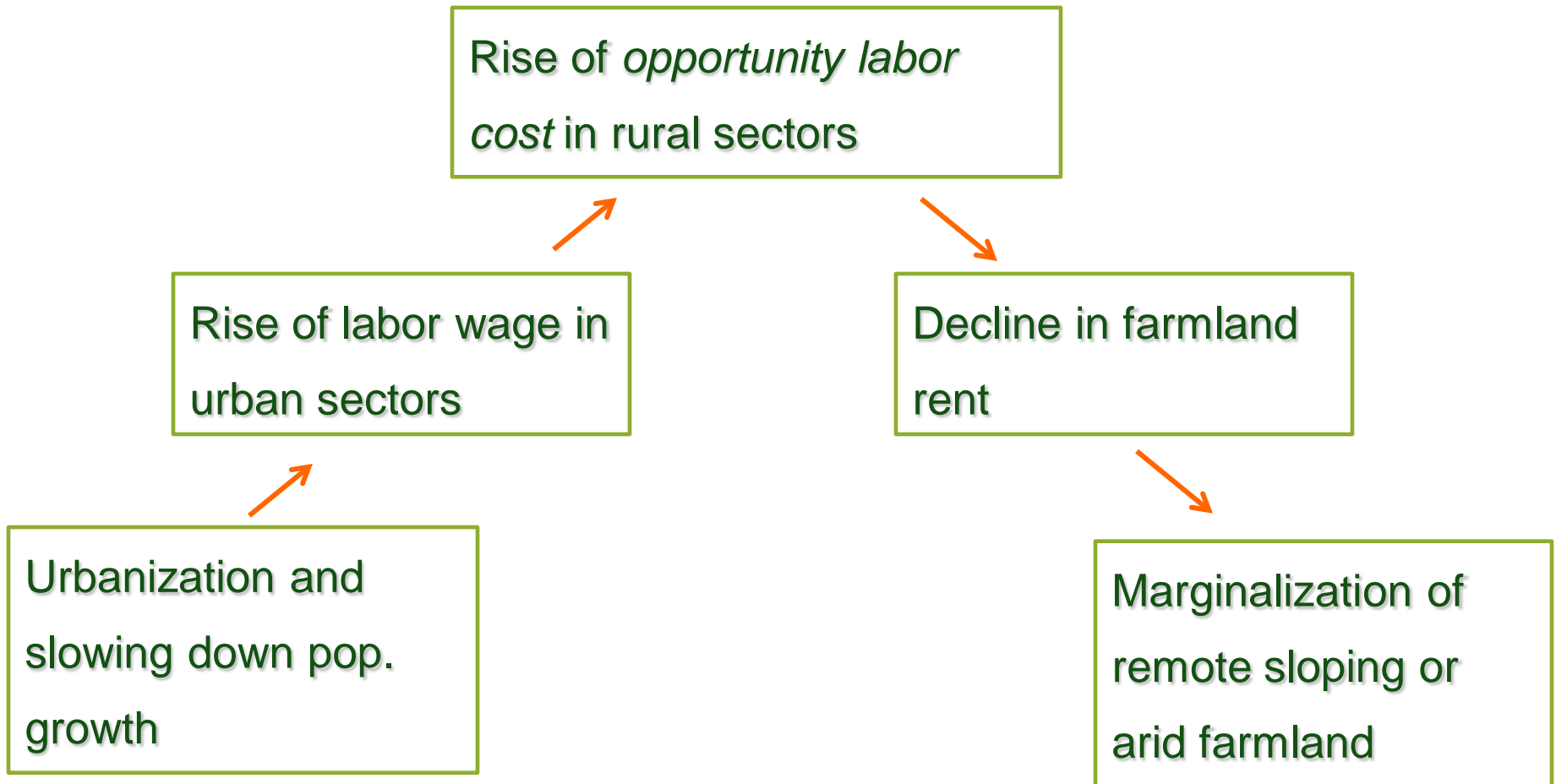
# The economic development path: farmland marginalization

Macro-scope



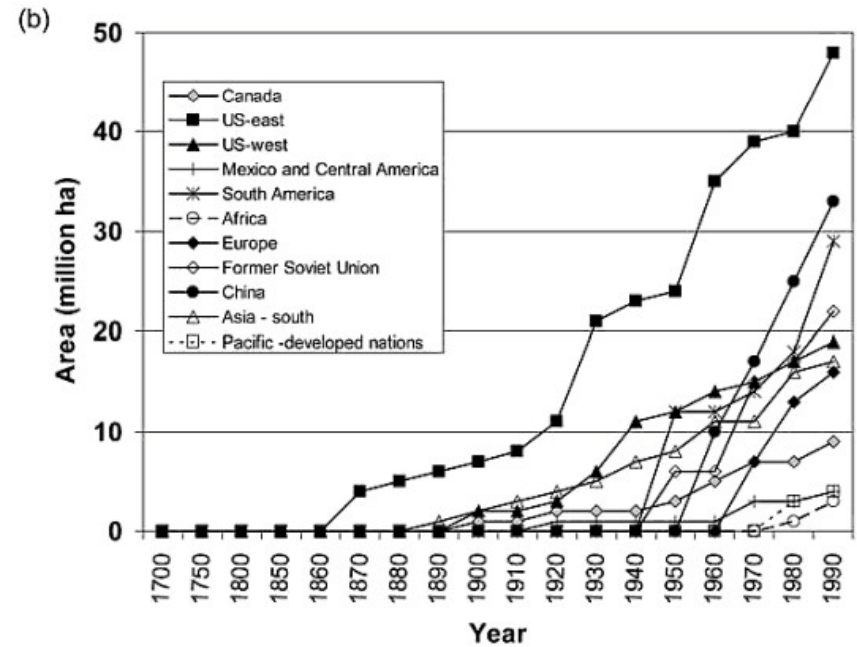
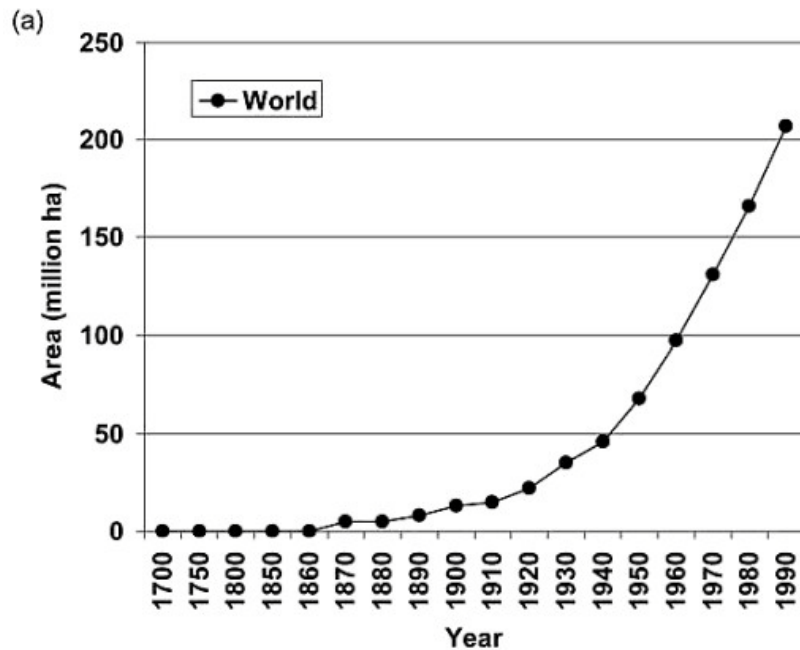
# Reasons for farmland marginalization/abandonment:

Micro-scope





# Farmland abandonment



*Cramer and Hobbs (Ed.), 2007, Old Fields: Dynamics and Restoration of Abandoned Farmland*

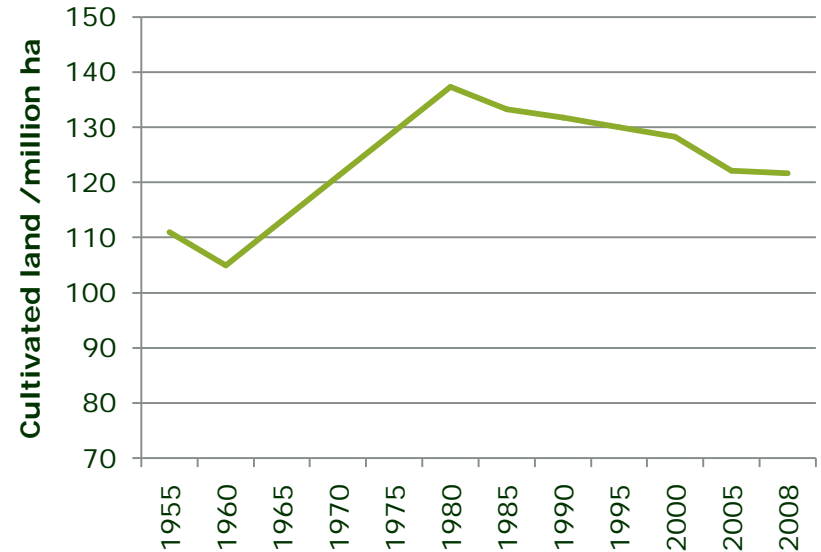


# Forest and farmland transitions in China

China ushered its forest and farmland transitions in the 1980s.



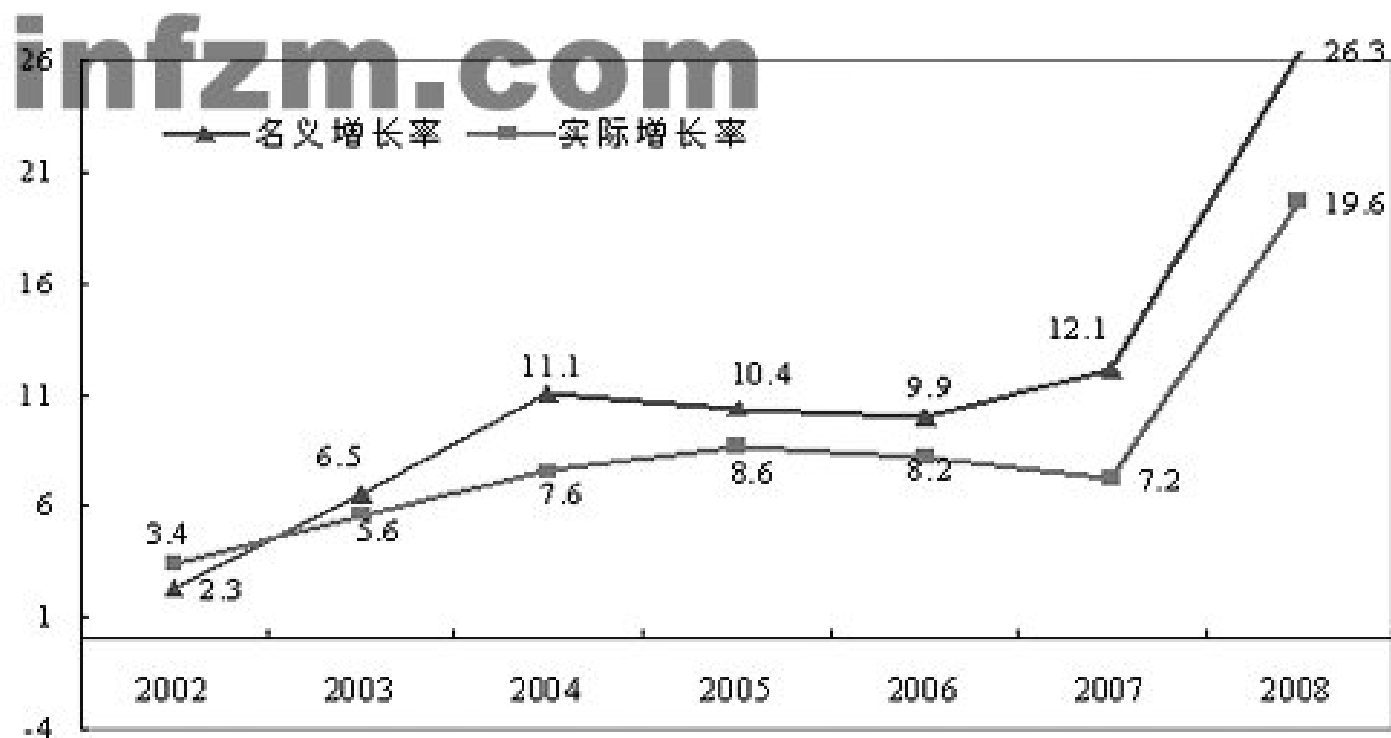
Forest area



Cultivated land



## The rising trend of 'floating' labor's wage in recent years

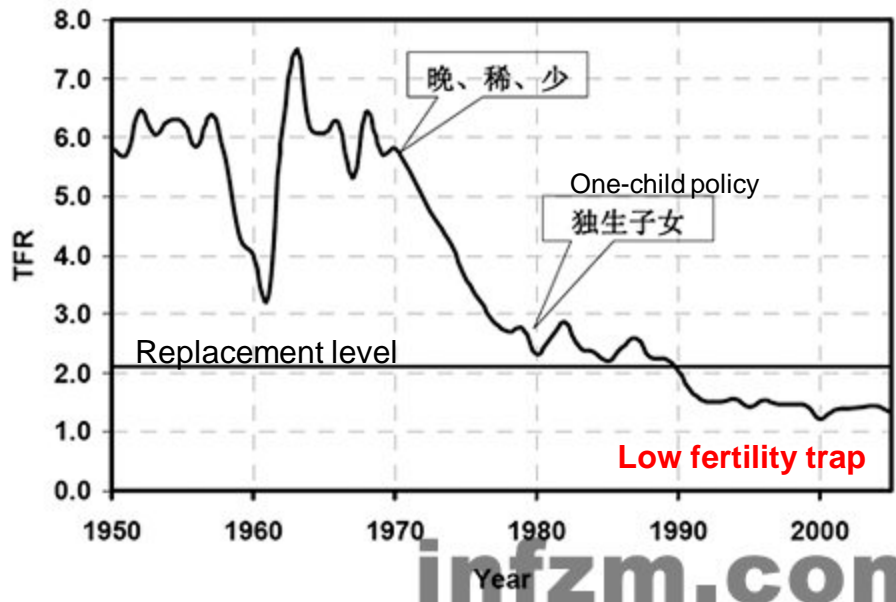


蔡昉：农民工实际工资增长率，2004-2007年一直保持在7%以上，金融危机的2008年达到19.6%（该值在2002年之前几乎没有增长，2002年为2-3%，2003为5-6%），说明刘易斯拐点已经到来。

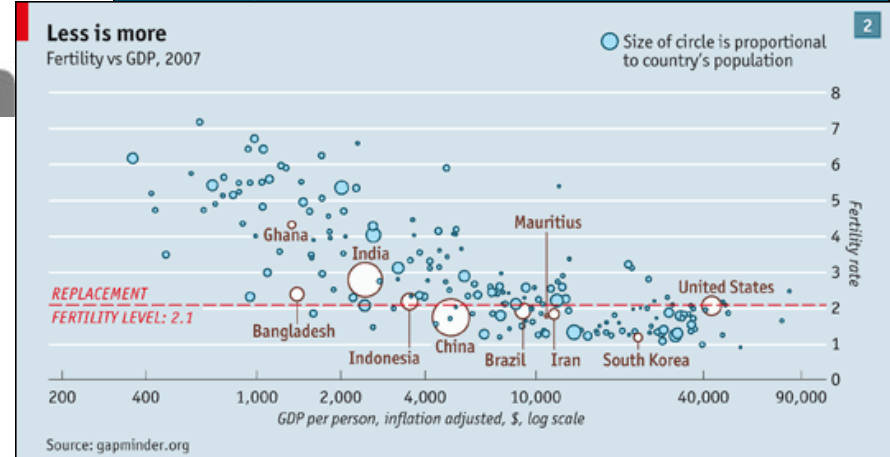
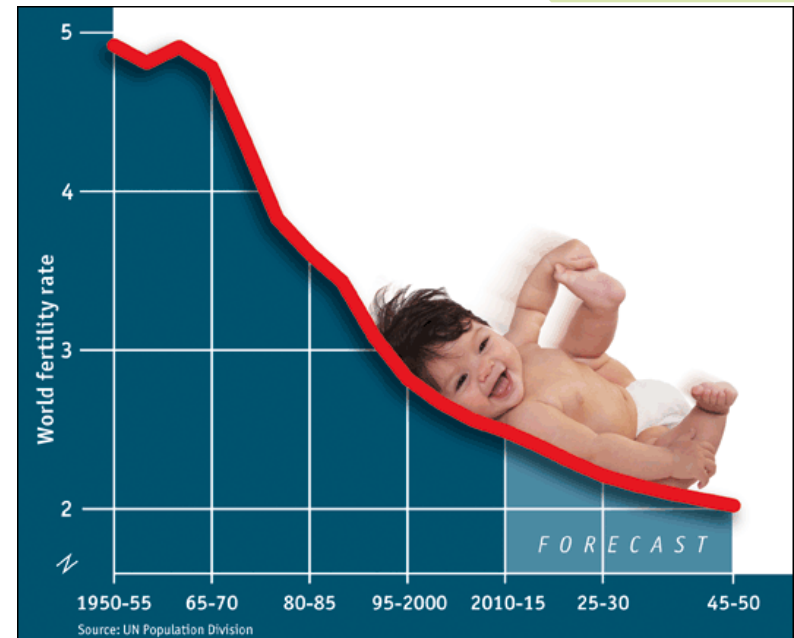


# Slowing down population growth

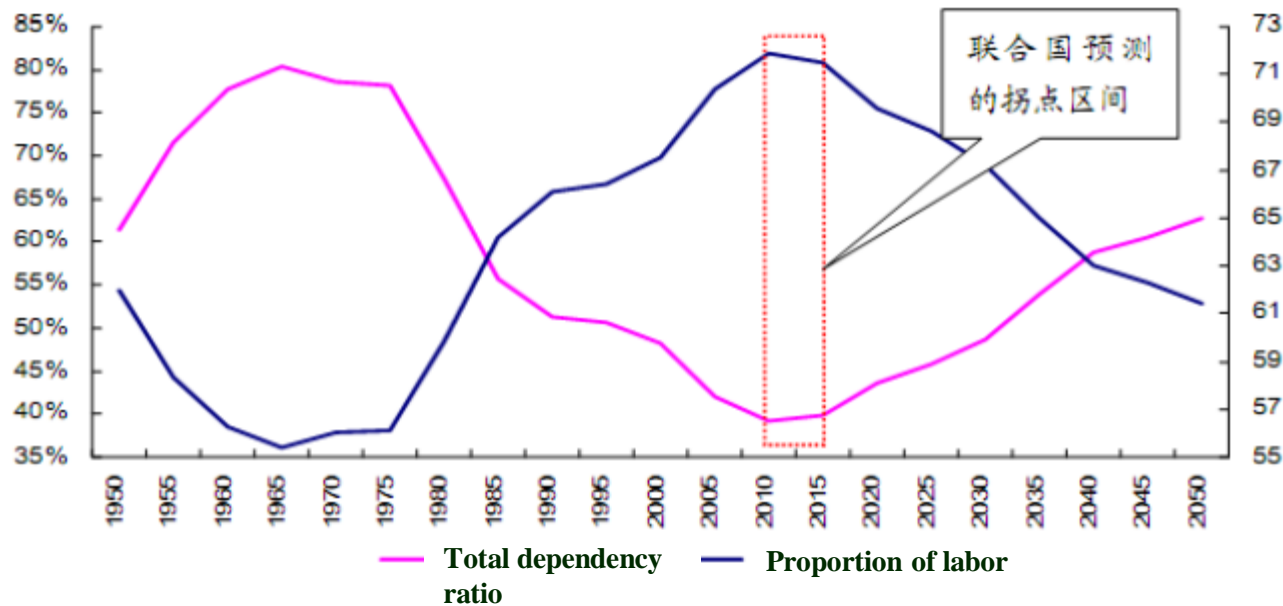
## 中国生育率的下降过程: 1950-2005



China became a very low fertility society in 1990



# Labor force in China will reach its peak soon

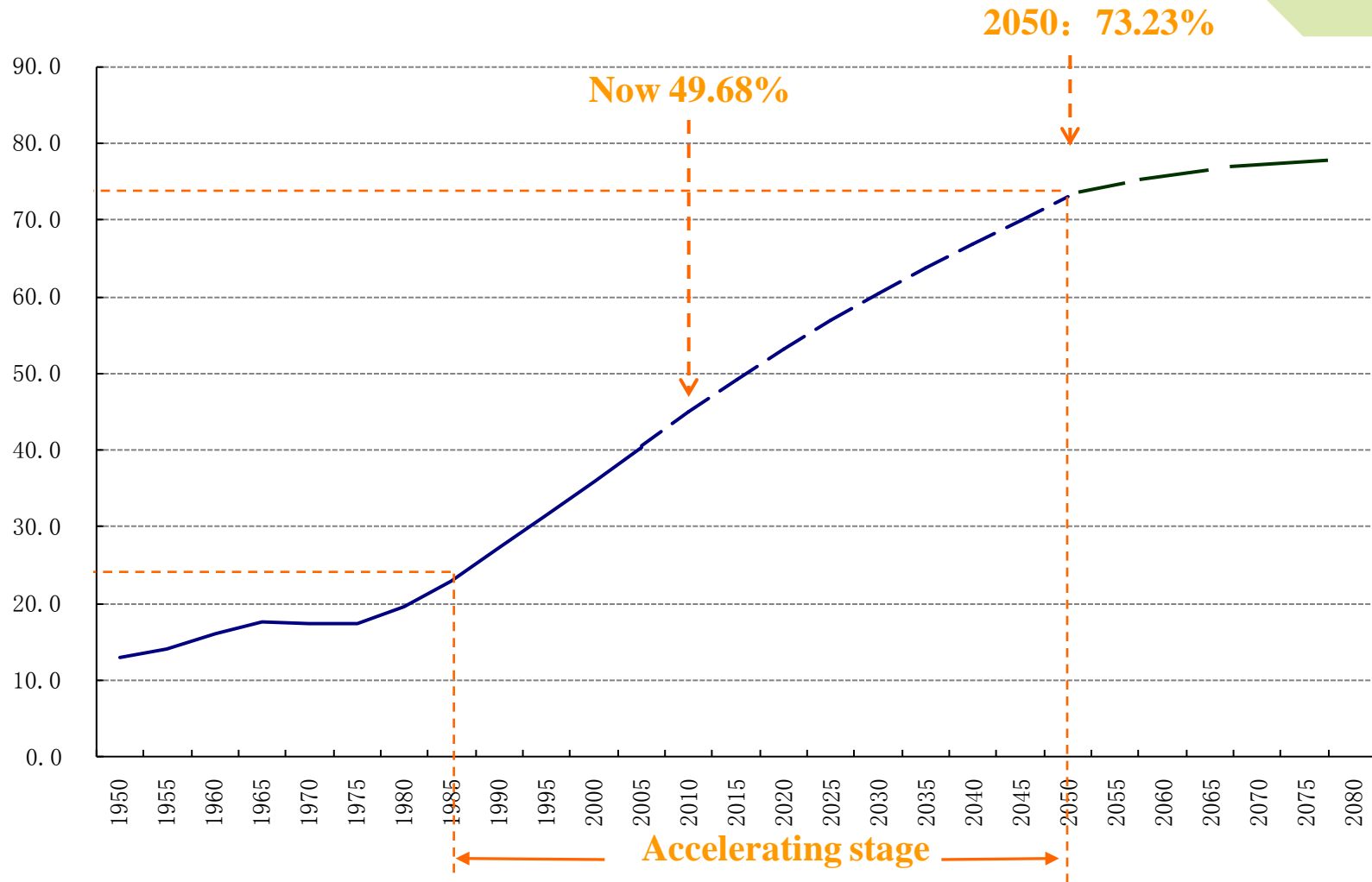


—Renmin University of China, 2010(<http://ier.ruc.edu.cn/xszy.asp>)

中国劳动力人口将在2015年迎来拐点



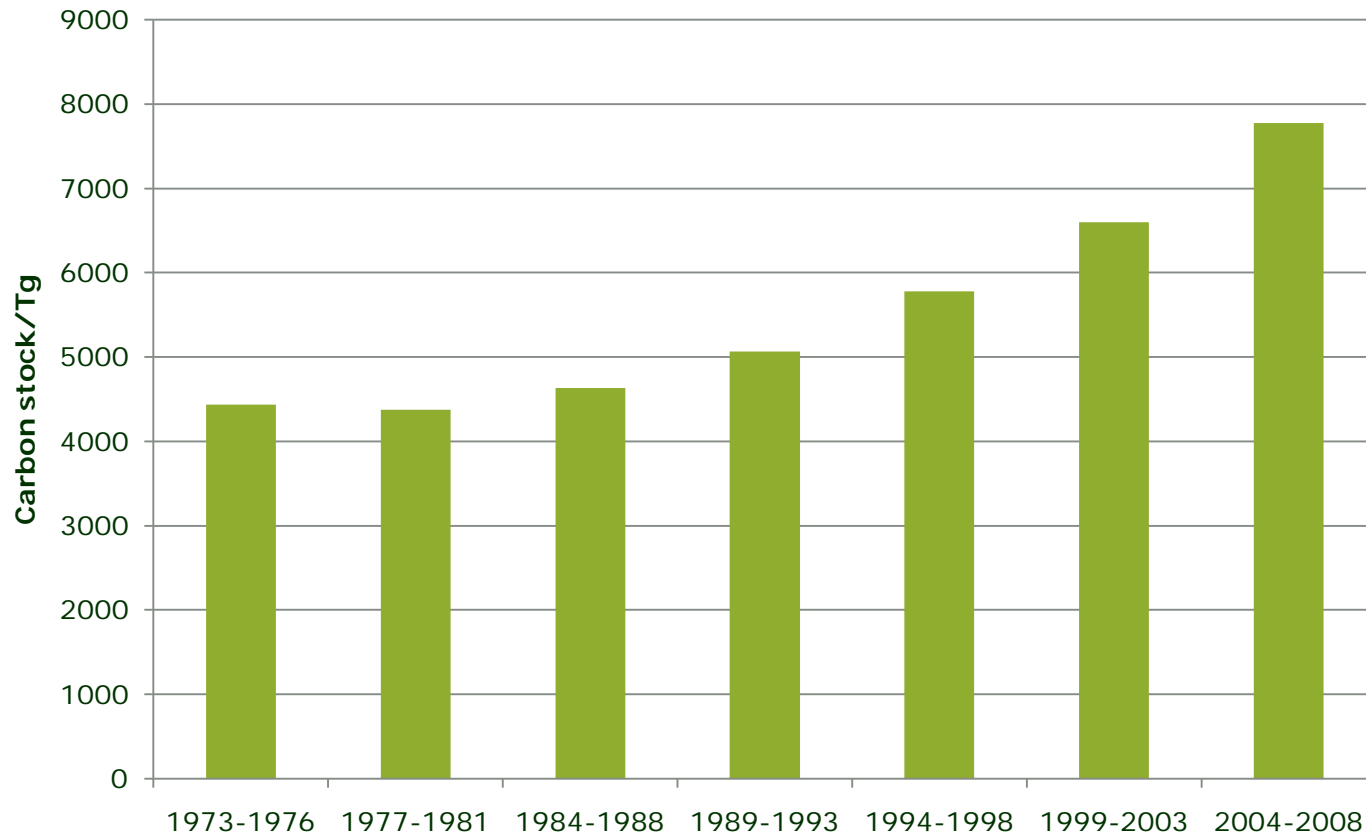
# Rapid urbanization (as projected with Northam's S-curve)



Data sources: UNDESA, *World Urbanization Prospects: The 2007 Revision*



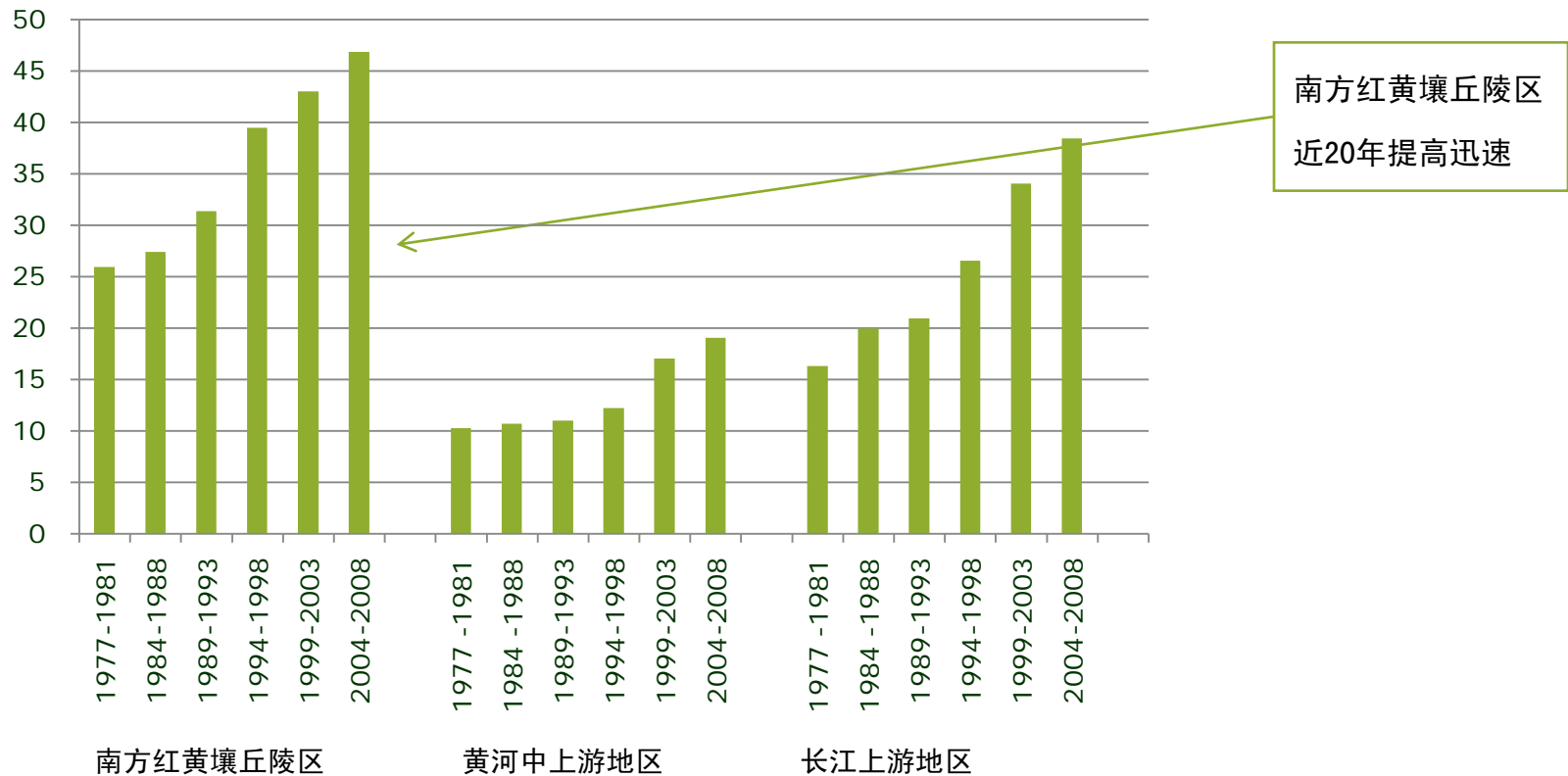
# Changes in forest carbon stock



—Fang et al. 2001; Guo et al. 2010; Li et al. 2011



# Changes in forest cover in major soil erosion area :



—Forest inventory data





# Wild lives is expanding their territory

—Wild boar disaster



*Wild pig invasion of  
the West Lake scenic  
area*

2000~2010年浙江省野猪数量从29,000只增加到150,000只。10年间增长了4倍。

—Nanfang Weekend, Sept.22, 2010

# Conclusions and implications

- National or continent-wide FT provide a valuable perspective for ecologically sustainable development;
- Major driving forces are unbanisation and cropland marginalisation;
- But the possibility of a global FT is still questionable.



*Thanks!*

*Li Xiubin*

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