

# Research Horizons in China

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## Outline

- Introduction
- Resources
- Agriculture
- Other Rural Sector Issues
- Labor and Migration
- Research Support
- Discussion

## Development Indicators Compared

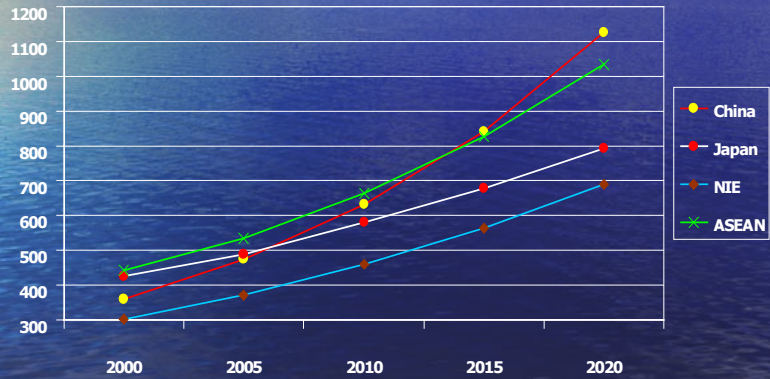
	China (Latest)	Japan (c. 1960)
<b>Life Expectancy (years)</b>		
Female	72	73
Male	68	68
<b>Infant Mortality (per 1000)</b>	31	31
<b>Primary Sector in GDP (%)</b>	16	17
<b>Per Capita Electricity Use (kwh)</b>	1071	1236

## Some Projections for China to 2020

- China will be the largest trading nation in East Asia by 2010, overtaking Japan in imports by 2005.
- Chinese GDP will rise to over two-thirds of Japan's by 2020, but remain below 10% in per capita terms.
- Most of this growth will be accompanied by increased inequality, particularly from a regional perspective.

# Real Imports

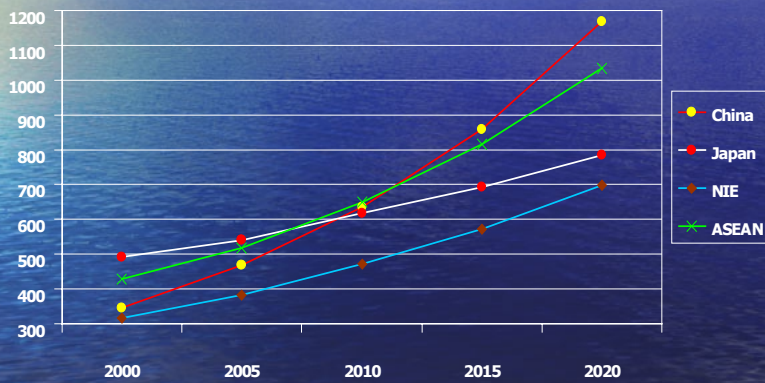
(billions of 2000 USD)



Source: Author's projections.

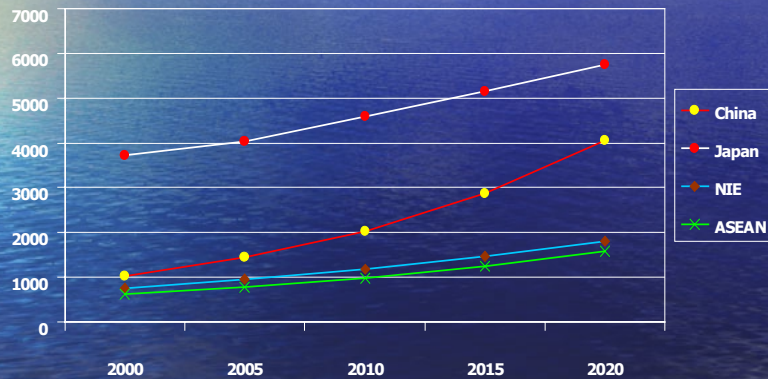
# Real Exports

(billions of 2000 USD)



Source: Author's projections.

## Real GDP (billions of 2000 USD)



Source: Author's projections.

## Resources – Principles

In China, the rural sector's primary resource and environmental effects arise from land use patterns, so we review the general principles of these first

- The term *land cover* denotes the natural or artificial objects on the Earth's surface.
- It is closely related to *land use*, which refers to why and how people work the land and how vegetation and soils are affected during this process. Land-use/cover changes alter how the Earth's system functions in three ways.

## Biochemical Cycles

- Deforestation accounts for about half the carbon released to the atmosphere since pre-industrial times; the other half comes from the burning of fossil fuels.
- Currently land-cover changes contribute about one-fifth of annual carbon dioxide releases.
- Nitrous oxide generated by applications of fertilizer, such as the large amounts of low-grade and highly volatile ammonium bicarbonate fertilizers used in China, is an important factor, as is methane released from rice paddies, ruminant livestock, and landfills;

## Radiation Balance

- Land-cover changes modify the Earth's surface characteristics, such as albedo and surface roughness, thereby altering heat fluxes;

## Ecological Complexity

- Intensifying land use has generally brought with it a simplification of ecosystems and a reduction of biodiversity. Important causes and disturbances are deforestation, fragmentation of ecosystems, regulation of water streams, monocultures, selective breeding, abandoning of traditional crop varieties and livestock breeds, and excessive application of agro-chemicals.

## Resources – Air

- The rural sector is a big contributor to greenhouse gases
- Air quality does not appear to be a significant factor in rural public health.
- For urban populations, however, chronic respiratory morbidity is five times the OECD average.
- China's share of global greenhouse gases is predicted to rise from 8% in 1995 to 26% in 2020.
- Average emission rates are falling, but growth is faster, especially in consumption (vehicles, solid waste, etc.).

## Resources – Water

- Aggregate supply appears adequate, but global warming could change all that.
- Natural distribution is capricious, managed distribution very inefficient.
- Serious rights/incentive issues in water management.
- Projects – Three Gorges, Grand Canal
- Pollution – Chemical and waste loading are both becoming serious problems locally.

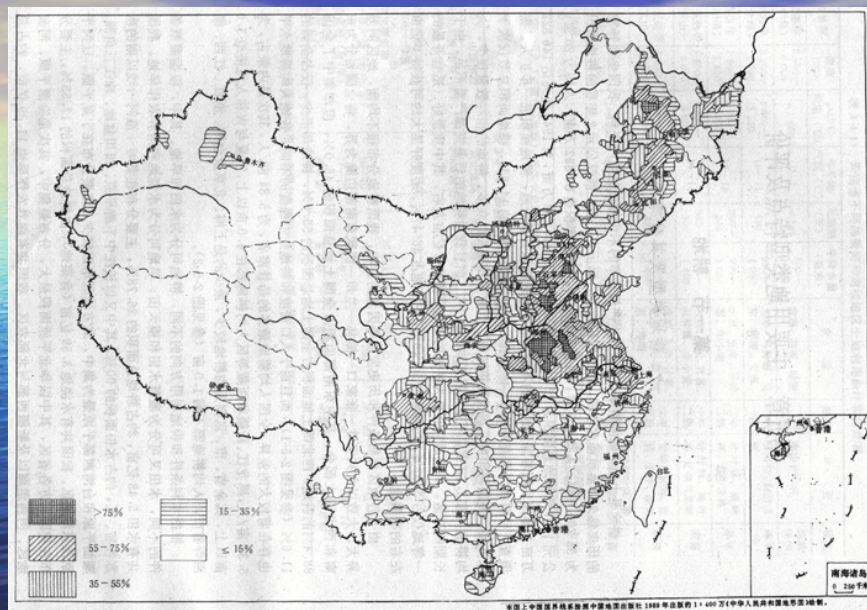
## Resources - Energy

- Yes, China has an unbelievable, 200 year reserve of bituminous coal.
- But, 40% of China's rail capacity is dedicated to moving it during the winter months. This is a very serious supply constraint.
- Alternatives – yes, but conventional
- Japan to the rescue?

## Resources - Soils/Land

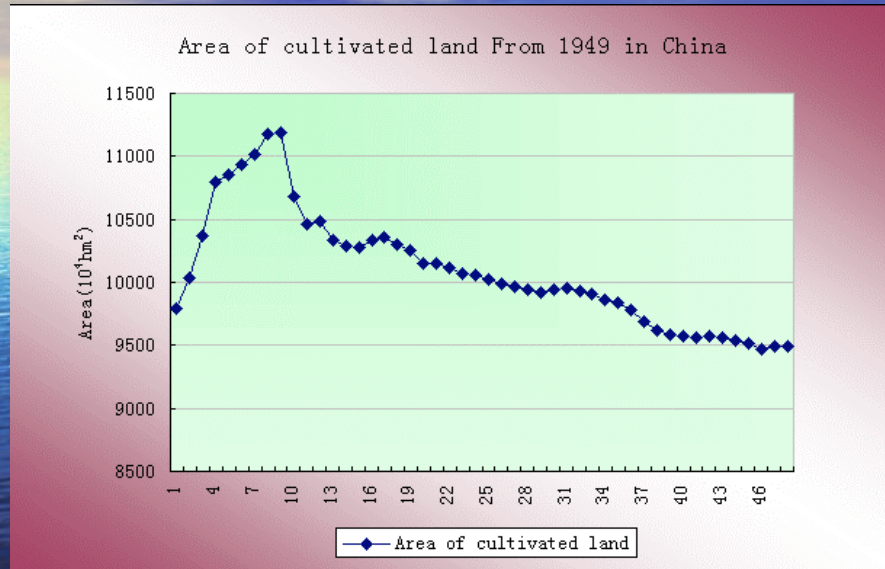
- Already among the world's most intensively used.
- Land displacement is a major problem.
- Chemical loading is also a growing problem, facilitated by subsidies.
- Rights issues are quite complex.

## Soils/Land – Agricultural Land Use





## Soils/Land - Cultivated Land Area



## Resources - Forestry

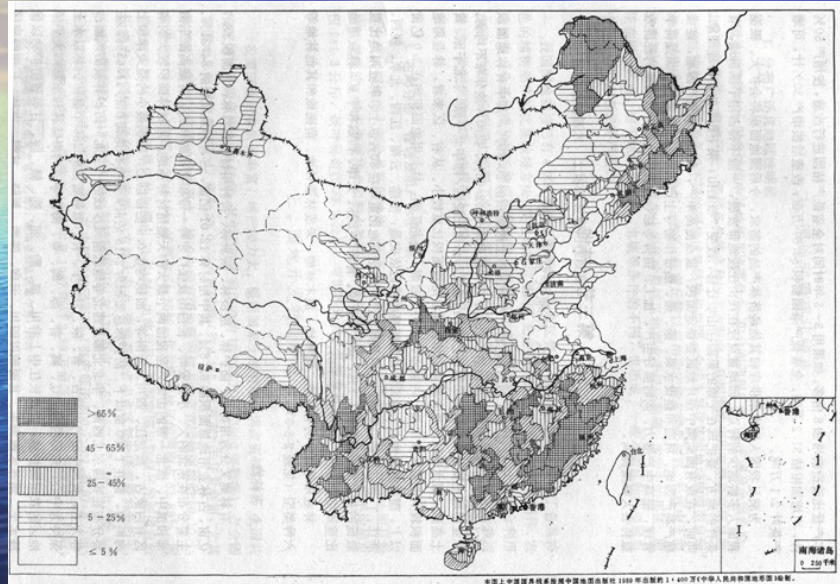
### Good news

- Serious and relatively sustained national commitment to planting.
- Extensive natural limits to logging.

### Bad news

- What is a forest?
- Diversity is basically going out the window
- FDI in extreme north and south (very bad)
- Emergent paper demand (scary)

## Resources - Forestry



## Agriculture Issues (domestic)

- Consumption Patterns
  - Engel, Aging
    - Meat and Fish 20%(1970)->40%(1990)
    - Protein requirements can move trade balances
- Technology – diffusion and adoption are slow and very uneven geographically
- Market access and margins

## Technology Diffusion - 2002

Image too large to email, please see

<http://www.roland-holst.net/Highlands.htm>

## Agriculture Issues (domestic)

- Property rights
  - Privatization
  - A lot of incentive issues
- De-collectivization and the optimal production unit
- Privatization of food processing (very necessary)
- Taxes and institutional failure

## Agriculture Issues (domestic)

- Finance
  - relatively stable in subsistence agriculture (esp. with non-transferable land), but difficult to get beyond this
- Remittances – later
- Sustainability – anyone's guess, but
  - Agrochemicals are still heavily subsidized
  - Water supply unreliable
  - Weather could become quite adverse at the margin
  - Capital costs are rising faster than farm incomes

## Agriculture Issues (international)

- WTO – a very big issue nationally, regionally, and maybe locally
  - Negotiated nationally, implemented (maybe) locally
  - Price transmission is generally a black box
  - Ag TOT – Who knows?
- North-South price dynamics are uncertain (OECD subsidies will decline a lot more slowly than Chinese protection levels)
- How will trade patterns emerge ?
  - Imports of technology, land, and subsidy intensive products
  - Exports of labor intensive and specialty products

## Agriculture Issues (international)

- FDI – yes, even in Chinese farming
  - Beginning in food processing and agricultural technology
  - Extending into farming, forestry, and fishery
  - Foreign affiliated exports:
    - 17%(1991)->50%(2001)
- Whither GMOs?
  - the answer depends upon ownership and IP generally

## Other Rural Sector Issues

- Isolation – this can be extreme and overcoming it is the key to rising above subsistence
  - Market access
  - Education/health service provision
  - Regional and sub-regional inequality
  - Non-ag diversification will remain very limited without big commitments to overcome this

## Other Rural Sector Issues

- Public Health – a lot of question marks here
  - Environment, especially toxicity and safety
  - Aging
  - HIV/AIDS
  - Health care delivery (barefoot or Gucci?)

## Other Rural Sector Issues

- Finance – some very nice modeling work to be done here on
  - Informal credit networks and risk sharing
  - Family versus other enterprise models
  - Inter-temporal, inter-generational, and spatial issues

## Labor and Migration

- Population
  - Will not stop growing until 2030
  - Growing fastest in rural areas
    - Among minorities
    - Among males
  - Transmigration policies are backfiring
- Migration – a time bomb?
  - Latin America cannot be repeated here
  - 200 cities with over a million people already
  - 100M official migrants, plus 250M “surplus” labor in agriculture
  - Residential infrastructure cannot be delivered fast enough
  - Asian “success” with migration until now hinged on the fact that, historically, it was demand-driven

## Labor and Migration

- How to stabilize rural populations?
  - Ag. TOT
  - Regionalize more downstream value added (shorten migrant travel)
  - The real conundrum – How to deal with ag Technology?
- Growth, Skills, and Inequality – the role of FDI
  - Evidently, FDI and unskilled labor are substitutes, but skilled labor is a complement
  - This means rising inequality and, depending upon labor supply conditions, limits to China’s comparative advantage
- Finance – Remittances
  - A very interesting and newly active area of research

## Support – who will pay for this?

- Before graduation
  - Find the right supervisor
  - Money may be available to individuals in a few areas
    - Climate and energy
    - WTO and ag. trade
    - Biotechnology and international IP issues
    - Public health
- After
  - Bilateral and multilateral aid agencies
  - Scientific public and private foundations
  - Some NGOs, but not many