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# Reflections on Eco-civilization & Environmental Ethics

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- Challenges to human being in 21st century
  - Global warming
  - Population – expanding human activities
  - Medical treatment and health care
  - Food supply
  - Energy resources
  - Water scarcity
  - Loss of biodiversity
  - Pollution
  - .....
- All these problems are connected with environment and ecology



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- Case of agriculture in China
  - In last 50 years, the Chinese population expanded from 500 million to 1.3 billion, arable land per person declined from 0.18h to 0.1 h. China feeds 22% of the world's population with 9% of world's arable land.
  - High-level waste and low efficiency in resource consumption:
    - 70% fresh water used in farming
    - China consumes more than 30% N-chemical fertilizer in the world
    - $\text{NH}_4\text{-N}$  becomes the main river pollutant in China, and the eco-environment has been drastically deteriorated by eutrophication
  - Bio-diversity losses in China
    - The number of endangered or nearly endangered higher plants reaches 4000-5000, accounts 15-20% of higher plants in China
    - 398 endangered vertebrate species, accounts 7.7%
    - Invading species cause crisis in local environment



One of an invading species: Crofton Weed  
(*Eupatorium Adenophorum Spreng*)



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- Self-questioning: what is the sustainable relationship between human being and nature
  - **Man's dependence on and conscious activity in nature**
  - **Dependence, adaptation, conflict and harmony between man and nature**
  - **Sustainable development of human being**



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- Principles of ethics and morality in science
  - To abide by ethics and benefit the human being
  - To serve public and society, to protect bio-diversity and eco-environment
  - To respect human dignity, human rights; to respect freedom of people and their creation; principle of informed content
  - Disinterestedness (resources, benefits and risks)



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- **The development of science and technology always challenges the traditional ethics and morality.**
- **Ethics and morality of science should regulate rather than restrict the development of science and technology.**
- **Scientists have more responsibility to solve the problems in global environment with their knowledge.**



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- Scientist is one of the social communities with highest knowledge level. It is their responsibility to protect human dignity, and to abide by the basic human ethics and morality.
- To "innovate the technology and benefit human being" is our eternal quest.
- Scientist's self awareness of scientific ethics and morality is very important



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- Facing the impact of globalized market economy, new technology brings great economical benefit. Scientists need to make rational choice on the basis of scientific spirit and also human well-beings.



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- Any new technology is a two-edge sword— when scientist advocates its advantages, he is also required to explain the possible risk and harm caused by this technology .



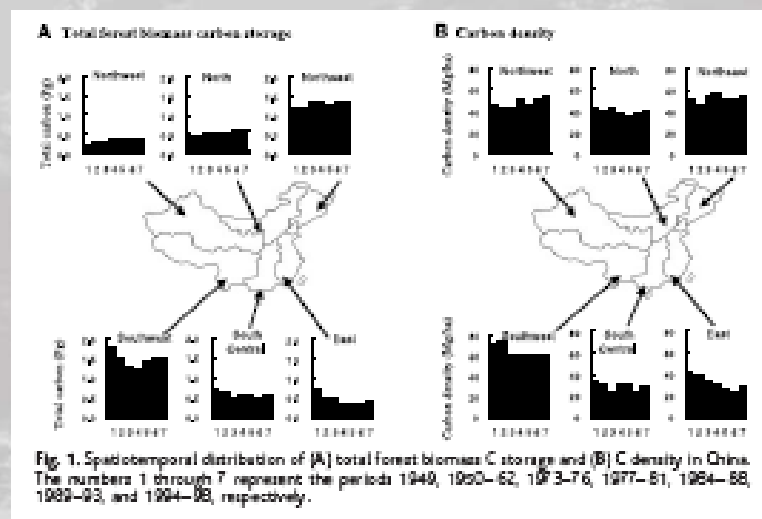
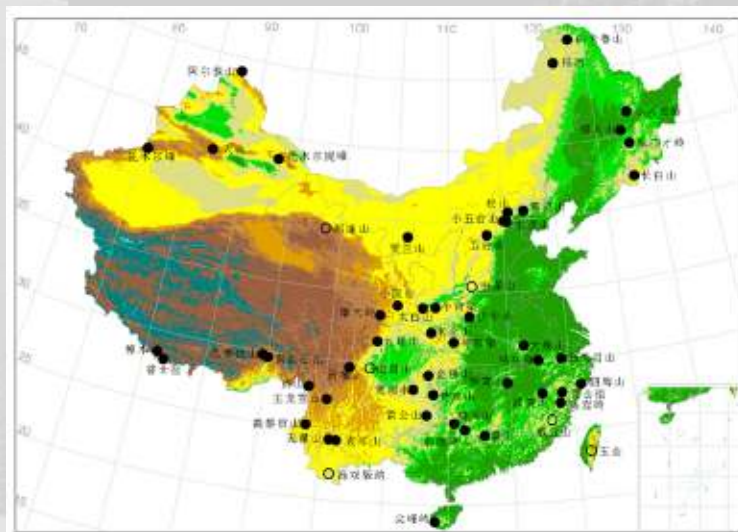
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- Eco-civilization and environment study in Peking University
  - College of Environmental Sciences and Engineering / College of Urban and Environmental Sciences
    - Zhujiang Delta environment monitoring
    - Pollution control in Dianchi Lake
    - Air monitoring in Beijing
    - .....



## Ecology and Environment research

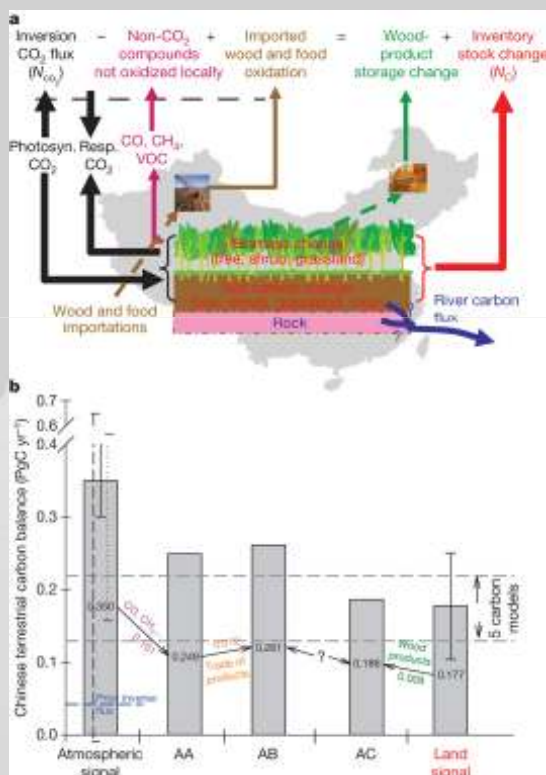
- Established Saihanba observatory for geo-environmental and ecological station, PKU (PKU-SOGES)
- Major results:
  - Carbon sink in China by forest, an ecological survey
  - It was commented as “an important benchmark study that will be cited for a long time” by the *Science commentary* (Onaga 2001)
  - It was also reviewed as one of the most important advances in the global carbon cycle by *Nature progress* (Schimel *et al.* 2001).



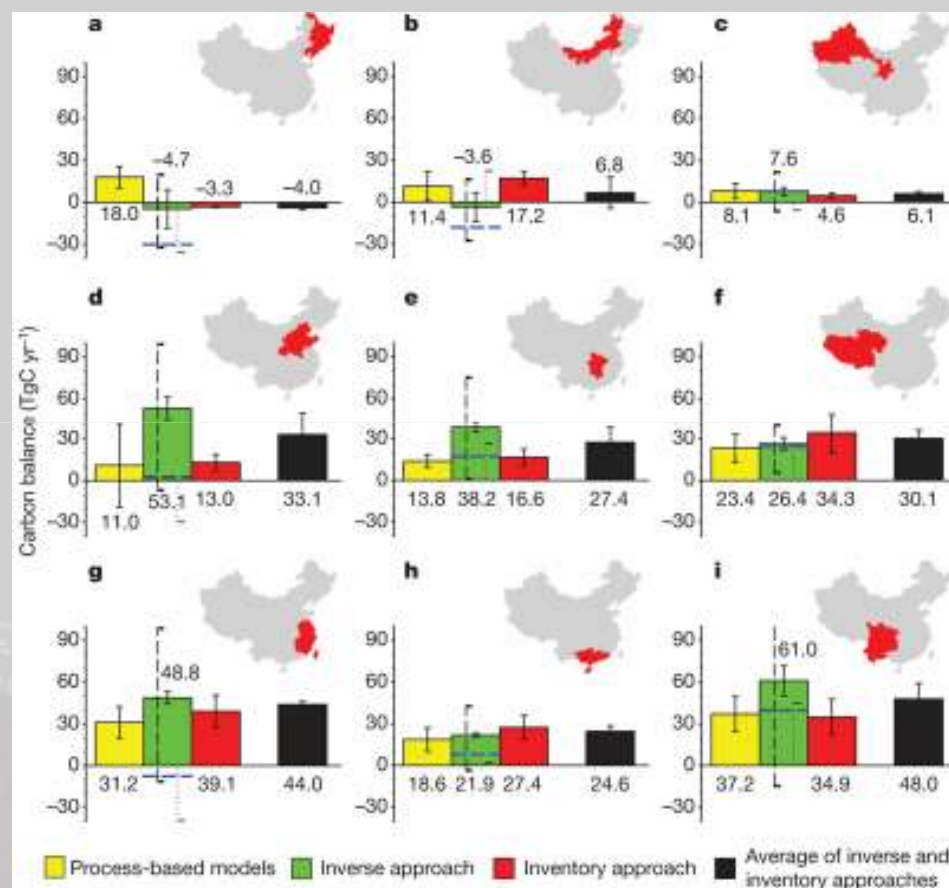


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## Carbon balance estimates of terrestrial ecosystems in China.



Carbon balance in the nine regions of China.



SL Piao *et al.* *Nature* **458**, 1009-1013 (2009) doi:10.1038/nature07944

nature



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## Biodiversity protection

- PKU Center for Giant Panda Conservation and Research
- White-headed leaf monkey (*Presbytis leucocephalus*)
- PKU Biodiversity Research Center at ChongZuo, GuangXi Province





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- Student's participation in the environment protection activities:
  - Educational Program for Environmental Education for College Students in China
    - 4th International Environment Forum for College Students (May, 2009)
  - Low Carbon Living Style (Low Carbon Pilot Program)
  - Student associations for environment protections
  - .....



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## IARU Green Campus Program

- NUS
- ANU
- ETH Zurich
- **PKU**
- Berkeley
- Cambridge
- Copenhagen
- Oxford
- Tokyo
- Yale





University	Targets
ANU	35% below 2006 levels by 2020
Berkeley	Back to 1990 levels by 2014
Cambridge	10% below 2005 levels by 2010/2011 for building related emissions
Copenhagen	20% below 2006 levels by 2013
NUS	<b>Energy &amp; heat:.....</b> <b>Air miles:.....</b> <b>Campus fleet emissions:</b> 100% offset in carbon emissions by using alternative fuels/greener vehicles and routing remaining carbon fees to campus green/energy efficiency projects

University	Targets
Oxford	20% of building related CO2 emissions below 1990 levels by 2010, real progress by 2020 and 60% by 2050 based on 1990 levels.
ETH Zurich	10% reduction in CO2 below 1990 levels
Peking	<b>15% per floor area below 2005 levels by 2010 (Short term goal).</b> <b>Currently reviewing for long term goal.</b>
Tokyo	15% of CO2 emission from non-experimental sector below 2006 by 2012
Yale	43% below 2005 levels by 2020



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- PKU Office of Campus Planning and Sustainability
  - two geothermal water well
    - 145 thousand tons of geothermal water annually
    - Saving approximately 580 thousand cubic meters of natural gas, or 7 to 8 million tons of standard coal
  - Building water cycle system to collect and transport wastewater and release back into the WeiMing Lake



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PKU Campus- a secondary forest and wetland system with rich biodiversity:

135 kinds of birds

11 kinds of small mammals

20 kinds of fish





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Thank you