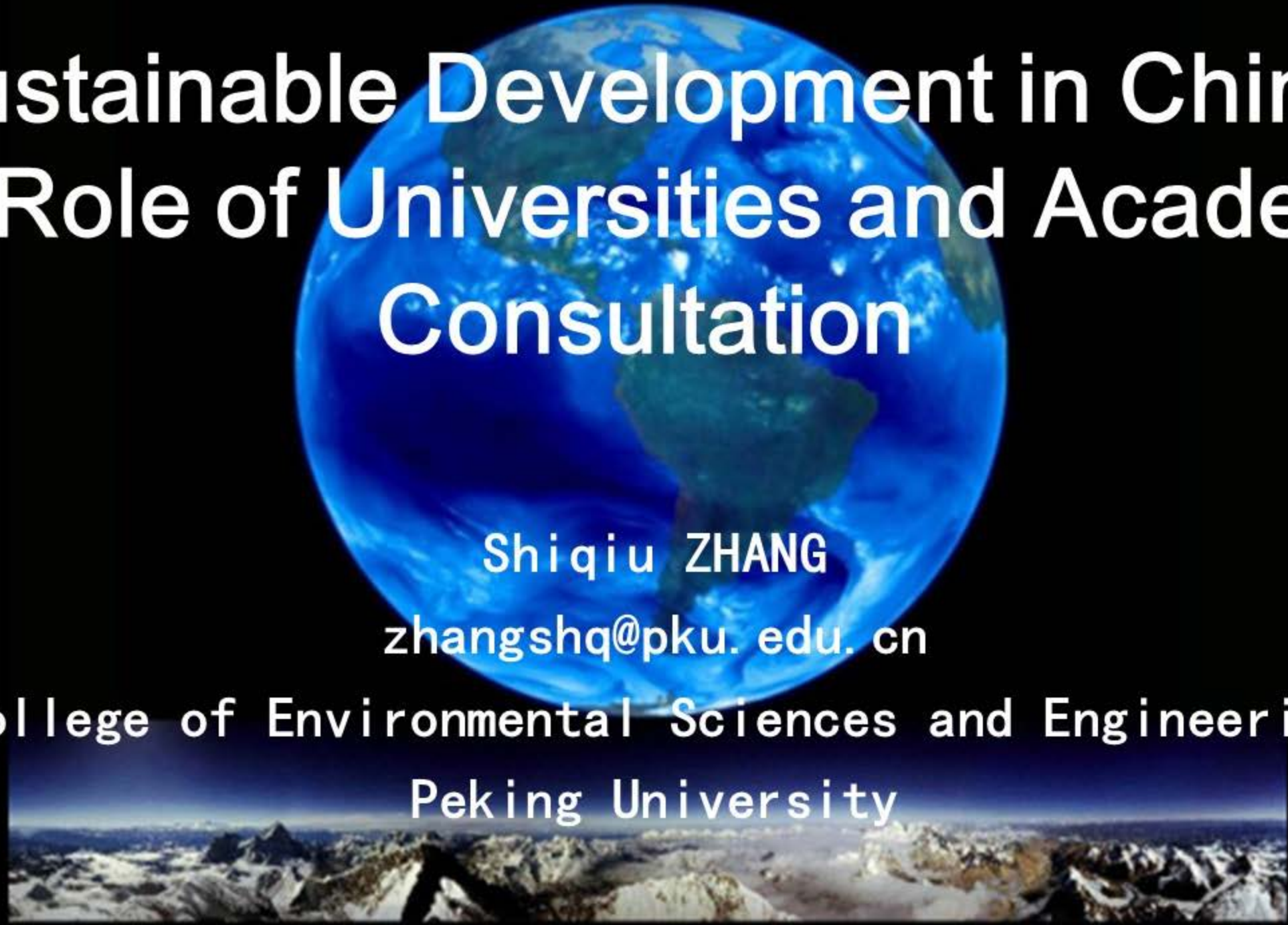
“Sustainable Development in China - the Role of Universities and Academic Consultation



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Addressing the local, regional and global problems under the framework of sustainability, by promoting eco-civilization, greening the economy, low/de-carbon practice, restructuring energy, and innovation

We are living in a dynamic Changing Planet:

- Resource
- Environment
- Eco-system
- technology
- Social restruction
- Uneven development and uneven distribution
- Globalization vs decentralization
- Government vs governance

China: The most dynamic economy

CHINA - Most Important Priorities

Chinese Economy
[1978 to 2000]
Grew at an annual rate of
9.3%

GDP growth
above 7.0 %
for [at least] next
15-20 years
(2020-2025)

- OPENING of the ECONOMY - WTO
- REDUCTION SOCIAL & ECONOMIC DISPARITIES

CHINA - Most Important Challenges

- **Accelerated Growth caused Severe Environmental & Social Imbalances**
- **Adjustments require Comprehensive Efforts to combine Economic, Social & Environmental (incl. Energy) concerns.**
- **Poverty alleviation and environmental protection**

Local, regional pollution
Health and welfare

Global change
International pressure

"China needs urgently to find an innovative road to continue the process of development, in general, & industrialization, in particular"

Reconciling the economic growth, natural capital (environmental quality, natural resources bases), social capital (a more equal society)

Two environmental revolution, and 3rd?

- 1960s to 1970s
  - The silent spring
  - The limit of growth
  - To limit the economic growth to keep the satisfied environmental quality
- 1980s-1990s
  - Our common future
  - Rio Conference
  - Reconciling the economic growth and environmental protection
  - Sustainable development
- 2010s
  - low carbon economy, green economy, green development
  - Technology, restructuring industry, social responsibility of Enterprises, public participation, environmental justice and social development
  - Governance -
  - Eco-civilization—harmonized human and nature

China: a critical stage: tipping point or turning point - windows of opportunities

Green Goals and development Capacity building and Innovation

New Political Opportunities

- the 18th CPC Congress, called to promote the eco civilization and integrate it to economic, social, political decision process
- The strong political willingness hopefully will be turned into reality during the coming years, and in the process, green development achieved for all parts of China. Such an outcome will be an immense contribution for the whole world's environmental state as well.
- --by CCICED

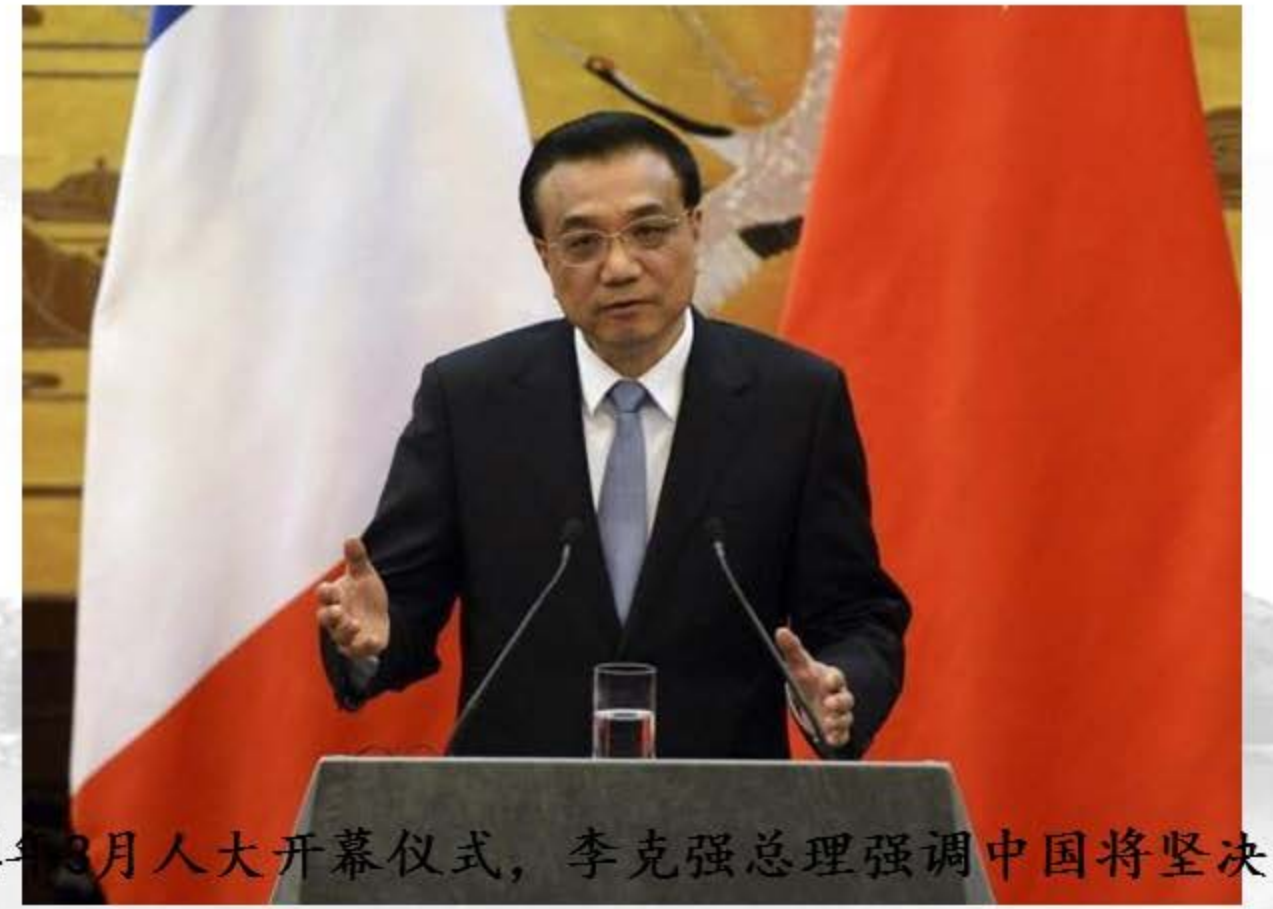
- "New Normal" of Economy
- Governance: "steel and iron" vs "multiple stakeholders involvement" + MBI + public
- Enhanced Env. Protection Law
  - *** public participation
  - *** "public interest litigation"

Continuing efforts----

- 11th 5 years plan, by 2010 (at 2005 level)-achieved
  - Energy efficiency improved 20%
  - Total emission reduction 10%
- 12th 5 years plan, by 2015 (at 2010 level)
  - Energy efficiency improved by 16%
  - Total emission reduced by 8-10%
- By 2020 reduce the GHGs emission by 40-45% per GDP of year 2005 level; 60-65% by year 2030
- increase the share of renewable and clean energy to 15% by 2010, and 20% by 2020

China to 'declare war' on pollution, premier says

BEIJING Mar 4, 2014 - http://www.reuters.com/article/2014/03/05/us-china-parliament-pollution-idUSBREA2405W20140305



2014年3月人大开幕仪式，李克强总理强调中国将坚决向污染宣战！

China's premier, Li Keqiang at opening of the National People's Congress, Mar 2014

‘War on Pollution’ : air -Water-soil Action Plan have been launched

http://www.chinadaily.com.cn/opinion/cartoon/2013-

General picture of China's climate

- Mitigating and adapting to climate change

- Transforming the development pattern

- Construction of ecological civilization and sustainable development

- Promoting international low-carbon competitiveness

- Energy Security, through energy efficiency and promotion of renewable energy

- Joining international climate cooperation constructively

A National Carbon Trading Market in 2017---

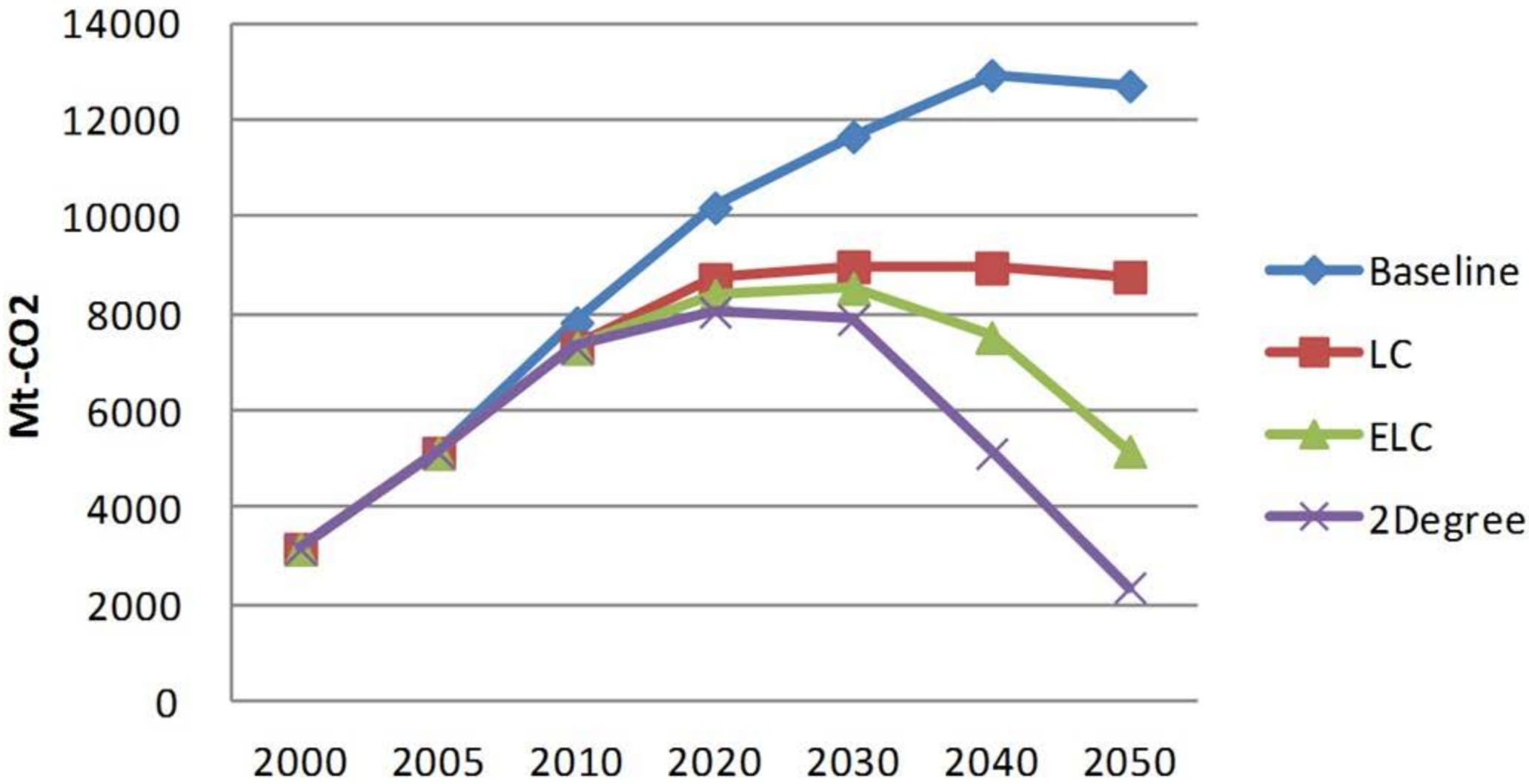
General picture of China's climate policy

Long-term target up to 2030

- Joint announcement between China and US on Climate change !
  - Peak around 2030; as earlier as possible
  - Share of Non-fossil fuel in energy mix would be promoted to be 20%;
  - Other actions: expand cooperation and pilot on clean energy, CCS, HFC;
  - launch smart/low carbon city initiatives; promote green product trade;
- "New Normal" of economic development

TURNING POINT

CO2 Emission in China



Low Carbon Scenario, LC

Enhanced Low Carbon Scenario, ELC

ERI estimation

Green Goals and development Capacity building and Innovation 'Mind the Gaps'

- China has an increasingly coherent & integrated set of Green Development Goals and Aspirations covering now to 2030.
- Capacity (governance and compliance) will improve through 'Deepening Reform', 'New Normal' Structural Adjustments, Anti-corruption, Rule of Law, etc.
- Innovation in S&T, management, financial mechanisms, institutional strengthening, & other means is necessary for accelerated progress on achieving and Ecological Civilization. Integrated approaches & international cooperation are needed.

Based on CCICED

http://www.chinadaily.com.cn/opinion/cartoon/2015-03/03/content_19699190.htm

Enhanced Env. Protection Law

*** public participation

*** "public interest litigation"

Reasons to be Positive about Environment & Development in China

- Enormous investment in War on Pollution
- Strong emphasis on Green Development, Greenization and Ecological Civilization
- Peak in Coal Use - already past
- Assurance of 13th FYP environment emphasis and good signs for 2015-2030 framework
- Revisions to environmental legislation & enforcement action
- Green development emphasized for int'l initiatives

Based on CCICED

Worries about Environment & Development Progress

- Slow implementation on Water & Soil in War on Pollution; enormous scale of problems
- Obvious problems with environmental risk management
- Limited governance capacity & Enormous financing needs
- Complication of the problems facing, both physical and social
- Enforcement is concerned

Based on CCICED

Governance Capacity

- Standard Approach (examples)
  - Law, Regulation & Compliance
  - Size of institution(s)
  - Leadership ability
  - Skills development
  - Budgets
  - Technology

- Green Alternative Approach (examples)
  - Development supervision by the people
  - Collaborative planning & management
  - Zero impact development
  - Green taxation
  - Sustainable consumption
  - Green investment
  - Integrated and coordinated planning
  - Sharing Economy

Responding to change: towards a sustainable development

- Education
- science……..
- outreach
  - Restructuring: social, economy, technology……
  - Policy tools
  - Implementation and practice
  - Social norm and behavior changes

University: education (human capital), knowledge generation, scientific understanding, improve the decision making, promoting social progress

Leadership and good citizenship are needed for a sustainable development future

- Social context
  - low carbon economy, green economy, green development
  - Technology, restructuring industry, social responsibility of Enterprises, public participation, environmental justice and social development
  - Governance - Government-enterprises-citizens(public)
  - Eco-civilization—harmonized human and nature

  - A need for Reconciling the economic growth and nature and society; improve social capital is the key

Leadership and good citizenship are needed for a sustainable development future

- A responsible citizen for Environment and sustainable development
  - GOAL: A responsible citizen/leadership with capacity, ability, power of effective action

A responsible citizen for Environment: norm/ethics

do it no matter how small it is, don't do it no matter how minor it is

负责任环境公民的基本行为准则/伦理“不以善小而不为、不以事小而乱为”by Zhang Shiqiu 2011-

- four levels?
  - 洁身自好：do your best
  - 以己及人、推己及人：influence others
  - 消费者力量： 消费为环境负责：consumer's power—consumption responsible for environment-eco system
  - 公民的力量： citizen and public power

目标：有能力、行动力和负责任的公民和引领者/推动者

公民权利和权力、公民责任、公民义务承担的整合

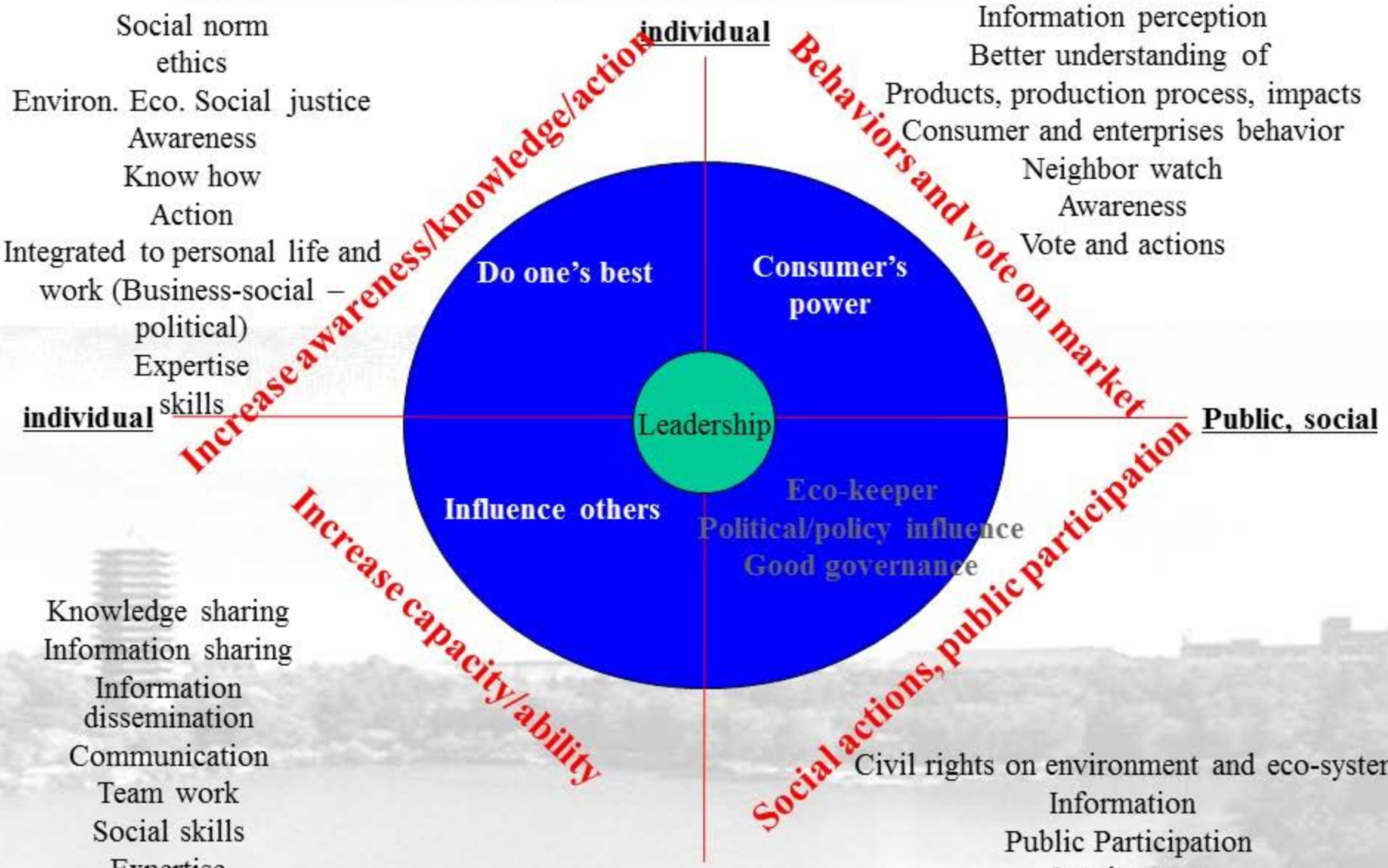
GOAL: A responsible citizen/leadership with capacity, ability, power of effective action

Integration of civil rights, power, responsibility, and duties

Zhang Shiqiu 2011-

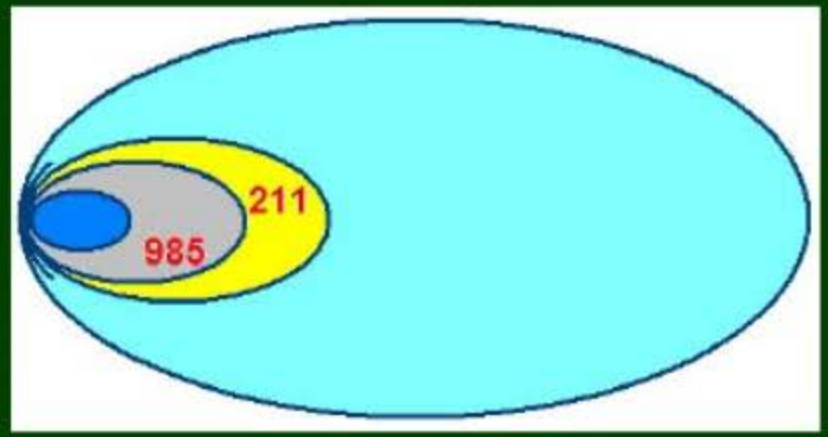
有能力、行动力和负责任的公民和引领者/推动者

responsible citizen/leadership with capacity, ability, power of effective action

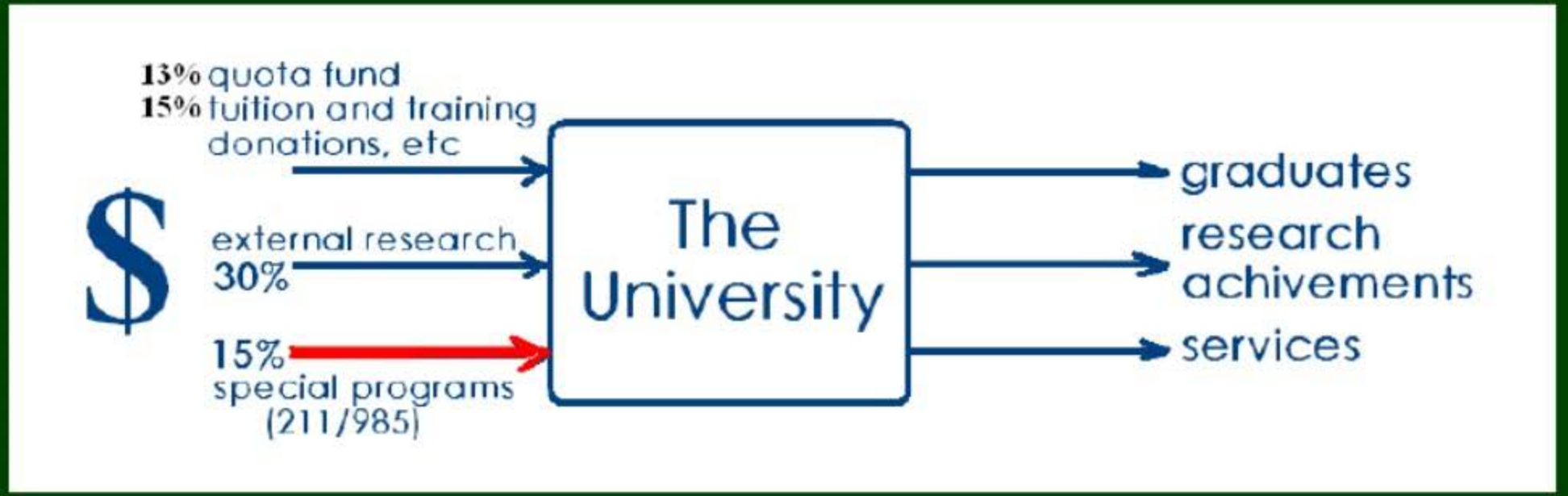


Learning curve

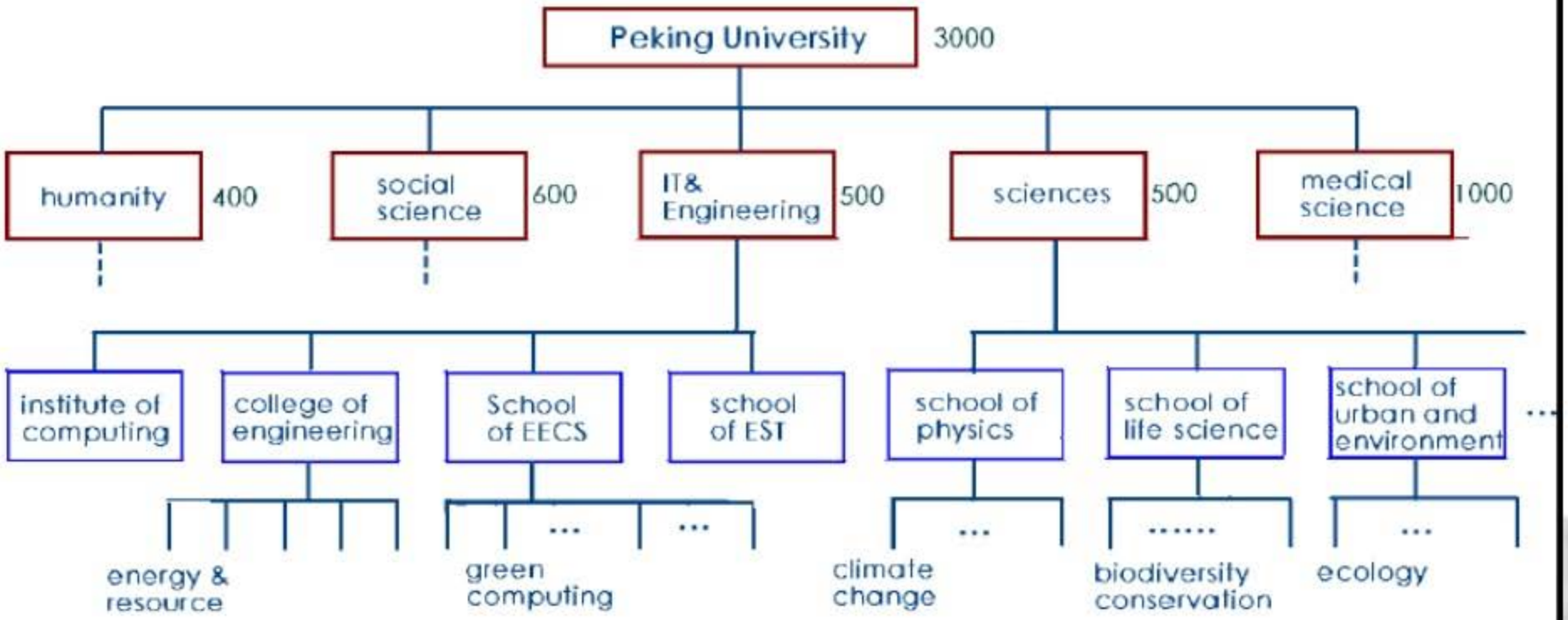
A Perspective of China's Universities



- Research Funding sources
  - NSFC
  - MOST
  - Other central government agencies
  - Provincial governments
  - Industries



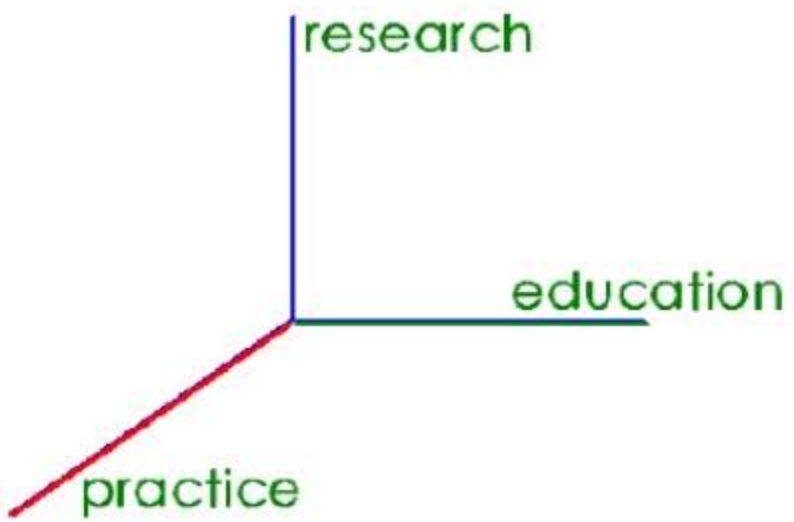
A Perspective of Peking University

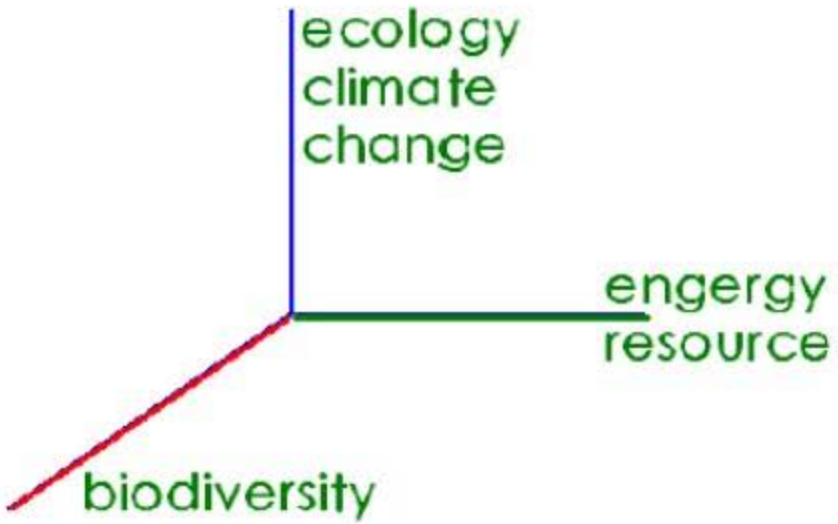


with an emphasis on sustainability and computing

Sustainability as a Pursue of the University

- contributing to global importance, besides traditional academic excellence





Sustainable development activities at PKU

- Institutions
- Green campus activities
- Syllabus and green courses pilot
- Global alliance

- College of Environmental Sciences and Engineering
- College of Urban and Environment
- College of Life Science
- College of Engineering
- College of Law; College of Economics; College of Public management

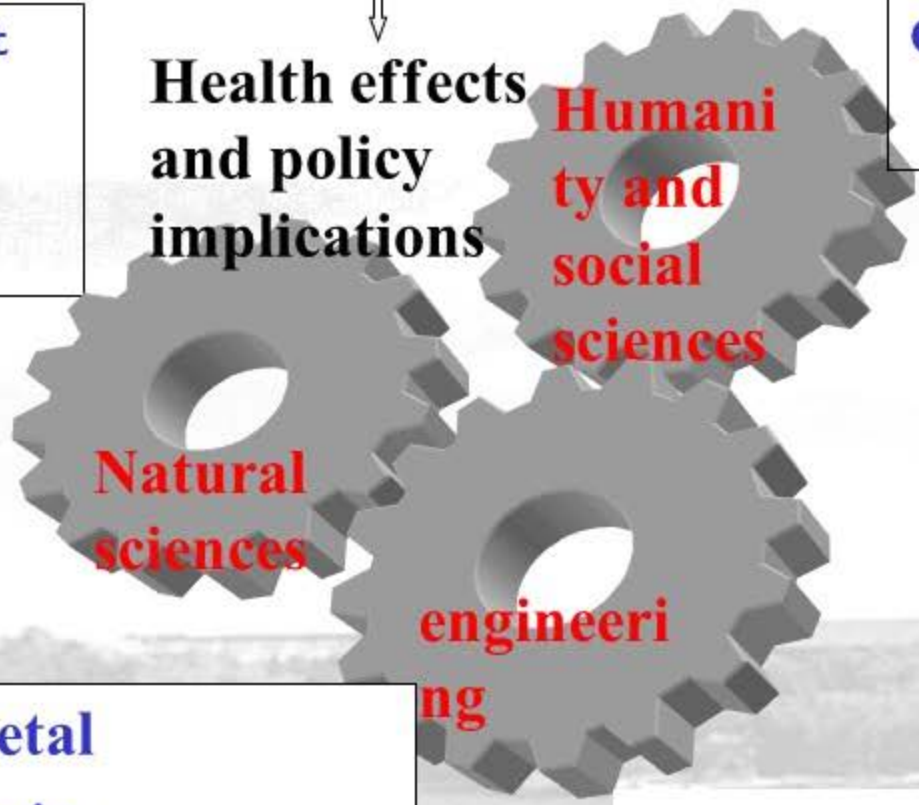
CESE

•Environ and health

- Env. Management and sus. development
- Env. Econ and policy

Health effects and policy implications

- Regional air pollution and climate change



sustainability

Env. Chemistry and physics

- Heavy metal
- Water basin
- Regional air pollution

Pollution prevention and control

Bio tech; chemical approach; systematic

Sustainable development activities at PKU: Green campus activities

- Students activities and students organization
  - the very active one was CDM club and Institute of Environmental Public Policy
- Green campus campaign
- GHG (Green House Gas) emission management of campus
- Biodiversity observation at campus
- Students alliance of universities in China and abroad

Jointly promoting the 1000 young environmental friendly ambassadors in China together with Ministry of Environmental Protection

千名青年环境友好使者行动

“千名青年环境友好使者行动”项目旨在对北京、上海、成都、广州、沈阳、西安六个城市的1000名青年进行节能减排培训，同时该千名受训青年又在自己所在的学校、社区对至少1000名公众进行培训，直接受众达上百万人次。

在面对面培训的同时，受训人员还通过腾讯网、个人博客等网络媒体向更广泛的人群宣传和倡导节能减排生活方式和理念，影响人群数以亿计，获得良好的宣传效应和社会反响。

2010年6月4日研究社成员阳平坚、易如因参加“千名环境友好使者行动”项目受到李克强常务副总理亲切接见

Organize various academic activities at the campus by the students organizations

全球环境管理论坛

全球环境管理论坛（International Environmental Governance Forum 2010）由联合国环境规划署支持、全球环境管理项目资助,于2010年8月8日在北京大学英杰交流中心举行。该论坛由联合国环境规划署（UNEP）资助，由北京大学环境公共政策研究社（IoEPP）组织承办，旨在召集关注环境的年轻人就当前环境管理方面的问题进行讨论，为政府决策提供建议。

2010年8月全球环境管理论坛

Sustainable development activities at PKU: Syllabus and green courses pilot

- Promoting the sustainable development and integrate into the curriculum
- Open course on sustainable development
- Syllabus changes
- Green course pilots

Integrate the real concerns into education processes……

Sustainability driven

Complex: Comparing to pure sciences

Systematic: Science-Engineering-Management

Formation-effects-prevention

Multi-disciplinary and integration: Social-natural for

What the basis will be needed?

Literature

History

Philosophy

Mathematics

Physics

Chemistry

Astronomy

Earth science

Life Science

Politics

Economics

Law

Required courses

Natural basis

General chemistry

Analytical chemistry

Specialty

Environ. Science

Environ. Engineering

Environ. Manage.

Ability

1、To find a problem

2、To explore the problem

3、To solve the problem

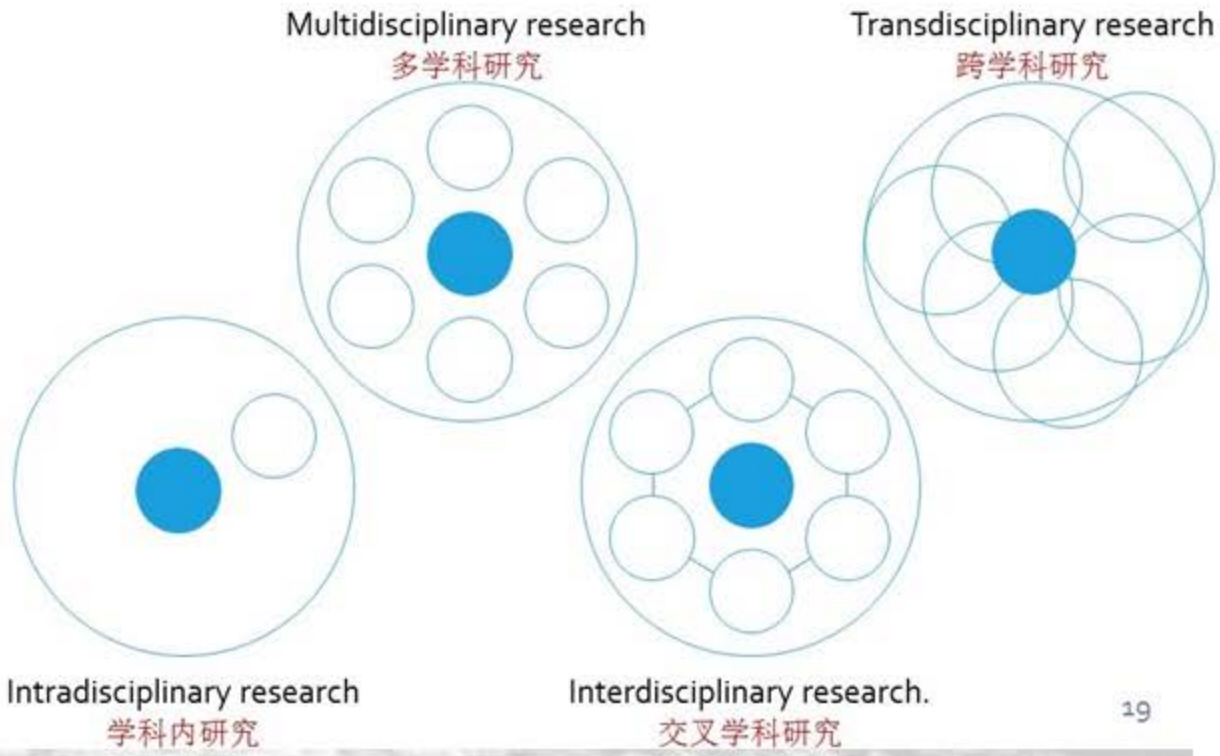
4、Express

Travel!

Make friends!

Intradisplinary, interdisciplinary, multidisciplinary, transdisciplinary open science

Typology of research 研究类型



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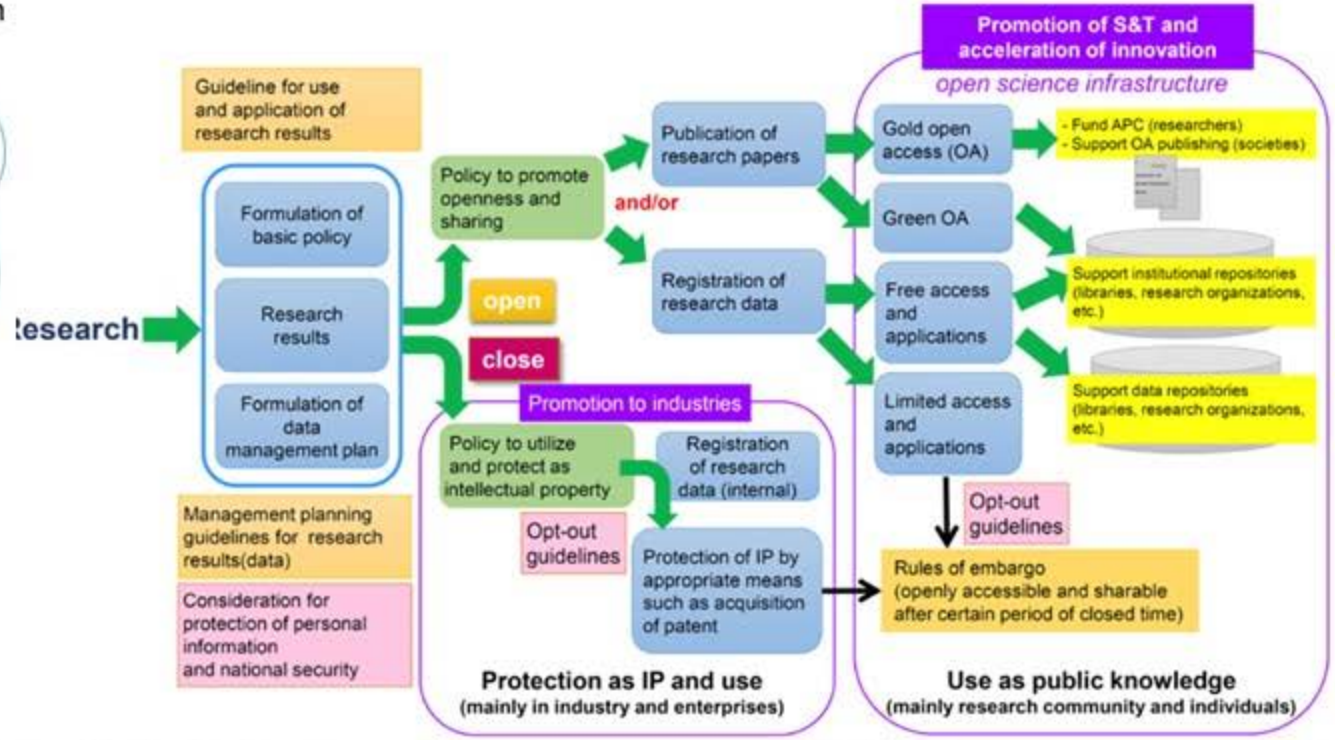


Cabinet Office (2015.3) Promoting open science in Japan. Executive summary.
http://www8.cao.go.jp/cstp/sonota/openscience/150330_openscience_summary_en.pdf

(Campaigns of Air Quality Research in Beijing and Surrounding Region)

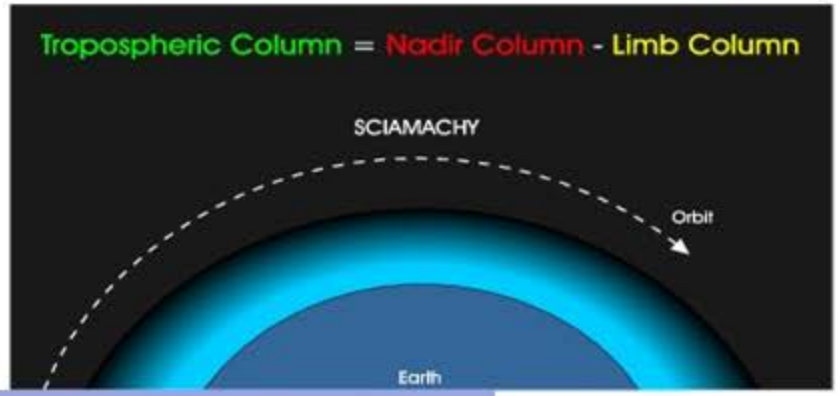
~20 Research Institutes Participated

1. Peking University
2. Institute of Atmospheric Physics, CAS
3. Anhui Institute of Optics and Fine Mechanics, CAS
4. Chinese Academy of Environmental Sciences
5. Chinese Academy of Meteorological Sciences
6. Beijing EPB,Tianjin EPB,Hebei EPB
7. Research Center for Environmental Changes, Taiwan
8. Hong Kong Polytechnic University, Hong Kong
9. University of Science and Technology, Hong Kong
10. University of Tokyo, Japan
11. National Institute of Environmental Sciences, Japan
12. Gwangju Institute of Science and Technology, Korea
13. Forschungszentrum Juelich, Germany
14. Institute for Tropospheric Research in Leipzig, Germany
15. Max-Planck Institutes in Mainz, Germany
16. Bergische University Wuppertal, Germany
17. CNR-IIA, Rome, Italy
18. Georgia Institute of Technology, USA
19. SUNY, USA
20. Texas A&M University, USA
21. Aerodyne, USA

Main Findings of CAREBEIJING-2007

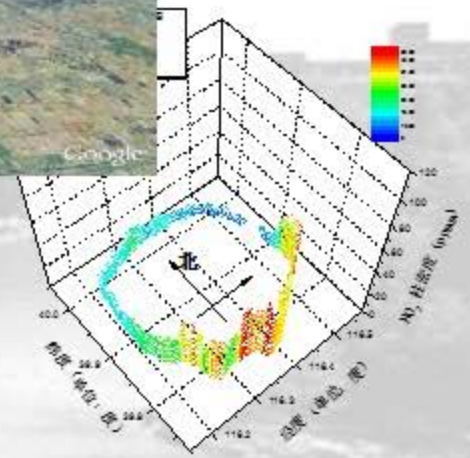
Integrated observation of ground, towers, aircraft, and satellite

1. All the methods used gave consistent evidences that emission from vehicles were reduced during the four days traffic control;



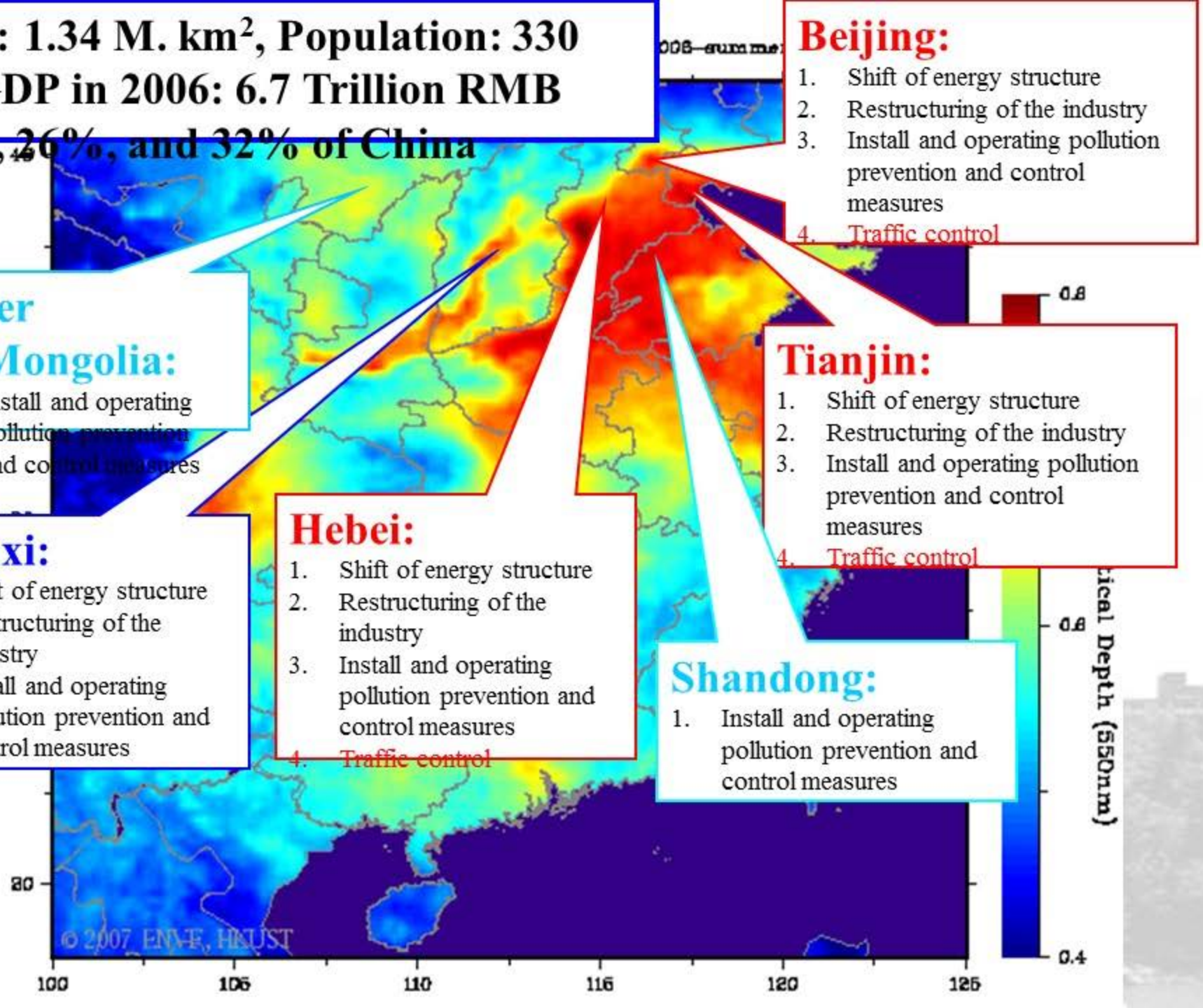
2. The traffic control during 2008 Olympic Game should have a larger scale than the four days traffic control in 2007 has.

3. Besides traffic control, systematic controlling measures, including those for construction and industries, are necessary.



Area: 1.34 M. km^2, Population: 330 M, GDP in 2006: 6.7 Trillion RMB

21%, 26%, and 32% of China



Beijing:

1. Shift of energy structure
2. Restructuring of the industry
3. Install and operating pollution prevention and control measures
4. Traffic control

Inner Mongolia:

1. Install and operating pollution prevention and control measures

Tianjin:

1. Shift of energy structure
2. Restructuring of the industry
3. Install and operating pollution prevention and control measures
4. Traffic control

Shanxi:

1. Shift of energy structure
2. Restructuring of the industry
3. Install and operating pollution prevention and control measures

Hebei:

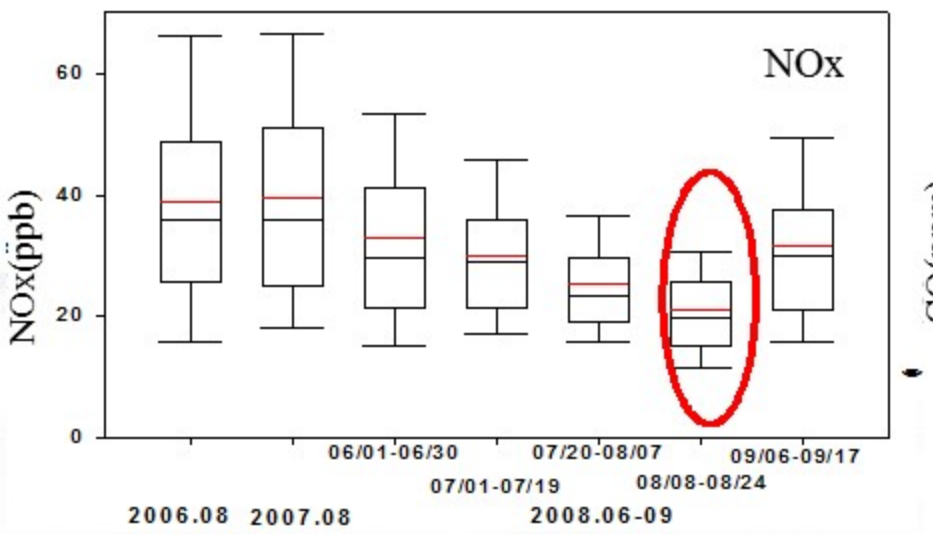
1. Shift of energy structure
2. Restructuring of the industry
3. Install and operating pollution prevention and control measures
4. Traffic control

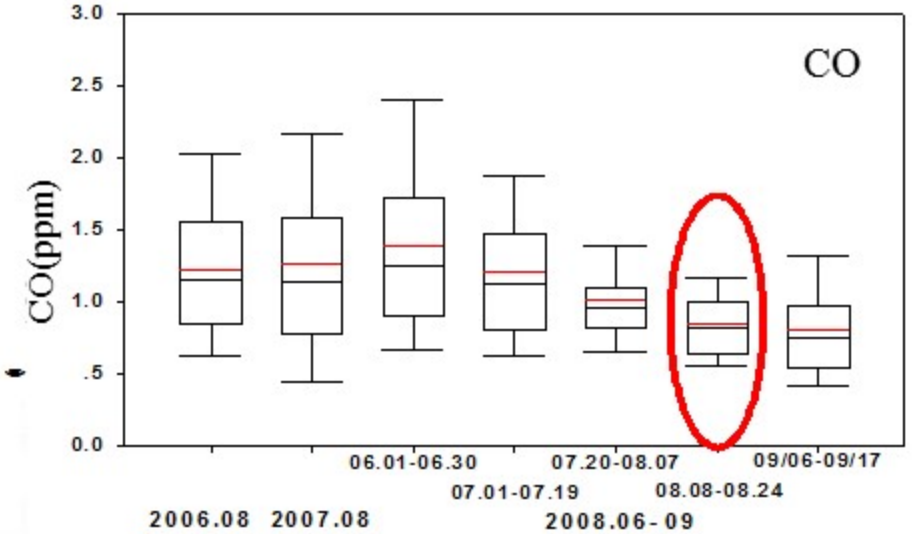
Shandong:

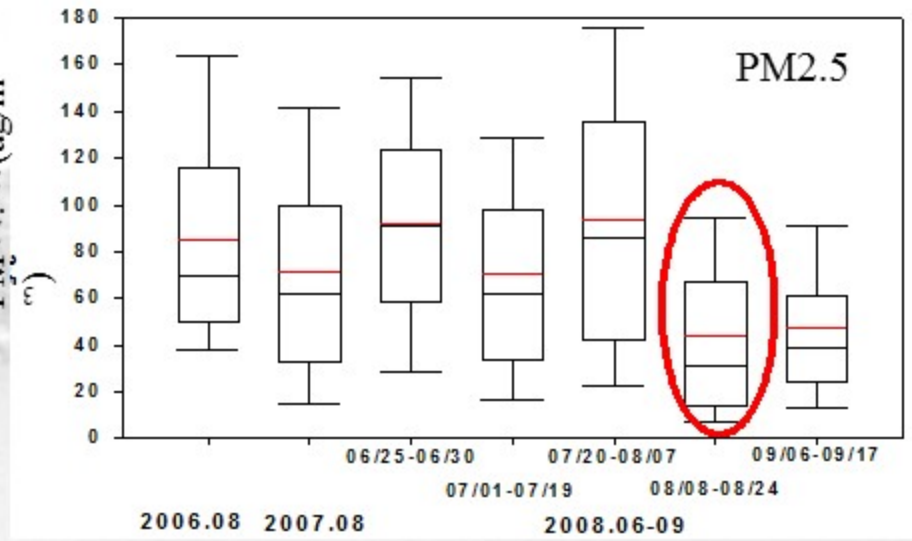
1. Install and operating pollution prevention and control measures

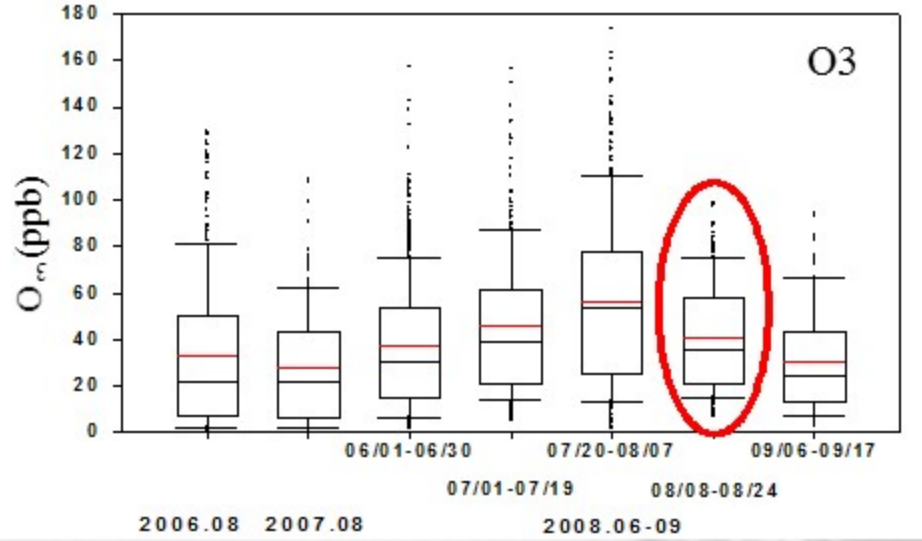
CAREBEIJING-2008

Evaluation of Controlling Policy during Olympics









Lessons learned

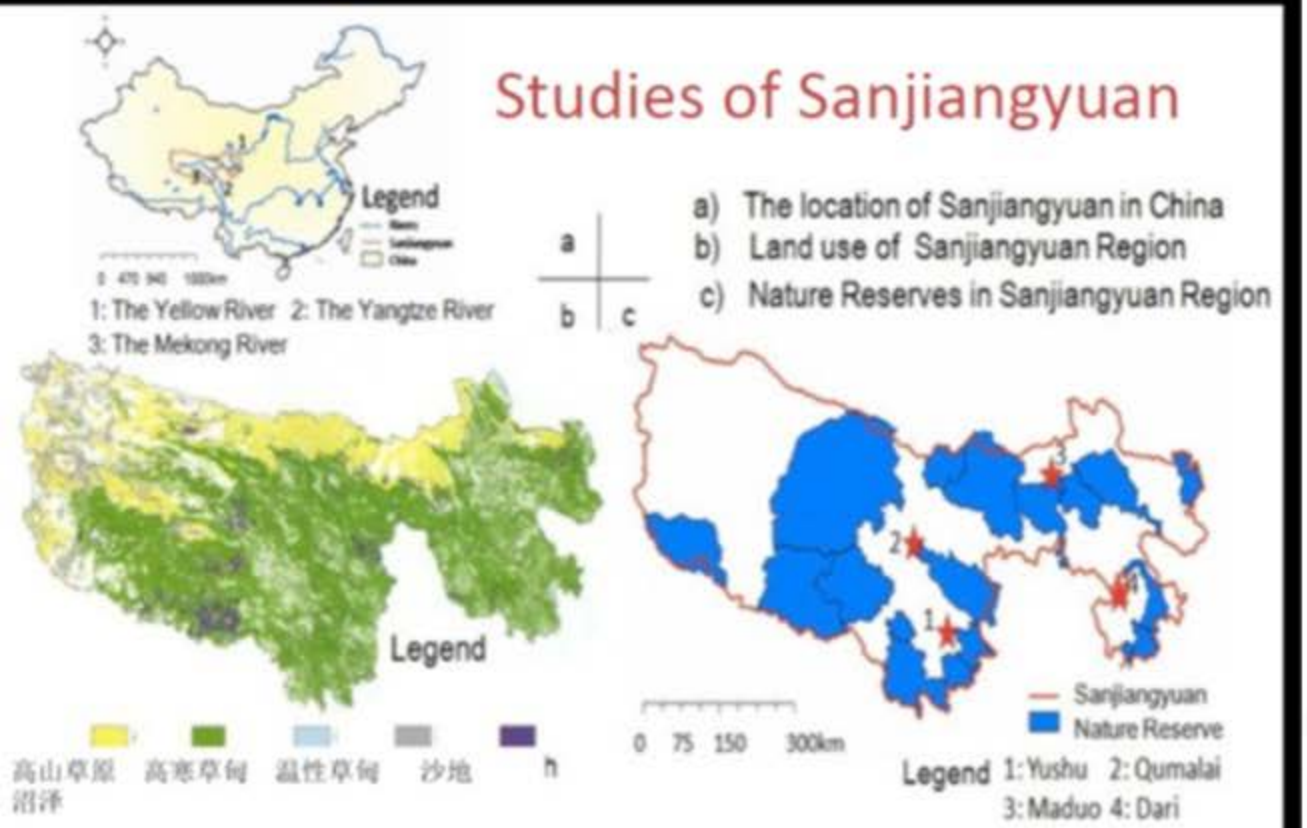
- Understanding of the feature of problems: science is important
- Least cost strategy?—economic and policy analysis is necessary
- Single vs multiple pollutants control: ancillary/co benefit,
- Local based and regional based-regional environmental regulatory and cooperation framework
- Short term and long term effects-co benefits, Momentum, incentive
- Emission based or damage based—right control priority and pollutants, sources
- Command and control and MBIs—costly or lower cost
- Awareness and participation of the residents—wise policy design
- Environmental regulatory reform—regional scheme

Social Biology, Population Genetics, and Ecological Physiology of the White-Headed Langur

- White-headed langur-*Trachypithecus leuc*
- Main distribution < 80km2
- Total population: < 1000 individuals
- Critically endangered species by IUCN

A research base was established 2002

Studies of Sanjiangyuan



- The area, vegetation and large protected areas (150,000km²)

Conservation and development should be based on better scientific evidences and analysis

What happened ?

- Climate change?
- Population increase/over grazing?
- Rodents invasion?
- Nomads vs. settlements? – behavior change?
- What else?

Causes of Degradation

Natural

- Warming
- Erosion by wind and water
- Freeze thawing
- Drought
- Snow storm
- Pests

Anthropogenesis

- Cultivation
- Overgrazing
- Livestock stepping
- Settlements
- Medicine harvesting
- Mining
- Road and cable building

STILL A LONG WAY AHEAD