

TPM11 - Session 4

PRA3. Urban Environment and
Eco-city
- Eco-City: Towards Ecological
Civilization



Eco-City: Towards Ecological Civilization



中国环境科学研究院
CHINESE RESEARCH ACADEMY OF ENVIRONMENTAL SCIENCES

Outline

Part I Urbanization Background

Part II Eco-City Study Progress

Part III Cooperation Suggestion

Part 1

Urbanization Background

Urbanization Background

- In 2012, Ecological Civilization was set as national development goal by the 18th CPC National Congress.

- *Improve and optimize spatial development pattern*
- *Promote natural resource conservation*
- *Intensify ecosystem & environmental protection*
- *Enhance environmental administration system building*



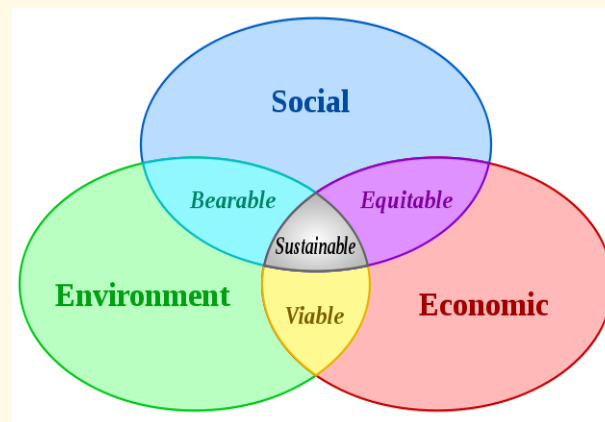
Chinese Upgraded Version “Sustainable Development”

Environmental Aspect:

The prevention and control of environmental pollution.

Economic Aspect: *Economic development should be compatible with the carrying capacity of resources and environment.*

Cultural Aspect: *Ecological culture construction.*

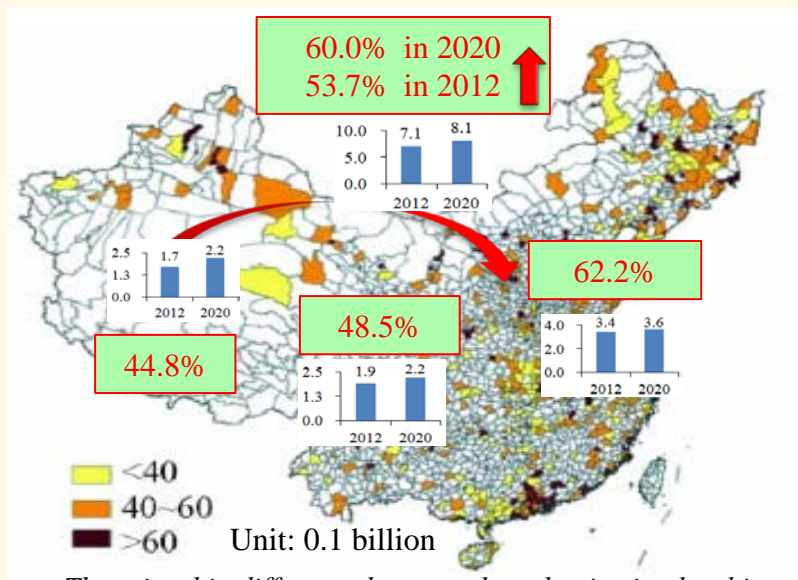


Urbanization Background

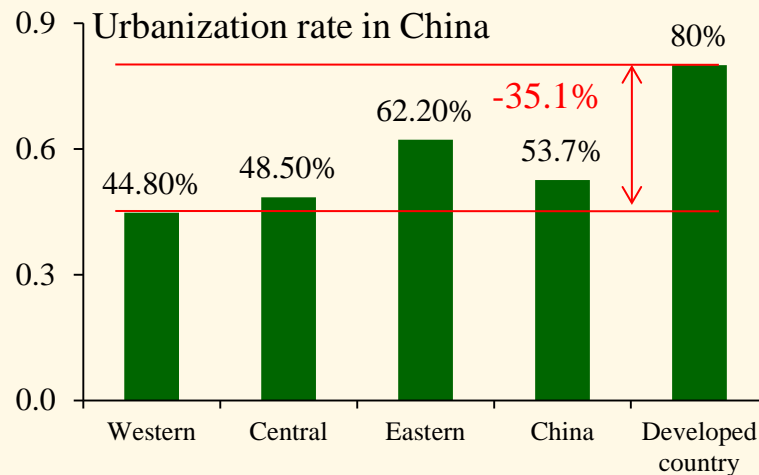
- Urbanization has been given priority as a main driving force to expand domestic demand.

The target of urbanization is to

- Intensify land use
- Expand domestic market
- Improve farmers' living condition
- Control pollution in rural



There is a big difference between the urbanization level in western and eastern regions of China



Chinese urbanization level is far below the world average level



“Urbanization is an irreversible trend, China is accelerating the speed and improving the quality of urbanization”

Chinese Premier Li Keqiang

Urbanization Background

■ Chinese new urbanization policy and expected goal (2014-2020)

‘Three 100-Million’ (2014-2020)

- 100-million more people move to cities

The cost for one farmer remove to city is 80000 RMB, the total cost for 100 million farmers is 8000 billions RMB.

- Improve 100-million people's living condition

- 100-million people live in Mid-west cities

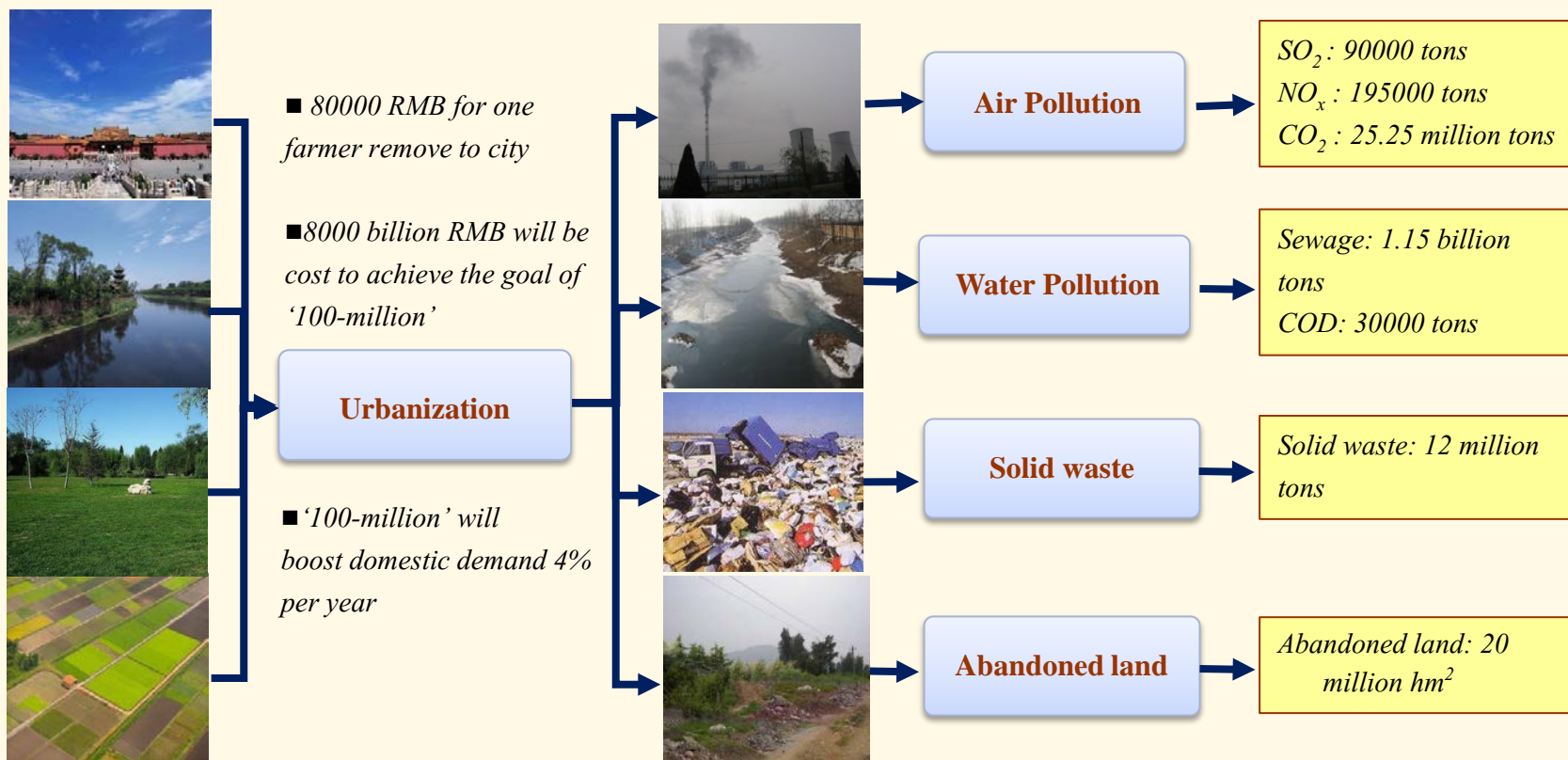
Key Index in New Urbanization Policy		
Index	2012	2020
Urbanization level	52.6%	60%
Public service		
Education proportion	50%	≥99%
Coverage rate of old age insurance	66.9%	≥90%
Coverage rate of medical insurance	95%	98%
Coverage rate of indemnificatory housing	12.5%	≥23%
Infrastructure		
Sewage treatment rate	87.3%	95%
Popularity of water supply	81.7%	90%
Comprehensive service facilities in community	72.5%	100%



The New Urbanization State Plan (2014~2020)

Urbanization Background

- In the future, China will remain rapid urbanization which will exert much pressure on environment protection.

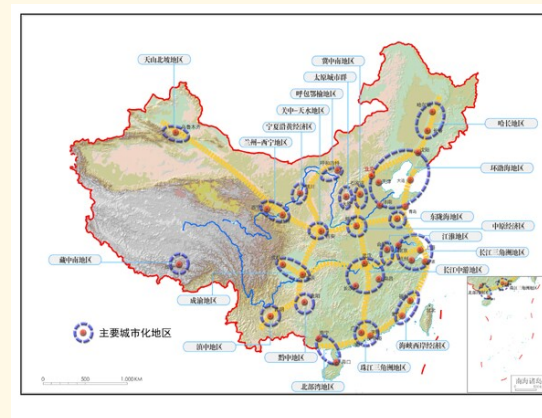


Urbanization Background

- In 2013, the Third Plenary Session of the 18th CPC central committee elaborated detailed plan to construct Ecological Civilization.

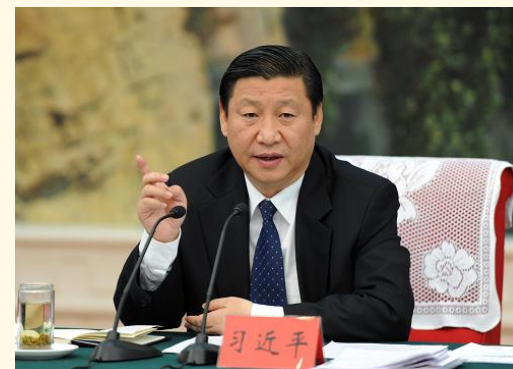
The main contents of Eco-City construction are as following:

- *Urban overall layout and optimization*
- *The development of ecological industry*
- *Ecological redline*
- *Ecological culture construction*
- *Urban living environment construction*



Urbanization pattern in the future ten years given by national ecological function regionalization

**China's inevitable choice
is to construct Eco-City**



Part 2

Eco-City Study Progress

Eco-Industrial Park



Eco-Industrial Park

■ Korea-China-Japan Eco-Industrial Park Forum

Date: 17-19 September, 2014

Venue: Best Western Guro Hotel, Seoul, South Korea

■ Participating Institutes:

- **NIES:** National Institute for Environmental Studies (Japan)
- **MOE:** Ministry of Environment (Japan)
- **SJTU:** Shanghai Jiaotong University (China)
- **TEDA:** Tianjin Economic-Technological Development Area (China)
- **KICOX:** Korea Industrial Complex Corporation (Korea)
- **MOTIE:** Ministry of Trade, Industry and Energy (Korea)
- **KSIE:** Korean Society of Industrial Ecology (Korea)
- **UNIDO:** United Nations of Industrial Development Organization



There were presentations and panel discussion to share EIP (Eco-Industrial Park) Experiences in three countries. Then site visit tour was held at Ulsan EIP and Gyeonggi EIP.

Eco-Industrial Park

■ International Conference on Eco-Industrial Development

Date: 29-30 October, 2014

Venue: Shanghai Jiao Tong University, Shanghai, China

Organizing Institutes:

- *Shanghai Jiao Tong University*
- *National Institute for Environmental Studies, Japan.*
- *University of Ulsan, Korea.*
- *De La Salle University, Philippines*

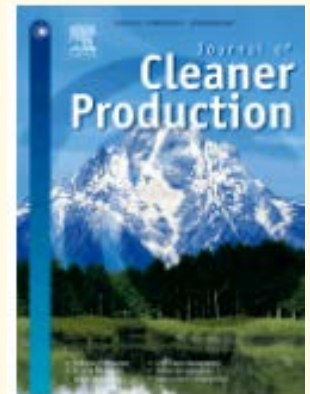
Session Title:

- *Keynote speeches.*
- *Low carbon development.*
- *Industrial symbiosis and metabolism.*
- *Circular economy.*



Special Volume in *Journal of Cleaner Production*

- Towards post fossil carbon societies: regenerative and preventative eco-industrial development.
- Editors: Yong Geng (China), Tuyoshi Fujita (Japan), Hun-suck Park (Korea), Anthony Chiu, Donald Huisingh.



Ecological Civilization Strategy

■ Research on Ecological Civilization State Strategy

Sponsor: Chinese Academy of Engineering

PI: Pro. Zhou J. and Meng W.

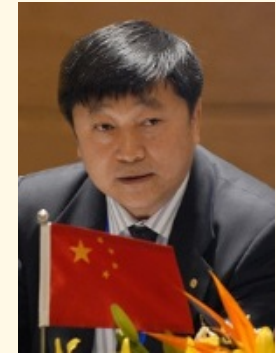
Budget: 10 million RMB

Period: 2013 ~ 2014

Team: 20 academicians



Zhou J., Pre.CAE



Meng W., Pre. CRAES



Chinese Academy of Engineering



Du X. W.,
Physicist



Shi Y. L.,
Environmentalist



Qian Y.,
Environmentalist



Liu X.,
Botanist



Shen G. F.,
Ecologist



Hao J. M.,
Environmentalist



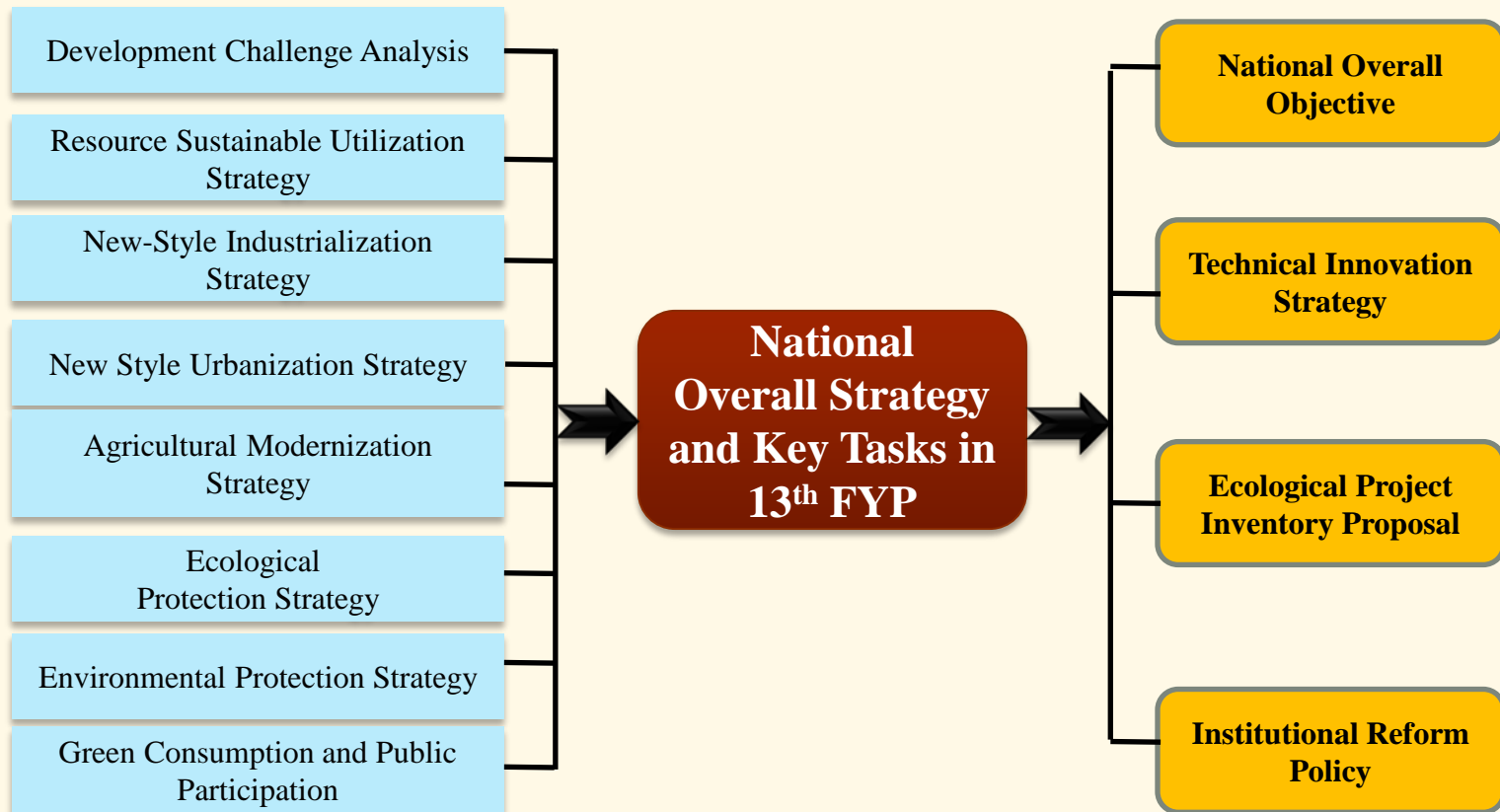
Chen J. N.,
Pre. Tsinghua



Fu Z. H.,
Physicist

Ecological Civilization Strategy

■ China National Ecological Civilization State Strategy and Key Tasks in 13th FYP



Ecological Civilization Strategy

■ Ecological Civilization State Strategy

- Make great efforts to alleviate Serious Pollution.
- Enlighten Public to Increase Environmental Awareness.
- Delimit and Institutionalize Ecological Red Line.
- Integrate into Unified Environmental Administrative System.
- Build up Market Mechanism of Ecological Capital.
- Implement Large-Scale Ecological Project to Improve Ecosystem Function.
- Enhance Technical Innovation to Upgrade Economic Structure.
- Establish and Perfect Ecological Civilization Promotion Legal System.

Eco-City Comparative Research

- Comparative research on urbanization in China, Korea & Japan and the construction of Eco-City in China.

Sponsor: CRAES

PI: Dr. Li Fen

Budget: 190,000 RMB

Period: May 2013 ~ May 2014



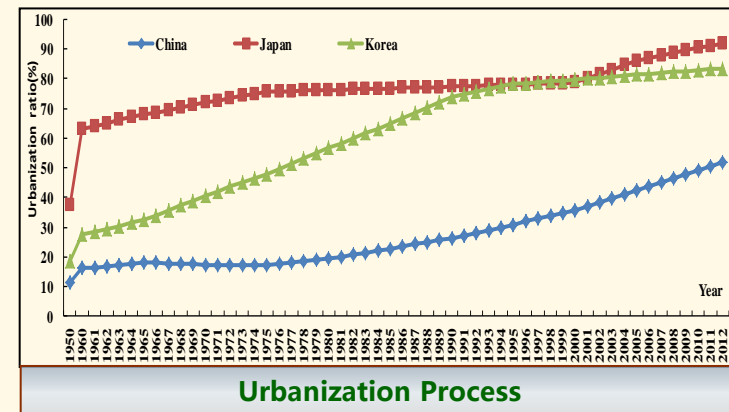
Dr. Li Fen

Main contents:

- Comparative research on urbanization process and environment challenges
- Experience on construction of Eco-City in Korea & Japan
- The construction of Eco-City in China
- Example case of Eco-City in China

Main results:

There are great differences on urbanization process of the three countries: different start time, different speed, and different stage.

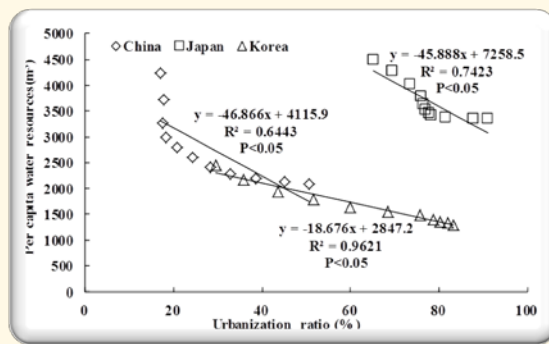


Eco-City Comparative Research

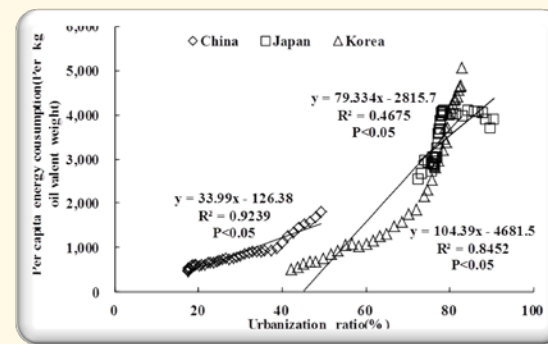
■ Comparative research on urbanization in China, Korea & Japan and the construction of Eco-City in China.

Main results:

- Three urbanization trend all kept growing fast, while the urbanization speed in both Japan and Korea grew more rapidly than that in China after the World War II.
- Japan and Korea are now at the late of stage of urbanization, with urbanization ratio of 91.73% and 83.47% respectively. China is now at the middle stage of urbanization, with urbanization ratio of 51.78%.
- Land resources and water resources demonstrated significant-negative correlations with urbanization ratio. Energy use expressed significant positive correlation with urbanization ratio.



Urbanization and Water Resources



Urbanization and Energy Consumption

Urban Ecological Red Line (ERL)

■ Ecological Red Line in Dapeng Eco-City Planning

Sponsor: Dapeng Government

Period: 2014 ~ 2020

Budget: 5 million RMB

Background:

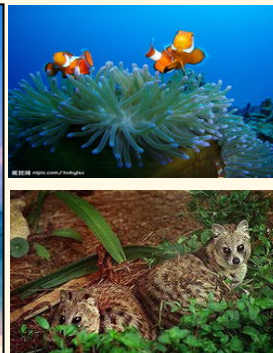
- Land Area : 607km²
- Population: 180,000
- Forest Coverage: >76%
- GDP : ¥ 24.5 billion



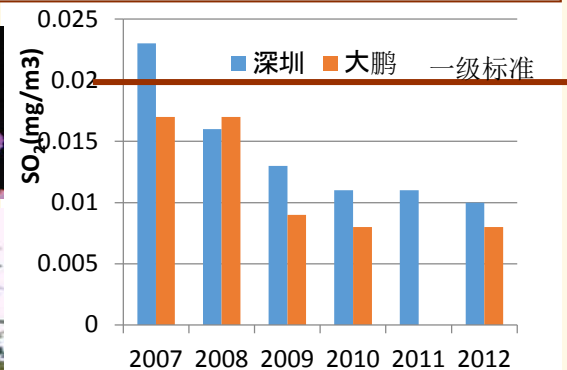
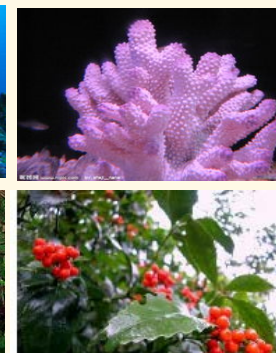
'Backyard' of Shenzhen



One of Most Beautiful Coasts



High Biodiversity



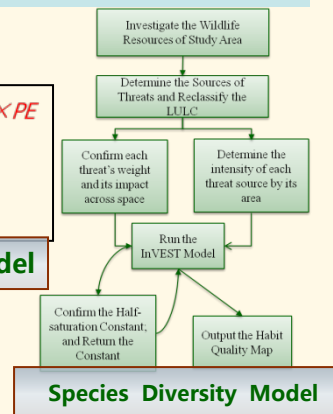
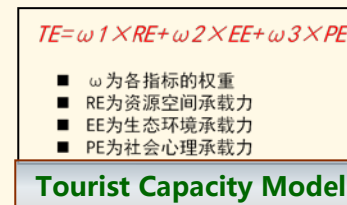
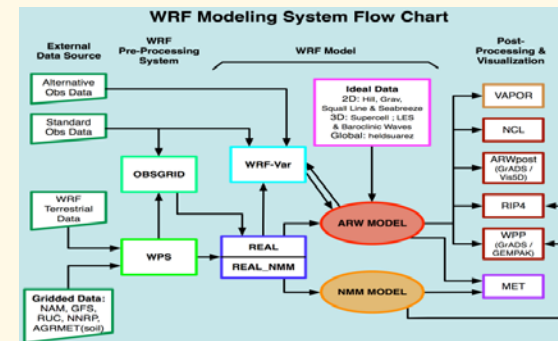
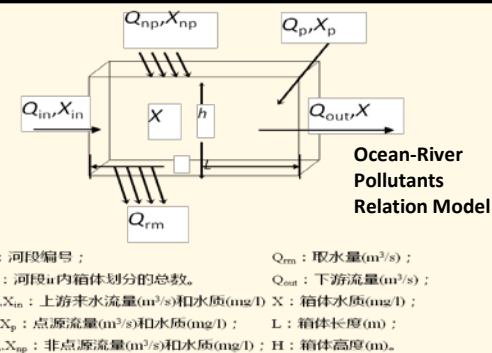
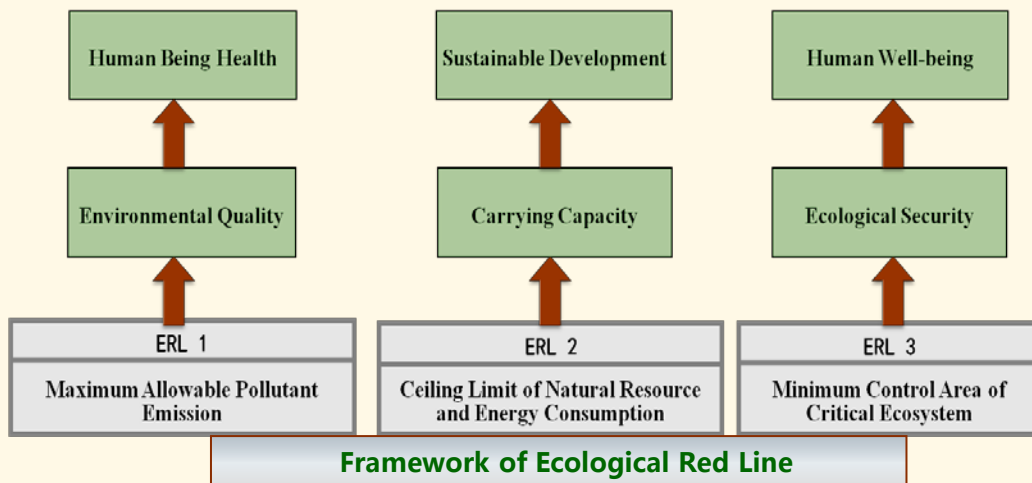
Excellent Environmental Quality

Urban Ecological Red Line (ERL)

Ecological Red Line in Dapeng Eco-City Planning

The Untouchable 'High-voltage Wire' in Human Activities

ERL is the limits on the amount and space boundaries of ecosystem that safeguard national ecological security and environmental quality.



Urban Ecological Red Line (ERL)

■ Ecological Red Line in Dapeng Eco-City Planning

Main result:

- *Min Ecosystem Area:* 258km²
- *Max Tourist Number:* 6.8 million/y
- *Max Vehicle Number :* 20 thousand/d
- *Max Pollutants Emission: COD cr:* 720.2 t/a

NH3-N: 36.4 t/a

TN: 67.5 t/a

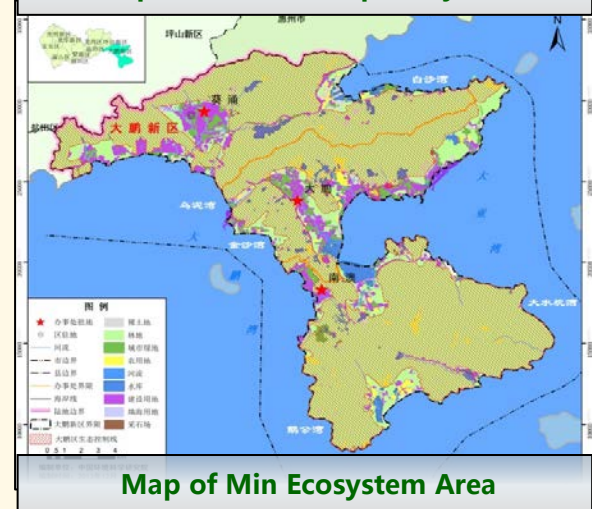
TP: 6.67 t/a

Conclusion:

ERL is an important basis in the plan of Industry Access System , Green Transport , Tourism and Ecological Security Pattern.

The Maximum Water Pollutants Emission

<i>Order</i>	<i>Name</i>	<i>CODCr(t/a)</i>	<i>NH3-N(t/a)</i>	<i>TN(t/a)</i>	<i>TP(t/a)</i>
<i>1</i>	<i>Kuiyong</i>	<i>429.84</i>	<i>20.82</i>	<i>39.20</i>	<i>3.97</i>
<i>2</i>	<i>Dapeng</i>	<i>161.90</i>	<i>8.52</i>	<i>15.72</i>	<i>1.56</i>
<i>3</i>	<i>Nan'ao</i>	<i>128.78</i>	<i>7.08</i>	<i>12.59</i>	<i>1.15</i>
<i>Summation</i>		<i>720.51</i>	<i>36.42</i>	<i>67.51</i>	<i>6.67</i>



Ecological Assets Accounting

■ Ecological Assets Accounting in Three-River Source

Title: “Assessment of Ecological Assets and Accounting in the Three-River Source Reserve, China”

Sponsor: Chinese Research Academy of Environmental Sciences (CRAES) & Government of Qinghai Province

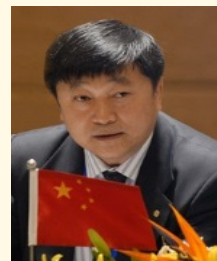
PI: Pro. Dr. Meng Wei
Academician of Chinese Academy of Engineering

Budget: 4 million RMB

Period: 2012 ~ 2014

Team:

- *CRAES: Chinese Research Academy of Environmental Sciences*
- *IGSNRR: The Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences*
- *AMS: Chinese Academy of Meteorological Sciences*
- *PKU: Peking University*



Area: 0.39 million km²

Altitude: 3500~4800 m

Population: 0.72 million

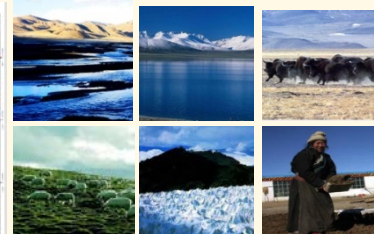
GDP: 7.7 billion RMB in 2010

Main industry: livestock husbandry

Nation: Tibetan

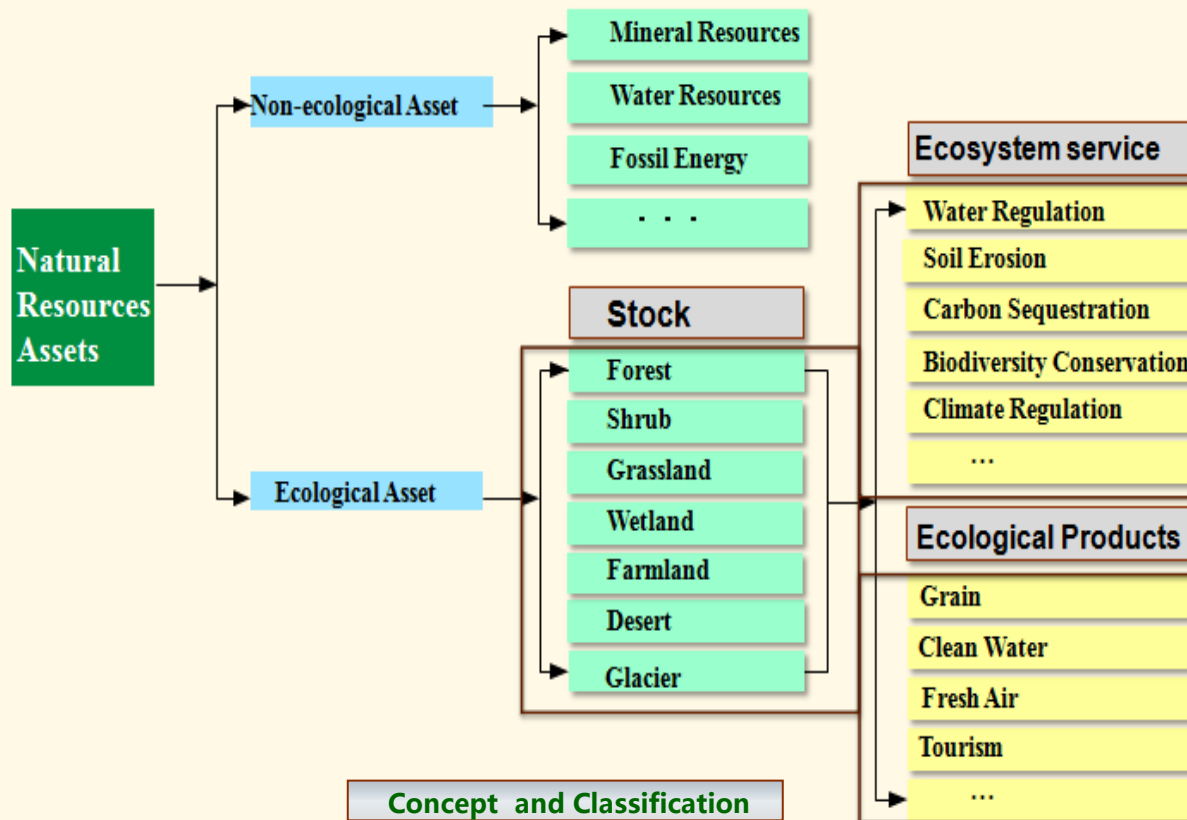


Three-River Source locates in the core region of Qinghai-Tibet Plateau, it is extremely rich in animal and plant resources.

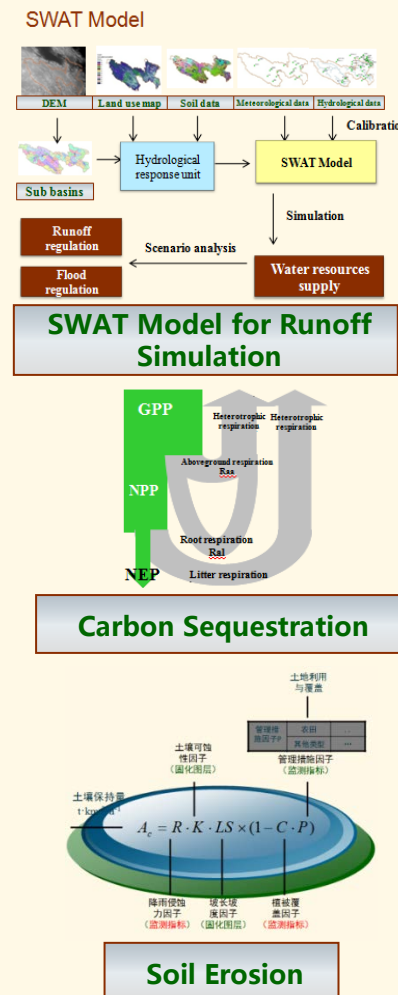


Ecological Assets Accounting

■ Concept & Methodology of Ecological Assets Accounting



Ecological Assets: Bio-productive land and its ecosystem service and ecological products



Ecological Assets Accounting

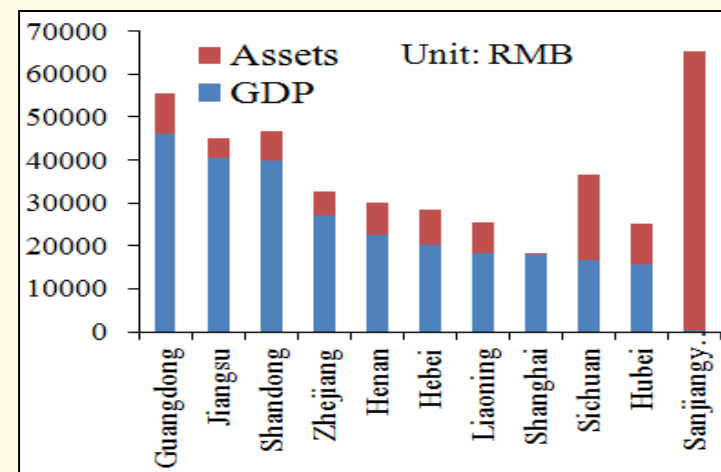
■ Concept & Methodology of Ecological Assets Accounting

$$S_{equivalent} = \sum_{i,j} \underbrace{L_i}_{\text{Bio-productive land}} \times \underbrace{E_i}_{\text{Equivalent factor}} \times \underbrace{A_{ij}}_{\text{Adjustment factor}} \times \underbrace{V_s}_{\text{Value of standard equivalent}}$$

Estimating Formula for Ecological Assets

Main results:

- In 2010, the ecological asset in Three-River Source is higher than the sum of GDP in Guangdong Province.
- The per capita ecological protection assets in Three-River Source is 5020000 RMB in 2010, which is 13.26 times higher than Macao, ranked first in China's per capita GDP.



Regions	GDP (0.1 billion)	Assets (0.1 billion)	Total (1000 billion)	Per capita assets (0.01 million)
Guangdong	45963	9446.75	5.54	5.31
Jiangsu	40516	4594.99	4.51	5.73
Shandong	39787	6904.17	4.67	4.87
Zhejiang	27154	5377.66	3.25	5.97
Henan	22619	7319.71	2.99	3.18
Hebei	20255	8152.7	2.84	3.95
Liaoning	18263	7233.95	2.55	5.83
Shanghai	17959	233.98	1.82	2.26
Sichuan	16745	20006.64	3.68	15.96
Hubei	15638	9562.02	2.52	3.84
Sanjiangyuan	240.17	65110.3	6.54	502.62

Ecological Assets and GDP in Top 10 Provinces

Part 3

Cooperation Suggestion

Cooperation Suggestion

Joint Study

- *Comparative research*
- *Case study (selecting 1-2 cities in each country)*

Workshop/Seminar

- *General plan*
- *Progress discussion*
- *Output seminar*

Exchange of Researchers

- *Visiting scholar*
- *Student exchange*
- *Field investigation*

Publication

- *Book (comparative research on Eco-City construction)*
- *Papers (3, one country for one paper)*
- *General report*

Cooperation Suggestion

Schedule Proposal

■ General plan and Eco-City case study in China

- *Time:* May 2015; *Place:* China
- *The experts of China, Japan and South Korea work together to establish evaluation index system and research methods.*

■ Annual progress workshop and case study in Japan

- *Time:* December 2015; *Place:* Japan
- *The experts in each country take responsibility for their own effectiveness evaluation and paper/report writing.*

■ Output seminar and case study in South Korea

- *Time:* June 2016; *Place:* South Korea
- *We jointly complete the general report of our research.*

Thanks for your attention !

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