1st Japan Korean China Tripartite EIA Workshop
"The Program for Japan-Korea-China Tripartite Conference on Effectiveness of EIA/SEA"

Date: Oct.28(Fri),2011

Venue: Beijing Normal University,China

Language: English (no translation)

Host Organization: MEP of China

Co-Organizer: Beijing Normal University

Conference Program

The Program for Japan-Korea-China Tripartite Conference on Effectiveness of EIA/SEA

Oct. 28th, 2011, Beijing, PRC

Session I Meeting kick-off

Hosted by Prof. Li Wei, School of Environment, BNU

8:30 - 8:45 Registration

8:45 - 9:00 Opening speech delivered by Dr. Li Tianwei, the Head of PEIA division, EIA Department, MEP, CHINA

9:00 - 9:15 Guest Address given by Dr. Akira Tanaka, Professor of Tokyo City University, Chairman of International Exchange Committee of Japan Society for Impact Assessment, JAPAN

9:15 - 9:30 Guest address given by Dr. Myungjin Kim, President of Korean Society of EIA, KOREA

Session II New trends & challenges of EIA/SEA

Chaired jointly by Prof. Akira Tanaka and Dr. Li Tianwei

9:30 - 9:55 **EIA in Japan - Progress and Prospect**, by *Mr. Hiroshi Ono*, EIA Review Office, Environmental Policy Bureau, Ministry of the Environment, JAPAN

9:55 - 10:20 **Low Carbon Green City and SEA in Korea,** by *Jong Ho Lee,* Cheongju University, KOREA

10:20 - 10:45 **Effectiveness of the Technical Guidelines for SEA within the context of China**, by *Dr. Bao Cunkuan*, Tongji University, CHINA

10:45 - 11:00 Tea break

11:00 - 11:25 **EA as a Social Infra-Structure for Creating a Sustainable Society**, by *Dr. Sachihiko Harashina*, Tokyo Institute of Technology, JAPAN

11:25 - 11:55 **Application of Strategic Environmental Assessment in the Oil Spill Accident,** *by Jong-Gwan Jung,* Senior Research Fellow of Chungnam Development Institute (CDI), KOREA

11:55 - 12:20 **SEA of Urban Planning in China**, by *Dr. Liu Yi*, Tsinghua University, CHINA

12:20 - 12:30 **Summary of Morning session**

12:30 – 13:30 LUNCH BREAK

13:30 – 13:50 Group photo at the main square of BNU

Session III Transboundary & regional issues in EIA/SEA

Chaired jointed by Dr. Sachihiko Harashina and Prof. Myungjin Kim

14:00 - 14:25 **Transboundary Environmental Impact Assessment in Northeast Asia,** by *Deok-Gil Rhee*, Chinese Research Academy of Environmental Sciences / NIPA, KOREA

14:25 - 14:50 **A Preliminary Environmental Impact Assessment to Free Trade Area in Discussion Between China, Korea and Japan (CJK-FTA)**, by *Dr. Mao Xianqiang,* School of Environment, Beijing Normal University

14:50 - 15:20 **Export Credit Agencies and Environmental Considerations - Comparison of China, Korea and Japan**, by *Ms. Noriko SHIMIZU*, Friend of Earth Japan and *Dr. Satoru MATSUMOTO*, Hitotsubashi University

15:20 – 15:35 Tea Break

15:35 – 16:00 **Greenhouse Gas Assessment in Forest Ecosystem,** by Myungjin Kim, Ecosystem Assessment Division, National Institute of Environmental Research, KOREA

16:00 - 16:25 **Theoretical and Practical Experience of Mega-Regional SEA in China**, by *Dr. Ren Jingming*, Appraisal Center for Environmental Engineering (ACEE), MEP of CHINA

16:25 - 16:50 **Global Warming and Phenology in Korea,** by *Sang Don Lee*, Ewha Womans University, KOREA

16:50 - 17:15 **Environmental Health Risk Assessment in China**, by *Dr. Cheng Hongguang*, Beijing University, CHINA

17:15 - 17:30 **Summary of afternoon session**

17:30 - 18:15 **Group discussion on how to develop a robust EIA/SEA system through close cooperation at both education and administration levels in the northeastern Asia : the Northeastern Asian EIA Education and Research Network ?**

18:30 - 20:30 **Dinner at Sculpting In Time Café, hosted by MEP, CHINA**

Access to Beijing Normal University

Railroad Access

To Ji Shui Tan Campus

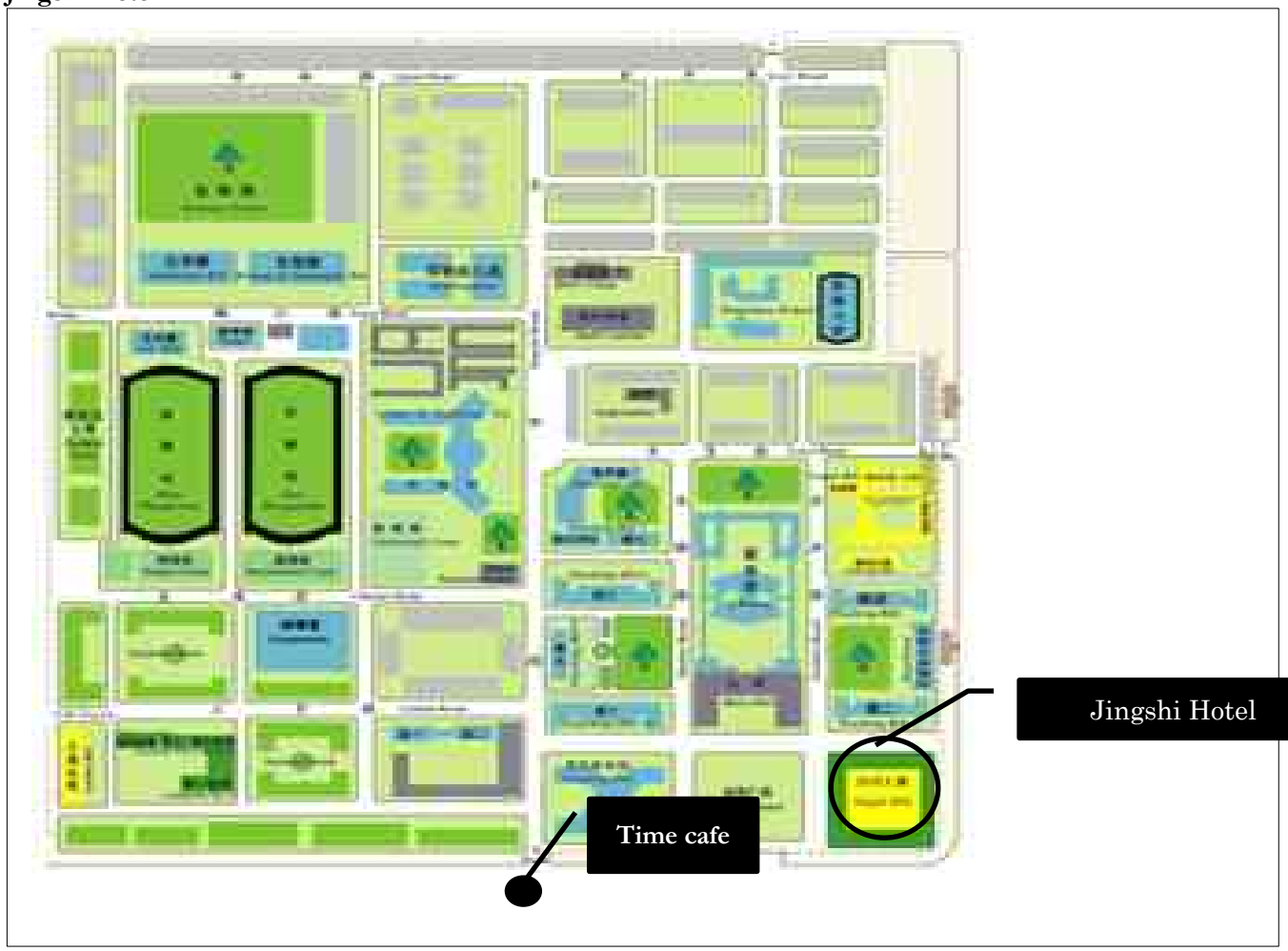
From Beijing Capital International Airport: Take the Airport Express to Dongzhimen Sta. (1 hour 5 minutes),then transfer to the Subway NO.2 Line to Ji Shui Tan Sta.(12 minutes) ,finally take the taxi to Ji Shui Tan Campus(5 minutes).

Maybe you can directly take the taxi from Beijing Capital International Airport to Ji Shui Tan Campus of Beijing Normal University, it will be spent about 30 minutes and 100 RMB.

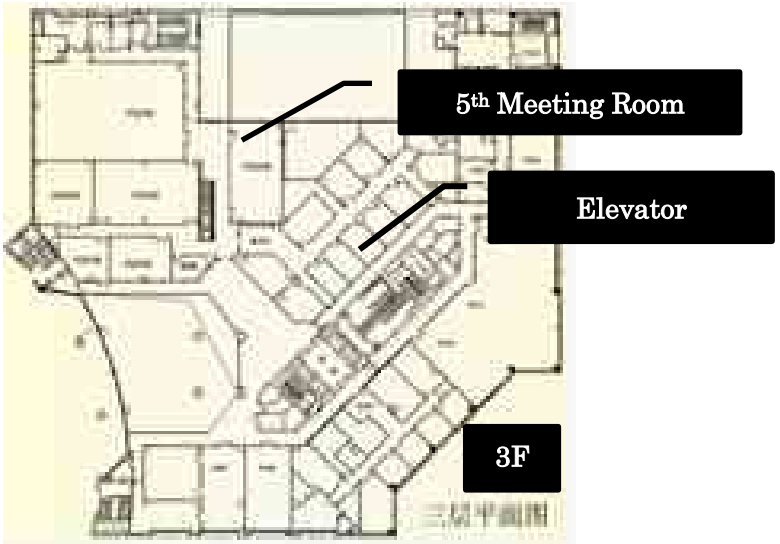
Venue: Jingshi Hotel "京师大厦"

Jingshi Hotel is situated at the southeast corner of Beijing Normal University. It is close to Xinjiekouwai Street in the east and Xueyuannan Street in the south between Bei Er Huan Road and Bei San Huan Road.（Venue of convivial party： Time cafe）

Jingshi Hotel



Inside Jingshi Hotel on 3F
The venue of conference is in the 5th meeting room.



Session 1:
Meeting Kick Off

Host: Prof. Li Wei (School of Environment, BNU)

Opening Speech:
Dr. Li Tianwei
(the Head of PEIA division, EIA Department, MEP, CHINA)

Guest Address Given:
Dr. Akira Tanaka
(Professor of Tokyo City University, Chairman of International Exchange Committee of Japan Society for Impact Assessment, JAPAN)

Guest Address Given:
Dr. Myungjin Kim
(President of Korean Society of EIA, KOREA)

"Figure The short- and long-term"
Dr. Akira Tanaka(Tokyo City University)

Opening Address of Japan

Akira Tanaka
Professor Dr. of Tokyo City University
Chairman of International Exchange Committee of Japan Society for Impact Assessment

It is my greatest pleasure to have been given this opportunity of delivering a guest address at the first Japan-Korean-China tripartite EIA Workshop. I express my sincere gratitude to Dr. Li Wei, Dr. Li Tianwei, all other Chinese and Korean friends who have made wonderful preparations for this workshop. Before getting into the theme, I would like to introduce Japan-Korean bipartite EIA Workshops which were held in both Japan and Korea.

- The 1st WS was held in Tokyo, Japan in 2003.
- The 2nd WS was held in Jeju-do, Korea in 2004.
- The 3rd WS was held in Yokohama, Japan in 2006.
- The 4th WS was held in Busan, Korea in 2008.
- The 5th WS was held in Nagoya, Japan in 2010.

We are faced with the harsh realities of the 311 disaster at the nuclear power plants. Problems for immediate solution are piling up. On this occasion, I would like to discuss "environmental nexus" in environmental destruction, because it is related to difficulties of Environmental Impact Assessments which are expected to play a role as the prevention or precautious against adverse environmental impacts.

There is a trend in the cause-and-effect relationship in environmental destruction which I call "environmental nexus". The immediate victims of deteriorating environmental conditions are the socially weak. The initial beneficiaries of sound environmental mitigation measures are also the socially weak. The socially strong such as the powerful and rich may have the ability to avoid harm from deteriorating environmental conditions. Among these powerful entrenched interests are some who may benefit from the destruction of the environment.

Awareness of this nexus is essential when looking for solutions to today‟s environmental problems. Policy decisions do not always reflect the wishes of society‟s weakest and are often used by a portion of society‟s strongest to pursue their own interests. Figure is a schematic diagram shows the change seen over time between the beneficiaries and the victims of environmental destruction. Environmental costs and benefits are shown on the vertical axis, while time is on the horizontal.

Initially, the benefits of environmental degradation to the strong may outweigh any damages. But these benefits gradually diminish until finally, the strong are damaged as well. However, that society‟s weakest are often on the losing end from the very beginning, and as the environment deteriorates, they simply lose more and more. The left side of the break-even point represents the short-term environmental nexus; the right side, the long-term environmental nexus. The relationship between short-term environmental nexus and long-term one is as same structure as the relationship between domestic environmental policies and global one.

As can be inferred from the figure, as long as the strong gain from environmental damage, they are unlikely to be interested in reducing this damage. The short-term environmental nexus thus represents a very common political impasse. There might be some among the strong who might actually impede efforts at conservation, since they have at that point, a "negative incentive" to protect the environment. Consequently, targets of all environmental policies must be aming for the society‟s weakest in order to cover other classes of human beings. Wildlife and nature who have not their voice must be treated as the society‟s weakest as well.

Return to the EIA Workshop, we agreed to have the second one in Korea in 2012 and the third one in Japan in 2013. I hope this tripartite workshop will build bridges of cooperation and friendship on EIAs between three countries. "He who would climb the ladder must begin at the bottom".

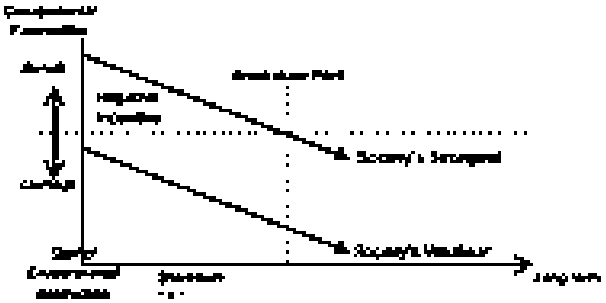


Figure The short- and long-term "environmental nexus" in environmental destruction

Source: Oogai and Tanaka (1994) Source of Funds for Environmental Management, Financing Environmentally Sound Development, Asian Development Bank

Opening Address of Korea

President of KSEIA, Myungjin Kim

Good afternoon, Chinese delegates, KSEIA and JSIA presidents and members. I am honored and delighted to address you in opening the first Japan-Korea-China tripartite EIA conference. We have held five Japan-Korea EIA workshops since
2003. Beginning this year we start the tripartite meeting.

As you know, today"s session themes are "New Trends and Challenges of EIA" and "Transboundary and Regional Issues." Our countries live in the same neighborhood. Around us we can glimpse the abundance of nature, but often we do not perceive or realize the impacts of human activities on it. Impact assessment can serve to anticipate and help prevent such impacts, and to devise alternatives that protect and enhance our environment.

In the tripartite countries of China, Korea, and Japan, we have ancient traditions of respect for nature and its creatures. But this venerable tradition is likewise under threat from heedless development and materialistic culture. We may recall its lessons on this occasion by considering how impact assessment practitioners can assist in promoting biodiversity and cultural conservation and achieving sustainable development.

Twenty years after the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, Rio+20, the International Conference for Sustainable Development will be held next year, again in Rio. The conference has two themes: "a green economy within the context of sustainable development and poverty eradication," and "the institutional framework for sustainable development." At Rio+10, the world summit on sustainable development held in Durban, the International Association for Impact Assessment (IAIA) submitted five important links by which impact assessment (IA) can contribute to making sustainable development a reality,

(1) Linking sustainability considerations to policies, plans, and programmes through strategic environmental assessment; (2) Integrating trade, environmental protection and sustainable development through IA; (3) Integrating ecosystem and biodiversity considerations in development decision-making through EIA and SEA; (4) Integrating health considerations into sustainable development through health impact assessment (HIA); (5) Integrating public participation and community involvement into sustainable development through IA.

IAIA will urge the Rio+20 conference secretariat and participants to endorse strategic environmental assessment and impact assessment as an effective decision support process for assisting Member States in implementing their commitments to sustainable development and green economy initiatives.

Today"s findings will be contributed to Rio+20 and our environments. In conclusion I would like to recall one Chinese word,
WheSamQwiIl(會三歸一), which means "three
into one." May this sentiment inspire and guide our common goal of improving our societies through closer cooperation. Thank you for your participation and best wishes for a successful conference.

Session 2:
New trends & challenges of EIA/SEA

Chaired: Dr. Akira Tanaka (Tokyo City University)
Dr. Li Tianwei (EIA Department, MEP, CHINA)

"EIA in Japan - Progress and Prospect"
Hiroshi Ono (EIA Review Office, Environmental Policy Bureau, Ministry of the Environment, JAPAN)

"Low Carbon Green City and SEA in Korea"
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"SEA of Urban Planning in China"
Liu Yi (Tsinghua University, CHINA)

EIA in Japan – Progress and Prospect

Hiroshi Ono

EIA Review Office, Ministry of the Environment, Japan

Keywords: EIA; SEA; Reporting; wind power; disaster restoration (within 5 keywords)

1 Introduction

Japan‟s EIA Law has a history of ten years - established in 1997 and put in force since 1999. However, the whole history of EIA in Japan is much longer starting back in early 1970s. Severe environmental pollution and degradation in 1960s pushed Japanese Government to incorporate EIA consideration in their public works in 1970s followed by the submission of an EIA bill to the Diet in 1981. The bill did not go through due to serious concerns from both development and conservation sides and the failure led to have a non legally bound EIA system based on a Diet decision. It took another 15 years for the reformulated EIA bill to finally go through the Diet.

2 Progress and Prospect

2.1 Progress

The national EIA system works supplemented by local government‟s EIA systems operated under local EIA laws, which usually cover smaller-scale projects. 10 years‟ operation of the EIA Law resulted in the assessment of 196 projects including 77 roads and 56 power stations. The EIA procedure is driven by project proponents and starts from screening process followed by scoping, assessment and review processes. The final EIS is used for the review of environmental aspect of the project upon its approval.

2.2 Prospect

As the result of the thorough review of ten-year operation, the EIA Law has been amended in April 2011. The amendments include the addition of two new steps upfront and rear of the current procedure – Project-based SEA and Post-EIA Reporting processes - as well as measures for enhancing information disclosure and public involvement. They will be enforced in a step-wise manner over the next two years. Emerging wind-power plants may also be included as one of the project categories under the EIA Law with a view to spurring renewable energy compatible with local environmental requirements such as noise, nature conservation and landscape.

The application of EIA requirements to disaster restoration works is another emerging issue due to the occurrence of East Japan Great Earthquake on March 11, 2011. The Article 52.2 of the EIA Law exempts disaster restoration works – rebuilding of damaged facilities – from the EIA requirements. However, with a view to embracing the objectives and general guidance of the Law, strict conditions apply for the exemption and best possible environmental and public involvement measures are being employed.

3 Conclusion

After ten-year operation of EIA Law since 1999, the Law was amended in April 2011 which will come into effect in the next two years. Future challenges of the EIA system include, among others, the effective operation of newly introduced Project-based SEA and Post-EIA Reporting processes, as well as the proper application of EIA for wind power plants and disaster restoration works in terms of balancing potentially contradicting requirement

EIA in Japan
- Progress & Prospect -

Hiroshi Ono
Director, EIA Review Office
Ministry of the Environment, Japan

Contents of Presentation

1. History of EIA in Japan
2. Current EIA System
3. Amendment of EIA Law
4. Issues and Challenges

History of EIA in Japan (1)

1972 Cabinet Agreement on Environmental Protection Measures for Public Works

- Introduction of preliminary EIA for Public Works

1981 Submission of EIA Bill to the National Diet

- Abandoned in 1983

1984 Cabinet Decision for the Implementation of EIA

- Cabinet decision-based EIA (not legally binding)

1993 Establishment of the Basic Environment Law

- Article on the strengthening of EIA

History of EIA in Japan (2)

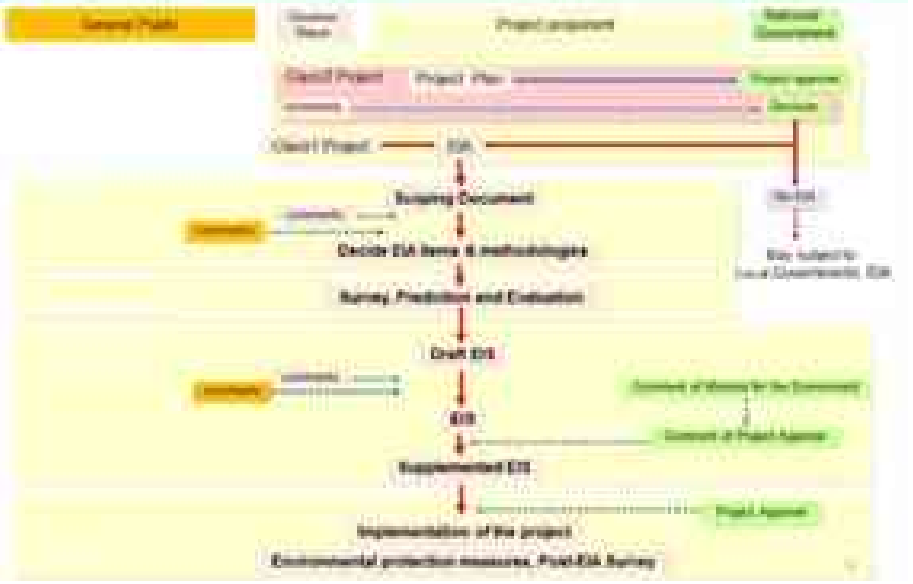
1997 Establishment of the Environmental Impact Assessment Law

1999 Enforcement of the EIA Law

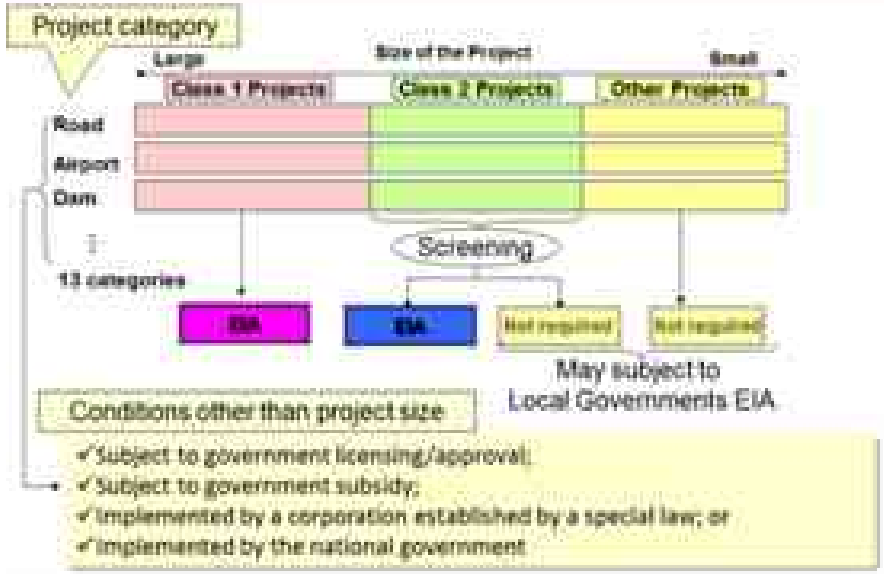
2011 Amendment of the EIA Law based on thorough review after 10-year's implementation

2012 ~ Enforcement of the amended EIA Law

3. Current EIA System
3-1 Procedures of EIA



3-2 Project Subject to EIA Law

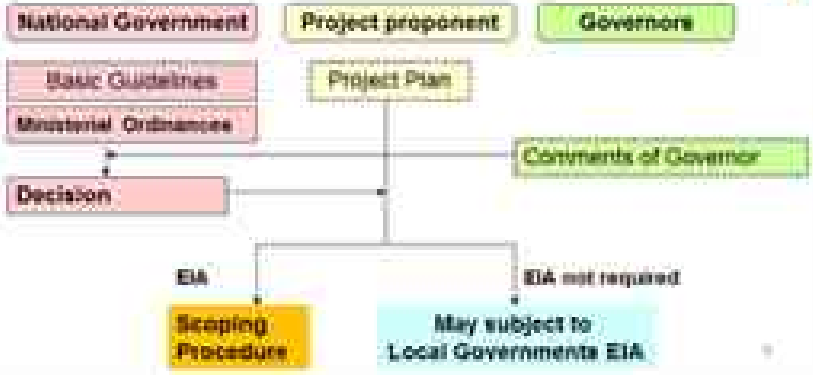


Project Categories

1 . Road (national expressways, national road with four lanes and more, etc.)
2 . River development (dam, flood discharge waterways, etc.)
3 . Railway (high-speed railway, etc.)
4 . Airport
5 . Power plant (hydro, thermal, geo-thermal, nuclear)
6 . Waste Disposal Site
7 . Land reclamation
8 . Land readjustment
9 . Residential area development
10. Industrial complex development
11. Urban infrastructure development
12. Distribution complex development
13. Land development by public cooperation
O . Port and harbor plan

3-3 Screening

- Only for Class 2 Projects
- Decide necessity of EIA based on project and regional characteristics
- Criteria stipulated in relevant Ministers ordinances



Criteria of Screening

1. Project Characteristics

- Projects which employ unproven technologies
- Projects implemented in a stepwise manner where overall plan have similar impact as Class 1 projects

2. Regional Characteristics

- Located on or around environmentally sensitive areas
- Located on or around designated environmental protection areas
- Located on already polluted areas

3-4 Scoping

Decide EIA methodologies taking into account comments of local governments and general public

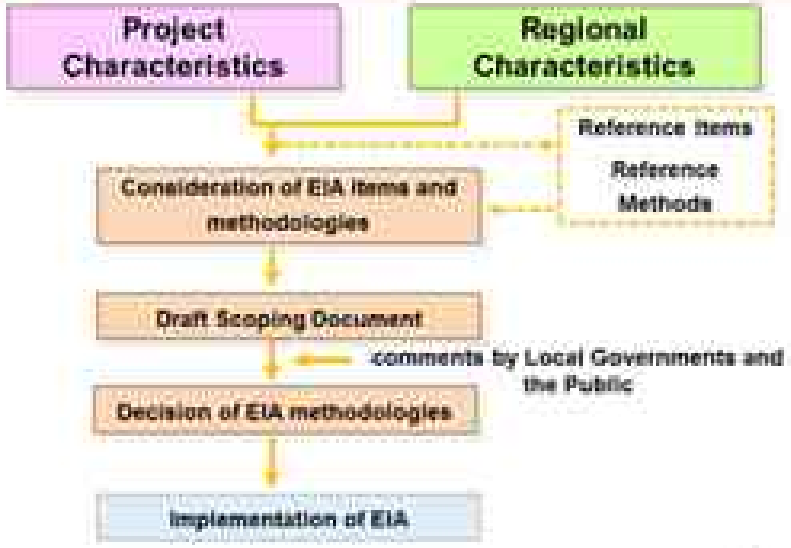
Merits of Scoping

Effective EIA reflecting project and regional characteristics	・Avoid redoing of environmental survey ・Effective EIA
Public involvement at the early stage of project undertaking	・Address environmental concerns by adjusting project planning

3-8 Local Governments EIA

- All prefectural governments and a number of large cities have EIA systems stipulated by their local laws.
- Procedures based on EIA Law should not be altered or prevented by local laws.
- Local laws may address project categories/scales not subject to EIA Law and establish supplemental procedures (e.g. public hearing, expert review committee).

Scoping Flow



Status of Enforcement

As of 2011.3.31

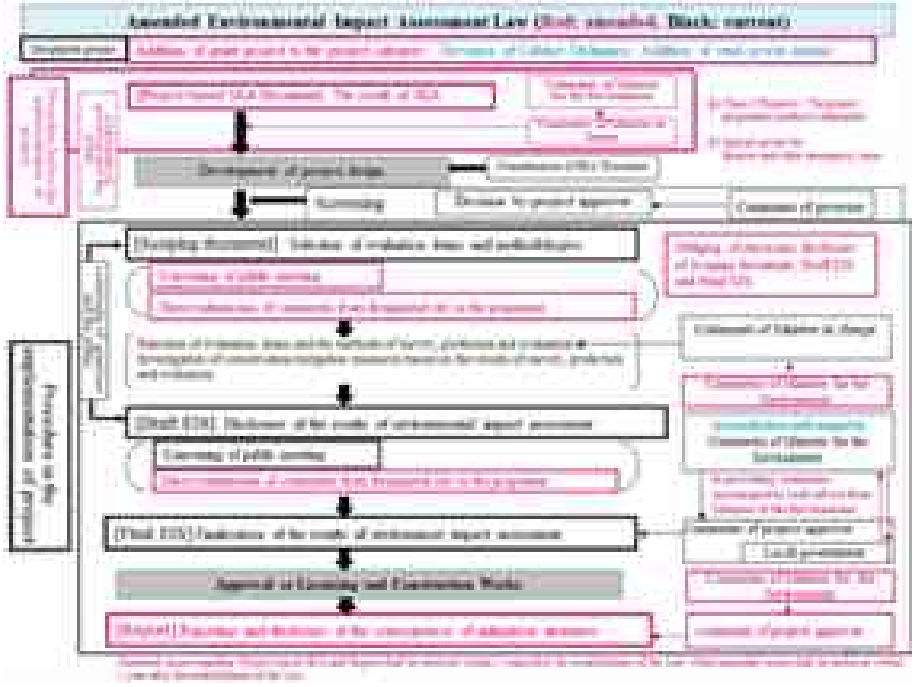
Category	Ongoing	Completed	Canceled	Total
Road	14	54	9	77
River	1	5	1	7
Railway	3	10	2	15
Airport	1	7	1	9
Power Plant	12	39	5	56
Waste Disposal	1	4	-	5
Reclamation	3	9	1	13
Land development	2	14	4	20
Total	36	138	22	196

4. Amendment of EIA Law

"Ten years after the effective date of this Law, the Government shall review the status of enforcement, and shall take necessary measures based on the results of such review." (Article 7 of Supplementary Provisions of EIA Law)

◆Investigation by the Central Environment Council
- Jan 2010 Report of EIA Special Committee
- Feb 2010 Final Report of Central Environment Council "Review of EIA System and the Way Forward"

◆Development of amended EIA bill
- March 19, 2010 Cabinet approval
- April 27, 2011 Establishment of amended EIA Law



Project-based SEA

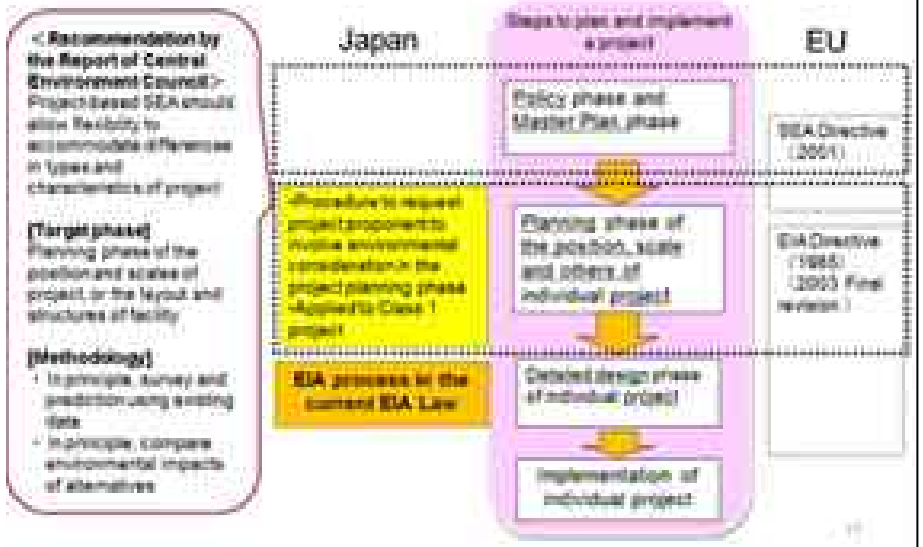
Strategic Environment Assessment (SEA) targets "strategic decision making phase" which comes before the implementation of individual project, that is, planning or policy phases where a framework is determined for the implementation of individual project.

[Current situation]
- Some local governments established local laws to enforce SEA
- Ministry of the Environment published a guideline to encourage relevant Ministries to apply SEA on a voluntary basis

[Rationale]
- Earlier environmental consideration in the project planning phase helps involve more effective and efficient avoidance and minimization measures

[Amended issue]
- Establish a procedure to request project proponent to involve environmental consideration in the project planning phase
- Examine environmental impacts of alternatives in terms of position and scale of project, or layout and structures of facility (project-based SEA)
- Comments are sought from Minister for the Environment and Minister in charge of the project

Concept of Project-based SEA



Post-EIA Reporting

[Current situation]
- A project proponent is required to conduct a post-EIA survey when prediction results and the effectiveness of mitigation measures claimed in the EIS may involve significant uncertainties.
- However, no mechanism is provided to ensure whether the post-EIA survey is appropriately conducted.

[Rationale]
A mechanism to ensure the appropriateness and transparency of post-EIA survey helps enhance the credibility and usefulness of EIA to all stakeholders including local governments and general public.

[Amended issue]
•Establish a procedure to request project proponent to report and disclose the consequences of mitigation measures claimed in the Final EIS
•Comments are sought from Minister for the Environment and Project Approver

5.Issues and Challenges

1. Preparation of enforcing amended EIA Law – accumulate lessons learned through implementing project-based SEA on a voluntary basis
2. Addition of wind-power plant as a new project category
   - promote renewable energy compatible with local environmental requirements
3. EIA exemption for disaster restoration works
   - how to ensure environmental consideration and public involvement

1. Preparation of enforcing amended EIA Law – accumulate lessons learned through implementing project-based SEA on a voluntary basis

Highway Project (Example)

A highway network plan in Yokohama City

13 alternatives in routing and road structure were examined with public participation

High-speed Railway Project (Example)

Reclamation Project (Example)

Step 1 SEA: Selection of Location

- Zone 6 was selected from Zone I to III

Step 2 SEA: Selection of Design

- A final design was selected from several options

Lessons learned

- Effective in enhancing stakeholders' understanding and facilitating the EIA and construction process
- Variety of ways in examining alternatives/options (alternative routing/structure, potential location band/zone, step-wise focusing)
- Timing of SEA – the earlier the better, or most appropriate timing?

2. Addition of wind-power plant as a new project category

- promotion of renewable energy compatible with local environmental requirements

Pros and Cons of Wind Power

Pros: Low carbon society

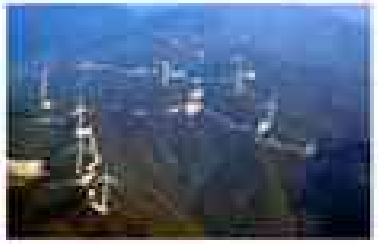
- Target in the National Energy Plan (2010.6)

10% of primary energy supply by renewable energy by 2020

- Envisaged Policies and Measures to Achieve Mid-term (2025) and Long-term (2080) GHG Reduction Targets (interim report by Global Environmental Subcommittee, Central Environment Council (2010.12)

11, 310 MW of wind-power generation capacity by 2010

Cons: Environmental Impacts



Challenges

- Renewable energy is promising in reducing GHG gases, but not necessarily environmental-friendly in other aspects (noise, landscape, nature conservation)
- Ensure compatibility of wind-power plants with local environmental requirements through EIA
- Streamlining through provision of environmental data, vigorous scoping

3. EIA exemption for disaster restoration works

- how to ensure environmental consideration and public involvement

Emergency Installation of Power Plants

Article 52.2 of EIA Law (outline)

EIA procedures stipulated by the Law shall not apply for disaster restoration works which are requested for designated public organizations to implement in accordance with laws/regulations or their disaster prevention plans.

Based on this article, emergency installation of power plants outside of damaged sites to restore lost power supply is exempted from EIA procedure under several conditions:

- installed in existing power plant sites of the company
- become operational within approximately 3 years
- employ best available environmental and public involvement measures

Diesel Generators

Provided by Tokyo Electric Power Company

Gas Turbine Generators

Provided by Tokyo Electric Power Company

Challenges

- Making sure the application of best available environmental and public involvement measures – needs follow-up
- "Exit strategy" from emergency phase – restoration of increased emission loads
- Potential EIA exemption for other restoration projects – road? railway?
- Streamlining effort in the operation of EIA rules and regulations

Thank you for your attention!!

Low Carbon Green City and SEA in Korea

Jong Ho Lee
Department of Urban Planning, Cheongju University, Republic of Korea

Keywords: Climate Change, Low Carbon Green City, SEA

1. Introduction

Korean government has come up with strategies and frameworks for Low Carbon Green Growth. In 2010, the Framework Act on Low Carbon, Green Growth was enacted, identifying policy directions as well as solidifying the institutional foundation for green growth. Ministry of Land, Transport and Maritime Affairs is implementing low carbon green city based upon Low Carbon Green Growth. Local governments are also establishing their basic urban planning for low carbon green city. Therefore the role of SEA on the urban planning for low carbon green city has become more important than ever before.

The purpose of this study is to suggest the desirable SEA methodology on urban planning for low carbon green city.

2. Climate Change and Low Carbon Green City

Korean government is now implementing both adaptation measures and mitigation measures such as setting its goal at a 30% reduction in greenhouse gases relative to BAU by 2020, and introduction of the Emission Trading Scheme in 2015.

In 2009, Korean government released a National Strategy for Green Growth and Five-Year Plan for Green Growth.

The direction for the green city of Korea can be summarized as following threes. First, the urban planning for energy saving includes minimization of travel demand for CBD through compact city; and mass transit through development of multiple transit transfer center and intelligent transportation system (ITS). Second, the city operates resource recycling facility such as automatic collection facility of solid wastes etc.; and develops the multi-energy management system of energy and water and rainwater management system. Third, the ecological city has waterfront space through ecological restoration of stream or river; and expands green space by provision of inner-city park and restoration of damaged green belt.

3. Urban Planning for Low Carbon Green City and SEA

Lately the basic urban planning contains the concept of low carbon green city to adapt to climate change. The SEA can be used to assess the impact of the basic urban planning in terms of reducing greenhouse gas emissions, reducing vulnerability to climate change, and making best use of the benefits of climate change.

SEA is implemented either in the Prior Environmental Review System (PERS) by Ministry of Environment, or in SEA by Ministry of Land, Transport and Maritime Affairs. The basic urban planning is not the subject of PERS but that of SEA. But at present, the SEA has not yet substantially been applied to the basic urban planning. Because the present SEA implemented by PERS is mainly focused on consultation function, the feedback of the planning and assessment cannot be fully undertaken.

4. Conclusion

Mitigating against, and adapting to, climate change especially the low carbon green city should be considered at various stages of the SEA on the basic urban planning to prevent, reduce and offset any significant adverse effects on climatic factors.

References

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Prior Environmental Review System.

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Japan -Korea-China Tripartite Conference on Effectiveness of EIA/SEA
28 Oct 2011, Beijing Normal University

Low Carbon Green City and SEA in Korea

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Ⅰ. Introduction : Is the Response to Climate Change OK ?

Response to Climate Change

- Mitigation: Low Carbon Green Growth
  - new and renewable energy:
    Economic ?
  - carbon emissions trading system
  - Low Carbon Green City:
    Different from Sustainable City ?
    Are SEA and EIA well working ?
- Adaption : to Global Warming, Flooding, Drought etc.

Green Growth in Korea

At the 60th anniversary of the founding of the Republic of Korea on August 15, 2008,

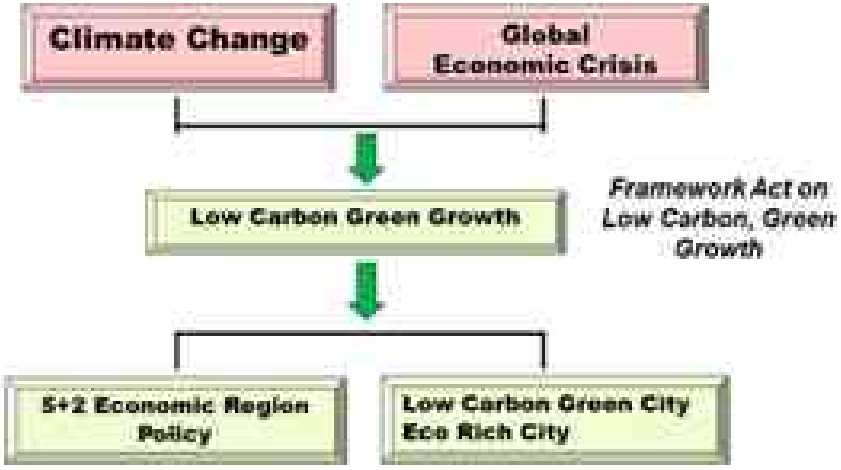
President Lee Myung-bak proclaimed as Korea's new national vision.

From the current development paradigm of quantity-oriented, fossil-fuel dependent growth

To quality oriented growth with more emphasis on the use of new and renewable energy resources

Objectives & Policy Directions of Green Growth

II. Green City in Korea

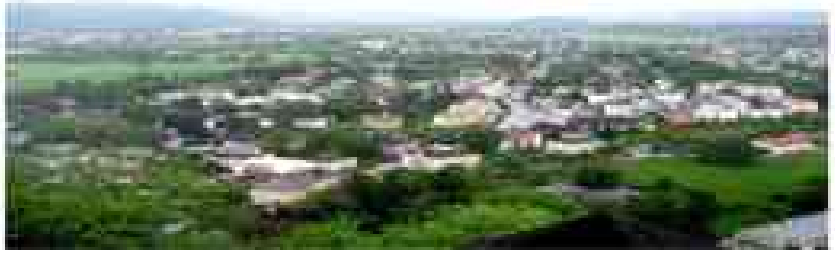


Downtown of Seoul

1900 ?

2011

Which is the Green City ?



Is SEA working well on the planning of Low Carbon Green City, Carbon Zero City, Carbon Neutral City, Climate Response City ?

- **1990's**

  Green City
  Eco-City, Eco-Polis
  Sustainable City

- **After Summer 2008**

  Climate Change Adaptation City
  Green Growth City
  Carbon Zero City
  Carbon Newtral City
  Low Carbon Green City

Two Green Cities by two Ministries in Korea

- **Low Carbon Green City**
  by Ministry of Land, Transportation and Marine Affairs(MOLTM)

- **EcoRich City**
  by the Presidential Commission on Green Growth (Established in Feb. 2009)

Main Factors of Low Carbon Green City

- Land Use
- Transportation
- Environmental Conservation and Management
- Energy
- Park, Open Space and Green Belt

Criteria for Assessing Green City

	Categories	Assessing Items
Carbon Absorption	Park/Green Space	Ratio of Park / Green Space
		Ratio of Ecological Land
		Ratio of Natural Land
Carbon Reduction	Land use	Work Distance
	Transportation	Mass Transit
		Bicycle
		Green Public Transit
	Eco-Building	Eco-Building Certification
	Energy	New and Renewable Energy
	Resources Recycle	Rainwater Use
		Graywater Use

Source: Guideline on Urban Development (by Ministry of LTM)

Green City in Korea

City	Area(㎡) / Population	Period	Effect	Planning Factor
Pyeongtaek : Seoehae	3,021,000 / 466,000	2006 - 2011	• Ratio of New and Renewable Energy > 5% • Solar Photovoltaic	- Green Village - New and Renewable Energy : Solar Photovoltaic, Solar Power Generation, Fuel Cell - Green Space for Carbon Absorption - Pedestrian Walkway, Bike route
Wolye : Bongpa	6,788,000 / 115,000	- 2014	• Effect of New and Renewable Energy: = 18,582 TOE/year • CO_2 Decreasing Effect = 41,937 TOE/year	- Green Transport System - New and Renewable Energy : Solar Photovoltaic, Geothermal Heat, Waste Incineration Heat - Green Transport System such as Tram - TS Type Rental Bicycle- New and Renewable Energy : Solar Photovoltaic, Solar Power Generation, Geothermal Heat - Distributed Rainwater Management - Waterway
Hwa-seong : Dong-tan2	7,180,000 / 200,000	2008 - 2012	• Ratio of Green Transportation > 20%	
Incheon -Cheheon	18,100,000 / 220,000	2005 - 2011	• Ratio of Mass Transport: Bicycle = 80 : 20 • Solar Photovoltaic	- Energy Saving City - New and Renewable Energy : - Resource Cycle - Green Transport Planning including 30 km bike route etc. - Energy Zone Planning for Education and Public Relation

Green City in Korea

City	Area(㎡) / Population	Period	Effect	Planning Factor
Asan	17,800,000 / 175,000	2009 - 2015	• Decreasing Energy Consumption more than 35%	- Green Home Building Energy System - New and Renewable Energy : Solar Photovoltaic, Geothermal Heat, Fuel Cell, Bio-Energy
Seoul Ma-gok	3,360,000 / 30,000	2007 - 2012	• Energy Saving & Recycling City • Energy Independency > 60% • Ratio of New and Renewable Energy > 40% • Decreasing Energy Use more than 50 % more • Decreasing GHG more than 66 % more • Decreasing Fossil Fuel more than 18% - 45,000TOE	- Environmental Planning related with the Han River - Eco-Transportation System - Waste Treatment System - New and Renewable Energy Specialization - Energy Zero-Public Building
New Capital City	72,900,000 / 500,000	2005 - 2030	• 25% Decreasing Effect of CO_2 = 209,245 TC/year	- Carbon Neutral City - IT City - New and Renewable Energy : Solar Photovoltaic, Solar Power Generation, Geothermal Heat, Solid Fuel, Digestion Gas(Methane) using anaerobic treatment

Eco Rich City

1. *Green Energy:*
   supplying facilities for renewable energy, consuming limit for architectural energy, green home, and passive house

2. *Green Commuting:*
   bicycle, BRT, railroad, transportation card, low carbon car, mass transit district.

3. *Green Oasis:*
   urban river ecosystem, regaining flow-rate, using rainwater, waterfront, and ecological ratio of water permeability.

Eco Rich City

4. *Green Recycle:*
   using energy from waste, reduction of construction waste

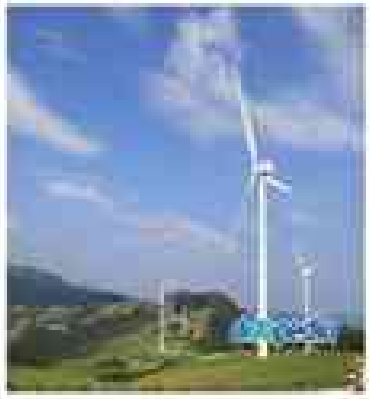
5. *Green Industry:*
   eco-tourism, eco-town,
   international cooperation and export

6. *Green Corridor:*
   green corridor axis and ecological space,
   urban biodiversity,
   rooftop and wall greening

7. *Green Humanism:*
   change of life style,
   environmental business,
   private and public consultation,
   education and experience program of green growth

Solar Energy

Wind Energy



Transportation: Mass Transit (Bus & Rail)

Transportation: Bycycle

III. SEA on Green City Planning

1. *History of EIA & SEA*
2. *SEA on Urban Planning*

1. History of EIA & SEA in Korea

	Ministry of Environment	
mon/yr	EIA	PRS
Dec/77	Environment Conservation Act : Prior Review System (PRS) based on individual laws	
Feb/81	Regulation on the Preparation of EIA Statement → EIA can be implemented	PRS based on Individual Laws
Jun/90	Framework Act on Environmental Policy(FAEP) of 1990	

PRS = Prior Review System
PERS = Prior Environmental Review System

History of EIA & SEA in Korea

	Ministry of Environment		Ministry of LTM
mon/yr	EIA	PERS ("lower" SEA)	"higher" SEA
Jan/93	EIA Act	Instructions of Prime Minister	
Dec/99	Act on Assessment of Impacts of Works on Environment, Transportation, Disasters, etc	FAEP Amendments of 1999	
Dec/04	"	"	Regulations for SEA
Jan/09	EIA Act	"	"
July/12	EIA Act		"

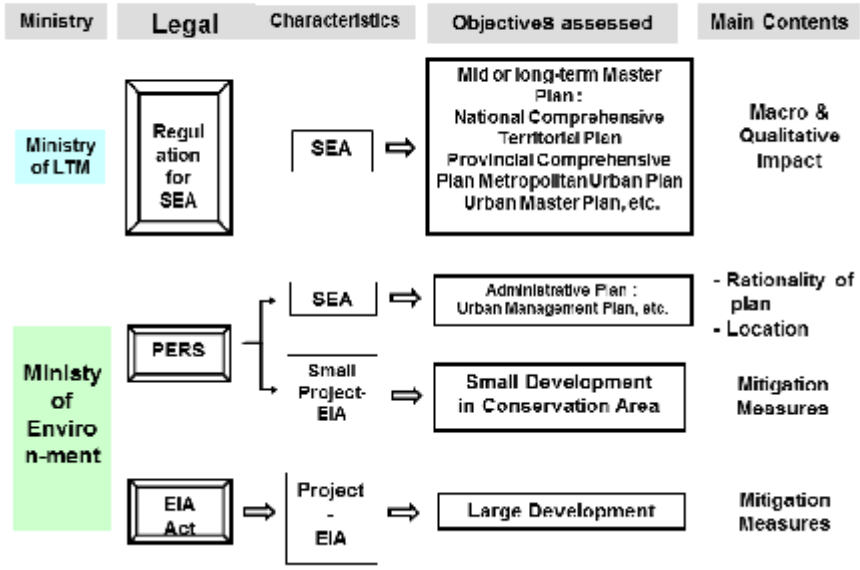
PERS = Prior Environmental Review System

Comparison of EIA, PERS and SEA

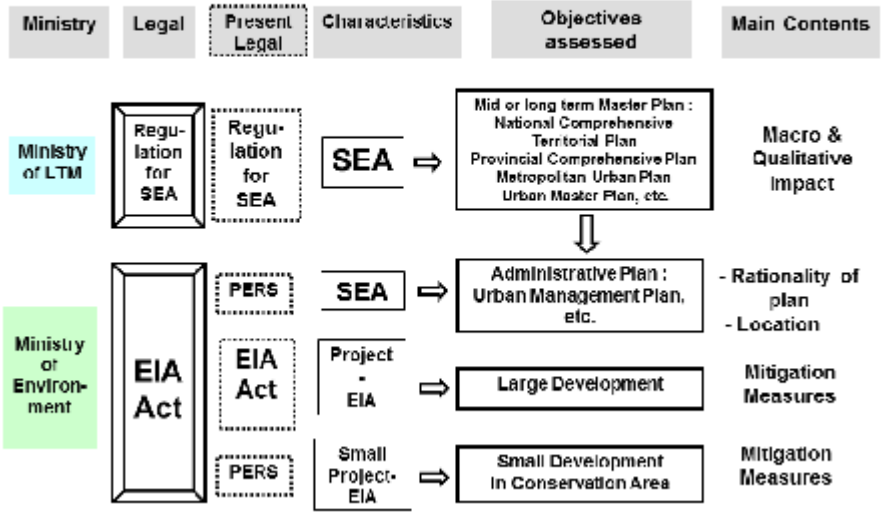
Cate-gory	Ministry of Environment		Ministry of LTM
Law	EIA EIA Act	PERS(SEA) Framework Act on Environmental Policy	SEA Regulation for SEA
Objectives assessed	● large development projects	● administrative plan ● small development projects in conservation area	● Mid or Long-Term Master Plan
Period	● before approval of implementation plan for development projects	● before decision of administrative plan and development plan	● before decision of Mid and Long-Term Master Plan

MLTM = Ministry of Land, Transportation and Marine Affairs

SEA and EIA System in Korea (Present)



SEA and EIA System in Korea (From July 2012)



[Fig] Integrated EIA System of PERS & EIA

2. SEA on Urban Planning

2-1 Manual on Prior Environmental Review System (by Ministry of Environment)

2-2 Regulation for Strategic Environmental Assessment (by Ministry of LTM)

2-3 Guideline on Urban Planning for Low Carbon Green City (by Ministry of LTM)

1-2-1. Low Carbon

1-2-2. Green Growth

- *solving climate change and environmental pollution thru saving and efficient use of energy/resource*
- *Make new growth engine to provide new jobs thru development of clean energy green technology*
- *Harmony of economy and environment*

1-2-4. Green City is defined as the city with such factors minimizing environmental pollution and Green House Gas as Compact Urban Structure, Mixed Land Use, Public Transit oriented Transportation System, New and Renewable Energy, Water & Resource Cycle.

2-4 Standard Model for Low Carbon Green City (by Ministry of LTM)

Fig. Planning Process of Low Carbon Green City

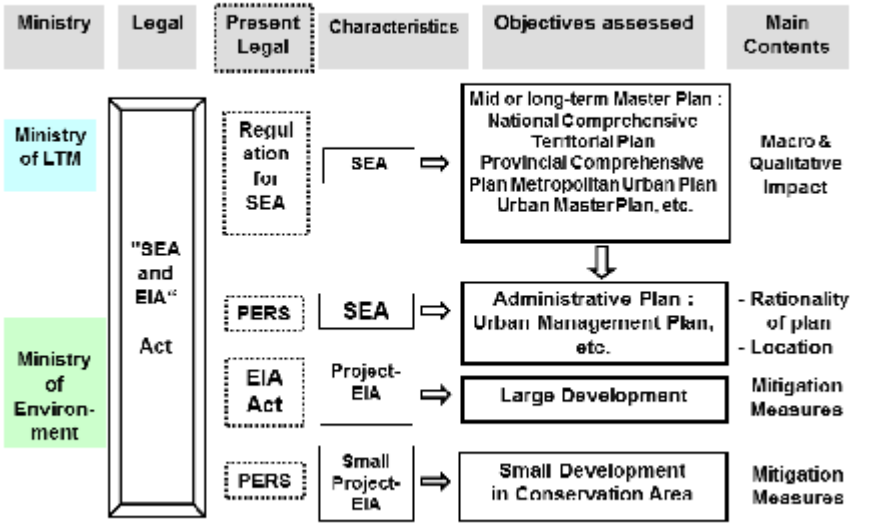
2-5 Guideline on Urban Planning based on Act on Planning and Use of National Territory (by Ministry of LTM)

2-6 Guideline on Urban Development (by Ministry of LTM)

Ⅳ. Closing Remark

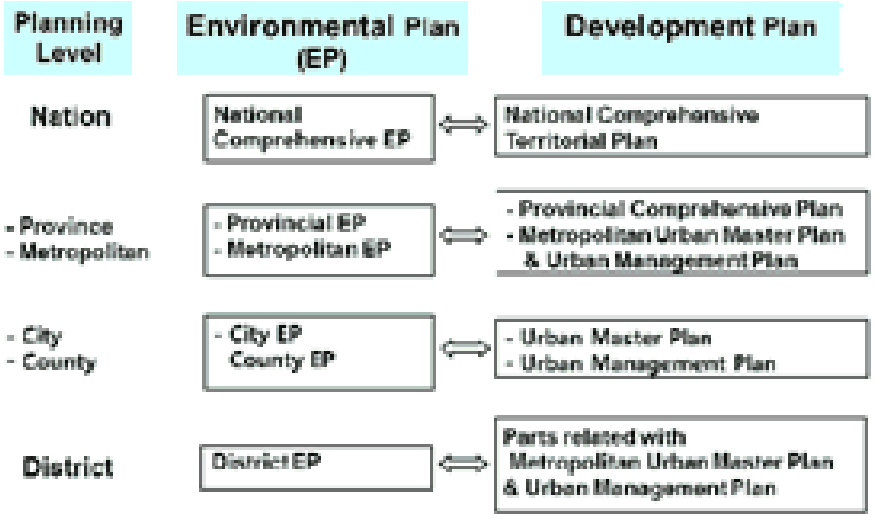
1. From the "two steps: upper & lower" SEAs to Interconnected SEA on Urban Planning
2. Integration of Development & Environmental Planning
3. Both Low Carbon Green City and Climate Change Adaptation City
4. Climate Change Mitigation & Adaptation in the SEA Process
5. Epilogue

SEA and EIA System in Korea: future direction

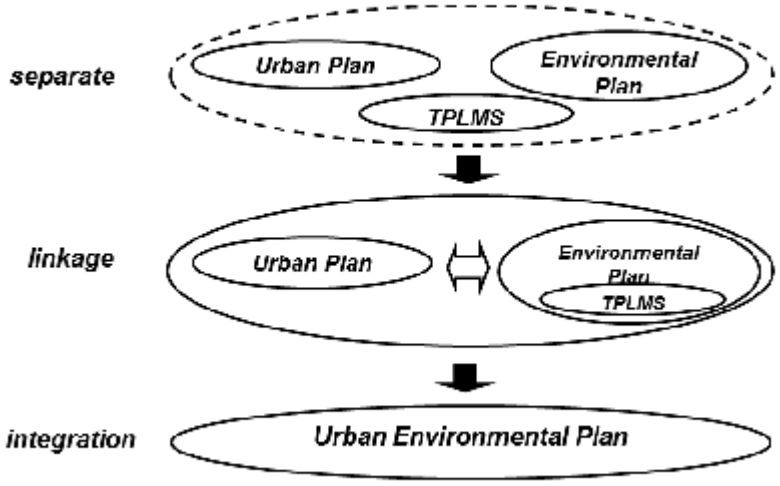


[Fig] Completely EA System Integrating EIA of MOE and SEA of MOCT

Integration of Development & Environmental Planning



Example of Integration Process : Urban Plan and Environmental Plan



TPLMS = Total Pollution Loads Management System

3. Both Low Carbon Green City and Climate Change Adaptation City

Escape from Climate Change

- **Mitigation : Low Carbon Green City**
- **Adaptation: Climate Change Adaptation City**
  Disaster Prevention City

4. Climate Change Mitigation & Adaptation in the SEA Process

2-1 Manual on Prior Environmental Review System
(by Ministry of Environment)
2-2 Regulation for SEA
(by Ministry of LTM)
2-3 Guideline on Urban Planning for Low Carbon Green City
(by Ministry of LTM)
2-4 Standard Model for Low Carbon Green City
(by Ministry of LTM)
2-5 Guideline on Urban Planning based on Act on Planning and Use of National Territory (by Ministry of LTM)
2-6 Guideline on Urban Development
(by Ministry of LTM)

Focused on mainly Mitigation → both Mitigation & Adaptation in the SEA

4-1 Climate Change Mitigation & Adaptation in the SEA Process

SEA process	How climate change could be considered in the process
Stage A: Setting the context & objectives, establishing the baseline and deciding on the scope	· Determine the current and likely future climate baseline. · Identify the likely significant problems and constraints caused by climate change. · Identify other relevant plans which contain climate change mitigation and adaptation measures. · Develop climate change objectives and indicators. · Consult with SEA Consultation Bodies.
Stage B: Developing and refining alternatives and assessing effects	· Suggest plan alternatives (referred to both mitigation and adaptation). · Assess the effects of plan alternatives on the climate change objectives and indicators. · Consider the alternatives' impacts on greenhouse gas emissions, and their ability to integrate climate change adaptation measures. · Begin to integrate climate change mitigation and adaptation measures into the plan.

Climate Change Mitigation & Adaptation in the SEA Process

SEA process	How climate change could be considered in the process
Stage C: Preparing the Environmental Report	- Explain how climate change issues have been identified and managed, including how uncertainty has been managed.
Stage D: Consulting on the draft plan or program and the Environmental Report	- Consult authorities responsible for climate change management and others - Fully integrate climate change mitigation and adaptation measures into the final plan.
Stage E: Monitoring the significant effects of implementing the plan or programme on the environment	- Monitor the effectiveness of mitigation measures in reducing greenhouse gas emissions. - Be prepared to respond to any adverse impacts identified.

4-2 Possible SEA Objectives on Climate Change

	Possible SEA Objectives
Mitigation	Minimize future climate change by: - reducing the need for energy, for example reducing the need to travel - improving energy efficiency - switching to lower carbon fuels - increasing % of renewable energy - improving waste and land use practices - maintaining carbon sequestration potential of woodlands, peats and other organic soils

4-2 Possible SEA Objectives on Climate Change

	Possible SEA Objectives
Adaptation	Reduce vulnerability to the impacts of climate change by - providing wildlife corridors - providing adequate health services and infrastructure - ensuring that drainage systems can cope with changing rainfall patterns/intensity - taking a precautionary and risk-based approach to developing in the floodplain - ensuring adequate sea defences - ensuring adequate future water supply and demand management - designing buildings and urban areas to cope with new climate extremes - providing robust transportation infrastructure - increasing urban green space - avoiding actions that foreclose or limit future adaptation, or contribute to climate change

4-3 Climate Indicators

Aspects of climate change	Possible indicators
Causes	Greenhouse gas emissions: per region, per capita
Climate / weather changes	- sea level - precipitation - temperature - Flood levels in rivers - extreme events such as heat waves
Local impacts of climate / weather changes	- average annual flood incidence / damage drought orders - ranges of habitats - number of heat and/or cold related deaths - number of cases of subsidence / insurance claims for subsidence - river flows and water quality

4-3 Climate Indicators

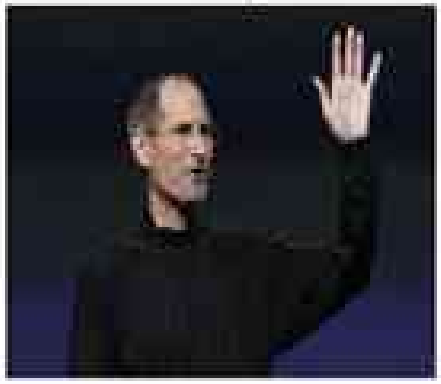
Aspects of climate change	Possible indicators
Mitigation measures	- household energy use - total electricity and gas use - vehicle-km travelled per person per year - electricity generated from renewable energy sources - and Combined Heat & Power (CHP) located in the area - embodied energy in new buildings - average energy efficiency of new buildings - % of new homes conforming to recognized codes for sustainable buildings
Adaptation measures	- % developments with Sustainable Drainage Systems - number or % homes in floodplain / coastal flooding - number or % roads/railway lines in floodplain - number of planning permissions granted against Environment Agency advice on grounds of flood risk - household water use - % of developments subjected to checklist for development

2005 Stanford Commencement Address By Steve Jobs

Stay hungry and Stay foolish !

Think Differently

Think Differently !



畫龍點睛 (Finishing Stroke) ? 蛇足(legs of snail, unnecessary comments)?

The easiest but the most difficult way to Low Carbon Green City and SEA ?

JoJu buddhist monk
[趙州禪師, Tang Dynasty (唐)778~897]

放下貪,
Put down your greed.
看得失
If not, live with the greed resulting in heavy torment (CO_2).

谢谢 ! Thank you very much !

Effectiveness of the Technical Guidelines for SEA within the context of China, by Dr. Bao Cunkuan, Tongji University, CHINA

Effectiveness of the Technical Guidelines for SEA within the Context of China

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Outline

Contents

Overall Introduction

1 Introduction

Technical Guidelines for SEA

Definition and Purposes

Strategies to develop Technical Guidelines

Definition:
The SEA guideline is the official published document with contents to introduce principles, standard procedures, particular methodologies, or specific technical requirements for SEA process, also called as guidance, manual, or standard, etc.

Purpose
1. to translate the laws into implementation;
2. to detail and provide practical guidance for each procedures;
3. to provide practical guidance on application of methodologies;
4. to promote the consistency and quality of practices;
5. to provide references or sources for further research;
6. to provide forum for discussion on the technical management SEA and form common understanding.

1 Introduction

Technical Guidelines for SEA

- Definition and Purposes
- Strategies to develop Technical Guidelines

1. The "separation strategies"——SEA guidelines are sectoral standards compiled by EPA separatedly
2. The "collaborative strategies"——the guidelines are collaboratively prepared by EPA and the relevant governmental departments

1 Introduction

1 Introduction

Technical Guidelines for SEA

- Guideline System
- Contextual Dimension

Context here refers to factors that can directly influence the SEA guideline effectiveness and is in return influenced by the application of SEA guidelines.

Four contextual dimensions:
Technical context
Legal /policy context
Institutional context
Social/cultural context

The understandings of technical guidelines system and its contextual dimensions inspired us to adopt a systematic approach to evaluate the effectiveness of SEA guideline.

1 Introduction

Criteria for Effectiveness Of Technical Guidelines

2 Effectiveness Criteria

Effectiveness Criteria

- Specific effectiveness
- Systematic effectiveness
- Contextual effectiveness

1. A high degree of consistency among purposes, responsibilities and legal status of the specific guideline
2. A cooperative transparent process involving stakeholders to develop the guideline
3. High-level technologies, including comprehensive contents, use of frontier methods and application of new techniques.
4. Provision of right, clear and adaptive standards and requirements for the preparation of SEA reports
5. Common acceptance and valid applications by SEA practitioners.

2 Effectiveness Criteria

Effectiveness Criteria

- Specific effectiveness
- Systematic effectiveness
- Contextual effectiveness

1. The existence of well-established system framework.
2. A high degree of consistency among purpose, contents, legal status among different SEA guidelines
3. The existence of effective cooperation among relevant organizations and public participation during the preparation of technical guidelines
4. The existence of a context that can support and facilitate the acceptance of technical guidelines.

2 Effectiveness Criteria

Effectiveness Criteria

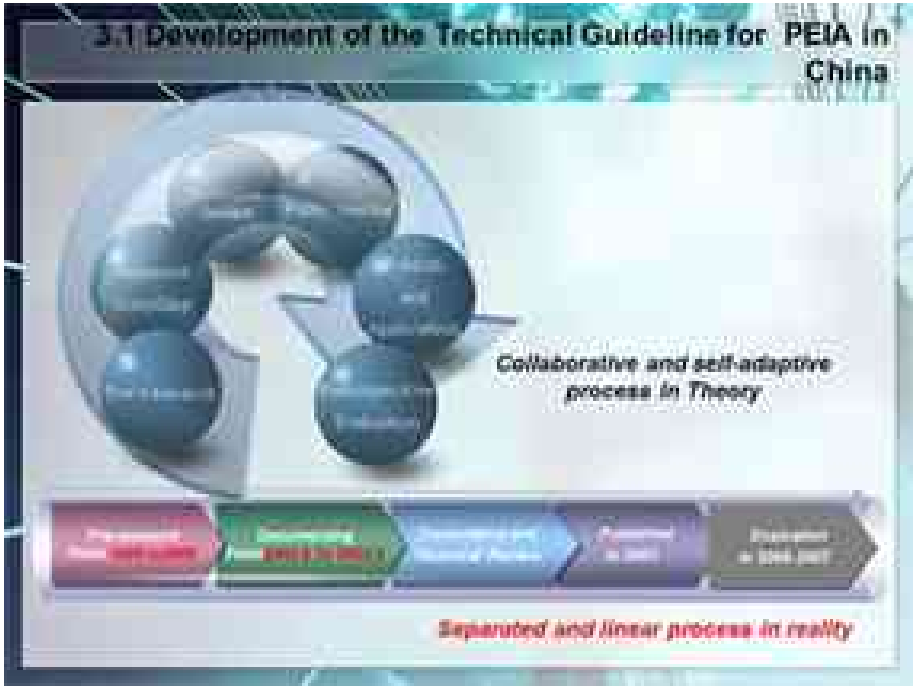
- Specific effectiveness
- Systematic effectiveness
- Contextual effectiveness

1. Compliance with existing legal documents, policies, as well as technical standards relevant to the SEA.
2. A high degree of environmental education or technical training to foster experts that could well understand and apply the technical guidelines
3. Existence of a strong political will to support and facilitate the application of technical guidelines
4. Sufficient Fund support for the research on the development and effective application of technical standards relevant to SEA

Following evaluation on the Technical Guidelines for PEIA in China are based, yet not limited to these theoretical effectiveness criteria.

Evaluation of the Guideline Effectiveness in China

3.1 Development of the Technical Guideline for PEIA in China



3.2 Methodologies: Questionnaire Survey to Explore Experts' Perspectives

Major questions in the Questionnaire

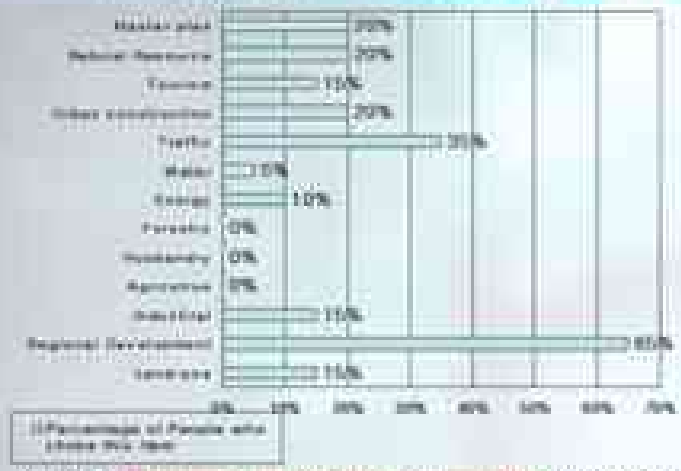
1. When did your organization begin to undertake review PEIA?
2. What's your perspection on SEA effectiveness in China?
3. What are the key issues to affect the effectiveness of SEA implementation in China?
4. How do you see the PEIA Guideline? (choose the specific components of guideline materials that have been of most use in your PEIA practice)
5. Are those principles of PEIA defined in the Guideline reasonably defined?
6. Do you think there are more types of plans that should be integrated with PEIA?
7. Are the terms defined in the Guideline accurate and understandable?
8. How do you comment on the working procedure standardized in the Guideline?
9. Are you willing to follow the content requirements proposed by the Guideline?
10. Do you follow the content requirements defined in Guideline in real practice?
11. How do you see the methods / techniques recommended in the Guideline?
12. Do you think the methods / techniques recommended in the Guideline well applied in PEIA?
13. How effective is the PEIA Guideline as you perceive?
14. What changes would you recommend be made to improve and revise the PEIA Guideline?

3.3 Major Results and analysis(1)—collection rate

Organization	Hardcopy Distributed	Hardcopy Collected	Valid Hardcopies	Collection Rate
Institutes with PEIA Qualification	158	44	42	26.6%
Planning authorities	30	4	4	13.3%
Institutes specializing in planning	68	4	4	5.9%
Environmental protection authorities	42	6	6	16.7%
In Total	298	58	56	18.8%

Analysis: The collection rates were very low (only 18.8% in total), owing to the lack of PEIA practical experience in China by the end of 2007. Most experts surveyed admitted that they have not had any PEIA experience thus far. E.g. From 2003-2006, few of 1000 urban plans undertaken by Shanghai Urban Planning and Design Institute had been processed with PEIA.

3.3 Major results and analysis(2) —overall implementation of SEA in China



Analysis: Five main areas for PEIA implementation were regional development, transportation, industry, natural resource and urban construction plan.

3.3 Major results and analysis(3) —overall effectiveness of SEA implementation in China

Table 3 Key Issues to Affect SEA Implementation Effectiveness (2007)

Key issues	Times of being selected	Times of being selected as No.1 Priority	Key issues	Times of being selected	Times of being selected as No.1 Priority
Legislative and political context	17	3	International experience	3	0
Decision-making	20	3	Administrative governance	12	3
Information disclosure	18	3	SEA strategies and mechanisms	20	3
Technical methods	22	4	Professional training	12	2
Political willingness	19	6			

Analysis: According to experts perspectives, five key issues that impact SEA effectiveness are the design of an adaptive and effective SEA strategies, technical capacity building, integration with decision-making process, political supports and information disclosure.

3.3 Major results and analysis(4) —Specific use of the Guideline

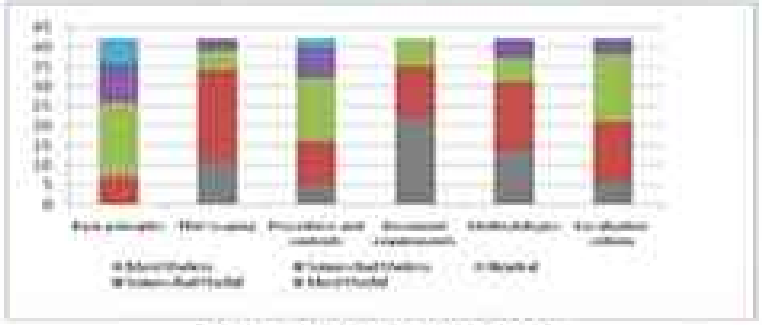


Figure3 Specific Uses of the Guideline

Analysis: It was apparent that the part concerning specific requirements for PEIA reports gained most votes for "most useful". Contents for scoping and methodologies were ranked in the second and third places as "somewhat useful". The part introducing abstract principles was considered to be "most useless", based on expert perception.

3.3 Major results and analysis(5) —Contents Rationalities

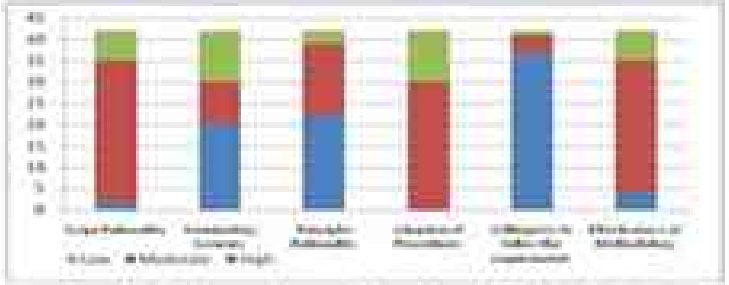


Figure4 Experts' perspectives on Rationalities of Guidelines Contents

Analysis: Though most experts tend to follow the requirements listed in the Guideline for the sake of review, they perceived that the Guideline are somewhat inapplicable in practice due to following reasons:

1. Working procedure proposed in the guideline is somewhat similar to that of project EIA, which could not reflect the distinction of SEA at plan level.
2. Some terms are not accurate, and some are too abstract and difficult to be understood.
3. Methods and technical tools listed in the Guideline are not applicable in practice due to constraints of information, time and expense.

Conclusions & Recommendation

4.1 Conclusion (1)

1. Overall speaking, though PEIA practice in China relies too much on technical standards, the existing Guideline fails to play a leading role in providing references and guidance for SEA implementation, as the acceptance from experts are very low.

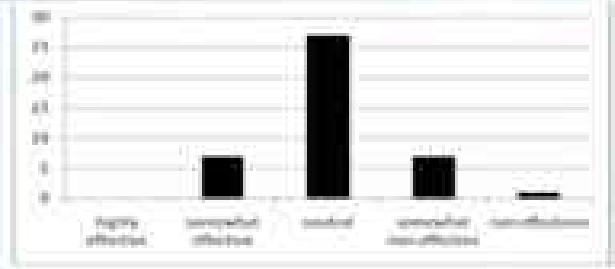


Figure 1 Overall Effectiveness based on Perspectives of EIA Experts

4.1 Conclusion (2)

2. And the major issues are: (listed according to priority)

(1) Fundamental Research on SEA which buttress the development of technical guidelines are insufficient or lagging behind.

(2) A system design for the development of technical standards of PEIA is absent. Issues such as "which types of guidelines should be developed", "when to develop", "for what specific purposes" and "the consistency among different guidelines " have not been properly addressed.

(3) The Technical Guidelines (2003) which was developed on the basis of project EIA lacks the consistency with attributes of SEA, i.e., strategic nature, long term, macro-level and uncertainty.

(4) Environmental authorities are " wrestling", rather than " cooperating" with other sectors during the development of a technical guideline/standard. (In practice, most technical guideline was initiated singly by environmental authorities, without enough discussion with relevant planning authorities, planners or public. Planning authorities are also permitted to initiate a technical guidelines withouth coordination with environmental authorities.)

4.2 Recommendations (1) — for Revision of the Guideline(2003)

Experts' recommendations on revision of the Guideline included six aspects.

(1) The legal status should be properly defined in consistency with the PEIA Regulation.

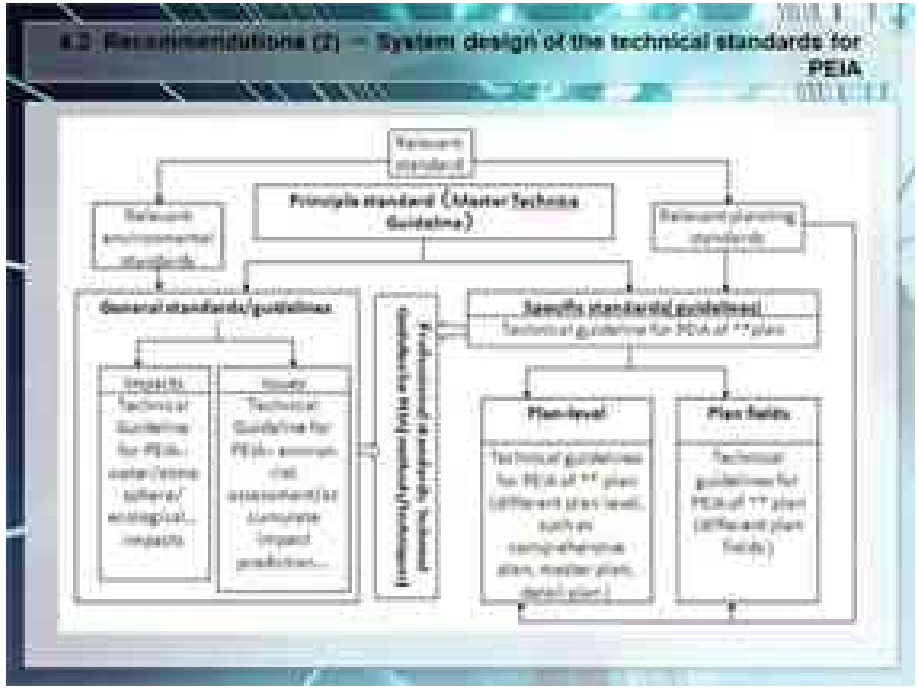
(2) The purpose of law in the preface should be redefined to fulfill various purposes rather than merely quality control of PEIA reports;

(3) Multiple procedures should be provided to be adaptive to different situations or demands in practices.

(4) The content addressing the relationship among social, economic and environmental benefits should be forcibly required in the PEIA report.

(5) Consistency with newly promulgated PEIA Regulation (2009) should be ensured.

(6) Systematic pre-researches and cooperations with other sectors should be carried out during the revision process.


4.2 Recommendations (2) — System design of the technical standards for PEIA
Principle standard (Master Technical Guideline)
General standards/guidelines
Plan-level
Plan fields


Question
THANKS FOR YOUR ATTENTION
How to achieve common understanding between environmental authorities and planning authorities as they stick to conflicting standpoint?


Effectiveness of the Technical Guidelines for SEA within the Context of China
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Environmental Assessment as a Social Infrastructure for Creating a Sustainable Society

Harashina Sachihiko

Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, Japan

keywords: Environmental Assessment, EIA, SEA, Sustainability, Heart-ware,

1. Introduction

Until establishment of Japanese EIA Act in 1997, it took quite long time of 25 years because of strong reluctance of major governmental bodies for public works and such industries as electricity, though majority of the people had been requiring a legislateive system. The EIA Act was amended in 2011. Even making some progresses such as introducing SEA on the siting satage, it has still fundamental problems. I woud like to discuss what is the critical problem in Japanese EA (EIA and SEA) systems from the viewpoint of EA as a tool in a sustainable society.

2. Sustainable Society and EIA

Since the Fukushima Nuclear Disaster, the role of EA has been gradually understood by Japanese people. Decision making of introduction of a huge technology should take best attention to such various impacts of environmental, social and economic through especially transparent process.

As the globally shared concept of sustainability should be realized in each country, Japanese government should work more positive to this direction. It has not been done well within Japan, though it has been recently realized in the field of international cooperation. The JICA Guideline of Environmental and Social Considerations 2010 is more advanced in terms of having a Reviewing Committee composed of outside experts.

In the process of amending the EIA Act, I insisted expansion of the scope of application to much smaller projects as it had been limited to only 13 types of huge projects. By this strong limitation, the screening process did not work and number of the EIA cases has been only about 20 per year, which is very small as it is 30,000 to
50,000 under the US NEPA. This is because EIA in the US is applied to every action having relationship with the decision of the federal government.

3 EA as a Social Infra-Structure

My argument is that EIA should be done more widely in a sustainable society because it gives opportunities to the public to share environmental information and to think the current and future situation of their environment. To act locally, they need think not only globally but also locally. If Japan became a country conducting plenty number of EIA even though most of them are small and concise ones, it would create more jobs in environmental areas, which should be towards green economy, and change education systems and accumulate more environmental information locally and nationally, then it could lead Japan to a more sustainable society.

EA in Japan should be expanded not only horizontally but also vertically through applying SEA to much higher stages of strategic decision making of plans and also even policies. In August 2011, Japanese government showed the will to conduct technology assessment (TA) on nuclear powers. Though it is a special case because of the tragedy of Fukushima, this approach should be expanded to other policies and plans by applying SEA of global standard.

4. Concluding Remarks

By the progress of EA, both EIA and SEA, we could expect to create a sustainable society. It is required to amend the EIA Act again as soon as possible for this goal. The key point is to rewrite the purpose to clearly describe the concept of sustainability. We need have more information disclosures and better participation processes.

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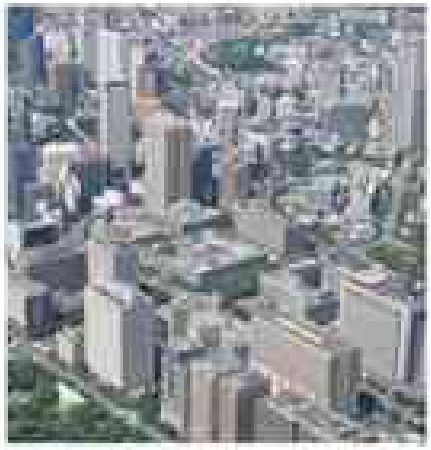
JICA, (2010) *JICA Guidelines for Environmental and Social Considerations*.

Japan-Korea-China Tripartite Conference
On Effectiveness of EIA/SEA
Beijing, Oct. 28, 2011

Environmental Assessment as a Social Infra-Structure for Creating a Sustainable Society

Sachihiko Harashina
Dean
Interdisciplinary Graduate School of Science and Engineering
Tokyo Institute of Technology

Past-President of IAIA

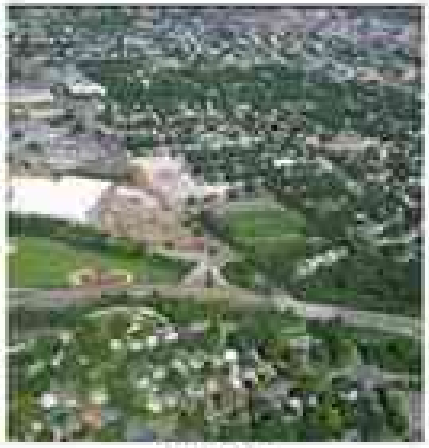


Tokyo

New York

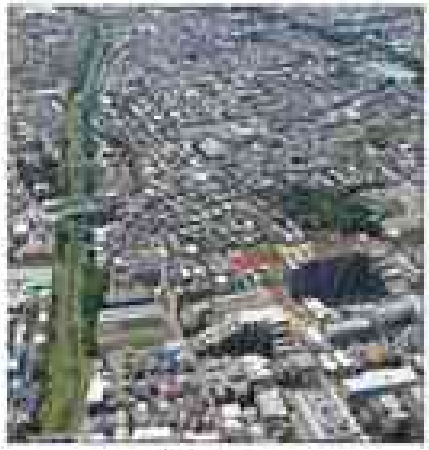
Land Use, Central Business Districts (by Harashina,2004)

Tokyo

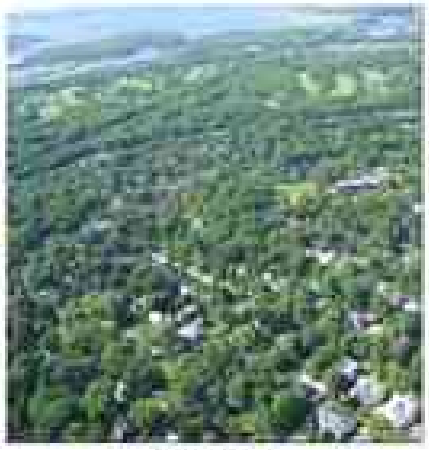


New York

Land Use, 10km from the CBD (by Harashina,2004)



Tokyo



New York

Land Use, 20km from the CBD (by Harashina,2004)

We Need Control Human Activities

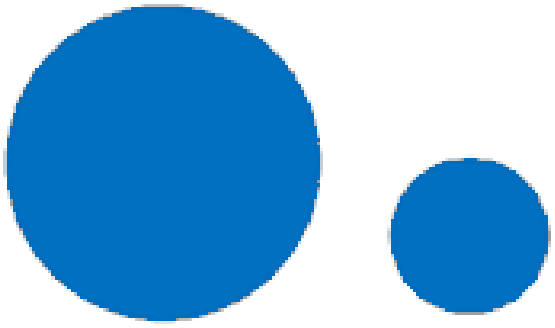
Environmental Assessment (EA)

The measure for sustainable development by *controlling human activities* that might have big impacts on the environment

- Needs Analysis,
  Mitigating Cumulative Impacts
- Methodological Background of EIA
  Systems Analysis/ Public Participation

Comparison of EA Cases

Numbers per year



320,000	60,000-80,000	70
China	USA	Japan

The Role of EA

A way for sustainable development (SD) by controlling human activities that might have big impacts on the environment

- Due process
  Process is regulated but no concrete order of mitigating the impacts
- Action Inducing Policy Measure
  Motivating volunteer action, A sort of CSR
- Communication to the public
  Information disclosure
  Public participation

Requirements for EA
-Rational and Fair Decision-Making-

For Rationality: Scientific Analysis
Application of Systems Analysis
Alternatives Comparison is the Kernel

For Fairness: Democratic Process
Public Participation,
Information Disclosure

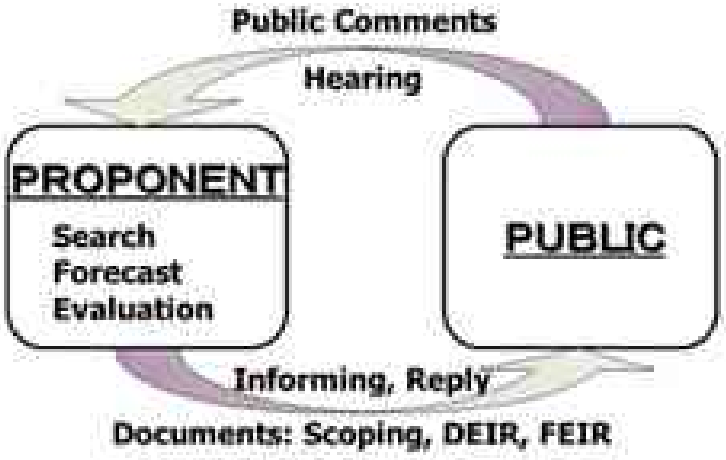
and

For Efficiency:
Creating an Efficient Way of Communication

EIA and SEA as Subsets of EA

- Concise EA
  - Concise EA for screening
  - Short time process, Less expensive
- EIA
  - EA with detailed studies and active feedbacks
  - Application of SA, Communication process
  - Paper based way is prevailing
- SEA
  - EA on the strategic decision making stage
  - Meeting based way could be taken

Communication in EIA process



Five Levels Model of Public Participation*

(1) Informing	(Informing**)
(2) Hearing	(Consultation**)
(3) Reply only	(Placation**)
(4) Meaningful reply	
(5) Partnership	(Partnership**)

* Harashina (1994-2001), feedback process for meaningful discussions conducted in public space.

** Comparable levels of Arnstein's eight ladders model of participation (1969)

Meaningful Reply is Realized by Discussions in Public Space

Two Ways of Discussions in Public Space

(1) Paper Based Way:

eg. Ordinal EIA process

major media are documents

(2) Meeting Based Way:

eg. Fixed members committee through open process

major media are meetings

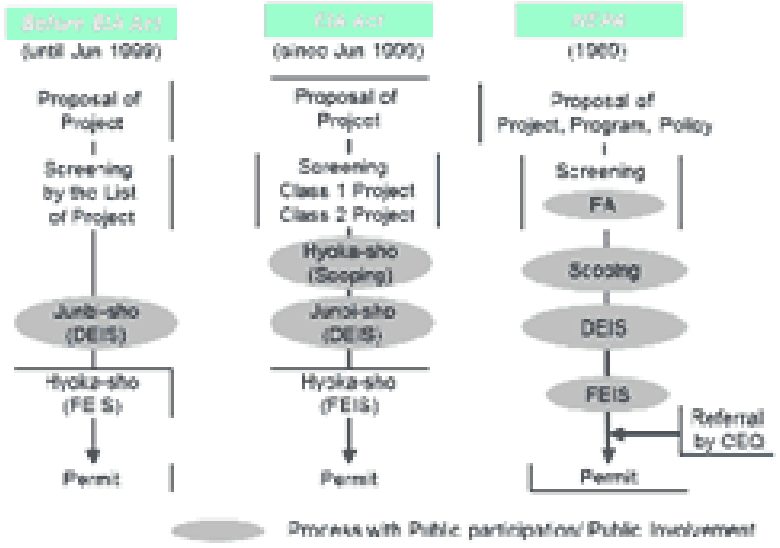
"Discussions in Public Space" through EIA

- EIA Process as a Communication Process by media mixture of papers and meetings
- Communication Media:

  based on Paper Documents

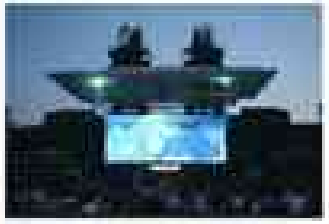
  based on Open Meetings

National Level EIA Systems: Japan and the US



2005 World Exposition in Japan

愛知万博 (Aichi Banpaku)

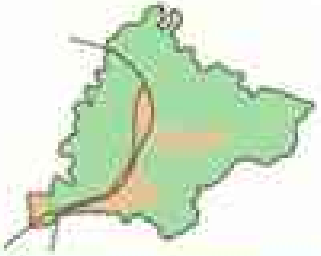


Wisdom of the Nature

A Case similar to the System under EIA Act
2005 World Exposition in Japan.

- Planning Process and EIA Process
- EIA Process: April,1998 – July,2002
- Utilized the Framework of the EIA Act
  - Special consideration was required by BIE
  - Theme: Beyond development, Wisdom of the nature
  - EIA Application was decided in 1995
- Four documents were published in the process
  (Scoping, D-EIS, F-EIS, Revised F-EIS)
- The plan was changed by public participation, which was out of the EIA process

The Original Plan
Appeared in the Scoping Draft, April 1998



Kaisho-no-mori Forest

Located 20km east from Nagoya St.

Area: 540ha

Developing (destroying) the Core of the Forest

Is it Beyond Development ?

Wisdom of the Nature ?

Kaisho-no-Mori Forest

Courtesy by the Nature Conservation Society of Japan

The EIA Process of the Exposition

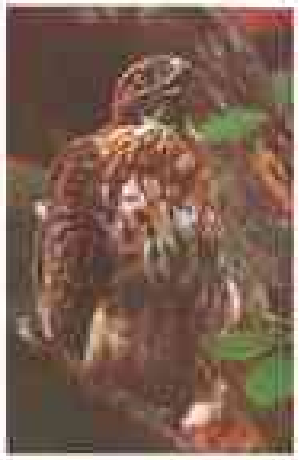
1998. 4 - 2002. 7 EIA Process

(former half)

- **1998. 4 Scoping**
- **1999. 2 Draft EIR**
  - **5 Goshawk nesting was found!**
  - **10 Final EIR (Interim EIR, actually)**
  - **11 Site visit by BIE**
- **2000. 1 Reviewing process of the F-EIR was finished by MITI committee (recommended the change of plan 2)**

The process was supposed to be finished in March.

Oh-taka (Goshawk)

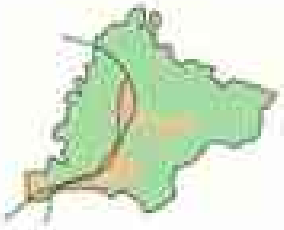


One of Endangered Species in Japan,

Nesting of goshawk was found by the branch of the Wild Bird Society of Japan in May, 1999. It was soon after the publication of the Draft EIR in February, 1999

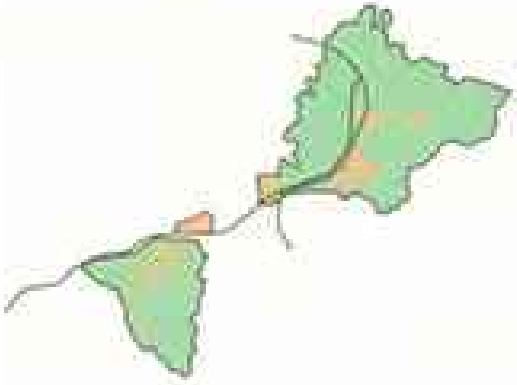
Alternatives in the Final EIR
(Actually, it become the Interim EIR)

Plan 1



The original site
Kaisho-no-mori only

Plan 2



Reduction of Impacts by Shifting from Plan 1 to Plan 2, in the Final EIR (Oct., 1999)

The EIA Process of the Exposition

1998. 4 - 2002. 7 EIA Process

- **1998. 4 Scoping**
- **1999. 2 Draft EIR**
  - **5 Goshawk nesting was found!**
  - **10 Final EIR (Interim EIR, actually)**
- **2000. 1 Review of the F-EIR was finished**

  Unfaithful action of MITI (reported)
  - **5 Intensive PP process was started**
  - **12 Registration at BIE**
- **2002. 3 Rev. Final EIR (Actual Final EIR)**

2002. 9 – 2005. 3 Construction

2005. 3 – Exposition (until 2005.9)

The Scandalous Fact was Reported by Newspapers Nationally Wide (Asahi Shinbun Newspaper, 2000.1.22.)

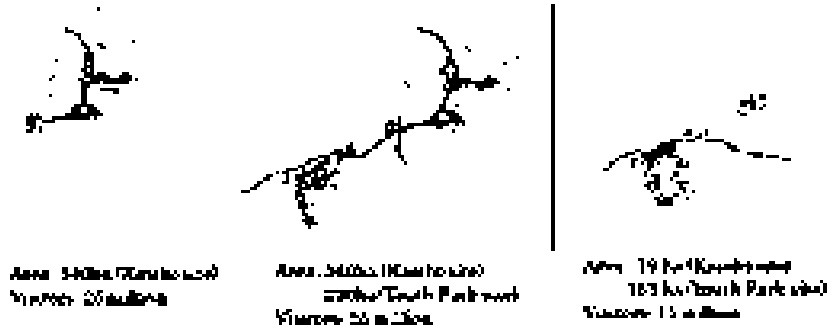
Change of Plan of the 2005 World Exposition

(from the left to the right)

Plan I
(Draft EIR, Feb. 1999)

Plan II
(Registered EIR, Oct. 1999)

Final Plan
(Registered at BIE, Dec. 2000)



The Site of 2005 World Exposition

The Lessons from the EIA Process

The Failure:

Took 4 years (2 years longer than usual)
No Alternatives in the Scoping Document

- *Alternatives Analysis* is Must
  Proponents have to know it
- *Scoping Process* for advanced participation
- EIA should be a part of *Planning Process*
- Transparency of *Reviewing Committee*

World Exposition Case as SEA

- Applied on the strategic decision making stages of Policy, Plan or Program
- No Action Alternative should be Examined
- Comparison between Environmental Aspects and Socio-Economic Aspects should be conducted
- Transparent Process for the Society
  PP/ PI
  Information Disclosure

Discussions in Public Space is

Realized by Environmental Assessment
Especially through EIA/SEA

- Planning Process
- How to assess
  Cost Benefit Analysis
  Environmental & Social Considerations

- **Decision Making in Democratic Societies**
- **Public Participation and Information Disclosure**

We should create

Sustainable World

A Gift from Korean Colleagues of IAIA

Past-President, IAIA

Application of Strategic Environmental Assessment in the Oil Spill Accident

Jong-Gwan Jung
Senior Research Fellow of Chungnam Development Institute (CDI)
101 Geumheung-dong, Gongju, Chungnam 314-140, Republic of Korea

1. Introduction

No single incident did more to raise Korean consciousness than the Hebei Spirit disaster, which just disgorged no less than 12,547kL of crude oil into the clean sea waters of Taean Peninsula Area. The images of dead birds and finless porpoise and wide range of tar-smeared beaches graphically illustrated mankind's capacity to foul its environment. The goal of this study is to review the Impact Assessment accompanied by oil spill accident which implies both substantive and procedural concerns. Substantively, the contents of assessment are impact categories; procedurally, the assessment process analyzes and evaluates those contents in various contexts and dimensions.

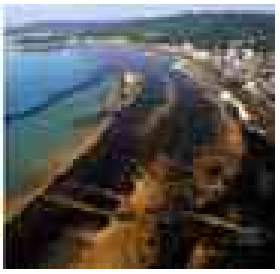
2. Oil Spill Monitoring and Cleanup

After oil spill, during the site survey by SCAT(Shoreline Cleanup Assessment Technique) team and the assessment of along the cleanup, we analyzed the characteristics of debris flowed into seashore including the remnants of oil residue as well as dispersed by emulsifiers as the state of chocolate mousse. As a result, the concentration of heavy metals in the lingered oil and smeared tar lump has been decreased rapidly as time goes by.

Shoreline cleanup endpoints are specific criteria assigned to a segment or unit of oiled shoreline that stipulate when sufficient treatment effort has been completed for that segment or unit.

3. Oil Spill Impact Assessment

Even before the initial step, a preliminary screening process takes place to determine the significance of potential impacts in the situation. In the case of outer continental shelf oil and gas development, the categorical exclusion of offshore operations has already been noted: impact assessment was precluded from the very start. Had it not been, salient issues and potentially significant impacts would have been identified for detailed study. The inclusion of “worst case analysis,” in this case a potential blowout or crash, would seem justified in light of previous experience. In the case of recovery from effects of the disaster, these might involve various options for environmental restoration and regional economic development.



4. Lessons Learned

These are some of the considerations that may be entertained in a retrospective impact assessment of the event. The essence of impact assessment however is anticipatory research. Two precepts can be applied in regard to the application of impact assessment in any case: In the first instance, the broad construction placed on the field of impact assessment, its contents and contexts provide some criteria for procedural decency and adequacy. In the second, Korea is unique in having made provision for a system of “disaster impact assessment” which has strong potential for anticipatory research applications.

References

1. CDI, Korea, 2009, A Study on the Pollution Survey of Oil Spill and the Methods of Ecological Restoration.

2. NOAA, 2010, Natural Resource Damage Assessment.

3. NOAA/MLTM, Korea, 2009, Natural Resource Damage Assessment Training Workshop Report.

October 28, 2011

Tripartite Conference on Effectiveness of EIA/SEA

Application of Strategic Environmental Assessment in the Oil Spill Accident

Jong-Gwan Jung
Senior Research Fellow of Chungnam Development Institute, Republic of Korea

contents

Introduction

ROK Marine Spill History

YUIL No. 1 : outer port of Busan
Volume (barrels): 18,881
Date: 1995-09-21

SEA PRINCE: Ulsan, East Sea
Volume (barrels): 31,600
Date: 1995-07-25

HEBEI SPIRIT : Yellow Sea, Taean
Volume (barrels): 80,000
Date: 2007-12-07

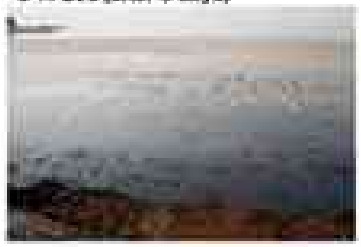
Hebei Spirit Oil Spill

Hebei Spirit : Yellow Sea, Taean (Korea)
Volume (barrels): up to 80000
Date: Dec 7, 2007

▲ 8 Dec (after 1day)

▲ 8 Dec (after 1 day)

▲ 11 Dec (after 3 days)

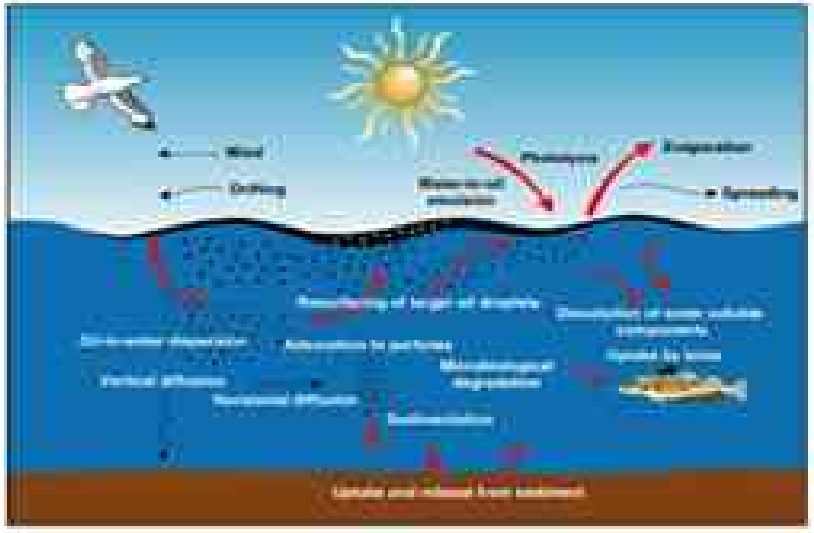


▲ 16 Dec (after 9 days)

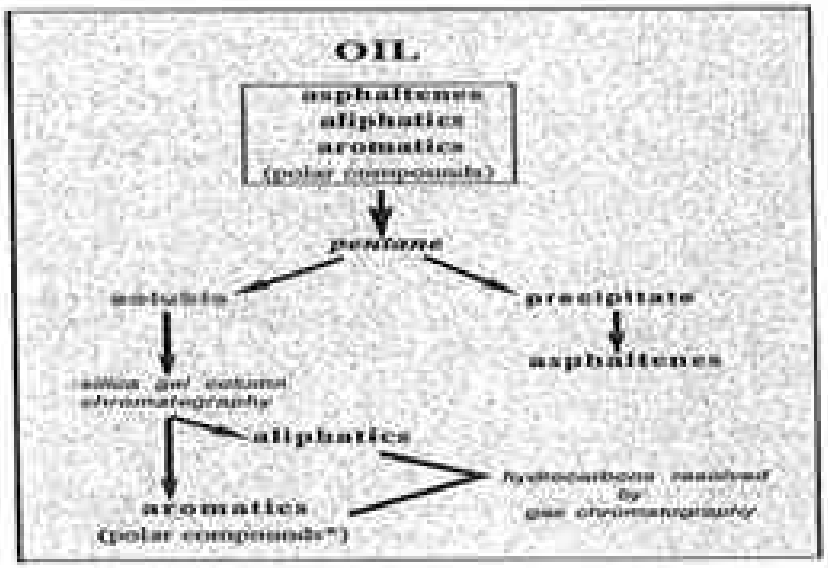
▲ 20 Dec (after 13 days)

▲ 21-22 Dec (after 14-15 days)

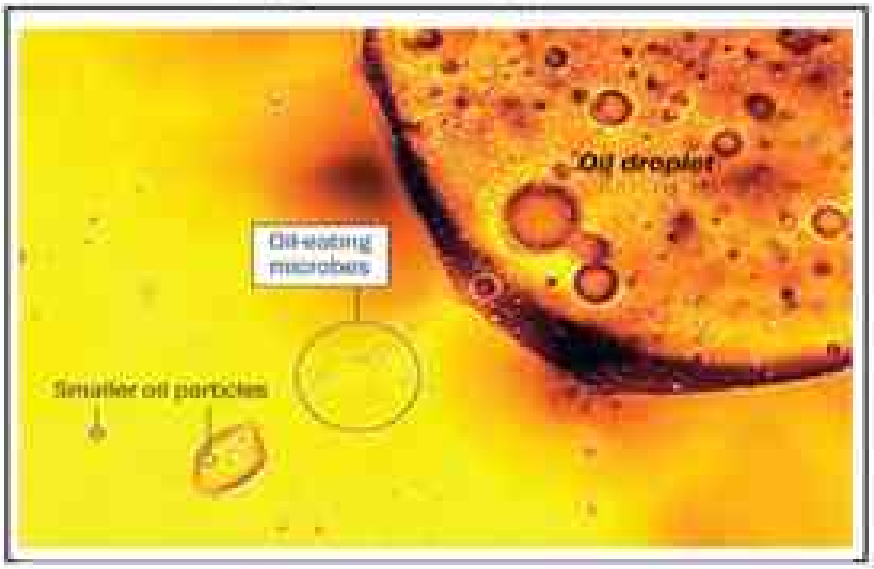
Weathering Process



Stabilization of Oil



Decomposition by Microbe



Oil Spill Cleanup and Monitoring

Shoreline Assessment

Planning:

- Contingency Plans
- Pre-SCAT Surveys
- Develop Resource Maps

Response:

- **Implement Plans**
- **Review Pre-SCAT**
- **SCAT Surveys**
- **Identify Protection and Treatment Priorities**

Shoreline Segments

Collection of data before an Oil Spill

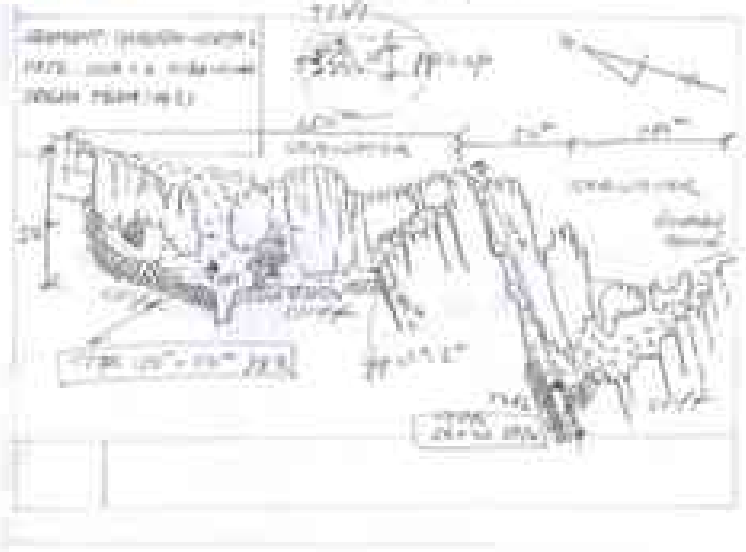
- General Information
- Physical Character of the Shoreline
- Resources at Risk
- Operational Characteristics
- Response Goals
- Methods
- Operation Issues

Collection of data after an Oil Spill

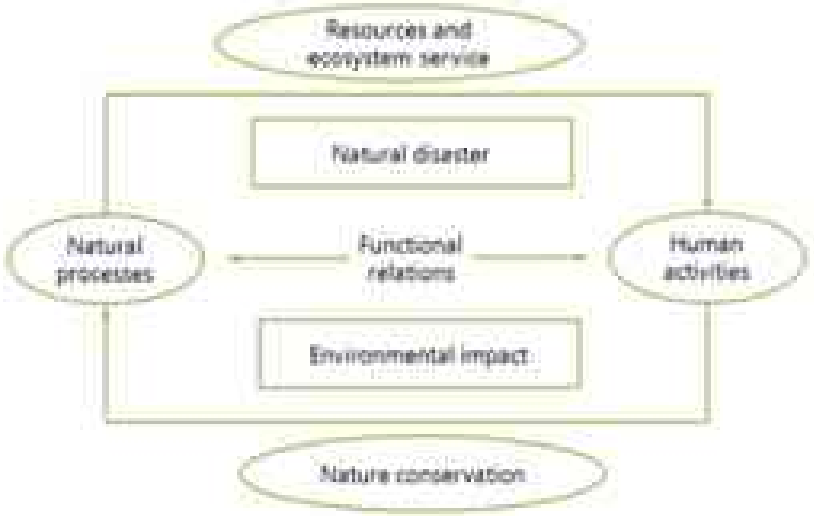
- General Information
- Survey Team
- Segment Surveyed
- Shoreline Type and Character
- Operational Features
- Surface Oiling Conditions
- Subsurface Oiling Conditions

- SCAT Sketch in Case Study 1

- SCAT Sketch in Case Study 2

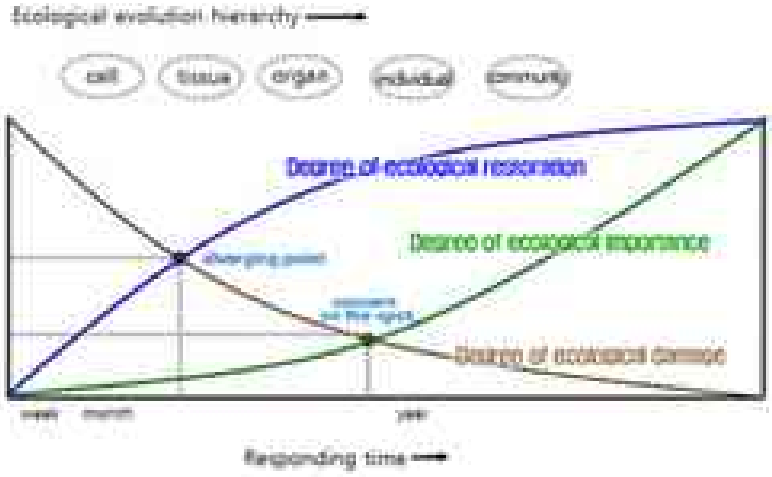


Evaluation of Ecosystem Service

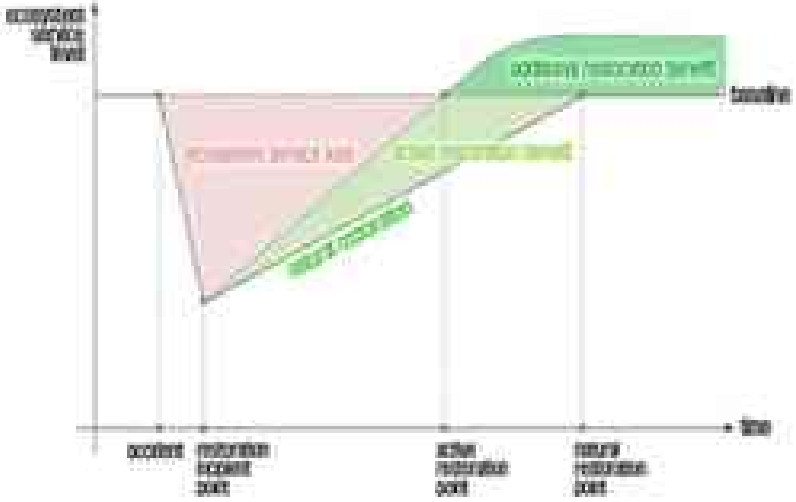


Ecological Restoration

Ecological Damage and Restoration



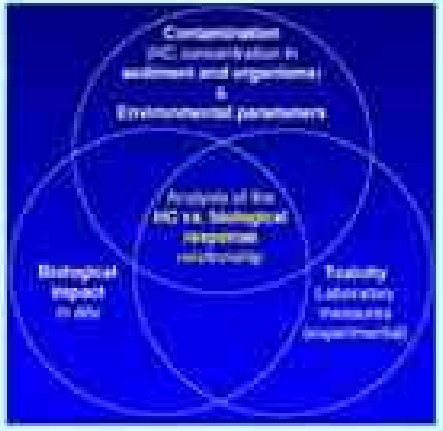
Ecosystem Service Loss & Benefit



Adaptive Resource Management

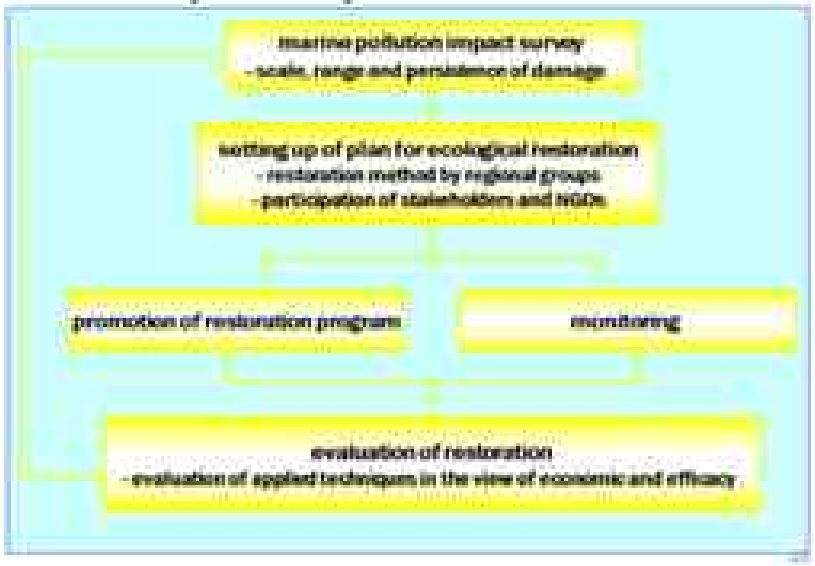
Oil Spill Cleanup and Impact

Oil Spill Impact Assessment



Framework for EIA by oil spill accident

Oil Spill Impact Assessment



Oil Spill Impact Assessment

Other shorelines of importance in the Taean area are mud and sand tidal flats. These shorelines are important bird and shellfish habitats and are considered to be sensitive to oil spills. While tidal flats are relatively impermeable to oil, oil can penetrate through holes made by burrowing animals, such as mantis crab and sea urchin.

What is required to assess accurately the environmental impact of oil spill?

"No loss of time, no loss of information"

Oil Spill Impact Assessment

Defining an impact assessment response framework:

- Standardized procedures (widely recognized by scientists) at national / international level prior to the spill
- Methods fitted for the pollution (size and type) and for the various aims of an SEA

i. To prove the impact (/or relating fluctuation to the spill)

ii. To quantify the loss

iii. To assess recovery

iv. To argue for cleaning or not, for stopping cleaning operations

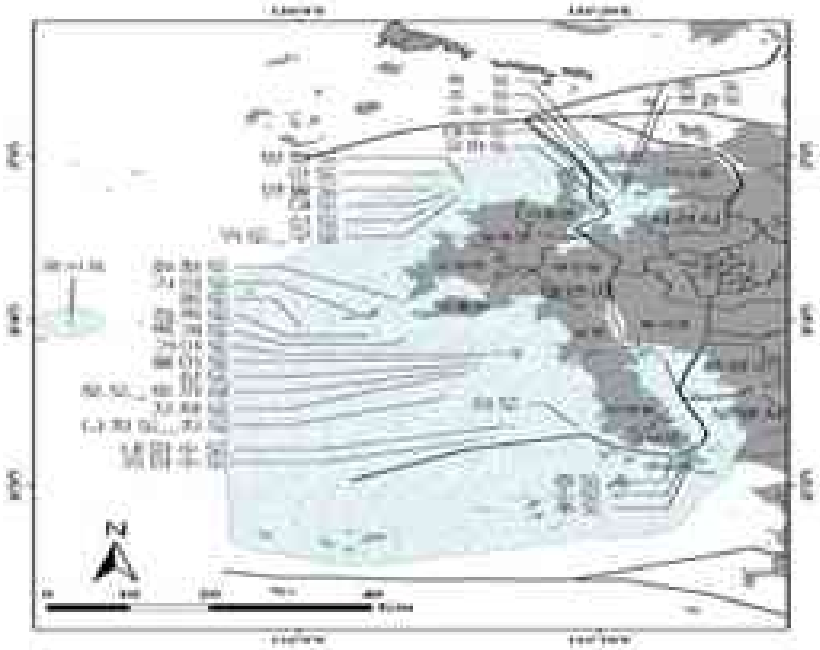
v. To build a compensation file...etc

Oil Spill Impact Assessment

Tidalflat Survey(2010. 6)

Tidalflat with Seaweed(2011. 4)

Shoreline wetland restoration by seagrass planting



Oil Spill Impact Assessment

Oil Spill Impact Assessment

Scoping	• Inclusion of worst case analysis • Injury assessment • Development of a restoration plan
Profiling	• To characterize the existing conditions and constraints in the impact situation
Analysis of Alternatives	• SEA will help guide the responsible agents on what types of restoration projects are most relevant for oil spill accident
Evaluation	• SEA will document this decision process as well as the environmental consequences of the selected alternative
Monitoring	• Special impact management plan is advisable in applying lessons learned from the assessment process

"What are needed for restoration?"

1, **Preparedness** for Oil Spill
: Contingency planning for the accident

2, **Emergency** for urgent response
: Arrangement by forecast scenario

3, **Evaluation and Surveilance** for situation priority
: Stakeholders participation through SEA

4, **Prevention settlement** by mutual dependence
: Decision making process for regional consensus

5, **Coastal restoration** by natural environment
: Methods and means for ecological restoration

ChungNam

Heart of Korea

Get Happy!

SEA of Urban Planning in China

Yi LIU

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Keywords: Urban sprawl, spatial uncertainty, system analysis, environmental modelling, regulation

1 Introduction

China has experienced rapid urbanization and industrialization over the last two decades. In 2010, almost half population lives in 654 cities and 19,322 towns. Urbanization, largely coupled with industrialization, has brought forward significant impacts on the nature: 1) uncontrollable spatial sprawl threatens regional ecological security; 2) long-term accumulative impacts & potential risks are significantly high. Furthermore, it is notable that large uncertainties have occurred in urban economic structure and spatial expansion.

2 SEA regulation for urban planning

SEA regulation for urban planning is one of the priorities in China. Municipalities (higher level cities that consist of sub-districts) are obligatory to implement SEA in forms of chapter. SEA of urban master planning is one of the six priorities in the 12th Five-Year Period. Yet, some desired improvements are desired.

3 SEA and system analysis: case study

The rapid transitioning and overwhelming uncertainties of China"s urbanization require a systematic SEA method which should take complexity and variation into consideration. A comprehensive SEA framework for urban planning is developed. Two land use based models, i.e. SIMULAND and ULE_CA, are discussed as case study.

4 Discussion

Both regulatory and methodological aspects of urban planning SEA are discussed. Some key points include: 1) trade-off obligation, chapters but not reports; 2) only larger „cities" are required to implement SEA; 3) not a common recognition/consensus; 4) less capacity in both local administration and technological support; 5) SEA"s reputation is undermined as it fails to provide a better understanding of causal relationship between urban growth and the nature; 6) lack of systematic and integrated methods to quantify potential impacts and risks caused by the rapid change of complex urban systems; 7) tend to fall in the trap of rigidity, regardless of variety and uncertainty of long-term development.

Japan-Korea-China Workshop
28 October, Beijing

SEA of Urban Planning in China

Dr. LIU Yi

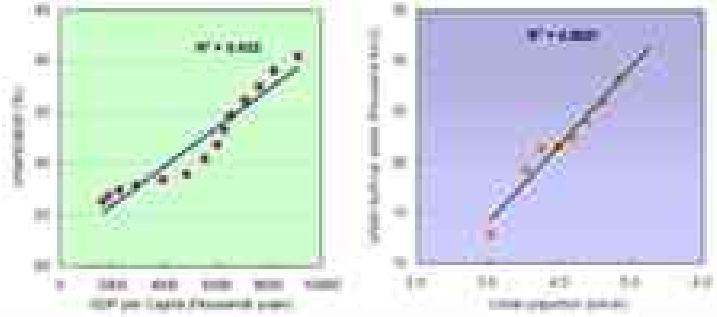
Director, Tsinghua Center for Strategic Environmental Assessment (CESSEA), Tsinghua University

Associate Professor, School of Environment, Tsinghua University

Beijing, China

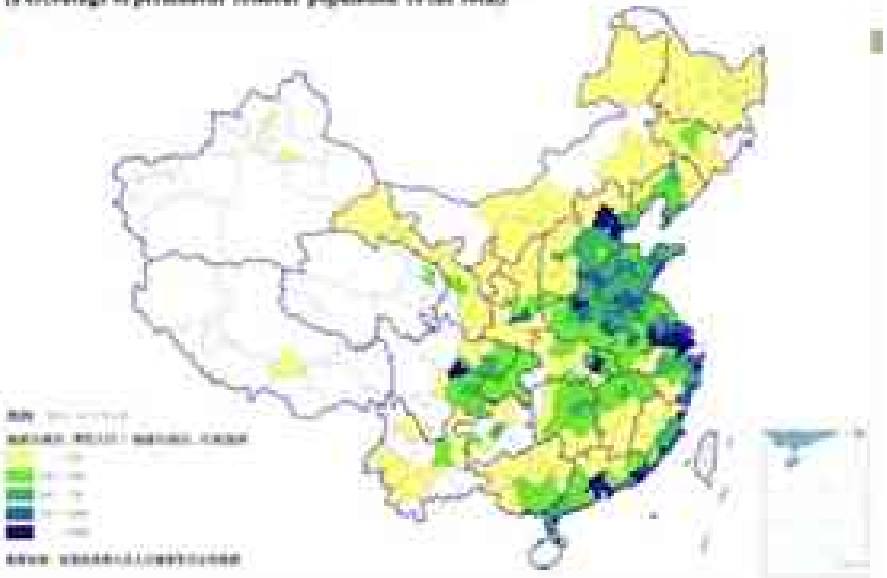
Profiles of Chinese 'Cities'

- 654 cities and 19,322 towns in 2010
- Urbanization rate reached 49.68% in 2010, annually increase by 1.36% since 2000, based on the 6th census
- Rapid urbanization has been coupled with economic development and land use change



Urbanization ratio by municipality in 2010

(Percentage of permanent resident population to the total)

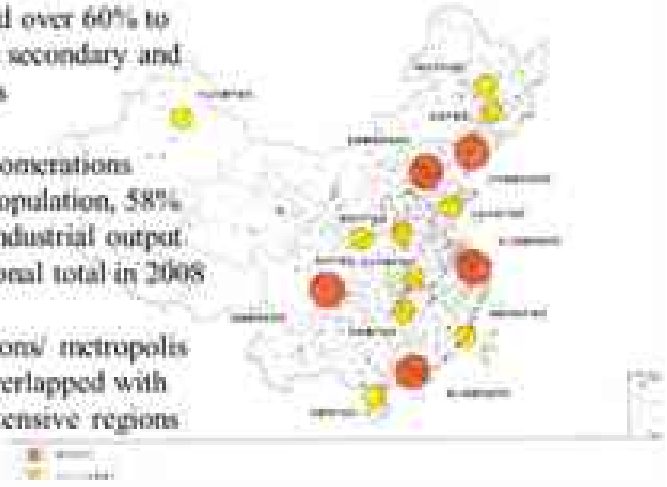


Urban economy

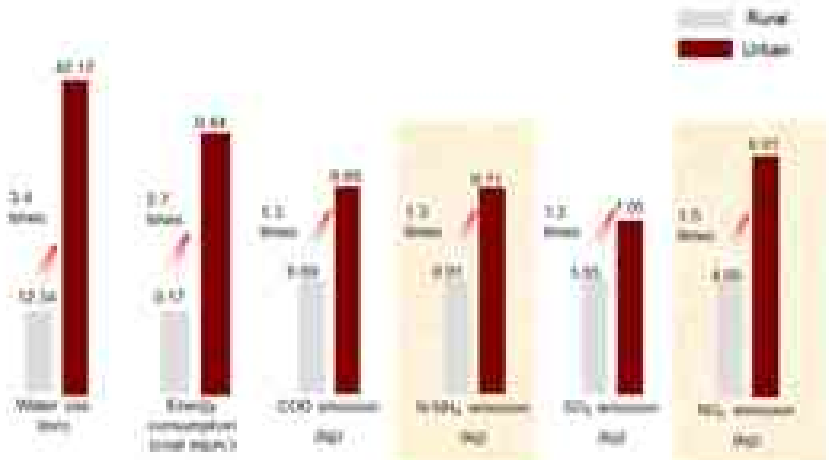
Cities contributed over 60% to the national total secondary and tertiary industries

Top ten city agglomerations produced 41% population, 58% GDP, and 65% industrial output value of the national total in 2008

City agglomerations/ metropolis have spatially overlapped with main industry-intensive regions



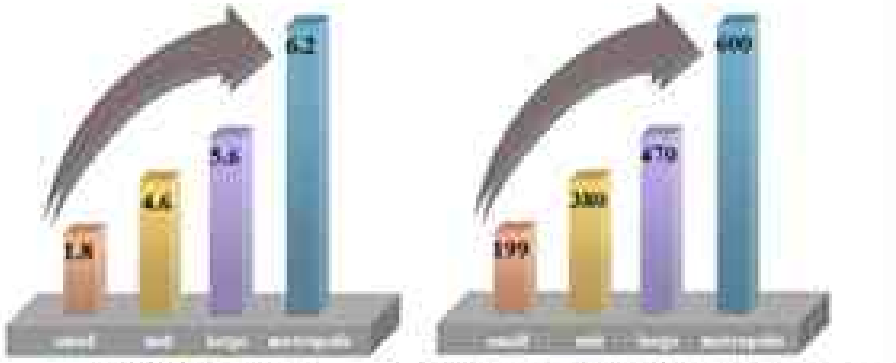
Impacts of urbanization



(estimated based on statistical data, including direct and indirect impacts; unit: per capita)

Impact of cities by population size

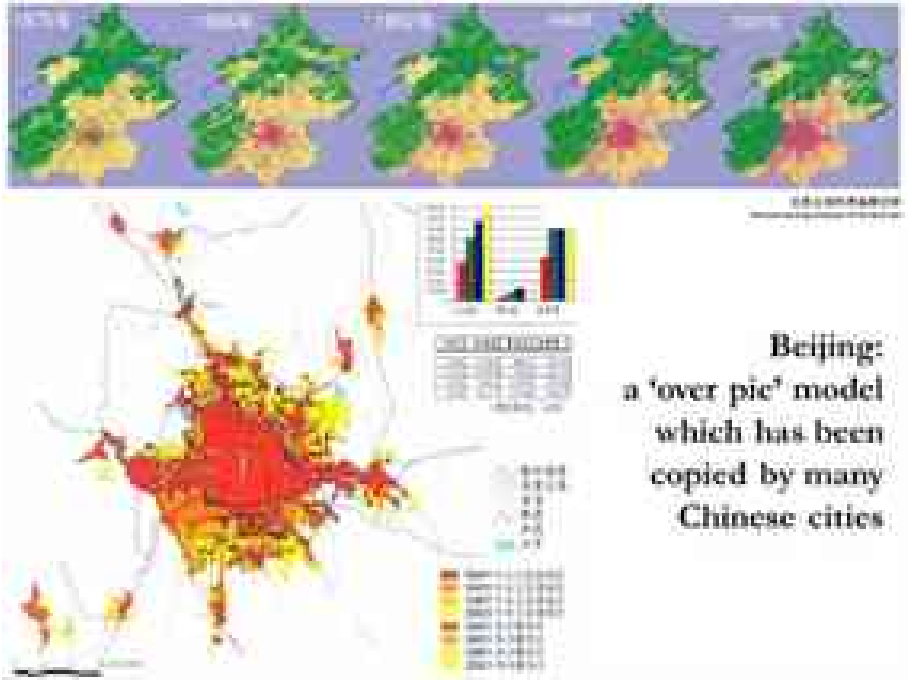
- Larger cities cause worse environmental impacts



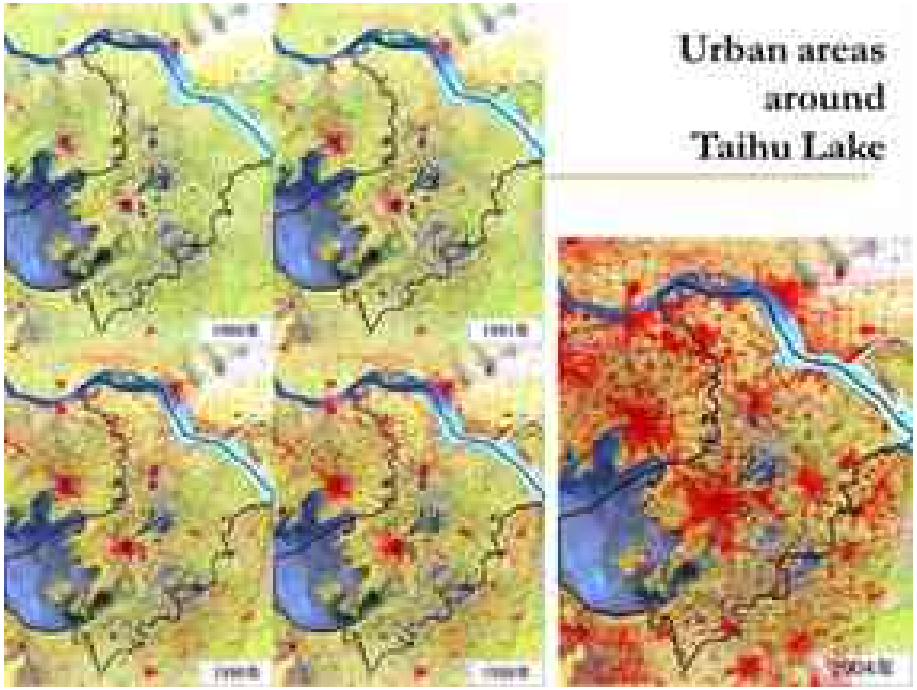
COD load (ton/sq km) Industrial electronic use (10^4 kilowatt-hour/sq km)

Spatial expansion

- Demand: 75% cities on early or mid-industrialization stage in 2008; Tremendous investment stimulates and maintains economic booming, but mainly heavy industry oriented
- Supply: cities have administrative jurisdiction over rural areas. This encourages the rapid land use change from rural to urban and/or industrial ones with relatively low price
- Results: rapid sprawl associated with discretionary and irrational industrial allocation



Beijing: a 'over pie' model which has been copied by many Chinese cities

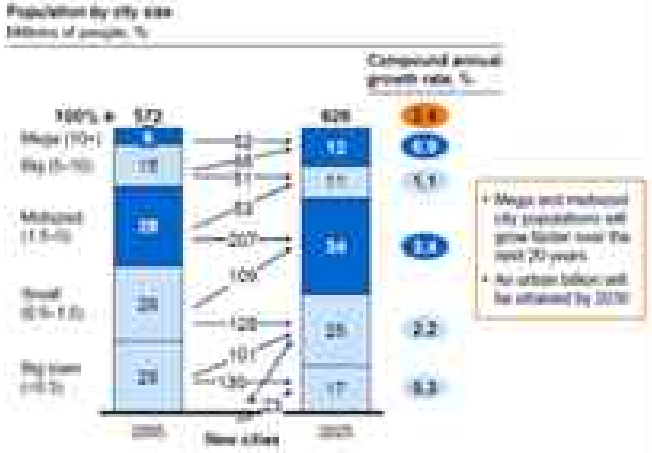


Moving toward an urban billion

By 2030:

Urbanization: about 70%

Urban population: over **1.0 billion**



Challenges in urban growth

- 'Industrialized urbanization' plus the tremendous flux of population migration challenges the bottom lines of resources and local environments
- Uncontrollable spatial sprawl threatens regional ecological security
- Long-term accumulative impacts & potential risks are significantly high

- More important, all the trends are very likely to continue without powerful and efficient intervention

Urban planning system

- Urban master planning
  - Governmental expectations and statutory regulation on urban function, developing goals, city size (population & economy), land use (boundary, pattern, type, intensity, etc.), and layout
- Urban detailed planning
  - detailed planning for controlling (regulatory plan)
  - detailed planning for construction (site plan)

Reflections on urban planning

- Lack of a holistic viewpoint: planning only for cities until 1st Jan 2008, the date the 'Urban and Rural Planning Law' coming into force
- Too rigid and lack of resilience in setting up goals & measures, less consideration of development variety and, more important, the uncertainty
- Tend to lock into traditional development models: emphasize & consolidate GDP growth, especially heavy & chemical industrial development
- Heavily rely on 'end-of-pipe' measures & infrastructures

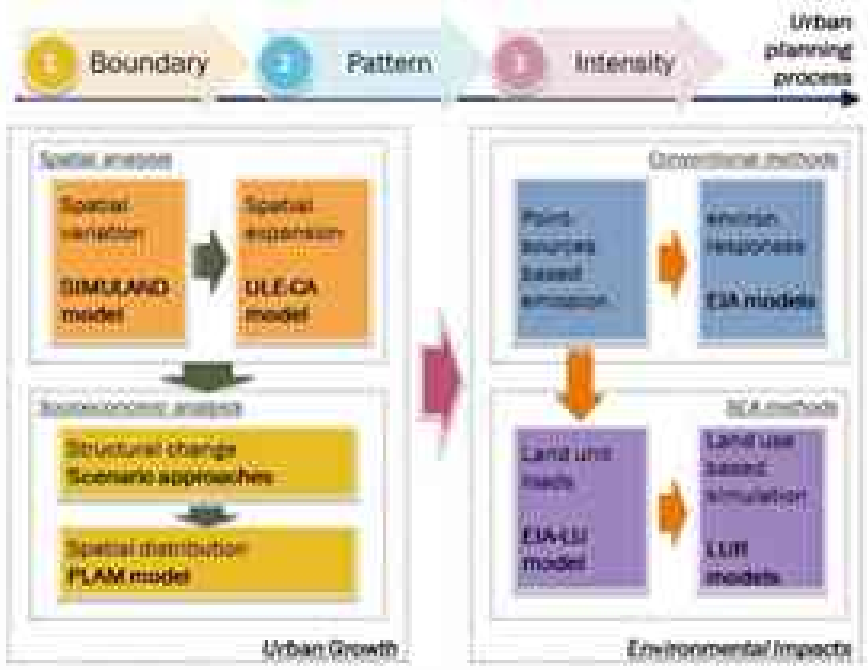
SEA regulation

- Municipalities (higher level cities that consist of sub-districts) are obligatory to implement SEA in forms of chapter (achieve no. Huanfa[2004]98)
- SEA of urban master planning is one of the six priorities in the 12th Five-Year Period (achieve no. Huanfa[2011]43)
  - Main target cities: the ones which are experiencing rapid development and facing severe conflicts
  - Main focuses: city's function, spatial layout and expansion, carrying capacity, environmental improvement

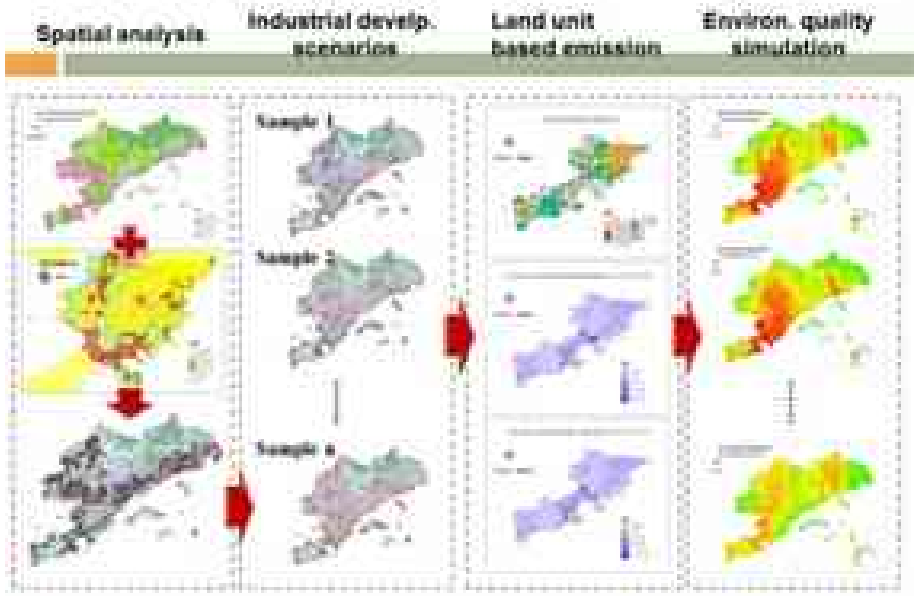
SEA Practices

Integrate SEA to urban planning

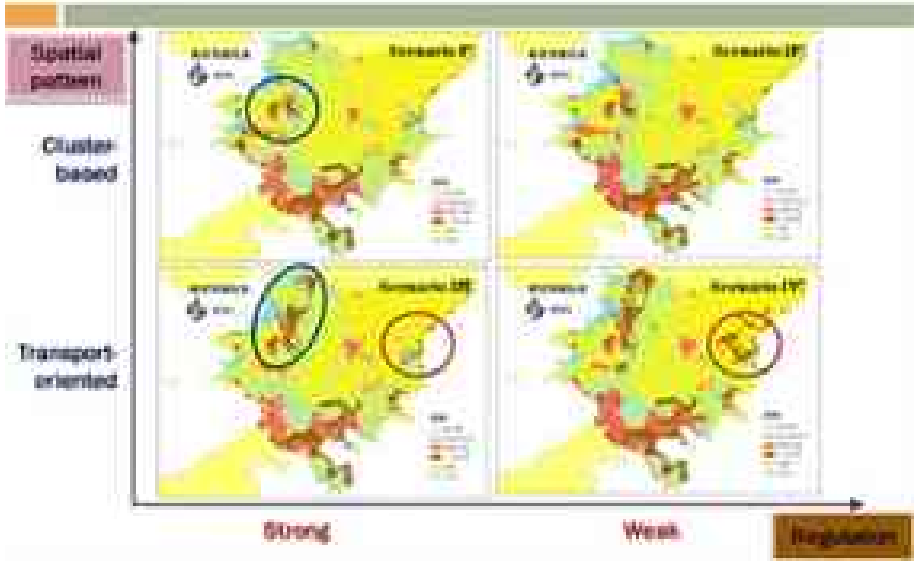
Urban planning stages	SEA Roles
(Technically, regardless of peer-review & approval procedure)	
Preliminary stage (~3 months)	Retrospective review; scoping & screening
Outline/interim stage (~6 months)	Less impact alternatives; uncertainty analysis
Outcome stage (6~12 months)	Impact forecasting & mitigation; risk adverse



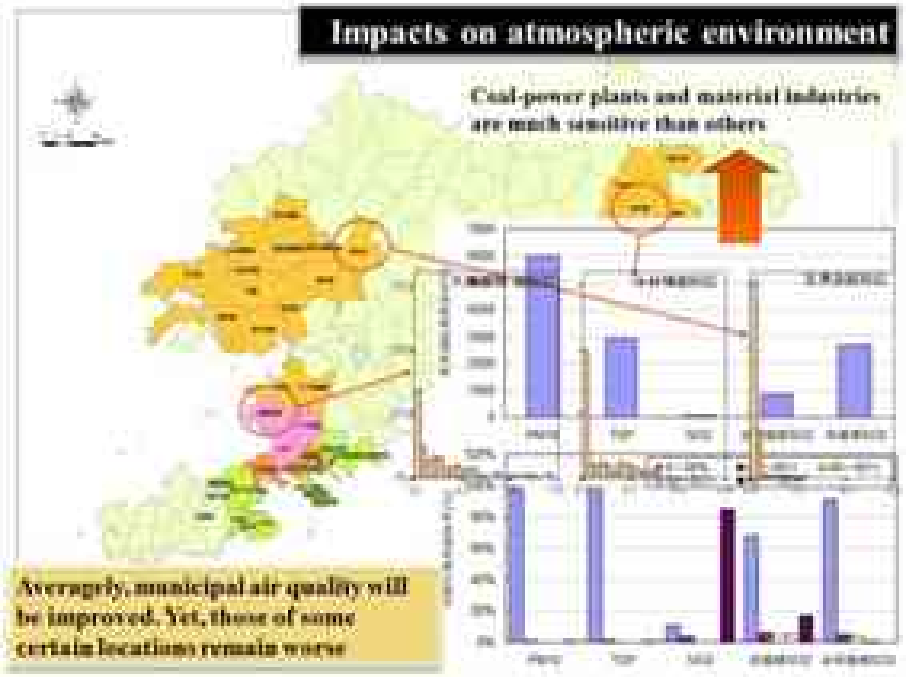
SIMULAND: complex system & uncertain impacts



ULE_CA: land use change



Impacts on atmospheric environment



Scenario analysis

Impacts	Scenario I	Scenario II	Scenario III	Scenario IV
Water demand	○	◑	◕	◕
Pulandian bay	◕	◕	●	●
Dalian bay	○	◕	○	○
Jinzhou bay	○	○	○	○
Dayaowan bay	○	○	○	○
Xiaoyaowan bay	●	●	●	●
Eastern bay	◕	◑	◑	●

○ ◔ ◑ ◕ ● Impact

Safe → Severe

Discussion: regulation

- Trade-off obligation, chapters but not reports
- Only larger 'cities' – but not smaller cities, ie. cities without districts and 'towns' in Chinese administrative hierarchy are required to implement SEA
- Not a common recognition/consensus, less acceptable/ preferable especially at locals
- 'Outline/interim stage' should be the crucial timing for SEA's intervention, instead of an *ex-post* action
- Less capacity in both local administration and technological support

Discussion: Methodology

- SEA's reputation is undermined as it fails to provide a better understanding of causal relationship between urban growth and the nature
- Lack of systematic and integrated methods to quantify potential impacts and risks caused by the rapid change of complex urban systems
- Tend to fall in the trap of rigidity, regardless of variety and uncertainty of long-term development
- However, China's situation implies that simply copy international BMPs is not fully applicable…

THANKS!

Session 3

Transboundary & regional issues in EIA/SEA

Chaired: Dr. Sachihiko Harashina
Prof. Myungjin Kim

"Transboundary Environmental Impact Assessment in Northeast Asia"
Deok-Gil Rhee (Chinese Research Academy of Environmental Sciences / NIPA, KOREA)

"A Preliminary Environmental Impact Assessment to Free Trade Area in Discussion Between China, Korea and Japan (CJK-FTA)"
Mao Xianqiang (School of Environment, Beijing Normal University)

"Export Credit Agencies and Environmental Considerations - Comparison of China, Korea and Japan"
Noriko SHIMIZU (Friend of Earth Japan)
Satoru MATSUMOTO (Hitotsubashi University)

"Greenhouse Gas Assessment in Forest Ecosystem"
Myungjin Kim (Ecosystem Assessment Division, National Institute of Environmental Research, KOREA)

"Theoretical and Practical Experience of Mega-Regional SEA in China"
Ren Jingming (Appraisal Center for Environmental Engineering (ACEE), MEP of CHINA)

"Global Warming and Phenology in Korea"
Sang Don Lee (Ewha Womans University, KOREA)

"Environmental Health Risk Assessment in China"
Cheng Hongguang (Beijing University, CHINA)

Deok-Gil Rhee
Chinese Research Academy of Environmental Sciences / NIPA, Republic of Korea

1. Introduction

Northeast Asian subregion is one of the world‟s core economies where huge economic activities and industrial production have brought about people‟s well-being and on the other hand, serious environmental stresses. The three countries of China, Japan and South Korea, because of geographical situation, form one environmental sphere in which pollution of one country moves to other countries, calling for close environmental cooperation. Though the three have different political and institutional settings and have implementing environmental policies and programs in their own countries, there is need for more common and concerted efforts to improve the environmental quality by countries on the regional basis.

The purpose of this study is to review the feasibility of adopting environmental impact assessment in transboundary context in the Northeast Asian countries, so that the region can achieve common goals of improving national and regional environmental quality and people‟s well-being.

2. Northeast Asian Environment

Northeast Asian countries (confining to China, Japan and South Korea) because of rapid economic development and industrialization, have confronted by environmental pollution and degradation of natural ecosystems. Important issues in particular are long-range transboundary air pollution, sand and duststorm, marine pollution of yellow sea, etc., which are transboundary in nature and have to be solved by relevant countries‟ cooperation and common efforts.

3. Environmental Cooperation in the Region and beyond

There are several regional environmental programmes which have been implemented by international community and countries in the region in the form of bilateral or multilateral cooperation schemes. United Nations (UNESCAP, UNEP and UNDP) played important role. Tri-Partite Environmental Ministers‟ Meeting has been a core consultative mechanism in which three countries have held annual meeting for environmental cooperation among countries. There are some joint study projects to broaden knowledge base on regional environment; LTP, EANET, etc. Although those environmental cooperation schemes contributed to improving environmental situation in the region as a whole, it failed to achieve substantial progress because of lack of binding agreement for each country to fulfill necessary actions for the regional environment.

There are examples of conventions regarding transboundary environmental issues; UNECE ratified a Convention on Long-range Trans- boundary Air Pollution and Espoo Convention on Environmental Impact Assessment in a Tans- boundary Context. Other conventions of this sort exist in North America and Caspian Sea.

4. Convention on the Environmental Impact Assessment in the Transboundary Context in the Northeast Asian region

In order to overcome the limit to the effectiveness of existing environmental cooperation mechanism, there is need for adoption of binding instrument in the form of convention on the transboundary environmental issues in this region. It calls for in-depth study on the feasibility of adopting the environmental impact assessment in the transboundary context, which requires the following steps to be taken.

First, it is important to build consensus among decision makers and politicians of each country that the convention is a mandate to achieve ultimate goal of environmental protection in this region. Second, a Long-term Regional Environmental Master Plan should be established with a clear objective and vision. Lastly, in the process of making convention, core elements of the convention such as parties, procedures, target project/program/policy, public hearing, bureau, etc. should be defined, for the implementation of Transboundary Environmental Impact Assessment in Northeast Asia.

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United Nations Economic Commission for Europe, 2011, Introduction to Espoo Convention

NORTHEAST ASIAN TRANSBOUNDARY EIA

Very Preliminary Version

Deok-Gil Rhee, Professor
CRAES/NIPA

1. Northeast Asian Subregion

◇ Northeast Asian Subregion
- China, Japan, Korea (Rep. of Korea + DPR Korea)
- Area 10.16㎢, Population 15.6 million, GDP $12 trillion
- One of three Economic Zones ; North America and European Union

◇ Economic and Social Development
- Most dynamic economies in the world
- High Human Development Index(HDI)
- Environmental pollution and ecosystems degradation
  - Emission of sulfates and GHG

East Asia(UN)

2. State of the Environment in Northeast Asia

◇ Land
- Forest cover highly variable among countries
- Land degradation, desertification and soil pollution

◇ Air
- Urban air pollution affecting human health in large cities
- Suspended particulate matter, sulfur dioxide, nitrogen oxides, greenhouse gases, etc.
- Long-range transboundary air pollutants

◇ Water
- Water pollution and eutrophication
- Water availability and safe drinking water
- Marine and coastal pollution

◇ Biodiversity
- Rich in biodiversity, with China being ranked 17th mega-diversity country
- Damage to natural ecosystems, endangered wildlife, etc.

3. Transboundary Environmental Issues in NE Asia

- Air Pollution
  - Acid deposition, affecting forest ecosystems and soil
  - Dust and sandstorm, VOCs, POPs, ozone, etc.
- International Waters : Tumen, Yalu, Amur(Heilongjiang) rivers
  - Tumen River, with 3 riparian countries, polluted by industrial activities
- Yellow Sea
  - Semi-closed seas, with pollutants from inland and coastal areas
  - Threats to marine ecosystems and fishery
- Wetland and Migratory Birds
  - 15 endangered migratory bird species travel from Russia, North China to Korean peninsula and Japan, and to South Asia and the Pacific
  - East Asian and Asian-Pacific Flyways
- Large Mammals
  - Tiger, leopard, bear, fox are under threat of extinction
  - Diminishing number due to habitat destruction

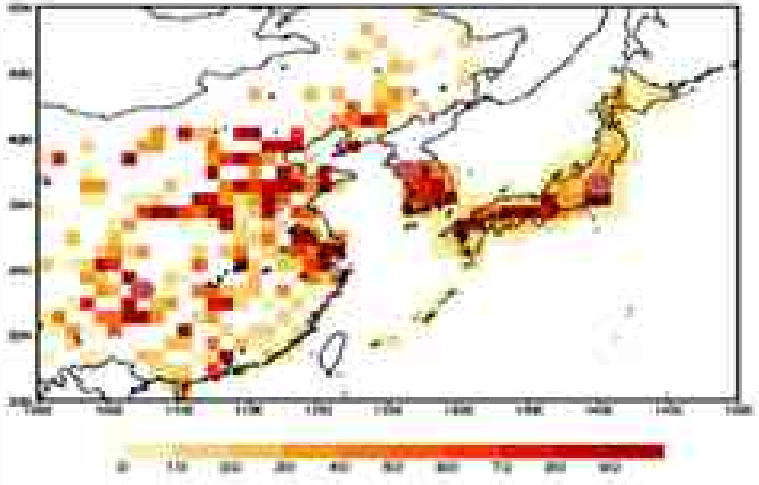
4. Existing Environmental Cooperation Mechanism

- Tri-Partite Environmental Ministers' Meeting among China, Japan and Korea (TEMM)
  - Ministerial environmental meeting, since 1999, 13th in Busan (2011)
  - Forum for discussion of environmental policy issues of mutual interest
  - Ten priority areas for environmental cooperation : climate change, bio-diversity, sandstorm, air/water/marine pollution, chemical management
- North-East Asian Conference on Environmental Cooperation (NEAC)
  - Policy dialogue and information exchange among China, Japan, Korea, Mongolia and Russia (1992)
- North-East Asian Sub-regional Program on Environmental Cooperation (NEASPEC)
  - Meeting of Senior Officials on environmental cooperation in the region
  - Started in 1993, 6 countries' participation
- NOWPAP : Action Plan for Marine and Coastal Environment of the Northwest Pacific Region(UNEP's Regional Seas Programme)

4. Existing Environmental Cooperation Mechanism

- LTP Project : Joint Research Project on Long-range Transboundary Air Pollutants in the Northeast Asia
  - Joint research project, launched in 1995, as agreed by Tripartite Environmental Ministers
  - Study on emission, transport and deposition of long-range trans-boundary air pollution in the region
  - Implemented from 2000 – 2012 by 3 cycles, aiming at broadening and scientific knowledge base on transboundary pollution in NE Asia
- EANET : Acid Deposition Monitoring Network in East Asia
  - Acid deposition monitoring and its impact on soil, vegetation and water
  - Initiated by Japanese Ministry of Environment, then transferred to UNEP Regional Resource Center for Asia and the Pacific
  - Regional network, with 13 countries' participation in East Asia
  - Create understanding on acid deposition and provide information for policy making at various level in East Asian countries

Emission, Transport and Deposition of Air Pollutants in Northeast Asia (LTP Project)



5. Cases; Conventions/Agreements on the Transboundary Environmental Issues

- ◇ CLRTAP; Convention on Long-range Transboundary Air Pollution
  - Signature by 24 countries in 1979, entered into force in 1983
  - Legally binding instrument, to reduce emissions of air pollutants
  - Implemented successfully, abating acidification of Scandinavian lakes
- ◇ Espoo Convention; Convention on Environmental Impact Assessment in a Transboundary Context
- ◇ Transboundary EIA in the Caspian Sea Region
  - Five littoral countries : Azerbaijan, Iran, Kazakhstan, Russia and Turkmenistan, with support of UNDP, UNEP, World Bank
  - Adopted Framework Convention for the Protection of Caspian Sea, in 2003, and Transboundary EIA entered into force in 2006
- ◇ North American Free Trade Agreement and Transboundary EIA
  - United States, Canada and Mexico, signed in 1993
  - Adopted North American Agreement on Environmental Cooperation
  - Convention on North American Transboundary EIA, failed to ratify
- ◇ International/regional environmental conventions/agreements with provisions on transboundary environmental issues

6. Espoo Convention

- ◇ Convention on Environmental Impact Assessment in a Transboundary Context
  - Signed in 1991, entered into force in 1997 leading role by UNECE
  - Parties(countries) assess the environmental impact of certain activities, and notify and consult each other on major projects which may have a significant adverse environmental impact across boundaries
- ◇ Parties to the Convention : 45 (signatories : 30)
  - UNECE member countries
  - Non-UNECE UN member countries : Russian Federation, United States, Canada, etc.
- ◇ Notification, EIA documentation, consultation, decision, post-project analysis, etc.
- ◇ Strategic Environmental Assessment to augment Espoo Convention
  - Incorporate environmental considerations into policies, plans and programs

6.1 Procedural steps; Espoo Convention

- Application of the Convention by the Party of origin
- Notification of the affected Party by the Party of origin
- Confirmation of participation by the affected Party
- Transmittal of information from the affected Party to the Party of origin
- Public participation in the affected Party
- Preparation of EIA documentation
- Distribution of the EIA documentation for the purpose of participation of authorities and public of the affected Party
- Consultation between the concerned Parties
- Final decision by the Party of origin
- Transmittal of final decision documentation to the affected Party
- Post-project analysis(voluntary)

7. Constraints in furthering regional environmental cooperation in Northeast Asia

- ◇ Different Political and Social Systems
  - Capitalism versus socialism
  - Different economic development stages
- ◇ Different Environmental Situation
  - Government policies, people's awareness
  - country-specific environmental problems
- ◇ Lack of Experiences and Expertise
- ◇ Long Way to go
  - For UNECE CLRTAP
    - 10 years from discussion(1960s) to Convention(1979)
    - 4 years from Convention to entry into force(1983)
  - For UNECE Espoo
    - 6 years from signature(1991) to entry into force(1997)
- ◇ Participation of DPR Korea

8. Roadmap to Cleaner Northeast Asian Environment

◇ **Ultimate goal** : Prosperity of the Northeast Asia and well being of the people in the Northeast Asian region

◇ **Actions required**

① Building and strengthening the understanding of the region-specific environmental situation

② Broadening consensus among people, community and countries

③ Political decision

◇ **Steps for Transboundary environmental problems in Northeast Asian region**

① Formulation of environmental master plan for NE Asia

② Strengthening cooperation within existing programs and instruments

③ Agreement/convention on Long-range Transboundary Pollution in the Northeast Asia

9. Closing Remarks

◇ **Northeast Asian Environmental Sphere**

- China, Japan, Korea, in geographic adjacency
- Continuous economic growth and rapid change
- Environmentally affect and affected by, among countries
- Joint efforts for environmental protection by NEA countries

◇ **Transboundary Environmental Convention, and Transboundary EIA in NE Asia**

- Scientific study and EIA methodology ⇒ Options
- Decision-making by people and political leaders

We are on a same boat;
Who will sail the boat?

THANK YOU
FOR YOUR ATTENTION

An Assessment of China-Japan-Korea Free Trade Agreement (CJKFTA)'s Economic and Environmental Impacts on China

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1 Introduction

Recently governmental leaders from China, Japan and Korea have formally appealed to initiate feasibility study of a Free Trade Agreement among the three countries (CJKFTA) to form a regional free trade zone in East Asia. Considering that freer trade can cause unexpected impacts on domestic environment and ecosystem, there is a need of evaluating the environmental impacts of such a trade policy, to help the negotiators to understand and pay more attention to environment issues during CJKFTA negotiations, and help to lobby the government to carry out appropriate policy instruments for adaption or mitigation. Following the *Chain Reaction Assessment Method (CREM)* which integrates and links the elements of *Trade, Production, Consumption and Environment*, this paper is to quantitatively and qualitatively assess CJKFTA"s possible influences on China"s environment. The quantitative part estimates the variations of China"s major conventional pollutants and GHGs emissions in two policy scenarios in order to represent CJKFTA"s scale and structural influences on China"s environment, which is based on a static Computable General Equilibrium (CGE) model working with GTAP 7 database and China"s energy-environment statistics. The qualitative analysis involves CJKFTA"s regulatory and other direct effects on China"s environment.

2 Results or Conclusion

Based on these assessments, it is predicted that CJKFTA could lead to notable environmental impacts, including emission increasing of TN, TP, COD, agricultural solid waste and CO_2 , while emission decreasing in SO_2, dust and agricultural chemicals. Policy suggestions are made in order to combat those negative environmental effects and amplify positive ones, aiming at a more sustainable regional freer trade system.

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Japan-Korea-China Tri-party Conference on Effectiveness of EIA/SEA
Oct. 28th, 2011, Beijing, PRC

A Preliminary Environmental Impact Assessment to Free Trade Area in Discussion Between China, Korea and Japan (CJK-FTA)

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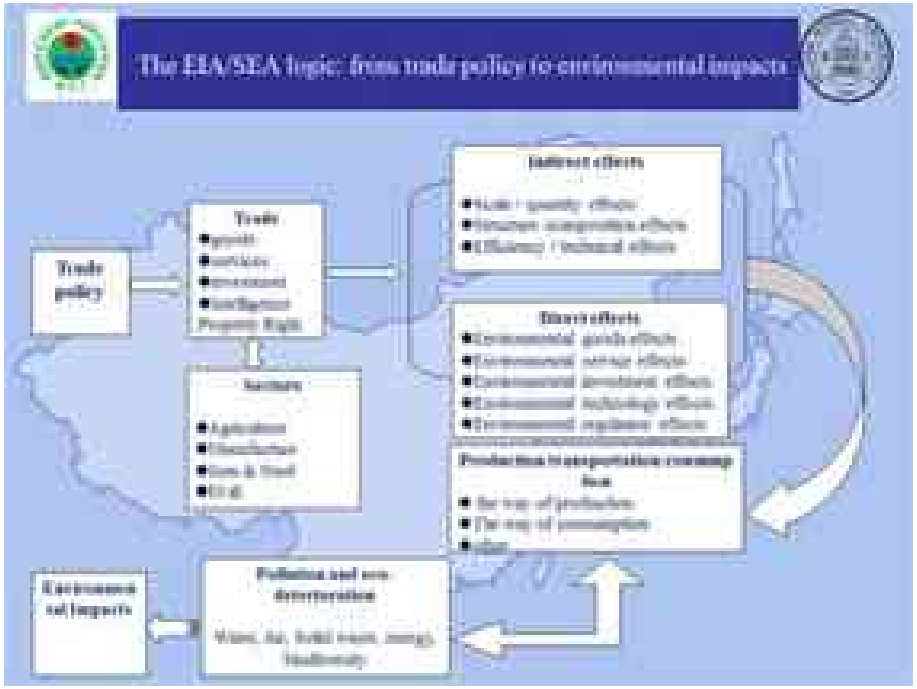
Oct 28, 2011

Importance of EIA/SEA on Trade Policy

- **Trade and Environment problem in China**
- According to "Expert Group of Trade & Environment of MEP, China", there is a large volume of ***Environmental Deficit*** behind the large volume of ***Trade Surplus***.
- In 2005 export contributed to
  - 23% of the total CO_2 emission,
  - 39% of the industrial SO_2 emission
- 18% of the COD emission
- 12% of the total industrial and agricultural water use

The EIA/SEA logic: from trade policy to environmental impacts



CJK-FTA in discussion : background

Economic and political relationship of the 3 nations

- Structural complement
- East Asia integration in discussion

Trade relationship of the 3 nations

- Japan is the 3rd largest trade partner and 2nd largest overseas investor to China
- Korea is the 6th largest trade partner and overseas investor to China

Screening and Scoping of the environmental impacts of CJK-FTA on China

Identify "double-sensitive" sectors

- Sectors with larger share in Sino-Japan, Sino-Korea trade, and with larger environment and resource impacts;
- **11 primary sectors and 41 secondary sectors:**

  Agriculture., Textile, Iron&Steel, Coke, Chemistry, Electronics., Vehicle, mining, paper, building material, machinery.

Screening and Scoping of the environmental impacts of CJK-FTA

- Environmental Impacts from key industries

Environmental factors / Key Sectors	Water	Air	Solid waste	Eco-impacts
Agriculture	√√√	√	√	√√
Textile	√√√	√	√	
Iron&Steel	√√	√√√	√√	
Coke	√√√	√√	√	√
Chemistry	√√√	√√	√	
Electronics	√	√	√√	
Motor vehicle	√	√√	√	
Mining	√	√	√	√√
Paper Making	√√√	√	√	√
Construction material	√	√√√	√	√
Machinery	√	√	√	

Review to the Economic feasibility studies of CJK-FTA

Most of the feasibility studies agree that, CJK-FTA will promote

- GDP growth
- Trade Growth
- Investment Growth
- Knowledge economy effects
- Challenge to trade structure optimization in China

But no environmental impacts considered.

Economic-Environmental impact analysis and assessment

Scenarios Assumption of free trade arrangement under CJK-FTA

- **Scenario 1**: all import tariff and quota removed
- **Scenario 2**: all import tariffs, quota and export tariffs removed
- **Scenario 3**: all import tariffs, quota and export rebate removed
- **Scenario 4**: all import tariffs, quota, export tariffs and export rebate removed

Economic-Environmental impact analysis and assessment

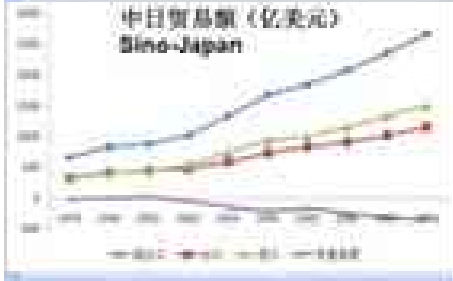
General Equilibrium Analysis

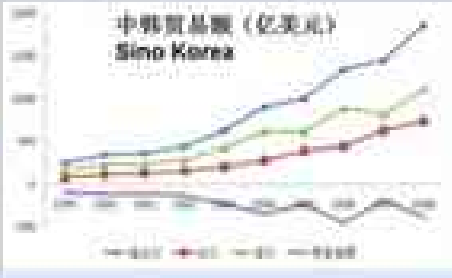
- CGE model with 57 sectors, solved with Games software
- **Data sources:**
- 2008 as the base year, China custom statistical data base（EPS database), World Tariff Profile 2008（WTO）, **GTAP** (Global Trade Analysis Program)database（2004）, Chinese statistical year book, the pollution emission, Coefficient handbook of the 1st national general survey on pollution, China Environmental statistical year book, et al.

Economic-Environmental impact analysis and assessment

CJK Trade Value

- in 2008, Japan and Korea ranked the 3rd and 6th trade partners)
- China is in deficit in the trade with J&K

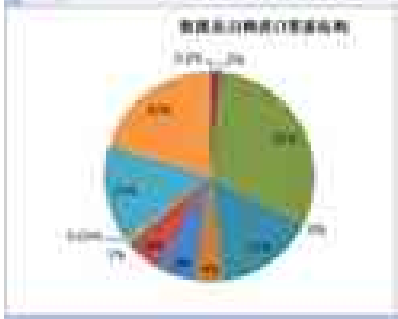


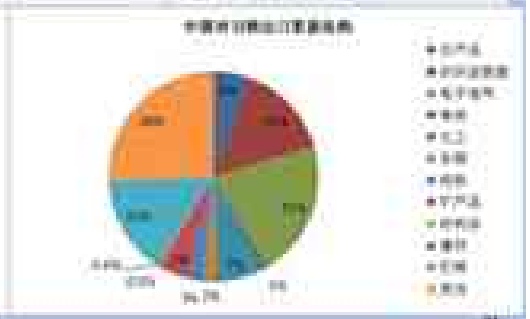


Economic-Environmental impact analysis and assessment

CJK Trade Structure

- China import electronics, machinery, organic chemical products et al. from J&K,
- and export Agricultural, textile, electronics product, et al to J&K

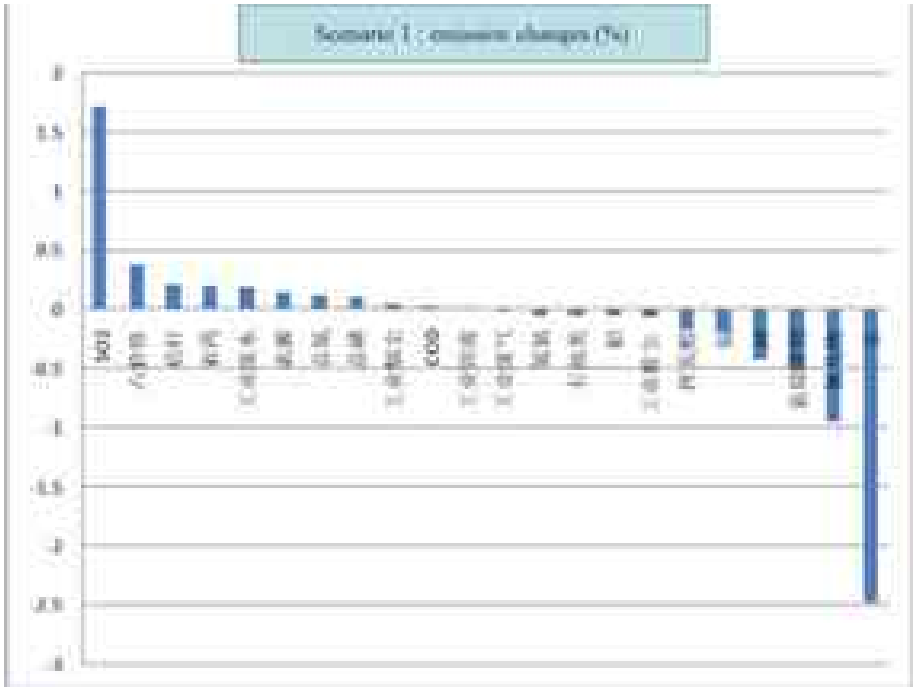




Economic-Environmental impact analysis and assessment

General Equilibrium Analysis Results

- **Scenario 1:**
- Industrial water, COD, TN, TP, SO_2, dust, solid waste will increase to some extent, with SO_2 increases the most (mostly from Iron & Steel);
- Heavy metals, dangerous waste, waste gas, et al., will decrease to some extent, from the reduction (mainly from chemistry reduction).

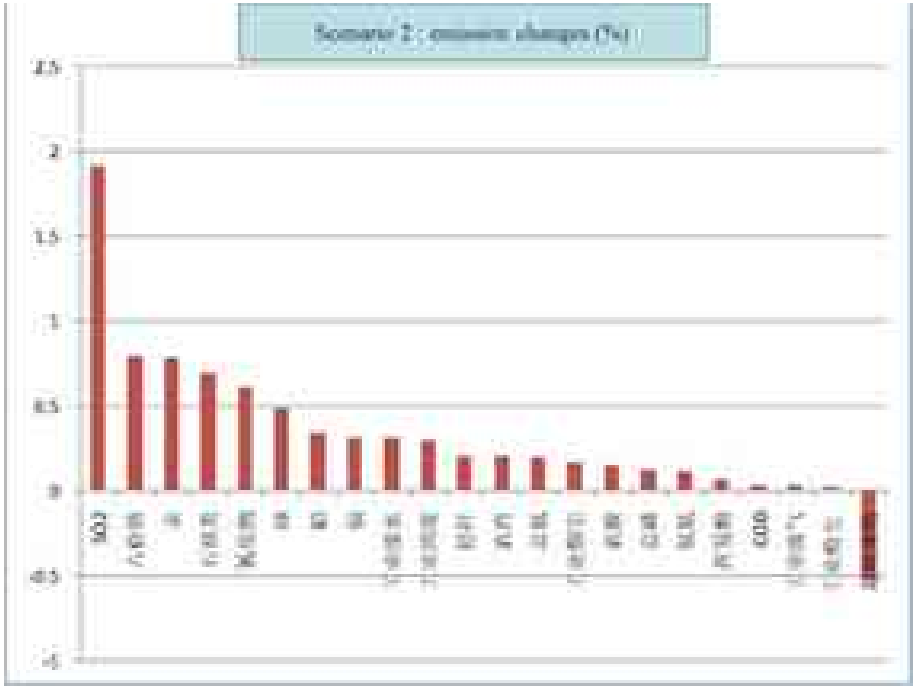


Economic-Environmental impact analysis and assessment

General Equilibrium Analysis Results

- **Scenario 2 (export tariff cancelled)**

➢ Most pollutants increased, with SO_2 up to 1.9%, mainly by Iron&Steel.



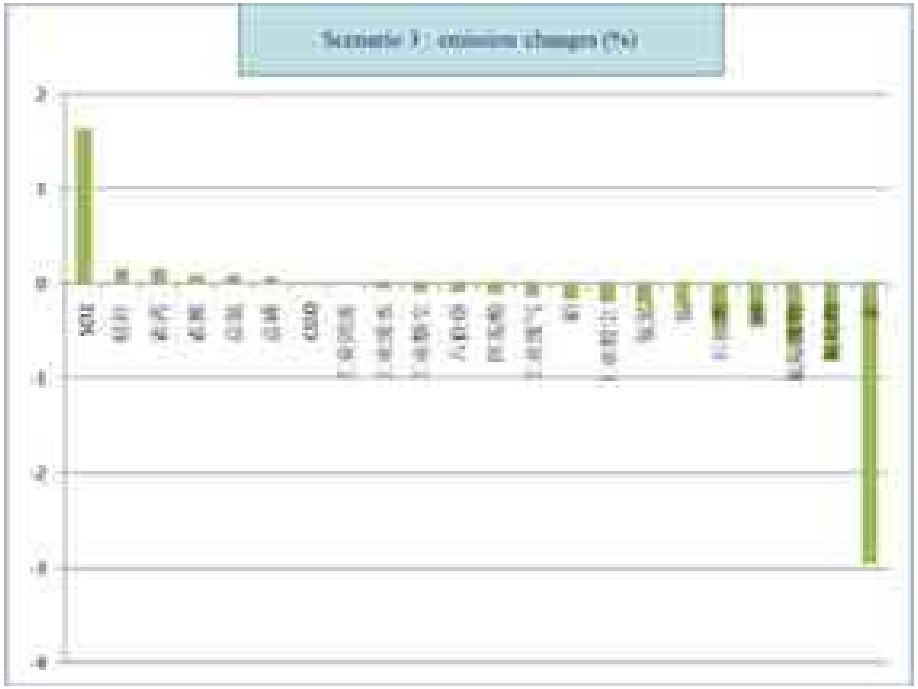
经济-环境影响分析与评价
Economic-Environmental impact analysis and assessment

General Equilibrium Analysis Results

- **Scenario 3 (export rebate removed)**

➢ Most of the pollutants emission decreased, with nutritory reduced the most, by 3.0%, mainly from chemistry, compared with Scenario 1 and 2

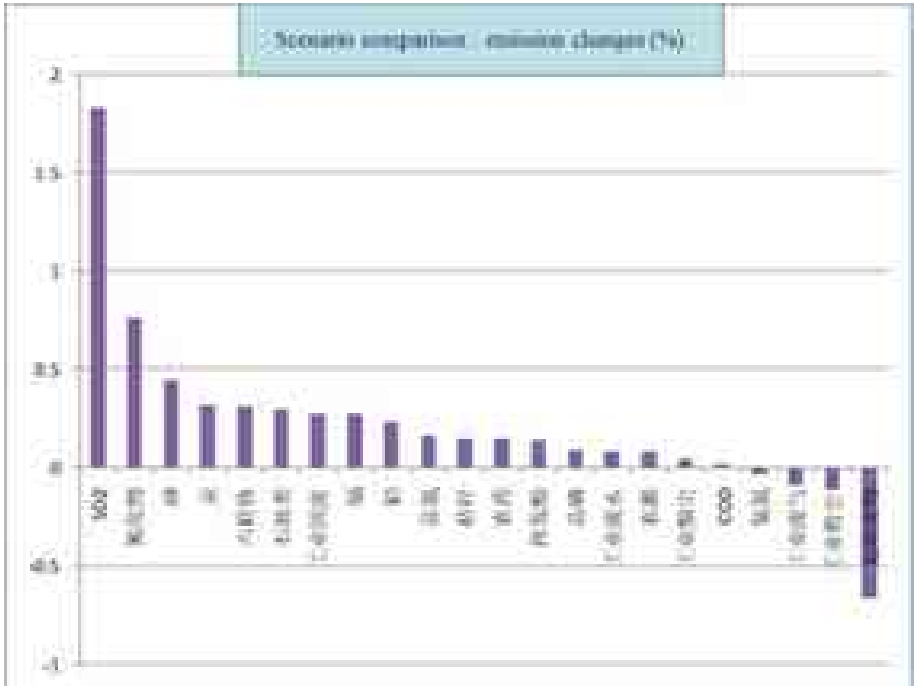
➢ COD, TN, TP, NO_2 et.al. will still in increasing.



Economic-Environmental impact analysis and assessment

General Equilibrium Analysis Results

- **Scenario 4 (export tariff and export rebate cancelled)**
- Most of the pollutants increased, with SO_2 up to 1.8%, mainly from Iron&Steel; similar to Scenario 2



Economic-Environmental impact analysis and assessment

General Equilibrium Analysis

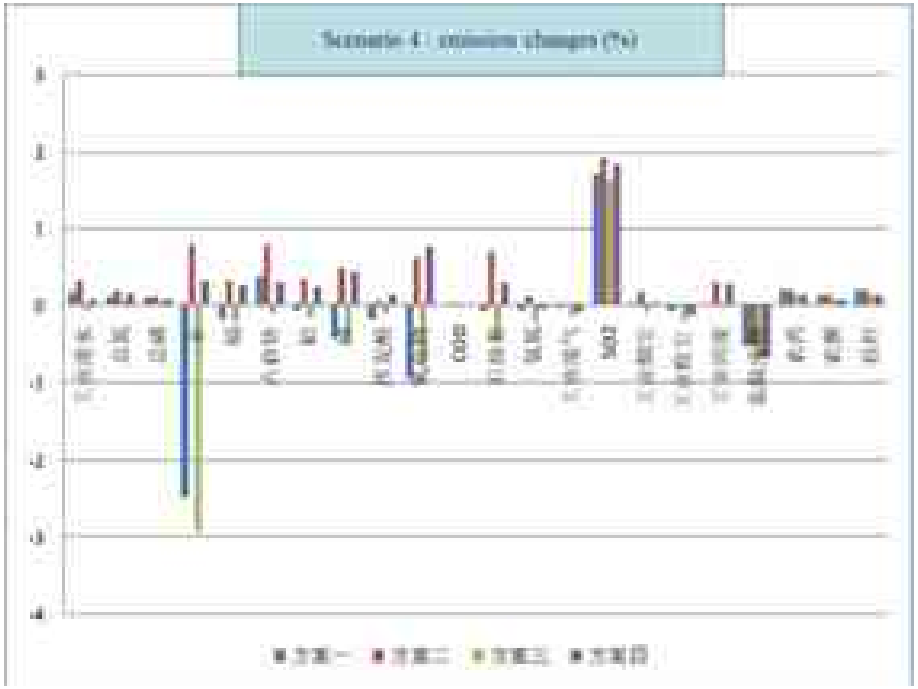
- the environment impacts :

Scenario2 > Scenario4 > Scenario1 > Scenario3

In General, CJK-FTA will have both negative and positive impacts to the pollution generation and emission;

but removal of "export tariff" will have obvious negative impacts;

and removal of "export rebate" will have positive impacts to some extent on pollution reduction.



Economic-Environmental impact analysis and assessment

Partial Equilibrium Analysis to the Key Sectors

- Agriculture
- textile
- Iron & Steel
- Coke
- Chemistry
- Motor vehicle
- Electronics
- Mining
- Construction Material
- Paper Making
- Machinery

Economy-Environment impacts analysis and assessment

Partial Equilibrium Analysis

- The model

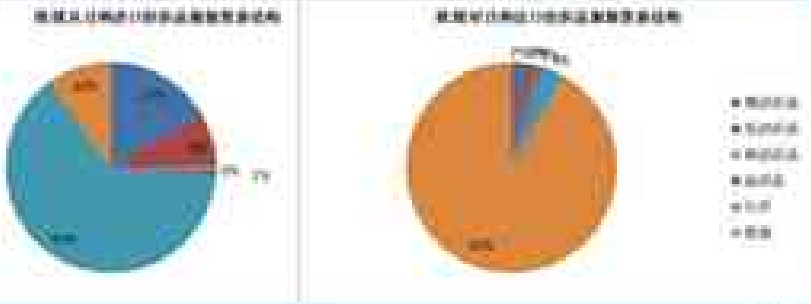
  CPE (Computable Partial Equilibrium model): 11 sectors and 47 sub-sectors

- Scenarios 1, 2, 3, 4

Economy-Environment impacts analysis and assessment

Textile and Apparel: Status Quo

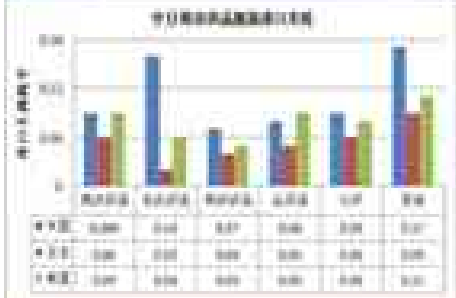
- China has comparative advantage
- Clothing is the main export product to J & K

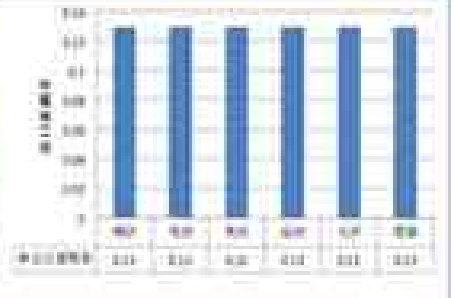


Economy-Environment impacts analysis and assessment

Textile and Apparel: Status Quo

- All the 3 national have high trade barrier.





Economy-Environment impacts analysis and assessment

Textile and Apparel: Economic Impacts

- will increase by 0.62% in Scenario 1 and 2;
- will Decrease by 0.43% in Scenario 3 and 4 due to removal of export rebate

Economy-Environment impacts analysis and assessment

Textile and Apparel: Environmental Impacts

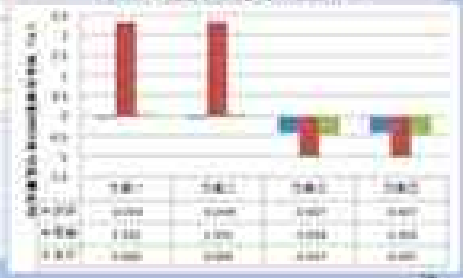
- **In Scenarios 1 and 2, waste water and COD emission expand by 0.14% and 0.07%;**
- **In Scenarios 3 and 4, waste water and COD emission will decrease by 0.35% and 0.44%, mainly due to export rebate removal.**

Economy-Environment impacts analysis and assessment

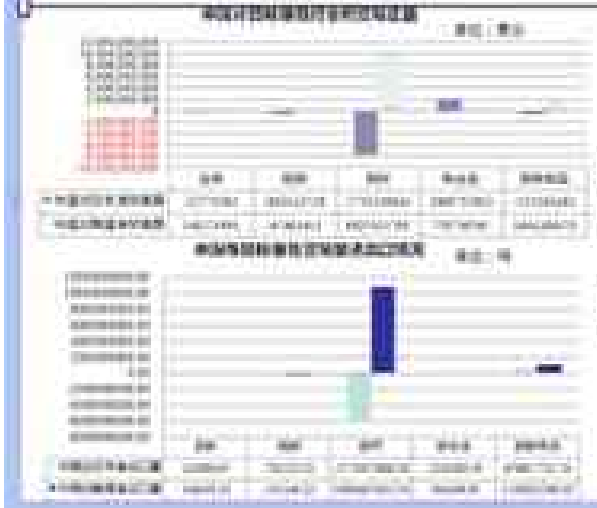
Textile and Apparel: Environmental Impacts

Change of waste water discharge

Change of COD emission



Iron&Steel: Status Quo



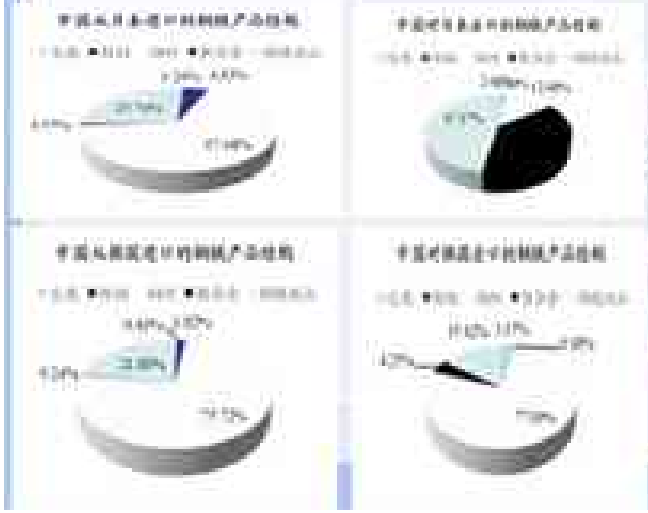
China is in trade surplus in terms of "Trade Volume",

but in deficit in terms of "Trade Value"

Iron&Steel: Status Quo

China tends to export low valued products, such as pig iron, ferroalloy, crude steel, and import high valued steel products

Iron&Steel: Status Quo



China export large volume of ferroalloy to Japan and import large volume of steel products from Japan

Iron & Steel: Status Quo

China is using relatively high export tariff and import tariff.

	0.02	0.054	0.043	0.054	0.046
	0.17	0.15	0.1	0.2	[illegible]
	0	0	[illegible]	0	[illegible]
	0.015	0	0	0	0.005
	0.003	0	0	0	0.047

目前，中国对钢铁产品征收的进出口关税基本符合其资源性和附加值的情况，但是相较于日韩，我国对粗钢、钢材及铁合金的进口关税仍较高。

自贸区建立后，中日韩可能逐步对钢铁产品实现"零关税"。

中日韩自贸区建立之后，我国从日韩进口钢铁产品的贸易额或表现增长，国内钢铁行业生产增速总体减缓，产品结构向低端低附加值产品倾斜。

Economy-Environment impacts analysis and assessment

Iron&Steel: Economic impacts

Considering existing tariff level, reduction of import and export tariffs will push China's Iron & Steel industry heading to lower end products

生铁 Pig Iron

粗钢 Crude steel

铁合金 Ferroalloy

钢材 Rolled Steel

Economy-Environment impacts analysis and assessment

Iron&Steel: Environmental impacts

Lower end products increase will cause more consumption of iron ore, energy and more SO_2 and waste water emission – high S and C tendency

Economy-Environment impacts analysis and assessment

Coke: Trade Status Quo

China is in absolute trade surplus

Trade volume with J&K

Import from Japan (t)	Export to Japan (t)	Import from Korea (t)	Export to Korea (t)
151,200	2,337,009.06	0	600,515.66

Economy-Environment impacts analysis and assessment

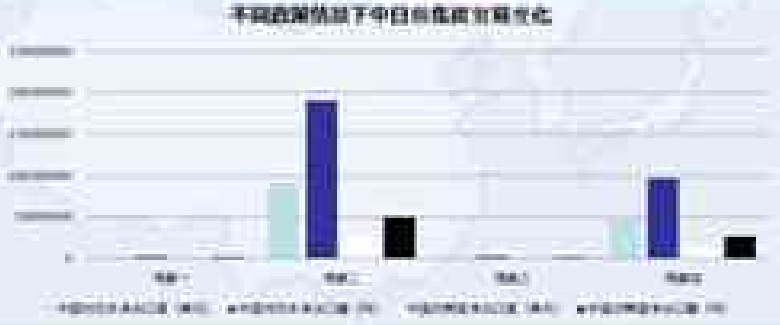
Coke: Trade Status Quo

China is applying 40% export tariff on Coke

中国对日韩的进口关税税率	0.05
中国对日韩的出口关税税率	0.4
中国出口退税率	0
日本对中国的进口关税税率	0.016
韩国对中国的进口关税税率	0.03

Coke: Economic impacts

Cancellation of export tariff will cause huge increase of coke export to J & K.



Coke: Environmental impacts

Free trade on Coke will largely increase pollutants emission in the sector.

- Direct impacts

Environmental Services

Environmental Goods

Environmental Investment

Environmental Technology

Environmental regulation

Environmental Services

Market Open to

- Sewage treatment
- Household solid waste incineration & power generation
- Dangerous waste treatment
- Air pollution control
- Renewable energy
- Etc.

Will benefit environmental protection directly

Environmental goods

- Environmental Goods import will benefit environment
  - Recycled Iron & Steel
  - Recycled paper
- Need to be cautious about Environmental "Bads".
  - Waste electronics
  - Used clothes

Environmental investment

more investment from J&K into pollution treatment, cleaner energy, energy saving and natural conservation, et al.

Environmental Technology

Facilitating IPR transfer, and better IPR protection will incent domestic R&D.

Environmental regulation

Incentive for better regulation and better implementation.

Summary to the EIA to CJK-FTA

Direct Impacts

- Positive impacts from:
  - environmental goods
  - environmental services
  - environmental investment
  - environmental technology
  - environmental regulation

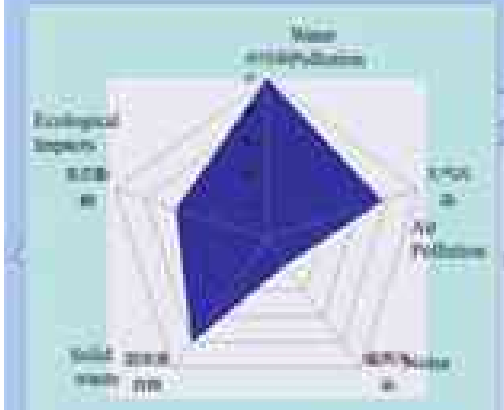
Negative impact:

- **risk of trans-boundary moving of E-waste and other wastes from J & K**

Indirect impacts

- Freer Trade under CJK-FTA will cause pollutant emission (COD, TN, TP, SO_2) increases in sectors such as Iron & Steel, Coke, Construction Material, Agriculture, et al., mostly due to scale and structural effects.
-
- For some sectors such as Chemistry, Electronics, Machinery, et al., Freer Trade under CJK-FTA will lead to some reduction of pollutants emission.
- Removal of export tariff will deteriorate environmental performance of heavily polluting sectors.

Indirect impacts



Environmental Impact Rose Map of CJK-FTA

In general, CJK-FTA will affect Water Environment the most, and then followed with Solid Waste and Air pollution, and Ecological impacts are less obvious.

Environmental Impact mitigation policy suggestions

- Environmental protection coordination mechanism
- Promoting environmental investment and environmental technology transfer
- Prioritize free trade of environmental goods and services

Difficulties and uncertainties

Complexity of the economy-environment system

Scale and structural effects are relatively easier to deal with.

Efficiency effect, regulation effects are much difficult to grasp.

Many thanks for your attention !

Export Credit Agencies and Environmental Considerations - Comparison of China, Korea and Japan -

MATSUMOTO Satoru[1], and SHIMIZU Noriko[2]

[1] Graduate School of Social Sciences, Hitotsubashi University, Japan
[2] Friends of the Earth Japan

1. Introduction

Last decade has seen dramatic changes in dynamics of the export credit agencies (ECAs), quasi-governmental financial institutions that provide financial supports for domestic companies undertaking business overseas. In 2010, disbursements by the Export-Import Bank of China (China EXIM) and the Export-Import Bank of Korea (KEXIM) are $53.0b and $56.5b for each, which by far surpass $20.1b of the Japan Bank for International Cooperation (JBIC) i.e. a Japanese ECA and the biggest Asian ECA a decade ago. Since large ECAs often support huge development projects that involve severe adverse environmental and social impacts, environmental and social considerations by ECAs need to be paid attention more as they expand. Hence, the purpose of this presentation will investigate environmental and social considerations by comparing among these three major Asian ECAs.

2. Comparison between Korea and Japan

Since KEXIM and JBIC are the members of the Working Party on Export Credits and Credit Guarantees (ECG) of OECD, these two ECAs agreed "Recommendation on Common Approaches on Environment and Officially Supported Export Credits (Common Approaches: CA)". The CA is a gentleman's agreement among ECG, whose main purpose is to promote a level playing field among member ECAs. The comparative analysis finds firstly these ECAs in principle in line with CA, but JBIC has more robust disclosure policy, attributed to strong participation of Japanese civil society in the establishment and revision of its environmental guidelines. Also, it indicates possibility of better check-and-balance system of KEXIM.

3. Comparison between China and CA

China EXIM, not a member of ECG despite of its lending volume, established the Guidelines for Environmental and Social Assessment (GLs) for its loan projects in August 2007. Compared to the CA of ECG, only China's GLs cover social impacts and respect local people's rights to land and resources. On the other hands, disclosure clauses are not contained in the China's GLs and the benchmarks for loan review are mainly host country's law while the CA recommends ECAs to apply international standards like those of World Bank Group. In recent, Chinese government drafted new guidelines which cover not only China EXIM but also all the Chinese financial institutions doing business abroad to make more sustainable overseas operations they finance. China EXIM's policy on environment is on the improve.

4. Conclusion

In terms of lending volume, these ECAs in East Asia are developed as crucial financial powers. In order for their overseas operations more environmentally and socially sound, transparency should be a key challenge to be strengthened, which would be driven on by further involvement of civil society actors including NGOs and academics.

References

OECD, 2010, Responses to the Survey from Members of the OECD's Working Party on Export Credits and Credit Guarantees regarding their procedures and practices concerning the environment.

China Export Import Bank, 2007, Guidelines for Environmental and Social Impact Assessments of the China Export Import Bank's Loan Projects, unofficial translation.

Export Credit Agencies (ECAs) and Environmental Considerations
- Comparison of China, Korea and Japan -

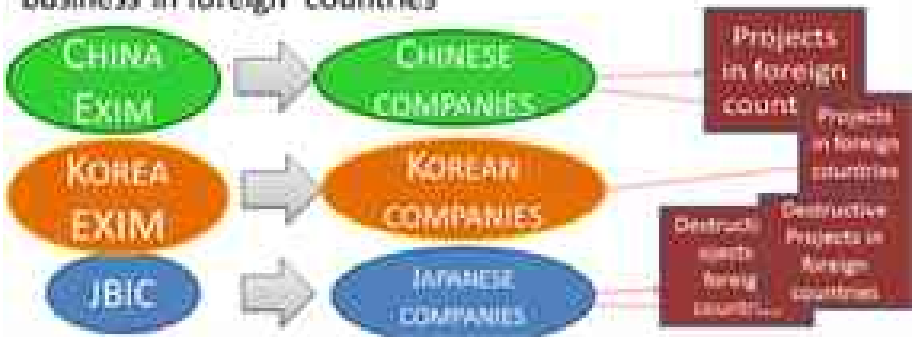
Dr. MATSUMOTO Satoru, Graduate School of Social Sciences, Hitotsubashi University, Japan
SHIMIZU Noriko, Friends of the Earth Japan

Background of our research

To compare environmental and social Policies of:
- The Export-Import Bank of China (China EXIM)
- Export-Import Bank of Korea(Korea EXIM)
- Japan Bank for International Cooperation(JBIC)

} Export Credit Agencies (ECAs)

ECAs = support domestic companies that undertake business in foreign countries



Purpose of our research

Volume of disbursement of three ECAs for the past 10 years
(Million USD)

	2000	2005	2010
China EXIM	------	14,645	53,030
Korea EXIM	6,427	27,489	56,494
JBIC	7,749	9,739	28,096

How env/soc policies evolved as the financing volume increased?

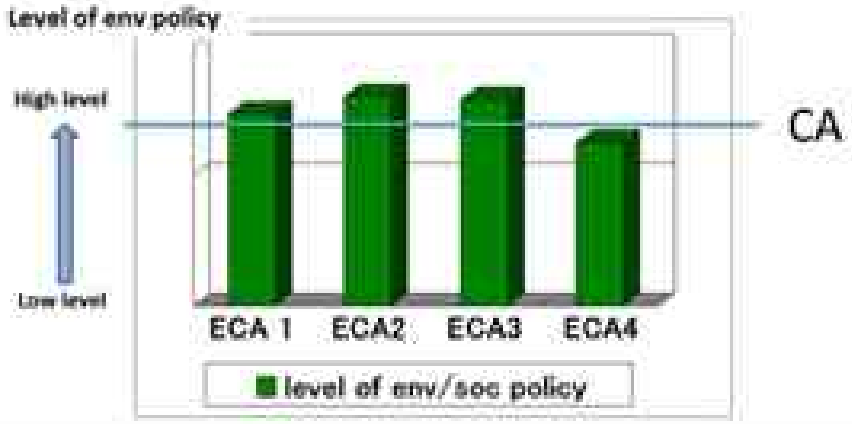
Content of presentation

1. Comparison between KEXIM and JBIC (Noriko Shimizu)
2. China EXIM (Dr Satoru Matsumoto)

1. Comparison between KEXIM and JBIC

OECD and Common Approaches

- Common Approaches(CA): Gentlemen's agreement on env/soc policies among members of the Working Party on Export Credits and Credit Guarantees (ECG) of OECD



Members of the Working Party on ECG of OECD

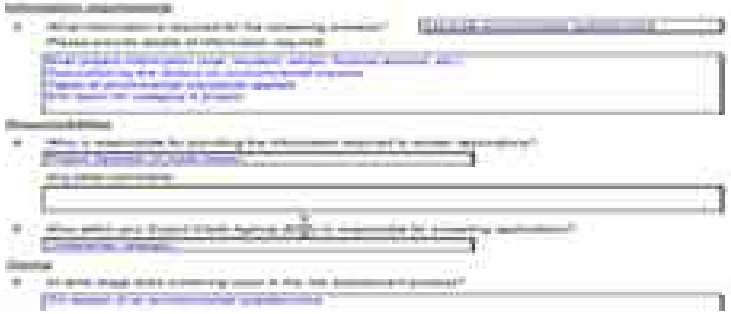
- Australia
- Austria
- Belgium
- Canada
- Czech Republic
- Denmark
- Finland
- France
- Germany
- Greece
- Hungary
- Italy
- Japan
- Korea
- Luxembourg
- Mexico
- Netherlands
- New Zealand
- Norway
- Poland
- Portugal
- Slovak Republic
- Spain
- Sweden
- Switzerland
- Turkey
- UK
- US

Content of Common Approaches

1. General Principles
2. Screening and Classification of Projects
3. Environmental Review
4. Evaluation, Decision and Monitoring
5. Exchange and Disclosure of Information
6. ANNEX (Illustrative List of Category A Projects, EIA Report)

Methodology of comparison between KEXIM and JBIC

- Based mainly on ECA's answers to questionnaires on CA prepared by OECD for the purposes of peer review among ECAs
- 57 questions totally, but introduce a few of them
- Focus on differences, rather than commonalities



1. General Principles

	Answers by ECAs	
	KEXIM	JBIC
Establishment of env policy	Yes	Yes

2. Screening and Classification of Projects

	Answers by ECAs	
	KEXIM	JBIC
Responsible department for screening?	Engineering & Environment Advisory Office	Loan Departments, who closely consult with Environmental Analysis Department

3. Environmental Review

	Answers by ECAs	
	KEXIM	JBIC
Benchmarking policies	Always World Bank's safeguard policies for benchmarking. IFCs and others are used case-by-case basis	World Bank's safeguard policies, other than where IFC/Regional Development Banks standards apply
Responsible staffs of env review	Environmental Practitioner (always)	Underwriter and Environmental Practitioner (always jointly)

4. Evaluation, Decision and Monitoring

	Answers by ECAs	
	KEXIM	JBIC
Disclose monitoring information?	Always encourage project proponent for disclosure	Disclose on its website to the extent that such information is disclosed to public in the project country. (but no such cases so far)
Responsible staff for monitoring	Engineering & Environmental Office	Underwriter and Environmental Practitioner (case-by-case basis)

5. Exchange and Disclosure of Information

	Answers by ECAs	
	KEXIM	JBIC
Disclose env policy?	No (*do not say no, but actually don't)	Yes
No of env practitioners	approximately 5	approximately 15
Responsible staffs of monitoring	Engineering & Environmental Office	Underwriter and Environmental Practitioner (case-by-case)

5. Exchange and Disclosure of Information

	KEXIM's web and JBIC's policy	
	KEXIM	JBIC
Disclose screening form after L/A?	No	Yes
Disclose result of env' review after L/A?	No	Yes

Observation

- In general, both are in line with CA.
- Info disclosure:
  - ✓ KEXIM generally follow with CA, except for not publishing env policy
  - ✓ JBIC is more transparent, disclose more than what CA requires
  - ✓ Pressure from CSOs in establishing/revising the JBIC's guidelines
- Governance of taking env/soc into consideration:
  - ✓ JBIC has more staffs
  - ✓ KEXIM's organisational governance may be more independent.
- What will be the implication of these differences? Any impacts at the project level?

Export Import Bank of China

(China EXIM)

Large volume and impacts though non-OECD country

1. Evolution of the Environmental Social Guidelines
2. Comparison China EXIM's Guidelines with OECD Common Approaches
3. Good practice and disputes

1. Evolution of the Environmental Social Guidelines

China EXIM and Environmental/Social Guidelines

- 2004 Environmental Policy
- 2007.4 Public Release
- 2007.8 Guidelines for Environmental and Social Assessments of the China Export and Import Bank's Loan Projects (2007GL)
- 2009.7 "Draft" Guidelines for the Environmental Conduct of Chinese Outward Foreign Direct Investment Companies

2. Comparison between China EXIM's 2007GL and OECD Common Approaches

A. General Principles

Common Approaches	China EXIM
Scope: Export credit with a repayment term of two years or more	None
- Foster transparency, predictability, responsibility in decision-making	- Implement national strategies for sustainable development
- Encourage prevention and mitigation	- Promote economic, social & env'tal development
- Enhance financial risk assessment	- Control credit risk

B. Screening and Classification

Common Approaches	China EXIM
- Screen all applications - Specify "projects" to be classified - Classify projects in accordance with potential environmental impacts (Category A, B, C)	- No screening by China EXIM

C. Environmental Review

Common Approaches	China EXIM
- Indicate necessary info on potential env'tal impacts - Cate.A: EIA is required - Cate.B: vary from project to project - Cate.C: no action needed - Benchmark: host country standards, WB safeguard policies or IFC's PS or relevant IOs' standards - Exceptions	- EIA prepared during pre-loan/loan period review - Benchmark: host country standards; without them China's standards or international practices - Respect local people's right to land and resources - Handle properly resettlement problems - Openly consult the public in accordance with host country's requirements

D. Evaluation, Decision and Monitoring

Common Approaches	China EXIM
- Evaluate info to decide whether request further info, decline or provide support - Ensure compliance with conditions of their support - Take actions to restore compliance - Encourage monitoring reports and relevant info publicly available	- Negotiate to amend proposal based on ESIA - Require responsibilities in loan contract - Inspect & monitor project based on ESIA - Require borrowers to eliminate serious problems - Stop disbursing loans & demand early payback in accordance with contract

E. Exchange and Disclosure

Common Approaches	China EXIM
- Cate.A: disclose publicly project info and make EIA docs publicly available at least 30 days pre-decision - Cate.A&B: make available to the public at least annually info on projects including env'tal info	- None

F. ANNEX

Common Approaches	China EXIM
- Illustrative List of Cate.A (27 detailed items)	- None
- EIA Report: executive summary; policy, legal and administrative framework; project description; baseline data; env'tal impacts; alternatives; env'tal managem't plan; consultation	- Env'tal impacts & related impacts on health and safety - Air, water, soil, waste, natural env't… - Socio-economic, natural resources, social env't - Labor, social security, health, land, migration… - Propose policies & measures to reduce impacts

Analysis of China EXIM GL

Strengths	To be strengthened
- Respect local people's right to land and resources - Rights to stop disbursing & to demand an early repayment - Social impacts are included in assessment - On-going projects are covered	- No screening (categorization) - Only host country's law and standards (benchmark) - EIA during loan period - No disclosure clauses (ex. project description, EIA, action plans etc.)

Improving…

"Draft" Guidelines for the Environmental Conduct of Chinese Outward Foreign Direct Investment Companies

- Introduction to "Category A, B, C"
- EIA before any loans are granted
- No money provided when projects fail the review and are unable to take remedies
- Incorporate environmental governance procedures into their business
- Establish an appropriate mechanism for complaints

27

3. Good practice and disputes

A good practice

Belinga Iron Ore Project (Gabon)

★Letter from local env'tal NGO to China EXIM (late 2008)

References	Claims
EXIM GL: social impacts, local people's rights	Deforestation, fishing, pollution
Decree: draft EIA and public consultation	Information and consultation needed
China's EIA Law: make EIA public	Public opinion should be reflected in decision

China EXIM pulled financing until the results of IAs are verified.

Major disputed projects

(source: newspapers in 2011)

- Coca Codo dam (Ecuador): Impacts on the Fall
- Ramu Nickel Mine (PNG): waste slurry dumped into the Bismarck Sea
- Merowe Dam (Sudan): relocation to desert, impacts on fishing, waterborne diseases
- Chambishi mine (Zambia): labor conditions and safety
- Bui Dam (Ghana): impacts on national park
- West Seti dam (Nepal): lack of public acceptance and governance (c.f. ADB)

Further research needed

- Less attention to KEXIM among civil society (academics, NGOs...) despite of its scale
- Comprehensive analysis of individual cases on application of Guidelines
- Other ECAs in 3 countries (Official Investment Insurance, China Development Bank)
- Focus on other emerging donors (India, Thailand, Brazil, South Africa, etc.)
- Focus on private (and state-own) banks

References (KEXIM and JBIC)

- International Financial Corporation(2010) 'IFC ANNUAL REPORT 2010'
- OECD(17 June, 2007) 'Revised Council Recommendation on Common Approaches on the Environment and Officially Supported Export Credits' http://www.oecd.org/official documents/displaydocumentpdf/?cote=TAD/ECG(2007)6&docLanguage=en
- OECD (2010) 'Responses to the Survey from Members of the OECD's Working Party on Export Credits and Credit Guarantees regarding their procedures and practices concerning the environment' 'Responses of KEXIM and JBIC'
- OECD (December 2010) 'Export Credits and the Environment: 2010 Review of Member's Responses to the Survey on the Environment and Officially Supported Export Credits' http://www.oecd.org/officialdocuments/displaydocumentpdf/?cote=TAD/ECG(2010)10/FINAL&docLanguage=en
- OECD (November 2008) [illegible]
- OECD (2 APRIL 2003) Environment and Export Credits: 2002 Revised Common Matrix http://www.oecd.org/document/18/0,3343,en_2649_34169_2487018_1_1_1_1,00.html
- JBIC's Webpage http://www.jbic.go.jp/ja/
- Webpage of Korea Exim http://www.koreaexim.go.kr/
- [illegible] NGO in Japan [illegible] 2009

References (China EXIM)

- China Export Import Bank, *Guidelines for Environmental and Social Impact Assessments of the China Export Import Bank's Loan Projects*, Aug.2007, unofficial translation.
- Global Environmental Institute, *Environmental Policies on China's Investment Overseas*, 2010, China Environmental Science Press.
- OECD, *Revised Council Recommendation On Common Approaches on the Environment And Officially Supported Export Credits*, June 2007.
- Brainforest, Letter to President of China Exim Bank dated on 20 Oct. 2008.
- Hensengerth, Oliver, *Integration of Chinese Institutions with host governments in dam construction*, Discussion Paper, Mar.2011, German Development Institute.
- BankTrack and Friends of the Earth, The Green Evolution Environmental Policies and Practice in China's Banking Sector, Nov.2008.
- Newspapers (Bloomberg, Eurekalert, Financial Times etc.)

Greenhouse Gas Assessment in Forest Ecosystem

Sangsik Suh, Taehyn Kim, Byeonggug Yang, Myungjin Kim
Ecosystem Assessment Division, National Institute of Environmental Research, Incheon, Korea

1. Introduction

Ecosystem functions have been imbalanced by the disturbance of human activity. This is expected to be the main factor of accelerating global warming. Futhermore the changes in ecosystem structure have emerged as an important environmental issue (Son and Lee 2001). As a result, the importance of greenhouse gas assessment come to the fore and added in Environmental Impact Assessment Act as one of the assessment factor in Korea.

In this study, we intend to quantify the amount of greenhouse gas absorption or emission by plant photosynthesis and respiration. This method can be used for greenhouse gas assessment in forest ecosystem and is expected to be useful tool for compensating the uncertain factors in CO_2 budget calculation, which will eventually help to improve the EIA and environmental policy.

2. Methodology

2.1 Site and plant specie

Experimental site is located at Mt. Taewha in Gwangju, Gyeonggido. The site consists of 40 years old *Pinus koraiensis* plantations and is approximately 16 ha. *P. koraiensis* density is 566ha. The mean DBH (Diameter of Breast Height) and the average height of the trees are 27.9 cm and 19.1 m, respectively.

At the *P. koraiensis* plantations, we built walk-through tower (eco-tower) which was 22m height. The micrometeorological environments such as air temperature, solar radiation and wind speed are being monitored at above canopy and below canopy height.

2.2. Photosynthetic chamber

The major CO_2 absorption in forest is occuring through the plant photosynthesis and emission for respiration. To measure the plant photosynthesis in daytime and respiration in nighttime, we designed

photosynthesis measurement chambers using non destructive method (Suh *et al.* 2006). To analyze quantitatively the amount of CO_2 absorbed by *P. koraiensis*, these chambers were installed on eco-tower on March, 2011. Parts of live branches and leaves are placed inside the chamber and the changing CO_2 concentration is monitored and converted to unit mass per unit area (Suh *et al.* 2011).

3. Result and discussion

The air temperature at below canopy showed the more gradual change than above canopy due to the shade of canopy. Because the LAI (Leaf Area Index) is larger than 3.5, the solar radiation showed the dramatic decrease at below canopy. This experiment showed the decrease in CO_2 concentration in daytime by photosynthesis and increase in nighttime by respiration of *P. koraiensis*.

This result demonstrate that this particular CO_2 measurement method using photosynthesis can be used for the calculation of CO_2 budget in forest ecosystem.

4. References

Son, Y. and Lee, S.H., 2001. Relationship between land-use change and soil carbon and nitrogen. Journal of Korean Forestry Society 90: 342-348.

Suh, S.U., Chun, Y.M., Chae, N.Y., Kim, J., Lim, J.H., Yokozawa, M., Lee, M.S. and Lee, J.S., 2006. A chamber system with automatic opening and closing for continuously measuring soil respiration based on an open-flow dynamic method. Ecol. Res. 21, 409-414.

Suh, S., Kim, T., Yang, B., Yi, J., Park, S., Shim, K., Yang, H. and Kim, M., 2011. Approaches for greenhouse gas (GHGs) assessment in ecosystem. Impacts of Climate Change, Third Scientific Conference in EIA and SIA, 171-178.

Tripartite EIA/SEA Conference in Beijing

Greenhouse Gas Assessment in Forest Ecosystem

October 28, 2011
Beijing, China

Myungjin Kim, Ecosystem Assessment Division
National Institute of Environmental Research

Contents

Climate Change and Ecosystem

GLOBAL ENERGY BALANCE

Radiation Balance

The radiation balance of the Earth system is zero(=) → Greenhouse

If the balance of the Earth radiation budget happens to lose some power, the Earth climate system would be changed. In general, we call it as "Climate Change".

Greenhouse Effect

Without atmosphere, Solar radiation → absorbed by Earth → fly radiated to space as heat

With atmosphere, Solar Radiation → absorbed by Earth and some trapped by the atmosphere → some is radiated to space as heat

Climate Change

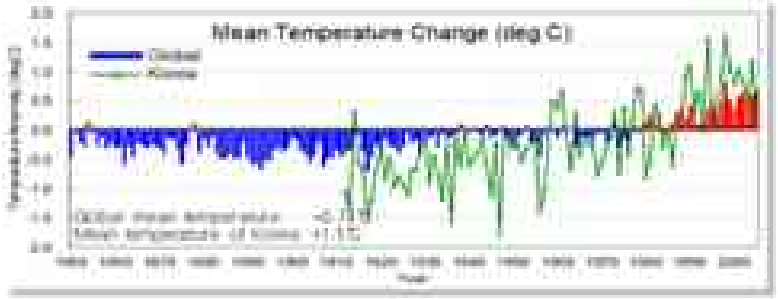
Long-lived greenhouse gases: carbon dioxide, methane, water vapor, and 3 gases

Human Activity → increasing the abundance of GHGs → enhancement of radiation → Global Warming

Anthropogenic climate change Factor

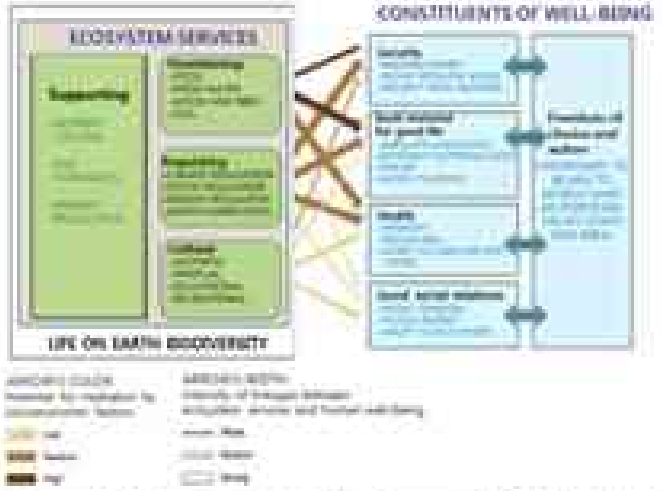
Observed Climate Change on the Korean Peninsula

- Temperature rise: 1.5℃ up in the past 100 years (twice as the global)
- Sea level rise (Jeju Island) : 22cm increase in the past 40 years (three times as the global)

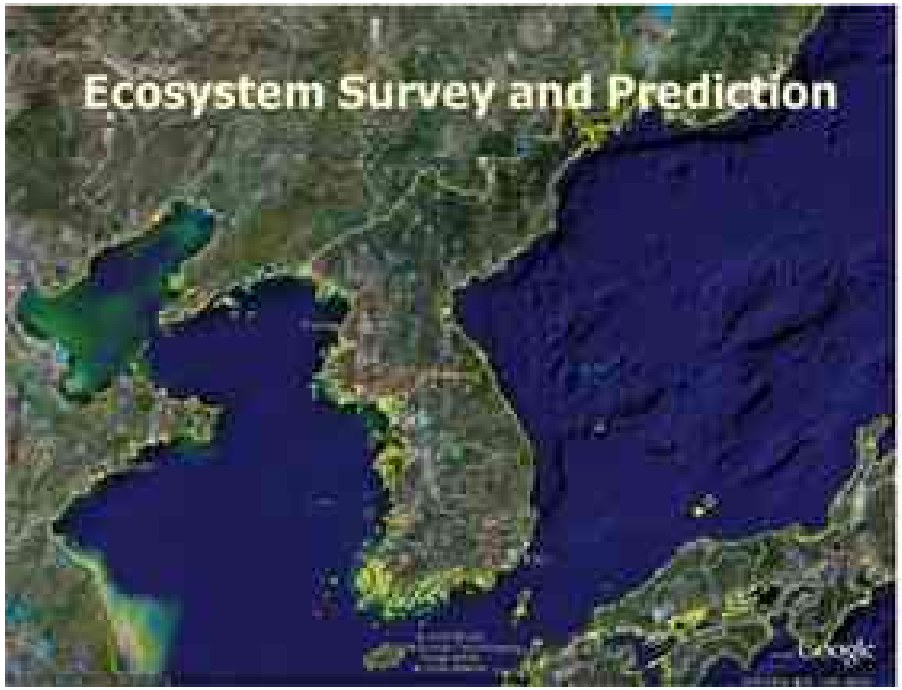


(METRI, 2005; NORI, 2006)

Ecosystem Services and Constituents of Well-being



Source : Millennium Ecosystem Assessment Synthesis Report, 2005



National Ecosystem Survey

- Natural Environment Conservation Act, Article 30

- Purpose: "Biodiversity Change Analysis" on
- Periodical survey (every 10 year)
  1) 1st NES : 1986-1990
  2) 2nd NES : 1997-2000
  3) 3rd NES : 2006-2012
- Overall survey of various ecological fields
  - Landforms and 8 taxa
    1) Flora
    2) Vegetation
    3) Benthic macro invertebrates
    4) Terrestrial insects
    5) Freshwater fishes
    6) Amphibians
    7) Reptiles
    8) Birds

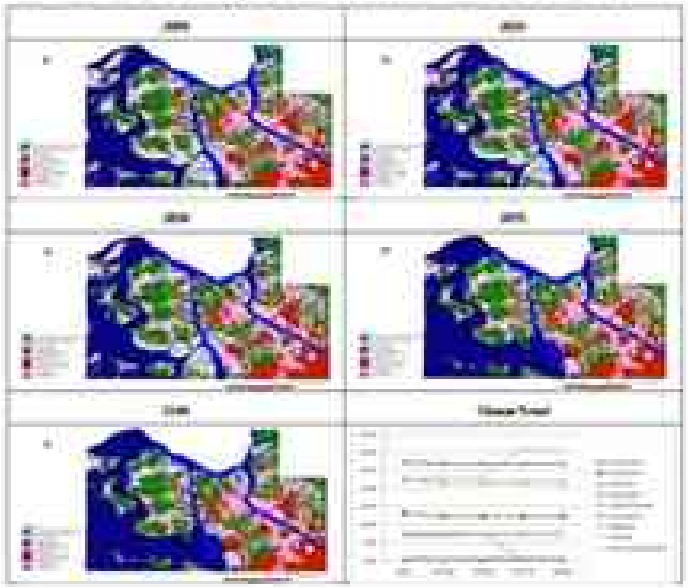
National Long-term Ecological Research

Purpose:
1. Ecosystem Impact on Climate Change
2. Ecosystem Change and Biodiversity Conservation

Project Period
- 1st Stage: 2004-2006
- 2nd Stage: 2007-2009
- 3rd Stage: 2010-2013

Mt. Jiri over 1,000 m height
1981: 262 ha, 2007: 216 ha
18% Decrease

Prediction by EPA SLAMM
Han River Estuary after 2050: tidal flat decrease

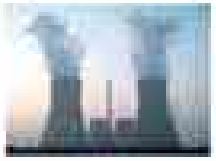


Bioclimatic Classification Based on PCA and Cluster Analysis of 67 Bioclimatic Variables

- 21 classes are 16 Inland classes and 5 Islands classes including 3 Jeju, 1 Baengnyeongdo and 1 Ulleungdo class.
- These classes varied greatly in size with the large classes occurring in the central inland areas of South Korea.
- The classes in mountain areas tended to be smaller and more fragmented.

Greenhouse Gas Assessment

Accelerating global warming	• Destruction of nature for improving living conditions of mankind
Environmental impact assessment	• To minimize the destruction of natural environment
Greenhouse gas assessment	• Recent increased awareness about global warming



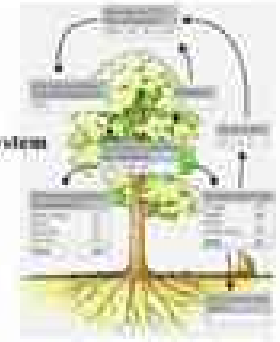
Greenhouse Gas Assessment needs Accurate Measurement

- Unlike in industry, very complicated processes are involved in forest ecosystem and difficult for quantifying the greenhouse gas budget with one approach
- Assessment of greenhouse gas emission using model equation

Subdivision of factor for prediction model (source: Korea Forest Research Institute)

	Rice paddy	Upland	Forest	Etc
tonC/ha	60.5	45.9	67.9	11.5

DBH	Broad-leaf tree	Needle-leaf tree
cm/yr	0.67	0.64



Multiple Measurement for Greenhouse Gas Budget in Ecosystem

- Field Experiment: Micrometeorology, Photosynthetic chamber, Soil respiration Biometric and Physiological method
- Laboratory Experiment: Temperature gradient chamber, CO2 gradient chamber

Photosynthetic Chamber

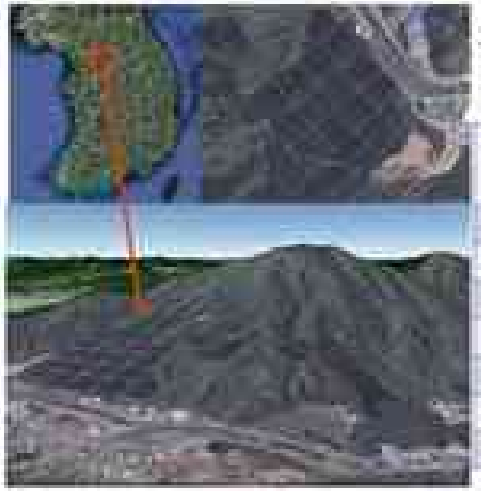
Manufactured Equipment

- Measuring photosynthesis efficiency
- Do only short term monitoring
- Difficult for moving to field every time
- Difficult for long term monitoring
- Limitation by weather

To Overcome Such Limitations

- Designed automated chamber for long term monitoring
- 20cm diameter x 30cm length
- Pneumatic system for chamber lid
- Convert CO_2 ppm to mgCO_2 per area and time

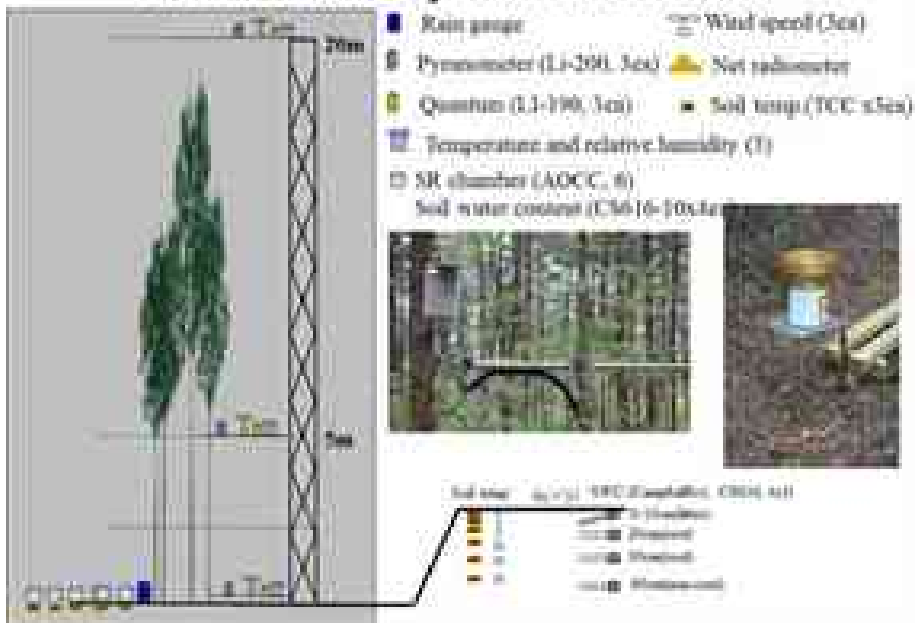
Location of Field Experimental Site



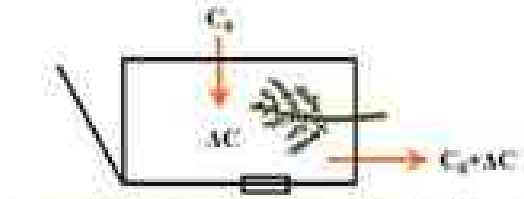
Mt. Taewha in Gwangju, Gyeonggido

Forest	40 years old *P. koraiensis* plantation
Area (ha)	14
Altitude (m)	129-219
Slope direction (°)	NE 50-60
Precipitation (mm)	1329.2
Density (no./ha)	968
DBH	27.9
Height (m)	19.1

Measurement System of Eco-tower

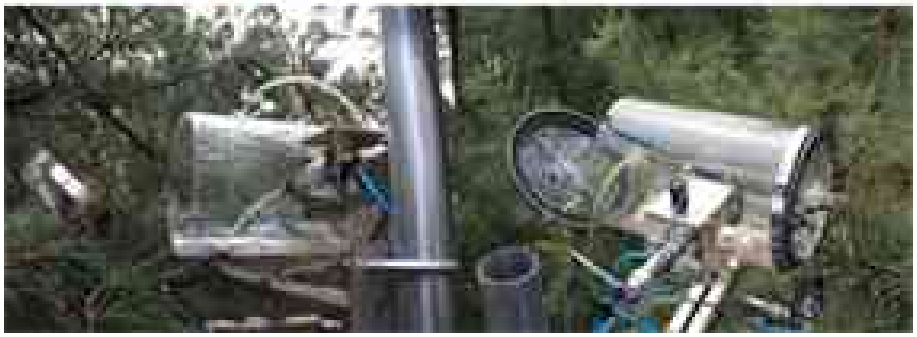


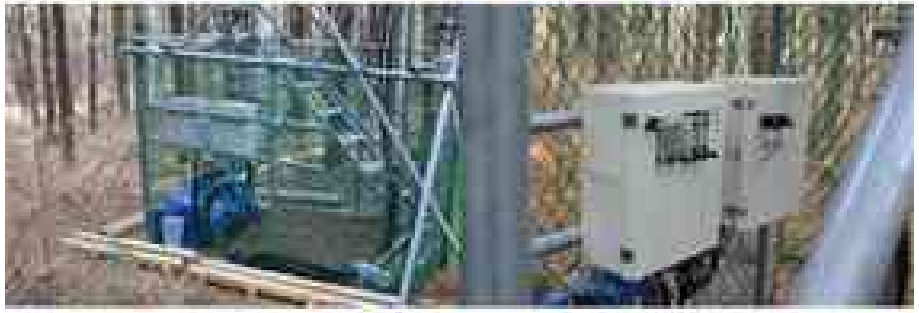
CO_2 Flux Measurement of Each Chamber



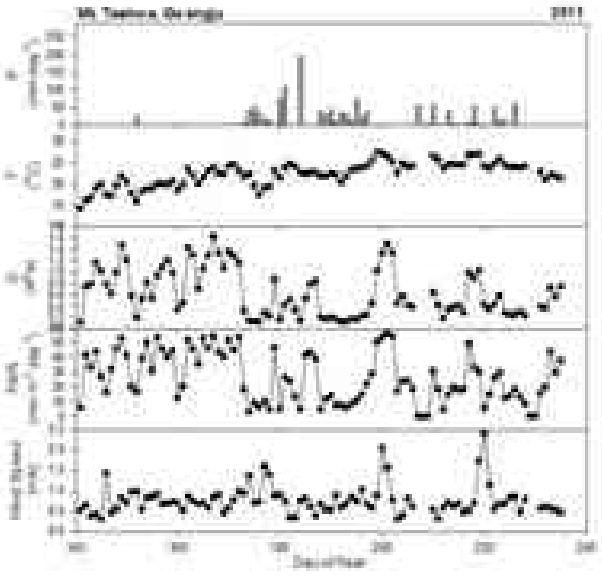
C_0 : initial CO_2 ppm

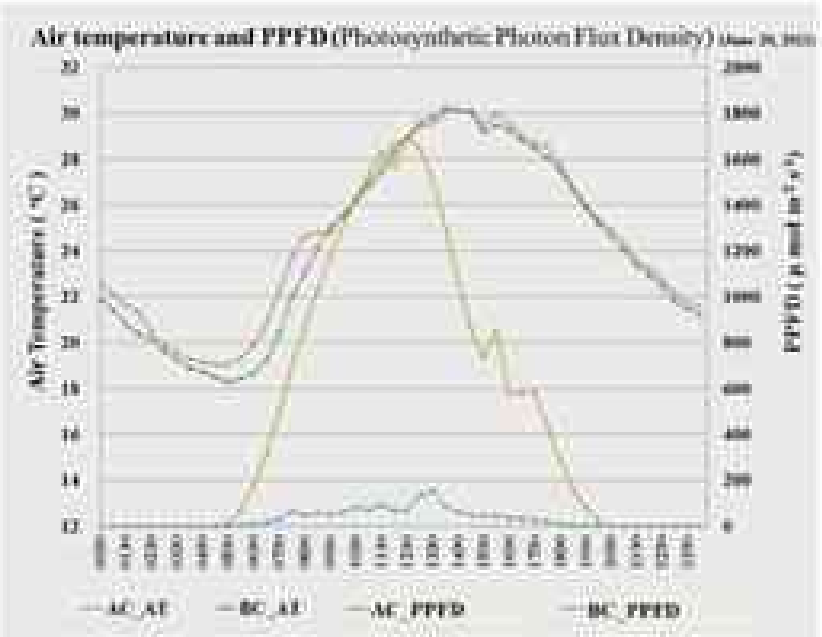
ΔC : CO_2 ppm changes per time
day $\Delta C<0$, night $\Delta C>0$

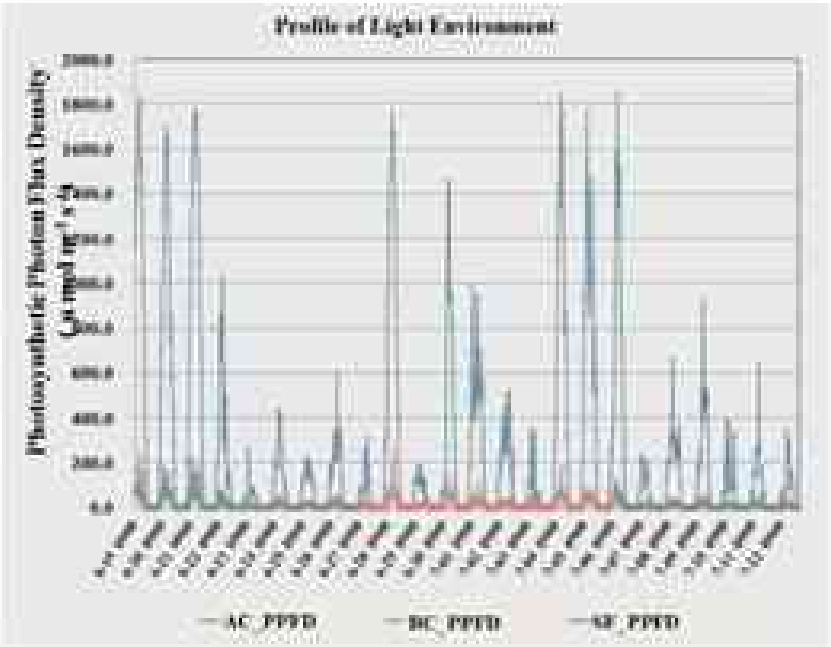


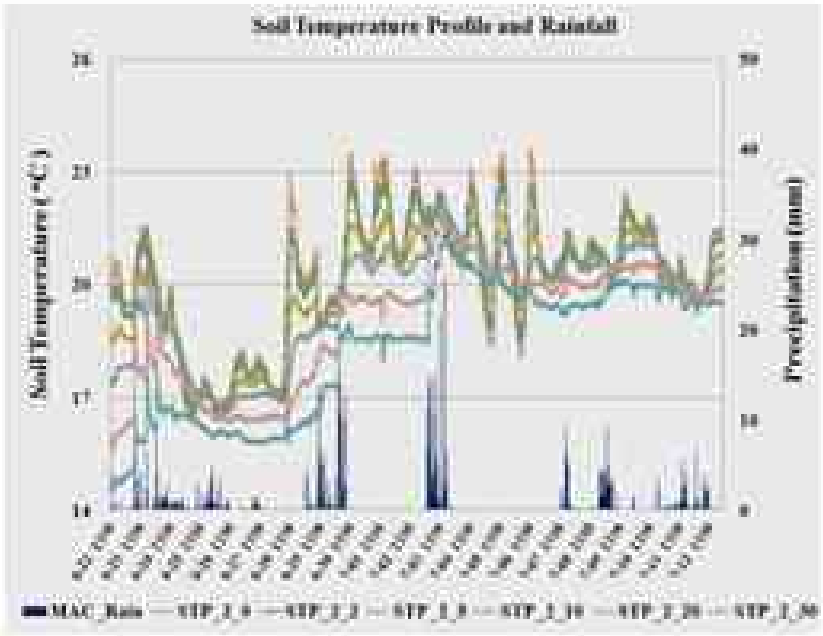


Real Time Data Monitoring

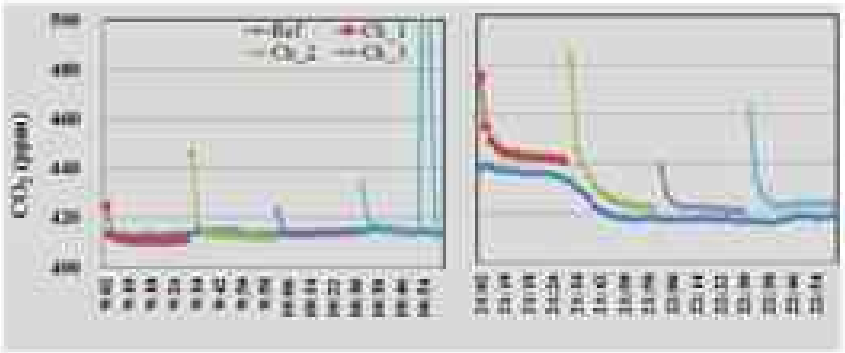








CO_2 Flux between Plants and Atmosphere

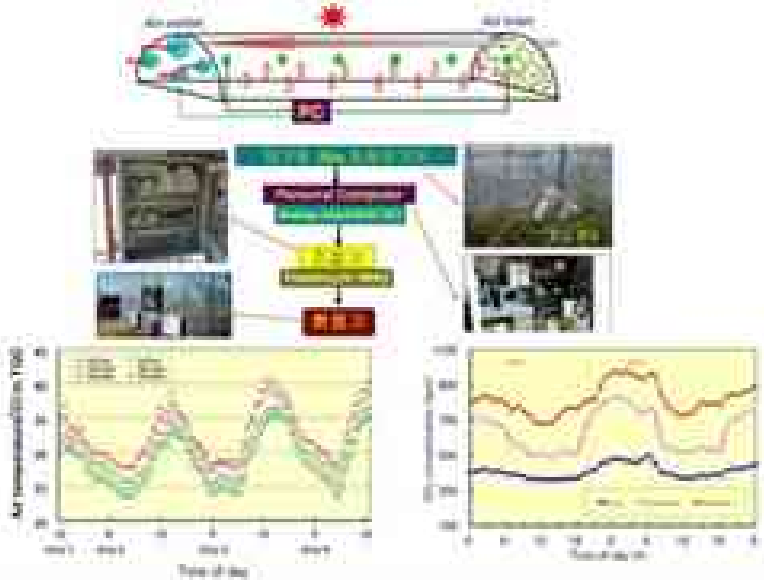


Plant Photosynthesis

Plant Respiration

Ecotower and Temperature Gradient Chamber

Temperature Gradient Chamber



Applications in EIA

"Low Carbon, Green Growth"

-The Core of Korea's New Vision:

Green Growth: Sustainable growth which helps reduce greenhouse gas emission and environmental pollution

<Korean President Address on August 15,2008>

Review of Korean EIA System

Tiering	Related Acts	Lead Agency	Cases Reviewed by Ministry of Environment
Policy	National Land Use Management Act, etc.	Ministry of Construction& Traffic, etc. 1)	Before 1989:1 cases 1990-1993: 1,701 1994-2000: 3,475
Plan	Framework Act on Environmental Policy (Prior Environmental Review System: SEC 2000)	Ministry of Environment	1993-2000: 1,251 2000-2009:37,653 2)
Program			
Project	Environmental Impact Assessment (EIA) Act	Ministry of Environment	1982-2009: 4,069 (after EIS review)

1) Currently, Ministry of Land, Transport and Maritime Affairs (MLTM)

2) 4,023: Pro agree, 31,496:Pro agree with condition, 1,207:Pro disagree, 2,926:Only give back opinions of designer, destruction of natural environment, due summary, disagreement, landscape view, etc.

Ecosystem Assessment in EIS Preparation

Air, Water, Land, Natural Ecosystem, Living, and Socioeconomic Environment

- **22 Environmental Factors (air quality, greenhouse gases…)**

Natural Ecosystem Environment

- **Flora and fauna**
- **Natural environment assets: endangered species, preservation area**

<EIS Preparation Regulation, 2009>

One index of species diversity

$D = N(N-1)/(n_1(n_1-1)+n_2(n_2-1)+ \ldots +n_s(n_s-1))$

D = Simpson's index of diversity, from 1 to an infinite value

s = number of species

n_i = number of individuals of species i (i=1, …,s), and

N = total number of individuals of all species

Evaluation of Changes in Ecosystems Caused by Human Actions

- Biodiversity and habitat fragmentation
- Species diversity and its hypothesized linkage with ecosystem stability
- Significant species, including keystone and indicator species
- Ecosystem "quality" and other criteria for identifying lands to include in preservation programs

<Leonard Ortolano, Environmental Regulation and Impact Assessment,1997>

Ecosystem assessment is an application of EIA of growing importance in Korea.

- Improvement of ecosystem services
- Advancing environmental sustainability

Ecosystem Assessment in EIA

Applications at Tiering (4 P) Levels

- Ecosystem Protected Areas
- Ecosystem Survey Data
- Endangered Wild Fauna and Flora
- Ecosystem and Nature Map, etc.

Impact assessment on ecosystem does not fully represent potential and expected effects, usually criteria based on survey is applied to EIA.

Leopard cat *(Prionailurus bengalensis)*

- logged dipterocarp forest or secondary forest fragments (Rajasthan 2007)
- Grassland near cropland (Choi 2007)
- Slope, vegetation type, distance from a garbage dump, rivers and residences (Watanabe 2003)
- land use, land cover, edge density (in/ha), ridges, and distance from water (Nho 2007)
- hillock (Kim 2008)

Amur goral *(Nemorhaedus caudatus)*

- rock, slope, aspect, elevation, ridge, vegetation and human disturbance (Yang 2002; Choi 2004)
- hunting, fire, stress etc. (Kikokihokan, 2000)

(http://www.sanjang.net)

Class Change of Ecosystem and Nature Map

Bokdeukeup Yangjae Kyong-gido

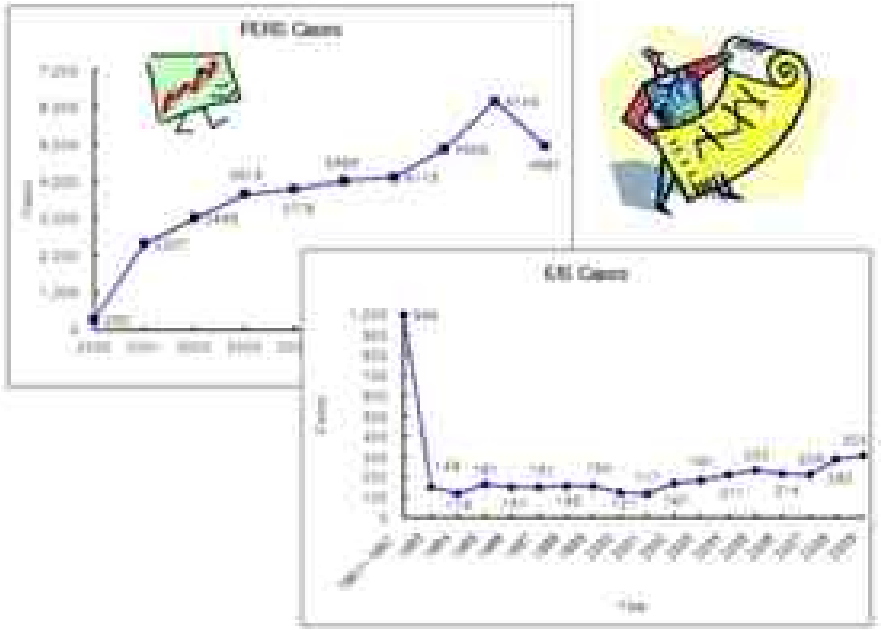
- Notice: April 22, 2010
- Vegetation Survey and Leopard cat Finding

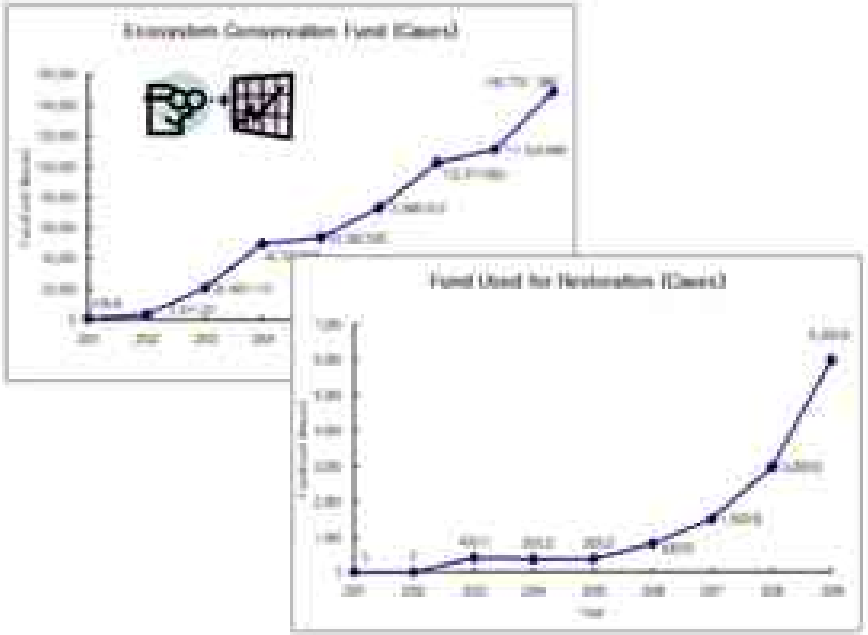
'07.4.11

Revised Map

Leopard cat scat

Mongolian oak and Japanese larch





Guideline for greenhouse gas assessment 2009.12.7

Status survey	• Status of GHG emission sources and sinks • Measuring amount of GHG emission and sink • Emission/sink source survey → Calculating the emission/sink factor → Calculating amount of GHG emission/sink
Greenhouse gas emissions effect prediction	• Prediction range : energy use, land use change, waste generation, destruction of sink sources • Prediction method : Use of GHG emission guideline for local government ('09 KECO), IPCC guideline or country-specific emission factors
Greenhouse gas reduction goals	• GHG reduction target will be chose by considering the reduction potential
Establishment of mitigation plan	• Establishing mitigation plan such as expansion of green areas, recycling resources and energy conservation

Conclusions

1. Greenhouse gas assessment helps the calculation of CO_2 budget followed by forest destruction
2. CO2 measurement method such as photosynthesis will be developed.
3. Ecosystem assessment makes an important role in EIA or SEA process.
4. Linking Climate Change to Ecosystem in EIA and SEA.
5. Tripartite Role in LALA, Rio+20 (June 4-6, 2012) and WCC (Sep. 6-15, 2012).

Theoretical and Practical Experience of Mega-Regional SEA in China, by Dr. Ren Jingming, Appraisal Center for Environmental Engineering (ACEE), MEP of CHINA

Theoretical and Practical Experience of Mega-Regional SEA in China

Dr. Ren Jingmitg.
Deputy General Engineer
Director of SEA Institute
Appraisal Center for Environment & Engineering,
MEP, CHINA

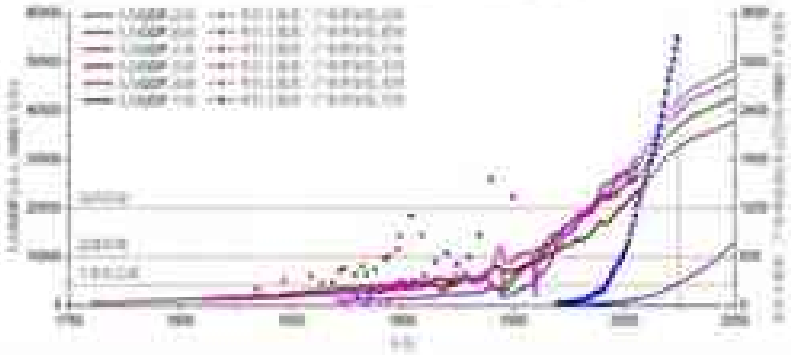
Oct. 28th 2011 Beijing

Content

1. Background
2. Theoretical Basis
3. Practice and Technical Frame for SEA of The Five Mega-Regions in China
4. Research Production Application

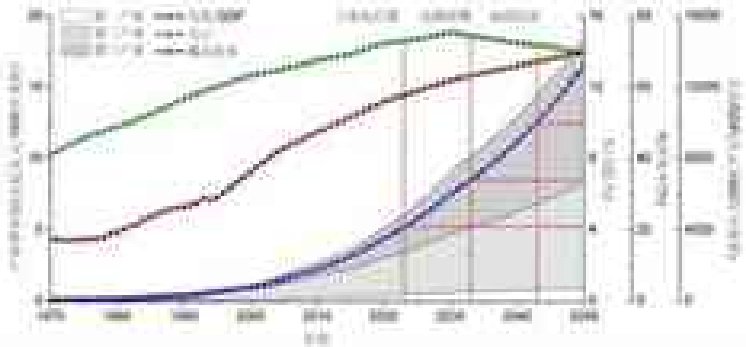
1. Background—Two Key Conflicts

- **Ecological security:** Spatial conflict between discretionary industrial expansion and eco-security pattern
- **Environmental Capacity:** Structural conflict between resources& environm. carrying capacity and rapid growth of heavy industries



1. Background—Structure Optimization and Spatial Restriction

- In the future 20 years, an optimized industrial structure and spatial distribution is crucial for the rapid development regions of industrialization and urbanization, which can minimize environ. constraints and ensure a long-term balanced development of economy and environment



1. Background—SEA as an Effective Instrument

- Industrial restructuring and spatial layout optimization are the strategic instruments for the national macro-economic regulation. Mitigating two conflicts is crucial to take environmental protection consideration into decision.

Regional SEA should play far more important role in spatial control

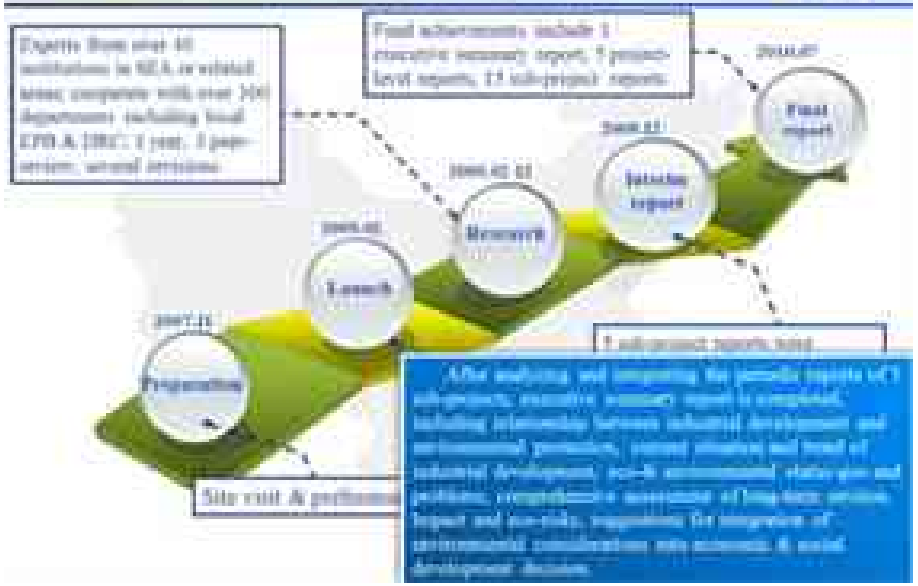
2. Theoretical Basis

- **Key technical issues: identification, description and assessment of regional ecological risks and health impact caused by intensive industrial development at large spatial & long temporal scale**
  - Spatial conflict between irrational industrial expansion and ecological security pattern
  - Structural conflict between rapid growth of heavy industries and environmental carrying capacity

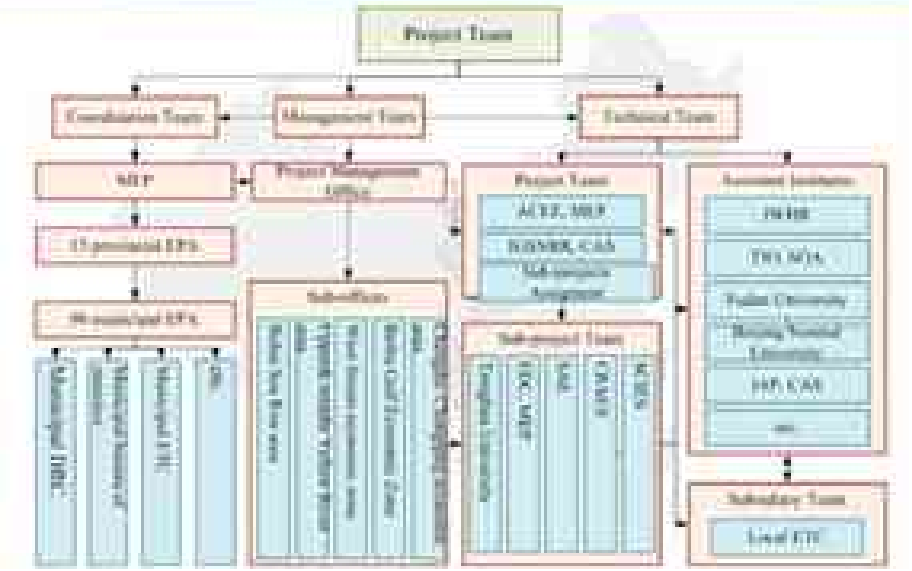
2. Theoretical Basis

- **Analyze existing status:**
  key problems, restrain factors, (de-)coupling relationship
- **Predict future trends:**
  Resource carrying capacity, environmental carrying capacity, ecological security
- **Find the way for potential solutions:**
  Industrial regulation, and long-term developing mechanism

3. SEA for Five-Mega Regions – Procedures



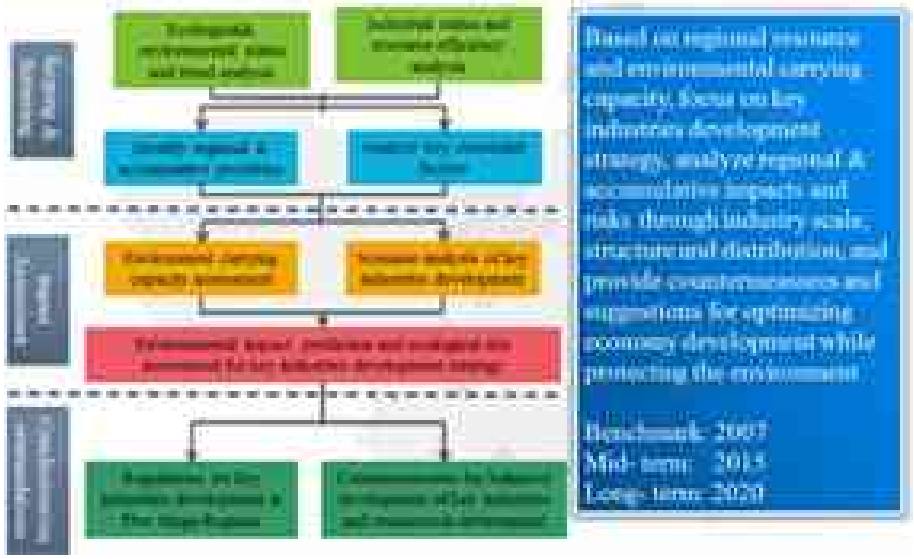
3. SEA for Five-Mega Regions - Organization



3. SEA for Five-Mega Regions - Organization

- **Three-level project administrative system**: centre-region-province, including 15 provincial EPBs
- **Three-level technical supporting system**: project-subproject-subsidiary, involving nearly 100 scientific research institutes
- **Some key institutions**: Project director system, the significant item reporting system, the key technologies attack deliberation system, the all-the-way tracking appraisal system and data material sharing system
- A **consultant committee** including over 50 experts led by 19 academicians

3. SEA practice for Five-Mega Regions —Technical Framework



3. SEA Practice for Five-Mega Regions — Technical Frame Work

- Prominent resource and environmental problems analysis - constraints factors
- Resource and environment efficiency comparison - promoting space
- Resource and environment carrying capacity analysis - scale and structure regulation
- Environmental impact assessment by Scenario analysis-ecological risk identification
- Comprehensive assessment and regulation for key industries - scale and structure regulation
- Comprehensive measures to ensure efficient regulation - long-term effective mechanism

3. SEA Practice for Five-Mega Regions —Technical Frame Work

- **Strategic objectives determine the bottom line**
- **Carrying capacity underlie the permit criteria**
- **Potential risks localize industrial layout**
- **Regional advantages prioritize economic structure**
- **Res/environ constraints limit developing size**

3. Main findings - Characteristics of Key Industries: Scattered Distribution of Heavy Industries

Lack of overall regional planning and efficient coordination, heavy industries incline to locate in coastal and riverside areas that tend to shape a scattered layout.

Nearly 90% chemical industries located along the Yangzi River, Min river and Tuo river in Chengdu-Chongqing economic area

Large concentration of heavy industry industrial in Bohai Gulf economic zone

3. Main findings - Characteristics of Key Industries: Structure 'Lock into' Heavy Industries

Due to resource condition, industrial basis, as well as the rapid development in recent years, heavy industries have become dominant in these Five Mega-Regions, and petrochemical, metallurgy, energy and electric industries have priorities in large-scaled projects.

Regions	Key Industries	Proportion of Heavy Industries	
		2000	2007
Bohai Sea Rim Area	Petrochemical, Iron and Steel, Machinery	78	78
West Straits Economic Zone	Petrochemical, Machinery, Electronic Information, Electricity	67	69
Beibu Gulf Economic Zone	Petrochemical, Metallurgy, Paper, Energy, Food, Pharmaceutical, Building Materials, Shipping	54	64
Chengdu-Chongqing Economic area	Chemical, Steel, Machinery, Energy, Electricity	60	68
Upper& middle Yellow River area	Coal Mining, Electricity, coal chemical processing, Metallurgy	80	84

3. Main finds - Challenges

The key two conflicts have been manifested; over-capacity and ecological deterioration have been intensified in some regions.

- **Environmental and ecological system have been deteriorated in Bohai Sea Rim area.**
- **Environmental condition is generally satisfying in West-Straits Economic Zone & Beibu Bay Region, but pollution and ecological risks are still prominent in some areas.**
- **Chengdu-Chongqing Economic Zone is environmentally sensitive. The Three-Gorge reservoir is threatened by eutrophication.**
- **Upper & Middle Yellow River Region is ecologically vulnerable, and compound water resource problem has exacerbated its vulnerability.**

3. Main finds - Challenges

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- **Upper & Middle Yellow River Region is ecologically vulnerable, and compound water resource problem has exacerbated its vulnerability.**

3. Main findings – Mid & Long-Term Ecological Risks

The two key conflicts are likely to be increasingly intensified. Regional ecological deterioration & accumulative impacts tend to be a matter of overall importance. The bottom line of ecological security and carrying capacity would be broken through

- **Overall environ. quality will be declined, and trend of pollution and eco. degradation will become irreversible in Bohai Sea Rim Area.**
- **Pollution and ecological deterioration will be intensified in West-Straits and Beibu Gulf Economic Zones, and current favorable environment will become unmaintainable.**
- **Chengdu-Chongqing Economic Zone's ecological function and environmental security will be unguaranteed, and The Three-Gorge reservoir is continuously threatened by eutrophication.**
- **Water crisis is prominent in Upper& Middle Yellow River Region, and the decline of ecological vulnerability will be uncontrollable.**

3. Main findings – Recommendations

- Institutionalize **one strategic goal**: the five pilot mega-regions aiming to 'environmental protection optimizes economic development'
- Eliminate the **two conflicts**: mechanism, distribution & structure regulation, infrastructure
- Ensure **three priorities**: policy, inputs, capacity building
- Guard **four bottom-lines**: eco-function, resources, emission, environmental permit
- **Differentiational regulation** on **the five mega-regions**: bottom-lines, permit criteria, distribution/layout, structure, and scale.

4. Research Production Application

- **National: support decision-making for the 12th five-year plan**
  - Strategic goals and developing patterns for mega-regional ind. growth
  - Promote ecological restructuring of conventional industries
  - Propose mechanism and guidelines coordination of economy and environment
- **Regional: Issue guidelines for the 5 mega-regions, respectively**
  - Guide (re-)location and restructuring of key industries
  - Promote regional framework of strategic environment protection
- **Major Project level: restrict environmental permit**
  - Highlight principles for development of big projects
  - Enhance SEA's guidance to EIA at planning and/or project level
  - Promote SEA for key industries within the five mega-regions

Thanks!

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Global Warming and Phenology in Korea

Sang Don Lee*

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1. Introduction

Phenological dynamics have been recognized as key attributes of plants and animals that are being affected by a warming climate. As a result of rising temperatures, many plant species are leafing out and flowering earlier in the spring, many animals are active earlier, and many migratory birds are arriving earlier at points along their spring migration routes. However, the changes vary considerably among species, some species are changing dramatically while other are not changing at all. Knowing a particular species response to global warming in the context of its surrounding environment will be crucial for the assessment of the effects of climate change on its populations, the communities it forms part of, and on biodiversity in general. In this paper phenological observations collected for 12 plant and animal species by the meteorological agencies in Korea (34 sites with some since 1921) will be analyzed. The main questions we are to answer are: is a species phenological response to increasing temperatures consistent along a large geographic range? Are species at a particular site having a similar phenological response to global warming? Answering these questions will help us to better understand the complex effects of climate change on natural populations, communities and biodiversity.

2. Species response to Climate Change

Winter temperatures (Nov through Mar) have risen by an average of 1.2 °C over the region from 1953 to 2005. The phenology of each species has independently changed over that time interval. *Prunus*, *Taraxacum* and *Wisteria* are flowering earlier at 111 of 150 sites, 45 of 71 sites and 57 of 75 sites, respectively. However, *Rana*, *Picris*, *Alnus*, *Pieris*, and *Cettia* are being detected for the first time later over time at the majority of sites. *Camellia* and *Miscanthus* have variable changes among sites. In particular, *Miscanthus* is arriving earlier over time at 51 of 81 sites of Japan, and arriving later in 56 of 73 sites of Korea. This variation among species and sites reflects the complexity of species' responses to change.

3. Future Trends of species response

In Korea, these sample locations represent the latitudinal and temperature gradient found in the data. Within each location, the species differ in their predicted phenological responses to future warming temperatures, and these discrepancies also shift from one location to another. In addition, a particular species response to warming also differs from one location to another. For example, when comparing forecasts for a 3 °C increase under a moderate climate change scenario by the year 2100 (IPCC 2007), the phenological response clearly differs among species and sites. In contrast, forecasted changes in phenology for certain other species appear relatively constant among locations.

4. Phenological change and Ecological responses

More field studies are urgently needed to determine the extent to which phenological shifts may take place. The results clearly demonstrate that it is difficult to generalize from one site to another because of differences that exist between the phenological responses of individual species and sites. In addition, the relationship of phenology and temperature may not linear, as has commonly assumed. This nonlinearity might in part explain why the same species in different locations can show different responses to a warming climate. However, with large datasets that span broad geographic areas and temperature gradients, scientists can improve predictions of how phenological responses and ecological relationships will change in the future.

References

Primack, R.B., I. Ibanez, S.D. Lee, et al. 2009. Spatial and interspecific variability in phenological responses to warming temperatures. Biological Conservation 142: 2569-2577.

Ecosystem Conservation and Phenology Change to Global Warming in Korea and NE Asia

Japan-China-Korea Tripartite SEA/EIA Symposium
Beijing Normal University
Oct 28th, 2011

Korea : **Sang Don LEE, Department of Environmental Sciences and Engineering, Ewha Womans University, Seoul, KOREA**

Japan : **Hiroyoshi Higuchi**, Lab of Biodiversity Sciences, University of Tokyo

USA : **Richard B. Primack**, Dept of Biology, Boston University, Boston, MA
Inés Ibáñez, University of Michigan, Ann Arbor, Michigan
Abraham J. Miller-Rushing, Rocky Mt. Biological Lab, Colorado
John A. Silander, Jr., Dept of Ecology and Evolutionary Biology, University of Connecticut

Phenological dynamics

- What is it?
  - Rising temperature => plant species are flowering earlier in the spring; and leafing earlier
  - Migratory bird species arriving earlier in spring
  - Many animals active earlier
- What are the problems?
  - The changes are different among species
  - Ecological mismatches

Ecological mismatches

- Disrupt relationships among some species and their environment
  - Decline and extinction of species responding to global warming
  - Even harder if the species in residency in a short time period
  - Resource availability shortened
  - Spring migratory birds of Pied flycatcher (*Ficedula hypoleuca*) in northern Europe from Africa (Both et al. 2006, Nature)

English Oak
Quercus robur

EARLIER

From Both et al. 2006, Nature

English Oak
Quercus robur

EARLIER

Winter Moth
Operophtera brumata

EARLIER

From Both et al.
2006. *Nature*

English Oak
Quercus robur

EARLIER

Winter Moth
Operophtera brumata

EARLIER

Pied Flycatcher
Ficedula hypoleuca

SAME TIME
EACH YEAR

From Both et al.
2006. *Nature*

Lacking in researches

- Mismatches are quite rare in the literature; available only single location
- Need a wide geographic range
  - Especially no evidence in NE Asia
- In Korea and Japan : weather records
  - 102 sites since 1953
  - 74 sites since 1921
- Green Growth Adaptation?
  - Do we really understand the ecosystem process?

Climate change and ecological relationship

- Climate change in ecosystems
  - Evidence is quite rare due to lacking in obtaining informative data
  - Phenological response of various species
    - 6 plant species :
    - 3 bird species :
    - 1 Frog and 2 insects :
- Data collected during 1953-2005
  - 176 metrological stations (weather records) in Korea and Japan

Observed species

- **Both Korea and Japan**
  - First flowering of Japanese apricot tree (*Prunus mume*)
  - First appearance white butterfly (*Pieris rapae*)
  - First arrival of barn swallow (*Hirundo rustica*)
  - First singing of the skylark (*Alauda arvensis*)
  - First appearance of black-spotted pond frogs (*Rana nigromaculata* sympatric of *R. pirica*)
- **For Japan only**
  - First flowering of dandelion (*Taraxacum spp*) both native and non-native
    - Native Camellia shrub (*Camellia japonica*)
    - Native Wisteria vine (*Wisteria floribunda*)
  - First singing of bush warbler (*Cettia diphone*)
  - Bud burst of maiden hair tree (*Gingko biloba*)
  - Native mulberry tree (*Morus bombycis*)
  - First appearance of paper wasp (*Polistes jadwigae*)

Plants, birds, insects and amphibians

Weather data

- 120 stations from Meteorological Agency in Japan
  - http://www.jma.go.jp/english/index-e.html
- 74 weather stations from Korea Meteorological Administration
  - http://web.kma.go.kr/eng/biz/climate/climate_data/1123374_1389.html
- From Northern Hokkaido (latitude 45°24.9'N) to southern islands (24°20.2'N) : subtropical to boreal regions

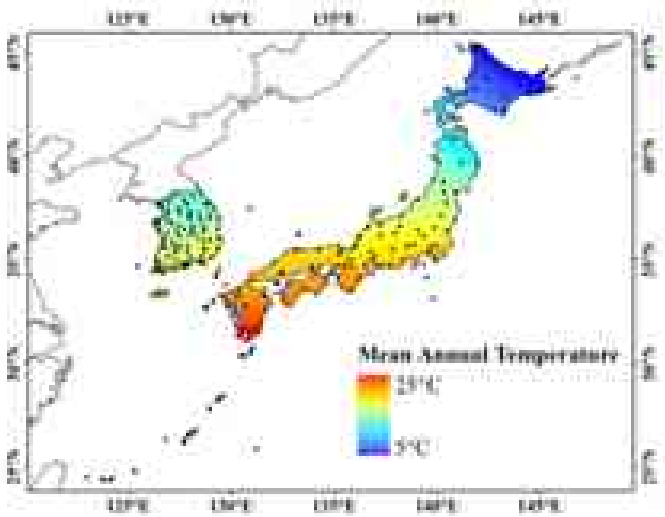


Fig. 1. Map of Japan and South Korea showing the locations of the meteorological sites (dots) and mean annual temperature,

A model for plant and animal phenology

$$\text{Phenology}_{st} = \alpha_s \cdot e^{(-\beta_s * temperature_{st})} + \gamma * latitude_s + \varepsilon_{st}$$

Mean winter temperature (November to March); Bayesian approach

Site s in year t
Negative relationship with temperature
Linear relationship with latitude
Error $\varepsilon \sim Normal(0, \sigma_\varepsilon^2)$

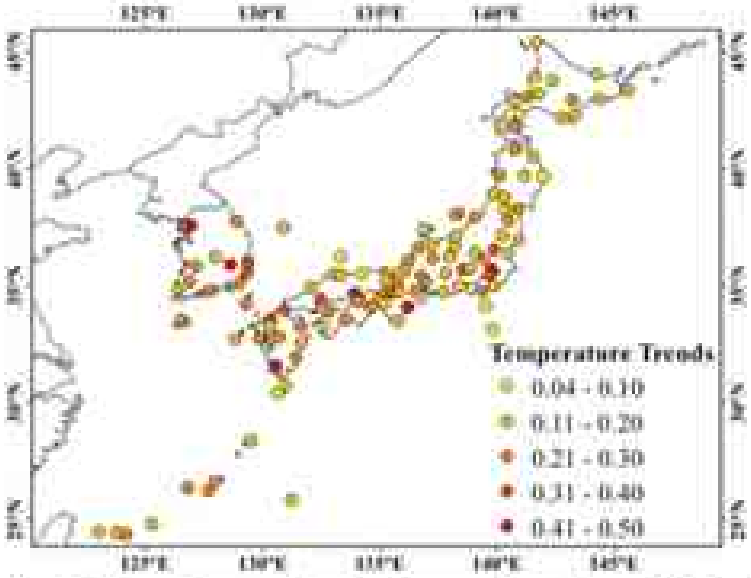
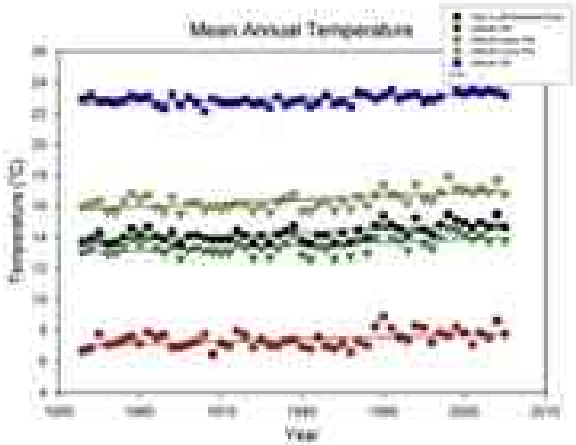


Fig 2. Warming trends for November through March (°C/decade) during (1953-2005)



- Temperature over time (mean temperature among locations in the same latitude)
- The higher the latitude, the colder the temperature

Species response

- **Flowering earlier**
  - *Prunus* (111/150 sites) Fig
  - *Taraxacum* (45/71) and *Wisteria* (57/75) also flowering earlier
- ***Gingko* and *Morus* leafing out earlier**
  - 64/78 sites
  - 23/36 sites
- ***Rana, Pieris, Alaudia, Polistes, Cettia***
  - appearing later over time
- ***Camellia* and *Hirundo***
  - Variable among sites
  - *Hirundo* arriving earlier in Japan (51/81) and Korea (56/73)
- **High variation among species' response to change**

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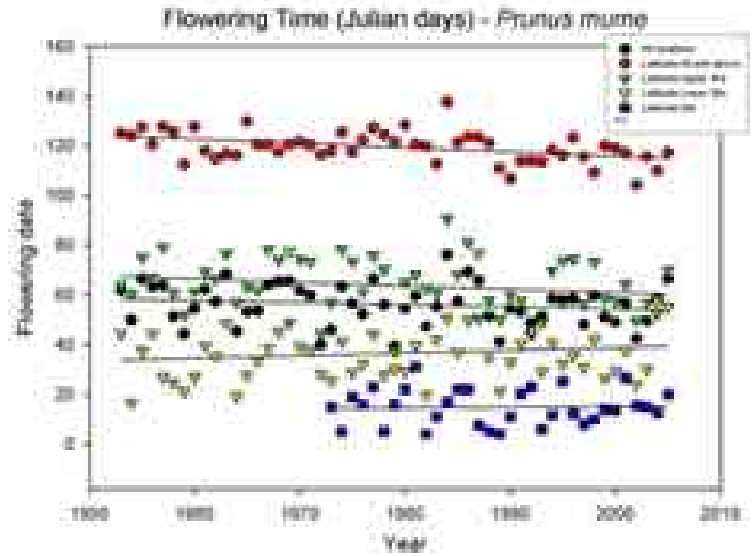
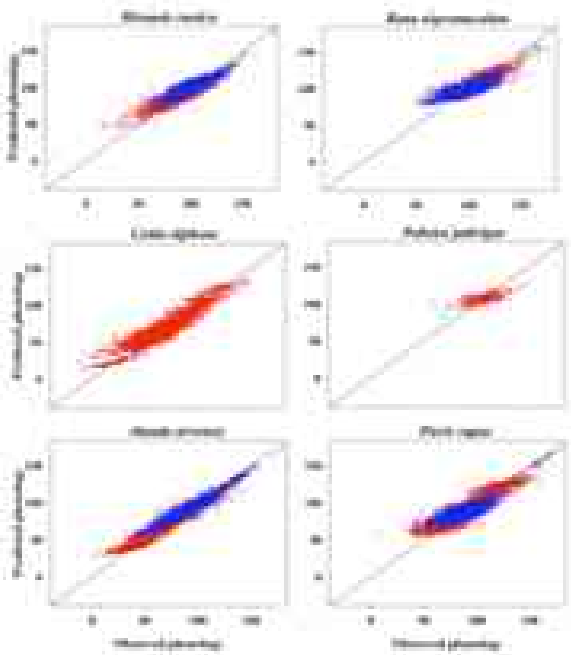
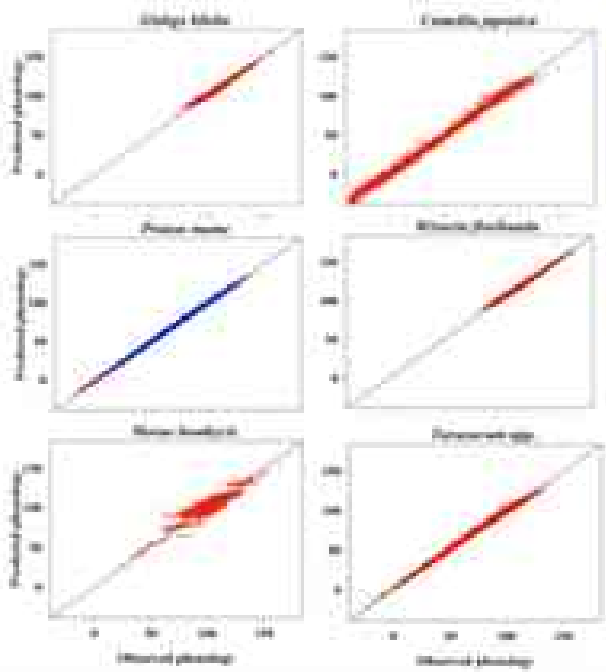




Observed vs predicted Phenology
- **Japan data in red;**
- **Korea data in blue**

R2	Species
0.54	*Hirundo*
0.84	*Cettia*
0.89	*Alauda*
0.30	*Rana*
0.17	*Polistes*
0.65	*Pieris*



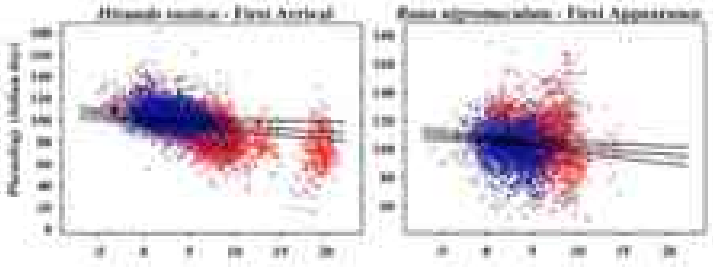
Observed vs predicted Phenology
- **Japan data in red;**
- **Korea data in blue**

Plant species better fitted

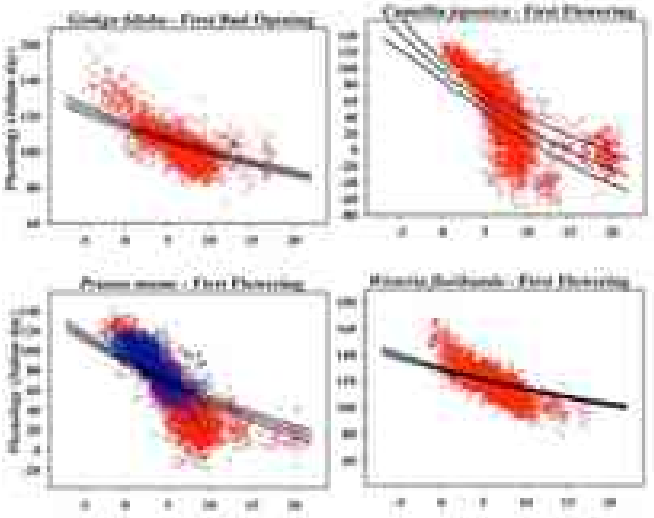
R2	Species
0.97	*Gingko*
0.99	*Prunus*
0.81	*Morus*
0.99	*Camellia*
0.98	*Wisteria*
0.99	*Taraxacum*

Temperature changes at a different rate

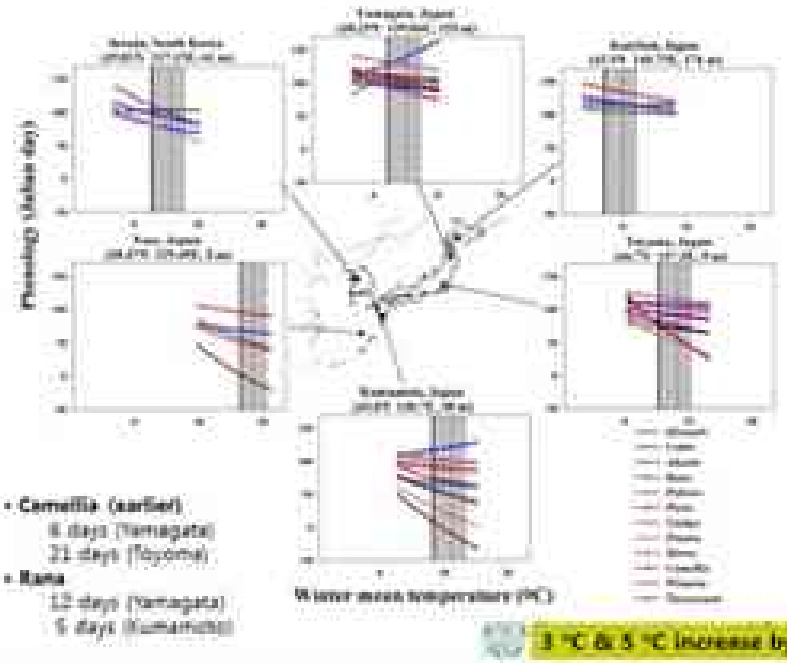
Phenology vs winter mean temperature



Bird (Hirundo) and frog (*Rana*) :
temperature to be a negligible effect on phenologies (slope < 1.0 day earlier/°C)



Plant species (Prunus, Taraxacum, Camellia) :
flowering time fluctuates widely indicating sensitive to temperature (slopes : >4.0 days earlier/ °C)



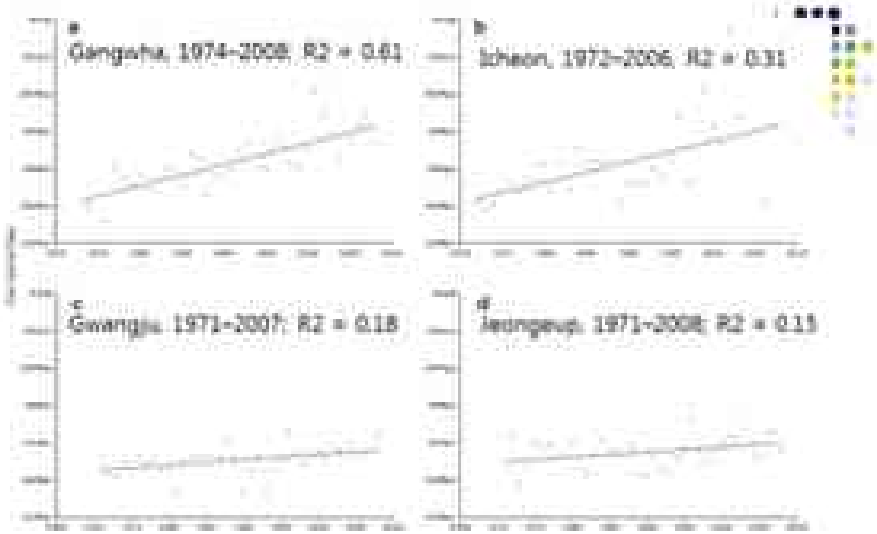
- **Camellia (earlier)**
  - 8 days (Yamagata)
  - 21 days (Toyoma)
- **Rana**
  - 12 days (Yamagata)
  - 5 days (Kumamoto)

3 °C & 5 °C increase by IPCC

Barn swallows (*Hirundo rustica*)

- Migratory birds
  - Appeared as 'fortune' bird in the Korean traditional story
  - mean temp (of Feb and Mar) & population
  - Data in 53 stations of weather service
    - 6 sites early arrival
    - 47 sites late arrival (ranging 8-45 days) during 1971-2008
    - temperature 39 sites increasing (P <0.05)
- Declining population size
- Other parts of the world
  - Declining population in Denmark and Europe (Moller 1989)

First Arrival Date

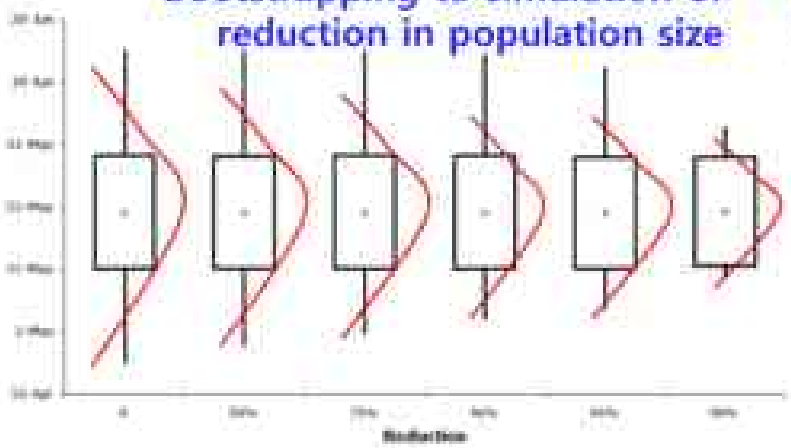


Changes in the FAD (first arrival date) for Korean swallows during 1970-2008

station	Days later (1971-2008)	P	R2	Temp /year	P	R2	FAD /temp	P	R2
Suwon	17	0.00	0.25	0.06	0.00	0.13	1.70	0.10	0.09
Chuncheon	23	0.00	0.25	0.04	0.03	0.12	3.30	0.08	0.08
Gangneung	23	0.00	0.3	0.07	0.00	0.11	1.19	0.02	0.14
Seoul	14	0.12	0.07	0.06	0.00	0.24	-0.47	0.72	0.00
Incheon	11	0.09	0.08	0.07	0.00	0.15	2.29	0.31	0.03
Daejeon	3	0.24	0.04	0.12	0.17	0.05	-0.77	0.91	0.01
Gangwha	42	0.00	0.62	0.09	0.11	0.08	0.21	0.05	0.00
Yangpyeong	31	0.00	0.19	0.11	0.17	0.06	-0.20	0.91	0.00
Icheon	45	0.00	0.34	0.05	0.03	0.19	1.21	0.09	0.03
Jeoksan	0	0.00	0	0.11	0.16	0.07	-1.00	0.67	0.01

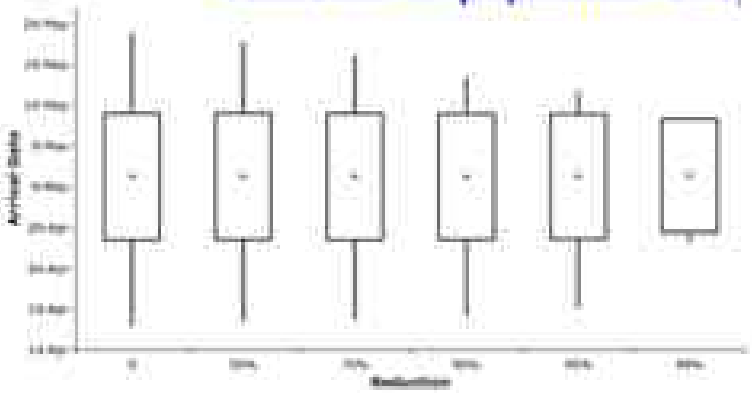
Temp : March and April
Mean=0.04C/year (0.016-0.078 C/year) => 0.6-1.7 C over 37 years

Bootstrapping to simulation of reduction in population size



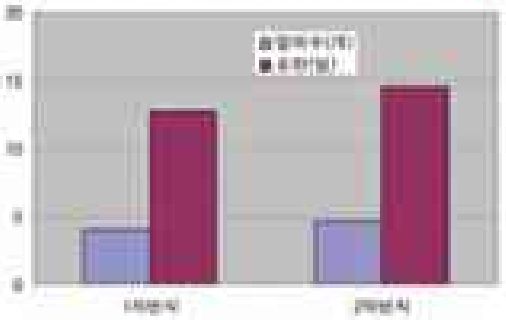
Mean arrival date for a migratory population of 676 gray catbirds (*Dumetella carolinensis*). '+' means date of mean arrival

Bootstrapping to simulation of reduction in population size



• Mean arrival date for a migratory population of 408 white-throated sparrows (*Zonotrichia albicollis*). '•' means date of mean arrival

Breeding Chronology



(Lee, 2009)

- # of eggs in 1st breeding (mid-April) and 2nd brood (late-May)
- 1st breeding (4.0±0.54, n=8) and 2nd brood (4.63±0.52, n=8)

Korean Swallow Day

- Lunar March 3rd spring arrival date of barn swallows
  - Late March in the 1970s
  - Now arriving in April and May
  - Delay of up to 2 months

Why so decline

- Insect populations due to agricultural activities
  - Pesticides and air pollution (Moller, 2001)
  - Nest sites (Moore, 2001)
  - birds late appearance due to population size declining => few places to nest (Moller, 2001, Nature 411:904-5) and fewer foods to feed on
- Wintering grounds
  - Europe, Africa wintering populations
  - NDVI in land use pattern
  - Stay longer in wintering areas

Korean population in SE Asia and northern Australia

- Landscape changes in recent years
- From raising two broods per season to one brood
- A shift in the migration pathways not passing through Korea, migrating over land further to the west
- Assuming 99% or more; 93% in Chungbuk province during 10 years
  - Chungbuk population during 1987-1997
  - From 2282 to 155 (per 10 ha, 93% decline)

Can barn swallow be 'Natural Monument' in Korea?

Conclusions-1

- Temperature increasing during 1971-2008
- 47/53 sites late arrival
- Four sites near Seoul => delay 23-45 days
- Decrease of insects and habitat modification
- Wintering grounds and migration routes
- Raising broods per season

This work is published in Biological Conservation (2012)

Conclusions-2

- Species vary in their responses to temperature and locations
  - Plants sensitive, but insects and frogs insensitive
  - Urban vs. Rural
- Adaptation measure for ecosystem change
  - Responding to climate change
- Long-term monitoring in NE Asia including China??

This work is published in Biological Conservation (2009) and Philosophical Transaction of Royal Society (2010)


Welcome to IUCN WCC in Sept. 2012 at Jeju
Thank you for your attention !!

Environmental Health Risk Assessment in China, by Dr. Cheng Hongguang, Beijing University, CHINA

Health Risk Assessment of Lead Pollution in China

Outline

1. Background
2. Recent Lead Pollution Incidents
3. The Complexity of Lead Pollution
4. Main Problems
5. An Example of Health Risk Assessment
6. Research Results & Countermeasures
7. Directions of the Next Step

Background

China is rich in the resources of lead. By the end of 2005, China had found 1014 lead diggings, 8.18 million tons of lead reserves and 13.93 million tons of the foundation reserves, and the total resource is 28.41 million tons.

China's lead industry mainly comprises three parts as lead acquisition, smelting and processing. As an important basic raw materials, lead plays a significant role in various fields. In 2008, we produce 37.8% of the global lead and consume 35.7% of the global consumption of lead: China has become the largest lead producer and consumer.

Background

Lead relate closely with industrial development and people's life, therefore it is an obvious fact that numerous lead enterprises would exist widely in China for a long time.

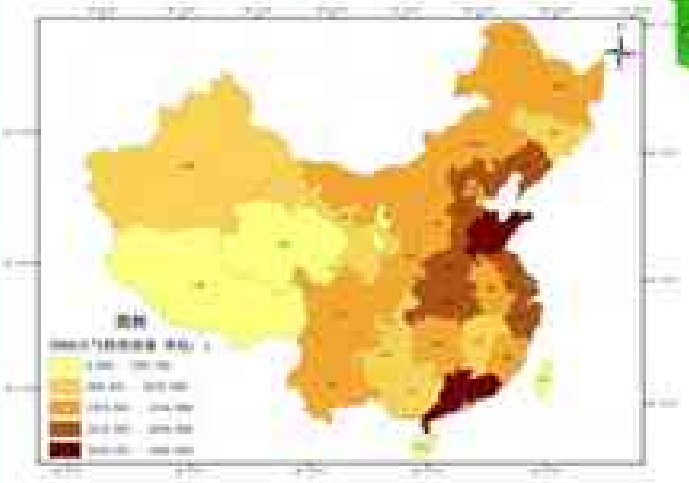
Due to the tension supply of lead, the renewable lead production develops rapidly in recent years, which mainly use waste batteries, waste lead cables, lead alloy and lead processing wastes as raw materials, and most of the enterprises are small private plants concentrated in the Jiangsu and Anhui province.

Background

In general, China's lead industry is still in the growth stage of extensive form with low industry concentration and small business volume. It is difficult to supervise so many tiny mines and plants distributed widely with poor equipments and smelting process level.

Lead Mines Distribution

Background



Atmospheric Lead Emissions in 2008

Lead Pollution Harm

China has very serious heavy metal pollution, mostly involving lead, cadmium, mercury, arsenic, chromium and other toxic substances. In the 21 major heavy metal pollution incidents between 2006 to 2009, lead pollution composed 13 events(62%) of them.

Lead is the only trace element which human don't need. It is stable and nondegradable, and can be accumulated for a long time in the environment.

Lead Pollution Harm

Lead can hinder the formation of blood cells, causing chronic poisoning symptoms like mental decline, spirits down, insomnia, headache, and even feebleness, nausea, inappetence and diarrhoea. And it is terrible that lead affects human health without a threshold.

Children is the sensitive population of lead pollution, who uptake lead several times high than adult would. When the blood lead level reaches 60 MCG per 100 ml, it can cause behavior abnormalities by intelligence obstacle. Moreover, lead's damage to children is direct and some of which are irreversible.

Lead Pollution Harm

70% of the lead in China is for lead-acid battery production. Therefore, many incidents happened nearby the lead-acid battery factories.

Lead Pollution Harm

Recent Incidents

2006.9 Huixian, Gansu

368 people with overproof blood lead, triggering a group incident (the first event)

2009.8 Fengxiang, Shaanxi

851 children with overproof blood lead out of 1016 children

2009.9 Wugang, Hunan

1354 overproof children out of 1958 children

2009.10 Shanghang, Fujian

121 overproof children out of 287 children

Recent Incidents

2009.12 Qingyuan, Guangdong

Dozens of children were found to be lead poisoning

2010.4 Neijiang, Sichuan

47 adults and 2 children were tested to be lead overproof

Chenzhou, Hunan

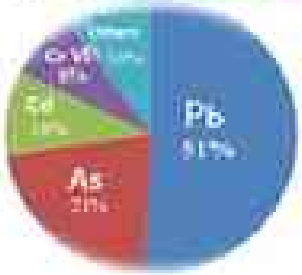
29 children were hospitalized for lead poisoning

Jiahe, Hunan

250 overproof children

Recent Incidents

From 2006 to now, 23 emergencies of "blood lead [illegible] than" above level III occurred, which composed more than a half of the heavy metal environmental health events.



The Complexities

The pollution and exposure origin and approach of lead are wide and complex. In addition to the natural sources, environment pollution and human exposure of lead relate closely to human activities, including: Industrial waste, car emissions, engaged in the lead industries, contact in life commodities and food with lead and unhealthy lifestyle, etc.

In order to reduce the health risk of lead pollution, we can't attribute the polluting approach to a single specific source.

The Complexities

Even if the enterprises stopped the production or discharge non lead emissions, as long as the existing lead level in the living environment did not dropped, or the other risk factors which affect human body contact and intake of lead did not eliminate, it cannot be eliminated of the health threat brought by lead.

The Complexities

Endeavors

China's published lead environment standards of emission, environment quality and waste disposal, run throughout the whole process of environmental management, and parts of the standard limit equal the developed countries. We also have worked out some environmental management requirements, promoting industrial technology upgrades and clean production.

In addition, China has started the research projects of lead pollution source analytical and characterization, damage compensation standards and health hazard supervision laws, prevention and control area division and risk classification, and key industries pollution control and management, etc.

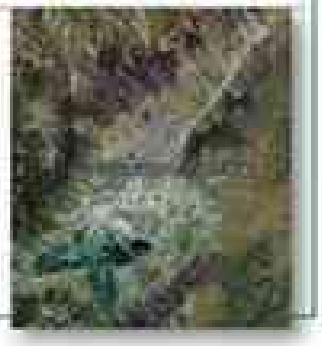
Example in Yunnan

The reason to choose:

Huize county has the relatively concentrated nonferrous metal mining and metallurgical industry since the ancient time.

The Chihong lead-zinc stock Co., LTD located in the Zehai town, with a history of nearly 80 years. The population surrounding the mine is stable and the landscape of Zehai is watershed, which limits the spread of atmospheric industrial pollutants.

Therefore, the Zehai area is a environment sensitive area easy to accumulate heavy metal pollution, which would lead to excessive exposure crowd and concentrated health damage.



Technical Route

Focused questions:

1. How to cut off the exposure way from different heavy metal pollution sources,

2. How to intervene public health and medical clinic under different levels of heavy metal harm,

3. How to develop comprehensive prevention and control measures of environmental standards and monitoring indicators

Technical Route

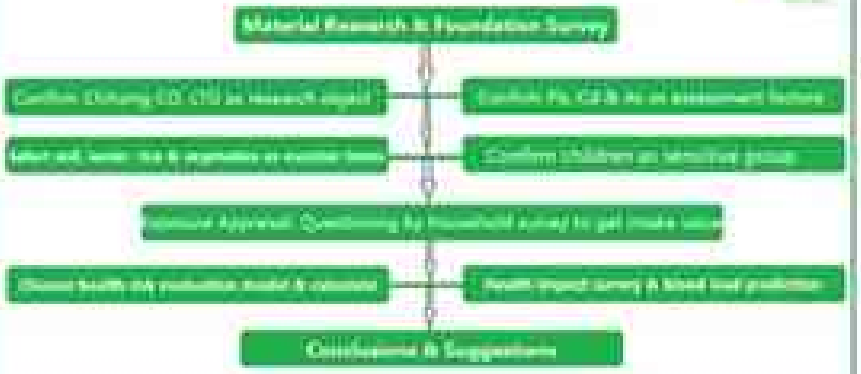
4. How to evaluate the environmental health supervision system with the environmental health as the key factor.

5. Finding the main gaps in the standard system, supervision and law enforcement tools, inter-departmental cooperation and coordination, policy compensation and information sharing.

6. Analyzing and evaluating China's current legal problems about environmental health, in order to construct and promote China's environmental health law system, and put forward solutions.

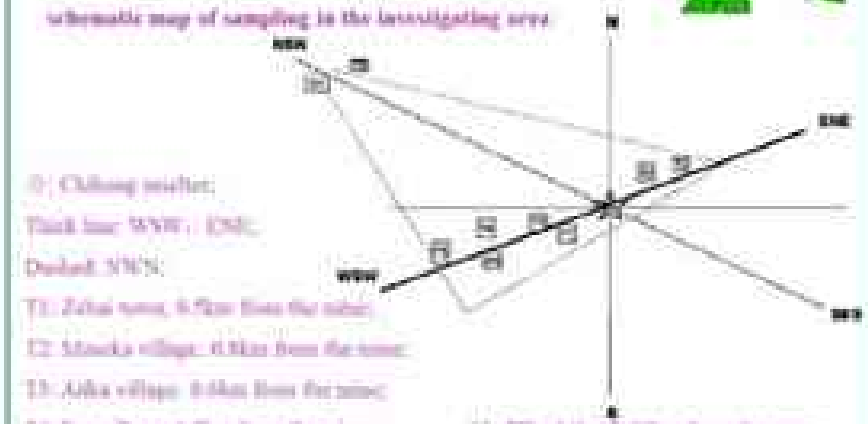
Technical Route

Technology roadmap of the project in Huize, Yunnan



Research Contents

Schematic map of sampling in the investigating area



0: Chilong market;

Thick line: WNW、ESE;

Dashed: NNW;

T1: Zehai town, 6.7km from the mine;

T2: Mouda village, 0.8km from the mine;

T3: Aiba village, 0.6km from the mine;

T4: Fan village, 1.2km from the mine;

T5: Willow village, 2.8km from the mine;

T6: 7Pka village, 70.6km from the mine;

S1: 7Pka School, 10km from the mine;

S2: Light School, 0.8km from the mine;

S3: Xinhua School, 1.2km from the mine;

Research Contents

The main environmental exposure assessment factors:

Pb、Cd & As which can spread through the atmosphere, within the settlement extent scope of the productive emissions.

The main detection objects:

The Pb、Cd & As pollution condition of the soil, water and rice and fresh vegetables in the survey area.

Research Contents

Evaluation methods:

Single factor index method: $P_i = C_i / S_i$

P_i——Quality index of pollutant i

C_i——Actual value of i, (mg.kg-1)

S_i——Evaluation standard of i, (mg.kg-1)

$P_i \leq 1$, non-pollution

$1 < P_i < 2$, Light pollution

$2 < P_i$, Moderate pollution

$P_i \geq 3$, Severe pollution

Research Contents

According to the investigation,

1、The lead level in tap water of T1、T3、T4 is separately 1.9、3.9、3.9 times higher than the health standard level;

2、In the 36 vegetable samples, there were 83% of the samples with Pb overproof, 91% with Cd overproof, and 81% with As overproof;

3、Serious condition of soil pollution. Pb、Cd & As pollutants contribution rate are: 43%, 31.5%, and 25.5%. To be specially alarm, the dust pollution degree of elementary school is higher than the farm soil.

4、The underground water quality is good, so it can be concluded that the background of the heavy metal content dose not cause the environmental pollution mainly.

Research Contents

	Cd (Background: [illegible] mg/kg)		Pb (Background: [illegible] mg/kg)		Pb (Background: [illegible] mg/kg)	
sampling point	content mg/kg	Accumulated pollution index	content mg/kg	Accumulated pollution index	content mg/kg	Accumulated pollution index
Maoshi village, T2	1.37	16.1	3014	55.9	77.18	7.1
Willow village, T3	1.39	16.7	1281	25.6	86.71	8.2
Aisha village, T5	1.29	14.1	872	24.2	94.63	3.2
Zihai town, T1	0.949	10.1	1097	36.3	55.92	2.9
Fan village, T4	1.10	19.7	659	18.3	55.78	2.4
75ka village, T6	0.619	3.4	139	3.2	8.74	0.9
Light School yard	1.34	18.6	2340	66.1	102.81	12.8
Light School building	1.08	20.8	2311	63.3	201.85	14.7
Xinhua School yard	1.33	18.4	2000	56.2	82.18	7.6
Xinhua School building	1.08	20.8	1374	41.7	87.82	6.2
75ka School yard	1.08	20.7	1109	30.1	42.09	8.8
75ka School building	1.02	11.1	697	18.1	35.82	3.2

Accumulated pollution index of soil in the investigation area

Research Contents

Pb、Cd & As intake by children in the survey area

Survey Area	Intake source	Dust μg/d	Water μg/L	Vegetable μg/d	Total Intake μg/d/person	Acceptable Intake μg/d/person
Xinhua School	Pb	917	74.22	100.25	1013.8	105.95
	Cd	0.79	2.94	2.60	13.3	28
	As	87.35	6.47	43.13	87.47	62.14
75ka School	Pb	444.75	5.95	72.7	542.94	107.14
	Cd	0.74	2.98	6.13	14.71	28
	As	19.74	5.22	15.94	66.79	64.29
Light School	Pb	1156	5.17	225	1314.6	118.7
	Cd	0.75	2.08	14.3	24.95	21
	As	97.35	4.63	123	225.91	66.43

Research Contents

The investigation shows that, the lead intake values of children in 3 survey point are considerably more than the standard JECFA(THE JOINT FAO/WHO COMMITTEE ON FOOD) allows, the intake of the, 2 survey point of children intake more arsenic than the standard WHO allows. In addition, the main lead intake source is dust, and the main arsenic intake source is vegetables from food.

Research Contents

In this survey, it failed to measure blood lead level of children due to the right of information. To understand the local children's lead exposure damaged degree, the paper quotes from the blood lead prediction model-Windows (IEUBK win model) provided by US experts to estimate the blood lead level under certain live environment exposure of the children in the survey points in Yunnan.

Research Contents

Prediction results of children's blood lead level

Survey Points	Input Parameters					Output Results	
	Air (mg/m³)	Food (μg/d)	Water (μg/L)	Soil (mg/kg)	Dust (g/d)	Blood Lead (μg/dL)	% (>10μg/dL)
Xinhua School	Default*1	112.59	24.32	659	0.5	25.0	100
75ka School	Default*1	92.77	5.52	188	0.5	15.3	100
Light School	Default*1	343.41	5.17	2014	0.5	38.172	100

The 3 survey points' blood lead level of children all exceed the 10 μ g/dL warning value.

Risk Assessment

Single pollutants risk assessment model:

HQ=Intake or Absorbed Dose/ RfD（ADI）

Xinhua School Pb: HQ=1.0539/0.10397=10〉1
As: HQ=0.09747/0.06214=1.5〉1

75ka School Pb: HQ=0.54294/0.10714=5〉1
As : HQ=0.04629/0.06429=0.6

Light School Pb: HQ=1.5346/0.1107=14〉1
As: HQ=0.22501/0.06643=3.3〉1

Survey point with risk index greater than 1 is at risk

Risk Assessment

Multiple pollutants total risk calculation method:

The discarcinogenic total harm index HI=ΣHQi

Xinhua School HI=11.5〉1
75ka School HI=5.6〉1
Light School HI=17.3〉1

Consequently, The Pb、As pollution in the investigation area constitute large health risks of children, and Pb contributes more than As.

Risk Assessment

Environmental carcinogens risk model:

$$Rig=[1-exp(-DigQig)]/70a$$

Rig—— average annual cancer risk, a-1;

Dig——average daily exposure dosage per unit weight, mg/(kg·d);

Qig—— Carcinogenic intensity coefficients, (mg/(kg·d))-1;

70a—— Life expectancy

Risk Assessment

Survey Points	Cancer Risk (annual risk, a^{-1})		Excess Risk Degree ($R_i \times 10^5$)	
	As	Pb	As	Pb
Xinhua School	7.02E-04	4.41E-06	6.31E-04	/
75ke School	/	2.19E-06	/	/
Light School	1.47E-03	6.00E-06	1.42E-03	/

The simulation results show that the Light & Xinhua school children are facing high As cancer risk, which are 6 to 29 times above the maximum acceptable risk level recommended by ICRP(International Commission on Radiological Protection).

Research Result

The initial judgment of the health risks cause:

1、Exclude the possibility that the high level of environmental background value leads to serious soil lead pollution.

2、The organized emission of industrial soot by lead and zinc smelters—— take Chihong company as a representative—— is the main contribution of factors to local heavy metal soil pollution.

3、The disorganized emissions by vehicles in and out of the area may be related to the high side of lead level in the soil and the dust of the sampling points.

Research Result

Organizing Committee

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