

The 12th Asia Impact assessment Conference in Shizuoka

AIC2018

“Green Region and Impact Assessment”



VENUE : University of Shizuoka, Japan, Kusanagi Campus

DATE : August 20th- 22nd, 2018

Executive Committee Chairperson :

Akira TANAKA, Tokyo City University, Japan

Managing Committee Chairperson :

Yuichi MIYAKE, University of Shizuoka, Japan

Japan Society for Impact Assessment



Steering Committee:
Akira TANAKA
Sang-Don LEE
Wei LI

Photo:
Mt.Fuji-The Heart of Japan. The View from Nihondaira.
Provided by Shizuoka City

The 12th Asia Impact assessment Conference in Shizuoka

AIC2018

“Green Region and Impact Assessment”



VENUE : University of Shizuoka, Japan, Kusanagi Campus

DATE : August 20th- 22nd, 2018

Executive Committee Chairperson :

Akira TANAKA, Tokyo City University, Japan

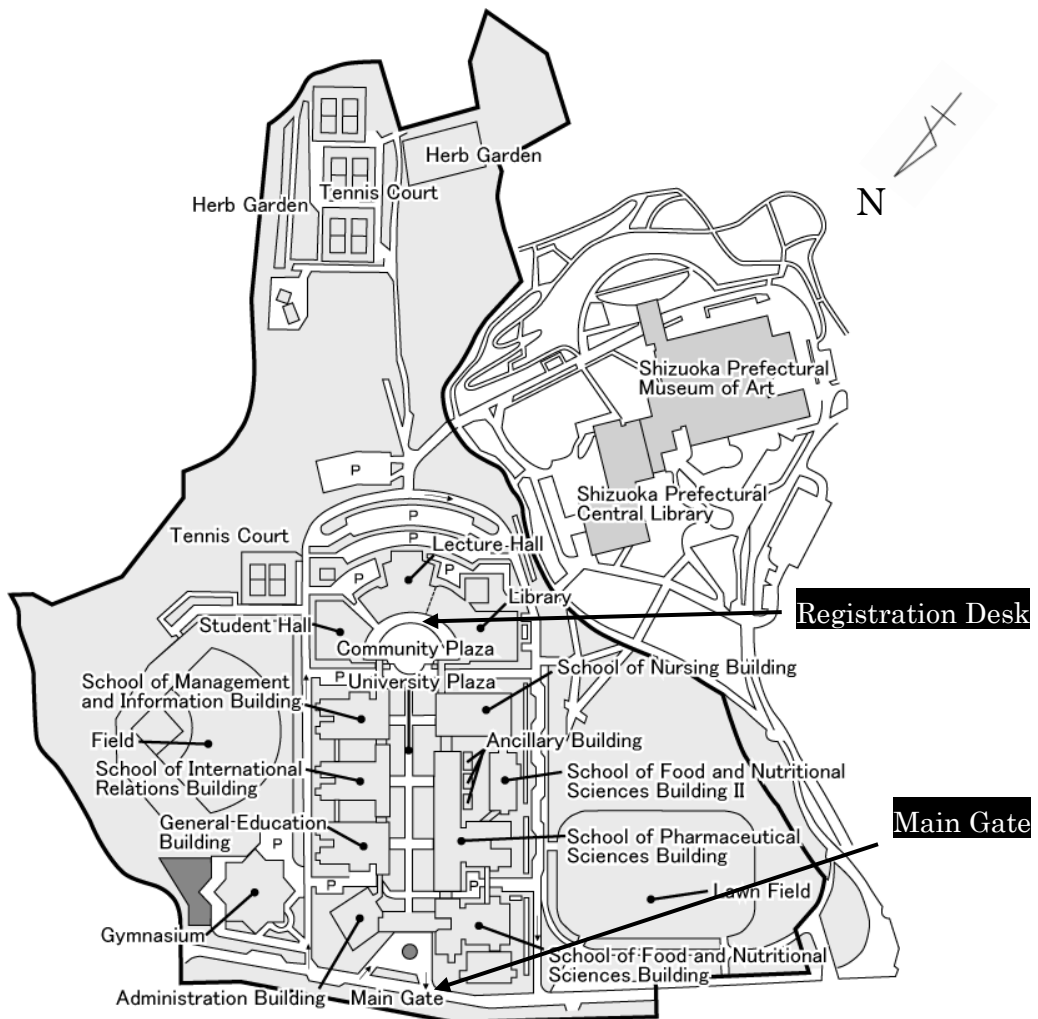
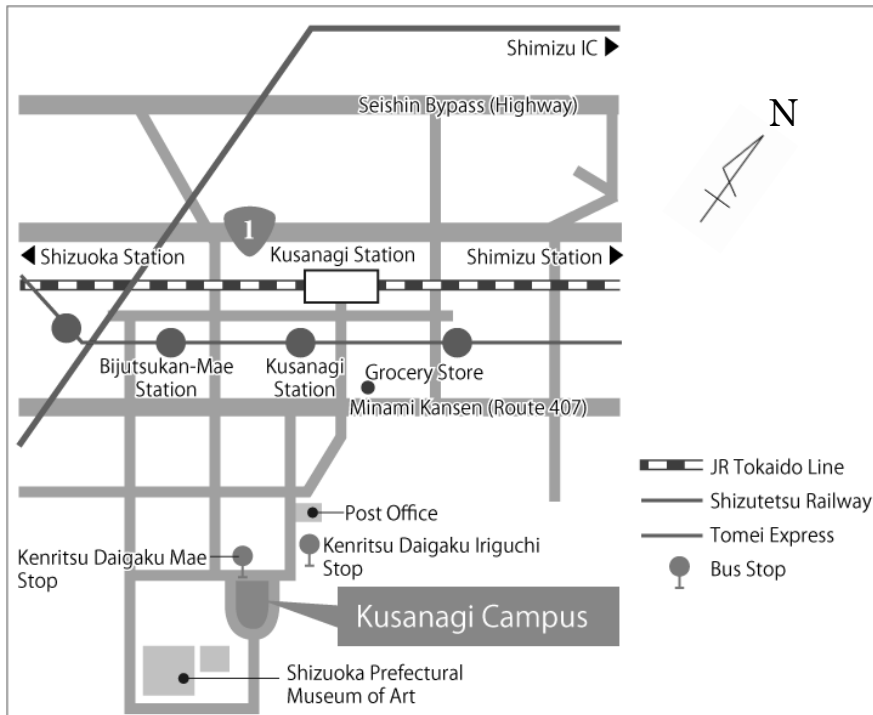
Managing Committee Chairperson :

Yuichi MIYAKE, University of Shizuoka, Japan

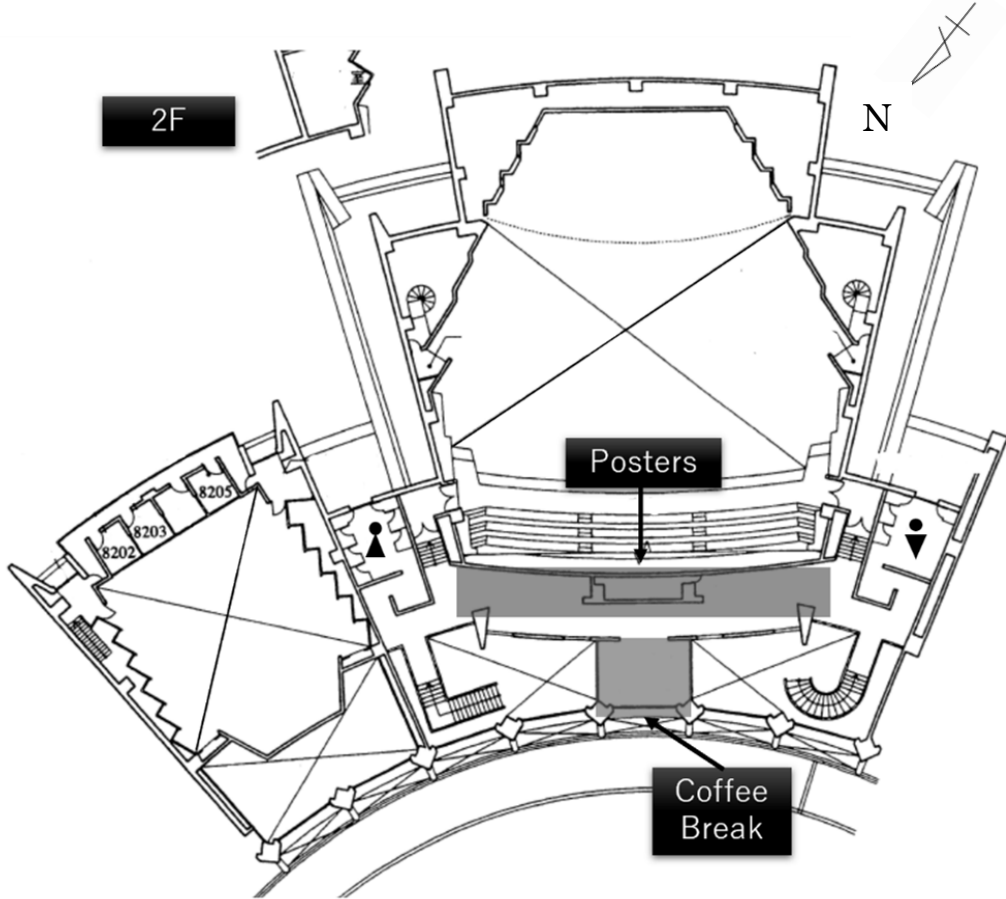
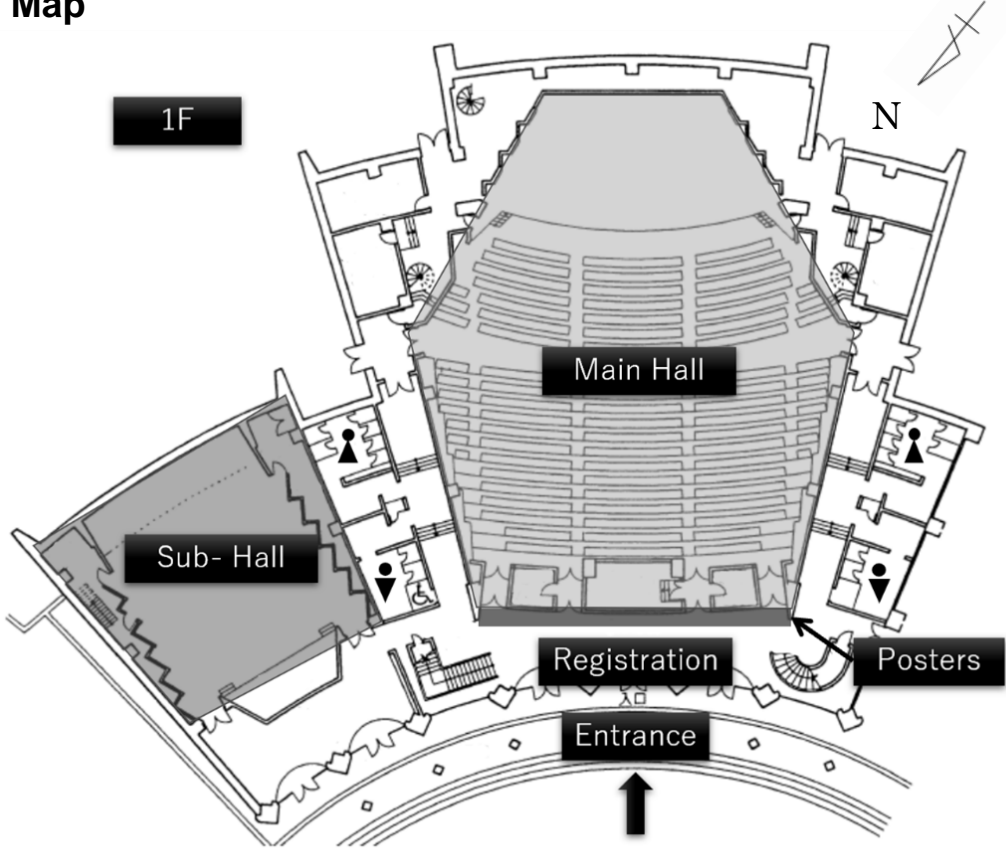
Japan Society for Impact Assessment



Access Map to University of Shizuoka, Japan



Floor Map



Asia Impact Assessment Conference 2018

Welcome to Mt. Fuji Country, Shizuoka, Japan

Akira Tanaka, Dr., MLA

Chairperson of Executive Committee of AIC2018

Professor, School of Environment, Tokyo City University

Welcome to the Asia Impact Assessment Conference 2018 in Shizuoka! I am Akira Tanaka, chairperson of the executive committee of the AIC2018. I am a professor of Tokyo City University in the School of Environment, located in Yokohama.

First, I would like to extend my warmest regards to all those who are present today- from friends from times past to the international participants of the AIC2018 joining us from various countries. To University of Shizuoka, who has provided us with this wonderful venue and to all others who have contributed to the success of this conference, I am grateful for your help and support. Without you, AIC2018 would not have been possible.

For AIC2018, 130 participants from more than seven nations, including Korea, China, Thailand, Philippines, Maldives and Japan, will be joining us. Of the 130 participants, over 80 are from outside of Japan. There will be more than 50 oral presentations and 35 poster presentations. I believe that there are this many international participants due to global interest in the AIC, combined with the appeal of Shizuoka, the home of the world heritage site of Mt. Fuji.

Over the course of the following two days, August 20th and the 21st, oral and poster presentations will be held at University of Shizuoka, and for the evening of the 21st, we will have a banquet at Nippondaira Hotel, from which we will have the perfect view of Mt. Fuji (depending on the weather). There, we will have prepared for you a fantastic meal made from local ingredients of the Shimizu Ward and City of Shizuoka. I hope that you will enjoy the special cuisine of the region while getting to know each other. Finally, on

the 22nd, there will be a technical visit by bus. During this time, we will tour the history and culture of Shimizu and Shizuoka, starting with the best view point of Mt. Fuji.

Now, the AIC was proposed by the International Exchange Committee of the Society for Impact Assessment in Japan, and the first AIC was held between Japan and Korea in 2003 in Tokyo. The aim was the academic and technological exchange of environmental policies and technologies, with a focus on the field of environmental impact assessment. Afterwards, conferences were held between Japan and Korea, with the location alternating between the two nations. From the sixth conference, China became a member, and conferences were assembled with these members until the 10th conference. From 2017, Vietnam became a participant as well, and the conference was hosted in Da Nang, Vietnam.

This 15th year is the memorable 12th anniversary of the conference, and the aim is the exchange within the field of environmental impact assessment in Asia. And so, the conference has been renamed from the names of the four original member countries to the “Asia Impact assessment Conference (AIC)”. With the theme of “Green Region and Impact Assessment,” which is relevant on the local, regional, and global levels, it has been decided that this year’s conference will be held in Shizuoka, Japan, the home of the world-famous Mt. Fuji. As an original member of this conference and a native to Shimizu Ward, Shizuoka Prefecture, I am overjoyed to host this conference here today.

I would like to conclude this address with my hopes for this meeting. I have a strong wish that this conference will reap great benefits for environmental policies and technologies, beginning with environmental impact assessment, and serve as an opportunity to both renew old friendships and be blessed with new ones. Finally, I hope to see you again in good health and happiness.

Thank you very much.

AIC2018 in Shizuoka

“Green Region and Impact Assessment”

❖ Contents

Conference Schedule	1
Program	7
Session Program	9
List of Posters.....	19
Abstracts	25
Opening Plenary Abstract	27
Session Abstracts	28
Poster Abstracts.....	79
List of Participants.....	113
Sponsors	121

AIC2018 in Shizuoka

“Green Region and Impact Assessment”

❖ Conference Schedule

Day 1 Monday, August 20

Time	Contents	Place
8:00~	Registration Desk Open	Entrance of Main Hall
9:00~ 9:40	<p><Opening Plenary></p> <ul style="list-style-type: none"> ● Mitsuru TANAKA (Chairperson of JSIA) ● Nobuhiro TANABE(Mayor of Shizuoka) ● Sang-Don LEE (Korea) ● Wei LI (China) ● Hiroshi KITO(President of the University of Shizuoka) <p><Special Lecture> Kazuyoshi YAMADA (Museum of Natural and Environmental History, Shizuoka) The Nature of Shizuoka - from Mount Fuji to Suruga Bay -</p>	Main Hall
9:40~ 10:10	Taking commemorative photograph	Main Hall
10:10~ 10:30	Coffee break / Round table	Lobby at Main Hall
10:30~ 12:30	<p>Theme Forum : “Green Region and Impact Assessment”</p> <p>Co-Chairpersons: Akira TANAKA, Shirley LEE</p> <ol style="list-style-type: none"> 1. Akira TANAKA (Tokyo City University) Green Region and the Role of SEA/EIAs 2. Shintaro MURAI (Ministry of the Environment, Japan) EIA system and its Implementation in Japan 3. Hidefumi KURASAKA (Chiba University) “Sustainable Zone” - Regional economic indicators on self-sufficiency of food and energy” 4. Sang-Don LEE (Ewha Womans University) Application of HEP for maximizing habitat value in the process of road construction 5. Seiji ARAI (Japan Association of Environment Assessment) Study on introduction of biodiversity offset in Japan 	Main Hall

	<p>6. Wei LI (Beijing Normal University) Promoting green development of the resource-based cities in China by integrating the three-line model into SEA</p> <p>7. Takahito NIWA (EX Research Institute Ltd.) Proposal towards the Creation of General Policy for Mainstreaming of Biodiversity in Japan</p>	
12:30~ 13:40	Lunch / Coffee Break	A bento-box lunch will be provided at Student Hall
13:40~ 14:50	<p>Oral Presentation Session (A-1, B-1) Presentation 12min each, Q&A 3min</p>	Main Hall / Sub Hall
14:50~ 15:40	Poster session 1 & Coffee break / Round table	1 st / 2 nd Floor Lobby
15:40~ 16:50	<p>Oral Presentation Session (A-2, B-2) Presentation 12min each, Q&A 3min</p>	Main Hall / Sub Hall
16:50~ 17:00	Announcements	Main Hall / Sub Hall
17:00	Break up	Main Hall / Sub Hall

Day 2 Tuesday, August 21

Time	Contents	Place
8:00~	Registration Desk Open	Entrance of Main Hall
8:30~ 9:55	<p>Oral presentation session (A-3, B-3) Presentation 12min each, Q&A 3min</p>	Main Hall / Sub Hall
9:55~ 10:30	Poster session 2 & Coffee break / Round table	1 st / 2 nd Lobby
10:30~ 11:55	<p>Oral presentation session (A-4, B-4) Presentation 12min each, Q&A 3min</p>	Main Hall / Sub Hall
11:55~ 13:05	Lunch break	A bento-box lunch will be provided at Student Hall
13:05~	Oral presentation session (A-5, B-5)	Main Hall /

14:15	Presentation 12min each, Q&A 3min	Sub Hall
14:15~ 15:30	Poster session 3 & Coffee break / Round table	1 st / 2 nd floor of Lobby
15:30~ 15:40	Moving to Main Hall for Closing Plenary	
15:40~ 16:00	<Closing Plenary> <ul style="list-style-type: none"> ● Jong-Gwan JUNG ● Shirley LEE ● Sachihiko HARASHINA 	Main Hall
16:00~ 16:20	Announcements	Main Hall

Banquet (Nippondaira Hotel, August 21)

16:20~ 17:00	Moving to Nippondaira Hotel by Shuttle bus	
17:00~ 17:15	Banquet reception desk open	Nippondaira Hotel
17:15~ 17:30	Taking commemorative photograph	1 st floor of Nippondaira Hotel Banquet room: Room "Fuji"
17:30~ 19:30	<Banquet> <ul style="list-style-type: none"> ● Tsuyoshi TAKAGI (City of Shizuoka Shimizu Ward Director) ● Akira TANAKA (Tokyo City University) ● Host country representative of next year 	1 st floor of Nippondaira Hotel Banquet room: Room "Fuji"
19:30~ 20:15	Moving to Shizuoka Station by Shuttle bus	JR Shizuoka Station
20:15	Break up	JR Shizuoka Station

Day 3 Wednesday, August 22

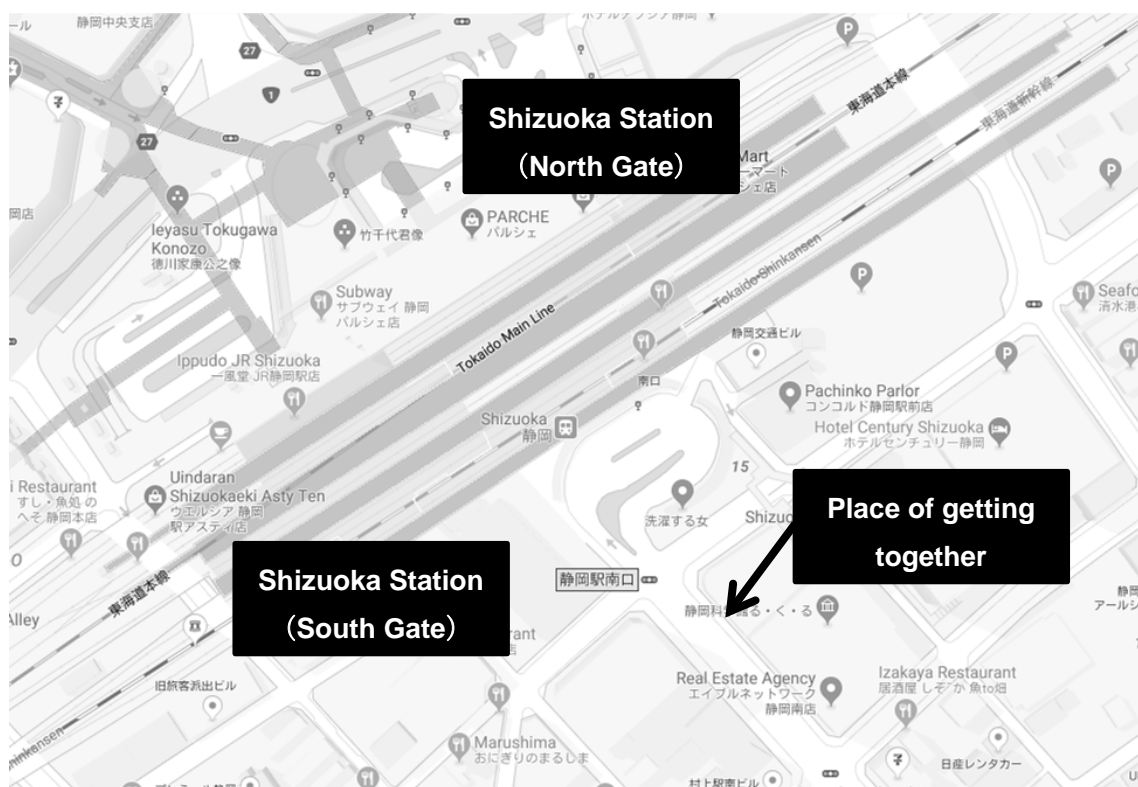
Technical Visit

Preregistration is required.

8:00 : Get together at Front of **SURUGA Bank** (near the JR Shizuoka Station **SOUTH Gate**)

8:30~17:00 : A full day of eco tour opportunities to visit Mt.Fuji viewpoints and Japanese natural and historical sites in Shizuoka

17:00 : Break up at JR Shizuoka Station



Location of Place of getting together

AIC2018 in Shizuoka

“Green Region and Impact Assessment”

❖ Program

Session Program.....	9
List of Posters.....	19

Each serial number of abstracts is the same as that of the session.

Session Program

Day 1 Monday, August 20

A : Main Hall			
Time	Session	No.	Presenter / Title
			-Theme Forum- "Green Region and Impact Assessment" Co-Chairpersons: Akira TANAKA, Shirley LEE
10:30~ 10:42		1	Akira TANAKA, Tokyo City University (Japan) Green Region and the Role of SEA/EIAs
10:42~ 10:59		2	Shintaro MURAI, Ministry of the Environment, Japan (Japan) EIA system and its Implementation in Japan
10:59~ 11:11		3	Hidefumi KURASAKA, Chiba University (Japan) "Sustainable Zone" - Regional economic indicators on self-sufficiency of food and energy
11:11~ 11:23	A-0	4	Sang-Don LEE, Ewha Womans University (Korea) Application of HEP for maximizing habitat value in the process of road construction
11:23~ 11:35		5	Seiji ARAI, Ginko TSUJISAKA, Akihiko MATSUOKA, Koichi IDE, Shogo OGASAWARA, Yasuhiro KATO, Yoshifumi SAKI, Taro SHIROMOTO, Yuki TOGO, Tadashi NISHIZAWA, Yoshihiro HORI, Chikako WATANABE, Yosuke WATANABE, Takafumi KAWAMURA, Ayaka MATSUMIYA, Masakazu AOSHIMA, Shinji ODA, Kiyoharu YOSHIZAWA, Akira TANAKA, Japan Association of Environment Assessment (Japan) Study on introduction of biodiversity offset in Japan
11:35~ 11:47		6	Wei LI, Beijing Normal University (China) Promoting green development of the resource based cities in China by integrating the three-line model into SEA
11:47~ 11:59		7	Takahito NIWA, EX Research Institute Ltd (Japan) Proposal towards the Creation of General Policy for Mainstreaming of Biodiversity in Japan

A : Main Hall				B : Sub Hall			
Time	Session	No.	Presenter / Title	Session	No.	Presenter / Title	
11:59~ 12:30	A-0		Q&A, Discussion				
Lunch Break							
			Co-chairpersons : Wei LI, Naoko GENJIDA			Co-chairpersons : Kiichiro HAYASHI, Myungjin KIM	
13:40~ 13:57		1	Yoichi KUMAGAI (Japan) Green city-regions: Criteria for sustainability assessment <Keywords> green, city-region, sustainability, assessment, criteria		1	Kuitip SUWANTEEP (Korea) Improvement of ESC monitoring system and its report by analysis on JICA's projects as case study <Keywords> Improvement, Monitoring report, Analysis, Effectiveness, Environmental and Social Consideration	
13:57~ 14:14	A-1	2	Shirley LEE (China) EIA and Green Regions for Railway Projects in Hong Kong <Keywords> Ecological Compensation, EIA, Alignment selection, Construction method selection, Public participation		2	Ayaka YASUMOTO, Takehiko MURAYAMA, Shigeo NISHIKIZAWA (Japan) Analysis of Monitoring Reports for Infrastructure Development Projects through Development Assistance <Keywords> Environmental Assessment, Environmental and Social Considerations, Development Assistance, Monitoring	
14:14~ 14:31		3	Takafumi KAWAMURA, Akira TANAKA (Japan) Policy research of Photo-voltaic power generation and Biodiversity conservation in the Izu-peninsula <Keywords> Green Region, Photovoltaic generation, EIA, Watershed, Izu-peninsula		3	Xianglan YU (China) The application and prospect of CPTED theory in the urban planning <Keywords> EIA Act, CPTED, Crime Prevention, Urban Planning	
A : Main Hall				B : Sub Hall			

Time	Session	No.	Presenter / Title	Session	No.	Presenter / Title
14:31~ 14:48	A-1	4	Kai TIAN, Yanwei ZHAO (China) Construction and Application of the Comprehensive Assessment Method for the Ecological Environmental Impact of Transmission Projects <Keywords> EIA, Transmission Projects, Comprehensive Assessment, Landscape, Ecosystem, Sensitive area	B-1	4	Siyang ZHOU, Wei LI (China) A study on integrated diagnosis method of resources-environment- economy for industrial path dependence in mineral resource-based cities and its application: based on the improved C-D production function <Keywords> cobb-Douglas production function, mineral resource-based cities, industrial path dependence, integrated diagnosis, marginal revenue
Poster Session & Coffee Break						
15:40~ 15:57	A-2	1	Co-chairpersons: Sang-Don LEE, Hidefumi KURASAKA Tomoki WASHIO, Hideyuki ITO, Takahiro FUJII (Japan) Analysis of Factors to Cause Hokkaido Sika Deer-Vehicle Collisions - Case Study of National Route 45 - <Keywords> Road-kill, Deer-Vehicle Collisions, Traffic Accidents, Road Ecology, Regression Analysis, Transportation and Environments, Hokkaido Sika Deer (Cervus nippon yesoensis)	B-2	1	Co-chairpersons : Yanwei ZHAO, Akiko URAGO Jong-Gwan JUNG (Korea) An Initiative of SEA for the Local Energy Transition <Keywords> Energy Transition, SEA, scenario, participatory planning
			A : Main Hall	B : Sub Hall		

Time	Session	No.	Presenter / Title	Session	No.	Presenter / Title
15:57~ 16:14	A-2	2	Myeong-je KIM, Hye In CHUNG, Jimhoo HWANG, Junhee LEE, Yu-young CHOI, Jieun RYU and Seong-Woo JEON, (Korea) Understanding and Predicting NDVI spatial pattern with climate and topographical variables using GWR <Keywords> GWR, NDVI, climate variables, topographical variables, spatial autocorrelation, Moran's I	B-2	2	Keisuke GOTO, Akira TANAKA (Japan) Comparative Study on Tiering in Strategic Environmental Assessments in Japan and the United States <Keywords> Tiering, SEA, Policy, Plan, Program
16:14~ 16:31		3	Koji AINOTA, Akira TANAKA (Japan) Future Potential of Soundscape Monitoring in Urban Greenery <Keywords> soundscape, biodiversity, monitoring, urban, greenery		3	Qihui ZHANG, Xianqiang MAO (China) Total factor productivity analysis considering environment and energy factors <Keywords> Total factor productivity; environment; energy; DEA; EKC
16:31~ 16:48		4	Kiichiro HAYASHI (Japan) Conservation Priority Mapping of Forest Ecosystem Services in the Case of Nagoya, Japan <Keywords> Ecosystem Service, Biodiversity, SEA, Japan, Conservation Map		4	Kentaro NAKAMURA, Kenichiro YANAGI, Eiji KOMATSU and Akihiro NAKAMURA (Japan) Strategic Environmental Assessment Framework for Carbon Capture and Storage in Japan <Keywords> Carbon Capture and Storage (CCS), SEA, Environmental law, Climate change, Long-term liability

Day 2 Tuesday, August 21

A : Main Hall			B : Sub Hall			
Time	Session	No.	Presenter / Title	Session	No.	Presenter / Title
			Co-chairpersons : Mitsuru TANAKA, Koji AINOTA			Co-chairpersons : Youngsoo LEE, Hiroo KASAGI
8:30~ 8:47		1	Takehiko MURAYAMA (Japan) Experiences of advisory panel on environmental and social consideration in JICA <Keywords> Environmental and social consideration, Development Assistance, Infrastructure project		1	Takumi NAGASHIMA, Takehiko MURAYAMA, Atsushi NAGAOKA, and Shigeo NISHIKIZAWA (Japan) Geothermal Development Potential Evaluation Considering Environmental and Social Conditions <Keywords> Renewable Energy Potential, Geothermal Development, GIS, Energy Policy, Sociacceptability
8:47~ 9:04	A-3	2	Naoyuki SAKUMOTO (Japan) Social Impacts and the Human Rights Approach in Asia <Keywords> EIA/SEA, social considerations, human rights, SDGs, Aarhus Convention, UN Guiding Principles on Business and Human Rights	B-3	2	Kaiwen Ji, Shigeo NISHIKIZAWA, and Takehiko MURAYAMA (Japan) Research on Community Acceptance of the Woody Biomass Power Plant <Keywords> Biomass, Community Acceptance, Environmental Impact, Complaint, Annoyance
9:04~ 9:21		3	Kaoru AKAHOSHI, Shunsuke HIEDA, Naoko GENJIDA (Japan) EIA implementation and challenges in Myanmar - Survey with possible support from Japan <Keywords> EIA, Bilateral Cooperation, Capacity Building, Myanmar, Japan		3	Sachiko HARASHINA, Yurika AYUKAWA (Japan) Sustainable Energy and SDGs - From the first RE100 university in Japan- <Keywords> Renewable Energy, RE100, Natural Energy, Heart-ware

A : Main Hall				B : Sub Hall		
Time	Session	No.	Presenter / Title	Session	No.	Presenter / Title
9:21~ 9:38	A-3	4	Jianhong LU, Zhengyan LIU, Peng SONG, Xianqiang MAO (China) Environmental and economic impacts of “the Belt and Road Initiative” on typical countries alongside <Keywords> “the Belt and Road Initiative”, trade policy, Environmental Impact Assessment, GTAP model, NTBs reduction	B-3	4	Hyungseok PARK, Sewoong CHUNG, Sungjin KIM, Eunju LEE (Korea) The relation between thermal stratification strength and carbon cycle in a stratified reservoir <Keywords> Carbon cycle, GHGs, Lake number, Lake Analyzer, Schmidt stability
9:38~ 9:55		5	Rui HUANG (China) A Comparative Study of EIA System Between China and Vietnam: Biodiversity and Climate Factors into Green One Belt One Road Initiative <Keywords> EIA System, Comparative Study, Biodiversity, Climate Factors, Green One Belt One Road Initiative		5	Jun OTSUKA, Hideyuki ITO, Takahiro FUJII (Japan) Comparative Analysis of Efforts for Environment Conservation by Travel Companies on Ecotour with Accommodation between Japan and Australia <Keywords> Tourism, Ecotourism, Eco Certification Program, Tour Operation, Accommodation, Australia, Japan
9:55~ 10:30	Poster Session & Coffee Break					
10:30~ 10:47	A-4	1	Yuki SHIROTA, Akira TANAKA (Japan) Survey on trends of Green Infrastructure and future prospects in Japan <Keywords> Green Infrastructure, biodiversity, Ecological network, multi-function, stormwater management	B-4	1	Jing LIU, Renzhi LIU (China) A Bayesian Approach to Integrated Ecological and Human Health Risk Assessment of Accidental Water Pollution in Watershed Scale <Keywords> accidental water pollution; Bayesian networks; integrated risk analysis; uncertainty; watershed-scale
			Co-chairpersons : Takehiko MURAYAMA, Renzhi LIU	Co-chairpersons : Jong-Gwang JUNG, Naoyuki SAKUMOTO		

A : Main Hall				B : Sub Hall			
Time	Session	No.	Presenter / Title	Session	No.	Presenter / Title	
10:47~ 11:04		2	Tetsuya KAMIJO (Japan) Positive correlation between discussion of alternatives and public involvement <Keywords> Alternatives, public involvement, quantitative text analysis, positive correlation, minutes of meetings		2	Masahiro TOKUMURA, Makoto SEKINE, Mohammad RAKNUZZAMAN, Md Habibullah AI MAMUN, Md Kawser AHMED, Muhammad Rafiqul ISLAM, Yuichi MIYAKE, Takashi AMAGAI, Shigeki MASUNAGA, Masakazu MAKINO (Japan) Feasibility of Quantitative Image Analysis Method to Improve Performances of Arsenic Field Test Kit for Screening of Tube Well Waters in Bangladesh <Keywords> Arsenic, Bangladesh, drinking water, analysis, screening	
11:04~ 11:21	A-4	3	Namwook CHO, Moungh-Jin LEE (Korea) A Study on the Scientific Assessment of Environmental Impact through the Data Based Assessment <Keywords> Environmental Data, GIS, Archives, Data Publishing Framework, Data Science	B-4	3	Jong Ho LEE, Sungyong HA (Korea) Integrated Control of Pollutants in Korea <Keywords> Integrated Control of Pollutants, Integrated Environmental Management	
11:21~ 11:38		4	Tomoko KAKU, Yohei SUZUKI (Japan) Stakeholder Engagement in Environmental Impact Assessment: Urban Railway Project in Sri Lanka <Keywords> EIA, Stakeholder Engagement, Alternative Analysis, Protected Area, JICA		4	Qi WANG, Masahiro TOKUMURA, Yuichi MIYAKE, Takashi AMAGAI (China) Environmental impact of halogenated polycyclic aromatic hydrocarbons emitted from E-waste recycling activities in Vietnam <Keywords> halogenated polycyclic aromatic hydrocarbons (XPAHs), E-waste recycling, open burning, POPs	
A : Main Hall				B : Sub Hall			

Time	Session	No.	Presenter / Title	Session	No.	Presenter / Title	
11:38~ 11:55	A-4	5	Mizuki KANAI, Akira TANAKA (Japan) Study on timing to protect endanger species in EIA <Keywords> Biodiversity, EIA, LCES, Endangered species, Mitigation	B-4	5	Mitsuru TANAKA, Kenshi BABA, and Makoto OGAWA (Japan) Climate Change Adaptation Strategies in Japan and Suggestions to EIA System <Keywords> Climate Change, Adaptation, Local Government, EIA	
Lunch Break							
13:05~ 13:22	A-5	1	Co-chairpersons : Yoichi KUMAGAI, Yuki SHIBATA Nathasith CHIARAWATCHAI, Thanakorn ERMUJDAKUL, Worawut HAMARN, Kanatip RATANACHOO (Thailand) The 2st PTT's Strategic Environmental Assessment (SEA) for Eastern Economic Corridor of Innovation (EECi) Project, THAILAND <Keywords> Eastern Economic Corridor (EEC), Eastern Economic Corridor of Innovation (EECi), Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA), Sustainable Development	B-5	1	Co-chairpersons : Jong Ho LEE, Sachihiko HARASHINA Kosuke MURAMATSU, Hiroshi AIUCHI, Yuta GORO, Masahiro TOKUMURA, Qi WANG, Takanori AMBO, Masakazu MINAGAWA, Ryutaro ISHIBASHI, Yuichi MIYAKE, Takashi AMAGAI, Masakazu MAKINO (Japan) Decolorization of Colored Effluent from Textile Manufacturing Industry in Bangladesh by Photo-Fenton Reaction Coupled with Catalyst <Keywords> Photo-Fenton Reaction, Catalyst, Decolorization, Colored Effluent, Wastewater Treatment	
			A : Main Hall				B : Sub Hall

Time	Session	No.	Presenter / Title	Session	No.	Presenter / Title	
13:22~ 13:39	A-5	2	Shingo TAKEDA, Takehiko MURAYAMA , Shigeo NISHIKIZAWA (Japan) Social Considerations for Coral Offset in Vanuatu <Keywords> Mitigation Hierarchy, Coral, Biodiversity Offset, Social Consideration, Vanuatu	B-5	2	Youngsoo LEE, Sang-Ki CHOI (Korea) Criteria for Health Impact Assessment in Integrated Pollution Prevention and Control in Korea <Keywords> IPPC, HIA, Criteria	
13:39~ 13:56		3	Hiroo KASAGI, Akiko URAGO (Japan) Un-sustainable information disclosure and archives of the EIA documents in Japan <Keywords> EIA Archives EIA database Information disclosure EIA Law		3	Hirotake NAITOU, Yukinori TANI, Kouske TOSHIKI, Jeong-Soo YU, Erdenedalai BAAATAR, Choijilsuren BUYANTOGTOKH, Tserendorj JAVZANDOLGOR, Bolorchuluun SHUKHEE (Japan) Survey of Lead pollution caused by motorization in Ulaanbaatar <Keywords> Mongolia, lead pollution, Blood lead, motorization, livestock health	
			A : Main Hall		B : Sub Hall		

Time	Session	No.	Presenter / Title	Session	No.	Presenter / Title
13:56~ 14:13	A-5	4	Xianqiang MAO, Mudan WANG and Mengyuan LIU (China) Co-Control Potential of Substituting Hydropower for Fossil Fuels: A Case Study in Sichuan, China <Keywords> hydropower, co-control effect, energy substitution, emission reduction, Sichuan	B-5	4	Jiaxuan CHEN, Runhe CHENG, and Wei LI (China) Method and application on overall allocation of space and industry for urban industrial total atmospheric pollutant emission <Keywords> urban atmospheric pollution, total industrial emission, overall allocation, spatial distribution, leading industries
14:13~ 15:30	Poster Session & Coffee Break					

List of Posters

No.	Title & Keywords	Name
P-1	<i>Estimation of WTP for transparent noise-barriers by using CVM</i> <Keywords> CVM, WTP, transparent noise-barrier	In-Chul BAE, Chung-Ki LEE (Korea)
P-2	<i>Mission and Activities of the KSEIA</i> <Keywords> Mission, Activities, KSEIA, Journal of EIA	Sookjin JEON, Jong-Gwan JUNG, and Myungjin KIM (Korea)
P-3	<i>Modeling of breeding-site occupancy dynamics for Northern Goshawks in urbanized areas</i> <Keywords> Northern Goshawk, Accipiter gentilis, urbanized area, breeding, dynamic occupancy model	Haruki NATSUKAWA, Kaname MORI, Shizuko KOMURO, Takashi SHIOKAWA, and Hiroyuki MATSUDA (Japan)
P-4	<i>An Analysis of Redevelopment and Resettlement History of Seoul</i> <Keywords> Redevelopment, Resettlement, Gentrification, Social Impact Assessment	Kongjang CHO, Aram SEO, and Sungju HAN (Korea)
P-5	<i>Development of a leaching assessment framework for the utilization of coal ash at South Korean mine reclamation sites</i> <Keywords> Leaching assessment, coal ash, mine reclamation, EIA	Hanna CHO (Korea)
P-6	<i>Spatial variations of water quality data in the four weirs installed in Nakdong River</i> <Keywords> Spatial Variation, Kruskal-Wallis, Harmful Cyanobacteria, Nakdong River, Weir	Daeyeon Park, Hyungseok Park, and Sewoong Chung (Korea)
P-7	<i>Social Impact Management of Geothermal Development</i> <Keywords> Geothermal Development, Social Impact, Resource Management, Community Design	Yuki SHIBATA, Aki SUWA, and Takehiko MURAYAMA (Japan)
P-8	<i>The Dispersal Trend of Alien Plants in Road Construction</i> <Keywords> Alien plant, Road development, Dispersal strategy, Seed bank	Yunsoo CHU, Seon-Mi LEE, Jung-kwon KIM, and Hyohyemi LEE (Korea)
P-9	<i>Estimation of PM2.5 Concentration through the Restriction on Diesel Vehicles</i> <Keywords> Diesel Vehicle, PM2.5 concentration, Emission Reduction, CMAQ	Suhyang KIM, Sun Hwan PARK, Min Uk CHOI and Hyun-Soo JOO (Korea)

P-10	Implementation of environmental impact assessment, environmental management and monitoring. <Keywords> EIA, EMEF, IRT, Management, Monitoring, Implementation	Dikarama KAULA, Vivin IRASWATI, Erri N MEGANTARA, Bambang HERU and Herri Y HADIKUSUMAH (Indonesia)
P-11	Effects of Traffic Characteristics on Roadside Air pollution <Keywords> Roadside, Air pollution, Traffic, Effect, Correlation	Hyejin KANG, Chulhwan KIM (Korea)
P-12	Approach for Mainstreaming of Climate Change Adaptation in Urban Basic Plan of Korea <Keywords> Mainstreaming of Climate Change Adaptation, Urban Basic Plan, Korea	Youngsoo LEE, Seung Hyun LEE, and Sang-Ki CHOI (Korea)
P-13	Elution characteristics by sediment characteristics <Keywords> Elution characteristics, Sediment, Characteristics, Kaolin, Fluorine	Yoon-a PARK, Dong-Min LEE, and Jong-Min OH (Korea)
P-14	Habitat selection analysis of Ural Owls using an occupancy model <Keywords> Ural Owl, Occupancy model, Habitat Selection, Robust Design, Call-broadcasting	Takumi SHIMIZU, Haruki NATUKAWA, Hiroki YUASA, and Tomohiro ICHINOSE (Japan)
P-15	Water quality assessment for a drinking water resource with a three-dimensional analysis <Keywords> dam reservoir, drinking water resource, eutrophication, three-dimensional analysis, water quality assessment	Young-Sik HAM (Korea)
P-16	Evaluation of turbid flow by climate change impacts in a large dam reservoir in Korea <Keywords> Climate change, HadGEM2-AO, RCP 4.5, Turbid water	Hyungseok PARK, Sewoong CHUNG, Yeojeong YOON, and DaeYeon PARK (Korea)
P-17	GIS-based Land-use suitability analysis for urban development using soft computing in Ili Valley, China <Keywords> Multi-criteria evaluation, Soft computing, Urban development, Ordered weighted averaging, Xinjiang	Chaoxu LUAN, Renzhi LIU, Jing LIU, and Hanwen ZHANG (China)

P-18	<p><i>Analysis of Sediment Contamination Levels in a Hypereutrophic Reservoir</i></p> <p><Keywords> algal bloom, sediment, total phosphorus, hypereutrophic reservoir, water quality</p>	Sungjin KIM, Youngcheol CHO, and Sewoong CHUNG (Korea)
P-19	<p><i>Towards sustainable management on contaminated agricultural lands in South Korea</i></p> <p><Keywords> Heavy-metal contaminated agricultural soils, Anthropogenic source, Policy alternatives</p>	Sang-il HWANG, Kyeong YANG, and Eun-jeong CHA (Korea)
P-20	<p><i>A Study of Attached Microorganism Community with the Water Quality in Urban Stream</i></p> <p><Keywords> Attached Microorganism, Microorganism Community, Water Quality, Growth Amount, Urban Stream</p>	Tae Kyung KIM, Kyung Mi MUN, Kyoung Eun CHOI, Eun Ji HEO and Jong Min OH (Korea)
P-21	<p><i>Study on ecological influence of Changchun high-tech development zone on Jingyuetan National Forest Park</i></p> <p><Keywords> EIA, Industrial development Zone, National Forest Park, Ecological Impact</p>	Hongguang CHENG, Zhenzhen WU (China)
P-22	<p><i>A Study on the Legal and Institutional Review for Improving Bio-Mobility in Environmental Impact Assessment</i></p> <p><Keywords> EIA, Wildlife Crossing, Guiding fence, Escape ramp, roadkill</p>	Su-gon PARK, Yong-Su PARK (Korea)
P-23	<p><i>Analysis of CO2 Emission Characteristic of Daecheong Reservoir during the Turnover Period</i></p> <p><Keywords> CO2 emission, NAF, turnover, reservoir</p>	Eun-Ju LEE, Hyeong-Seok PARK, and Se-Woong CHUNG (Korea)
P-24	<p><i>Arsenic and Heavy Metal Contaminations of Rice Grown in Bangladesh</i></p> <p><Keywords> Arsenic, Heavy Metal, Bangladesh, Rice, Analysis</p>	Jumpei MIYAZAKI, Kosuke MURAMATSU, Masahiro TOKUMURA, Muhammad Rafiqul ISLAM, Qi WANG, Yuichi MIYAKE, Masahiro SAKATA, Shigeki MASUNAGA, Takashi AMAGAI, and Masakazu MAKINO (Japan)
P-25	<p><i>Impact of extreme turbidity events on the connected Andong-Imha reservoirs system</i></p> <p><Keywords> climate change, turbid water, CE-QUAL_W2, RCP 4.5&8.5, BMA</p>	Yeojeong YOON, Hyungseok PARK, and Sewoong CHUNG (Korea)

P-26	<i>Improvement Plan for the Assessment of Plantation Areas in the Environmental Impact Assessment, Republic of Korea</i> <Keywords> National Vegetation Class, Vegetation Development, Plant Species Composition, Vegetation Index, Sorensen's Diversity Index	Seon Mi LEE, Jae Gyu CHA, Su Gon PARK, and Young Ho CHO (Korea)
P-27	<i>Device for Measuring Dermal Exposure Rate of Flame Retardants via Direct Contact with Products</i> <Keywords> Dermal Exposure, Flame Retardants, Risk Assessment, Silicon, Migration	Mai SHINDO, Kotone TERAO, Kosuke MURAMATSU, Masahiro TOKUMURA, Qi WANG, Yuichi MIYAKE, Takashi AMAGAI, and Masakazu MAKINO (Japan)
P-28	<i>An influence of Government Trust on Siting Acceptance for NIMBY Facilities</i> <Keywords> NIMBY, acceptance, incineration, government trust, question investigation	Ik-Jun YEON, Ju-Young JUNG, Sung-Sik PARK, Ji-Sun JUNG, and Jung-Sik CHO (Korea)
P-29	<i>A Comparative Study of Odor Acceptance between Korea and China</i> <Keywords> acceptance, odor, question investigation, industrial complex, odor awareness	Ik-Jun YEON, Ju-Young JUNG, Sung-Sik PARK, Ji-Sun JUNG, and Jung-Sik CHO (Korea)
P-30	<i>Study on the Preference of the Ecotone in the Natural Landscape</i> <Keywords> View landscape, Natural landscape, Biodiversity, Characteristics of landscape, Landscape component, Landscape evaluation, Ecotone	Seiichiro OHATA, Akira TANAKA (Japan)
P-31	<i>Performance Evaluation of Noise Reduction Devices which installed on the Noise Barrier</i> <Keywords> Road Traffic Noise, Noise Barrier, Noise Reduction Device	Chulhwan KIM , Hyejin KANG (Korea)
P-32	<i>Removal of Tar from Biomass Gasification Process</i> <Keywords> Biomass, Gasification, Tar, Oil Scrubber, Removal	Ju Hoe KIM, Jong Min OH, Young Min JO, and Sang Bum KIM (Korea)
P-33	<i>Distribution Patterns of the Dominance Macrobenthos at Subtidal on Coast Developments in Korea</i> <Keywords> Macrobenthos, Coast-Developments, Indicators, Dominance-species, Distribution	Hyoung-Sum HAN, Yang-Ho KIM, and Hyun-Shik YEE (Korea)

P-34	<p><i>Nuclear power plant decommissioning project and public participation</i></p> <p><Keywords> NPP, Decommissioning, EIA, Public Participation</p>	Kyunghee SHIN, Jin-gyeong KWON, and Kongjang CHO (Korea)
P-35	<p><i>“Biotope-package” as Ecological Roof Vegetation -Effects for Biodiversity Conservation and Heat Island Mitigation-</i></p> <p><Keywords> Biotope-Package, Effects for Biodiversity Conservation, Heat island Mitigation, Wetland</p>	Tanaka Laboratory, Tokyo City University (Japan)
P-36	<p><i>Study for Feasibility of Japanese Biodiversity Banking “Satoyama Banking”</i></p> <p><Keywords> Satoyama, Biodiversity Banking, Quantitative Evaluation, HEP, EIA</p>	Tanaka Laboratory, Tokyo City University (Japan)
P-37	<p><i>“Minami-Alps Biosphere Reserve”</i></p> <p><Keywords> High Mountains, Deep Valleys, Fostering Biological and Cultural Diversity</p>	Shizuoka City (Environmental Policy Division)

AIC2018 in Shizuoka

“Green Region and Impact Assessment”

❖ Abstracts

Opening Plenary Abstract.....	27
Session Abstracts.....	28
Poster Abstracts	79

Each serial number of abstracts is the same as that of the session.

Opening Plenary

The nature of Shizuoka –from Mount Fuji to Suruga Bay-

Kazuyoshi Yamada¹

¹Museum of Natural and Environmental History, Shizuoka, Japan

Keywords: Mount Fuji, Suruga Bay, Izu Peninsula, Southern Alps, Red lists

1. Introduction

Shizuoka Prefecture locates on center part of Honshu Is., is an elongated region following the coast of the Pacific Ocean at the Suruga Bay, the deepest in Japan. In the west, the prefecture extends deep into the Japanese Southern Alps which have more than 3,000 m.a.s.l. In the east, it becomes a narrower coast bounded in the north by Mt. Fuji, until it comes to the Izu Peninsula. These diverse landscapes lead to spreading biodiversity in this area. Here, it will be introduced nature of Shizuoka Prefecture (Fig.1).

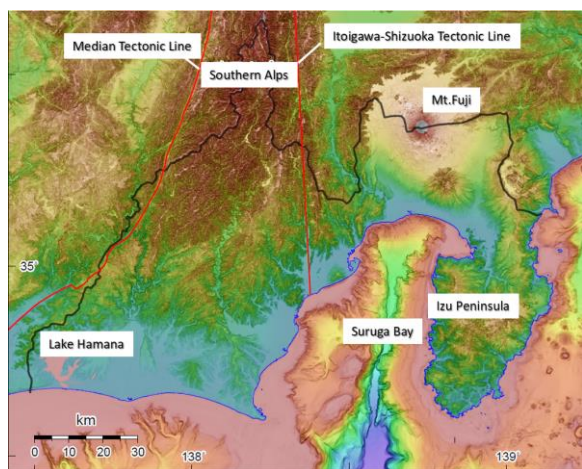


Figure 1 Topographical Map of Shizuoka Pref.

2. Main Landscape

2.1 Mount Fuji

Mount Fuji is the highest mountain at 3,776.24 m, and active volcano. It was identified four phases of volcanic activities in the formation of Mount Fuji. Modern shape of mountain is thought to be formed since the last 10,000 years ago. Last large eruption had been occurred at AD 1707. In 2013, Mount Fuji was added to the World Heritage List as a Cultural Site.

2.1 Suruga Bay

Suruga Bay, which has ca. 2,500 m in water depth, was formed by tectonic subduction of the Philippine Sea Plate and the Eurasian Plate at the Suruga Trough, making it a source of considerable seismic activity, and giving the bay its extreme depth.

2.3 Southern Alps

Southern (Akaishi) Alps is mountain range of central Honshu Is, one of main area of Japan Alps. Geology of this area was composed by accretionary prism since ca. 100 million years ago, due to plate tectonics. High variety of fauna and flora found at the sites. In 2014, Southern Alps was added to UNESCO Biosphere Reserves List.

2.4 Izu Peninsula

The Izu Peninsula has an unique geological scheme other than the mainland of Japan. At 14 million years ago, the Izu block located far away from the Island Arc. After that, by tectonic subduction, the block was collided with the mainland, and it formed the peninsula same as today ca. 600,000 years ago. Because of unique geo-history, the Izu Peninsula was finally added to UNESCO Global Geopark List in April, 2018.

3. Biodiversity preservation

In this year, Shizuoka Prefecture will publish 2nd version of Red Lists after 2004. Total number of threatened species is reported as 619, that corresponds to 4.8 % against all of species. Although we have unparalleled landscapes as mentioned above, it is time to discuss sustainable preservation for keeping the nature.

Green Region and the Role of SEA/EIAs

Akira Tanaka

Tokyo City University, Japan

Keywords: Carrying Capacity, Sustainability, Tiering, Zoning, No Net Loss, Biodiversity Offset/Bank, HEP

What is “green region”?

A green region (GR) refers to the states of balance between cumulative negative impacts (net loss) on the ecosystem resulting from human activities such as development and cumulative positive impacts (net gain) due to conservation efforts with respect to certain region. It is also defined as a sustainable state in which the difference between the net loss and net gain of a region is within its carrying capacity.

While the scope of GR, likewise with ecosystems that range from a small aquarium to the spaceship Earth, can be considered at various scales of extent, local, regional and global, it is desirable to apply the concept to an ecological unit such as a watershed shown in Figure 1.

Why a green region now?

Recently, with the proliferation of the use of renewable energy from wind and solar, there is a phenomenon whereby such power plants are becoming concentrated in some regions. Figure 2 depicts the current state of solar power plant developments in Izu Peninsula, Shizuoka. EIAs are not being conducted during the development of such plants because this type of development is still new and its scale is small. However, there is a serious possibility of cumulative impacts on the environment due to the concentration.



Figure 1 Concept of “Green Region”

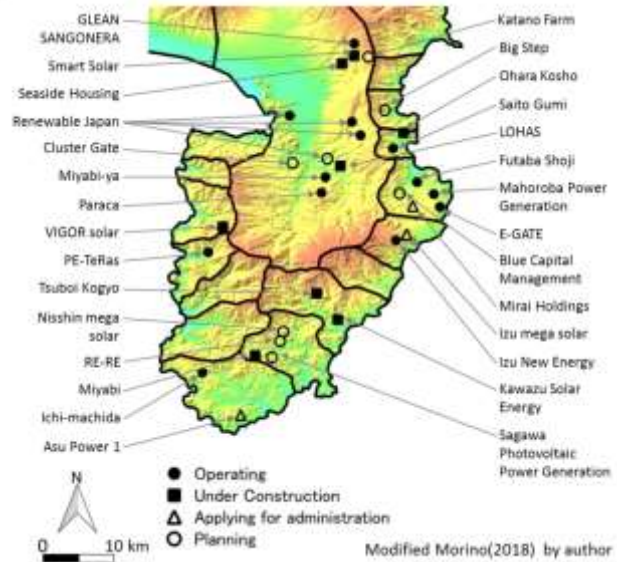


Figure 2 Location of Photovoltaic Power Generation Plant in Izu Peninsula, Shizuoka

The role of SEA/EIA in Green Region

There are several roles of SEA/EIA for a GR. In addition to the current approach of screening by scale of development project, screening by ecological vulnerability of the area and “zoning” with consideration for a region’s overall carrying capacity should be introduced. A “tiering” that applies environmental information including zoning, that is commensurate with the maturity of planning in the regional SEA and individual EIA respectively, should be introduced. Assessment of multiple alternative plans according to the “mitigation hierarchy” including “no action” should be introduced. “Quantitative methods” such as “HEP” for evaluation of both impacts and effects of mitigation measures, should be introduced.

Lastly, it is important to note that there are differences in how to conceive GR. Because some are specific to a land like biodiversity, while others are universal like CO2 and electricity..

References

Tanaka, Akira (2017) Can EIA be an effective tool for creating ecologically sustainable society? –From the aspect of “Green Region”, The 6th Korea-Japan-China Tripartite EIA Conference, p.13.

EIA system and its Implementation in Japan

Shintaro Murai

Environmental Impact Assessment Division

Ministry of the Environment, Japan

Keywords: EIA, Wind Power, Zoning, Coal-fired power plant, Japan

1. Introduction (Overview of EIA Act in Japan)

In Japan, a system on EIA was first introduced in 1972. EIA Act was enacted in June 1997, and the Act was revised in 2011.

In the present EIA system, the project proponent implements EIA by the steps of survey, forecast and evaluation for each subject and the Minister of the Environment states his/her opinions for the conservation of the environment according to the requests. EIA system contains 13 items of target projects (wind power generation was added in 2012).

In recent years, the number of project in EIA has increased rapidly. The possible reasons may be, 1) a primary EI consideration at the planning stage was added in EIA system by the revision of the EIA Act, 2) the wind power generation was added as target project in EIA, and 3) the thermal power generation plan has increased since East Japan Great Earthquake Disaster in 2011.

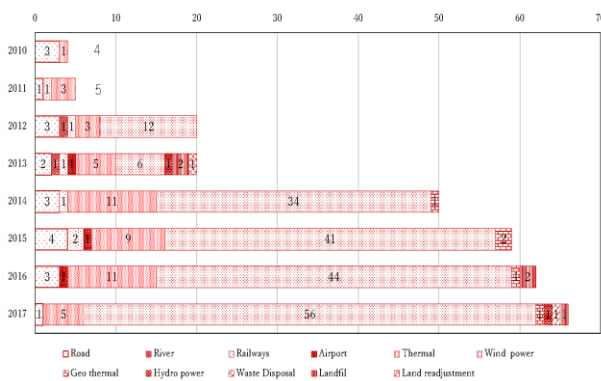


Figure1. The Number of Submitted Opinions from the Environment Minister

2. Zoning for Wind Farm in Japan

Responding to Paris Agreement, the cabinet approved the Plan for Global Warming

Countermeasures in 2016. As for renewable energy, a large number of projects of wind power plant were planned and some problems, for example considering wide or cumulative effects in environment, or trouble with residents appeared.

MOEJ has promoted zoning method for resolution of the problems and conducted 10 projects in the country. The project aimed to develop the zoning methodology for wind farm based on the assessment on economic and social impact as well as environmental impact in local government level. The zoning areas would be included the areas where the installation of wind farm should be promoted, avoided and so on.

3. The opinion of the Minister of the Environment for coal-fired power plants

Many coal-fired thermal power plants are under planning and EIAs for these projects are in progress. It is necessary to perform EIA for individual projects in order to achieve the CO2 emission target in FY 2030 and further since 2030, following the achievement of the target settled for reduction of CO2 emission in the whole electric utility industry and in each individual company, and monitoring the situation of these actions. The Minister of the Environment stated serious opinions from the view of environment conservation and Global Warming Countermeasures toward some cases recently.

References

M. Oi, F. Ito, M. Tanimoto (2017), Current status and challenges of EIA for coal fired power plants, Proceedings of the Annual Conference 2017 of JSIA, pp.118-121 (http://www.env.go.jp/policy/assess/Article_3_Current_status.pdf)

"Sustainable Zone" - Regional economic indicators on self-sufficiency of food and energy

Hidefumi Kurasaka¹

¹Chiba University, Japan

Keywords: renewable energy, local government, food self-sufficiency, regional revitalization, energy shift

1. Introduction

Kurasaka laboratory and accredited NPO corporation Institute for Sustainable Energy Policy Research Institute have announced the actual state of renewable energy supply by municipalities in Japan every year since 2005. We call a municipality where the amount of renewable energy obtained in the municipality exceeds the amount of energy consumed in that municipality by calculation as "sustainable zone" municipality.

2. Findings from the Latest Calculation

The latest result of "sustainable zone" research (as of March 2018) is to grasp the renewable energy equipment that is in operation as of the end of March 2017 and to calculate the amount of energy supply when the equipment is operated yearly. The result of this calculation is summarized in Table 1.

We define municipalities, which are producing renewable energy in an amount that exceeds the demand for energy for consumer and agricultural sector in the region as "energy sustainable zones." And we call municipalities

which generate renewable energy electricity in amounts that exceed the electricity demand for consumer and agricultural sector in the region as "power sustainable zones." In Japan, numbers of these municipalities are growing as shown in Figure 1.

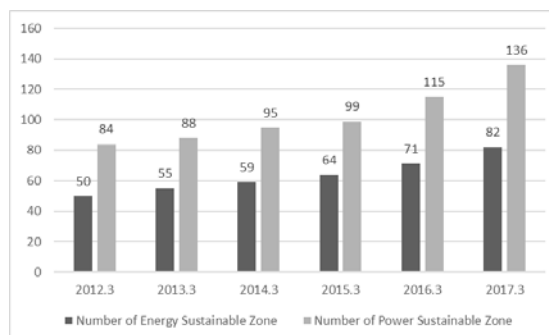


Figure 1: Number of Sustainable Zones

Municipalities with food self-sufficiency rate exceeding 100% were 566 municipalities. Of the 82 municipalities that are "energy sustainable zones", 42 municipalities also exceeded 100% in the self-sufficiency of food.

References

Kurasaka Laboratory and Institute for Sustainable Energy Policy (2018) "Sustainable Zone Report FY2017" (in Japanese) <http://sustainable-zone.org/wordpress/wp-content/uploads/sustainablezone-2017FY-report.pdf>

Table 1: Renewable Energy Supply in Japan

	2015.3				2016.3				2017.3				2017/2015	2017/2012
	Total amount(TJ)	ratio within power	ratio	Growth rate	Total amount(TJ)	ratio within power	ratio	Growth rate	Total amount(TJ)	ratio within power	ratio	Growth rate		
PV	285894	51.1%	43.8%		394211	57.2%	50.4%	137.9%	469532	60.0%	53.6%	119.1%	164.2%	922.4%
Wind	47037	8.4%	7.2%	106.1%	50076	7.3%	6.4%	106.5%	56010	7.2%	6.4%	111.9%	119.1%	116.9%
Geo-thermal power	22078	3.9%	3.4%	100.3%	22175	3.2%	2.8%	100.4%	20947	2.7%	2.4%	94.5%	94.9%	89.3%
Hydro power(below 10	130092	23.3%	19.9%	100.3%	132173	19.2%	16.9%	101.6%	134243	17.2%	15.3%	101.6%	103.2%	101.3%
Biomass power	74290	13.3%	11.4%	*	90511	13.1%	11.6%	121.8%	101249	12.9%	11.6%	111.9%	136.3%	*
Renewable power	559391	100.0%	85.7%	143.5%	689146	100.0%	88.1%	123.2%	781981	100.0%	89.3%	113.5%	139.8%	291.6%
Solar thermal	30422		4.7%	93.2%	30129		3.9%	99.0%	30290		3.5%	100.5%	107.8%	108.4%
Geo-thermal utilizatio	25655		3.9%	101.5%	25182		3.2%	98.2%	25304		2.9%	100.5%	99.6%	100.0%
Biomass thermal	37476		5.7%	*	37626		4.8%	100.4%	37921		4.3%	100.8%	250.6%	*
Renewable thermal	93553		14.3%	132.7%	92937		11.9%	99.3%	93515		10.7%	100.6%	136.1%	137.0%
Renewable energy	652944		100.0%	141.9%	782083		100.0%	119.8%	875496		100.0%	111.9%	232.5%	260.2%
Ratio to energy demand for civilian + agricultural, forestry and fishery industries	7.86%				9.42%				10.54%					

Application of HEP for maximizing habitat value in the process of road construction

Sang-Don Lee¹

¹ Dept. Environmental Sciences & Engineering, Ewha Womans University, Seoul, Korea

Keywords: Evaluation Procedure (HEP), EIA, Road-kill, Eco-corridor, Waterdeer

1. Introduction

In the existing EIA, unlike other fields, the field of natural environment has a poor forecasting method through quantitative evaluation, and it is difficult to select a reduction plan accordingly. In this study, we use the HEP (Habitat Evaluation Procedure) technique, which can quantify the long-term effects of ecosystem, and the CHU (Cumulative Habitat Unit) value of the final derivation unit of HEP thus planning the amount of reduction plan.

2. Title

Application of HEP for habitat value in the process of road construction

2.1 Methods

In this study, spatial analysis was used to coordinate the points with waterdeer (*Hydropotes inermis*). Spatial analyst was selected as the optimum index of habitat for the animal, and data were obtained from the vegetation cover, water density, contour line, and land use and road network. In order to calculate the HSI (Habitat Suitability Index) value and CHU value for the waterdeer in the area of Hongchon to Inje, the study was conducted to investigate the land cover of major classification, national river system, vegetation and highway No. 60 Hongchon - Inje through the distribution map of the major classification and Road Network. After extracting and referring to the report on the EIA of the construction project, ArcView and ArcGIS map were used, and the statistical tests were performed

2.2 Results

As a result of the study, the environmental impacts of the project area due to the road construction showed a net loss ecological value of 912.3, a 362.7 increase in net profit value according to the reduction plan, and a recovery value of 549.6 after 50 years of the reduction plan installation. Comparing ecological corridor of 13 sites, the highest net profit was CHU of 69.5 at point 4, and it can be regarded as an ecological passage connecting habitat most appropriately

3. Conclusions

Restoring can only work as limited amounts because we do not have a system measuring the damage of ecosystem. In this regards restoration should be achieved as much as possible to meet the original condition such as>NNL (not net loss) of habitat and population as a biodiversity offset. Government agencies, private conservation organizations, businesses and private landowners can cooperate in large-scale ecosystem management projects to achieve conservation objectives and to restore ecosystem in a sustainable way

Reference

Tanaka, A. 2013. Theory and Practices for Habitat Evaluation Procedure in Japan. Asakura Publishing Company.

Study on introduction of biodiversity offset in Japan

Seiji Arai^{1,2}, Ginko Tsujisaka^{1,3}, Akihiko Matsuoka^{1,4}, Koichi Ide^{1,5}, Shogo Ogasawara^{1,6}, Yasuhiro Kato^{1,7}, Yoshifumi Saiki^{1,8}, Taro Shiromoto^{1,9}, Yuki Togo^{1,10}, Tadashi Nishizawa^{1,11}, Yoshihiro Hori^{1,12}, Chikako Watanabe^{1,13}, Yosuke Watanabe^{1,14}, Takafumi Kawamura^{1,15}, Ayaka Matsumiya^{1,13}, Masakazu Aoshima¹, Shinji Oda¹, Kiyoharu Yoshizawa¹, Akira Tanaka¹⁵

¹Japan Association of Environment Assessment.,Japan ²NIPPON ENGINEERING CONSULTANTS CO., LTD.,Japan ³Prec Institute Inc.,Japan ⁴ENVIRONMENTAL CONTROL CENTER CO.,LTD.,Japan ⁵Tokyo Power Technology Ltd.,Japan ⁶PACIFIC CONSULTANTS CO.,LTD.,Japan ⁷NIPPON KOEI CO.,LTD.,Japan ⁸POLYTECH ADD, Inc.,Japan ⁹Oriental Consultants Co.,LTD.,Japan ¹⁰TOKYO KYUEI CO., LTD.,Japan ¹¹NS Environment Corporation.,Japan ¹²SANYO TECHNO MARINE,INC.,Japan ¹³TAISEI CORPORATION.,Japan ¹⁴SHIMIZU CORPORATION.,Japan ¹⁵Tokyo City University.,Japan

Keywords: Biodiversity offset, no net loss, Environmental Assessment, Ecosystem Quantitative Evaluation

1. Introduction

To minimize loss of biodiversity by development projects, biodiversity offsets as part of compensation of residual impacts have been implemented in developed country. Although biodiversity offsets have not been institutionalized in Japan, the concept have become important issue for EIA policy. For future institutionalization, this study have practically examined challenges of biodiversity offsets in Japan.

2. Methods

Among various challenges of biodiversity offsets in Japan, technical aspect of biodiversity evaluation and institutional aspect of offsetting program operation were studied. Satoyama ecosystem which is Japanese traditional agricultural landscape with rich biodiversity were focused as potentially offsetting site in Japan in this study. Chiba city in suburban Tokyo were selected as hypothetical case study area.

3. Results

3.1 Biodiversity evaluation technique

Challenges of applying foreign evaluation methods to Satoyama were studied. Habitat evaluation procedure (HEP) in the United States and Habitat hectore method (Hha) in Australia were selected as major foreign

evaluation methods. Biodiversity offset between habitat loss by development and habitat gain by conservation were analyzed. Main results were following; 1) compensation area were evaluated to 3 times larger than development area in case of HEP and 2.4 times in case of Hha, 2) habitat gain by conservation were considerably smaller than habitat gain by development, and 3) when evaluating Satoyama ecosystem, vegetation disturbance by conservation practices needs to be reflected into evaluation criteria.

3.2 Operation of biodiversity offset institution

Three type of institution in United States, Compensation Funds(In-Lieu-Fee program), One-Off Offset, and Mitigation Banking were selected. Based on case study in Chiba city, institutional challenges were examined. Main results were following; 1) with involvement of public sector and various stakeholders, Compensation Fund (In-Lieu-Fee program) might be sustainable and suite for Japanese Satoyama offsets, and 2) if compensation area were 2.4 times larger than development area, annual cost for one offsetting project were estimated to 820 thousand yen/ha.

4. Reference

Tanaka, A. (2006). Theory and Practices for Habitat Evaluation Procedure in Japan (Japanese language).Asakura. Tokyo. 266pages.

Promoting green development of the resource-based cities in China by integrating the three-line model into SEA

Wei Li

Beijing Normal University, China

Keywords: Green development, The three-line model, SEA, Resource-based city, Effectiveness

1. Introduction

The 262 resource-based cities, of which economic structure is dominated by natural resource exploited and processed, have made a tremendous contribution to China's economic miracle. However, a big proportion of these cities are suffering from economic depression and environmental degradation. How to promote green development of those resource-based cities remains a big challenge to SEA in China.

2. Applying the three-line model into SEA

2.1 The three-line model

The Three Lines refer to the red line of ecological conservation, the bottom line of environmental quality security and the upper line of natural resource utilization. For the resource-based cities, the relation of a studied development plan and the three lines may be interpreted as Fig.1.

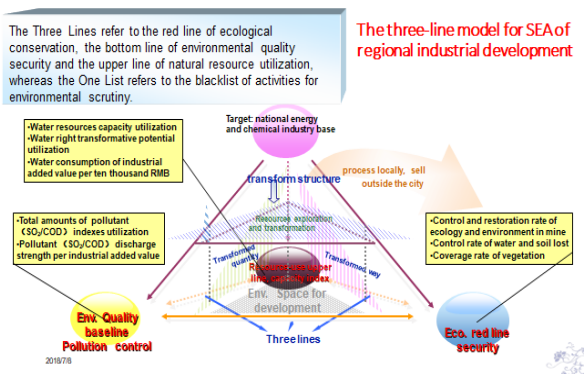


Fig.1 Conceptual model of the three lines into an SEA of a development plan

2.2 Case Study

As a emerging resource-based city, the Ordos, has experienced an amazing economic growth with an annually averaged rate over 18% in the past two decades by mining coal and other mineral resources and developing coal chemicals such as cokes, methanol, olefin, dimethyl ether, coal-oil, and so on. Meanwhile, water pollution, grassland losses, ground water decline and other problems have been witnessed, and a worsening trend of local ecosystem is predicted. The development-forbidden zones were mapped out as the red lines for conservation by evaluating ecological importance, sensitivity and vulnerability of the land-use units, the bottom lines for securing environmental quality were identified by estimating the potentials of pollution reduction and industrial updating, and the upper lines for natural resource uses were set up by taking the accumulative effects of land, water and coal uses on long-term ecological improvement into account.

3. Conclusions

It is expected that application of the three-line model would help transform the SEA results from relatively soft recommendations into hard restrictions or criteria, by which a more environmentally sound development be actively attained in the city.

References

Wei Li*, Yang Zhao (2015) Bibliometric analysis of global environmental assessment research in a 20-year period, EIA Review, No.50, pp.158-166.

Proposal towards the Creation of General Policy for Mainstreaming of Biodiversity in Japan

Takahito Niwa

EX Research Institute Ltd., Japan

Keywords: Mainstreaming of Biodiversity, Japan Biodiversity Outlook, Potential Map, Ecological Network, Aichi Mitigation, Aichi Biodiversity Strategy

1. Introduction

According to Japan Biodiversity Outlook (MOEJ 2010), drivers of biodiversity loss are divided into four crises. Development pressure has the most serious impacts within four crises though the rate of additional biodiversity loss is slightly reduced. As long-term responses, recovery from past losses caused during the period of rapid economic growth is quite significant.

In this paper, the significance of creation general policy is proposed for recovery from past losses by collaboration among diverse stakeholders, not by severe mitigation based on the polluter-pays principle.

2. Aichi Biodiversity Strategy

2.1 Map of Biodiversity Potential

Figure1: Potential Map of Dragonfly

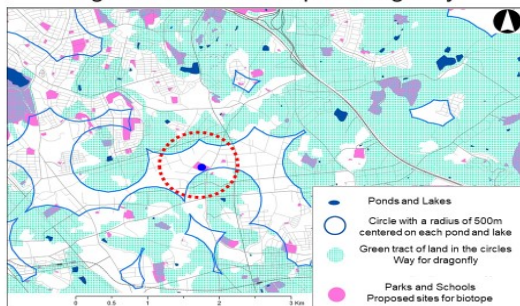


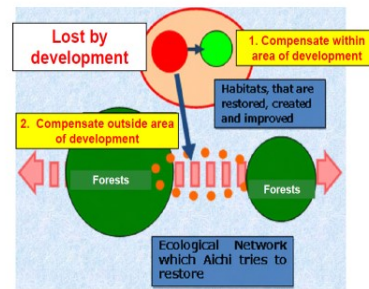
Figure2: Ecological Network



Potential Map shows the possibility to restore the ecosystem and the target to create ecological network by collaboration among stakeholders.

2.2 Aichi Mitigation

Figure 3: Aichi Mitigation



Aichi Prefectural Government recommends companies to create ecological networks. Not only companies developing nature over a hectare in the future but also companies which did in the past can be actors in this method.

Aichi considers that ecological networks increase due to moral responsibility of the companies which exploited nature in the past development. Moreover, Aichi attempts to make this method legally binding one.

References

- Japan Biodiversity Outlook (2010) Ministry Environment of Japan, pp. vii-viii.
- Aichi Biodiversity Strategy 2020 (2013) Aichi Prefectural Government

Green city-regions: Criteria for sustainability assessment

Yoichi Kumagai^{1 2}

¹School of Environment, Resources and Sustainability (SERS), University of Waterloo, Canada

² Centre for Management Studies, Instituto Superior Técnico (CEG-IST), University of Lisbon, Portugal

Keywords: green, city-region, sustainability, assessment, criteria

1. Purpose and method

This study generates criteria for sustainability assessment (SA) focusing on green city-regions. First, operational definitions as well as potential issues of green city-regions are identified by reviewing literature. Second, generic criteria for SA are introduced. Third, the SA generic criteria are specified for application to green city-regions.

2. Green city-regions

The meaning of “green” as an adjective is elusive when it is used relating to decision-making. I will first examine the existing explanations of words in decision-making accompanied with “green”, such as regions, cities, growth, infrastructure, building, energy, economy, budget, procurement and investment. After all, “green” may simply relate to human actions having positive (or less negative) impact on the natural environment. It may overlook lasting wellbeing of people. More integrative perspective would be beneficial for the concept of “green”, which would make it similar to “sustainable”. Thus, it is meaningful to specify the SA generic criteria to consider requirements for “green city-regions” to be sustainable.

City-region can be understood as a flexible and dynamic geographic location based on direct and indirect interdependence of people’s activities for diverse entrepreneurial and innovative outcomes, connecting neighbourhoods (Kumagai and Partidario 2018). The notion of green city-region would feature urban and suburban setting that has positive impact on the environment while securing lasting wellbeing of people living there. It suggests

better accessibility to wide range of quality goods and services with more resilient urban systems.

3 Specified sustainability assessment criteria

The SA generic criteria presented include: socio-ecological system integrity, livelihood sufficiency and opportunity, intra-generational equity, inter-generational equity, resource maintenance and efficiency, socio-ecological civility and democratic governance, precaution and adaptation, and immediate and long-term integration (Gibson et al 2005). The recognized issues of green city-regions serve as a perspective to specify the SA generic criteria.

4. Conclusion

The key is establishing public will to promote more human-scale and resilient urban system that has positive impact on the environment and secures lasting wellbeing of people. The criteria this study generates are useful not only for the experts in the city-regional politics, but also for the users of the city-region, to have a common ground for the meaningful discussion. In actual use, the SA criteria for green city-regions should be further specified reflecting the region’s situation.

References

- Gibson, R.B. with Hassan, S., Holtz, S., Tansey, J and Whitelaw, G., 2005. Sustainability Assessment: Criteria and Processes, London: Earthscan.
- Kumagai, Y. and M. Partidario. 2018. Lasting community wellbeing: Comparison of Lisbon and Tokyo. Sustainable Development. in print. DOI 10.1002/sd.1864.

EIA and Green Regions for Railway Projects in Hong Kong

Shirley Lee¹

Hong Kong Institute of EIA, China

¹ Email: shirsllee422@gmail.com

Keywords: Ecological compensation, EIA, Alignment selection, Construction method selection, Public participation

1. Introduction

The protection of ecological important areas in Hong Kong has been receiving increasing attention after the implementation of the EIA Ordinance in 1998. This paper presents lessons learnt from two selected railway projects on: how the protection of green regions affected (1) the selection of railway alignments, (2) their construction methods, eventually leading to (3) enhancement of local ecological features to include: (a) the preservation of a freshwater marshland, (b) the restoration of disused fish ponds and (c) extension of a park area within the urbanized city center.

2. EIA Recommendations

Two Railway Projects, namely:

- (1) East Rail Extension – Hung Hom to Tsim Sha Tsui and
- (2) Sheung Shui to Lok Ma Chau Spur Line

will be examined with respect to constraints imposed by existing ecologically sensitive uses, and how these affected the selection of the railway alignments; subsequent decisions over the forms of the railways and respective construction methods to mitigate adverse impacts. Discussion will focus also on ecological enhancement measures recommended in the EIA and as results after public participation.

3. Implementation and Follow-ups

The paper will also present how ecologically related EIA measures were subsequently implemented, the result of follow-up monitoring and auditing works to ensure delivery and affirmation on the success or otherwise of the various enhancement methods, including management plans.

4. Conclusion

These completed railway projects demonstrated that, when planned and designed with careful consideration of their impacts on sensitive green regions through the use of EIA, can be deployed as 'green' resilience measures by adequate provision of compensatory management habitats and enhancement measures on past neglected or disused ecological areas.



Figure 1. Lok Ma Chau Habitat Enhancement

References

- Kowloon – Canton Railway Corporation (2000) East Rail Extension – Hung Hom to Tsim Sha Tsui EIA.
- Kowloon – Canton Railway Corporation (2002) Sheung Shui to Lok Ma Chau Spur Line.
- MTR (2011) Annual Report 2011 pp88

Policy research of Photo-voltaic power generation and Biodiversity conservation in the Izu-peninsula

Takafumi Kawamura¹, Akira Tanaka¹

¹Tokyo City University, Japan

Keywords: Green Region, Photovoltaic power generation, EIA, Watershed, Izu-peninsula

1. Introduction

Recently, Japan has faced problems spatial loss of natural environment and biodiversity due to careless construction of photovoltaic power generation plant since 2012, FIT (Feed-in Tariff) Law had instituted. The Izu-peninsula is no exception that was listed in the Global Geopark in April 2018.

In the Ito city, there is a plan of construction of photovoltaic power generation plant and people are concerning for spatial loss of natural environment and biodiversity.

In this research, we collected laws or regulations and systems national, prefecture and municipality level and compared each other focused on special loss of natural environment to suggest Izu-Peninsula's municipality a policy for sustainable society it is balancing environmental impact of constructing photovoltaic power generation plant and natural environment and biodiversity conservation.

2. Results

As a result, there is a FIT law as promotion for construction of photovoltaic power generation plant and has an ability to control careless construction of it. Though, in the Izu-Peninsula, some plans seem to be applied with division (Morino, 2018).

Some municipalities in the Izu-Peninsula have regulation for control construction of photovoltaic power generation plant. It is a reporting system. In case of Ito city, if that plan will cut over 1.2ha, the mayor doesn't agree for that construction. Though, it doesn't have an ability of suspension for illegal plan or activity.

Administration or reporting system in the Natural Park law, Natural Environment Conservation law and Forest law don't request planning with according to Mitigation Hierarchy (avoid, minimize and compensate environmental impacts).

In the Shizuoka prefecture, constructions of photovoltaic power generation plant with land forming over 50ha are listed in prefectural EIA

regulation's requirement as construction of industrial park. Though, in the Ito-City's case, that plan will form 48ha land. It wasn't required assessment following the prefectural EIA regulation.

4. Conclusion

We concern about "avoidance of assessment" due to limitation of assessment target by volume of development area.

Environmental impacts occur in "Watershed" (e.g. many fish die if soil is flashed due to cutting forest).

If improve problem of "avoidance of assessment", Strategic Environmental Assessment is needed.

If consider environment impacts in the watershed, it is better that fulfill "Green Region". It will be realized by regional Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA).

Area of municipalities and watersheds almost match in the Izu-peninsula. Unit of "Green Region" is municipality.

In farther research, we consider about SEA and EIA system to be "Green Region" in Izu-Peninsula's watersheds and municipalities.

References

- Hirohisa Morino (2018) Mega solar in the Izu(conclusion) concern about impacts for GLOBAL GEO. Izu News Paper 2018/5/30 (Original title is written in Japanese).
- Tanaka, Akira (2017) Can EIA be an effective tool for creating ecologically sustainable society? -From the aspect of "Green Region", Proceedings of Impact Assessment and Post Management, the 1st Vietnam-Japan-Korea-China EIA Conference, p.13.

Construction and Application of the Comprehensive Assessment Method for the Ecological Environmental Impact of Transmission Projects

Kai Tian¹, Yanwei Zhao¹

¹School of Environment, Beijing Normal University

Keywords: EIA, Transmission Projects, Comprehensive Assessment, Landscape, Ecosystem, Sensitive area

1. Introduction

Much attention has been paid to the assessment method for the ecological environmental impact of transmission projects, however, the existing researches are mostly single-scale studies and it is not conducive to the implementation of comprehensive assessment for the ecological impact (Liu et al., 2017). This paper analyzes the ecological impact characteristics of three scales of landscape, ecosystem and sensitive areas, and, based on the analytic hierarchy process, puts forward the different scale ecological impact methods and multi-scale ecological impact comprehensive assessment method. Taking Qinghai-Henan±800kV HVDC project as an example, three layers of ecological impact assessment hierarchy were established, and the results of the assessment were compared between different scales and the comprehensive evaluation results were obtained.

2. Ecological impact assessment

2.1 Assessment index system construction

Based on the impact of transmission projects of multiple ecological factors, the ecosystem, sensitive area, landscape as the criterion layer, and selected 10 indexes as index layer (Table 1).

2.2 Project introduction

The project was carried out through four provinces in Qinghai, Gansu, Shanxi and Henan, with a total length of about 1638.6km. The total area of the evaluation area was 1096.51km².

Table 1 Ecological impact evaluation index system

Target layer	Criterion layer	Index layer
EIA	Landscape	Land Use Transition
		Landscape Fragmentation
		Spatial Structure
		Landscape Heterogeneity
	Ecosystem	Ecosystem Structure
		Energy Flow Process
		Biodiversity
	Sensitive area	Wildlife Protection
		Soil Erosion
		Landscape Harmonicity

EIA(ecological impact assessment)

3. Conclusions

This method could realize the comprehensive and given evaluation of ecological impact, and it is beneficial to the connection with different scale environmental impact mitigation measures.

References

Liu, J.L., Zhang, C (2017) Study on environmental impact assessment index of electric power transmission, Energy Environmental Protection, No.3, pp.42-45.

Improvement of ESC monitoring system and its report by analysis on JICA's projects as case study

Suwanteep Kultip

Environmental and Social Considerations Supervision Division,
Credit Risk Analysis and Environmental Review Department,
Japan International Cooperation Agency (JICA)

Keywords: Improvement, Monitoring report, Analysis, Effectiveness and Environmental and Social Consideration

1. Introduction

EIA monitoring is an important tool and beneficial to the environment as it enables action to be taken if unexpected problems occur including allow any issues identified to be rectified. It has the same goal as EIA, by minimising the negative and maximising the positive consequences of development (Marshall et al, 2005). According to JICA Guidelines for Environmental and Social Consideration (ESC), JICA confirms monitoring results in order to ensure that the project proponents, etc. give the ESC agreed to in the environmental review after conclusion of an agreement.

However, the quality of the reports is varying over time and project-by-project. The strengths and weaknesses of current practice are a good indication of where the monitoring could be extended in order to enhance the role of the monitoring system and improve effectiveness. This study aimed to increase the quality of monitoring report including improve the effectiveness of ESC monitoring system by using JICA's projects as case study.

2. Improvement of ESC monitoring system

2.1 Cases analysis

There are 40 reports of on-going loan projects fund by JICA between April 2017 to April 2018, which were selected on this study. It is divided into 4 areas as shown in Fig.1.

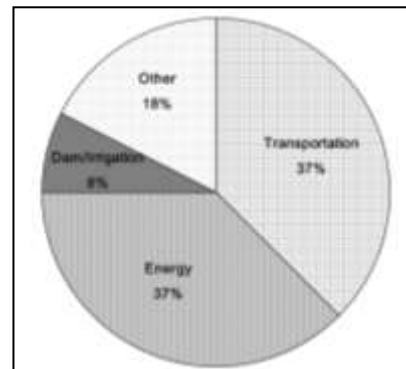


Fig.1 Monitoring reports profile

2.2 Quality Improvement

Regarding the importance of the basic element of monitoring report, the evaluation criteria for this study was created and developed for improvement of its quality in practice. There are 10 dimensions to evaluate and examine in which area should be concerned/focused.

3. Conclusions

The results demonstrate that the monitoring reports in practice still need several improvements especially monitoring parameters selection, interpreting of monitoring results, monitoring form and so on. Moreover, JICA has been implementing the ESC Monitoring Management Sheet strategy including strengthening on the review results process. These are for increasing the efficiency and quality of monitoring reports.

References

Marshall, R, J Arts and A Morrison-Saunders (2005) International Principles for Best Practice EIA Follow-up, Impact Assessment and Project Appraisal, 23(3): 175-181.

Analysis of Monitoring Reports for Infrastructure Development Projects through Development Assistance

Ayaka Yasumoto¹, Takehiko Murayama¹, Shigeo Nishikizawa¹

¹Tokyo Institute of Technology, Japan

Keywords: Environmental Assessment, Environmental and Social Considerations, Monitoring, Development Assistance

1. Introduction

Preparation and execution of environmental and social impact assessment is the key to avoiding and minimizing environmental and social impacts of infrastructure projects. However, many projects tend to concentrate on environmental impact assessment preparation prior to project commencement, rather than monitoring implementation. Therefore, we summarize the monitoring requirements of donors, including the World Bank, Asian Development Bank (ADB), and Japan International Cooperation Agency, and analyze the obtained results by monitoring ADB's reporting frequencies.

2. Monitoring Implementation

2.1 Comparison of Safeguard Policies

Specific analyses on monitoring conditions and requirements of each donor were conducted. These analyses focused particularly on a) monitoring purpose, b) monitoring methods, and c) disclosure methods of monitoring results. Based on these analyses, this research found that the three organizations set different monitoring standards. Furthermore, ADB described more detailed monitoring requirements in their Safeguards Policy Statement (2009). For instance, during the construction phase, the ADB demands at least semiannual monitoring reports for projects likely to have significant adverse environmental impacts, and quarterly monitoring reports for highly complex and sensitive projects.

2.2 ADB's Monitoring Reports Analysis

Based on the abovementioned analyses, ADB's 72 transportation (railway and road) projects were selected and monitoring reports available on ADB's web site were reviewed.

Table 1: Frequencies of Environmental and Social Monitoring Reports (unit: months)

Category	Environmental Monitoring Report	Social Monitoring Report
A	12.3	17.4
B	22.3	24.8
C	N.D.	25.9
Overall	17.7	26.6

3. Conclusions

This study compared several donors' monitoring requirements based on certain criteria. This analysis discovered that a) ADB described more detailed monitoring requirements in their Safeguards Policy than other donors, b) the average frequency of monitoring implementation ranges from once every eighteen months to a little over two years, and c) environmental monitoring tends to be implemented more often than social monitoring.

References

ADB (Asian Development Bank) (2009) Safeguards Policy Statement

The application and prospect of CPTED theory in the urban planning

Xianglan Yu

Zhejiang Gongshang University, China

Keywords: EIA Act, CPTED, Crime Prevention, Urban Planning

1. Introduction

At the present time, attention to the understanding of citizen's security and the improvement of them is one of the most important issues for the professional and theatrical issue for the citizens. Crime prevention through environmental design (CPTED) is a multi-disciplinary approach to deterring criminal behavior through environmental design. CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts. Generally speaking, most implementations of CPTED occur solely within the urbanized, built environment. Specifically altering the physical design of the communities in which humans reside and congregate in order to deter criminal activity is the main goal of CPTED.

2. Application of urban planning strategy under the influence of CPTED

CPTED was originally coined and formulated by criminologist C. Ray Jeffery. A more limited approach, termed defensible space, was developed concurrently by architect Oscar Newman. CPTED macroscopically emphasized on comprehensive crime prevention measures. Today, CPTED mainly refers to Newman or Crowe model, which focuses on environmental design to achieve the goal of deterring the criminals effectively. After 40 years of development, CPTED turns to be increasingly matured, and

the second generation of CPTED, namely, CPTED II, has emerged from the United States to the world.

3. Conclusions and Prospect

CPTED is a more systematic, scientific and technological manner, attracting more and more study, interest and investment from public agencies, academics and security industry in the world.

In summary, relevant legislations and National Standards should specify the process and system of CPTED, also detailed risk assessment checklists and design guidelines/manuals have to be developed so that they can support the crime impact assessment law.

References

- Cozens, P. (2002), Sustainable Urban Development and Crime Prevention Through Environmental Design for the British City. Towards an Effective Urban Environmentalism for the 21st Century, *Cities: The International Journal of Urban Policy and Planning* 19(2): 129-137.
- Crowe, T. (2003). Advanced Crime Prevention through Environmental Design; (Seminar notes), American Crime Prevention Institute, Louisville, Kentucky, pp.33-67.

A Study on Integrated Diagnosis of Industrial Path Dependence for Mineral Resource-Based Cities: Based on an Improved Cobb-Douglas Production Function

Siyang Zhou¹, Wei Li¹

¹State Key Lab of Environmental Simulation and Pollution Control, School of Environment, Business School, Beijing Normal University, Beijing 100875, China

Keywords: cobb-Douglas production function, mineral resource-based cities, industrial path dependence, marginal revenue, integrated diagnosis

1. Introduction

Diagnosing and resolving path dependence (PD) is the key to achieve a green transformation of industrial development and break the curse of resources and environment in mineral resource-based cities (MRBC). Through analyzing the process of industrial development PD in MRBC and their ecological environmental issues, the two resources of minerals and environment are added as input factors into the C-D function to construct the Integrated Diagnosis Method of Resources-Environment- Economy (IDMREE) to quantitatively diagnose industrial PD and apply to Ordos which is rich in coal resources.

2. Method

2.1 Establishing the improved C-D function

Mineral resources and environmental resources are used as input factors to establish the industrial C-D production function of mineral resource-based cities as shown in formula (1).

$$Y_i = A_i K_i^\alpha L_i^\beta M_i^\gamma E_i^\delta \quad (1)$$

Among them, Y_i is the industrial added value of mineral resource city i ; K_i is the input of industrial fixed assets; L_i is the input of industrial labor; M_i is the input of major mineral resources; E_i is the input of ecological environment; α , β , γ , δ are the output Elasticity.

The partial derivatives of K, L, M, and E are the marginal revenues (MR) of various input factors to industrial added value. The integrated MR of input factor MR_{KLME} is:

$$MR_{KLME} = MR_K + MR_L + MR_M + MR_E \quad (2)$$

According to the law of diminishing marginal revenue and MR_{KLME} curve shape, the PD process

can be determined into 2 types: integrated marginal revenue increasing (IMRI) and integrated marginal revenue decreasing (IMRD).

2.2 Environmental factors selection and value evaluation

The ecological system and its service function destroyed by the resource-based industry, and the value of environmental pollution are taken as environmental resources.

3. Results

The integrated output elasticity of the industrial input factors in Ordos was 0.8158, showing a decreasing scale of returns, indicating that the scale expansion has not been able to stimulate industrial economic growth. MR_{KLME} curve increased from 0.18 to 1.40 yuan between 2001 and 2007, and industrial development was in the IMRI process; from 2008 to 2015, the fluctuation from 0.99 to 1.13 yuan, entering the IMRD process, indicating that The integrated input elements of industrial development are redundant.

4. Conclusions

The IDMREE method can make up for the time lag of traditional methods, help mineral resource-based cities to recognize the resource and environmental problems brought about by industrial development earlier, and reduce the economic cost and technical difficulty of solving traditional routes.

Reference

- Field B C. (1995) Natural Resource Abundance and Economic Growth[J]. Land Economics, 81(4):496-502.
- Dinda S. (2004,) Environmental Kuznets Curve Hypothesis: A Survey. Ecological Economics, 49(4):431-455.

Analysis of Factors to Cause Hokkaido Sika Deer-Vehicle Collisions - Case Study of National Route 44 -

Tomoki Washio¹, Hideyuki Ito², Takahiro Fujii²

¹Nihon University, Graduate School, Japan

²Nihon University, Japan

Keywords: Road-kill, Deer-Vehicle Collisions, Traffic Accidents, Road Ecology, Regression Analysis, Transportation and Environments, Hokkaido Sika Deer (*Cervus nippon yesoensis*)

1. Introduction

The population of Hokkaido sika deer (*Cervus nippon yesoensis*) have increased after the World War II due to protection policy. Under the circumstances, deer-vehicle collisions (DVCs) have been increased and it has become a serious problem. Therefore, the purpose of study is to analyze the factors that cause DVCs on National Route 44 through the field survey of the roadside environment on National Route 44 connecting between Kushiro and Nemuro in Hokkaido, which has the highest number of DVCs per km.

2. Data and Methods

2.1 Data Collection

DVCs data which had been gathered for 4 years from 2012 to 2014 and 2016 by Hokkaido Police were used in this research. In autumn of 2016, a field survey was conducted on National Route 44 to collect the data of roadside environmental factors such as the installation status of road facilities (fences for deer, animal crossing signs, road lightings, etc.) and the form of road structure, in every 500m. In addition, the land use data around the roadside was created using GIS. We used these data as explanatory variables for analyzing the accident factors of DVCs.

2.2 Poisson Regression Analysis

We developed Poisson regression model and then analyzed the factors affecting the occurrence of DVCs in every 500m. For the analysis, we used response variable as the number of accidents occurring every 500m and used 12 indicators

obtained from field survey of the road environment and land use data as explanatory variables.

3. Results and Conclusion

The result of Poisson regression model is shown in the Table 1. According to the values of the regression coefficients, it was shown that the fence installation rates in front and back section, animal crossing signs and road structure which is embankment had positive values and then it was clarified that these had relation to the occurrence of DVCs in particular. On the other hand, the fence installation rates, road structure (cut and flat) and land uses had negative values, which had few connection with the non-occurrence of DVCs.

Table 1: Result of Poisson Regression Model

Variable	β	SE	Wald	P
Fence Installation Rates	-0.007	0.002	8.20	0.004 **
Fence Installation Rates in Front and Back Section	0.011	0.003	16.88	0.000 ***
Animal Crossing Signs	0.481	0.096	24.89	0.000 ***
Road Structure				
Embankment and Cut	1.007	0.227	19.61	0.000 ***
Embankment and Flat	1.016	0.242	17.58	0.000 ***
Cut and Flat	-0.128	0.611	0.04	0.834
Both-sides Embankment	0.838	0.210	15.88	0.000 ***
Both-sides Cut	0.435	0.289	2.27	0.132
Land Use (Area Ratio)				
Open Water	-0.011	0.007	2.40	0.122
Pasture	-0.010	0.002	24.93	0.000 ***
City	-0.006	0.002	9.14	0.003 **
Forest	-0.006	0.002	9.96	0.002 **

References

- Hubbard, W. M., Danielson, J. B., Schmitz, A. R. (2000) Factors Influencing the Location of Deer-Vehicle accidents in Iowa, *The Journal of Wildlife Management*, Vol.64, pp.707-713.
- Noro, M., Hara, F., Hagiwara, T. (2009) Determining Causal Factors in Deer-Vehicle Collisions by Examining Deer Ecology, *Infrastructure Planning Review*, Vol.26, pp.889-900.

Understanding and Predicting NDVI spatial pattern with climate and topographical variables using GWR

Myeong-je Kim¹, Hye In Chung¹, Jinhoo Hwang¹, Junhee Lee¹, Yu-young Choi¹, Jieun Ryu² and Seong-Woo Jeon¹

¹Department of Environmental Science and Ecological Engineering, Graduate School, Korea University, Korea

Keywords: GWR, NDVI, climate variables, topographical variables, spatial autocorrelation, Moran's I

1. Introduction

Normalized Difference Vegetation Index (NDVI), which shows the quantitative reference of forest distribution and the quality of forest area, has been commonly used to understand the changes in its spatial patterns. And they are influenced by natural factors such as topography, climate and so on.

In this study, using GWR model, we try to prove the actual correlation of NDVI and climate and topographical variables, and to identify their estimated regression equation.

2. Main Methods

2.1 Using GWR model

In this study, GWR model has been used to improve the accuracy of prediction. Although OLS, Ordinary Least Squares, regression model with vegetation index has been used to analyze their correlation, it has its own limits of not reflecting on spatial autocorrelation that spatial data, such as distribution of vegetation groups have when they are concentrated in space. Therefore, GWR, Geographically Weighted Regression, has been widely used lately to consider the spatial autocorrelation of each variable.

2.2 Analyzing and Predicting the relationship

Using GWR under the South Korean region, this study try to 1) analyze the correlation of forest distribution represented by NDVI and climate and topographical variables and 2) predict NDVI change and the trend of its spatial distribution,

deriving relation (NDVI = f(climate, topographical variables)) where NDVI is a dependent variable.

3. Conclusions

We've also conducted to verify the spatial accuracy, acquiring spatial data of satellite images, and analyzed the spatial characteristics of patterns with low accuracy. Based on the results, we'll further study the NDVI change of South Korea under climate change scenarios.

Acknowledgements

This subject is supported by Korea Ministry of Environment (MOE) as "The Chemical Accident Prevention Technology Development Project."

References

- Binbin Lu, Paul Harris, Martin Charlton, Chris Brunsdon (2014) The GWmodel R package: further topics for exploring spatial heterogeneity using geographically weighted models, *Geo-spatial Information Science*, pp.85-101
- Hye-Young Kim, Chul-Min JUN (2012) Land value analysis using Space syntax and GWR, *Journal of the Korean Association of Geographic Information Studies*, pp.35-45
- Luo Guo, Z Ma, and Lianjun Zhang (2008) Comparison of bandwidth selection in application of geographically weighted regression: a case study, *Canadian journal of Forest Research*, pp.2526-2534
- Z. Zhao, J. Gao, Y. Wang, J. Liu, S Li (2015) Exploring spatially variable relationships between NDVI and climatic factors in a transition zone using geographically weighted regression, *Theoretical and Applied Climatology*, pp.507-519

Future Potential of Soundscape Monitoring in Urban Greenery

Koji AINOTA¹, Akira TANAKA¹

¹Tokyo City University, Japan

Keywords: soundscape, biodiversity, monitoring, urban, greenery

1. Introduction

Ecosystem evaluation in existing Environmental Impact Assessment has several issues such as time consumption, high costs, lack of quantitative evaluations and considerations of relativity between other evaluating items in EIA, and dependence on researchers' knowledge and experiences for accurate investigation results. Rapid and quantitative ecosystem evaluation is increasing in demand with the recent trends of applying rapid assessment for ecosystem evaluation. In this study, we considered the future potential of soundscape monitoring for applying to 1)Ecosystem Evaluation in Environmental Impact Assessment, 2)Ecosystem Evaluation of Urban Greenery Area.

2. Methodology

2.1 Field Investigation

We conducted an investigation that was implemented from September to November in 2014 to collect soundscapes by using recorders.

The recorders have built in stereo microphones, and these were used to hold 24 hours of recordings in each sites. In total, the investigation was done in 26 recording sites which have different land uses. These study areas are located around urban areas in Japan. The land uses were forests(F), bamboo forests(BF), artificial lands(AL), grass fields(GF), residential districts(RD), residential street(RS), paddy fields(PF), farms(F), pond, waste land(WL), streams, residential parks(RP), greening area(GA), and so on.

2.2 Analysis

To consider the relationship between soundscapes and landscapes, we chose several different factors, such as Natural Sounds Values(NSV), Green Coverage Ratio(GCR), the number of calling cricket species(NCCS),

Vegetation Diversity Index(VDI), and Shannon Index(Acoustic Diversity Index ; ADI). The correlations were calculated by applying Pearson product-moment correlation coefficient(PPMCC).

3. Discussion

The figure shows the results of ADI, VDI, & NCCS. The results of PPMCC analysis are listed below. VDI & NCCS : 0.57, VDI & ADI : 0.48, NCCS & ADI : 0.49, GCR50m & ADI : 0.45, and GCR100m & ADI : 0.42. The results suggested weak correlation between ADI & other factors. Meanwhile, we found strong positive correlations between NSV and GCRs as the table shows. We emphasize that there are potential applications of Soundscape Monitoring in Japan.

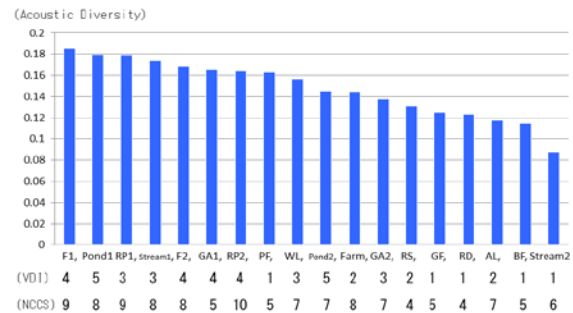


Figure : Results of ADI, VDI, & NCCS

Table. Results of PPMCC between NSV and GCR

Daytime : 6am-6pm		Nighttime : 6pm-6am	
Average Score	Average Score	Average Score	Average Score
Radius50m	Radius100m	Radius50m	Radius100m
r : 0.76	r : 0.80	r : 0.57	r : 0.50
t : 5.82	t : 6.59	t : 3.47	t : 2.85
p<0.01	p<0.01	p<0.01	p<0.01

Reference

Ainota K., Tanaka A.(2016) Basic Study of the Relationship between Environmental Sounds and Green Coverage Ratios : Potential Application of Sound Monitoring to Ecosystem Evaluation. *Environmental Information Science Vol.30 No.41*, pp.375-392.

Conservation Priority Mapping of Forest Ecosystem Services in the Case of Nagoya, Japan

Kiichiro Hayashi¹

¹Nagoya University, Japan

Keywords: Ecosystem Service, Biodiversity, SEA, Japan, Conservation Map

1. Introduction

Urban city has been facing a strong development pressure on the nature. Expanding residential area has been causing the degradation of forest area and also the fragmentation of the natural area in a city. Nagoya City, Japan is facing the same issues which lead to the loss of ecosystem services (ESs). In this study, based on multi-point forest survey, ES maps were developed which can be utilized for a conservation priority mapping.

2. Study method

2.1 Study area

Nagoya City, Japan is selected for this study area. Nagoya region is the third largest city in population and economic activities in Japan. Because of the urbanization, urban forest in Nagoya City has been degrading. City's green area occupied only 22 % of the total area of the city (Nagoya City, 2015).

2.2 Method

A multi-point forest field survey was conducted. Up to now, nearly 200 forest sites in the city have surveyed. In this study, forest is defined as 1ha and more canopy area in the city. In each forest, 100m², 300m² or 400m² study sites were set up for a field survey which is similar with Hayashi and Ooba (2015, in press).

After collecting the basic data, several ESs were calculated and mapped including biodiversity related topics, regulating services, supporting services and cultural services.

3. Conclusions

Based on the assessment of the ES mappings, conservation priority was developed taking into consideration the distribution of the ES potential supply.

Acknowledgement

We thank the Nagoya City Greenification and Public Works Bureau and many forest owners. We thank N. Yoshino, W. Kobayashi, N. Kawaguchi, J. Okata, H. Takagi, T. Matsumoto, H. Sumi and others for their assistance. This was supported by KAKENHI15K00622 from JSPS, Japan.

References

- Nagoya City. 2015. Green coverage research in Nagoya. Nagoya City office web site: <http://www.city.nagoya.jp/shisei/category/53-3-3-1-0-0-0-0-0-0.html>. (in Japanese)
- Hayashi, K., and Ooba, M. 2015. A framework study on the methodology of biodiversity offset assessment in Japan—Hypothetical case of GIS screening and on-site field assessment—. IAIA15 Web Proceedings, http://conferences.iaia.org/2015/final_papers.php, accessed November 25 2016.
- Hayashi, K., Ooba, M. (in press) Spatial assessment of cultural ecosystem services for urban forests based on a multi-point field survey: case in Nagoya City, Japan. IJERD8-2.

An Initiative of SEA for the Local Energy Transition

Jong-Gwan Jung

Chungnam Institute, Korea

Keywords: Energy Transition, SEA, scenario, participatory planning

1. Introduction

Energy transition is generally defined as a long-term structural change in energy systems. That is a particularly significant set of changes to the patterns of energy use in a society, potentially affecting resources, carriers, converters, and services. Particularly the debate on phase-out of coal and nuclear power plants is progressing rapidly due to changes in internal conditions, including the occurrence of earthquakes and frequent air quality deterioration issues in Korea. The Korean Ministry of Commerce Industry and Energy has announced the 'Renewable Energy 3020 Plan', which is to extend the portion of renewable energy mix to a target of 20% by 2030. In this context, to achieve this target we need ambitious action plan in the provincial level. And cumulative effects are part of the framework for the local energy transition at the project levels according to the application of the back-casting scenario schemes.

2. Method

We set up representative model to forecast the future energy system by using accumulated dataset on energy consumption and supply, which is to estimate the change in specific point of future. And then draw out critical variables to predict that will affect the energy system.

By accepting these conditions, we set 3 scenarios, such as CE(carbon economy) as is to maintain existed trends, NE(new energy) with technology innovation and focus on the hydrogen industry in low growth era, and EC(energy citizen) with post-coal renewable sources. In the process of scenario setting, we selected quantitative variables to energy demand for each section. And future estimation of these are used based on the statistical database and regional development plan such as population, GRDP, and added value along the industry.

3. Result

Under the condition that congested coal-fired power plants in Chungnam Province, we need some strategies to reflect the diverse possibility and constraints through the transition scenarios. A transition toward sustainable energy is the shift to decentralized renewable energy and efficiency. Although so far these shifts have been replacing coal-fired energy, their declared goal is the abolishment of coal, reducing non-renewable energy sources and the creation of an energy system based on 60% renewable energy by 2050. Achieving the necessary energy transition will require interests to be weighted at national and local level. SEA can support the discussions among many stakeholders by presenting the options for transition. This may also assist in reducing public resistance to plans for transition. Energy Vision of Chungnam Province contains aspirations for 2050 and a vision on the direction of developments within the area for ensuring complete energy neutral in 2050.

We suggested Provincial energy vision with the objective to transit all the traditional energy to renewables expressed as a slogan of 'Full of starlight made by energy citizen'. This includes the participatory planning that making a plan and implement to invest demand side management and renewables development scheme as an energy transition process. This would bring multiple benefits such as better quality of life, job creation and social inclusive growth.

References

- Canter, L. (2015), Cumulative Effects Assessment and Management, pp.269~273.
- World Bank (2017), Environmental Assessment: Emerging Lessons Series #3, Washington DC, pp. 31~36.
- NCEA (2018), Views and Experiences, pp. 26~27

Comparative Study on Tiering Systems in Strategic Environmental Assessments in Japan and the United States

Keisuke GOTO¹, Akira TANAKA²

¹Tokyo City University, Japan

² Tokyo City University, Japan

Keywords: Tiering, SEA, Policy, Plan, Program

1. Introduction

In Japan, implementation of the environmental impact assessment (EIA) process in earlier stages is promoted. Correspondingly, tiering is utilized, however, it is noted that tiering used in Japan does not have original meaning of tiering. Therefore, this study clarifies and compares the definitions of tiering used in Japan and the United States

2. Method

This study clarifies the definitions of tiering used in Japan and the United States by consulting the relevant statutes, directives and guidelines implemented in Japan and the United States.

3. Conclusions

Tiering used in the countries surveyed are presented in Table 1. It is noted that, in the United States, tiering refers to the difference in the scale and characteristics of decision-making in the prior and later tiers in the tiered process and collection of information at each tier according to the corresponding characteristics. On the other hand, in Japan, tiering refers to using, in the later tier, the information collected in the prior tier.

Table 1: Definitions of tiering in the countries surveyed

Countries surveyed	Tiering
Japan	Tiering in the plan stage refers to utilizing or reflection on the information and result collected in the plan stage of the research in the

	investigation, forecasting, and evaluation stages to make the EIA process effective and reasonable
United States	Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review (§1508.28). Whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent statement or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental assessment need only summarize the issues discussed in the broader statement and incorporate discussions from the broader statement by reference and shall concentrate on the issues specific to the subsequent action.

Source: Environment Agency (2013) [Japan]; Council on Environmental Quality (1970) [United States]

References

- Environment Agency (2013) Technical Guide to Consideration in Plan Stage, 189pp. (This is an English translation of the original text written in Japanese)
- Council on Environmental Quality (1970) Regulations for Implementing NEPA.

Total factor productivity analysis considering environment and energy factors

Zhang Qihui¹, Mao Xianqiang¹

¹Beijing Normal University

Keywords: Total factor productivity; environment; energy; DEA; EKC

1. Introduction

In past four decades, rapid economic growth has caused great energy consumption and serious environmental and ecological problems in China. China is now the world's largest energy-consuming country and the largest emitter of carbon dioxide (CO₂). In 2017, the total energy consumption reached 4.47 billion tons of standard coal equivalent (SCE), which is about 7.82 times that of 1978. Therefore, adjusting the energy structure and increasing the efficiency of energy use will greatly benefit the building of an environment-friendly society. Recently, China has introduced a series of policy measures to adjust the energy structure and increase the proportion of non-fossil energy sources. Does energy structure adjustment improve energy efficiency and reduce CO₂ emissions? What is the optimal energy structure? What are the energy efficiencies of different energy types? And what is the potential CO₂ emission reduction after china's energy structure adjustment? These issues will be discussed in this article.

2. Methods

2.1 The environmental Kuznets curve (EKC) analysis

EKC hypothesis attempts to explain the impact of economic development on environmental pollution by simulating the evolution between per capita income and environmental pollution indicators. In general, the environmental Kuznets curve presents an inverted "U" type.

The basic model of the environmental Kuznets curve is as follows.

$$Y_i = \alpha_i + \beta_1 x_i + \beta_2 x_i^2 + \beta_3 x_i^3 + \varepsilon_i \quad (1)$$

Where Y denotes per capita CO₂ emissions or CO₂ emissions per unit of GDP; x denotes per capita regional GDP; subscript i denotes different cities or regions; α is a constant; β_k is a coefficient

of the k-th explanatory variable; ε is a random error term.

2.2 Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) is an efficiency evaluation method based on the concept of relative efficiency.

In this study, a calculation model SBM model considering undesired outputs is used. Assuming there are n DMUs, each DMU contains m inputs and s outputs. The calculation method is as follows.

$$\min \rho = \frac{1 - \frac{1}{m} \sum_{i=1}^m s_i^- / x_{io}}{1 - \frac{1}{s_1 + s_2} \left(\sum_{r=1}^{s_1} S_r^g / y_{ro}^g + \sum_{r=1}^{s_2} S_r^b / y_{ro}^b \right)} \quad (2)$$

$$\begin{aligned} s.t. \quad & x_o = X\lambda + s^- \\ & y_o^g = Y^g \lambda - s^g \\ & y_o^b = Y^b \lambda + s^b \\ & \lambda \geq 0, s^- \geq 0, s^g \geq 0, s^b \geq 0 \end{aligned}$$

3. Preliminary Conclusions

The EKC curve of China's urban CO₂ emissions presents an inverted "N" type, most cities in China are near the highest point of the curve. Since there are great disparities in potential energy savings and CO₂ emission reductions in regions, policy making for the efficiency improvement should take these differences into consideration. Energy structure adjustment by decreasing coal consumption while increasing other energies' supplies is an effective way to improve the efficiencies of coal dominated energy structure in China. Promoting non-fossil energy is an important way to adjust the existing energy structure. However, this should be done according to local conditions.

Reference

Onater-Isberk E (2016) Environmental Kuznets curve under noncarbohydrate energy, Renewable & Sustainable Energy Reviews, 64:338-347.

Strategic Environmental Assessment Framework for Carbon Capture and Storage in Japan

Kentaro Nakamura ,Kenichiro Yanagi, Eiji Komatsu and Akihiro Nakamura

Centre for Environmental Law, Meiji University, Japan

Keywords: Carbon Capture and Storage (CCS), SEA, Environmental law, Climate change, Long-term liability

1. Current legal framework of EIS for CCS in Japan

Current legal framework of EIS for Carbon Capture and Storage (CCS) in Japan is stipulated in the Marine Pollution and Prevention Law. However, the environmental impact assessment law does not target for CCS project itself.

2. Uncertainties of CCS projects

CCS has scientific and technological uncertainties (e.g. data or facts on leakage) and uncertainties due to long time scale of CO₂ storage. Considering some of cancelled large-scale projects in EU, these uncertainties, along with financial problems, are key factors of success of the projects.

3. Role of SEA

EIA will contribute to find and provide knowledge to improve scientific and technological uncertainties, and legal framework of long-term liability contribute to assure uncertainties due to long time scale. For success of individual CCS projects, it is important to assess appropriately and enhance public understanding for the common

factors (features and risks of CCS technology, or its role in national policy of climate change and energy) in every CCS projects, as well as for the factors derived from individual projects. In SEA process, each of feasible multiple scenarios developed by a project planner will be made an impact assessment in aspect of environment, society and economy, so that the best scenario will be identified. In this point, SEA will play an important role because it assesses upper level policies or plans of individual CCS projects.

4. Conclusions

Much of cost for current CCS projects have to rely on national subsidies for much of its large cost, and long time scale storage needs to take account of impacts on future generations. As a result, public acceptance is critical, and to set a legal framework for CCS and apply SEA is expected to enhance public acceptance in Japan. Therefore, it is important to implement SEA in Japan for policies and upper plans including CCS. It is an urgent matter that reflecting result of SEA in policies or plans to overcome challenges and barriers of CCS projects, and designing a long-term policy strategy plans and programs for deploying and increasing CCS.

References

K. Yanagi (2011), *Comprehensive study of environmental assessment law*, Seibunsha , pp.105-107.
 This study is supported by “Environment Research and Technology Development Fund of the Ministry of the Environment, Japan” .

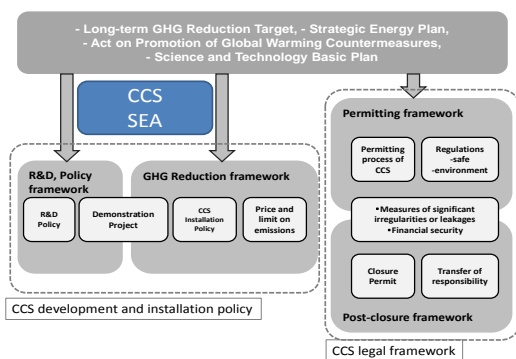


Figure 1: Role of SEA for CCS framework

Experiences of advisory panel on environmental and social consideration in JICA

Takehiko Murayama

Tokyo Institute of Technology, Japan

Keywords: Environmental and social consideration, Development Assistance, Infrastructure project

1. Introduction

Japan International Cooperation Agency (JICA) has started an advisory committee on environmental and social consideration for the projects in 2004. In 2010, the guideline was revised in response to organizational change in 2008. From the beginning of the committee, the author has contributed as a chair, and we have some experiences on advices for specific projects. In this presentation, the outline of activities of the committee as well as our advices for the projects are summarized.

2. Activities of the panel

Currently, the committee consists of 24 members who come from academia, research institutes, consultants as well as NGOs. We review the projects categorized in A (and B if necessary). In general, we have discussions with JICA members twice, the first stage of scoping period after implementation of initial environmental examination (IEE), and the second stage after draft final report has been completed. For each project, we organize a working group and have opportunities to discuss with JICA staffs and study group members in the above two stages. In addition, we have plenary meetings hold on monthly basis, and finalize our comment drafted by the working group.

3. Comments of the panel

Table 1 shows distribution of the panel's advices for targeted projects between 2016 and 2017. The most frequently advised points were alternative analysis, and it was followed by livelihood restoration, explanation to the local stakeholders,

Table 1 Distribution of the panel's advices

Item	Number
Alternative analysis	67
Livelihood restoration	53
Explanation for local stakeholders	41
Local safety and health	24
Biodiversity	23
Vulnerable groups	22
Monitoring	21
Resettlement	20
Noise, Vibration	16
Air pollution	14
Waste	14
Cultural heritage	14
Others	211
Total	540

Local safety & health, and biodiversity. In addition, text mining method was applied for the committee's advices related to recent projects.

4. Effects and challenges

Effects of committee's activities would include the following points, improvement of project reports in view of technical aspect, upgrading the reports on justification and verification of the project, proposal of additional studies and advices on careful consideration to large-scale projects with uncertain impacts. We also have challenges including insufficient Information at earlier stage of proposed projects, mixture of certain and uncertain aspects of findings, limited information on projects' sites, conflicts of views for controversial projects.

Reference

Murayama, Kawazoe, Matsumoto and Sakurai (2012): JICA's Advisory Committee: Benefits and challenges", IAIA Annual Meeting.

Social Impacts and the Human Rights Approach in Asia

Naoyuki Sakumoto

Japan External Trade Organization/JETRO, Japan

Keywords: EIA/SEA, social considerations, human rights, SDGs, Aarhus Convention, UN Guiding Principles on Business and Human Rights

1. Introduction

Most Asian countries have undergone political democratization process in late years, however, many do not reach the attainment of social democratization stage including environmental democracy. From the point of effective EIA implementation, democratic aspects based on human rights are regarded indispensable. In this context, the need for EIA decision-making process in a democratic manner will be focused, together with the discussion how Asian countries are ranked in “international standards.” We are no longer allowed to single out environment issues alone for discussion without considering other global factors under SDGs framework.

2. Title: Social Impacts and the Human Rights Approach in Asia

2.1 General Situation of EIA/SEAs in Asia and the need for social considerations

The status and role of EIA/SEA as one of the environmental management instruments in Asia is examined. The need for paying attention to social considerations is understood indispensable under any socio-political and environmental conditions.

2.2 Tasks and gaps in implementing EIAs and the overcoming efforts

Up to the present, various efforts to develop EIA have been made to strengthen EIAs in Asia through different channels and stages. However, environmental democracy situation in Asia is still weak and the constraints to rights approach are existing. Studies on the human rights approach to the environment in some Asian countries at a

Constitutional level, environmental democracy indexation result, and the environment-related human rights infringement cases are introduced.

2.3 Towards the internationally standardized environmental goals

Three environment-related international goals, including SDGs, Aarhus Convention, UN Guiding Principles on Business and Human Rights, are discussed and analyzed to examine the underlying basic principles. These documents are regarded important from the point of identifying the basic principles and specifying the roles and responsibilities of environmental actors in realizing environmental democracy.

3. Conclusions

Asian countries are still fragile in the attainment of environmental democratization. EIA can be referred to as a Roman God “Janus” who has two contrasting faces of democratic and regulatory aspects. Development of public participation in EIA symbolizes the degree of democratized decision-making process in respective country. In this point, human rights approach depends much on respective country’s political and social situation, however, it should not be ignored.

References

UNECE (United Nations Economic Commission for Europe). The Aarhus Convention: An Implementation Guide (2nd ed., 2014).

WRI (World Resources Institute). “Environmental Democracy Index,” (<https://environmentaldemocracyindex.org/>)

EIA implementation and challenges in Myanmar - Survey with possible support from Japan

Kaoru Akahoshi¹, Shunsuke Hieda² and Naoko Genjida¹

¹Institute for Global Environmental Strategies (IGES), Japan and ²Nippon Koei Co., Ltd., Japan

Keywords: EIA, Bilateral Cooperation, Capacity Building, Myanmar, Japan

1. Introduction

Ministry of Natural Resource and Environment Conservation (MONREC), Myanmar introduced EIA procedure (EIAP) in December 2015. The Ministry of Environment Japan (MOEJ) was considering to support Myanmar which stands at the initial stage of effective implementation of EIA. As a starting point, MOEJ, Institute of Global Environmental Strategies (IGES), and Nippon Koei Co. Ltd. conducted a ground survey and interviewed MONREC officials, NGOs, Environmental consultants, and Japanese businesses in Myanmar on EIA related issues in November 2017. Based on that survey, several cooperation programs have been devised as possible means of Japan's cooperation to the country. We will introduce the results of the survey and discuss possible supports Japan could provide to Myanmar.

2. Current problems on the ground

2.1 Current situation and challenges

Myanmar's assessment has three types of procedures namely EIA, Initial Environmental Examination (IEE), and Environment Management Plan (EMP). According to the interview survey, several issues MONREC faces in the operation of EIAP, and existing support programs for MONREC provided by various development assistance organizations were identified. The existing problems are:

- Issues related to EIAP institutions (e.g. The targets are quite extensive; Existing cases are also requested to go through EIAP.)
- Issues related to EIAP enforcement (e.g. More than 2,500 cases have on the waiting list to get reviewed.)
- Lacking in human resources (both MONREC staff and environmental consultants)
- Insufficient of technical capability

As for these problems, the necessity of support with the mid- to long-term span has been confirmed. In addition, another urgent issue is that MONREC plans to drastically increase the number of staff in the future aiming for decentralization to the local branch department.

The large number of new staff with various background need capacity building on basics of environmental problems and technical knowledge for EIA work.

2.2 Consideration of a cooperation program

As for drafting cooperation programs, following points were taken into consideration: to be flexible as MONREC is still in the early stage of EIA implementation; to avoid overlapping of supporting programs and cooperate with other donors; to utilize the strengths of Japan especially in forecast and evaluation technics of environmental impacts that has not been supported by other donors yet; to utilize IGES' research and analysis in EIA in neighboring Asian countries to support Myanmar.

3. Possible cooperation and points to note

3.1 Support programs planned:

- 1) Provision of EIA technical guidebook
- 2) Technical training for new staff: Basic information and assessment training
- 3) Setting up a help desk for businesses on EIA (Web-site based)
- 4) Establishing a monitoring database on EIA implementation status

3.2 Challenges to be addressed :

- How we could help MONREC staff to understand the importance of EIA rather than conducting EIA as a simple administrative procedure to get funds.
- How to motivate trainees who could be so-called "training fatigue" by taking lots of training from various donors.
- In the long term, wider scale of institutional reform might need to be also considered.

References

MOEJ, IGES, Nippon Koei Co. Ltd., et al. (2018) Commissioned Report for Promoting Asian Regional Collaboration on EIA: pp171-226, Appendix: pp1141-1221

Japan Association of Environmental Assessment (2017) Technical Guidebook on EIA: pp6-303

Environmental and economic impacts of “the Belt and Road Initiative” on typical countries alongside

Jianhong Lu¹, Zhengyan Liu¹, Peng Song², Xianqiang Mao^{*,1}

¹School of Environment, Beijing Normal University, No. 19 Xijiekouwai street, Beijing 100875, P. R. China

² School of Public Affairs, Chongqing University, No. 174 Shazheng street, Chongqing 400044, P. R. China

Keywords: “the Belt and Road Initiative”, trade policy, Environmental Impact Assessment, GTAP model, NTBs reduction

1. Introduction

“The Belt and Road Initiative” is an ambitious economic vision. It will promote the opening-up of and cooperation among the countries along this route, and also generate economic and environmental impacts on those countries which are currently facing the most challenging development and environmental problem. But there have yet been no studies to analyze the economic and environmental consequence of the most important trade liberalization. This research aims to identify the environmental and economic impacts of “The Belt and Road Initiative” from the angle of NTBs reduction.

2. Methodology and Data

2.1 Methodology

GTAP Model is a multi-sector, multi-regional computable general equilibrium (CGE) model, which is employed to simulate the economic impact of NTBs reduction due to the Belt and Road as a basis for projecting its environmental impact.

Low, moderate and high trade facilitation scenarios were established to simulate different implementation efforts on basis of baseline scenario. Considering the planning of the Belt and Road and trade volume, the change of NTBs between ASEAN and China, Russia and China, India and China, European Union and China were simulated in this study.

2.2 Data sources

Main data for GTAP model is derived from GTAP 9 database. The sectoral GHGs and pollutant emissions factor data of China and other trade partners in 2011 are drawn from WIOD. AVEs of NTBs used in this study come from the research Overall Trade Restrictiveness Indices and Import Demand Elasticities published by World Bank (Kee et.al, 2006).

3. Conclusions

“The Belt and Road Initiative” will bring a win-win consequence to objective regions. Social welfare and GDP of China, ASEAN, India, EU and Russia rise in different simulated scenarios, which shows the positive effect of “The Belt and Road Initiative” on economics. The various changes of imports and exports in different sectors of different regions shows that “The Belt and Road Initiative” allows the countries and regions to maximize its comparative advantages in manufacture goods. From the perspective of environmental impact, total GHGs and pollutants (SO_x, NO_x) emissions of China, ASEAN, India and Russia decrease, GHGs and NO_x emissions in EU decrease but SO_x emissions in EU increase. These changes in different regions take global GHGs, SO_x and NO_x emissions decrease, which means this strategy can facilitate a downward trend of global total GHGs and pollutants emissions.

References

Kee, H.L., Olarreaga, M., Nicita, A. 2006. Estimating Trade Restrictiveness Indices. *The Economic Journal* 119(7): 172-199.

A Comparative Study of EIA System Between China and Vietnam: Biodiversity and Climate Factors into Green One Belt One Road Initiative

Rui Huang¹

¹Beijing Normal University, China

Keywords: EIA system, Comparative Study, Biodiversity, Climate Factors, Green One Belt One Road Initiative

1. Introduction

Since 2013, China putting forward its One Belt One Road Strategy, the cooperation between China and Vietnam in political, economic and environmental protection tends to closer and closer. Meanwhile, as one of the fastest growing countries in the region, Vietnam is facing both the opportunities and challenges from the international community, which is also a double-edged sword for its natural environment, threatening the local biodiversity and increasing the adverse impact of climate factors. Though both China and Vietnam have been developing national environmental impact assessment (EIA) for decades, there are significant differences between the systems.

2. Description and comparative analysis of EIA system in China and Vietnam

As SEA in the two countries is still in the early stage of development, this study mainly compares the EIA for construction projects.

2.1 Legal guarantee

EIA is required by environmental legal system and guided by specific regulations in both countries. While only Vietnam requires the protection of biodiversity by law.

2.2 Purpose

EIA focuses more on coordinated development of economy and environment in China, and reflection of environmental protection in social activities in Vietnam.

2.3 Structure of reports

More bio-diversification content is involved in Vietnam's EIA structure according to the official circular.

2.4 Appraisal process

The decision-making authority in both countries regulates the preparation and implementation of EIA through the appraisal process.

2.5 Public participation

There is more attention to climate factors and necessary components for public participation in Vietnam.

3. Conclusions

The comparison between Vietnamese and Chinese EIA systems shows possible ways to seek common ground while reserving differences in bilateral cooperation, which is the key to flourish the development and build Green One Belt One Road Initiative.

References

- Alison Clausen, Hoang H. Vu, M. Pedrono (2011). An evaluation of the environmental impact assessment system in Vietnam: The gap between theory and practice. *Environmental Impact Assessment Review*, 31(2).
- Law on Environmental Protection. Vietnam, 2005
- Law of People's Republic of China on Environmental Impact Assessment, 2016

Geothermal Development Potential Evaluation Considering Environmental and Social Conditions

Takumi Nagashima¹, Takehiko Murayama¹, Atsushi Nagaoka¹, and Shigeo Nishikizawa¹

¹ Tokyo Institute of Technology, Japan

Keywords: Renewable Energy Potential, Geothermal Development, GIS, Energy Policy, Sociacceptability

1. Introduction and purpose

Amount of geothermal resource development in Japan is 2% of estimated amount of viability. Evaluation of geothermal development potential is being studied as a promotion measure for development. However, it is pointed out that consideration of environmental and social conditions is not sufficient.

Purpose of this research is to evaluate potential of geothermal development considering more expanded environmental and social conditions and to clarify issues for introducing geothermal power generation in Japan in the future.

2. Method

Based on survey conducted by Japanese Ministry of the Environment in 2014, data on four kinds of environmental and social conditions not considered were added and analyzed (Figure 1). 2 out of 4 analyzes are described in the next part.

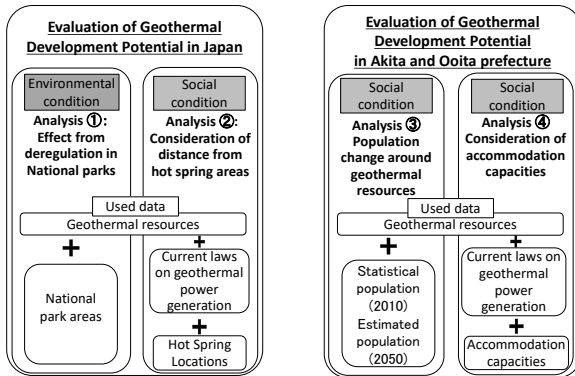


Figure 1 Research Framework

3. Result

3.1 Effect from deregulation in National parks

The amount of geothermal resources that can be drilled in Type 1 Special Region where the deregulation was made in 2017 was calculated. The main results are shown in Table 1.

Result shows 9.3% of drilling geothermal resources existed in this area nationwide average, indicating the possibility that these can be drilled due to deregulation.

Table 1 resources in type 1 special area

Prefecture	Total (kw)	Within Type 1 Special Area (kw)	Ratio
Hokkaido	2,779,098	300,866	10.8%
Akita	2,071,153	444,817	21.5%
Toyama	618,523	345,174	55.8%
Total	22,202,520	2,067,467	9.3%

3.2 Population change around resources

For Akita Prefecture and Oita Prefecture, it was clarified how much population exists in area 2 km from geothermal resource (about 2010 statistics and estimates in 2050) and rate of change in population. Area map about distribution of resources and population is shown in Figure 2, and result is shown in Table 2.

As a result, in both prefectures, the population declines by more than 30% in 2050, and in Akita prefecture the population will be halved. This suggests Akita would have a lower development risk in terms of impacts to living environment.

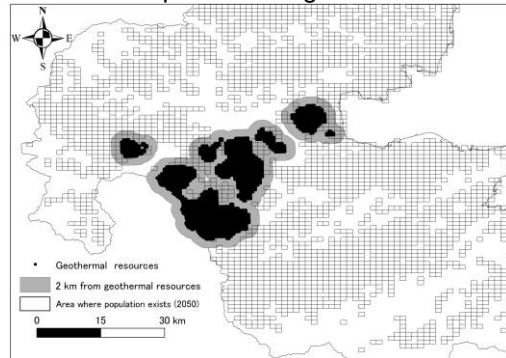


Figure 2 Distribution of resources and population (in Oita Prefecture)

Table 2 Population near resource (2010, 2050)

Prefecture	Population		change rate (Base: 2010)
	2010	2050	
Akita	21,457	11,589	54.0%
Oita	142,415	97,243	68.3%

4. Conclusions

The following findings were obtained by four analyzes.

- In the national level, 1) Deregulation in national park type 1 special areas increase geothermal resources equivalent to 9.3% in national level. 2) Considering the influence from the existing hot spring area, new geothermal resources of 20% or more would be newly considered.
- From case study for two prefectures, 3) The population near geothermal resources tends to decrease by 30% or more. 4) The impact of economic activities considering accommodation capacity would be high at around 40%.

Reference

Jouju Uechi, et al. (2016) Conflict Analysis over Geothermal Power Developments, planning and public management, No. 39(3), pp.44-57.

Research on Community Acceptance of the Woody Biomass Power Plant

Kaiwen Ji¹, Shigeo Nishikizawa², and Takehiko Murayama³

¹Tokyo Institute of Technology, Japan

² Tokyo Institute of Technology, Japan

³ Tokyo Institute of Technology, Japan

Keywords: Biomass, Community Acceptance, Environmental Impact, Complaint, Annoyance

1. Introduction

After FIT is introduced in Japan, certificated capacity of biomass power electricity is growing rapidly, over 14.8MW by Nov. 2014. Woody biomass is playing an important role in biomass electricity. There have been some researches about social acceptance of woody biomass powerplant, while no research is about the impact to local communities. This research is to make clear the community acceptance of biomass power plants by investigating on disputes and complaints about biomass power plant and make clear the impact and annoyance to residents.

2. Methods and Results

2.1 Framework

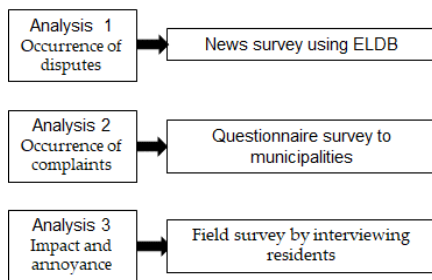


Figure 1: Research Framework

Figure 1 shows the framework of this research.

2.2 Disputes and complaints

There are 6682 articles about woody biomass from 1999 to Apr. 2017, only 1 is about disputes. There are 8 articles about 'biomass opposition', but most of them are special cases about wood

from Fukushima, affected by the accident, only 2 articles are about opposition to biomass facilities. In order to make clear the complaints to woody biomass power plants, a questionnaire survey to 40 municipalities is done, 22 questionnaires are collected, and 3 had complaints about woody biomass power plant.

2.3 Impact and Annoyance

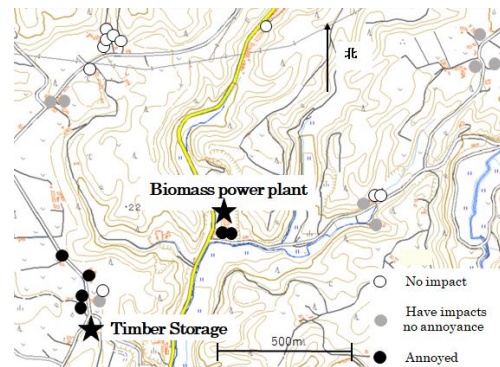


Figure 2: Distribution of the Residents

Result of the field survey is showed in Figure 2. 23 answers from 37 residents are collected. All people who feel annoyed are living near 500m to the plant or the timber storage according to this figure.

3. Conclusions

Woody biomass power plant and its storage may have impact to residents live within 500m.

References

Agency for Natural Resources and Energy (2015), 「About the tendency of renewable energy introduction」

Sustainable Energy and SDGs

-From the first RE100 university in Japan-

Sachihiko Harashina¹, and Yurika Ayukawa¹

¹Chiba University of Commerce, Japan

Keywords: Renewable Energy, RE100, Natural Energy, Heart-ware, CUC

1. Introduction

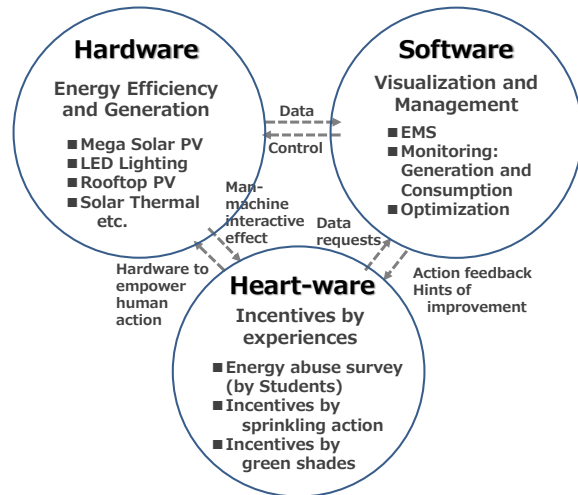
The goal 13 of the SDGs, Climate Action, is quite important for sustainable future. The RE100 movement is a good way to shift energy policy sustainable, as concrete activities indicating the possibility of renewables should work effectively to change the mind of the people. The first RE100 University in Japan was appeared in 2018, which is Chiba University of Commerce, CUC.

2. Three wares for introducing renewables

To change a policy in a society, three types of wares of hardware, software and heart-ware are necessary as shown in the figure. The authors started the actions towards RE100 by holding open seminar series for enlightenment, a measure for Heart-ware creation, of the CUC community in 2013 when the Feed in Tariff system to promote renewables was started. In the same year, CUC management installed a mega solar PV as a fund operation by applying FIT on the Noda site 10km far from the main campus in Ichikawa. The performance in 2014, the first year, was quite good. The electricity produced was equivalent to 77% of that consumed in the main campus.

3. The process to be the first RE100

Then, Dr. Harashina, as Dean of the Faculty of Policy Informatics at that time, launched “Energy saving and energy generating project” in 2014, and a feasibility study on RE100 in electricity was conducted, supported by government subsidy, and lead by Prof. Ayukawa with the help of outside experts, together with students in 2015. The result of the study showed the possibility. Becoming the CUC president In 2017, Dr. Harashina authorized



the project as a university activity and decided investments of installing such hardware as LEDs for lightings of all buildings and additional solar panels at the Noda solar plant and introduced such software as EMS. These actions were taken within FY2017 and CUC became, theoretically, the first RE100 University in Japan, which is on electricity. CUC is examining it by monitoring the performance within FY2018.

4. Next step

CUC also sets more ambitious goal as RE100, which is on total energy use including not only electricity but also heating until FY2020. To achieve the 2020 goal, we will work with students for energy saving, and make investments for energy producing by installing more rooftop solar panels and a bio-gas turbine in the main campus. We believe that the power of commerce could change the society towards sustainable energy.

References

CUC Press Release (2017) Towards the 1st RE 100 University in Japan. 13, November 2017

The relation between thermal stratification strength and carbon cycle in a stratified reservoir

Hyungseok Park, Sewoong Chung, Sungjin Kim, Eunju Lee

¹Chungbuk National University, Korea

Keywords: Carbon cycle, GHGs, Lake number, Lake Analyzer, Schmidt stability

1. Introduction

Inland waters take an important role of the global carbon budget estimation because of the ability to store, decompose and emission organic carbon from watersheds (Battin et al., 2009). Over 1 million dams globally were reported that important source of GHGs as like CO₂, CH₄, N₂O (Demeer, 2016). However, studies on the 'pulse emission' mechanism occurring during the convective mixing of atmosphere-water surface and turnover have been insufficiency. The aim of this study was to discover the relation between thermal stratification strength and carbon cycle using measured data of pCO₂, temperature profiles.

2. Materials and Methods

Monitoring was performed during July–December 2017 at the Daecheong Reservoir in Korea. Weather (temperature, precipitation, wind direction & speed) and reservoir operation data (inflow, outflow, water level) collected from Korean Meteorological Administration and K-water. To survey the seasonal changes of stratification in the reservoir, thermistor chain (15 ea) was installed in front of the dam from 0 to 33 m by depth, measuring data every 10 minute. Schmidt stability(*S_t*) and Lake number(LN) as indicators of stratification strength in the waterbody were calculated from collected temperature data using rLakeAnalyzer package in R. In situ pCO₂ was measured to survey for distribution of CO₂ partial pressure by water depth using a submersible NDIR detector (Pro-Mini CO₂, Pro-Oceanus Systems Inc., 2016).

3. Results and discussion

At the beginning of the survey, the temperature was 26.7°C in the middle of July, *S_t* was 2383 J m⁻² that stable thermal stratification was formed. And, highest *S_t* showed 2674 J m⁻² on August 12. As the average temperature dropped below 10 °C at the end of October, the thickness of metalimnion decreased sharply (8.8 -> 4.4 m) and the thermal stratification intensity weakened(*S_t* 790.2 J m⁻²). During mixture between the upper and lower layer by turnover mechanism, the pCO₂ of the upper layer increased and the pCO₂ of the lower layer decreased, approaching the equilibrium concentration.

4. Conclusions

pCO₂ was oversaturated under the thermocline during the period in which a stable thermal stratification was formed. Which is caused of accumulated inorganic carbon from decomposition of organic carbon in the bottom layer. pCO₂ of whole layer was supersaturated to 632.6 - 1454.0 uatm after turnover.

References

Battin, T. J., S. Luyssaert, L. A. Kaplan, A. K. Aufdenkampe, A. Richter, and L. J. Tranvik (2009): The boundless carbon cycle. *Nature Geoscience*, 2, pp. 598-600.

This research was supported by the Ministry of Education, Republic of Korea and National Research Foundation of Korea in 2017. (National Research Foundation of Korea-2016-R1D1A3B03-2016131042)

Comparative Analysis of Efforts for Environment Conservation by Travel Companies on Ecotour with Accommodation between Japan and Australia

Jun Otsuka¹, Hideyuki Ito², Takahiro Fujii²

¹Nihon University, Graduate School, Japan

²Nihon University, Japan

Keywords: Tourism, Ecotourism, Eco Certification Program, Tour Operation, Accommodation, Australia, Japan

1. Introduction

Ecotourism is defined responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education. Recently, ecotours based on ecotourism concept have being held in various regions of Japan. However, according to existing research (Ito et al. 2016), it is shown that the efforts for environmental conservation of ecotours without accommodation in Japan is inferior to that of Australian ecotours. Therefore, the purpose of this research is to compare the efforts for environment conservation by travel companies between Japan and Australia using questionnaire survey with focusing on ecotours with accommodation.

2. Questionnaire Survey

The questionnaire in this research was developed based on Australia's advanced certification program that is called "Eco certification program". This Eco certification program is consisted of 55 evaluation items. For simplifying this, we selected and summarized to 39 items by cutting off the items related to Australian aborigines and integrating the questions concerning efforts of environmental conservation of each transportation mode. Consequently, the evaluation items in the questionnaire were questions such as service quality of ecotour, involvement of local communities and efforts for energy saving of accommodation. We asked to answer the

questionnaire to all travel companies operated ecotours in Japan and Australia in five point scale.

3. Results

The total score was calculated by sum of each score of evaluation items. As the result, the both total score of most ecotours and the average score of each ecotour in Australia were higher than that of Japan.

4. Conclusion

It was concluded that the ecotours with accommodation in Japan had many problems such as insufficient actions for environmental conservation, unclear conservation target and no criteria for assessing the ecotours in Japan. Therefore, it could be said that it is necessary to introduce certification program for better ecotours in Japan.

References

- Ito, H., Nakayama, Y., Fujii, T. (2016) Comparative Study on Ecotours of Australia and Japan Based on International Criteria (GSTC) of Ecotourism , Technical Papers of the 19th Annual Meeting, Japan Association for Human and Environmental Symbiosis, Vol.19, pp.1-6.
- Lee, H. W., Moscardo, G. (2005) Understanding the Impact of Ecotourism Resort Experiences on Tourists' Environmental Attitudes and Behavioural Intentions, Journal of Sustainable Tourism, Vol.13, pp.546-565.

Green Infrastructure and It's Future Prospects in Japan

Yuki Shiota¹, and Akira Tanaka¹

¹Tokyo city University, Japan

Keywords: Green Infrastructure, biodiversity, Ecological network, multifunction, stormwater management

1. Introduction

Green Infrastructure (hereinafter it is called "GI") attracts attention because it helps to solve environmental problems such as natural disasters, degradation of biodiversity and improve economic effects. One of the features of GI multifunction is active in many scenes. In contrast to most Gray infrastructures, Single objective. GI is multifunctional which means it can promote win-win solutions or 'small loss-big gain' combinations that deliver benefits to a wide range of stakeholders as well as to the public at large. In addition, there are big effects by a combination of GI and Gray Infrastructure (European Commission, 2013). However, GI has not reached common recognition. The purpose of this study is organizing the characteristics of GI by comparing typical GI through Clarifying how does GI been defined. Then this study is concluded by considering the necessary points to consider to define GI in Japan.

2. Main contents

EU and United States Environmental Protection Agency (hereinafter it is called "EPA") of America have defined GI at country or large range. The EU defines GI as a strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings. (European Commission, 2013). In the EU, GI has strong relationship with Natura 2000. Especially, EU's GI focus on ecosystem networks and biodiversity. On the one hand EPA of America defines GI as a

comprehensive approach to water quality protection defined by a range of natural and built systems that can occur at the regional, community and site scales. (EPA, 2010). EPA's GI focus on solution as flood control and stormwater management.

3. Conclusions

There is no unified definition of GI among the nations. Also, the definition in Japan is not established. GI has not always constant definition, and it could be changed depending on the characteristics of the land or the problems that is facing. Therefore, it is necessary to form a concept of GI based on Japan's problems and features. It is important to consider GI as a small range and a large range. If so, the idea of the Green Region greatly contributes to Japan's GI.

References

- European Commission (2013) Building a Green for Europe Environment infrastructure, 24pp.
- European Commission (2012) Multifunctional Urban Agriculture for Sustainable Land Use,37
- EPA (United States Environmental Protection Agency) (2010) Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure, 76pp.
- Tanaka, Akira (2017) Can EIA be an effective tool for creating ecologically sustainable society? -From the aspect of "Green Region", Proceedings of Impact Assessment and Post Management , the 1st Vietnam-Japan-Korea-China EIA Conference, p.13.

Positive correlation between discussion of alternatives and public involvement

Tetsuya Kamijo

JICA Research Institute, Japan

Keywords: Alternatives, public involvement, quantitative text analysis, positive correlation, minutes of meetings

1. Introduction

Public involvement is a key EIA process but previous studies reveal some shortcomings such as no involvement due to lack of recognition for early participation (Doelle and Sinclair 2006); the gap between legal process and poor practice (Panigrahi and Amirapu 2012); lack of understanding of the process (Wiklund 2011). Some studies propose recommendations to low public involvement such as providing access, adequate notice, and sharing findings (Spaling et al. 2011); mutual trust among stakeholders (Kengne et al. 2013); the authorities credible commitment (Chi et al. 2014). Other studies focus on a relationship between alternatives and public involvement (Hoover and Stern 2014; Rega and Baldizzone 2015; Kamijo and Huang 2016). There is a possibility to improve public involvement through the discussion of alternatives. However, little is known about a linkage between two processes based on data analysis. The study applied quantitative text analysis (QTA) to the minutes of meetings of three projects supported by the Japan International Cooperation Agency. The analysis focused on five subjects (environmental issues, social issues, development issues, alternatives, and a sense of public involvement) using coding rules. The number of paragraphs corresponding to each coding rules was counted according to each stakeholder.

2. Positive linkage of discussion of alternatives and public involvement

The number of participating stakeholders who discussed the alternatives and the number of paragraphs for three projects is 24 and 67

respectively. Out of them, 13 stakeholders mention public involvement in 33 paragraphs. The correlation coefficient between paragraphs of alternatives and the sense of public involvement is 0.77 (** $p < .01$, $n=24$). In addition, the number of participating stakeholders who discussed alternatives in more than two paragraphs is eleven and ten out of eleven stakeholders spoke about public involvement. The discussion of alternatives affects an attitude of participating stakeholders (Cuppen et al. 2012). A good alternatives analysis may induce improved public involvement (Kamijo and Huang 2016). The participating stakeholders who discussed alternatives, tended to show a high sense of public involvement.

3. Conclusions

The positive correlation between the discussion of alternatives and a sense of public involvement was identified. Public involvement could be enhanced through the active discussion of alternatives. Further studies are needed to activate the discussion of alternatives and public involvement.

References

- Kamijo, T., Huang G. (2016) Improving the quality of environmental impact assessment reports: effectiveness of alternatives analysis and public involvement in JICA supported projects. *Impact Assess. Project Appraisal* 34(2), 143-151.
- Kamijo, T., Huang G. (2017) Enhancing the discussion of alternatives in EIA using principle component analysis leads to improved public involvement, *Environ. Impact Assess. Rev.* 65, 63-74.

A Study on the Scientific Assessment of Environmental Impact through the Data Based Assessment

Namwook Cho^{1,2}, Moungh Jin Lee¹

¹Korea Environment Institute, Korea

²Yonsei University, Korea

Keywords: Environmental Data, GIS, Archives, Data Publishing Framework, Data Science

1. Introduction

The environmental impact assessment(EIA) process can be broadly divided into predict through present status information, reduction measures of development, and post-management. Also possible to manage social conflict through EIA(Gauthier et al, 2011).

In order to assess the environmental impact, it is necessary to utilize various regional and environmental information. However, in order to evaluate the environmental impacts scientifically, it is necessary to secure institutional objectivity as well

Because EIA is based on predictions, there is uncertainty and subjectivity is inevitable in the search of mitigation method.

2. Disclosure of EIA

EIA information is being disclosure for value such as transparency of the EIA operation.

The effects of information disclosure can be estimated on the basis of policy evaluation theory and information economics theory.

Through the disclosure, At first, it can strengthen the accountability of the business entity, Second, it can be used as scientific evidence for conflict adjustment. Last, the validity of the EIA system can be strengthened.

3. EIA Archive Case

In Korea, EIA information is provided through EIASS(EIA Support System), which provides on

environmental impact statement, evaluation process, environmental information in the nearby area.

EIASS collects and provides environmental impact statement, and EIA information of various projects based on spatial information. and linking with other information can increase the available for EIA.

4. Conclusions

In order to scientific assessment of environmental impact, it is necessary to operate an information disclosure based system, which can positively affect EIS contents.

In the case of Korea, EIASS provides an environment where spatial or time-series based evaluation can be performed through the disclosure of EIA information.

Especially, information on accumulated EIA can be used for cumulative impact assessment through monitoring of development demand concentrated in a specific area, and can contribute to scientific evaluation

References

- Gauthier, M., Simard, L., & Waaub, J. (2011). Public participation in strategic environmental assessment (SEA): Critical review and the quebec (canada) approach. *Environmental Impact Assessment Review*, No.31(1), pp.48-60.
- Sörme, L., Palm, V., Finnveden, G., 2016. Using E-PRTR data on point source emissions to air and water—first steps towards a national chemical footprint. *Environmental Impact Assessment Review*, No.56, pp.102–112

Stakeholder Engagement in Environmental Impact Assessment: Urban Railway Project in Sri Lanka

Tomoko Kaku¹, and Yohei Suzuki²

¹ERM Japan, Ltd., Japan

²ERM Japan, Ltd., Japan

Keywords: EIA, Stakeholder Engagement, Alternative Analysis, Protected Area, JICA

1. Introduction

The study for the implementation of New Light Rail Transit (LRT) System Project in Colombo, Sri Lanka was conducted by Government of Sri Lanka with cooperation of JICA (Japan International Cooperation Agency) and Environmental Impact Assessment (EIA) study was carried out as part of the study. A case study of stakeholder (SH) engagement during the EIA study will be introduced with some lessons and learns which can be applied to future projects.

2. Stakeholder Engagement in EIA Process

2.1 Importance of Stakeholder Mapping

The LRT Project is proposed to solve traffic issues in Colombo, with total length of approx.16km and 16 stations, and with all elevated structure. As it is a lineal project in urban area, there are various types of SHs which was considered to be one of key challenges in the study. Therefore, at the beginning of the study, stakeholder mapping was conducted carefully. Relevant national/local governments, project affected farmers/business owners, etc. were identified as SHs of the Project.



Figure 2: Stakeholder Engagement Program

2.2 Role of Stakeholders' Involvement

It was highlighted that Involvement of stakeholder played significant role, especially at the process of alternative analysis of route selection. In the process of the route selection, the Project examined several routes through the consultation with various stakeholders for various purposes, such as route around a protected area or sacred trees (Bo trees). For such successful involvement of SHs, however, the Project experienced practical difficulties such as convening SHs in meetings and adjusting conflict of interests of each SH.

3. Conclusions

Early identification and involvement of SHs contributed to the successful EIA process of the Project. Some challenges in the SH engagement are found in practice, thus such lessons can be reflected in other future projects' SH engagement plans and activities.

References

- Government of the Democratic Socialist Republic of Sri Lanka Ministry of Megapolis and Western Development (MMWD) (2018) Environmental Impact Assessment for Colombo Light Rail Transit (LRT) Project.
- JICA (2018) Draft Final Report: Preparatory Survey on the Project for Establishment of New Rail Transit System in Colombo.

Study on timing to protect endanger species in EIA

Mizuki KANAI¹, & Akira TANAKA¹

¹Tokyo city University, Japan

Keywords: Biodiversity, EIA, LCES, Endanger Species, Mitigation

1. Introduction

Japanese Environmental Impact Assessment selects indicator species from the viewpoint of superiority, typicality and speciality, then its habits, abundance and habitat are comprehended. But it doesn't usually include habitat analysis. (Mashuyama, 2007) In fact, in Chiba Prefecture, despite Lake Inba is an important habitat of bittern (*Botaurus stellaris*) which is listed as Endangered (EN), express railroad across the wetland of Lake Inba was still constructed. In Japan, there is a law related to endangered species called "The Law for the Conservation of Endangered Species of Wild Fauna and Flora (LCES)" Which was enforced in 1993, aiming conservation of wild animals and plants. Thus the purpose of this research is to explain how the EIA which manage both development and conservation and LCES which is for biodiversity preservation are related each other, and exactly when the species are conserved.

2. Title

In terms of the relationship for biodiversity conservation between EIA and LCES, the following points can be abstracted. This study investigate these two points based on the existing literature and interview.

1. How does the mechanism of LCES work When the indicator species are identified during EIS?

2.If the species which was found during the practice of EIA was not listed as indicator species but its scarcity value was regarded, are there any emergency steps such as to select as indicator species? In this case, how does the business in question have to deal with it?

3. Discussion

ESA defines "conservation" as "Based on the standard, when the situation of the endangered species and threatened species improved so that they should not be listed anymore." On the other hand, LCES doesn't clearly define nor explain "conservation". Also at the case of LCES, Natural Habitat Protection Areas can be designated only when the Minister of the Environment approves. In the case of ESA, the critical habitat of the species is designated when the species are regarded as endangered species and threatened species. In fact, there are differences in the number of designated area. Despite ESA includes 704 species, LCES is 7 species and 9 sites. This research is still in progress, so it is required to study more about present and future situation of EAI, based on the comparison between the U.S and Japan.

References

Tetsuo Masuyama (2007) Ecosystem Assessment in Environmental Assessment. 259-274, Tatsuya Niisato, Masataka Sato, Wildlife protection technology Second Edition. Kaiyusya, Tokyo, 426. (This is an English translation of the original text written in Japanese)

A Bayesian Approach to Integrated Ecological and Human Health Risk Assessment of Accidental Water Pollution in Watershed Scale

Jing Liu, Renzhi Liu
 School of Environment, Beijing Normal University, China

Keywords: accidental water pollution; Bayesian networks; integrated risk analysis; uncertainty; watershed-scale

1. Introduction

Open waterways, such as rivers and lakes, are particularly susceptible to accidental pollution events. Regional-scale ecological and human health risk assessments (ERA-HHRAs) are used to determine the likelihood of effects from multiple stressors on ecological and/or human endpoints to estimate the risk of accidental water pollution. We propose a Bayesian Network Framework to integrated ecological and human health risk assessment of accidental water pollution. By using this approach, we are able to conduct quantitative, probabilistic, and spatially explicit risk assessments for watershed-scale accidental pollution.

2. Conceptual Model Construction

By identifying sources of stressors, stressors, exposure pathways, effects of stressors on receptors, and the resulting impacts on endpoints at a watershed scale, we constructed a conceptual model in **Figure 1**.

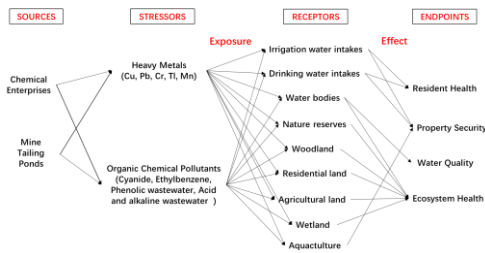


Figure 1 Conceptual model of ERA-HHRAs

3. Bayesian-Network Processes

BNs are graphical models used to describe probabilistic cause and effect relationships, making them similar to the conceptual models typically used in risk assessment.

3.1 Node Definition and Data Sources

Input parameters are presented as probability distributions, which are derived directly from simulation data. Input parameters and CPTs can be refined to reflect our greater knowledge of the system, thereby reducing the uncertainty in the risk estimates.

3.2 Discrete node states

Parent, child and endpoint nodes are discretized into ranked states, which allows for the evaluation of combined effects from multiple stressors, including those that are categorical or vary in their units of measurement.

3.3 Conditional Probability Tables

The CPTs contain the probabilities of the daughter node states given all possible combinations of the parent node states. Each possible combination is shown as a row, and the row must sum to 100%. The CPTs can be obtained by expert judgment, empirical evidence, mathematical or biological equations and case file learning.

4. Uncertainty Analysis

Uncertainty in any model input was incorporated into the input frequency for that node. Uncertainty in the model inputs was translated through the model as wider probability distributions of the intermediate and endpoint nodes.

5. Results

Bayesian networks of conceptual model has finally been constructed and calculated in **Figure 2**.

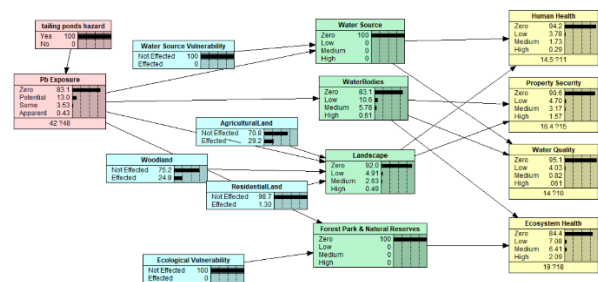


Figure 2 Bayesian Networks for ERA-HHRAs

Reference

Harris, M. J., Stinson, J., & Landis, W. G. (2017). A Bayesian Approach to Integrated Ecological and Human Health Risk Assessment for the South River, Virginia Mercury-Contaminated Site. *Risk Analysis*, 37(7), 1341-1357.

Feasibility of Quantitative Image Analysis Method to Improve Performances of Arsenic Field Test Kit for Screening of Tube Well Waters in Bangladesh

Masahiro Tokumura¹, Makoto Sekine², Mohammad Raknuzzaman³,
Md Habibullah Al Mamun³, Md Kawser Ahmed³, Muhammad Rafiqul Islam⁴,
Yuichi Miyake¹, Takashi Amagai¹, Shigeki Masunaga², Masakazu Makino¹

¹University of Shizuoka, Japan

²Yokohama National University, Japan

³University of Dhaka, Bangladesh

⁴Bangladesh Agricultural University, Bangladesh

Keywords: Arsenic, Bangladesh, drinking water, analysis, screening

1. Introduction

To efficiently address the arsenic problem, to know the accurate and extensive contamination levels in drinking waters is essential. However, in Bangladesh, laboratory facilities to determine arsenic concentration such as an inductively coupled plasma mass spectrometer (ICP-MS) are rarely present. Arsenic field test kit is expected to be alternative solution to collect nation-wide contamination levels in drinking waters.

In this study, to evaluate commercial arsenic field test kit, the arsenic concentrations in drinking water (in both shallow tube and deep tube wells) in Bashailbogh village, Bangladesh were determined by using commercial arsenic field test kit and compared with those by ICP-MS. Furthermore, to improve performance of commercial arsenic field test kit for determination of arsenic concentration, we tried to apply quantitative image analysis method to more accurately determine the arsenic concentration from the digital picture of test paper of the arsenic field test kit.

2. Method

The sampling was conducted in February 2014 (post-winter). Water samples were collected from both shallow ($n = 7$) and deep tube wells ($n = 14$) of fourteen different Bareas.

In general, the arsenic concentration is visually and sensuously determined by the arsenic field test kit based on the color of the test paper which is colored according to the arsenic concentration. It is likely to cause the wide interindividual variability and the difficulty to apparently discriminate a small color difference, which results in error of measurement. Therefore, in the developed quantitative image analysis method, the color of the test paper is numerically determined by color difference which is calculated from RGB (Red Green Blue) values of colored and based parts of the kit.

3. Results and discussion

The arsenic concentrations measured by the developed method (quantitative image analysis method) were in good agreement with those by the common method accordance with its manual. The arsenic concentrations measured by the developed method (quantitative image analysis method) were in good agreement with those by ICP-MS within $100 \mu\text{g L}^{-1}$ of the arsenic concentration.

4. Conclusions

The developed method could improve performance of commercial arsenic field test kit for determination of arsenic concentration. This method could be applied to other field test kit.

Integrated Control of Pollutants in Korea

Jong Ho Lee¹, Sungryong Ha²

¹Department of Urban Planning and Real Estate, Cheongju University, 28503 Republic of Korea

²Department of Urban Engineering, Chungbuk National University, 28644 Republic of Korea

Keywords: Integrated Control of Pollutants, Integrated Environmental Management

1. Introduction

One important change in environmental management in Korea is the integrated control of environmental pollutant facilities based on the Integrated Management Act of Environmental Pollutant Facilities. But it is not integrated management of environmental media or pollutants, but integrated control of environmental pollutant facilities. This study tries to suggest the direction for integrated management of environmental media or pollutants.

2. Integrated Environmental Management

2.1. Integrated Control of Environmental Pollutant Facilities

The purpose is to protect people's health and environment by integrating the control of pollutant-discharging facilities so as to effectively reduce pollutants produced from each business establishment, and by establishing a system under which best techniques for environmental control can be applied to meet conditions of each business establishment.

2.2 Integrated Management of Environmental Media

In order to prevent air pollution due to incineration of solid waste, water pollution resulting from landfill, and aquatic ecosystem damage due to acid rain, the integrated management of environmental media (air, water, and soil etc) is necessary. But integrated management of environmental media has not been sufficiently implemented. This study

reviews and the cases, and tries to suggest desirable direction.

2.3 Integrated Control of Pollutants

Integrated management of pollutants is required in order to decrease photochemical smog resulting from chemical combination of hydrocarbon and nitrogen oxides under the condition of strong solar radiation and windless, and secondary particulate matter formed through chemical reaction of sulfur dioxides or nitrogen oxides with vapor, ozone, and ammonia etc. Lately in Korea, the concentration of particulate matter has become higher from internal and abroad pollutant sources. Therefore this study reviews the cases, and suggests desirable direction.

3. Conclusion

For environmental conservation, not only integrated control of environmental pollutant facilities but also integrated management of environmental media and/or integrated control of pollutants are required.

References

Korea Environment Institute, 2016, A Research on Efficient Implementation of Integrated Environmental Management, Ministry of Environment.

Ministry of Environment, 2017, White Paper of Environment.

Environmental impact of halogenated polycyclic aromatic hydrocarbons emitted from E-waste recycling activities in Vietnam

Qi Wang¹, Masahiro Tokumura¹, Yuichi Miyake¹, Takashi Amagai¹

¹ University of Shizuoka, Japan

Keywords: halogenated polycyclic aromatic hydrocarbons (XPAHs), E-waste recycling, open burning, POPs

1. Introduction

Halogenated polycyclic aromatic hydrocarbons (XPAHs) are pollutants unintentionally produced by combustion processes of organic material containing chlorine or bromine. Several XPAHs elicit dioxin-like activities comparable to those of several mono-ortho polychlorinated biphenyl (PCB) congeners. On the other hand, recycling processes of electronic waste (E-waste) is a new major source of dioxin-related compounds due to uncontrolled burning and primitive recycling operations of E-waste. However, little is known about productions and emissions of XPAHs by the E-waste recycling processes. In order to assess the XPAHs contaminations in the vicinity of E-waste recycling activities, we have determined XPAHs in 32 surface soil and 8 river sediment samples collected around the E-waste recycling area in northern Vietnam. Thirty-one target compounds including 21 chlorinated PAHs (ClPAHs) and 10 brominated PAHs (BrPAHs) were quantified by gas chromatography-high resolution mass spectrometry (GC-HRMS) in this study.

2. Results and discussion

2.1 Occurrence of XPAHs by E-waste recycling activities

The highest concentrations of XPAHs in soils (3,960 pg/g dry wt) and sediments (3,930 pg/g dry wt) were detected from samples near an open burning site and an E-waste recycling workshop, and the profiles of individual XPAHs isomer in these samples were similar. On the other hand,

the lowest concentrations were detected from samples collected near rice paddy (25.4 pg/g dry wt, soil sample) and upstream area of river (20.3 pg/g dry wt, sediment sample) which are not E-waste recycling area. Furthermore, composition ratios of BrPAHs to total XPAHs in this study were higher than those in fly ash of waste incinerators which were reported in previous studies. It means that bromine content ratios of E-waste in this study could be larger than those of waste material, because E-waste in this study contained a large amount of brominated flame retardants.

These results suggested that XPAHs occurred in E-waste recycling activities and they impacted the surrounding soil and sediment.

2.2 Unidentified isomer

A large number of peaks of unidentified isomers of XPAHs were observed based on the isotope patterns of molecular ions [M, M+2, M+4] by GC-HRMS analyses. These unidentified isomers should be an important factor in the impact assessment for XPAHs.

3. Conclusions

The XPAHs occurred in E-waste recycling activities and they contaminated the surrounding soil and sediment. The inclusion of unidentified compounds would result in an increased excess risk of XPAHs.

References

Wang, Q. et al., (2016) Journal of Water and Environment Technology, Vol.14, No.3, pp.166-176.

Climate Change Adaptation Strategies in Japan and Suggestions to EIA System

Mitsuru Tanaka¹, Kenshi Baba², and Makoto Ogawa³

¹Hosei University, Japan

²Tokyo City University, Japan

³Hosei University, Japan

Keywords: Climate Change, Adaptation, Local Government, EIA

1. Introduction

IPCC AR5 (Fifth Assessment Report, Climate Change 2013/2014) declares that global average surface temperature is projected to likely increase at a high speed for the end of the 21st century. As global warming continues, the ways in which climate change is manifested will differ significantly depending on the region. Our society in general should prepare for the accelerating global warming and take adaptations to climate change based on local circumstances. This report discusses the actual conditions of adaptation measures in Japan and make a trial examination on a relationship between climate adaptations and EIA system.

2. Adaptation Measures to Climate Change

2.1 Knowledge of IPCC AR5

IPCC AR5 'Summary for Policymakers' tells us that the increase of global average surface temperatures for 2081–2100 relative to 1986–2005 is projected to likely be in the ranges derived from the CMIP5 model simulations, that is, 0.3°C to 1.7°C (RCP2.6) and 2.6°C to 4.8°C (RCP8.5). In this context RCP means Representative Concentration Pathways which are used for

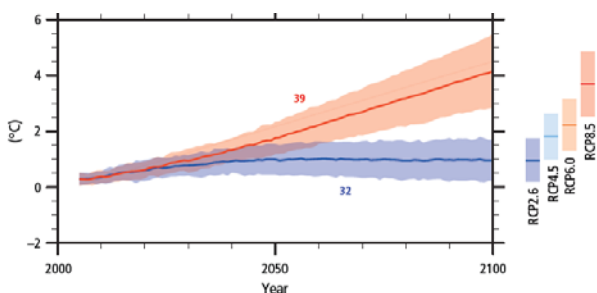


Figure 1: Global average temperature change

making projections to describe four different 21st century pathways of GHG emissions and atmospheric concentrations, air pollutant emissions and land use.

2.2 Policy Trends of Adaptations in Japan

In November 2015 Japan's first National Plan for Adaptation to the Impacts of Climate Change was adopted by Cabinet Decision, clarifying in detail the country's basic approaches to climate change adaptation and measures in each sector and the implementation of the related measures started. Naturally, prior to that National Plan, measures were being taken in individual areas such as agriculture and water-related disasters. And in July 2018 Climate Change Adaptation Act was enacted and promulgated.

3. Conclusions

Through responding to intensifying climate change and planning adaptations, careful examination is required regarding with predicting and assessing environmental factors such as atmosphere, topography / geology, water in EIA system. Environmental measures with a target project also should be reconsidered cautiously.

References

Intergovernmental Panel on Climate Change (2014) Climate Change 2014 Synthesis Report 'Summary for Policymakers', IPCC, pp.10-11.

Center for Regional Research, Hosei University (2018) Report on Local Climate Change, Hosei University, Tokyo, pp.3-7

The 1st PTT's Strategic Environmental Assessment (SEA) for Eastern Economic Corridor of Innovation (EECi) Project, THAILAND

Nathasith Chiarawatchai, Thanakorn Ermukdakul, Worawut Hamarn, Kanatip Ratanachoo
 Project Environmental Management Department, PTT Public Company Limited (PTT)

Keywords: Eastern Economic Corridor (EEC), Eastern Economic Corridor of Innovation (EECi), Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA)

1. Introduction

In Thailand, SEA is gaining momentum as a necessary prerequisite for sustainable Policy, Plan, and Program decision making. The SEA guideline is being developed by the Office of the National Economic and Social Development Board (NESDB), then will be legalized and applied to government sectors. Project entities shall use SEA as a mandatory framework for conducting EIA.

PTT has established EECi @ Wangchan Valley Project in Rayong (Figure 1). Creating value as a hub of R&D and innovation with 3,000 rai (480 ha) area, it encompasses start-up & innovation center, pilot plant, accommodation, utility, and others. Although SEA is yet legalized, in order to prevent environmental problems from rival activities in newly area-based development, PTT decides to conduct the 1st Preliminary SEA by itself aiming to integrate environmental, economic, and social consideration into master plan before conducting project EIA. Carrying capacities and environmental constraints are taken into account during strategic decision making on applicable project types and sizes to prevent exceeding carrying capacities like other area in the past.

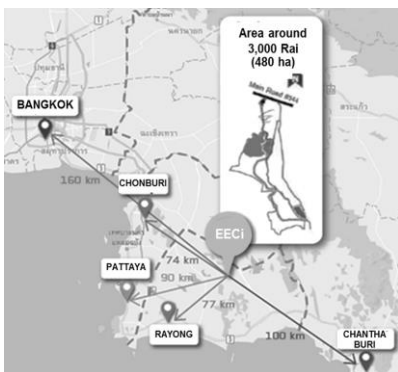


Figure 1 Project Location

2. Methodology

PTT has integrated related guidelines established by NESDB, Office of Natural Resources and Environmental Policy and Planning (ONEP), with PTT's experience in EIA for applying to preliminary SEA of this project. Study

concept consists of four steps as shown in Figure 2. Public participation shall be inclusive in all processes.

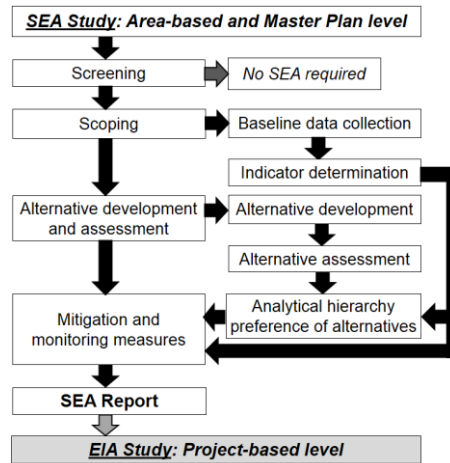


Figure 2 Draft Thailand's SEA Process (NESDB, 2018)

3. Result

The preliminary SEA is beneficial to indicate environmental aspects related to carrying capacity of target area. Mitigation and measures can be set up simultaneously with project master plan to mitigate impact to acceptable level and used as a mandatory framework for conducting EIA. Furthermore, the data and results can be used for supporting any future promulgated SEAs conducted by government sector.

4. Conclusions

The preliminary SEA is a practical tool for informing and influencing strategic decision making. However, some processes according to SEA guideline need to be modified for practicability. PTT envisions this study shall be a good practice for other projects in environmental advocacy towards making sustainable choice, which potentially leads to project concurrence in the future.

Reference

Eastern Economic Corridor of Innovation (EECi) (2018) www.eeci.or.th
 National Economic and Social Development Board (NESDB) (2018) Draft Guideline of SEA Process.

Social Consideration for Coral Offset in Vanuatu

Shingo Takeda ¹, Takehiko Murayama², and Shigeo Nishikizawa³

¹Environmental and Social Consideration Review and Supervision Division, Credit Risk Analysis and Environmental Review Department, Japan International Cooperation Agency (JICA)

^{2,3} School of Environment and Society, Tokyo Institute of Technology

Keywords: Mitigation Hierarchy, Coral, Biodiversity Offset, Social Consideration, Vanuatu

1. Introduction

International Organization such as World Bank requests counterpart agency to take measures for conservation of ecosystems and natural habitat, applying the mitigation hierarchy to their development projects (BBOP 2012). JICA's ODA loan project "Pori-Vila international multipurpose wharf construction project in Vanuatu" (hereinafter referred to as "the Project") impacts on corals, thus the Project transplanted the corals as a mitigation measure after consideration of alternative site to avoid the impact. However, the survival rate of the transplanted corals became low (less than 50%) according to monitoring reports. JICA has suggested implementation of coral offset to compensate the coral loss to the counterpart agency and it was accepted. The idea of the coral

Consequently, four (4) candidate offset sites which meet criteria of good accessibility, presence of damaged corals and presence of certain amount of live corals were selected. The candidate offset sites were studied to grasp coral cover, species composition of corals, benthic animals and sea algae/weed, and physicochemical environment e.g. water temperature and salinity. While community nearby candidate offset sites was interviewed to know their coral-related activities, benefit from corals, and perception of coral conservation. The biological and social similarity between candidate offset sites and affected site was calculated with cluster analysis software, and social significance and acceptance of the offset were discussed.

3. Result

The candidate offset site "Ifira" and "Vatumaru" have higher biological and social similarity with affected site respectively. People around the "Iririki" is relatively less engaged in the coral-related activities while they have relatively higher awareness for the conservation of corals, and this may indicate easiness of offset implementation at Iririki. These results will be used for stakeholder meetings to select best offset site(s) and for preparation of offset site management plan.

4. Conclusion

Consideration of social significance and people's perception of natural resource management are extremely important to set up the offset site because natural resources are inextricable part of human life. However conventional case of biodiversity offset have been more focused on biological aspect. Our attempt aims to incorporate the social aspect throughout the offset process. In order to confirm the effectiveness social consideration, preparation of selective management plan and regular monitoring of the offset will be carried out in our offset program.



Fig. 1 Map of Port-Vila bay. Circle indicates the candidate offset sites.

offset is to offset the coral loss and loss of coral-related human activities at affected site by creating small scale Community Conservation Area (CCA) at the site on which physically damaged corals exist.

2. Methodology

A rapid assessment was conducted at 20 sites in the Port-Vila bay to select candidate offset sites.

References

BBOP. Guideline Note to the Standard on Biodiversity Offset. 2012.

Un-sustainable information disclosure and archives of the EIA documents in Japan

Hiroo Kasagi¹, Akiko Urago²

¹NPO Workshop for Sustainable Community, Japan

²Raven Ltd., Japan

Keywords: EIA, EIA database, Information disclosure, Archives, EIA Law

1. Introduction

Information disclosure and archives of the EIA documents in Japan is far from the international standard. Most of the EIA reports cannot be accessed after one month disclosed period, although EIA law has come into force since 1999. Environmental measured data for EIA is not shared with the open database. Followings are the problems of EIA disclosure and some actions by Japan Society for Impact Assessment (JSIA).

2. Limited access to EIA reports

All the national level EIA reports had been stored and allowed to access freely at the office of Japan Association of Environment Assessment (JEAS) since 1999. But Ministry of Environment Japan (MOEJ) closed the reference room in 2011. It was because of the complaints by some project owners who insisted the copy right and risk of the disclosure of secrets.

After revision of the EIA law in 2011, disclosure of the EIA reports on the website was stipulated. But after the one month disclosure period, most of the EIA reports cannot be accessed. The downloaded pdf files of EIA reports were also programed to be locked. The only way to access the EIA reports after the disclosure period is requesting to view the EIA reports to MOEJ. After acceptance of the request, MOEJ consult to the project owner whether they can present the report or not. Only the original EIA reports which allowed by the project owners can be accessed at the room of the MOEJ.

3. Actions of JSIA

Kasagi and other members of JSIA researched treatment of the EIA report and EIA data after reviewing at local level and revealed that;

- Many local governments stopped disclosure of the EIA report just after the disclosing period,
- Some local governments classify EIA reports as normal official documents which should be disposed when expired (Kasagi 2016a), and
- Biological data and Environmental measured data for EIA is not utilized for cumulative impact assessment nor Environmental planning. (Kasagi 2016b, Kasagi 2017).

4. New rules and remained issues

JSIA submitted a written opinion to MOEJ in 2016 after some meetings and seminars based on the research. MOEJ started internal discussion about the EIA documents and changed the rules of disclosure in April 2018.

References

- KASAGI and URAGO (2016a) Disclosure and archives of the EIA report, Japan Society for Impact Assessment, Vol. 14 No.1, pp17-21 (in Japanese)
- KASAGI (2016b) Storage and disclosure of the EIA report after EIA procedures, Environmental Information Science Vol. 44 No.4 (in Japanese)
- AKAMATSU, KASAGI (2017) Trend and issues of the open databases of the Environmental data, Japan Society for Impact Assessment, Vol. 15 No.1 (in Japanese)

Co-Control Potential of Substituting Hydropower for Fossil Fuels: A Case Study in Sichuan, China

Xianqiang Mao, Mudan Wang and Mengyuan Liu¹

¹School of Environment, Beijing Normal University, China

Keywords: hydropower, co-control effect, energy substitution, emission reduction, Sichuan

1. Introduction

The rapid economic growth in China calls for enormous energy input and is associated with bad air quality. The fossil fuel consumption can cause a huge number of air pollutants and GHGs emissions. Clean energy is an ideal alternative to achieve this goal, in which hydropower is a typical representative.

Owing abundant hydropower resources, Sichuan province is taken as the case area to analyze co-control potential of substituting hydropower for fossil fuels and provide important policy implications for policy makers.

2. Research methods and contents

2.1 Energy development scenarios setting

According to the Energy Development Planning and present situation of Sichuan, several kinds of energy development scenarios were proposed. Hydropower in Sichuan province, which was sold to other provinces in China, is applied to replace fossil fuels used in power generation sector, or oil used in transportation sector respectively, or fossil fuels used in above two sector at the same time. Co-control potential is tested and compared to provide energy policy implication for local policy makers.

2.2 Carbon and air pollutant emission reduction

Based on *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC, 2006) and air pollutant coefficient data from researches, SO₂, smoke dust and carbon emission of fossil fuel consumption in power generation and transportation are estimated in Sichuan province. The emission reduction of air pollutants and carbon from hydropower substitution are calculated.

2.3 Co-control effects analysis

The co-control effect coordinate system (Zeng et al., 2017) and air pollutant emission reduction equivalence indicator (Mao et al., 2013) were applied to evaluate co-control effects of different energy development scenarios. Different scenarios were compared and ranked based on their respective co-control effects.

3. Conclusions

The application of hydropower has good co-control potential of CO₂ and air pollutant in Sichuan. The best co-control effect appears in the scenario where the hydropower is applied to substitute fossil fuels in power generation. Co-control effect is much lower when hydropower is used to replace oil consumption in transportation. Power generation is prioritized to substitution with hydropower to realize emission reduction and energy saving.

References

- IPCC, 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories, IPCC National Greenhouse Gas Inventories Programme.
- Mao, X., Zeng, A., Hu, T., Zhou, J., Xing, Y., Liu, S., 2013. Co-control of Local Air Pollutants and CO₂ in the Chinese Iron and Steel Industry. *Environ. Sci. Technol.* 47, 12002–12010. doi:10.1021/es4021316
- Zeng, A., Mao, X., Hu, T., Xing, Y., Gao, Y., Zhou, J., Qian, Y., 2017. Regional co-control plan for local air pollutants and CO₂ reduction: Method and practice. *J. Clean. Prod.* 140, 1226–1235. doi:10.1016/j.jclepro.2016.10.037

Decolorization of Colored Effluent from Textile Manufacturing Industry in Bangladeshi by Photo-Fenton Reaction Coupled with Catalyst

Kosuke MURAMATSU¹, Hiroshi AIUCHI¹, Yuta GORO¹, Masahiro TOKUMURA¹,
Qi WANG¹, Takanori AMBO², Masakazu MINAGAWA², Ryutaro ISHIBASHI²,
Yuichi MIYAKE¹, Takashi AMAGAI¹, Masakazu MAKINO¹

¹University of Shizuoka, Japan

²Mitsubishi Chemical Corporation, Japan

Keywords: Photo-Fenton Reaction, Catalyst, Decolorization, Colored Effluent, Wastewater Treatment

1. Introduction

A large amount of organic dyes is used in textile industries, and 40–50% of which end up in wastewater. Since most dyes are non-biodegradable, the activated sludge process, which is the most commonly used conventional wastewater treatment process, is not suitable to treat them. Consequently, inappropriate treatments of the colored wastewater causes severe environmental problems in the world, especially in Bangladesh.

The photo-Fenton reaction, in which OH radicals being a powerful oxidizing agent are continuously and efficiently, has drawn attention as a promising wastewater treatment process to efficiently treat the colored wastewater. However, the running cost of photo-Fenton reaction is high compared with that of the conventional biological wastewater treatment processes.

In this study, to reduce the running cost, we developed a novel wastewater treatment process by using the photo-Fenton reaction coupled with a catalyst.

2. Method

A 500 mL Pyrex beaker was used as a reactor. Three black light blue lamps (maximum irradiation wavelength = 380 nm) were used as a light source for the photo-

Fenton reaction. The initial pH was adjusted to pH = 3, which is the optimum pH for the photo-Fenton reaction, with sulfuric acid. After the concentration of Orange II, which is a model azo-dye used in this study, was adjusted, the experiment was started by adding iron sulfate, hydrogen peroxide, and a catalyst and turning on the lamps.

3. Results and discussion

The typical and conventional photo-Fenton reaction (without the catalyst) required 40 min for the complete degradation of 30 mg L⁻¹ Orange II. On the other hand, the developed photo-Fenton reaction (with the catalyst) took 20 min to degrade it.

The reaction kinetics analysis revealed that the synergistic effects occurred in the developed photo-Fenton reaction.

4. Conclusions

The photo-Fenton reaction was significantly improved by the combination with the catalyst. The reaction kinetics analysis elucidated the mechanisms of the improvement of the photo-Fenton reaction by the catalyst, which could be useful for further improvement of the catalyst.

References

Zanta et al., J. Hazard. Mater., 178, 258-263, 2010.

Criteria for Health Impact Assessment in Integrated Pollution Prevention and Control in Korea

LEE Youngsoo, Choi Sang-Ki

Korea Environment Institute, Korea

Keywords: IPPC, HIA, Criteria

1. Introduction

In 2017, Ministry of Environment of Korea has implemented Act on integrated management of environmental pollution facilities. In this act, Minister of Environment has to consider impact on human health from the facilities for approval. In this paper, we are going to explain the Act, criteria for health, review method for approval and, methodology of HIA of Korea

2. Criteria for Health Impact

2.1 National Standards

Framework Act on Environmental Policy of Korea has designated national standards for air, water and noise. For 8 air pollutants (SO₂, NO₂, PM-10, PM-2.5, CO, O₃, Pb, C₆H₆), according to averaging time, national standards are classified. These standards are administrative goals to achieve good environment.

2.2 Target Level of Environmental Quality

For another hazardous air pollutants except 8 air pollutants, to attain good environment assuring human health, target level of environmental quality is prepared. For example, the level of Formaldehyde is 5 µg/m³ for 1 year average.

2.3 Review Method for Approval

There are 3 steps for approval for 8 pollutants which has national standard. The 1st is to compare additional concentration to 3% of long-term(usually 1 year) national standard. If the 1st step fails, the 2nd step is to compare total pollution(present concentration + additional concentration) to

national standard(long-term or short-term standard). If the 2nd step also fails, another modelling will be carried out.

2.4 Methodology of HIA

For HIA(Health Impact Assessment), we calculate cancer risk for carcinogenic materials like heavy metal and exposure ratio for non-carcinogenic materials.

3. Conclusions

In order to take into account human health from air pollutant emitting facilities in IPPC, it is considered to be reasonable to prepare standard concentration in ambient air for hazardous air pollutants.

References

- LEE, Youngsoo et als. (2014) Effective Implementation Method of Health impact Assessment, Korea Environment Institute.
- Korean Government(2016) Act on Integrated Management of Environment Pollution Facilities

Survey of Lead pollution caused by motorization in Ulaanbaatar

Hiroataka Naitou¹, Yukinori Tani¹, Kouske Toshiki², Jeong-Soo Yu³, Erdenedalai Baatar³, Chojjilsuren Buyantogtokh⁴, Tserendorj Javzandolgor⁴, Bolorchuluun Shukhee⁴

¹ University of Shizuoka, Japan

² University of Miyazaki, Japan

³ Tohoku University, Japan

⁴ Institute of Veterinary Medicine, Mongolia

Keywords: Mongolia, lead pollution, Blood lead, motorization, livestock health

1. Introduction

Motorization associated with the process of economic growth has caused environmental pollution in its progress with development. Even Mongolia, where many people are nomadic, has undergone a sudden wave of motorization, with mainly Japanese used cars being imported into the country. Due to commonly-performed battery recycling, heavy metal pollution is a problem in the used car industry. This study investigated the state of lead pollution in livestock based on a preliminary survey conducted in 2015. We report the results of lead concentration tests on blood from livestock pastured in the Ulaanbaatar area in 2016.

2. Material and Method

2.1 Sampling

Blood was collected from 20 nomads livestock in each district (goat and sheep, 5 females, 5 males each). Blood samples were collected from livestock via puncture of the jugular vein using a blood collection tube containing heparin. Blood samples underwent dissolution within 24 hours and measurement within 48 hours.

2.2 Measurement of lead in blood

The LeadCare® II System (Magellan Diagnostics, MA, USA) was used to measure lead concentration in blood. The LeadCare® II System uses an electrochemical technique called Anodic

Stripping Voltammetry to determine the amount of lead in a blood sample. Measurement range of LeadCare® II is so 3.3 ~ 65 µg / dL, high concentration sample (range over) was measured again 10-fold dilution, and the obtained value was taken as the assumed value.

3. Results and Discussion

Among the five districts surveyed in 2016, only the Tuv - aimag district, which was 20 km south of the Ulan Bator city area, showed high blood lead levels in nomadic livestock. 625 µg / dL of Sheep (male) aged 4 years old and 662 µg / dL of goat (female) aged 3 years old showed extremely high lead concentrations in the blood. The other 18 animals, there was no difference depending on the livestock species, sex and age, and the blood Lead level was high, 13.7 to 326 µg / dL respectively.

In the Tuv-aimag district, the grassland spreads on both sides across the main road, and I saw the nomadic livestock in this area crossing the artery freely. The nomadic livestock that we blood collected this time is also highly likely to be affected by automobile exhaust gas traveling through the main road. Identification of lead contamination sources in this area is a future task.

References

Naitou H., Toshiki K., Yu J. S. et.al. (2017) Survey of lead pollution in nomadic livestock in Ulaanbaatar, Environmental science, 30 pp. 274-281.

Method and application on overall allocation of space and industry for urban industrial total atmospheric pollutant emission

Jiaxuan Chen¹, Runhe Cheng², and Wei Li³

School of Environment, Beijing Normal University, China

Keywords: urban atmospheric pollution, total industrial emission, overall allocation, spatial distribution, leading industries

1. Introduction

Concentration over-standard and excessive emission discharge of air pollutants caused by industrial activities has become the most essential pressure for the improvement of atmospheric environmental quality, which has significant spatial and structural characteristics in China. As an important means to emission reduction, control of total emission control can help to coordinate urban development and environmental protection. The reasonable allocation of total limits is the key to ensure the effectiveness of measures and policies about total emission control. To improve urban environmental air quality and promote green transformation of urban industries, it is necessary to take into account both the spatial distribution of pollution sources and the characteristics of the industrial structure of pollution emissions.

2. Technical processes and methods

Industrial air pollutant space and industry overall allocation of space and industry should not only consider the spatial distribution of atmospheric pollutant emissions, but also need to superimpose the emission characteristics of the industrial sector. The distribution process mainly includes four steps of screening leading industry and main-control factor, determining the total allocation limit, estimating spatial or industrial distribution coefficients and implementing overall allocation.

Based on the overall allocation indicator system, we use entropy method to estimate the allocation coefficient. The total emission indicator of urban industrial air pollutants can be allocated to each space unit and the leading industry according to the coefficient ratio.

3 Case Study

Ordos is located in the southwest of Inner Mongolia autonomous region with a total area of 87,000 km², which is also regarded as the important energy-chemical industry base in China. The structural characteristics of economic development are significant, while the economic contribution of coal mining and coal-based industry is relatively outstanding. Using the above-mentioned process and methods to do the spatial and industrial allocation for the total emission of atmospheric pollutants in Ordos (Table 1)

Table 1 Results of overall allocation for total atmospheric pollutant emission in Ordos industry^{4*}
unit: 10,000 tons per year

District	Coal				Electric power				Chemical industry				Others			
	SO ₂	NO _x	Dust	VOCs	SO ₂	NO _x	Dust	VOCs	SO ₂	NO _x	Dust	VOCs	SO ₂	NO _x	Dust	VOCs
Dongsheng	0.22	0.12	0.07	0.02	1.06	0.76	0.45	0.12	0.78	0.41	0.1	0.35	0.31	0.15	0.18	0.29
Dalad	0.51	0.28	0.17	0.04	2.51	1.81	0.98	0.29	1.84	0.98	0.18	0.88	0.77	0.3	0.13	0.74
Hanggin	0.21	0.08	0.04	0.01	1.12	0.62	0.21	0.08	0.81	0.34	0.06	0.23	0.34	0.09	0.03	0.19
Junggar	0.54	0.28	0.18	0.04	2.7	1.86	0.99	0.29	1.98	1.00	0.17	0.86	0.82	0.31	0.12	0.72
Ejin Horo	0.32	0.16	0.1	0.02	1.65	1.07	0.55	0.15	1.19	0.58	0.11	0.44	0.49	0.17	0.07	0.37
Otog Qiandq	0.21	0.18	0.08	0.02	1.04	1.19	0.33	0.14	0.75	0.64	0.07	0.42	0.31	0.26	0.04	0.35
Uxin	0.4	0.24	0.1	0.03	1.9	1.53	0.54	0.2	1.41	0.83	0.09	0.61	0.58	0.23	0.05	0.61
Otog	0.65	0.3	0.23	0.04	3.2	1.96	1.19	0.33	2.35	1.05	0.24	1.00	0.97	0.34	0.15	0.85
Change rate of per industry pollutant emission (%)	6	1.2	0.5	2.4	-10	-92	-20.2	-23.4	-13.5	-26.9	-17.5	-31.6	-0.7	-4.2	-3.2	-14.7

4. Conclusions

Urban atmospheric environmental quality is entering a stage of the stage of comprehensive improvement in China. Pollution reduction work combined with the adjustment and upgrading of industrial structure has become an important measure to deepen the control of the total emission for atmospheric pollutants can improve regional, industrial air pollution control system, and promote the transformation and optimization of industrial structure.

References

Wei Li, Yanju Liu, Wen Liu. Study on spatial distribution and dynamic optimization of total atmospheric pollutant control in planning environmental assessment [J]. Journal of Safety and Environment, 2009, 9(3):73-77.10

Estimation of WTP for transparent noise-barriers by using CVM

In-Chul Bae¹ and Chung-Ki Lee²

¹Korea Expressway Corporation Research Institute, Korea

²Korea National Open University, Korea

Keywords: CVM, WTP, transparent noise-barrier

1. Introduction

The contingent valuation method(CVM) has been the most preferred framework in deciding the price of environment goods. This study uses CVM as an analytic tool in order to estimate the WTP of installing transparent noise-barriers. To do this, a survey of 600 households was implemented on the effects of installing noise-barriers around the expressways.

2. Methodology and Results

2.1 Methodology

This method involves constructing a hypothetical market or referendum scenario and uses questionnaires in a survey to elicit customers preferences for public goods and services such as the natural environment by finding out how much they would be willing to pay for the specified improvements in them or receive for the degradation of these goods and services(Mitchell and Carson, 1989; Arrow et al., 1993). Respondents assume the established hypothetical market to state their WTP or vote for or against a public program at a particular tax price.

In order to allow for heteroskedasticity in individual households' willingness-to-pays(WTPs) along with spike models that are widely used to deal with censoring problem of responses at 0 in the CVM researches, we set a model with parametric conditional variance functions and derived closed-form expressions for conditional WTP and conditional probability to pay any non-zero amount for noise-barriers. These closed-form expressions

were used to estimate unconditional WTPs and to analyze patterns in WTPs according to the household characteristics.

2.2 Empirical Results

Height	5m	10m	15m
E[WTP _i]	2,393	2,886	2,969

Table 1: WTP for transparent noise-barriers

3. Concluding Remarks

The results indicate that the household is annually willing to pay 2,393, 2,886 and 2,969 Korean Won for the three height of transparent noise-barriers respectively. They suggest that increasing investment in noise-barriers potentially has a positive effect on improving the expressway environments. Henceforth the estimates will be used as significant information on the economic evaluation of transparent noise-barrier installation projects.

References

- Arrow, K., R., Solow, P. R. Portney, E. E. Leamer, R. Radner, and E. H. Schuman. 1993. "Report of the NOAA panel on contingent valuation". Federal Register, 58(10): 4601-4614.
- Mitchell, R.C. and Carson, R.T., 1989. Using survey to value public goods: The contingent valuation method. Resources for the Future. Washington, DC.

Mission and Activities of the KSEIA

Sookjin Jeon, Jong-Gwan Jung*, and Myungjin Kim

Korean Society of EIA, *Chungnam Institute, Korea

Keywords: Mission, Activities, KSEIA, Journal of EIA

1. EIA and KSEIA

Since Korea has introduced environmental impact assessment in 1977 (legally, 1971), EIA has improved markedly over the past four decades by enlarging EIA projects, instituting public participation and environmental monitoring, developing methodologies, and introducing strategic environmental assessment, health impact assessment and greenhouse gases impact assessment. The linkage system of land and environment planning in 2014 has been introduced. Several issues for EIA enhancement are being discussed.

In this respect, the role of KSEIA (Korean Society of EIA) for achieving sustainable society is to provide a responsible EIA tools and facilitate opportunities for desirable futures. KSEIA missions are to contribute to enhance the quality of impact assessment, promote academic exchange and professional working, encourage participation in IAIA and affiliate forum, exchange the latest information in environmental assessment, and serve as a foothold for international collaboration.

2. KSEIA Activities

The KSEIA has long been played as a linchpin of impact assessment in the Northeast Asia since 1992 established. Regionally KSEIA has a connection with Japan, China, Vietnam, Germany and other international organization such as IUCN. KSEIA contributes to make a better world through impact assessment by mutual collaboration and capacity building. Major activities by year are as follows;

- 1992. 6: Foundation of the KSEIA
- 1992.12: Publication of the 1st Journal of Environmental Impact Assessment
- 1995. 6: The 1st Participation of the 15th Conference of IAIA
- 2005. 7: Joining as a Member of IAIA Affiliates

- 2007. 6: The 27th Annual Conference of IAIA in Seoul, Korea
- 2012. 6: The 20th Anniversary of KSEIA Foundation
- 2012. 9: Korea-IUCN WCC EIA Workshop
- 2014. 3 and 2016. 9: Publication of an EIA Textbook
- 2014.10: CBD workshop on Improving Biodiversity for SD
- 2017. 3: Publication of "Assessing Korea: Impact Assessment for Sustainable Development," Charlie Wolf's Memory

3. Journal of EIA

The KSEIA has published the Journal of Environmental Impact Assessment bimonthly since 2004, after the first volume (1992). Till June 2018, the KSEIA published the volume 27 and 122 publications in total. The journal is interdisciplinary and comprises various aspects of environmental impact assessment including EIA procedures (theories, methods, and legislations), quantitative methods (modellings, predictions etc.), risk assessment, social impact assessment and economic measures. The journal delivers the experts to stay current with the latest standards of EIA practices. The Journal contents increase in the discipline of biodiversity, ecosystem, and climate change as well. KSEIA had been set up the submission and review system for the Journal of EIA by online; <https://kseia.jams.or.kr>

References

- Myungjin Kim and Charlie Wolf, 2014, The Impact Assessment We want, IAPA, Vol.32, No.1, 19-20
- Jong-Gwan Jung and Myungjin Kim, 2018, IAIA Affiliate KSEIA, Affiliates, Branches, and Associated Organizations Forum, IAIA18, Durban

Modeling of breeding-site occupancy dynamics for Northern Goshawks in urbanized areas

Haruki Natsukawa¹, Kaname Mori², Shizuko Komuro², Takashi Shiokawa² and Hiroyuki Matsuda¹

¹Yokohama National University, Japan

²Japanese Wild Bird Society Kanagawa branch, Japan

Keywords: Northern Goshawk, *Accipiter gentilis*, urbanized area, breeding, dynamic occupancy model

1. Introduction

Habitat occupancy by organisms is closely related to individual fitness. Breeding sites play a key role in maintaining the long-term viability of organisms. Even though organisms inhabit sites in the present time, it is not possible to conclude that they are to inhabit the same site to the same extent in the future. Therefore, elucidation of temporal change in breeding-site occupancy is extremely important.

Urbanization has various effects on many organisms. The response of organisms to urbanization varies greatly depending on species and taxonomic group. Urbanization is expected to increase even rapidly in the future. Hence, ecological studies in urban areas have become more vital than ever.

Northern Goshawk is a medium-sized raptor which inhabits forests in agricultural areas. However, recently it has expanded its distribution to urban areas in Japan. Studies on goshawks inhabiting urban areas are very limited, and no studies have elucidated the breeding-site occupancy dynamics. Therefore, this study was aimed at elucidating the breeding-site occupancy dynamics of urban-breeding goshawks.

2. Methods

2.1 Study Areas and field survey

The field survey was conducted in the eastern part of Kanagawa, Japan from 2004 to 2017. 80% of this study area consists of Densely Inhabited Districts. The study area of the forests was investigated between January 1 and June 15 each year, to detect the occupied nests by goshawks.

2.2 Measurement of environmental factors

A circle of 1 km radius was set centering the goshawk nests and land cover factors were measured the within the same. The measured

land cover factors were; forest area, open area, highly vegetated urban (HVU) area, urban area, tangential length of forest and open area, tangential length of forest and HVU.

2.3 Statistical modeling

Breeding-site occupancy dynamics were analyzed using dynamic occupancy model (MacKenzie *et al.* 2003). This model can simultaneously estimate the occupancy probability, the colonization probability (the probability of occupying a site by year $t+1$, which was unoccupied in year t), the local extinction probability (the probability of not occupying a site by year $t+1$, which was occupied in year t), and the detection probability. For the covariates of the habitat state model, the land cover factors measured in 2.2 were used. For the covariates of the detection model, the number of days from January 1 and its square and cube terms were used. The model with the smallest AIC value was defined as the top-ranked model.

3. Results

In the top-ranked model, the forest area rate showed a significant positive effect on the occupancy and the colonization probability. Further, it demonstrated a significant negative effect on the local extinction probability. There was no adopted covariate in the detection probability.

4. Conclusion

The study revealed the importance of conserving the forest sites to maintain the long-term urban-breeding goshawk population.

References

MacKenzie, D. I., Nichols, J. D., Hines, J. E., Knutson, M. G., Franklin, A. B. (2003). Estimating site occupancy, colonization, and local extinction when a species is detected imperfectly. *Ecology*, No.84, pp.2200-2207.

An Analysis of Redevelopment and Resettlement History of Seoul

Kongjang CHO, Aram SEO, Sungju HAN

Korea Environment Institute, Korea

Keywords: Redevelopment, Resettlement, Gentrification, Social Impact Assessment

1. Introduction

Korea has been experienced unprecedentedly rapid urbanization and industrialization since 1970's. As a result, high concentration of the population has been demonstrated from then. Especially the capital Seoul has become a metropolis with the population over 10 million. Accordingly, the urban redevelopment projects actively led by the government across the city have been implemented since 1970's. As a result, the land value of 2010 has soared almost 1,370 times more than that of in 1960.

Urban redevelopment of Seoul can be summarized as a process of 'social upgrading' by implementing physical improvement (e.g. demolition, rebuilding). In other words, in Korean context, the urban redevelopment process can be seen as a form of 'gentrification'. This research investigates the problems caused by redevelopment process focusing on the gentrification and resettlement problem.

2. Characteristics of redevelopment history

2.1 Mid 1970's~Early 2000's

The redevelopment was processed by the developers (association of property owners), who only seek the maximized development rent, resulting in rush in the process.

While compensation for residential measure has been improved slow by slow, the compensation for the commercial tenants was hugely insufficient.

In order for developers to clear the process swiftly, various types of illegal expedient are occurred for maximization of the developers' profit. The violence

brought huge conflict and resistance from the residents.

2.2 Mid 2000's ~ Presents

The developers, the real-estate consultants and landlords, saddle the vulnerable group such as the tenants with the development cost. Due to the biased current system, low-income tenants cannot be compensated fully about what they have invested in, for example a "foregift", which is 50-100 times higher than the monthly rental fee. Also, increased rental fee after the redevelopment burdens the original tenant. Subsequently, it promotes speculation in real-estate economy.

3. Conclusions

Redevelopment process in Seoul has made the area more attractive and activated, however, the marginalized group in the community has been discriminated during the process. The supply of higher level of the housings which not everyone can afford rather makes current dwellers have lower chance to purchase and even to return to the area. The problems represented in the most of the redevelopment of Seoul can be told as a typical example of 'exclusive displacement'. Higher proportion of tenant than the landlord in Korea makes involuntary resettlement inevitable.

References

1. Park, T.W et al. (2016), Gentrification in Korea, Urban Information Service, 413, 3-14.
2. Ku, D and Kim, S.J (2006), Social Impact Assessment of Urban Development Project : The Case of Eunpyeong New Town Project in Seoul, ECO, 2006.12, 7-43.

Development of a leaching assessment framework for the utilization of coal ash at South Korean mine reclamation sites

Hanna Cho¹

¹Korea Environment Institute, Korea

Keywords: Leaching assessment, coal ash, mine reclamation, EIA

1. Introduction

Numerous leaching procedures for coal ash have demonstrated that the quantity of the extracted major and trace elements can be extremely variable, depending on the nature of both the coal ash and the leaching solution. It is difficult to identify the suitable leaching method for coal ash according to the particular situation in the field area. Nevertheless, to reduce deviations between leaching test estimates in the laboratory and measurements in the field, the appropriate leaching test must be identified and the appropriate leaching procedures with the right conditions must be selected. Site-specific conditions must be given due attention in the selection of a leaching test for coal ash

2. Methods

In South Korea, there is one legal leaching procedure: KLP(Korea leaching procedures). To find suitable leaching procedures for using coal ash at mine reclamation sites in South Korea, several leaching procedures relative to coal ash were reviewed and evaluated. To evaluate KLP according to its release of coal ash elements by comparing it with that of other leaching methods, data on several leaching methods, such as KLP, TCLP(Toxicity characteristic leaching procedure), SPLP(Synthetic precipitation leaching procedure), and MWLP(Mine water leaching procedure) were collected and analyzed.

3. Conclusions

It was observed from this research that the KLP might have underestimated the leaching potential of nearly each trace metal in the analysis. Also, KLP appeared to have accurately predicted the long-term effect of coal ash in mine environments. Most Korean coal ashes have alkaline characteristics, and when their alkalinity has been exhausted, their leachate becomes acidic. There is no suitable leaching procedure for acid environments in Korea. Due to this fact, the pH of the MWLP buffer solution was lower than that of other procedures. MWLP effectively exhausts elements of coal ash and helps determine the long-term leaching behavior of waste placed in acid environments. Therefore, MWLP may be a more appropriate leaching test for the environmental impact assessment of the use of coal ash at mine reclamation sites in Korea

Acknowledgements This research was supported by the Korea Environment Institute (2017M3D8A2085339)

References

- Zandi M, Russell NV (2007) Design of a leaching test framework for coal fly ash accounting for environmental conditions. *Environ Monit Assess* 131:509–526.
- Sakanakura H, Osako M, Kida A, Sakai SI (2011) Design optimization and standardization of an environmental availability test under both acidic and alkaline conditions. *J Mater Cycle Waste Manag* 13:56–67

Spatial variations of water quality data in the four weirs installed in Nakdong River

Daeyeon Park†, Hyungseok Park, Sewoong Chung

Department of Environmental, Urban and Chemical Engineering Graduate school, Chungbuk National University, Cheongju, Korea

Keywords : Spatial Variation, Kruskal-Wallis, Harmful Cyanobacteria, Nakdong River, Weir

1. Introduction

The occurrence of algal blooms is one of the important environmental issues that has been observed in Nakdong River after installation of the 6 weirs since 2012. The field data collected through a regular water quality monitoring program are not sufficient to characterize the spatial variability of water quality. Thus, intensive water quality monitoring for acquiring spatial data in lateral and vertical directions are under performed by the Korean Ministry of Environment and Korea Water Resources Corporation to better understand the physical, chemical, and biological factors that influence on the bloom processes. However, intensive monitoring requires cost and labor. Therefore, it is needed to optimize sampling points to represent the spatial variability of the waterbodies.

The objective of this study was to perform statistical analysis on the field data to validate the difference of water quality variables in lateral and vertical directions using the Kruskal-Wallis test.

2. Materials and Method

Lateral (left, center, right) and vertical (top, middle, bottom) field data were collected at 500 m from each weir (G-G, DA, H-C, C-H) installed in Nakdong River. Sampling was performed 14 times from August to October, 2017. Water quality variables including water temperature, dissolved oxygen and four harmful cyanobacteria species (*Anabaena*, *Aphanizomenon*, *Microcystis*, *Ocillatoria*) were analyzed using the Kruskal-Wallis test with Nemenyi's test (Pohlert, 2014) for the pairwise multiple comparison of variables

measured at different location. Hypothesis test was conducted with a significance level of 0.1.

3. Results and Discussions

The results showed that the lateral variations of most water quality variables are not significant ($p < 0.1$), but the vertical variations are statistically significant for many variables (Table 1). 10 variables in the G-G weir and 13 variables in the DA weir showed a significant difference by water depth. In the H-C weir, 5 variables such as BOD, Chl-a, *Cyanobacteria* were different by water depth, and DO, SS, NH₃-N, Chl-a, *Microcystis* were difference by water depth at the C-H weir.

For the lateral variation tests, *Euglena* showed significant difference in the DA weir. And *Cyanobacteria* and *Dinophyta* were significantly different in the left side and right side in the C-H weir.

Table 1. Kruskal-Wallis test and post-test results(Top, Middle, Bottom)

	C-H	H-C	DA	G-G
Water Temperature	-	-	Top/Bot	Top/Bot
DO	Top/Bot	-	Top/Mid/Bot	Mid/Bot
pH	-	-	Top/Bot	Top/Bot
BOD	-	Top/Bot	Top/Bot, Mid/Bot	Top/Bot
SS	Top/Bot	-	-	Top/Bot
COD	-	-	Top/Bot, Mid/Bot	-
DTP	-	-	Top/Bot	-
PO4-P	-	-	Top/Bot	-
NH3-N	Top/Bot, Top/Mid	Top/Bot, Top/Mid	Top/Bot, Top/Mid	Top/Bot, Top/Mid
Chl-a	Top/Bot	Top/Bot	Top/Bot	Top/Bot, Mid/Bot
Cyanobacteria	-	Top/Bot	Top/Bot	-
Green	-	-	Top/Bot	-
Anabaena	-	Top/Bot, Top/Mid	-	-
Microcystis	Top/Mid	-	Top/Bot, Mid/Bot	-
Cryptophyceae	-	-	Top/Bot	Top/Bot, Mid/Bot

4. Conclusions

In the four weirs, the water quality and algae species showed significant difference by depths, while the lateral variations were found to be not significant.

5. References

Pohlert T. The pairwise multiple comparison of mean ranks package (PMCMR). 2014. R package.

Social Impact Management of Geothermal Development

Yuki SHIBATA¹, Aki SUWA², Takehiko MURAYAMA³

¹TOHO University, Japan

²Kyoto Women's University, Japan

³Tokyo Institute of Technology, Japan

Keywords: Geothermal Development, Social Impact, Resource Management, Community Design

1. Introduction

Japan has world's-third geothermal resource potential (23-GW) behind US (39-GW), and Indonesia (27-GW) (Williams, C.F. *et al.*, 2008, Darma, S. *et al.*, 2010). However, the Japanese electric capacity of installed geothermal power (537-MW) ranks 8th in the world lists behind US, Philippine, Indonesia, Mexico, Italy, New Zealand, Iceland. Geothermal power development in Japan has been started in the early 1970's, and currently 17 large/medium scale geothermal power plants are in operation, but the total geothermal electric power generation is only 0.2% of the total electric power supply in this country (Thermal and Nuclear Power Engineering Society, 2012).

On this background, we established "Geothermal Governance Study Group" in 2011. Since then, we have summarized the current situation and latest challenges of geothermal resource uses in Japan and other geothermic regions. This presentation shows the results of our study activities and proposes a new approach for the community driven geothermal resource management scheme.

2. Results of Our Study Activities

The result of our study activities were published as an introductory textbook "Geothermal uses in the community" in 2018. This textbook consists three main parts. The first part explains the basic mechanism of geothermal uses from the geological understandings to the engineering of power generation. The second part describes the social barriers of geothermal developments and introduces the 9 advanced cases which challenge the new approaches for community and/or municipal based geothermal development projects in Japan. The final part indicates various lessons from the theoretical studies of related fields including risk communications, impact assessment and consensus building. This part also refers suggestions from the good practices in Iceland, New Zealand and other Asian countries.

3. Conclusions

Through the publishing, our study group proposes a new approach for the community driven geothermal resource management and the planning systems including consensus based social impact management.

Acknowledgement

This work was supported by Grant-in-Aid for Young Scientists (B) Grant Number 17K12862.

References

- SHIBATA, Y., KANASUGI, M. UECHI J. "Social Impacts from Geothermal Developments" International Association of Impact Assessment , Annual Conference 36 (2016)
- Williams, Colin F., Reed, Marshall J., Mariner, Robert H., De Angelo J., Galanis, S. Peter Jr. (2008) "Assessment of moderate- and high- temperature geothermal resources of the United States".

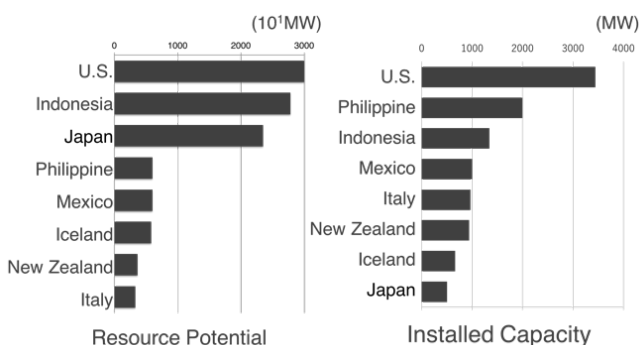


Fig. 1 Geothermal Potential and installed Capacity (Williams, C.F. *et al.*, 2008, Darma, S. *et al.*, 2010) ThinkGeoEnergy Research, GEA IGA (2015)

The Dispersal Trend of Alien Plants in Road Construction

Yunsoo Chu¹, Seon-Mi Lee¹, Jung-kwon Kim¹, and Hyohyemi Lee¹

¹National Institute of Ecology, Korea

Keywords: Alien plant, Road development, Dispersal strategy, Seed bank

1. Introduction

Road development is a construction in which civil engineering works such as logging and cutting are basically carried out. As a stabilized ecosystem is transformed into a bare land ecosystem due to disturbance of topsoil (Faucette et al., 2006), the area becomes very easy to invade alien plants (Forman, 2003). To identify the acceleration of the introduction and dispersal of alien plants due to the road construction, we investigated the seed bank and the aboveground vegetation survey at the Seolma-Gueum road construction site.

2. Results and discussion

2.1. Alien flora characteristic

Since disturbance is constantly occurring due to the characteristic of the road construction, the percentage of annual plants was high in most of the study sites. *Xanthium strumarium*, *Aster subulatus* appeared only in the seed bank, mostly unintentionally introduced species.

2.2. Classification of type according to alien plants

The result of principal coordinate analysis was classified into the three groups (Fig. 1). First, aboveground vegetation with high weight and volume of seeds and the unassisted dispersal. Second, natural vegetation with high percentage of wind dispersal. Third, seed bank with wind and unassisted dispersal ratio similar.

3. Conclusion

Road construction promotes the introduction of new alien plants. Vegetation was classified into three types, but it is expected that it will be similar as construction progresses. Because of the characteristics of the road, bidirectional dispersal

of alien plants will be possible at a much faster rate. It is predicted that dense alien plants will become a dispersal passage to the rural area because intercity connection is the main purpose.

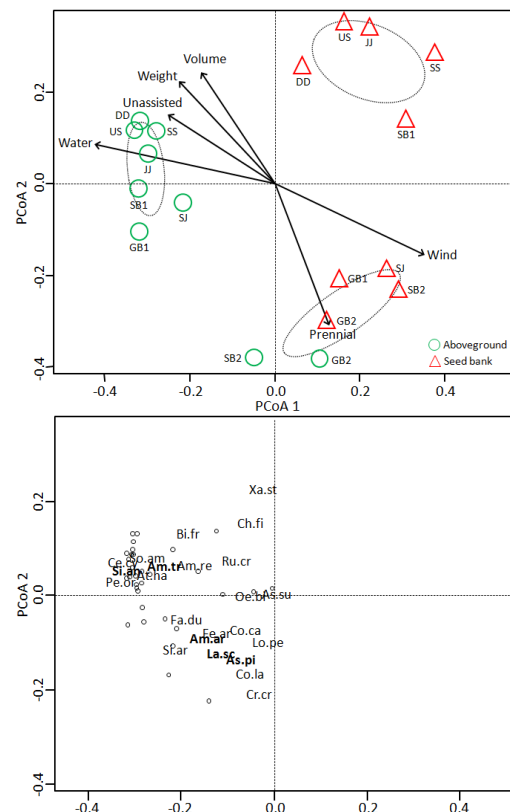


Figure 1. Results of principal coordinates analysis using soil seed bank and aboveground vegetation

References

- Faucette, L. B., L. M. Risse, C. F. Jordan, M. L. Cabrera, D. C. Coleman, L. T. West (2006) Vegetation and soil quality effects from hydroseed and compost blankets used for erosion control in construction activities, *Journal of Soil and Water Conservation*, No.61, pp.355-362.
- Forman, RT (2003) *Road ecology: science and solutions*, Island Press.

Estimation of PM_{2.5} Concentration through the Restriction on Diesel Vehicles

Suhyang Kim¹, Sun Hwan Park¹, Min Uk Choi² and Hyun-Soo Joo²

¹Sunil Engineering & Consultant, Co., Korea

²Korea Environment Institute, Korea

Keywords: Diesel Vehicle, PM_{2.5} concentration, Emission Reduction, CMAQ

1. Introduction

Diesel exhaust was recently classified as Group 1 carcinogen by the International Agency for Research on Cancer (IARC, 2012). The Korean government has established the emission reduction measures for the on-road transportation sector, such as fuel reformation, DPFs supply, retrofitting of aged diesel vehicles, encouraging the use of low emission vehicles (LEV).

The aim of this study is to estimate PM_{2.5} concentrations when all of the diesel passenger cars, vans, light trucks and buses are replaced with in gasoline or LPG vehicles in Seoul by WRF-SMOKE-CMAQ modeling system.

2. Methods

The target period is 14th~18th January, 2018, when the high PM_{2.5} concentration episodes occurred in Seoul. High-concentration air pollutants were long-range transported into Seoul, after then, they were accumulated with domestic emissions and persisted in the near-surface atmosphere due to stagnant atmospheric conditions (Ministry of Environment, 2018).

CMAQ v4.7.1, WRF v.3.6.1 and SMOKE v.3.6 were employed. Local Data Assimilation and Prediction System (LDAPS) data of the Korea Meteorological Administration (KMA) were used to provide initial and boundary conditions for meteorological fields. The domain 1 for nesting process was covered the East Asia. The domain 4 covered Seoul is 67×67 grids in plane with 1 km grid resolution. The emissions in East Asia are

based on the INTEX-B emission. The anthropogenic emissions from Korea are derived from Clean Air Policy Support System (CAPSS) 2014 of the National Institute of Environmental Research (NIER).

3. Conclusions

In 2014, the NO_x emissions in Seoul were 62,358 tons, and 49% of which were from on-road mobile sources. Also, the NO_x emissions from target vehicles were 18,477 tons, accounted for 30%. The changes in emissions depending upon the conversion of vehicles were estimated by multiplying the ratio of the emission factors for diesel vehicles to gasoline or LPG vehicles.

As the results, NO_x emissions were estimated to 2,061 tons when diesel vehicles were converted to gasoline vehicles by totally 100%, it means approximately 88% decrease in NO_x emissions (18,477 tons to 2,061 tons). In addition, when converted to LPG vehicles, NO_x emissions were estimated to 2,576 tons, which means approximately 86% decrease in NO_x emissions. Finally, this study suggests that PM_{2.5} concentrations over Seoul can be estimated using the reduced emissions as above.

References

- IARC (2012) Diesel Engine Exhaust Carcinogenic, International Agency for Research on Cancer, World Health Organization.
- Ministry of Environment (2018) High concentration Particle matter in Seoul metropolitan area, press release, 7th Feb., 2018, in Korea.

Implementation of environmental impact assessment, environmental management and monitoring.

(Case Study of Environmental Management and Monitoring Implementation in Padang Pariaman District, and EIA in Kendal District, Indonesia)

Dikarama Kaula¹, Vivin Irawati¹, Erri N Megantara², Bambang Heru³ and Herri Y Hadikusumah²

¹ Master's Program in Environmental Science, Universitas Padjadjaran, Indonesia

² Master's Program and Doctor of Environmental Science, Universitas Padjadjaran., Indonesia

³ Doctoral Program of Management Science, Universitas Pasundan, Indonesia.

Keywords: EIA, EMEF, IRT, Management, Monitoring, Implementation

1. Introduction

Rules and Regulations that dictates Environmental Law in Indonesia have existed since more than 30 years ago. But in reality these days, there are still many Projects that neglects the importance of it. In Padang Pariaman There are 109 businesses and/or activities in this district which have Environmental Licenses, 87 of which have Environmental Impact Assesment (EIA), eight have Environmental Monittinging Effort Form (EMEF), and 14 others have environmental documents at EIA/EMEF level (*LHPKPP Services of Padang Pariaman District, 2016*).



Figure 1. Indonesia Map

In Kendal district there are 12 projects which is mandatory to have EIA, but only 6 of them accomplished that term, only 1 of those 6 have Implementation and Reporting Techniques (IRT).

2. Methodology

2.1 Objects and Location of Research

The object of the research is the implementation of management and monitoring of business

environment and/or activity in Padang Pariaman District which already has EIA or EMEF and has operated for at least one year. The research sites are included in the area of Padang Pariaman , and Kendal District (Marked in Figure 1).

2.2 Research Methods

The method used in the research is a combination of quantitative and qualitative methods (mixed method). The merger design is a convergent parallel where both quantitative and qualitative methods are used simultaneously, in which the results of the two are linked/compared for subsequent interpretation (Creswell, 2016).

3. Conclusions

Factors influencing a policy adopted from the Mazmanian and Sabatier (1983) theories have been shown to have an effect on the implementation of environmental management and monitoring of businesses and/or activities in Padang Pariaman District, although with varying degrees of significance. Influence can be either positive or negative. While in Kendal there is also a lack of understanding of EIA and funds to implement it from the government officials.

References

- Creswell, J. W. 2016. *Research Design (Qualitative, Quantitative, and Mixed Methods Approaches) – Fourth Edition*. Pustaka Pelajar. Yogyakarta.
- Mazmanian, D dan Sabatier, A. 1983. *Implementation and Public Policy*. Scot Foresman Company. California.

Effects of Traffic Characteristics on Roadside Air pollution

Hyejin Kang and Chulhwan Kim

Korea Expressway Corporation Research Institute, Korea
 Keywords: Roadside, Air pollution, Traffic, Effect, Correlation

1. Introduction

As of 2018, an average of 4 million vehicles a day use highway. Vehicles driving on the road are the major sources of air pollutants. In particular, the cause of most of the air pollution in road occupies a large part. The traffic volume and road length of Expressway has been increased continuously. The traffic volumes are increasing every year, and the concentrations of air pollutants are increased depending on traffic volume increase. Air pollution caused by vehicles on the road will affect roadsides through diffusion. This study investigated the effect of traffic characteristics on roadside air pollution.

2. Scope & Result of Research

2.1 Scope of Research

- Sampling Sites : 2 Expressway Site
- Data Duration : 24 hours
- Measurement pollutant : PM2.5, PM10, NOx(NO+NO₂)
- Traffic Data : Field measurement data



Figure 1: Measurement points

2.2 Results

The results of measurement of traffic volume and air pollutant concentration are as follows.

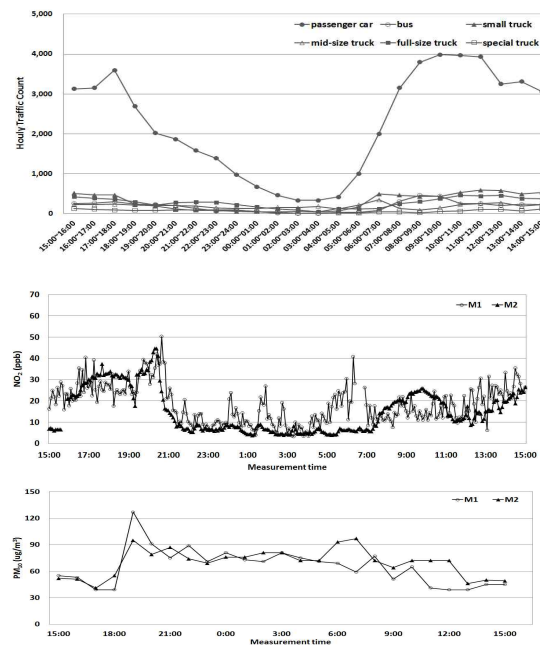


Figure 2: Measurement Results

3. Conclusions

According to the correlation analysis depending on a whole traffic change, NOx tended to increase with a rise in the traffic volume. Overall, there were correlations between pollutants and a traffic change. However, PM10 and PM2.5 seemed to have low correlations with a traffic change.

References

National Institute of Environmental Research, 2015 Yearbook Atmospheric Environment, Ministry of Environment, 2016.

Approach for Mainstreaming of Climate Change Adaptation in Urban Basic Plan of Korea

LEE Youngsoo, LEE Seung Hyun, Choi Sang-Ki

Korea Environment Institute, Korea

Keywords: Mainstreaming of Climate Change Adaptation, Urban Basic Plan, Korea

1. Introduction

Climate change adaptation is very important to minimize adverse impact of extreme disaster caused by climate change. For the mainstreaming of climate change adaptation in the high-level administrative plan, we reviewed guideline for basic urban plan and confirmed how much adaptation is considered in this guideline. And we suggested revised guideline to take into account climate change adaptation

2. Guideline for Urban Basic Plan

2.1 Contents of Guideline

The guideline is composed of 5 chapters.

Chapter 1 : Generals

Chapter 2 : Range of Planning

Chapter 3 : Contents and Principles of Planning

Chapter 4 : Criteria for Planning of Specific Plan

Chapter 5 : Planning Procedure

Chapter 1 consists of 3 parts. The 1st is purpose of the guideline. The 2nd is meaning of the guideline. The 3rd is hierarchy and position.

Chapter 2 consists of 3 parts. The 1st is target of plan. The 2nd is target year. The 3rd is spatial zone of plan.

Chapter 3 consists of 3 parts. The 1st is contents of urban basic plan. The 2nd is basic principles of planning. The 3rd is notice for planning.

Chapter 4 consists of 13 parts. The 1st is characteristics and status of city. The 2nd is goal of plan and index designation. The 3rd is designation of spatial structure. The 4th is land use plan. The 5th is infrastructure. The 6th is core of city and living environment. The 7th is preservation and management of environment. The 8th is landscape and esthetics. The 9th is park and green space. The 10th is prevention of disaster and safety. The 11th is development and promotion of economy, industry, society and culture. The 12th is execution of plan. The 13th is division of living space.

Chapter 5 consists of 5 parts. The 1st part is set up of plan. The 2nd is increase of public participation. The 3rd is application for approval. The 4th is approval of plan.

3. Conclusions

In order to identify whether climate adaptation is considered in high-level administrative plan, we reviewed guideline for set up of urban basic plan. It was found that adaptation is considered rarely in the urban basic. Thus, we suggested a revised guideline.

References

Ministry of National Land and Transportation, (2017) Guideline for Set up of Urban Basic Plan

Elution characteristics by sediment characteristics

Yoon-A Park¹, Dong-Min Lee¹, and Jong-Min Oh²

¹ Department of Applied Environmental Science Kyung hee University, Korea

² Department of Environmental Science & Engineering Kyung hee University, Korea

Keywords: Elution characteristics, Sediment, Characteristics, Kaolin, Fluorine

1. Introduction

The purpose of this study was to Elution characteristics by sediment characteristics in the river by conducting an experiment with small and medium rivers in Gyeonggi-do. A total of three sampling sites have been selected to collect river sediment of different Particles in diameter. Adsorption and elution characteristics according to saturation showed that the higher the clay content, the higher the adsorption amount of fluorine and the lower the amount of fluorine released. From this study, It was possible to predict the behavior of fluorine dating from depending on the soil of sediments.

2. Research method

Fluorine concentration in sediment is measured using an ultraviolet / visible ray spectroscope according to Standard methods for the examination of Soil pollution. We used artificial contaminated specimens 1, 2, and 3 to see how Elution characteristics by sediment characteristics. In the neutral conditions, 30 ml of the third distilled water was added to each of the 2 grams of artificially contaminated specimens, which were then added to the 50 ml capacity chemical tube and tested for six hours at room temperature. After centrifugation of the suspension, the fluorine concentration of the upper layer was then measured using an ion electrode (ISE meter).

3. Conclusions

Analysis of the results of the experiment showed that The amount of fluorine eluted changed with the amount of kaolin added. In all of the samples 1, 2 and 3, less elution was emitted when no kaolines were added at all. If sample 1, 2, and 3 were analyzed without adding kaolines, the amount of fluorine was high in the order of sample 3 of sample 1 > sample 2. As the absorption reaction with fluorine was better in specimen 3 with a higher proportion of silt and clay, the result was that the amount of elution in the water was the least. The characteristics of the soil may vary depending on the physical conditions such as stream velocity, depth, and width of the stream, and the characteristics of fluorine in different sections are expected to vary.

Table 1: Amount of fluorine eluted

	Sample1	Sample2	Sample3
Addition of kaoline 0%	1.5%	0.9%	0.6%
Addition of kaoline 0%	3.3%	3.1%	1.6%

4. Acknowledgement.

This research was supported by a grant (12-TI-C02)(code18CCTI-B063263-07) from Advanced Water Management Research Program funded by Ministry of Land, Infrastructure and Transport of Korean government

5. References

Chae-Lim Kim, 2017, Effect of sediment Property on Adsorption of Fluoride, KyungHee University

Habitat selection analysis of Ural Owls using an occupancy model

Takumi Shimizu¹, Haruki Natukawa², Hiroki Yuasa³ and Tomohiro Ichinose⁴

¹Keio University, Japan

²Yokohama National University, Japan

Keywords: Ural Owl, Occupancy model, Habitat Selection, Robust Design, Call-broadcasting

1. Introduction

Habitat selection by organisms is closely related to individual fitness. Habitat selection can be identified by the disproportionate rate of some habitats compared to their availability in the environment, and it reveals essential requirements of the organisms.

The Ural Owl (*Strix uralensis*) is a medium-sized raptor distributed from northern Eurasia to the Scandinavian Peninsula. Top predators, such as Ural Owls, are often associated with high species richness because they usually have large home range with spatial heterogeneity. Therefore, raptors can be designed as surrogate species to represent the status of many species on some habitats. For this reason, to elucidate the habitat selection of Ural Owl and to quantify the habitat requirement is important for habitat management of the owl and many species.

Nevertheless, previous studies on habitat selection of Ural Owl are limited. Therefore, this study aims to elucidate the habitat selection of Ural Owl.

2. Method

2.1 Study Area and field survey

The field survey was conducted in Kamakura City, Kanagawa Prefecture, Japan from the beginning of April to the middle of May 2018 (Figure 1). We used the call-broadcasting method at 41 randomly selected survey points from 7 pm to 6 am the following day. Each survey lasted six minutes and consisted of three minutes of playing back the male territorial song using a speaker and three minutes of waiting. During the six minutes, we recorded as “present” if there was a reaction in the neighborhood less than 250m from the survey spot. This survey was a robust design that conducted iterative surveys 5 to 6 times at each spot.

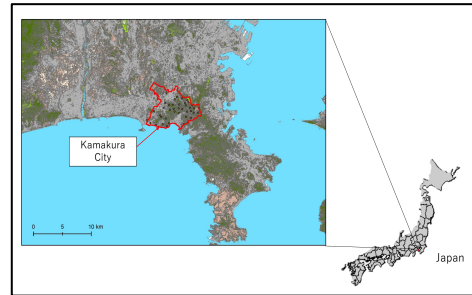


Figure 1: Survey area of this study

2.2 Statistical modeling

We analyzed using occupancy model with the objective variable of whether owls were present or absent and covariates of land cover rate within 500 m around the survey site. The occupancy model can simultaneously estimate the presence probability and the detection probability of organisms (Mackenzie *et al.* 2002). This model is described hierarchical bayesian model and posterior probability of parameter is calculated Markov chain Monte Carlo method. The analysis was carried out by a combination of all covariate, and the model with the lowest WAIC value was considered the top-ranked model.

3. Result

The Ural Owl presence probability when the cover rate of forest and grassland within 500 m around the survey spot increased. The detection probability was 42.1 % in this survey.

4. Conclusions

Therefore, land use plans considering forests and grasslands are important for Ural Owls and other species.

References

MacKenzie, D. I., J. D. Nichols, G. B. Lachman, S. Droege, J. A. Royle, and C. A. Langtimm. (2002). Estimating site occupancy rates when detection probabilities are less than one. *Ecology* No.83, pp.2248–2255.

Water quality assessment for a drinking water resource with a three-dimensional analysis

Young-Sik Ham

Faculty of Environmental Studies, Tokyo City University, Japan

Keywords: dam reservoir, drinking water resource, eutrophication, three-dimensional analysis, water quality assessment

1. Introduction

Generally, the dam reservoir is one of important drinking water resources. However, dam reservoirs are susceptible to Water Quality Degradation by Eutrophication originating from high water temperature, and excessive nitrogen and phosphorus concentration, which is generally resulting from some human activities (e.g., nitrogen and phosphorus fertilization, domestic wastewater & etc.). Even though biochemical oxygen demand (BOD) values representing river water quality in Japan has been decreasing, chemical oxygen demand (COD), nitrogen and total coliform bacteria have an increasing trend or chronically undesirable situation for freshwater in Japan. This research reports a water quality assessment for the Sagami lake of drinking water resource in Kanagawa Prefecture and Yokohama City in Central Japan.

2. Materials & Methods

On site, turbidity, dissolved oxygen & water temperature were three-dimensionally measured by a digital turbidity meter (TD-M500, OPTEX, Japan) & digital DO meter (Multi 3410, WTW, Germany) in May and August of 2017. All samples were transported to our laboratory for the analysis. Total coliform bacteria & *Escherichia coli* were also analyzed by a coliform detection paper (Suncoli X-Type, Sun Chemical Co., Ltd, Japan). F⁻, Cl⁻, NO₂⁻, Br⁻, NO₃⁻, HPO₄²⁻, SO₄²⁻, Li⁺, Na⁺, NH₄⁺, K⁺, Mg²⁺, Ca²⁺ were determined by an ion chromatography (ICS-1100, DIONEX, USA). pH and EC (Electrical Conductivity) were

measured by a pH meter (691 pH Meter, Metrohm, Swiss) and EC meter (DS-72, HORIBA, Japan). COD was measured in triplicate by a pack test (WAK-COD (D), Kyoritsu Chemical Check Lab., Corp., Japan) to which was applied a oxidation with potassium permanganate in alkalinity and visual colorimetric method.

3. Result & Discussion

Algae bloom caused by eutrophication has been observed in the Sagami lake since the dam reservoir (1947), which has been causing the alkalization of high pH (>8.5). Furthermore, under the condition of high pH, the mobilization and release of toxic heavy metals (Bourg & Loch, 1995) can be accelerated with some water quality degradations and negative environmental effects for the aquatic living things including human being. In water depths, water temperature, turbidity & dissolved oxygen are seasonally showing some difference and pattern. Although water quality is generally downgraded in summer (August in this study), the turbidity was improved in summer and deeper water down to 5 m. This study assesses suitable and unsuitable points for drinking water resources throughout three-dimensional analysis. This assessment will be very useful for selecting suitable points for the water intake of drinking water resource and improving the water quality.

References

Bourg, A. C. M., J. P. G. Loch (1995) Mobilization of heavy metals as affected by pH and redox conditions, Salomons & Stigliani (Eds.), *In Biogeodynamics of Pollutants in Soils and Sediments*, pp.87-102.

Evaluation of turbid flow by climate change impacts in a large dam reservoir in Korea

Hyungseok Park, Sewoong Chung, Daeyeon Park, Yeojeong Yoon

¹Chungbuk National University, Korea

Keywords: Climate change, HadGEM2-AO, RCP 4.5, Turbid water

1. Introduction

Long-term discharge of turbid water from large dam reservoirs is an important socioenvironmental problem in Korea. This study used a suite of mathematical models to simulate the fate of turbidity flows in Soyanggang Reservoir in Korea, which is an important source of drinking water for the Seoul Capital Area, in response to selected extreme flood events based on the Representative Concentration Pathway 4.5 climate scenario.

2. Materials and Methods

Soyanggang Reservoir (latitude 37°56'44", longitude 127°48'52"), is located 12 km upstream of Soyang River (North Han River) in Korea. The reservoir is used for multipurpose including water supply, flood control, and hydropower generation. For the generation of future climate data in the watershed, a specific climate scenario (RCP 4.5) simulated using HadGEM2-AO, which is the national standard General Circulation Model (GCM) in Korea, is selected. The GCM data were created based on the IPCC's Fifth Assessment Report (Chung et al. 2015).

The simulation was performed according to the procedure as shown in Fig.1. Evaluation of turbid flow was analyzed based on the stratification strength (S_i ; Schmidt number) and density flow regimes.

3. Results and discussion

The model was validated using the observed extreme flood event (2006) and showed a satisfactory performance in simulating the thermal stratification and transport of turbidity flow in the stratified reservoir. The thermal stratification was strong ($St\ 3785\ J\ m^{-2}$) when turbid flow entered in 2027. Subsequently, the thermal stratification weakened but the persistent turbidity problem did not occur. On the other hand, the turbid water mixed to the surface layer as the thermal stratification intensity weakened ($St\ 2491\ J\ m^{-2}$) in 2040. These results imply that management of persistent turbidity in the reservoir may be difficult when the extreme flood event and autumn turnover occur simultaneously.

4. Conclusions

The fate of turbidity flows was highly influenced by both the thermal stability of the reservoir and the season in which the flood event occurred. The high-turbidity plume remained in the mid-layer of the reservoir under strong thermal stratification but it rapidly mixed with the ambient water under weak stratification

This work is supported by the Korea Agency for Infrastructure Technology Advancement(KAIA) grant funded by the Ministry of Land, Infrastructure and Transport (Grant 18AWMP-B083066-05)

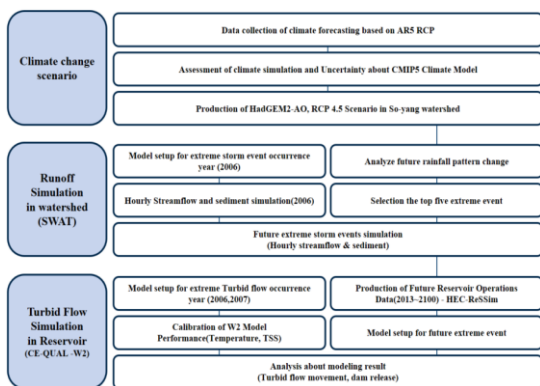


Fig.1 Conceptual diagram of individual model simulation steps

GIS-based Land-use suitability analysis for urban development using soft computing in Ili Valley, China

Chaoxu Luan, Renzhi Liu, Jing Liu and Hanwen Zhang
School of Environment, Beijing Normal University, China

Keywords: Multi-criteria evaluation, Soft computing, Urban development, Ordered weighted averaging, Xinjiang methods.

1. Introduction

Land-use suitability analysis is an important step in land use planning for urban development. This study aimed to implement two GIS-based multi-criteria soft computing methods: Ordered Weighted Averaging (OWA) and Logic Scoring of Preference (LSP), to comparatively evaluate and map land-use suitability for urban development in Ili Valley, China.

2. Methodology

The GIS-MCA procedure for the land-use suitability can be subdivided into several stages (see Fig. 1).

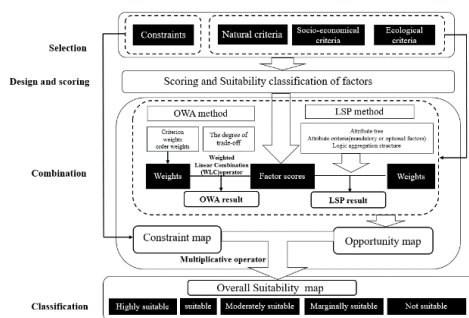


Figure 1: GIS-based Land-use suitability analysis procedure

2.1 Selection of the factors

The evaluation used fourteen factors as suitability criteria. The suitability criteria were grouped into four main categories, namely: natural criteria, socio-economical criteria, ecological criteria and constraint criteria.

2.2 Design and combination

The order weight and the parameter α (attitudinal character) characterize the OWA aggregation. The order weight was generated by applying the maximum entropy approach. The LSP aggregation structure is a decomposition structure based on soft computing models (see Fig. 2). Combination of the opportunity criteria was achieved from the two

methods. The Multiplicative operator was used to obtain the constraint map by means of constraint criteria. Overall land-use suitability map is determined by combining the opportunity map and the constraint map.

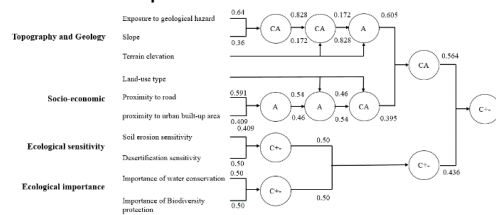


Figure 2: The LSP aggregation structure for Land-use suitability

2.3 Classification of the land-use suitability

The resultant map was classified into 5 levels: not suitable, marginally suitable, moderately suitable, suitable and highly suitable.

3. Results

Fig. 3 shows the urban development land-use suitability distribution for Ili Valley with two methods.

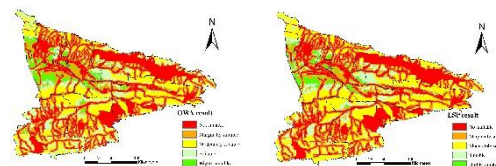


Figure 3: Overall suitability map with two methods

References

Liu R, Zhang K, Zhang Z, Borthwick A G L. 2014. Land-use suitability analysis for urban development in Beijing [J]. Journal of Environmental Management, 145: 170-179.

Montgomery B, Dragičević S, Dujmović J, Schmidt M. 2016. A GIS-based Logic Scoring of Preference method for evaluation of land capability and suitability for agriculture [J]. Computers and Electronics in Agriculture, 124: 340-353.

Yager R R, Alajlan N. 2016. Some issues on the OWA aggregation with importance weighted arguments [J]. Knowledge-Based Systems, 100: 89-96.

Analysis of Sediment Contamination Levels in a Hypereutrophic Reservoir

Sungjin Kim, Youngcheol Cho[†], and Sewoong Chung

Chungbuk National University, Korea

Keyword : algal bloom, sediment, total phosphorus, hypereutrophic reservoir, water quality

1. Introduction

The nutrients released from the reservoirs sediments are known to have a major impact on primary production and water quality of the aquatic system (Boström et al., 2002). Many agricultural reservoirs in Korea are eutrophic and showing a high-level of contamination with nuisance algal bloom and offensive odor during the summer. Particularly the aged reservoirs have relatively larger amount of contaminants accumulated in the sediments for long time. In order to manage the water quality of these reservoirs, it is necessary to assess the contamination levels of the sediments and to take measures to remove pollutants. The aim of this study was to investigate the spatial distributions of sediment contaminants in a hypereutrophic reservoir and assess the contamination level of sediments according to the Sediment Quality Assessment Guideline of Korean Government.

2. Materials and methods

To investigate the pollution level of sediments in the reservoir, we collected sediments twice or more from each site in 20 sites in the reservoir and analyzed the degree of pollution. The analysis items are pH, particle size, COD, ignition loss, total nitrogen (T-N), total phosphorus (T-P), heavy metals (Zn, Cr, Co, Ni, Pb, As, Hg, Cd), release rate nutrients from sediments.

3. Results and Discussions

The concentrations of ignition loss and total nitrogen tended to increase from upstream to downstream and ranged in 4.38-12.93% and 2,153-4,723 mg/kg, respectively. Heavy metals

were in the order of Zn>Cr>Co>Ni>Pb>As>Hg, and the contamination level of the heavy metals was not high as a whole. T-P concentrations were in the range of 765 ~ 3,238 mg/kg, which exceeded the contamination level of the Sediment Quality Assessment Guideline of River and Lake Sediment (Rule No. 2015-687 of the National Institute of Environmental Research, Korea) at two upstream sites, four midstream sites, and all downstream sites. These results indicated that the pollution level of the T-P, which is the main factor related to algal bloom, was found to be serious.

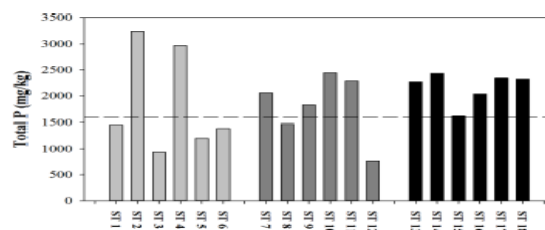


Figure 1 Spatial distribution (up-, mid-, and downstream from left to right) of T-P in the reservoir.

4. Conclusions

- 1) About 33% of upstream and 67% of midstream and 100% of downstream sediments were exceeded the contamination level of the Sediment Quality Assessment Guideline of River and Lake Sediment.
- 2) It is necessary to establish a countermeasure for sediment management to control the algal bloom which occurs periodically in the reservoir.

5. References

Boström, B., Jansson, M., and Forsberg, C (2002), Phosphorus release from lake sediments, *Arch Hydrobiol Beih Erebn Limnol*, 18(5): pp. 59.

Towards sustainable management on contaminated agricultural lands in South Korea

Sang-il Hwang*, Kyeong Yang, and Eun-je Cha

Korea Environment Institute, Korea

Keywords: Heavy-metal contaminated agricultural soils, Anthropogenic source, Policy alternatives

1. Introduction

In Korea, heavy metal contamination in agricultural land is caused by an increase in geological, geographical, and climatic characteristics, as well as by artificial pollution caused by the use of industrial activities, fertilizers, and pesticides by humans. In this study, we would like to contribute to the future management of heavy-metal contaminated agricultural soils by proposing an advanced management of contaminated agricultural soils after reviewing the current systems in both domestic and international cases in order to provide a systematic management of heavy metal contaminated agricultural land.

2. Sustainable Management of Agricultural Land Pollution

2.1 Examples of soil contamination in domestic agricultural areas

The Ministry of Agriculture, Food and Rural Affairs and Korea Rural Affairs conducted a survey of 5,645 districts and 86,709.2 hectares of farmland pollution during the period 2002 to 2004. As a result, the standards for soil contamination in the " Soil Environment Conservation Act " were exceeded in 158 areas, and the main causes of soil contamination were mining areas, industrial (agricultural-industrial) complexes, and uncontrolled landfills.

2.2 A Study on the Analysis and Improvement of Legal Systems

In the case of heavy metal management in Korea's agricultural environment, the related laws are operated in accordance with the scope and contents of the work between concerned departments, resulting in insufficient systematic management of contaminated farmland. In the case of soil contamination caused by artificial or natural causes of farmland, the risk assessment process is not implemented by granting an exception. The cleanup work is to be carried out based on the " Farmland Act ". Lack of such laws caused heavy metal contaminated farmland to be placed at the blind spot of the Act in the course of the survey, prevention of diffusion, and cleanup of contaminated sites.

3. Conclusions

Problems among the Soil Environment Conservation Act, the Farmland Act, and the Mine Damage Prevention Act were identified and improvement measures were prepared.

References

Ministry of Agriculture, Food and Rural Affairs (2015), Research on the need to establish and operate an environment management system for farmland, 216pp.

Acknowledgement

This subject is supported by Korea Environment Institute(KEI) as "A Study of Policy Alternatives for Managing Heavy-metal Contaminated Agricultural Soils by Natural Causes"

A Study of Attached Microorganism Community with the Water Quality in Urban Stream

Tae Kyung Kim¹, Kyung Mi Mun¹, Kyoung Eun Choi¹, Eun Ji Heo¹ and Jong Min Oh¹

¹Kyunghee University, Korea

Keywords: Attached Microorganism, Microorganism Community, Water Quality, Growth Amount, Urban Stream

1. Introduction

The attached Microorganisms are clearly changed in volume due to water flow, flow rate, water temperature, and nutrients compared to other life groups, and are useful for identifying cumulative changes in the water system by attaching them to the substrate. In this study, water quality changes and attached microbial communities are analyzed in the stream to analyze the effects of business site discharge on the attached microbial community. These studies can be used to understand stream ecosystems and to assess biological water quality, which can be used as a basis for establishing efficient water quality management measures for streams in the future.

2. Methods and Results

2.1 Methods

In measures the TOC, T-N, T-P, water temperature, pH, EC as its water measure, and analyzes ions(F⁻, Cl⁻ and SO₄²⁻). And to analyze the amount of growth of the attached microbial community, an artificial bricks are installed on the stream bed for five weeks, and then collects microbial communities attached to bricks at weekly intervals. Take only the same amount of square size of 5 cm X 5 cm when taking samples. Use this sample to measure SS, AFDW and Chlorophyll-a.

2.2 Results

The Ion analysis analyzed the amount of temperature after discharge, and found that three ions increased after discharge. The data analyzed weekly samples of the attached microbial

community showed that the SS was about 20 times greater in the stream than in the previous five weeks. AFDW increased by about 2.6 times in the stream after the introduction of the discharge water, and chlorophyll-a also increased by about 9 times in the stream after the discharge water was introduced.

3. Conclusions

In this study, the effect of the effects of attached microorganisms in urban streams was understood to some extent, and a variety of aspects such as the degree of attachment of attached algae and changes in geology are needed. And that these data should be used as a pollution indicator of the stream and be applied to water quality management in the river.

Acknowledgement

This subject was supported by "Development of algae management using stream structures in the stream" (code 18AWMP-B098640-04) funded by MOLIT(Ministry of Land, Infrastructure and Transport).

References

- Tae-Woong Ahn, I-Song Choi, Jong-Min Oh (2008) Effect of Attached Microorganism Community on Water Quality with the Conditions of Stream Environment, Journal of Korean Society of Water Science and Technology, Vol.16, No.4, pp.55-62.
- Hyun-Woo Kim, Kyong Ha, Gea-Jae Joo (1998) Evaluation of Exposure Times for Periphyton Biomass Estimate using Artificial Substrata in Headwater Streams, Journal of the Korean Environmental Sciences Society, Vol.7, No.1, pp.112-115.

Study on ecological influence of Changchun high-tech development zone on Jingyuetan National Forest Park

Hongguang Cheng¹, Zhenzhen Wu¹

¹ Beijing Normal University, Beijing, China

Keywords: EIA, Industrial development Zone, National Forest Park, Ecological Impact

1. Introduction

The environmental impact assessment of regional development is to evaluate the potential impact of human development activities on environment at a certain geographical range, comprehensively and systematically. However, it is also very important to identify and predict the potential impact of development activities on the Nature Reserve and Scenic Area, scientifically and accurately, which are around the developing zone. In this study, Jingyuetan National Forest Park was selected as the research object to analyze the influence of the construction of Changchun High-tech Industrial development Zone (High-tech Zone) on its ecological environment. Jingyuetan National Forest Park is located in the east of Changchun Jingyue High-tech Development Zone in Jilin Province.

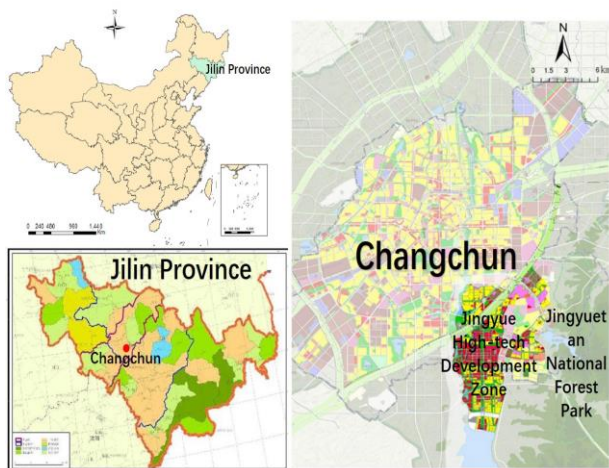


Figure 1: Location

2. Methods

Jingyuetan National Forest Park is near by the Changchun Jingyue High-tech Development Zone, so it is very important to evaluate the effect of

exploitation on the ecosystem service function of Jingyuetan National Forest Park. The course of development and construction has influence on the functions of regulator, supply, support and culture. Forest ecosystems not only provide human beings with the necessary food, medicine and industrial and agricultural production of raw materials and other products, but also maintain the survival and development of human life support system.

3. Conclusions

To sum up, it is meaningful to assess the effect of development on the ecosystem service function of National Forest Park.

4 Reference

- WANG Jin-ye, YANG Li-lin, et al. Impact Assessment of Ecotourism Environment of National Nature Reserve— A case study of Mao'er Mountain National Nature Reserve[J]. Journal of central south university of forestry & technology, 2010, 1(4): 105-108.
- Briassoulis H. Tourism and Environment : planning issues and approaches. Istanbul [M]. Turkey : Yildiz University Press, 1991 : 78- 83.
- TANG Xiao—hui, LIN Nian-feng, JIANG Ling-ling. The assessment and contrastive analysis of the city ecological construction current state in Jilin Province[J]. Journal of Jilin University(Earth Science Edition), 2004, 34(Sup .): 144—148.

A Study on the Legal and Institutional Review for Improving Bio-Mobility in Environmental Impact Assessment

Su-gon Park¹, Yong-Su Park¹

¹National Institute of Ecology, Korea

Keywords: EIA, Wildlife Crossing, Guiding fence, Escape ramp, roadkill

1. Introduction

In 1998, a box-shaped ecological aisle began to be constructed in Jirisan Siamjae. In 2018, there are now 458 Wildlife Crossing. The cost of constructing Wildlife Crossing ranges from a minimum of 10 million won to a maximum of several hundred billion won depending on the type and scale. Even at such a high cost, there are about 2,000 wildlife road kills each year.

The purpose of this study is to analyze the causes of the decrease of road kills and to improve the consultation process and post-management-techniques in environmental impact assessment.

2. Method

2.1 Analysis of ecosystem cut-off facilities in the environmental impact assessment report.

Based on the results of analysis of 370 projects that mention ecosystem cut-off facilities (Wildlife Crossing, Guiding fence, Escape ramp, etc.) among 504 post-environmental impact surveys received in the 2016 National Institute of Ecology. The study was carried out in order to elucidate the problems of ecological aisle through the environmental impact assessment and suggest ways to improve it.

2.2 Research on Wildlife Crossing composition

Of the 370 post-environmental survey projects that were received as a linear project in 2016, 44 plants were selected randomly from about 30% of the 143 sites completed in June 2011 to June 2016 (5 years) And confirmed the actual condition of the passage.

3. Conclusions

Based on the survey of 504 post-environmental

impacts received at the National Institute of Ecology in 2016, we conducted literature surveys and on-site surveys on the eco-pathways established through the consultation on environmental impact assessment. The following five problems and improvement measures were derived.

First, the idea of Wildlife Crossing and the principle of unification are unified. Second, there are guidelines that can be applied at each stage in the field. Third, if the contents are different from the contents of the consultation, a penal clause is established to prevent formal formation. Fourth, there is a need for measures to strengthen basic research on Wildlife Crossing installation. Fifth, a systematic improvement plan should be prepared for enhancing the post inspection function of Wildlife Crossing and correcting it if it can not function.

Taken together, it would not have resulted in the fragmentation of habitat if roads were not built, and it would have been possible to move wild animals in wider areas than Wildlife Crossing. It would have been better connected than the current Wildlife Crossing

However, it can be said that wild animals have been used to set up Wildlife Crossing rather than leaving fragmented habitats as they are, but wild animals have not increased compared to pre-construction, which caused habitat fragmentation.

References

Kim, M. S., H. Y. Heo, S. M. Cho, S. A. Shin, T. M. Ahn (2005) An analysis of eco-corridors in Korea by Case study of Domestic and Foreign Cases. The journal of environmental restoration technology 8(2): 41-55.

Analysis of CO₂ Emission Characteristic of Daecheong Reservoir during the Turnover Period

Eun-Ju Lee^ψ, Hyeong-Seok Park, Se-Woong Chung

Department of Environmental, Urban and Chemical Engineering Graduate school, Chungbuk National University, Chungju, Korea

1. Introduction

Various studies have been conducted to identify the global carbon cycle. The global carbon cycle studies have largely been done without taking into account the function of land freshwater, such as lakes and reservoirs. However, CO₂ transfer from inland water to the atmosphere is a component of the global carbon cycle, and land freshwater is reported as a major source of atmospheric CO₂ in the carbon cycle analysis (Guerin et al., 2006; Battin et al., 2009).

In this study, CO₂ emission characteristics at Daecheong Reservoir located in Geum River basin of Korea were evaluated during the turnover period (June to November 2017) by estimating the Net Atmospheric Flux (NAF) of CO₂ at the atmosphere - water interface.

2. Materials and Methods

To evaluate the carbon emission characteristics of Daecheong Reservoir during the turnover period, this study conducted 14 field surveys for 6 months. The pH was measured with YSI pH1200. Alk(mg/L), COD(mg/L), TOC(mg/L), DOC(mg/L) and Chl-a(mg/m³) were analyzed according to Standard Method (APHA, 2005). The partial pressure of dissolved CO₂ in water (pCO₂) was calculated by thermodynamic equilibrium equation including pH, DIC, Alk and water temperature using CO2SYS. The NAF was calculated according to the partial pressure difference of the atmosphere and water with gas transfer velocity estimated using Wanninkhof and Knox equation.

3. Results and Discussion

The NAF in the period of strong formation of

hydrothermal stratification (June to September) was mostly absorbed atmospheric CO₂. On July 27 and August 3, NAF temporarily showed a positive value, which is considered to be due to rainfall. During the period from September 6 to 12, September 26 to October 10, the pCO₂ decreased due to the primary production of algae.

The pCO₂ in the reservoir surface and the NAF tended to increase as the stratification strength weakened. Fall turnover started from October 23rd, afterward the surface water was rapidly mixed with pCO₂ supersaturated deep water. Consequently, the surface pCO₂ increased up to 1500 μatm and the NAF was greater than 3000 mg/m²-d, and tended to increase with time.

The results confirm that the accumulated CO₂ in the middle and bottom of the reservoir discharges to the atmosphere rapidly after turnover period.

References

- Guerin, F., Abril, G., Richard, S., Burban, B., Reynouard, C., Seyler, P. and Delmas, R. (2006), Methane and carbon dioxide emissions from tropical reservoirs: significance of downstream rivers.
- Battin, T.J., Luyssaert, S., Kaplan, L.A., Aufdenkampe, A.k., Richter, A. and Tranvik, L.J. (2009), The boundless carbon cycle.

This research was supported by the Ministry of Education, Republic of Korea and National Research Foundation of Korea in 2017. (National Research Foundation of Korea-2016-R1D1A3B03-2016131042)

Arsenic and Heavy Metal Contaminations of Rice Grown in Bangladesh

Jumpei MIYAZAKI¹, Kosuke MURAMATSU¹, Masahiro TOKUMURA¹,
Muhammad Rafiqul ISLAM², Qi WANG¹, Yuichi MIYAKE¹, Masahiro SAKATA¹,
Shigeki MASUNAGA³, Takashi AMAGAI¹, Masakazu MAKINO¹

¹University of Shizuoka, Japan

²Bangladesh Agricultural University, Bangladesh

³Yokohama National University, Japan

Keywords: Arsenic, Heavy Metal, Bangladesh, Rice, Analysis

1. Introduction

In Bangladesh, rice, which is the staple food, is contaminated by arsenic and heavy metals. One of their sources is recognized as wastewater from industries which is not properly treated before discharge. The wastewater pollutes not only irrigation water, but also soil in the paddy field, which results in the pollution of rice by arsenic and heavy metals. As a result, the rice consumption in Bangladesh increases the risk of adverse health effects. (M. S Islam et al., 2015)

In this study, to perceive current pollution situation in Bangladesh, we measured the concentrations of arsenic and heavy metals in rice. In addition, the concentrations of them in soil in the paddy field, in which the rices were produced, were also measured to investigate the relationship between the concentrations of them in the rice and soil.

2. Methods

Arsenic (As) and heavy metals, cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), nickel (Ni), lead (Pb), selenium (Se), and zinc (Zn), were targeted in this study.

The paired samples of rice and soil were obtained from Sripur, Tongi (two places: A and B), Sonaragon, and Madhupur, in Bangladesh. Inductively coupled plasma-mass spectrometry (ICP-MS) was used to measure the concentrations of arsenic and heavy metals in rice and soil.

3. Results and discussion

The concentration of As in the rices produced in Madhupur, Sripur, and Sonargaon exceeded the guideline value established by CODEX (200 µg/kg). The concentration of Cd in the rice produced in Tongi A exceeded the guideline value established by CODEX (400 µg/kg). It is reported that As, Cd are contained in the wastewaters from textile industries. Therefore, the contaminations of As, Cd in rice produced in Madhupur, Sripur, Sonargaon, and Tongi in Bangladesh could be due to the anthropogenic sources.

In all the regions, the concentrations of As and the heavy metals in the soil in the paddy field were lower than the corresponding guideline values. The significant relationships between the concentrations in the rice and soil were observed in Zn and Cd.

4. Conclusions

The concentrations of As, Cd in rice exceeded the guideline values. No soil contamination in the paddy field were observed.

References

Islam et al. (2015) The concentration, source and potential human health risk of heavy metals in the commonly consumed foods in Bangladesh, *Ecotoxicology and Environmental Safety*, No. 122, pp. 462-469.

Impact of extreme turbidity events on the connected Andong-Imha reservoirs system

Yeojeong Yoon, Hyungseok Park · Sewoong Chung†

Department of Environmental, Urban and Chemical Engineering Graduate school, Chungbuk National University

Keywords: climate change, turbid water, CE-QUAL_W2, RCP 4.5&8.5, BMA

1. Introduction

Recently(2015), Andong and Imha dam reservoirs were connected via a tunnel (L=1.9km, D=5.5m) for a conjunctive use of the reservoirs. The Imha Dam, however, had a problem that turbid water after large flood events was released to downstream for a long time in the past. The turbidity events may be exaggerated due to future climate change as rainfall patterns change (Lee et al., 2010). There is a need to analyze the impact of projected extreme events on the persistent turbidity in the reservoirs system. The objectives of this study were to project the future (2017-2100) extreme flood events using mathematical models(climate-watershed-reservoir), to simulate the fate and transport of turbidity flows in the connected two reservoirs, and to assess the effectiveness of a selective withdrawal facility (SWF) based on the operational rules of the system.

2. Materials and methods

The climate data used to project the inflows were generated using Bayesian Moving Average method with 5 GCMs (ACCESS 1.3, CanESM2, CNRM-CM5, GFDL-ESM2G, HadGEM2-AO) and RCP 4.5 and RCP 8.5 scenarios. A 2D hydrodynamic and water quality model was constructed to simulate the Andong-Imha system. The model was calibrated with the field data collected in 2002 and 2003 when the most extreme turbidity event occurred in the history. The historical daily maximum inflows of Andong (1977-2016) and Imha reservoirs (1993-2016) were compared with the projected inflows (2017-2100) in Fig. 1. The goal of turbidity flow control was to minimize the number of days (Nday) discharging

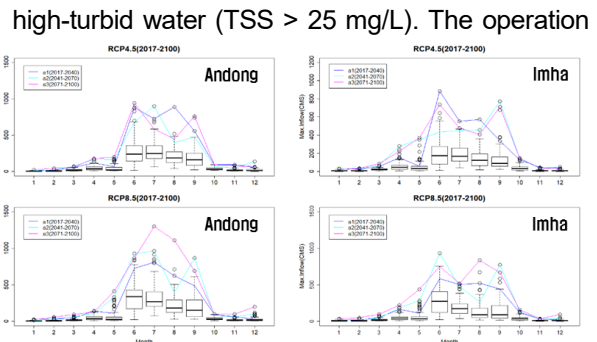


Fig.1 Historical (box plot) and future daily maximum inflow scenarios were classified as a selective clean water withdrawal and an urgent turbid water discharge. The selective withdrawal layer was chosen according to the operating rules provided by Korea Water Resources Corporation.

3. Results and Discussions

According to both historical and future projected daily inflow data, the past 2002-2003 event was found to be the most extreme event. However, occurrence frequency of the extreme events showed to increase in September in the future compared to past, which is more vulnerable to cause persistent turbidity because of fall turnover mixing. The flood event projected to occur in September of 2066 with RCP 8.5 was selected to assess the effect of the SWF. Simulation results showed that the Nday is about 107 days, which is much less than the 2002 event (468 days). Several different withdrawal scenarios simulations showed the SWF can reduce Nday about 18 days.

References

Lee GS, Kim JY, Ahn SR, Sim JM (2010) Analysis of Suspended Solid of Andong and Imha Basin According to the Climate Change. Journal of the Korean Association of Geographic Information Studies 13:1-15.

Improvement Plan for the Assessment of Plantation Areas in the Environmental Impact Assessment, Republic of Korea

Seon Mi Lee, Jae Gyu Cha, Su Gon Park, and Young Ho Cho*

National Institute of Ecology, Korea

Keywords: National Vegetation Class, Vegetation Development, Plant Species Composition, Vegetation Index, Sorensen's Diversity Index

1. Introduction

Korea's forests were severely devastated by the Japanese colonial era and the Korean War. A national reforestation project was carried out in the 1970s to rehabilitate them. As a result, the forests recovered and the area reaches up to 63.1%. Ministry of Environment makes an actual vegetation map and evaluates the National Vegetation Classification, which has five classes, based on vegetation survey data every five years. Plantation areas are entirely assessed as fourth class regardless of the time that has elapsed since plantation. This means the area is able to be developed. The purpose of this study is to suggest an improvement plan for the plantation assessment in the Environmental Impact Assessment (EIA).

2. Materials and Methods

2.1 GIS Analysis

We used a forest type map (1:5,000) made by the Korea Forest Service to show the plantation areas that are capable of development. Protected areas were excluded from the plantation areas.

2.2 Data Analysis

We collected vegetation data on secondary forests such as the *Pinus densiflora* community, *Quercus mongolica* community, *Q. variabilis* community and *P. rigida* plantation. A Vegetation Index (*Hcl*) and Sorensen's diversity Index (*Is*) were calculated based on the vegetation survey data and compared.

$Hcl = (\sum HI \times Vcl) / 100$ (*HI*: Height of the I layer, *Vcl*: Plant coverage of the I layer)

$ISs = (2C / (A+B)) \times 100$ (*A*: No. of species in the secondary forest; *B*: No. of species in the plantation; *C*: No. of species common to both)

3. Results and Conclusions

We analyzed the *Hcl*: *P. densiflora* community: 7.3~20.28; *Q. mongolica* community: 7.1~23.7; *Q. variabilis* community: 6.6~21.45; *P. rigida* plantation: 5.7~18.13. As a result of analyzing the *ISs* between the secondary forests and plantation, we found high values over 50. The *Hcl* and *ISs* of the plantation areas tended to be similar to that of the secondary forests. This means that the vegetation structure and species composition of plantation areas have almost recovered to those of secondary forests. Therefore, the plantation assessment in the EIA should be specified considering time-lapsed plantation to prevent careless development projects. In addition, we should consider that a plantation area that has three or four layer and higher *ISs* value should be limited from development projects.

References

- National Institute of Ecology. 2016. Development of technic and foundation construction for ecosystem conservation. pp. 237-325.
- National Institute of Ecology. 2017. Diagnostic assessment of damaged ecosystem and restoration areas and practice of resilience. pp. 279-320.

Device for Measuring Dermal Exposure Rate of Flame Retardants via Direct Contact with Products

Mai SHINDO, Kotone TERA0, Kosuke MURAMATSU, Masahiro TOKUMURA,
Qi WANG, Yuichi MIYAKE, Takashi AMAGAI, Masakazu MAKINO

University of Shizuoka, Japan

Keywords: Dermal Exposure, Flame Retardants, Risk Assessment, Silicon, Migration

1. Introduction

To reduce the risk of fire, flame retardants are contained in indoor products at high concentration. Some of them have toxicity such as carcinogenicity. Recent study reported that the dermal exposure could be a significant exposure route for flame retardants (Hammel et al., 2016).

As conventional methods to estimate a potential dermal exposure rate, the EpiSkin epidermis model and human skin obtained from plastic surgery are used. However, they are expensive and/or require technological expertise.

In this study, we developed a device, which is cheaper and easy-to-use, to estimate a potential dermal exposure rate of flame retardants in indoor products via direct contact with the products. As a material of the device, silicone seat was selected.

2. Methods of analysis

A silicone seat (2.5 cm × 2.5 cm, 0.5 cm thick) was prewashed by the ultrasonication with ethyl acetate/methanol (1:1, v/v) for 15 min twice and then dried. As a product which includes flame retardants, a car seat which concentrations were preliminary determined was selected. In a migration experiment, the prewashed device was put on the product and sampled at predetermined contact times. The migrated flame retardants in the device were extracted by the Soxhlet extraction method. The extract was concentrated with an evaporator, and it was further concentrated with nitrogen purge. The analysis was performed by using liquid chromatography coupled with tandem mass spectrometry (LC-MS/MS).

3. Results and discussion

We firstly determined the optimum analytical method for flame retardants in silicone. Although the cleanup method for the extract was optimized, the recovery rates of most flame retardants (13 out of 14) were not in the sufficient range (80%–120%). In contrast, the recovery rates of most flame retardants (9 out of 14) without cleanup were in the sufficient range. Therefore, it was concluded that no cleanup was suitable to analyse flame retardants targeted in this study in silicone.

In the migration experiment, the concentrations of flame retardants in the device increased with the contact time with the product. The migration rates of flame retardants from the car seat to the device were 1.2 (CsDPhP: cresyl diphenyl phosphate), 0.75 (TCEP: tris(2-chloroethyl) phosphate), 0.40 (TCPP: tris(2-chloroisopropyl) phosphate), 0.14 (TPhP: triphenyl phosphate), and 0.11 (TCsP: tricresyl phosphat) ng cm⁻² h⁻¹.

4. Conclusions

The experimental results revealed that the silicone device developed in this study could be useful to estimate the potential dermal exposure rate via the direct contact with products.

References

Hammel et al. (2016) Measuring Personal Exposure to Organophosphate Flame Retardants Using Silicone Wristbands and Hand Wipes, *Environ. Sci. Technol.*, No.50, pp.4483-4491.

An influence of Government Trust on Siting Acceptance for NIMBY Facilities

Yeon Ik-Jun¹, Jung Ju-Young², Park Sung-Sik³, Jung Ji-Sun¹, Cho Jung-Sik¹

¹Dept. of Environmental Engineering, Korea National University of Transportation, Korea

²Dept. of Public Management Information System, Korea National University of Transportation, Korea

³Dept. of Flight Operation, Korea National University of Transportation, Korea

Keywords: NIMBY, acceptance, incineration, government trust, question investigation

1. Introduction

The ordinary concept of trust includes both being willing to risk of cooperation and being favorable to others with positive expectation for their intention or behaviors (Bae, J.H., 2011). Based on such definition above, the government trust could be defined as being favorable to government's policy with a positive expectation or as either attitude or behavior to cooperate the government. This paper has tried to find answers for the major questions as below and to suggest implications to improve policy acceptance of people regarding the selection of location for a garbage incineration plant. Firstly, in which intent the government trust would impact the tendency of the residents to cooperate the government's policy? Secondly, might the different values among the residents result in the different cooperative responses against the government policy?

2. Trust in Government

2.1 Definition of the Concept

Government trust could be explained from various perspectives. Depending on the trust target, it could be divided into either the ruling party or the central government. From the context perspective, it might be explained to trust the capability or morality of the target. From the functional perspective, it might also be explained to trust the role performance of a particular policy of the government. In this paper, however, trust was defined as favorable perception and attitude against the policy based on positive expectation on government's intention and role.

2.2 Factors on Government Trust

It have impacted the government trust of such major factors as economic, social, political, even procedural performances and etc. In other words, people would trust their government if the economy was stable, the society was peaceful and there was no conflict in politics. But a value and tendency of individual resident have a significant effect on the government trust. The trust has been affected by traditionalism, materialism and even egalitarianism.

3. Conclusions

It is a critical component to decide to build unpleasant facility in my town how much local residents trust the local government regarding the location of the garbage incineration facility. Government trust is a significant variable of government acceptance. Based on the empirical research for "G" local government in Korea, it was proven the government trust had a significant impact on government acceptance. The more people perceived the local government has reasonably responded the conflicts during the location process of the incineration facility, the stronger they contended the necessity of building the facility. To sum up, the local government had better prepare strategies to maintain the residents' trust since the government trust is found out a major factor in deciding government acceptance in the process of locating unpleasant facility.

References

Bae J. H. (2011). The Root of Government Trust in Asia, <Doctoral Thesis in a Graduate School of Korea University>

A Comparative Study of Odor Acceptance between Korea and China

Yeon Ik-Jun¹, Jung Ju-Young², Park Sung-Sik³, Jung Ji-Sun¹, Cho Jung-Sik¹

¹Dept. of Environmental Engineering, Korea National University of Transportation, Korea

²Dept. of Public Management Information System, Korea National University of Transportation, Korea

³Dept. of Flight Operation, Korea National University of Transportation, Korea

Keywords: acceptance, odor, question investigation, industrial complex, odor awareness

1. Introduction

Odor pollution is a special air pollution, which takes air as the spread medium and affects human body through respiratory system. Generally, all smells which can stimulate olfactory organ of people, make people feel uncomfortable and damage living environment can be called as odor (Du Na, 2012). Odor in Korean 'Laws of Prevention and Treatment of Odorous Substance' is defined as hydrogen sulfide, thioalcohols, amines and other gases with pungent odor, which stimulate residents' respiratory system and bring uncomfortable feeling to people in smell, are called as odor. This paper tried to understand the difference of people in the two countries for odor adopting exploring factor analysis to tell the difference of factors affecting their odor acceptance. Based on correct understanding of odor problem using solid data analysis, this paper could draw conclusions to deal with a country's own odor issues and provide the most suitable answers to solve odor problems in these two countries.

2. Difference of Perception

2.1 Understanding of Odor

People have different cognitions and feelings for odor due to different living environment, psychological states, characteristics of social and cultural background, ages, individual health states and other personal situations. There will be differences in the cognitions and feelings of China and Korea for odor. In the aspect of lifestyle, there are certain differences between China and Korea in dining habit. China is with rich diet culture. There are a lot of spices in China, which are commonly used in daily life. But in Korea, the spices are seldom used and it is difficult for the Korean people to accept the spices. The spices will not commonly exist or used in daily life of Korean people. Considering lifestyle, there are great differences between these two countries in the cognition of smell.

2.2 Factors affecting Perception of Odor

The acceptance is often affected by several

factors like personal cultural attainments, spirit shackles, living environment and institutions since it includes the part to understand human's value system. Instead of a single-tired concept, it is a multi-level one (Jeong, 2008). Various factors can make positive or negative impacts on individual. Jung(2017), who makes research of the social acceptability to odor has put forward an idea the odor issue is necessary to be considered from several aspects and thought with diversified factors. It was said the factors could be divided into such categories as technology, risk, economic acceptance and etc.

3. Conclusions

In this study, the residents living near the industrial park are taken as the respondents. It analyzes the factors that affect odor acceptance of the residents. The samples chosen were both Chinese residents living near Nanjing Industrial Park and Korean residents living near Korean Qingzhou Industrial Park. In this study, the same analysis results were generated through the exploratory factor analysis for the permanent residents near Korea and China's Industrial Parks. However, a slight difference could be found in factors classified. In China, the first one is the 'Danger awareness', the second one is the 'Development', the third one is 'Economic loss', and the last is the 'Trust'. But in Korea, the first one is the 'Danger awareness', the second one is the 'Development', the third one is the 'Trust' and the last one is the 'Economic benefit'.

References

- Du Na, (2012), Study on odor pollution analysis and countermeasures of city industrial park-a case study of Suzhou industrial park.
- Jeong J. Y., (2008), A study on the reversal phenomenon of policy acceptability: focusing on the policies for the location of the radioactive waste treatment plant, Korea University, Doctoral thesis.
- Jung, J. S., (2017), A study on the odor characteristics per source category and the odor acceptance by the public

Study on the Preference of the Ecotone in the Natural Landscape

Seiichiro Ohata¹ & Akira Tanaka¹

¹Tokyo City University, Japan

Keywords: View landscape, Natural landscape, Biodiversity, Characteristics of landscape, Landscape component, Landscape evaluation, Ecotone

1. Introduction

The progress of the economy and industry has dramatically improved the living environment of people, but the regional environment has changed drastically with that. Especially, the landscape has been lost in its original appearance due to uniform development, attractiveness is being lost. In order to regain the appeal of the landscape, it is necessary to clarify the landscape preferred by people and their factors and trends. Therefore, this essay is concerned what kind of landscape should be developed or preserved using the several photos which include Mt. Fuji as the theme, which is attracting attention as a representative of Japan's natural landscape and registered as a World cultural heritage, to make questionnaires on landscape preference. The purpose of this study is to obtain the basic knowledge about the influence of incorporation of waterside ecotone, which is considered to have high biodiversity in the landscape.

2. Methods

2.1 Survey

The survey was conducted to 77 subjects using 30 Natural scene photographs with Mount Fuji as a main element through 3 social network services while January 14th ~16th in 2018. The photographs were gathered up to a set with two pieces and named A and B, then subjects chose one out of the two. All used photographs were gathered through an administrative homepage or brochure in a tourist attraction of Mount Fuji and they were chosen from all directions as much as possible (Fig. 1).

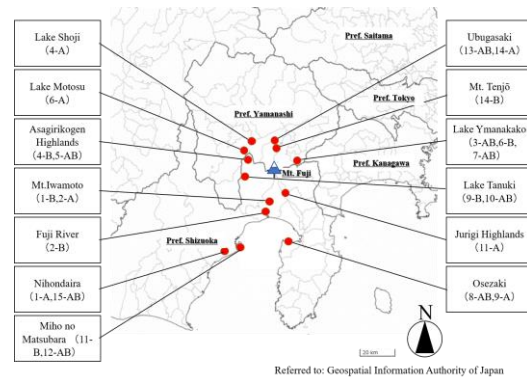


Fig. 1: The Researched View Spots of Mt. Fuji

2.2 Analyze

There are two ways to analyze; 1) Tallying the survey which shows how does the landscape been preferred more and 2) Measuring how large ratio does it cover that each component such as main component (Mt. Fuji), natural objects, artificial objects, sky, and greenery in the picture. This study is concluded through searching correspondence of the results.

3. Results and Conclusions

Three of the most preferred pictures than the other of the pair are 11-A, 12-B, and 15-B. It shows that water area can be preferred to greenery if they are almost same size and Mt. Fuji as well, greenery can be preferred to bare ground if they are almost same size but Mt. Fuji. It is suggested that the ecotone that has high biodiversity may become the factor of preference of the landscape.

References

- 1) Takamasa K., Katsunori F., & Masaaki Y.. (1994). A study on the Evaluation Structure of Favorability in Natural Landscape. *J. JILA*, 58(5), 177-180.2)

Performance Evaluation of Noise Reduction Devices which installed on the Noise Barrier

Chulhwan Kim and Hyejin Kang

Korea Expressway Corporation Research Institute, Korea

Keywords: Road Traffic Noise, Noise Barrier, Noise Reduction Device

1. Introduction

The noise reducing device (NRD) is one of measure for mitigating road or rail traffic noise. NRDs have been commonly used in Korea since late 1990's and various types and shapes of NRDs are developed and suggested. But, it has been installed without considerations of the noise source's characteristics. The spectrum of the noise source may affect to the NRD's effect. In this study, the effects of NRDs have been estimated for the different noise sources.

2. Evaluation Method

14 samples (A~N) of NRDs are tested its insertion loss at 9 receiving points shown if figure1 and then calibrated by source spectrum shown in Figure2. The effect of NRD is figured out by averaged for the 9 receivers shown in Figure1. Figure2 show the representative noise source spectra of the study. 3 road traffic sources and 3 railroad sources are considered in this study. Figure3 show the noise spectrum of different sources which are shown in Figure2. Each spectrum is measured at the road and railway side and band level are normalized by the level of 1,000Hz.

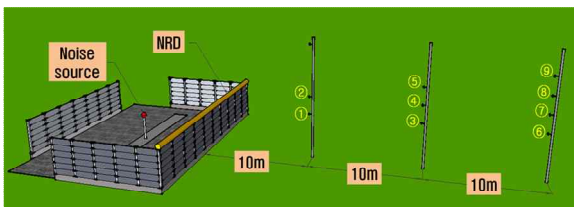


Figure 1: NRDs and test facility for evaluation.

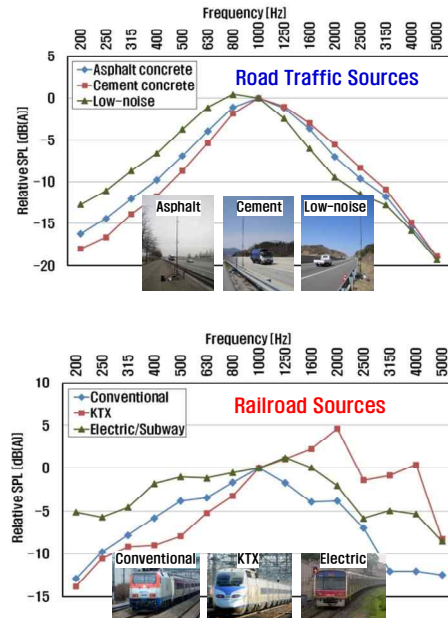


Figure 2: Noise spectra of different sources.

3. Results

Results of the study are shown in Table 1 for different 14-NRD samples(A~N), and shows different value for the same NRD because of different source spectrum.

Table 1: Estimated results of 14-NRD samples.

Samples	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Asphalt	1.9	1.7	1.0	1.8	1.9	0.4	1.0	0.8	1.7	1.7	0.7	0.6	1.4	0.6
Cement	2.2	2.1	1.1	2.0	2.2	0.7	1.5	1.2	2.0	2.1	1.0	0.9	1.7	0.9
Low-noise	1.4	1.1	0.7	1.5	1.4	-0.1	0.2	0.0	1.2	1.0	0.3	0.1	1.0	0.2
Conventional	1.5	1.5	0.8	1.7	1.5	0.3	0.5	0.6	1.6	1.5	0.5	0.5	1.2	0.3
KTX	2.3	3.2	1.2	2.3	2.4	1.7	2.6	2.9	3.1	3.4	1.5	2.1	2.4	1.5
Electric	1.3	1.6	0.6	1.5	1.3	0.3	0.2	0.7	1.6	1.5	0.3	0.4	1.3	0.4

References

C. Kim, et al. (2010) A Study on the Test Method for Noise Reduction Devices Installed on the Noise Barriers, Transactions of the Korean Society for Noise and Vibration Engineering, Vol. 20, No. 9, pp. 791-796

Removal of Tar from Biomass Gasification Process

Ju Hoe Kim^{1,2}, Jong Min Oh², Young Min Jo², and Sang Bum Kim¹

¹Korea Institute of Industrial Technology (KITECH), Cheonan 331-825, Republic of Korea

²Department of Applied Environmental Science, Kyunghee University 1732 DuckYoung Street, Ki Heung, Young-In, Kyenggi-do, Republic of Korea

Keywords: Biomass, Gasification, Tar, Oil Scrubber, Removal

1. Introduction

Gasification of biomass is one of promising options to compensate CO₂ generation and an alternative energy source to fossil fuel [1]. However, a significant air pollutant, tar is being produced from the process [2]. Thus this work attempted to reduce the tar from the biomass gasification process by oil scrubbing. A few oils including water, soybean oil, mineral oil and waste cooling oil have been applied.

2. Experimental

2.1 Apparatus

The target biogas was generated from a bubble fluidized reactor, and fed to the settling bed with impingers as shown in Fig. 1.

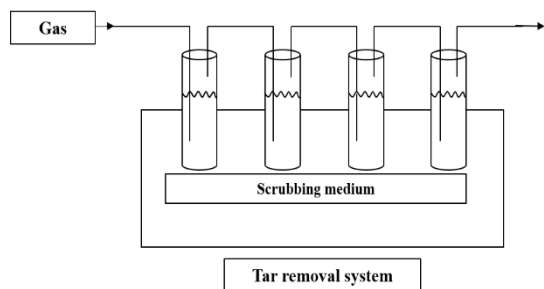


Figure 1: Tar removal test layout.

2.2 Method

Removal rate of tar was evaluated according to scrubbing time; 30, 60 and 90 mins. Sample gases were taken from the upflow and downflow of the reactor and analyzed GC-TCD/FID. The impinge reactor contained 100 ml of scrubbing liquid respectively.

3. Conclusions

Residence time, 30 minutes, resulted in the highest in removal rate of tar from the gas stream for all scrubbing

liquids. The efficiency of each liquid was soybean oil (97%), waste cooking oil (71%), mineral oil (63%) and water (31%).

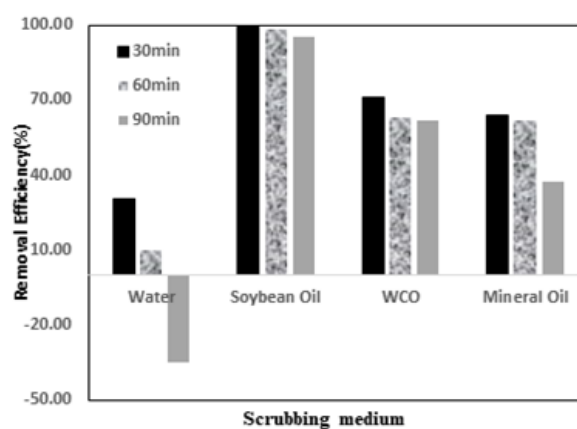


Figure 2: Removal efficiency of scrubbing liquids.

Water does not seem to be appropriate for tar absorption due to its nonpolar species. On the other hand, the low efficiency of waste cooking oil may be because transformation of molecular structure arisen from oxidation, hydrolysis and /or pyrolysis at high temperature cookings and reduction of pores by inflow of pollutants.

References

- [1] Myung Won Seo, Jeong Hoi Goo, Sang Done Kim, See Hoon Lee and Young Chan Choi (2010) Gasification characteristics of coal/biomass blend in a dual circulating fluidized bed reactor, *Energy Fuels*, 24, 3108-3118
- [2] Woo Jin Jo, Soo Hwa Jeong, Sungin Park, YoungTai Choi and DongHyun Lee (2015) Effects of Biomass Gasification by Addition of Steam and Calcined Dolomite in Bubbling Fluidized Bes, *Korean Chem, Eng Res* 53, 783-791

Distribution Patterns of the Dominance Macrobenthos at Subtidal on Coast Developments in Korea

Hyung-Sum Han, Yang-Ho Kim, and Hyun-Shik Yee

Korea Environment Corporation

Keywords: Macrobenthos, Coast-Developments, Indicators, Dominance-species, Distribution

1. Introduction

The influence of sedimentary facies and ecosystem at subtidal can be confirmed indirectly through distribution of Organic Pollution Indicators(OPI)*. OPI is most commonly used for annelida in invertebrates phylum. This study would like to use it as a basic data for the subtidal ecosystem investigation for coast developments by distribution patterns of OPI in environment impact statements reports and Post-environmental impact investigation reports in Korea.

2. Methods and Materials

For the data analysis distributions of OPI, the density of OPI at 75 sites : environment impact statements reports and Post-environmental impact investigation reports(Figure 1).

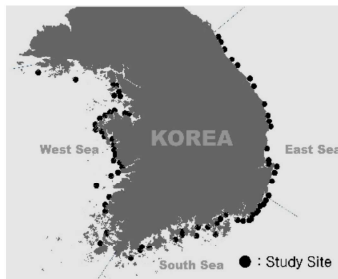


Figure 1: Study area(sites)

Maps of OPI is Analyzed by Surfer ver. 14 (mapping program). And, BHI (Benthic health Index) map was prepared using Benthic health Index at each sites.

3. Results

Map of BHI as shown in figure 2.

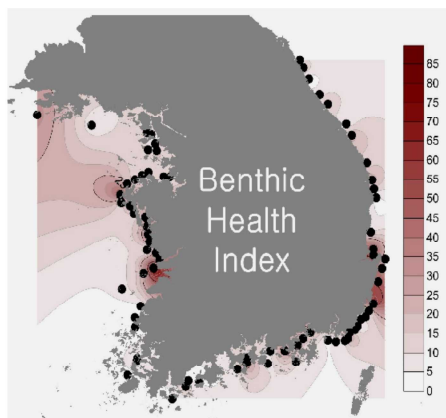


Figure 2: BHI map of Coast in Korea

Each maps of OPI species as shown in Figure 3.

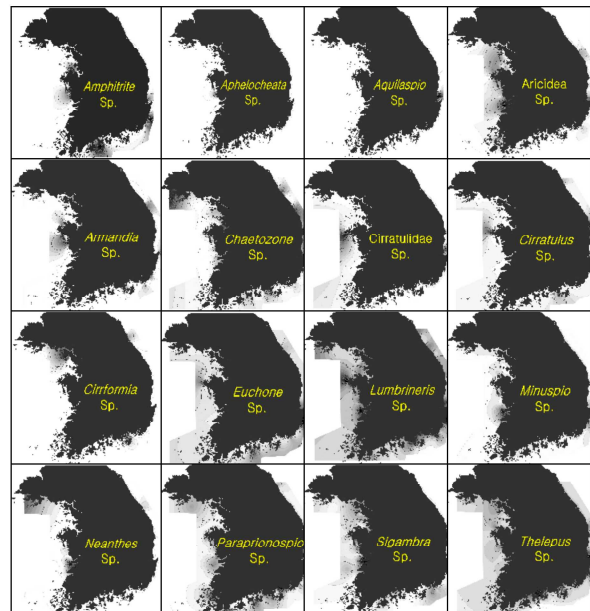


Figure 3: Distribution maps of OPI

3. Conclusions

We expect to be able to indirectly evaluate the benthic ecosystem through the distribution patterns of "Aricidea sp. Cirratulidae sp., Neanthes sp., Sigambra sp."(at west coast); "Amphitrite sp., Paraprionospio sp.,Thelepus sp."(at south coast); "Chaetozone sp., Cirratulus sp., Euchone sp."(at east coast)

We can expect to use the distribution map of Lumbrineris sp. as a basis for indirect evaluation of benthic ecosystem near by coast developments.

We have confirmed that the west coast has a high BHI index, which is attributable to the relatively large number of rivers that are in contact with the west coast, and relatively slow ocean currents add to the impact of coast developments(harbor, landfill, etc.).

References

- KEI(Korea Environment Institute)(2018), www.eiass.go.kr.
- Ministry of Oceans and Fisheries in Korea (2014) Regulations on methods and procedures of the fisheries environmental assessment. 14pp.

Nuclear power plant decommissioning project and public participation

Kyunghee Shin, Jin-gyeong Kwon, and Kongjang Cho

Korea Environment Institute, South Korea

Keywords: NPP, Decommissioning, EIA, Public Participation

1. Introduction

A large number of nuclear power plants (NPP) will be decommissioned and Korea also decided decommissioning of 'Kori Unit 1 nuclear power plant' in June 2017. Decommissioning of NPP could emerge the various concerns that related mainly to associate impacts such as community well-being, waste disposal and public health. Thus, the decommissioning project could be controversial and transparent and interactive communication processes are required. The research aims to examine how public participation was undertaken and a case study approach was introduced.

2. Methodology

For each of the case studies, information was gathered including documentation review (including Environmental Impact Statements), experience reports and so on. When participation was carried out, the range of stakeholders, access of information and related issues were investigated.

3. Results

Canadian Nuclear Laboratories (CNL) is performing the decommissioning of the Whiteshell Laboratories (WL) nuclear research facility and Comprehensive Study Report (CSR) under the Canadian Environmental Assessment Act was completed for the decommissioning project. As part of the environmental assessment process for the project, CNL conducted aboriginal engagement activities to inform communities and to communicate the potential effects of these activities to the environment, and to members of the community. Also CNL operates a Public

Information Program to inform groups about ongoing activities at sites and the potential effects of these activities on the public. Engagement methods included presentations to various stakeholders, publishing and updating project-specific webpage content, and conducting site visits etc.

The Maine Yankee nuclear power plant closed prematurely in 1997 and when the plant closed, the Maine Yankee Community Advisory Panel on Decommissioning (CAP) was established. The Maine Yankee represented the purpose of CAP was to enhance open communication, public involvement and education on Maine Yankee decommissioning issues. Maine Yankee was not obligated to accept or conform to the advice or recommendations made by the CAP. Then, Maine Yankee, in cases of disagreement, provided the CAP with an appropriate rationale for the disagreement.

The case study provided the value of public participation and the information collected pointed that the importance of early participation, providing sufficient information and on-going communication with all stakeholders.

References

- Catherine W. Ferdinand Black Diamond Consultants, Inc.(2005) The Maine Yankee Decommissioning Advisory Panel A Model for Public Participation in Nuclear Projects
- Canadian Nuclear Laboratories, White shell Laboratories (2017), Environmental Impact Statement for the In Situ Decommissioning of WR-1 at the Whiteshell Laboratories, Executive Summary, Revision 1

AIC2018 in Shizuoka

“Green Region and Impact Assessment”

❖ List of Participants

List of Participants

Name	Organization	Nationality	Notes
AHMED, Safa	MALDIVES ENVIRONMENTAL PROTECTION AGENCY	Maldives	
AINOTA, Koji	Tokyo City University	Japan	Presentation(A-2-3) Co-chairperson(A-3)
AKAHOSHI, Kaoru	Institute for Global Environmental Strategies	Japan	Presentation(A-3-3)
ARAI, Seiji	Japan Association of Environment Assessment	Japan	Theme Forum(A-0-5)
AUNG, Thiri Shwessin	Peking University, China	Myanmar	
BAE, In-chul	Korea Expressway Corporation	Korea	Poster(P-1)
CASCANTE, Madelyn	Freelance EIA Consultant	Philippines	
CHEN, Jiaxuan	Beijing Normal University, School of environment	China	Presentation(B-5-4)
CHENG, Hongguang	Beijing Normal University	China	Poster(P-21)
CHIARAWATCHAI, Nathasith	PTT Public Company Limited	Thailand	Presentation(A-5-1)
CHO, Hanna	Korea Environment Institute	Korea	Poster(P-5)
CHO, Kongjang	Korea Environment Institute	Korea	Poster(P-4)
CHO, Namwook	Korea Environment Institute	Korea	Presentation(A-4-3)
CHO, Youngho	National Institute of Ecology	Korea	
CHOI, Min Uk	Korea Environment Institute	Korea	
CHOI, Sang Ki	Korea Environment Institute	Korea	
CHU, Yunsoo	National Institute of Ecology	Korea	Poster(P-8)
ERMUKDAKUL, Thanakorn	PTT Public Company Limited	Thailand	
FAHMY, Farhana	Maldives Environmental Protection Agency	Maldives	
GENJIDA, Naoko	Institute for Global Environmental Strategies (IGES)	Japan	Co-chairperson(A-1)
GOTO, Keisuke	Tokyo City University	Japan	Presentation(B-2-2)
HADIKUSUMAH, Herri	Center for Environmental and Sustainability Science	Indonesia	Poster(P-10)
HAM, Young-Sik	Tokyo City University	Korea	Poster(P-15)

HAN, Hyoung-Sum	Korea Environment Corporation	Korea	Poster(P-33)
HARASHINA, Sachihiko	Chiba University of Commerce	Japan	Presentation(B-3-3) Co-chairperson(B-5)
HAYASHI, Kiichiro	Nagoya University	Japan	Presentation(A-2-4) Co-chairperson(B-1)
HORI, Ayumi	Toho University	Japan	
HUANG, Rui	Beijing Normal University	China	Presentation(A-3-5)
HWANG, Sang-il	Korea Environment Institute	Korea	Poster(P-19)
INOUE, Naomi	Graduate School of Global Environmental Studies, Sophia University	Japan	
ITO, Natsuki	Toho University	Japan	
JEON, Sookjin,	Korean Society of EIA	Korea	Poster(P-2)
Ji, Kaiwen	Tokyo Institute of Technology	China	Presentation(B-3-2)
JOO, Hyun Soo	Korea Environment Institute	Korea	
JUNG, Jong-Gwan	Chungnam Institute	Korea	Presentation(B-2-1) Co-chairperson(B-4)
KAKU, Tomoko	ERM Japan. Ltd.	Japan	Presentation (A-4-4)
KAMIJO, Tetsuya	Japan International Cooperation Agency (JICA) Research Institute	Japan	Presentation(A-4-2)
KANAI, Mizuki	Tokyo City University	Japan	Presentation(A-4-5)
KANG, Hyejin	Korea Expressway Corporation Research Institute	Korea	Poster(P-11)
KASAGI, Hiroo	NPO Workshop for Sustainable Community	Japan	Co-chairperson (B-3)
KAWAMURA, Takafumi	Tokyo City University	Japan	Presentation(A-1-3)
KIM, Chulhwan	Korea Expressway Corporation Research Institute	Korea	Poster(P-31)
KIM, Myeong-je	Korea University	Korea	Presentation(A-2-2)
KIM, Myungjin	Korean Society of EIA	Korea	Co-chairperson (B-1)
KIM, Sang Bum	KOREA INSTITUTE OF INDUSTRIAL TECHNOLOGY	Korea	Poster(P-32)
KIM, Suhyang	Sunil E&C	Korea	Poster(P-9)
KIM, Sung-Jin	Chungbuk university	Korea	Poster(P-18)
KIM, Tae Kyung	Kyung hee University	Korea	Poster(P-20)
KIM, Yang-Ho	Korea Environment Corporation	Korea	
KOBAYASHI, Masanori	University of Tokyo	Japan	
KOJIMA, Neiri	Toho University	Japan	
KUMAGAI, Yoichi	University of Waterloo	Japan	Presentation (A-1-1) Co-chairperson(A-5)
KURASAKA, Hidefumi	Chiba University	Japan	Theme Forum(A-0-3) Co-chairperson(A-2)

KWON, Yong-Su	National Institute of Ecology	Korea	
LEE, Chunwon	DONGSUNG ENGINEERING CO., LTD	Korea	
LEE, Eun-ju	Chungbuk National University	Korea	Poster(P-23)
LEE, Hyeoncheol	Korea Environment Institute	Korea	
LEE, Jong Ho	Cheongju University	Korea	Presentation(B-4-3) Co-chairperson(B-5)
LEE, Sang-Don	Ewha Womans University	Korea	Theme Forum(A-0-4) Co-chairperson(A-2)
LEE, Seon Mi	National Institute of Ecology	Korea	Poster(P-26)
LEE, Shirley	Retiree from Environmental Protection Department	China	Presentation(A-1-2) Co-chairperson(A-0)
LEE, Youngsoo	Korea Environment Institute	Korea	Presentation(B-5-2) Poster(P-12) Co-chairperson(B-3)
LI, Wei	Beijing Normal University	China	Theme Forum(A-0-6) Co-chairperson(A-1)
LIU, Jing	Beijing Normal University	China	Presentation(B-4-1)
LIU, Renzhi	Beijing Normal University	China	Co-chairperson(A-4)
LU, Jianhong	Beijing Normal University	China	Presentation (A-3-4)
LUAN, Chaoxu	Beijing Normal University	China	Poster(P-17)
MEGANTARA, Erri	Center for Environmental and Sustainability Science	Indonesia	Poster(P-10)
MIYAZAKI, Jumpei	University of Shizuoka	Japan	Poster(P-24)
MURAI, Shintaro	Ministry of the Environment, Japan	Japan	Theme Forum(A-0-2)
MURAMATSU, Kosuke	University of Shizuoka	Japan	Presentation (B-5-1)
MURAYAMA, Takehiko	Tokyo Institute of Technology	Japan	Presentation (A-3-1) Co-chairperson (A-4)
NAGASHIMA, Takumi	Tokyo institute of technology	Japan	Presentation (B-3-1)
NAITOU, Hirotaka	University of Shizuoka	Japan	Presentation (B-5-3)
NAKAMURA, Kentaro	Center for Environmental Law, MEIJI University	Japan	Presentation (B-2-4)
NATSUKAWA, Haruki	Graduate School of Environment and Information Sciences, Yokohama National University	Japan	Poster(P-3)

NIWA, Takahito	EX Research Institute Ltd.	Japan	Theme Forum(A-0-7)
OH, Jong Min	Kyung hee University	Korea	
OHATA, Seiichiro	Tokyo City University	Japan	Poster(P-30)
OKADA, Yuki	JBIC (Japan Bank for International Cooperation)	Japan	
OKAWA, Kio	Yachiyo Engineering Co., Ltd.	Japan	
OTSUKA, Jun	Nihon University Graduate School	Japan	Presentation (B-3-5)
PARK, Daeyeon	Chungbuk National University	Korea	Poster(P-6)
PARK, Hyungseok	Chungbuk National University	Korea	Presentation (B-3-4) Poster(P-16)
PARK, Su-Gon	National Institute of Ecology	Korea	Poster(P-22)
PARK, Sun Hwan	SUNIL E&C	Korea	
PARK, Yoon-a	kyung hee university	Korea	Poster(P-13)
SAKAGUCHI, Manabu	ERM Japan Ltd.	Japan	
SAKUMOTO, Naoyuki	Japan External Trade Organization	Japan	Presentation (A-3-2) Co-chairperson (B-4)
SETIANINGSIH SAGIMAN, Dwi	Independent Consultant	Indonesia	
SHIBATA, Yuki	Toho University	Japan	Poster(P-7) Co-chairperson (A-5)
SHIMIZU, Takumi	Keio University	Japan	Poster(P-14)
SHIMOMURA, Nobuko	Almec Corporation	Japan	
SHIN, Kyunghee	Korea Environment Institute	Korea	Poster(P-34)
SHINDO, Mai	University of Shizuoka	Japan	Poster(P-27)
SHIROTA, Yuki	Tokyo City University	Japan	Presentation (A-4-1)
SUNG, Sunyong	National Institute of Ecology	Korea	
SUWANTEEP, Koltip	Japan International Cooperation Agency (JICA)	Korea	Presentation (B-1-1)
SUZUKI, Yohei	ERM Japan Ltd	Japan	
TAKEDA, Shingo	Japan International Cooperation Agency (JICA)	Japan	Presentation (A-5-2)
TANAKA, Akira	Tokyo City University	Japan	Theme Forum(A-0-1) Co-chairperson (A-0)
TANAKA, Mitsuru	Hosei University	Japan	Presentation (B-4-5) Co-chairperson (A-3)
TEERAPATSAKUL, Artit	PTT PUBLIC COMPANY LIMITED	Thailand	
TOKUMURA, Masahiro	University of Shizuoka	Japan	Presentation (B-4-2)
TIAN, Kai	Beijing Normal University, China	China	Presentation (A-1-4)
TIKA RAM, Pokharel	Tokyo City University	Japan	
TYAS, Rahayu	Global Water Partnership- SEA Region	Indonesia	

URAGO, Akiko	Raven Ltd.	Japan	Presentation (A-5-3) Co-chairperson (B-2)
VERMUDO, Judy	Asian Development Bank	Philippines	
WANG, Mudan	Beijing Normal University	China	Presentation (A-5-4)
WANG, Qi	University of Shizuoka	China	Presentation (B-4-4)
WASHIO, Tomoki	Nihon University Graduate School	Japan	Presentation (A-2-1)
YAMADA, Kazuyoshi	Museum of Natural and Environmental history, Shizuoka	Japan	Opening plenary
YASUMOTO, Ayaka	Tokyo Institute of Technology, School of Environment and Society	Japan	Presentation (B-1-2)
YEE, Hyun-Shik	Korea Environment Corporation	Korea	
YEON, Ik Jun	Korea National University of Transportation	Korea	Poster(P-28) Poster(P-29)
YOON, Yeo Jeong	Chungbuk National University	Korea	Poster(P-25)
YU, Xianglan	Zhejiang Gongshang University of Professor/KSEIA	China	Presentation (B-1-3)
ZHANG, Qihui	Beijing Normal University	China	Presentation (B-2-3)
ZHAO, Yanwei	Beijing Normal University	China	Co-chairperson(B-2)
ZHOU, Siyang	Beijing Normal University	China	Presentation (B-1-4)

AIC2018 in Shizuoka

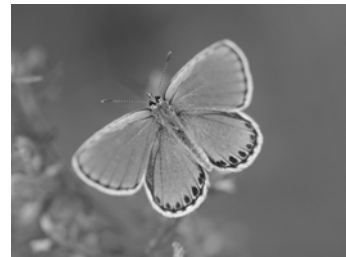
“Green Region and Impact Assessment”

❖ Sponsors

—Sponsors—

Environmental Assessment Center Co. Ltd

EAC is a leading environmental research company,
proud of its localized and customized solutions to the region.
Our top priority is sustainability, with long term horizon.



EAC

13-12 Seikan-cho, Aoi-ku, Shizuoka-shi, Shizuoka 420-0047, Japan
<http://www.eac-net.co.jp/>

Shizuoka Prefecture Environmental Assessment Association

<http://www.habi.ne.jp/sea/>

13-12 Seikan-cho, Aoi-ku, Shizuoka-shi, Shizuoka 420-0047, Japan



Founded in 1986, SEA is a consortium of six environmental research companies. The association takes the leading role in supporting the development of the industry in Shizuoka, e.g., by providing professional seminars and liaising with public sectors.



Environmental liability assessments in Japan

can be a tough task for foreign players, with a frustrating scarcity of straight answers – to the point where clients tell us, “Japan is like stepping through the Looking Glass.”

At EAI, we cut through all that. Across Japan, we have the technical expertise, experience and on-the-ground knowledge required to get the clarity you need: accurately assessing environmental risks and pinpointing their regulatory ramifications. We deliver definitive answers in plain terms your stakeholders can understand.

EAI Co., Ltd.

Hulic Jimbocho Building, 3F
2-2-31 Kanda Jimbocho, Chiyoda-ku
Tokyo, 101-0051 Japan
Phone: +81.3.3263.6051
email: info@ea-intl.com



Ryokusei Research Institute Co., LTD
 Researchers And Planners Of Natural Environment in Japan

株 式 会 社
緑 生 研 究 所
<http://www.ryokusei-ri.co.jp/>

Main Business Activities

- ◆ Support for environmental CSR
- ◆ Biodiversity research and consulting
- ◆ Environmental impact assessment
- ◆ Geographic information system
- ◆ Ecological planning

Environmental
 Assessment
 Center Co. Ltd.

<http://www.eac-net.co.jp/>

Fujiyama Co., Ltd.

<http://www.con-fujiyama.com/>

Science Co., Ltd.

<http://www.science-c.co.jp/>

SHIZUOKA
 CONSULTANT CO., LTD.

<http://www.shizuoka-con.co.jp>

Industrial Environment
 Reseach Center

<http://www.sankan.or.jp>

Tohnichi Co., Ltd

<http://www.tohnichi-net.co.jp/>

JSIA Japan Society for Impact Assessment

IAIA-Japan



Ministry of the Environment
Government of Japan



Shizuoka Prefecture, Japan



City of Shizuoka, Japan



Japan International Cooperation Agency

IGES Institute for Global
Environmental Strategies



**JAPAN BANK FOR
INTERNATIONAL COOPERATION**

JETRO Japan External Trade
Organization



Japan Association of Environment Assessment



伊豆半島ジオパーク
IZU PENINSULA GEOPARK



**SHIZUOKA ENVIRONMENTAL
ASSESSMENT ASSOCIATION**



静岡県立大学
UNIVERSITY OF SHIZUOKA



**TOKYO CITY
UNIVERSITY**

Executive Committee:

Akira TANAKA (Chairperson), Tokyo City University, Japan
Koji AINOTA, Tokyo City University, Japan
Takafumi KAWAMURA, Tokyo City University, Japan
Mizuki KANAI, Tokyo City University, Japan
Saki ISHINO, Tokyo City University, Japan
Seiichiro OHATA, Tokyo City University, Japan
Seiya OKITA, Tokyo City University, Japan
Yuki SHIROTA, Tokyo City University, Japan

Yuki SHIBATA, Toho University, Japan
Ayumi HORI, Toho University, Japan
Natsuki ITO, Toho University, Japan

Managing Committee Chairperson:

Yuichi MIYAKE, University of Shizuoka, Japan
Masahiro TOKUMURA, University of Shizuoka, Japan
Hirotaka NAITO, University of Shizuoka, Japan

**The 12th Asia Impact assessment Conference in Shizuoka
AIC2018**

“Green Region and Impact Assessment”

August 20 – 22, 2018

Publication:

Japan Society for Impact Assessment

International Exchange Committee

Chairperson, Akira TANAKA

http://jsia.net/3_activity/koryu/English/index.html

Address:

Tokyo City University Ushikubo-nishi 3-3-1, Tsuzuki-ku, YOKOHAMA 224-8551 Japan

tanaka@tcu.ac.jp

<http://www.yc.tcu.ac.jp/~tanaka-semi/en/index.html>



Japan Society for Impact Assessment
http://jsia.net/3_activity/koryu/English/index.html