

CENTER FOR ENVIRONMENTAL INNOVATION DESIGN FOR SUSTAINABILITY, OSAKA UNIVERSITY

February, 2015

Newsletter

No. **7**

We will soon be coming to the end of FY2014. Over this year, the Center for Environmental Innovation Design for Sustainability (CEIDS), Osaka University, has fruitfully engaged in a wide range of activities connected to research, education, and society-academia partnerships. In this Newsletter No. 7 we report broadly on some of the research and education initiatives CEIDS has pursued through international exchange and collaboration with local government bodies, as well as its “future design” research aimed at pioneering new developments.

1. Conceiving a vision for rural communities: Report from the international conference of the ARSA in Laos

In September 2014, five representatives of CEIDS and Osaka University attended the 5th International Conference of the Asian Rural Sociological Association (ARSA), held at the National University of Laos (NUOL) in Vientiane, Laos. In addition to planning panel sessions on the future of rural communities in Asia and presenting CEIDS research findings, they were also able to engage in a lively exchange of opinions with rural studies researchers from Bangladesh and Laos.

The host country, Laos, located on the Indochina peninsula, has a population of just under nine million people. Its major industry is agriculture, chiefly rice cultivation, but it also earns considerable foreign exchange through the sale of electricity produced by large-scale hydroelectric power plants. As a landlocked country, Laos has no seaports at its disposal, so its level of industrialization is very low. Nevertheless, its capital

of Vientiane, with a population of about a million, is a large and bustling city. With plenty of cars on the streets, and very large night markets every evening in neighborhoods along the Mekong River, which marks the border with Thailand, the city is remarkably lively. Although considerably smaller than the high economic-



Panel session

1. Conceiving a vision for rural communities: Report from the international conference of the ARSA in Laos (2)

growth countries of Southeast Asia, Laos is nonetheless developing at a steady pace.

The economic and social structures of Asia are currently changing at a dizzying rate. In China and other fast growing economies, there is rapid industrialization and an increasing concentration of people in the cities. Japan is facing the serious problem of population decline due to falling birth rates and demographic aging. On the other hand, countries like Bangladesh and Indonesia have to confront various challenges presented by rapidly growing populations. Given the massive size and diversity of Asia, the question “what is happening in rural Asia?” is a hard one to answer. One common feature is that the income of people working in the agricultural sector is significantly lower than that of people working in the cities—in particular, those working in the manufacturing or service sectors. The effects of changes in the economic structure resulting from economic growth vary, but one of them is an accelerating migration of people from rural to urban areas in search of work or higher paying jobs. At the same time, rural communities and agriculture are also changing. Farming, which was long practiced as a means of livelihood, is becoming just another way to earn money. In some regions, a lack of younger people to take over farms is leading to agriculture being abandoned. The potential consequences and problems arising from this are truly many and various.

The aim of the conference panel session planned by ARSA was to stimulate discussion about conceiving a vision for the future of rural Asia, based on an understanding of the impact that these kinds of changes in social and economic structure are having on rural communities and inhabitants. In their respective panel reports, Shuji Kurimoto (Professor at CEIDS) and Keishiro Hara (Associate Professor at CEIDS) presented case studies about constructing sustainable rural communities in Japan, looking at the positive and negative effects of agricultural policy, and the value of collaboration between stakeholders. Next, Rashedur Rahman (Associate Professor at Bangladesh Agricultural University) and Khamsing Keothoumma (researcher at

the National University of Laos) reported on their research projects. These dealt with the selection of technology relating to shrimp farming and aquaculture in the delta regions of Bangladesh, which are heavily affected by climate change, and on sustainable resource use and living environments in rural communities of southern Laos. Detailed presentations of these reports are to be published in the proceedings of ARSA, so please refer to them.

In the general debate following the reports, it was recognized that while poverty is a pressing problem in the rural communities of developing countries, for the long term it is important to focus on revitalizing those rural communities and adapting to the effects of climate change. Of course, the key to this is creating a vision for rural communities and figuring out how to realize it. There is also a need for the kind of meso-level research pursued by CEIDS and an approach to solutions that is focused on appropriate technology and collaboration. After this session there was another exchange of views, allowing the participants to better understand each other’s perspectives. Apart from this panel session, Takashi Machimura (Associate Professor at



Welcome party



Commemorative photo

1. Conceiving a vision for rural communities: Report from the international conference of the ARSA in Laos (3)

the Graduate School of Engineering Osaka University), Yukari Fuchigami (project researcher at CEIDS), and Michinori Uwasu (Associate Professor at CEIDS) also enjoyed constructive discussion spurred by research presentations they made individually.

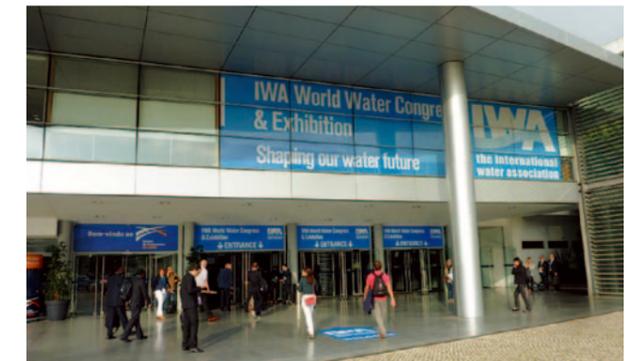
From ARSA’s point of view, we felt that the conference was a great opportunity for research exchange with people outside our area of specialization, and we came away with a clearer picture of the problems that rural Asian communities are grappling

with. We also sensed our own strong ties with the concepts of sustainability and meso-level planning. Although FY2015 will be the final year of the CEIDS project, we hope not only to go on exchanging opinions and reports, but also to consider opportunities for collaboration and practical activities as we pursue our research.

(Michinori Uwasu, Associate Professor, CEIDS)

2. Report from the IWA World Water Congress & Exhibition 2014 (Lisbon, Portugal)

The International Water Association World Water Congress & Exhibition 2014 (IWA-WWC&E 2014) was held in Lisbon, Portugal, from September 21 to 26, 2014. Three professors from Osaka University, Keishiro Hara (Associate Professor at CEIDS), Michihiko Ike and Masashi Kuroda (Professor and Assistant Professor in the Division of Sustainable Energy and Environmental Engineering at the Graduate School of Engineering) attended the conference to present research findings and gather information. The latter two are collaborating in a CEIDS project. This was the 9th IWA-WWC&E, which is the worldwide conference of the IWA. It was a very large gathering, with over 3,400 participants from every region of the world—Europe, Africa, South America, North America, Asia, and Oceania. More often than not, the majority of participants at international conferences held in Asia are from Asia, so it was impressive to see every part of the world well represented at this conference. There were many people from all over Africa, which is geographically close to Portugal, and from the countries of South America, which have remained deeply connected to Portugal since the Age of Discovery. These close geographical and cultural ties made us realize just how much Europe is at the center of the world.



Conference venue entrance

Naturally, as a conference of the International Water Association, which deals with all kinds of issues related to water, the topics of presentation and discussion were very wide ranging. There were presentations on an enormous variety of topics like basic water treatment technologies for water supplies, sewage systems, industrial wastewater, and agricultural wastewater; elemental technologies for improving efficiency; resource and energy recovery from water treatment systems; and reducing greenhouse gas emissions. Other presentations focused on operating and managing water supply and sewerage systems, sustainable public funding of water infrastructure, communication with customers (water system users) to improve service quality, and

2. Report from the IWA World Water Congress & Exhibition 2014 (Lisbon, Portugal) (2)

the effective utilization of “big data” regarding the management of the water supply sector. There was also discussion of comprehensive research on the appropriate scale and technology of water systems, such as long-term planning of water resource management focusing on the conversion and transition of water systems to ensure sustainable use and the application of resilient, small-scale, distributed water systems. In addition, there were



Assoc. Prof. Keishiro Hara making a presentation

several sessions on the human right to access safe water and on preventing water-borne infectious diseases. In Japan, where everyone enjoys easy access to safe water all over the country, it is hard to appreciate that more than half the world’s population—some four billion people—do not currently have ready access to safe water. This could be rightly called the most serious problem facing the world. This kind of conference, which deals simultaneously with such a wide range of topics, has not been held in Japan, probably because the scientific and academic societies of the various disciplines involved tend to meet individually. In light of this, one very fruitful aspect of participating in this conference was the opportunity to appreciate the overall tide of international research relating to water—not just the trends in one’s own specialized field of research.

One of the studies we presented at the conference was titled “Historical evolution and innovations of water-related technologies in Japan – Evidence from journal papers published over the last 50 years,” co-authored by the three representatives of CEIDS mentioned above, together with two other CEIDS collaborators—Michinori Uwasu (Associate Professor at CEIDS) and Masashi Takekawa (a doctoral student in the Graduate School of Engineering Osaka University). Japan has experienced some serious water-environment problems in the past. Its rapid economic growth and urbanization after the war gave rise to devastating health problems such as the outbreaks of Minamata disease and Itai-

itai disease, and also to water quality degradation due to eutrophication of enclosed bodies of water. Now, however, the quality of water in most of Japan’s water catchment areas is preserved to a high standard. While this basic outline of water environmental issues in Japan is widely known qualitatively, the study we presented is groundbreaking because it offers detailed analysis based on objective data. The research covers a total of 1,470 reports from the “Journal of Water and Waste” over the 50-year period from 1961 to 2010. By classifying, statistically analyzing and developing a database of water bodies, pollutants and other problems that need to be tackled, as well as the research “vision” that each published paper aimed at, we were able to create a clear timeline of research and development trends for water-related technologies. We found that there were two major turning points in Japanese R&D over the 50 years—one around 1970 and another around 1990. This revealed a gradual transition from industrial pollution problems to urban and living environment problems to global-scale environmental problems. Since this historical evolution of water environmental issues in Japan could be considered a model for developing countries, we felt that the opportunity to present our findings to researchers from all over the world was very valuable.

On the evening of September 25 a gala evening was held at the Convento do Beato, a magnificent 15th century building constructed by order of Afonso V of Portugal as a gift to his first wife. The party began in a very relaxed mood with a live band playing



Scene from the gala evening

2. Report from the IWA World Water Congress & Exhibition 2014 (Lisbon, Portugal) (3)

cheerful jazz, but later in the evening the volume was turned up as many of the conference participants enjoyed themselves dancing to disco music. Many of the Latin people took to the dance floor quickly and enthusiastically, but even the shy Japanese, in their own way, gradually began to move their bodies to the beat. It really felt like a “one world” moment.

(Masashi Kuroda, Assistant Professor, Division of Sustainable Energy and Environmental Engineering, Graduate School of Engineering)

3. Report from EcoBalance 2014 (international conference)

From October 27 to 30, 2014, EcoBalance 2014 (11th International Conference on Ecobalance) was held at the Tsukuba International Congress Center (Epochal Tsukuba) in the city of Tsukuba in Japan’s Ibaraki Prefecture. This international gathering has been held biennially for the past 20 years, since the inaugural conference of October 1994. As it happens, the conference also marked the 10th anniversary of the founding of the organizing body, the Life Cycle Assessment Society of Japan, established in October 2004.

According to the proceedings (final version, revised December 19, 2014), the international conference featured presentations by researchers from at least 26 different countries. Proportionally, the most represented regions were East Asia and Europe. From East Asia there were researchers from Japan, Thailand, Malaysia, Vietnam, Taiwan, South Korea, China, the Philippines, and Singapore. From Europe, there were researchers from Germany, France (including Réunion), Switzerland, the U.K., Italy, Belgium, the Netherlands, Croatia, Denmark, Finland, Sweden, and Norway. In addition, there were conference participants from Australia, Costa Rica, Brazil, the United States, and Canada.

The conference featured a wide range of sessions. It began on the morning of the 28th with the official opening and three keynote addresses. From the afternoon of the 28th through the morning of the 30th

there were parallel sessions (133 oral presentations) and on the afternoon of the 29th there were poster sessions with 125 presenters. Then on the afternoon of the 30th, to close the conference, there was a panel discussion titled “EcoBalance+20.” The overall theme of this year’s conference was “Creating benefit through life cycle thinking.” Accordingly, there were keynote addresses and special sessions on that subject, focusing on the fundamental concept of life cycle assessment (LCA).

One of the keynote addresses, titled “Values of life cycle thinking,” was delivered by Junko Eda, an environmental journalist, interpreter, and translator. In her address, Ms. Eda touched on the current status of LCA research and the challenges it is facing, using a causal loop diagram to describe cause and effect relationships. She based this on the concept of “system thinking,” which aims at solving problems by considering systems as a whole. She went on to point out that despite their common conceptual origins, “system dynamics” and “system thinking” are different. While the former is a numerical simulation technique that utilizes computers, in the latter case the overall structure of the system is analyzed using a graphical representation of the system, without relying on numerical simulation. This allows more people to participate in “system thinking.” Although strictly numerical LCA research will continue to be used, the use of “life cycle thinking” as a concept for making

3. Report from EcoBalance 2014 (international conference) (2)

general or approximate comparative judgments is likely to expand and help respond to rapidly changing social needs.

The parallel sessions, including special sessions, were held over three days. Special sessions featured subjects connected with the host city Tsukuba, a major center of scientific research, as well as research presentations on chemical engineering, information and communications technology, and research management. There were also special sessions on three topics connected to the main theme of the conference, global food security and corporate practices from life cycle perspectives; sustainability of materials and industries; and the practical challenge for sustainable industry. The general panel sessions also included research presentations on a wide range of topics, as listed below.

- Estimating the Contribution to Avoided Emissions
- Material Flow Analysis
- E-waste
- Driving innovation
- LCA Methodology
- Supply Chain Risk Management
- City & Building
- Behavior & Policy
- Policy & Visualization
- Agriculture & Foods
- Energy
- Waste Management & Recycling
- Water

CEIDS prepared a total of five research presentations for the poster sessions, which sparked some enthusiastic discussions and exchange of views. The authors and titles of the five poster presentations are as follows.

- Yukari Fuchigami (project researcher at CEIDS)
“Analysis of environmental loads and benefits of a bio-coke production factory: A case study in Osaka”
- Yusuke Kishita (Assistant Professor at CEIDS)
“Toward sustainable energy business using woody



Poster presentation



Keynote address

- biomass in rural communities”
“Forecasting electricity consumption of the Japanese information and communications sector toward green ICT”
“Evaluating the greenhouse gas emissions and life cycle cost of thermoelectric generators for passenger automobiles”
- Kazutoshi Tsuda (Assistant Professor at the Graduate School of Engineering, Osaka University)
“Potential self-supply of local resources towards regional sustainability: Case study of Shinjo Village in Okayama Prefecture, Japan”

Although these poster presentations featured case studies of local initiatives in such places as Takatsuki city, Osaka, and Maniwa city and Shinjo village, both in Okayama, the idea of LCA research providing scientific support of wide-ranging local development projects attracted considerable interest from overseas

3. Report from EcoBalance 2014 (international conference) (3)

researchers. The presentations also stimulated some valuable discussions. For anyone who wishes to learn more about presentations at this conference, the proceedings are published online under a Creative Commons license (CC BY 4.0) at the link below. (http://ilcaj.sntt.or.jp/EcoBalance2014/program/files/EcoBalance2014_abstract.pdf)

In December of last year, the next conference, “EcoBalance 2016,” had already been announced, and

will be held from October 3 to 6 in Kyoto. We hope to have another opportunity then to present the fruits of our research at CEIDS, which aims at connecting local and community needs with university research and education.

(<http://www.ecobalance2016.org/>)

(Kazutoshi Tsuda, Assistant Professor, Graduate School of Engineering)

4. Report on University of Hamburg-CEIDS Joint Research Seminar

On October 3, 2014, a joint research seminar between the Center for Environmental Innovation Design for Sustainability (CEIDS) and a group of professors from the University of Hamburg in Germany was held at Osaka University’s Suita Campus. For over two hours, starting at 3 p.m., researchers from CEIDS made presentations on their activities and engaged in discussions with members of the German group. The three visitors from the University of Hamburg were climate change specialist Jürgen Scheffran (Professor in the Institute of Geography), economics specialist Andreas Lange (Professor in the Faculty of Business, Economics and Social Sciences), and mathematics specialist Ingenuin Gasser (Professor in the Department of Mathematics, as well as Vice Dean for Internationalization and Support for Young Researchers). The opportunity for interdisciplinary discussions with these specialists in a variety of fields was a great inspiration to all the participating academics of CEIDS.

In response to the research and education presentations by the CEIDS members, on the topics listed in Table 1, the German visitors fired numerous questions in rapid succession. Professor Keishiro Hara offered an explanation of meso-level research, a concept developed by CEIDS. As a framework for

meso-level research, CEIDS has proposed a “Vision-Meso-Seeds” model. This model features a vision for a sustainable society (e.g., low-carbon society) and various technological seeds (e.g., solar power generation). It emphasizes the importance of appropriately designing the intermediate sphere (meso level) that connects these two elements. (For more details, see Reference [1].)

It seemed that through their presentations, the CEIDS professors were able to share their belief in the necessity and importance of meso-level research in realizing a sustainable society and for environmental innovation with the Hamburg professors. On the other hand, the CEIDS group was also confronted with some probing questions. For example, given that the expressed



Scene from seminar

4. Report on University of Hamburg-CEIDS Joint Research Seminar

(2)

visions are very abstract, how can they be rendered into reality? The Germans pointed out another associated problem: while taking a participatory approach to fleshing out a vision into reality is considered important, such a thing is too complex for ordinary citizens. These arguments, both related to research problems for realizing environmental innovations, are likely to serve as valuable hints for the further development of our meso-level research concept. On a different note, we heard that the University of Hamburg's Institute of

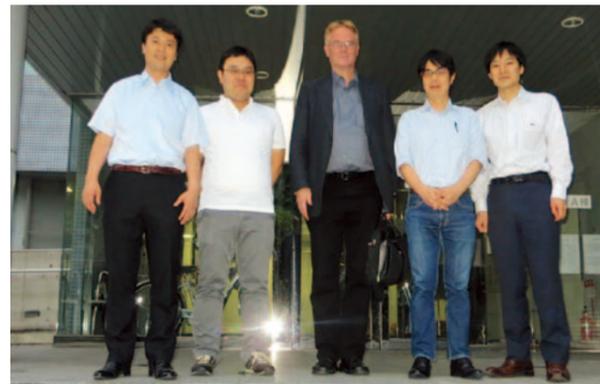
Geography, to which Professor Scheffran belongs, has launched a Master's program on the subject of climate change. This topic served as a springboard for an exchange of information on the subject of educational programs.

Finally, at the end of the joint seminar, we discussed the idea of future research collaborations between the University of Hamburg and CEIDS, and agreed to explore the possibilities. Despite the fact that the exchange was very brief, in part because the German visitors were constrained by a very tight schedule, we were able to pack in a lot during the short time together. The sense of fulfillment seems to be visible on the faces of the participants in the commemorative photo.

(Yusuke Kishita, Assistant Professor, CEIDS)

Reference:

[1] Keishiro Hara, Michinori Uwasu, Hideki Kobayashi, Shuji Kurimoto, Shinsuke Yamanaka, Yoshiyuki Shimoda, Yasushi Umeda, "Enhancing Meso Level Research in Sustainability Science - Challenges and Research Needs," Sustainability Vol. 4 , (2012), pp.1833-1847.



Commemorative photo outside the conference room

Table: Outline of presentations by CEIDS teaching staff

Topic (presenter)	Presentation theme
Research and Educational Activities at CEIDS, Osaka University (Keishiro Hara, Associate Professor)	Impacts of climate change and response strategy (Hiromune Yokoki, Ibaraki University) The necessity for meso-level research, a concept developed by CEIDS, for realizing environmental innovation, and an explanation of the concept behind the "Vision-Meso-Seeds" (VMS) model proposed as a fundamental framework for this purpose.
Mission of CEIDS for Education (Michinori Uwasu, Associate Professor)	An interdisciplinary sustainability education program for Master's program students, developed by CEIDS.
Development of Numerical Simulation System for Multi-scale Environmental Assessment Hikari Shimadera (Assistant Professor)	Numerical simulation model for assessment of atmospheric and water environments, suitable for a wide range of spatial scales, from the entire earth, to districts, and even indoor spaces.
Removal and Recovery of Selenium from Waste and Wastewater by Using Selenium-metabolizing Bacteria Masashi Kuroda (Assistant Professor)	The state of development of technology for removing selenium from solid waste and wastewater utilizing microorganisms, and examples of its application, as an illustration of seeds-style meso-level research.
Computer-aided Scenario Design for Sustainability Yusuke Kishita (Assistant Professor)	Design support methodology for scenarios relating to sustainability, and the scenario of electric power demand in the Kansai region in 2030 as an example application of this.

5. International exchange: Academic exchange seminar with Shanghai Jiao Tong University

The 17th Osaka University-Shanghai Jiao Tong University Academic Exchange Seminar was held from November 2 to 4, 2014, at Shanghai Jiao Tong University (SJTU). On the first day, a reception was held at SJTU's Xuhui Campus. On the second day, there were session meetings on various fields of research at the Minhang Campus. These seminars, which are based on an academic exchange agreement between the universities, are held almost every year, with the two universities alternating as host. Since the first such exchange in 1995, on the field of welding materials engineering, the scope of the seminars has gradually expanded to other fields. Currently, the exchanges span the sciences and humanities to cover virtually the whole spectrum of academic disciplines. This year the sessions dealt with a total of eight fields. In addition to materials, global architecture, information, physics, optics, environment, and history, a new field, combustion engineering, was added.

The environment session that the Center for Environmental Innovation Design for Sustainability (CEIDS) participated in included three members of CEIDS, Prof. Shuji Kurimoto, Assoc. Prof. Keishiro Hara, and myself (Assist. Prof. Hikari Shimadera), as well as Assist. Prof. Masashi Kuroda of the Department of Sustainable Energy and Environmental Engineering, Graduate School of Engineering, Osaka University, and three Master's students from the Graduate School of Law and Politics—Yue Gao, Zhoupei Li, and Tian Zeng. These three Chinese students, all currently enrolled at Osaka University as overseas students, seemed very pleased at the chance to join the seminar. The seminar also gave us the opportunity to meet up again with Prof. Zhenjia Zhang and Prof. Wenhua Wang of SJTU's School of Environmental Science and Engineering, as well as Assoc. Prof. Huiyu Zhao of the SJTU's KoGuan Law School, who each gave a lecture to the environment session at the 16th seminar held the previous year at Osaka University.

As outlined in the table below, a total of 17 presentations were made at the environment session

meeting of this year's seminar. The broad range of topics included water environment purification and resource recovery using microorganisms, analysis of large-scale atmospheric pollution due to fine particulate matter (PM_{2.5}), legal provisions and public participation initiatives to promote environmental conservation in China, use of biomass resources for fuel and industrial processes, and chemical processes for environmental remediation and resource recycling. While the presenters at the previous session meeting were all professors, graduate students also gave a number of presentations at this year's seminar. For the students, the opportunity to make a presentation in English was itself of great value. Unfortunately, it was not possible to engage in any substantial discussion after each of the presentations due to time constraints, but there were some active exchanges during the break periods.

Including my report, there were only two presentations on atmospheric pollution. However, due to growing concerns about air pollution problems, including the impact of PM_{2.5}, in China, my presentation attracted a good deal of interest. I was particularly pleased to have an in-depth exchange with Assist. Prof. Zhen Cheng of SJTU's School of Environmental Science and Engineering, whose presentation was about the analysis of air pollution in the Yangtze River delta. For one thing, we share the same field of specialization—air pollution—and we both conduct numerical simulations of the atmosphere. I continued exchanging information



Commemorative photo before the session meeting

5. International exchange: Academic exchange seminar with Shanghai Jiao Tong University (2)

with Prof. Cheng after the seminar, and even discussed the possibility of joint research with him.

I believe that before Japan and China can cooperate to remediate environmental problems, it is first necessary to develop a common recognition of problems amongst researchers in both countries. For the next research exchange seminar, set to be hosted

by Osaka University, I would like to see the seminar develop into something more than just an occasion for exchanging information—a platform for developing international joint research initiatives between the two universities.

(Hikari Shimadera, Assistant Professor, CEIDS)

Table: Session program

Opening address	Zhenjia ZHANG (Prof., SJTU)	Afternoon break	
#1	Masashi KURODA (Assist. Prof., Osaka Univ.) Removal and Recovery of Selenium from Waste and Wastewater by using Selenium-metabolizing Bacteria	#10	Hua ZHANG (Postdoc, SJTU) Highly selective and efficient hydrogenation of fatty acids to fatty alcohols using Zn and Pt/C catalyst
#2	Hikari SHIMADERA (Assist. Prof., Osaka Univ.) Performance of Air Quality Modeling System for PM _{2.5} Simulation	#11	Guodong YAO (Postdoc, SJTU) Potential green reductants in metal smelting based on carbohydrate biomass
Morning break		#12	Xiaoyun XU (PhD student, SJTU) Removal of low concentration mercury by biochars : A potential of biochar for the remediation of Hg-contaminated sediments
#3	Qi GAO (Lecturer, SJTU) Problems and Prospect of Public Participation in Environmental Matters in China : Commentary on the Relevant Revision of Environmental Protection Law	#13	Wenbing WANG (PhD student, SJTU) UV photolysis for enhanced phenol removal at presence of 2,4,6-trichlorophenol (TCP)
#4	Huiyu ZHAO (Assoc. Prof., SJTU) The evolvments of China' s EIA and present challenges	#14	Jia DUO (PhD student, SJTU) Reduction CO ₂ to formic acid with Fe under hydrothermal conditions
Lunch		#15	Ruixue WANG (PhD student, SJTU) Application of pyrolysis process and pyrolysis mechanism for recycle renewable resource from polarizing film of waste liquid crystal display panel
#5	Yue GAO (Master's student, Osaka Univ.) Water Pollution In Hangzhou	#16	George Chira KIRUMBA (Master's student, SJTU) Comparison of Different Macrophytes in the Degradation of Atrazine and Alachlor in Aqueous Solution
#6	Zhoupei LI (Master's student, Osaka Univ.) Situation of Environmental Information Disclosure and PRTRs in China	#17	Zhe LV (Master's student, SJTU) Pilot Scale Test of Eco-Dam for In-situ Remediation of Polluted Aquaculture Water in Yangcheng Lake
#7	Tian ZENG (Master's student, Osaka Univ.) Brief Research on Environmental Public Interest Litigation of Japan and China	Closing address	Wenhua WANG (Prof., SJTU)
#8	Keishiro HARA (Assoc. Prof., Osaka Univ.) Analysis of the overall benefits of introducing Bio-coke from perspectives of life cycle CO ₂		
#9	Zhen CHENG (Assist. Prof., SJTU) Characteristic s of typical haze events in the Yangtze River Delta, China		

6. Visit from King Faisal University, Saudi Arabia for a presentation on CEIDS' research and education activities

On Wednesday November 12, 2014, a delegation of nine researchers from King Faisal University in Saudi Arabia, together with officials of the Royal Embassy of Saudi Arabia, paid a visit to Osaka University's School of Engineering. The Center for Environmental Innovation Design for Sustainability (CEIDS) took the opportunity to offer a presentation of its research and education activities, as well as to engage in discussions with the visitors. In addition to CEIDS staff, a number of other people from the School of Engineering participated in the encounter, including Prof. Kiyoshi Fujita of the Center for International Affairs, Graduate School of Engineering and representatives from the Division of Materials and Manufacturing Science at Mitsubishi Electric's Research Laboratory of Manufacturing Converging Technologies, and Nippon Steel & Sumitomo's Metal Joint Research Chair for Welding & Joining. Each of these also offered presentations on their wide-ranging research and education activities.

From CEIDS, Assoc. Prof. Keishiro Hara gave a presentation that analyzed individual elemental technologies in terms of their relationship with social needs and a vision of the future that society is seeking. He stressed the importance of a process for shaping a sustainable society by positioning these elemental technologies appropriately within the kind of social system that people and communities want to create, and on this basis he explained the value and potential of the meso-level research that CEIDS is pursuing. As a concrete example of this, he presented a case study of the life cycle assessment (LCA) of thermoelectric technology that Osaka University is doing R&D on, explaining in detail the argument for linking the contributions made by elemental technologies to shaping a low-carbon society with a vision of a low-carbon society achieved by appropriately applying such technologies. Both in Japan and abroad, thermoelectric elements are regarded as a highly promising technology for converting waste heat directly into electricity. Since urban waste heat is a major issue in Saudi Arabia, this assessment case study

is of great relevance, and the Saudi visitors expressed a desire to maintain a dialogue with Osaka University on this topic.

Looking ahead, as the fruits of CEIDS' meso-level research become more widely diffused throughout society, it will be necessary to more clearly define the possibilities of this research methodology and its challenges. International exchanges like this one give us access to diverse opinions and perspectives and they make us more aware of the importance of international collaboration. Although CEIDS has so far engaged in international exchanges quite widely within Asia and with Europe and North America, we hope to continue expanding and strengthening our international collaboration and exchange efforts.

(Keishiro Hara, Associate Professor, CEIDS)



Research exchange between representatives from King Faisal University, Saudi Arabia and the Royal Embassy of Saudi Arabia and representatives of Osaka University

7. “Sustainability D-Lab” launched in FY2014 as an Interdisciplinary Research and Education subject

The Center for Environmental Innovation Design for Sustainability (CEIDS) launched its new “Sustainability D-Lab,” as a subject in the “Research on Local Safety and Security and Management Practices for the Commons” project. A “D-Lab” is a type of educational program, originally developed at the Massachusetts Institute of Technology (MIT), aimed at training personnel to help solve the many diverse problems of developing countries through manufacturing and design. It stems from the ideas of intermediate technology and appropriate technology, which have been advocated since the 1980s to emphasize the importance of products and designs that can be maintained by local people themselves, as opposed to technically sophisticated, complex solutions that nobody can effectively utilize. Accordingly, the “D” in “D-Lab” stands for a number of concepts, such as “development” (development of products and communication), “dialogue” (dialogue between local people and technologists), and “dissemination” (dissemination of products and ideas).

This class embodies the specificity and social applicability of the previous year’s “FY2013 Totsukawa-mura (Tosukawa village) Commons Discovery Student Seminar,” and consists of lectures dealing with reviving rural communities, study design, field study of surveyed areas, and joint design work and presentations. The aims of the class are to understand the state of rural communities in Japan by thinking and working together with local people, and by cultivating the ability to identify and formulate problems and synthesize solutions (the ability to design solutions to problems). A total of 12 students from a variety of departments at Osaka University participated in this year’s class. They were divided into teams of four for group work and visited the Kannogawa district of Tsukawa-mura. Totsukawa-mura, located in the far south of Nara Prefecture, is the largest “village” municipality in Japan by area. In addition to its abundance of mountains and forests, it is renowned for the World Heritage Kumano Kodo (the Kohechi route of the ancient pilgrimage trail), for its history, featuring

Totsukawa samurai and *tenchugumi* (armed group), and for its hot springs villages. Unfortunately, Typhoon No. 12 of September 2011 wreaked devastation on Totsukawa-mura, accelerating the area’s decline in tourist numbers and local population. The participants in the field study trip to the Kannogawa district visited five mountain settlements quite distant from the center of the Totsukawa-mura municipality. The impact of population decline and aging here is great. In light of this, the focus of this year’s class was to investigate ways (physical and non-physical) to overcome the challenges facing the Kannogawa district, and to create prototypes of proposed solutions.

The classes were centered on a field study trip from November 7 to 9, with preparatory lectures and practical training before the field study and prototype creation after the trip. The preliminary lectures, held at the “Co-creative Design Laboratory for Sustainability, UMEKITA” of CEIDS, provided an introduction to the history and resources of the rural communities and to the specific conditions in Kannogawa. The students also carried out group work (problem identification and formulation). There was a guest speaker, Mr. Akihide Hirano (deputy director of NPO Regional Renaissance Agency and secretary of a cooperative aimed at reviving the rural district of Itoshiro in Gifu), who talked about the practical aspects of local revival, covering topics such as revival of mountain communities using micro hydroelectric power, use of biomass, and rethinking local communities.

The students on the field study trip were hosted by Mr. Isao Okada of the Kannogawa Happy Bridge Project (HBP), a cooperative promoting rural exchange experiences, and Mr. Ryoichi Masutani and Mr. Akinari Kamiya of the Totsukawa-mura Tourist Promotion Bureau. On the first day of the trip, we asked Mr. Okei Mori, Mr. Takahiro Mori, and Mr. Takehiro and Mrs. Masako Ueda to speak, respectively, on three themes, in accordance with the issues formulated by each student team: lifestyle and culture in mountain settlements, memories of disaster times, and the future

7. Researcher Interview No. 4, “Methodology and Practice of Future Design”

(2)

of forestry, agriculture, and mountain settlements. At night, we stayed in a farmhouse *minshuku* (Japanese-style B&B), where we enjoyed a wood-fired bath and local cuisine. On the second day, under the guidance of

the Kannogawa HBP, we helped local volunteers in their community work to clean the former Imoze Elementary School, which now serves as the main meeting venue of the local community. We then visited the Kohechi



Interview survey at Kannogawa



Community maintenance work (with local volunteers)

Table: Schedule during the visits

	Team A	Team B	Team C
Nov. 7, afternoon	Interview survey on “lifestyle and culture” in Uchino, Kannogawa	Interview survey on “memories of disaster times” in Uchino, Kannogawa	Interview survey on “the future of forestry, agriculture, and mountain settlements” in Miura, Kannogawa
	Strolling around the farmhouse <i>minshuku</i>		
	Interview survey with the Kannogawa Happy Bridge Project (HBP)		
	Lodging at farmhouse <i>minshuku</i>		
Nov. 8, morning and afternoon	Community work (cleaning the former Imoze Elementary School)		
	Visit to Kohechi route of the World Heritage Kumano Kodo (Miura Toge side): Strolling and visiting the windbreak forest	Strolling in the Imoze and Sugise settlements of Kannogawa, and strolling on the Kohechi route of the World Heritage Kumano Kodo (Obako Toge side)	
	Lodging at farmhouse <i>minshuku</i>		
Nov. 9, morning and afternoon	Participation in Shinto ritual (to honor the mountain god) at Yamaten, Kannogawa		
	Interview survey on “life in a mountain settlement”		
	Farm work experience		Interview survey on “the future of forestry and mountain settlements” in Sugise, Kannogawa
	Tea meeting with ladies of the settlement (interview survey)		

7. "Sustainability D-Lab" launched in FY2014 as an Interdisciplinary Research and Education subject (3)

route of the World Heritage Kumano Kodo. On the third day, at the settlement of Yamaten in Kannogawa we took part in one of the most important religious rites of the local people, paying respect to a mountain god. First thing in the morning we climbed up to a shrine dedicated to the mountain god, made offerings and paid

our respect. We then joined the locals in their traditional custom of throwing (and picking up) *mochi* (rice cakes). Next, we tried our hand at harvesting soybeans, and then over tea we listened to a talk by two ladies of the settlement, Mrs. Toshiko Matsuba and Mrs. Ikuko Tsuji. Team C also listened to Mr. Masashi Tsuji speaks about



Developing prototypes through group work



Commemorative photo with Mrs. Ikuko Tsuji and Mrs. Toshiko Matsuba, who kindly assisted us



Presentation of a concrete prototyp



Commemorative photo at the final presentation with officials from Totsukawa-mura

7. "Sustainability D-Lab" launched in FY2014 as an Interdisciplinary Research and Education subject (4)

forestry. The most lasting impression of the field trip in the minds of the students was the pride and affection for Kannogawa underlying almost everything that the locals talked about, as if to say, "Yes, it's inconvenient to live here, but nonetheless we love this place and wish to stay." Before the study trip, many students felt that increasing the population of the settlement was the most serious challenge to face, but after hearing the locals speak, their perception of the problem shifted to more concrete concerns, connected more closely to the real lives of the locals.

In the latter half of the classes, after the field trip, the students pursued group work at UMEKITA lab. with each group creating its prototype solution for the problem it set for itself. Team A developed a tool to use when harvesting, binding, carrying, and drying soy beans, with the aim of reducing the burden of agricultural work on elderly people. The focus of Team B originated from their interview survey, when they heard a local report that the most inconvenient aspect of disasters was the loss of refrigeration due to electric power outages. This prompted the group to propose a Kannogawa version of an existing device—a "non-electric refrigerator." Team C proposed the use of terraced rice fields for a local community revitalization project, as a way of applying local resources to revive the local community. We invited Mr. Masutani and Mr. Kamiya, Totsukawa-mura officials, to the final presentation of the students' work on December 16. The students explained their specific proposals to improve the lives of the people living in Kannogawa based on the previously described challenges, from the viewpoint of students and as village outsiders. In response to these proposals, the two officials from Totsukawa-mura made connections to some of the work currently being done by the municipality, and they offered constructive feedback in the form of agreement, corrections, and additional information. Given that that the work was done in limited class time, there were many elements of the students' proposals that need to be improved or that cannot be feasibly applied without further development. We were very encouraged, though, to hear

the two officials say that they wished that the people of Kannogawa and Totsukawa-mura could have heard the presentations. For the future, we want to refine the prototypes, taking into account the feedback received, and present them in Totsukawa-mura. Furthermore, we would like to develop them to the stage where they could be handed over for next year's crop of students to work on. The students hope to make use of their experience for future research presentations, while the CEIDS staff will incorporate the experience in their educational work.

The content of the students' proposals from this project will not have any immediate impact on the problem of Totsukawa-mura and Kannogawa's declining population. Nonetheless, through this class, the students learned how to identify problems that they wish to solve by actually going into the field and communicating directly with local people and seeing and thinking about things for themselves. Even more importantly, they learned how to link these challenges to concrete and practicable proposals and they came to understand the difficulty, pleasures, and value of doing all these things in collaboration with colleagues of different disciplines and year levels. I believe it is of great value for students to move outside the comfort zone of their own departments and expertise and to engage in discussion from multiple viewpoints.

We would like to express our sincerest thanks to everyone from the municipality of Totsukawa-mura, everyone from Kannogawa who welcomed us on our visit, and to everyone from Kannogawa HBP, which kindly hosted us on our study trip.

(Yukari Fuchigami, Project researcher, CEIDS)

8. Striving collaboratively to create a future society - collaborating with local government bodies in Future Design research

Over the past few years, the Center for Environmental Design Innovation for Sustainability (CEIDS) has worked to cultivate a new kind of methodology for realizing a sustainable society. In this methodology, we evaluate the knowledge and elemental technologies that are produced on a daily basis by universities and research institutes in terms of their relevance to humans and to social systems, and by appropriately placing and developing them in society. In other words, this research attempts to link the seeds of all kinds of research and the seeds of elemental technologies with the vision of a sustainable society. This is what we define as “meso-level research” and apply to a wide range of research initiatives. Since this kind of research analyzes and assesses the positioning of research and technology seeds within the context of a social system, it is very important that it is pursued with social experiments and interaction with society. Based on this recognition, we have forged

relationships with Suita City (Osaka) and other local government bodies and various stakeholders. Suita City has participated with us steadily over the past years in a joint research group focused on meso-level research, and this partnership has proved fruitful at a variety of levels, such as the City having jointly hosted symposiums with CEIDS. The continuity of this social-university partnership or social dialogue effectively creates a platform for meso-level research.

We are now starting to apply the meso-level research methodology and practice that we have established thus far to new research challenges. Together with other researchers in Japan, such as Tatsuyoshi Saijo (Professor, School of Management, Kochi University of Technology; Visiting Professor, CEIDS) and Reiko Aoki (Professor and Executive Vice President, Kyushu University), we are pioneering a new field of research, which we call “Future Design.” (For details, see pp. 9-11 of Newsletter No. 6) The essential



Scene from a joint research group meeting at Suita City Hall (Dec. 1, 2014)



CEIDS seminar with invited guest Mr. Ritsuji Yoshioka of Yahaba Town (Dec. 23, 2014)

8. Striving collaboratively to create a future society - collaborating with local government bodies in Future Design research (2)

point of meso-level research is to link promising seeds of research to a desirable vision. But how do we create or select a “desirable vision” or “future vision”? At present there is no methodology or social mechanism by which people holding widely divergent views can share or appropriately select a vision. And, despite the fact that the selection of a future vision and decision-making of current generations will have a major impact on future generations, those affected future generations cannot participate in the decision-making of the present. This may seem to be an obvious observation, but from the point of view of intergenerational equity, it is very problematic.

At CEIDS we have started to pursue research founded on a recognition that methodologies that reflect the viewpoints and priorities of future generations in the debates and decision-making of present generations are essential. We hope to enable a broad range of stakeholders to design and select a future vision collaboratively, as well as promote social mechanisms that support such debate and decision-making processes (which we call “social devices”), which are going to become more and more important over time. The aim of Future Design is to develop methodologies that effectively enable current and future generations to design a future society together, with the participation of a diversity of stakeholders, and to explore social mechanisms and systems to support such collaborative design. In the course of our brainstorming at CEIDS we wonder about how we can form a group that can consider the interests of future generations today. What kind of fundamental information and future scenarios need to be presented in order for people participating in debates and decision-making now to concretely and appropriately shape and conceive of a future society? How should such debates be facilitated? Thus we are tackling this research from a variety of perspectives. In addition to the theoretical research, we are conducting an actual Future Design project for Suita City, based on cooperation with local government bodies (Suita City in this case) and with the participation of a large diversity of stakeholders.

On December 1, 2014, we held a research group meeting at Suita City Hall. Members of CEIDS met with staff from Suita City’s environment, roads and parks, and sewerage and wastewater departments, for an exercise in Future Design with the supposition of participation of various generations and stakeholders. On Saturday February 28, 2015, CEIDS and other Osaka University representatives are scheduled to join with Suita City staff, as well as ordinary citizens, students, and company representatives for a Future Design exercise on the subject of environmental planning in Suita City. Holding workshops like this, with a broad spectrum of participation, on a continuing basis allows us to steadily deepen our Future Design research efforts. At the same time, we are starting to work on joint research with local government body representatives to explore social mechanisms that enable the ideas and concepts generated in the process of developing a vision of the future to find their way into public policy.

Here is another case study. On Tuesday December 23, 2014, we invited Mr. Ritsuji Yoshioka from the department responsible for water supply and sewerage in the town of Yahaba in Iwate Prefecture for a seminar at CEIDS’ Umekita offices (Co-creative Design Laboratory for Sustainability). The seminar focused on the future of water supply services and management in the town of Yahaba, which is facing the prospect of population decline in the years ahead. The aim was to create a future plan and vision, not only through debate within the municipality, but also through active communication with local inhabitants. The process of debate and selection through which these local citizens, known as “water supply supporters” (literally translated from Japanese words), may determine the most appropriate water supply system produced some very interesting results. In fact, this initiative of Yahaba Town’s was featured on a national primetime TV report on the NHK program “Close Up Gendai,” under the title “Water supply crisis due to advancing deterioration” (broadcast October 16, 2014), and was also covered widely in other media. The key figure

behind this citizens' participation initiative in Yahaba was our guest Mr. Yoshioka. In the seminar, he gave a talk titled "Policy formation in a society of declining population and the silent majority - aiming to create a town with a future people can feel confident in," after which there was a lively discussion. We decided to plan a Future Design exercise with the supporters of Yahaba Town (the first workshop is scheduled for March 27, 2015), and we also had some valuable exchanges on matters such as methods for conveying information

and methods of facilitation. Since some personnel from Suita City also sat in on this seminar, it was a precious opportunity for an exchange of views between different local government bodies.

CEIDS is keen to continue building its experience with this kind of collaboration at the local government body level and developing general-purpose and practicable Future Design methodologies and platforms.

(Keishiro Hara, Associate Professor, CEIDS)

9-1. CEIDS Research Project (5): Geometric modeling using measurement data Introduction

Introduction

I have been conducting research on methods for manipulating 3D geometric models with computers. Recently, the focus of my research has been to incorporate the real objects, obtained using measurement devices such as CT scanners and laser scanners, into a computer to find solutions to various problems in the medical and engineering fields. The information on objects acquired with these kinds of measurement devices are essentially collections of points and pixels, which cannot be used as they are. To use this data effectively to solve problems it is necessary to extract the necessary parts from the data and to identify the meaning of those parts. It is then necessary to convert them into geometrical forms that can be used with software such as CAD packages that work with polygon data. The technology for solving these kinds of problems is geometric modeling, which is my specialty. In this paper, I offer an outline of the research I have done and what I'm currently working on.

Polygonization of thin-plate mechanical objects scanned by a CT scanner

In the manufacturing industry, a process known as reverse engineering creates CAD models of geometric models of real objects. Reverse engineering aims at

making manufacturing processes more efficient, by comparison with design data and simulation of the shapes of real objects. In this study I conducted research on creating polygon models from mechanical parts made of sheet metal. The typical method for creating a polygon model from volume data is to consider the CT data as a scalar field and then compute the isosurfaces based on it. However, since CAD models for sheet metal parts are generally expressed with a surface model of normal thickness, another step is necessary. In this study we solved this problem by computing the medial axis (surface) that passes through the center of the geometrical form from the CT image. Studies focused on the neutral axis have been a staple subject of research for some decades now, but in our study we developed an algorithm for correctly computing non-manifold polygons for geometrical objects that are branched as a result of welding or a similar process. (See Fig. 1.)

Extracting roadside trees from urban data using a laser scanner

Roadside trees are being actively planted in urban districts, not just for the sake of environmental benefits such as absorbing CO₂ and mitigating the heat island

effect, but also for scenic beautification. In fact, large numbers of roadside trees can be seen in and around the campus of Osaka University. At the same time, roadside trees are planted not just along heavily trafficked roads, but also in environments that are already crowded with electricity poles, lampposts, water mains, and various other things. As a result, maintenance of trees is becoming a serious issue. Generally, maintenance of roadside trees is managed by public employees who regularly go out to visually inspect them and record their findings on paper. This is laborious and risky, since the documentation can be easily lost. Thus, many local governments are grappling with the problem of how to efficiently manage their roadside trees.

In our latest study, We are developing a system for managing roadside trees using a laser scanner to regularly measure the trees. The scanner we used for the study is called a Mobile Mapping System (MMS), consisting of a vehicle fitted with a laser scanner and GPS. A main feature of an MMS is the ability to measure trees at normal driving speed, without causing any obstruction on the road. Since trees are planted along the sides of roads, an MMS seems to be an

optimum solution for measuring roadside trees. One problem with using measurement data from an MMS for maintenance of roadside trees is that since the collected data will also include objects such as electricity poles, traffic lights, and the buildings and pedestrians that are passed, it becomes necessary to automatically extract just the trees from all this data. Our research focuses on the geometrical characteristics of trees to develop a technique for extracting the trees using the local distribution of point clouds. If the roadside trees can be extracted, it will also be possible to survey the distance between trees, tree height, and interference with electricity poles and other objects. We believe that in the future this kind of regular measurement can be employed for various kinds of environmental assessment and risk management tasks relating to roadside trees. We also think that this technology might serve as a good way of assessing scenery, for example by measuring greenery levels.

Summary

I presented here a simple outline of some of the research I have done on the use of measurement data for geometric modeling, as well as research I am currently working on. I am conducting geometric modeling-related research in a variety of other fields too, such as anthropology and medicine. Although these fields are very diverse, the common challenge is the extraction of necessary information (geometric model) from the given data. At the same time, each field has its own particular technical problems, which my research alone may not necessarily solve. I look forward to continued collaboration with specialists in different fields to try and solve a variety of problems, and hopefully along the way I can contribute something to the advancement of geometric modeling technology.

Reference:

T. Michikawa and H. Suzuki, "Polygonization of Volumetric Skeleton with Junctions", *Computer-Aided Design*, Vol. 45, No. 4, pp.822-828, 2013.

(Takashi Michikawa, Assistant Professor, CEIDS)

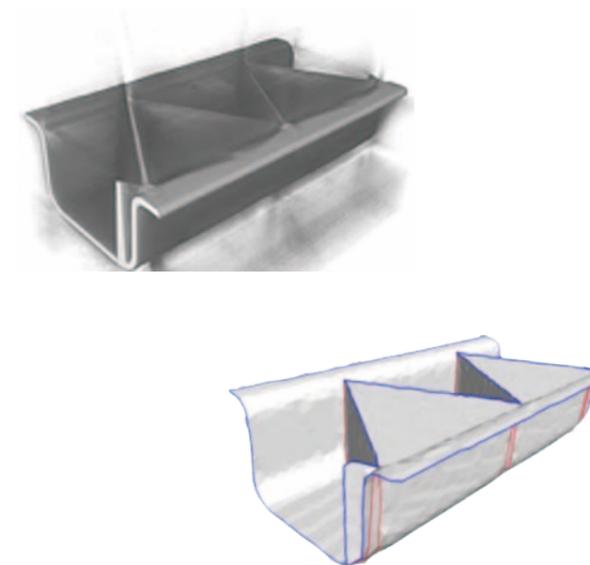


Fig. 1 Creating the medial surface from volume data for sheet object (Source: Michikawa, 2013)

9-2. CEIDS Research Project (6): Development of analysis and assessment methods for realizing sustainable cities

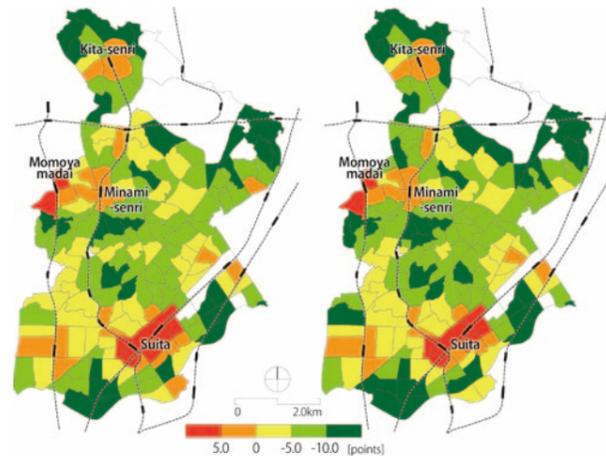


Fig. 1 Assessment of convenience in Suita City (left: 2010, right: 2040)

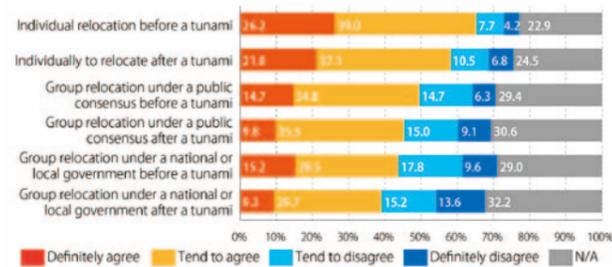


Fig. 2 Responses to relocation/migration plan in Kochi City (N = 428)

Cities are now the setting of most human activity, essential places where people must live and survive. Already, more than 90% of people in Japan reside in cities, with this figure expected to increase further in the years ahead. Yet, cities are beset with a host of environmental, economic, and social problems. One particularly serious challenge facing Japanese cities is that of declining population. Japan has been forced into a drastic review and policy turnaround on the issue of cities and urban planning, because the underlying assumptions of a growing population and economic development that prevailed in the decades after the war

no longer apply. Now that the country has been plunged into an era of intermittent population decline, it's not just that the concept of cities must be reexamined. We have reached the stage where it is necessary to study ways to actually reorganize Japan's cities.

Since the time of my doctoral studies I have set out to research the sustainability of cities. Even now I am thinking about what kinds of measures are needed to achieve sustainable cities. While my approach varies according to the theme, here is an introduction to some of the research I am working on at CEIDS.

1) Assessing "city convenience" in Suita City

The notion of a "compact city" has been proposed as a model for a sustainable city. I'll omit the details, but a compact city today is basically a city with a structure that allows people to live close to their workplace and to access most of their needs for life by walking, and which is linked to other cities by a public transport network. A declining population will make it difficult for the large sprawling cities of today to maintain their size and preserve the conveniences of life that we enjoy. To realize a compact city, it is necessary to increase the density of railway, bus, and other public transport nodes in districts' central cores, but in view of Japan's social and economic condition, it is hard to imagine creating new cities. There seems to be no alternative, therefore, to reorganizing existing urban centers. Given this scenario, the most obvious and efficient approach would be to utilize areas that are already quite dense and that offer a high level of convenience as core locations. It therefore follows that we need to determine the locations of current stores and the accessibility to trains and buses, and to evaluate them from the point of view of immediacy and accessibility. (See Fig. 1.) On the basis of this data, I am analyzing areas that have the potential to become central core nodes, with certain modified criteria such as using assessments that exclude railway-related indicators in order to put more weight on bus transportation, and assessments of cases in which the proportion of elderly people is

9-2. CEIDS Research Project (6): Development of analysis and assessment methods for realizing sustainable cities (2)

high in future population estimates, because people's walking speed decreases as they age. On the other hand, we cannot neglect subjective assessments based on what people choose and how they live. Even if a place is highly convenient in objective material terms, in reality it could be unsafe, or it might not provide desirable services and shops for residents. For this reason, I conducted questionnaire surveys on lifestyle convenience and living environment, and compared the results to that of assessments of hard infrastructures. In addition, I am organizing the data from my research findings and creating correlative links so that it can be used as a resource for urban planning formulation, for example to present to government bodies.

2) Volume study and attitude survey on city relocation in Kochi City

While the occasion of the Great East Japan Earthquake in 2011 helped many people appreciate anew the importance of interpersonal ties, it also stimulated considerable rethinking about the location of cities. I strongly believe that, particularly in cities at risk of massive devastation due to a tsunami following a major earthquake, relocation of the city should be considered as an option when thinking about a vision of the future. When it comes to relocation, however, people's circumstances vary, so a policy of gradual, progressive relocation over time should be considered, as opposed to a mass relocation. In fact, when I conducted a questionnaire survey in Kochi City, more people agreed with a plan to allow people to decide on relocation individually than with a plan for everyone to be relocated en masse under a national or local government directive. Also, more people agreed with a plan to relocate before an earthquake than after. (The option that the highest number of respondents agreed with was for everyone to decide individually to relocate before a tsunami. A total of 65.2% agreed with this option (those answering "Definitely agree" and "Tend to agree"), compared to 11.9% who disagreed (those answering "Definitely disagree" and "Tend to disagree"). (See Fig. 2.) In total, 73.1% of respondents stated that

in the event of a tsunami they would definitely migrate, or that they would migrate under certain conditions. For an individual to change their home and workplace requires a great deal of energy. Through this study, I analyzed the conditions for migration, which I think can be used to propose a plan that could at least somewhat mitigate the risk of disaster.

Cities have been shaped over many generations by the forebears of the people who live in them, and they will also shape the lives of their descendants for many generations to come. As I wrote at the beginning, I want to pursue research that takes the massive demographic turning point we are now facing as an opportunity to help shape cities, towns, and localities that are pleasant to live in and appealing. For this purpose, while continuing to conduct exhaustive assessments like that of the first study presented here, I am also planning to participate in real urban planning and development projects. Since cities are complex systems, their study needs to be approached from a wide variety of viewpoints. I've been pursuing this kind of research in collaboration with researchers from other fields, as well as people from the government and private sectors. So maybe I will have the opportunity to work with you in my research. If so, I look forward to your cooperation. Since most of us are residing and living in cities, I would be very happy to have the opportunity to hear your personal thoughts on the current state and future vision of our cities.

(Hiroyuki Takeda, Lecturer, Management of Industry and Technology, Graduate School of Engineering)

10. News from CEIDS

1 Co-authored paper selected as “editor’s choice” article by journal

The article below, co-authored by a CEIDS researcher, was selected as an “editor’s choice” article by the English-language journal Environmental Development (Elsevier).

(<http://www.journals.elsevier.com/environmentaldevelopment/editors-choice/>)

Kazutoshi Tsuda, Bi Hong Low, HayatoTakahashi, Keishiro Hara, Michinori Uwasu, Yasushi Umeda(2014)

Potential Accounting of Regional Biomass Resource Circulations in Japan : A Prospective on Regional Rural-Urban Partnerships, Environmental Development, Vol. 9, pp. 24-42

This paper, which analyzes and assesses biomass energy diffusion potential through the promotion of a rural-urban partnership in Japan, from both a technological and systems perspective, was rated highly for its multifaceted analysis.

2 Exhibition at the 18th Suita City Environmental Education Fair

The 18th Suita City Environmental Education Fair was held on Saturday January 31 at the May Theater in Suita City. CEIDS presented an exhibit titled “University research and education for realizing a sustainable society - from a collaborative initiative between Suita City and Osaka University.” CEIDS is pursuing a close research and education alliance with Suita City, and this exhibition is one expression of this partnership.

http://www.city.suita.osaka.jp/home/soshiki/div-kankyo/kankyoseisaku/oshirase/_60307.html.

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