

# FY2011 Debrief Meeting on Education and Research

Programs of the Graduate School of Environmental Science

Okayama University

Okayama University, Japan

## Feb.2 (Thurs.)

Place Okayama University  
International House Lounge

### PROGRAM

13:00~

Symposium on Exchange and Cooperation  
Programmes for Promotion and  
Development of the Education, Science and  
Technology, and Culture of Developing  
Countries in the Asia-Pacific Region

## Feb.3 (Fri.)

Place The Main Conference Room, 2F, Bldg.  
of the Graduate School of Natural Science  
and Technology

### PROGRAM

9:00~

Debrief Session of the Project  
Researches on "Environmental  
Rehabilitation in Asia"

## Feb.4 (Sat.)

Place The Main Conference Room, 2F, Bldg.  
of the Graduate School of Natural Science  
and Technology

### PROGRAM

9:50~

International Symposium on  
Environmental Science and Technology

## Feb.5 (Sun.)

Place The Main Conference Room, 2F, Bldg.  
of the Graduate School of Natural Science  
and Technology

### PROGRAM

9:30~

FY 2011 Debrief Session of the Practical Research  
and Education of Solid Waste Management Based  
on Partnership among Universities and  
Governments in Asia and Pacific Countries



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## 2-5 Debrief Meeting of the Project

Yasuhiro MATSUI

### SUMMARY

This Debrief Meeting was held as the third official event of the partnership project on education and research program “*Practical Research and Education of Solid Waste Management Based on the Partnerships among Universities and Governments in Asia and Pacific Countries*”. The meeting’s participants consisted of the staff and students of Okayama University who interested with the meeting’s contents and invited experts from collaborator countries who were engaged in the research themes of the project; such as China, Thailand, Vietnam, Malaysia, Indonesia, and Guam.

The objective of this meeting was to welcome presentations and encourage interchange discussions for the development of human resources for environmental rehabilitation in Asian countries, as well as the collaboration among Asian universities for the promotion of environmental science and education.

The Debrief Meeting had fourteen presentations in two sessions, eight presentations in morning session and six presentations in afternoon session. The meeting’s presenters consisted of eight staff of Okayama University and nine invited experts from collaborator countries; such as China (1), Thailand (1), Vietnam (3), Malaysia (1), Indonesia (1), and Guam (2). The contents and discussion of this meeting were summarized and presented as follows:

Firstly, Prof. Ken Yoshikawa, Director of Solid Waste Management Research Center, Okayama University, presented the opening address for the meeting.

The first presentation was entitled “*Waste Recycling Activities in Hanoi City – Vietnam*”, presented by Associate Professor Nguyen Thi Kim Thai of University of Civil Engineering, Vietnam. She introduced the status of waste management in Hanoi, Vietnam (including daily collection amount, waste composition, and waste flow); especially waste recycling activities by the traditional craft villages and the central composting plants. The presentation also discussed the success and risk of the current waste recycling activities.

Dr. Pham Khac Lieu, Mr. Tran Ngoc Tuan, and Ms. Le Vu Khanh Hoa of Hue University of Sciences, Vietnam made their presentation entitled “*A Survey on Informal Sectors Handling Recyclable Wastes in Hue city, Vietnam*”. The presenter introduced the general solid waste management in Hue city, the brief summary of their researches during period (2011 – 2012) relating to “*informal sectors for recyclable wastes*,” entitled “*A Study on Material Flow of Recyclables Handled by Informal Sectors and their Operational Efficiencies in Hue*”. The objectives of this research were to draw the material flow of recyclables handled by informal sectors, to collect the basic data on operational efficiency of informal sector and official sector, to estimate the operational efficiency of informal sector and official sector, and to analyze the factors affecting operational efficiency. They also presented some preliminary survey results, raising problems during surveys, and future surveys and studies.

Associate Professor Yasuhiro Matsui, Ms. Do Thi Thu Trang, and Dr. Nguyen Phuc Thanh of Okayama University made their presentation entitled “*Commercial and Institutional Solid Waste Generation and Relevant Factors: Case Study in Tourism city - Hue, Vietnam*”. The objectives of this presentation were to estimate the unit waste generation rate (kg/unit/day), to estimate the physical composition of waste in order to identify the recycling potential and the greenhouse gas emission, and to explore the correlation between waste generation and exanimation factors. The presenter introduced the outline of research surveys and applying methodologies, and the preliminary analysis and discussion of practical surveys.

Ms. Tran Thi Tu of Institute of Resources, Environment and Biotechnology - Hue University, Vietnam implemented the presentation entitled “*A Study into Adsorption of Dye from Aqueous Solution by Peat*”, and introduced the outline of experiments’ methodologies (material, analysis methods, experimental setting). The objectives of this study were to describe the proper conditions for handling dye in aqueous solution by peat and to set the dynamic equation of dye adsorption by peat.

Associate Professor Azhar Uddin, Ryota Ichida, Associate Professor Morihiro Maeda and Kazuki Miyamoto of Okayama University made their presentation entitled “*Development of Technologies for Utilization of Agricultural and Forestry Wastes: Preparation of Biochar from Coconut Husk and Rice Husk*”. The aim of this work was to develop technologies that can be used to utilize agricultural and forestry wastes (especially from coconut husk and rice husk) by converting them into source of energy such as fuel oil and gas and solid biochar. The specific aim of this research project was to develop the preparation method for high quality biochar with the suitable properties for soil conditioning. The presentation introduced the results on evaluation of biochar from coconut husk and rice husk; including effect of pyrolysis temperature on the development of specific surface area of the biochar, water adsorption capacity of the biochar, pH and elemental/nutrient composition, the emission of CO<sub>2</sub> from the mixture of soil and coconut husk biochar.

Associate Professor Morihiro Maeda, Kazuki Miyamoto, and Associate Professor Md. AzharUddin of Okayama University; and Satoshi Hayashi and Riei Yokoyama of Nisshoku Corporation presented their presentation entitled “*Characteristics of Biochar Materials Produced from Coconut Shells and Rice Husks for Soil Application*”. The presentation discussed the characteristics (e.g., pH, EC, major elements, NO<sub>3</sub>-N, NH<sub>4</sub>-N, PO<sub>4</sub>-P, SiO<sub>2</sub>-Si, Cation exchange capacity) of biochar materials produced from coconut shells and rice husks by different conditions and solutions. Research plans in FY 2012 by pot experiments for in both Japanese and Vietnamese climate and soil conditions were introduced.

Professor Jianhua Li of Tongji University, China made his presentation entitled “*Characteristics of River Ecosystem and Fish Biodiversity Conservation in Changjiang River Basin*”. The objectives of this work were to clarify the fish fauna and aquatic plants flora in the East Tiaoxi River, to identify patterns of association between fish communities and habitat variables, to review the main threats to fish biodiversity, and to present recommendations for aquatic biodiversity conservation. The presentation also discussed the survey results on the relationship between fish community and environmental variables, such as turbidity, emerged plants, submerged plants, floating plants, etc.

Assistant Professor Takehito Ujihara and Professor Hirofumi Abe of Okayama University made their presentation entitled “*Developing of Indicators for the Establishment of a Sound Material-cycle Society : China’s Sustainability Assessment based on Decoupling Concept: by using Ecological Footprint*”, and introduced the concept of Ecological Footprint, the results of researches during period (2010.4 – 2012.3), and the future research plans. The presentation presented the results on the association between China’s ecological footprint and economic growth; the regional ecological footprint in China was calculated and compared by a time-series (1995-2010) analysis and decoupling analysis. The future research will be focused on evaluations for the environmental balance based on the environmental loads and the region’s capacity and the measures for a sound material-cycle society.

Professor Yukitaka Kimura of Okayama University made his presentation entitled “*Utilization of Subcritical Water to Separate Components of Biomass - New Application for Complete Availability of Wood Biomass-*”. The presentation introduced the elements and compositions of shell of walnut, the characteristics of subcritical water, the outline of methodology for preparing foam plate, and the possibility for complete availability of wood biomass using subcritical water.

Professor Mari Marutani of Guam University; Professor Yukitaka Kimura and Daisuke Miyaji of Okayama University; and Associate Professor Yoshiro Kishida of Okayama shoka University made their presentation entitled “*Utilization of Food Waste for Agricultural Applications in Guam*”, and introduced the results of the second year research project on the collaborative research and education activities between Okayama University and the University of Guam. The objectives of this research were to organize the field visits to food waste management system in Japan for Guam representatives and to construct a pilot food waste processing system to produce local animal feeds and composts in Guam. The outcomes of this research were a pilot study on collection of waste oil will be conducted in February at Dededo and studies on compost have began and continued to do chemical analysis and to establish suitable composting systems in Guam.

Associate Professor Mohammad Golabi and Professor Kirk. Johnson of University of Guam, Guam-USA and Professor Takeshi Fujiwara and Eri Ito of Okayama University presented their presentation entitled “*Waste Generation in the Island of Guam – A Cooperative Research Project with UOG and the Okayama University in Japan - Phase I: the Survey*”. The presenter introduced activities during their first visit (including lectures, seminars, and field visits at waste composition sites, composting sites, various landfills, gasification plants, and incineration plants) and the questionnaire survey. The contents of this survey included the attribute of head of household, the respondents’ awareness about waste collection systems, waste generation and separation, and the respondents’ willingness to participate in recycling programs. The outline of questionnaire survey and preliminary results were presented and discussed.

Associate Professor Hideaki Nagare, Pham Thi Minh Duc, and Takumi Iwata of Okayama University and Assistant Professor Satoshi Akao of Tottori University made their presentation entitled “*Treatment Process of Wastewater from Milking Parlor*”. The objective of this work was to develop a small and inexpensive process of wastewater from Milking Parlor for small farmers. They introduced the outline of experiments, treatment process procedure, and results for laboratory scale experiments of developed process.



Professor Yuji Takeshita and Associate Professor Mitsuru Komatsu of Okayama University made their presentation entitled *“Parameter Estimation for Numerical Analysis of Groundwater Seepage and Mass Transport in Final Disposal Site”*. The objective of this study was to estimate parameters of groundwater seepage and mass transport in final disposal site by numerical analysis. The authors introduced and explained the measure’s methodology, experiments, analyses, and experimental results of two approaches: determination of effective porosity of porous media by using FDR and determination of dispersion coefficient by tracer test (FDR sensor, Soil moisture / EC Sensor on the market).

Associate Professor Orawan Siriratpiriya of Chulalongkorn University, Thailand presented her presentation entitled *“Disposal Technique of Domestic Sewage Sludge in Yield Increment with Safe from Heavy Metals and Pathogenic Organisms”*. The presenter introduced the generation rate (tons/day), compositions of domestic sewage sludge as well as the justification for utilization in agriculture in Thailand with safe for both heavy metal and pathogenic organisms. The presentation also presented the experiment results and discussion.

Professor Enri Damanhuri of Institut Teknologi Bandung, Indonesia made his presentation entitled *“Mass Reduction of Residential Waste in Composting Process”*. The objective of this study was to evaluate mass reduction by composting process at transfer points. The presentation introduced the outline of experimental research and discussed the preliminary results.

Professor Takeshi Fujiwara of Okayama University and Dr. Mochammad Chaerul and Professor Enri Damanhuri of Institut Teknologi Bandung, Indonesia implemented their presentation entitled *“Evaluation on the Effect of Waste Separation by Household on Waste Recycling in Bandung City”*. The presentation introduced the cooperation research activities in FY 2011 between two universities (Okayama University and Institut Teknologi Bandung) and the outline of present research. The objectives of this research were to clear the difference in environmental impact and economy between current solid waste management and solid waste management based on separate collection, to evaluate the effectiveness in introducing incinerator plant and methane fermentation plant, and to predict of the change in recycling society composed of scavengers, collector, trader, dealer.

Professor Agamuthu Pariatamby of University of Malaya, Malaysia presented his presentation entitled *“Disaster Waste Management: Challenges and Solutions”*. The objectives of this presentation were to discuss the disaster waste management focussing on the issues and challenges faced by countries during and after a disaster episode and to recommend solutions as to mitigate the problems arising from disaster waste management via 3 case studies.

The discussion topics were as follows; the current status of recycling activities, such as traditional craft villages and central composting plans as well as informal sectors (to Associate Professor Nguyen Thi Kim Thai); the material flow of recyclables handled by informal/official sectors and their operational efficiencies for developing master plans for 3Rs promotions (to Dr. Pham Khac Lieu); the methodology and preliminary results for estimating the unit waste generation rate, physical compositions, and relevant factors influencing waste generation rate of commercial and institutional sectors (to Associate Professor Matsui); the data collection methodology, existing basic database, and potential of food waste utilized for agriculture application (to Professor Mari Marutani); the research’s methodology on waste generation by

questionnaire survey and achievements (to Associate Professor Mohammad Golabi); the development and application of the preparation methods for high quality biochar (from agricultural and forestry wastes, especially from coconut husk and rice husk) with the suitable properties for soil conditioning (to Associate Professor Azhar Uddin); the characteristic of biochar materials produced from coconut shells and rice husk and the possibility of application in agriculture purpose (to Professor Kimura); the methodology and experimental conditions for preparing foam plate and possibility for complete availability of wood biomass using subcritical water (to Professor Yukitaka Kimura); the experimental methodology and achievements of the proper conditions for handling dye in aqueous solution by peat, the dynamic equation of dye adsorption by peat, and the significant indicator (parameter) for high potential dye adsorption by peat (to Ms. Tran Thi Tu); the methodology and experiments for developing a small and inexpensive waste water treatment process from milking parlor (to Associate Professor Nagare); the association between fish biodiversity and fish ecosystem (to Professor Jianhua Li); the methodology, experiments, analysis, and application for estimating parameters of groundwater seepage and mass transport in final disposal site by numerical analysis (to Professor Yuji Takeshita); the quality and characteristic of domestic sewage sludge, toxicity and environmental impacts, the possibility of application in agriculture (to Associate Professor Orawan Siriratpiriya); the calculation methods of waste generation and the preparation and mitigation for problems arising from disaster waste management (to Professor Agamuthu Pariatamby); the composting processes, control parameters, and optimum operation condition for reducing mass of residential waste (to Professor Enri Damanhuri); the methodology for estimating and modeling the effect of waste separation by household and the effectiveness in introducing incinerator plant and methane fermentation plant (to Professor Fujiwara); the association between ecological footprint and economic growth, what is the significant signal for evaluating a case study (good or not good)? (to Assistant Professor Ujihara);

At the final presentation, Prof. Takeshi Fujiwara, Vice Director of Solid Waste Management Research Center, Okayama University, presented the wrap-up discussion for the debrief meeting. He evaluated the project activities of this year. Education was the most important objective of the project; especially to increase number of exchange students and professors among collaborator countries as well as to grow up the international human resource for collaborator countries (students will easy find appropriate job at international fields). For researches, because this project is the practical research project, we welcome presentations relating to practical researches by participants in next meeting. For cooperation, the Solid Waste Management Research Center (SWMRC) of Okayama University has been keeping the role of bridge as the “partnership” aiming at developing elite human resources in the Solid waste research field to conduct practicable research for taking solid waste problems, with the collaboration of partner universities from Asia-pacific regions, local authorities in foreign countries where serious solid waste problem occur, and Japanese local authorities. For outcomes of the project, in last year we have combined project’s activities and achievements in a report, and this year we also summarize reports and try to publish as a book and distribute to relating universities. Next, Professor Hirofumi Abe, Vice President, Okayama University, introduced the outline and target of the new project which we (SWMRC) are applying.

The final discussion was chaired by Professor Takeshi Fujiwara of Okayama University, and the suggestions and comments from participants were as follows:

- ✓ Professor Agamuthu Pariatamby, University of Malaya, Malaysia: In our project, education and research activities can implement without MOU between Okayama University and collaborator universities. The limitation of MOU is short effect time (one year or five years).
- ✓ Professor Orawan Siriratpiriya, of Chulalongkorn University, Thailand: We can continue our project activities: student exchange and researches by more research directions without MOU. If possible we should draw out the outline and expected outcomes/achievements of whole project as well as for each participant.
- ✓ Associate Professor Nguyen Thi Kim Thai of University of Civil Engineering, Vietnam: Regarding to the outcomes of project, the report for last year was very good; however, we would like to publish our outcomes as full-paper or research paper in an integrated book/report to share and transfer full knowledge and experience for relating developing countries.
  - Professor Takeshi FUJIWARA: The report of last year was only a summary for project activities and meeting presentations of participants. Next year, we would like to publish a completed report or book; so, if you have any academic/research papers concerning our research project, we can combine those into the next year report.
- ✓ Professor Enri Damanhuri of Institut Teknologi Bandung, Indonesia: Regarding to student exchange, the exchange time from 5 days to 1 week is rather short for study purpose, one semester exchange is better. The students can take some subjects/course at the visited universities. However, we must think about the compatibility of the education system among universities. Why we do not think a double degrees for exchange students (for example, master students study one year in collaborator universities and one year in Okayama university, Japan).
  - Professor Takeshi Fujiwara and Professor Hirofumi Abe: We will think and try to apply for future project.
- ✓ Professor Jianhua Li of Tongji University, China: Regarding to research system, we should introduce practicable and applicable researches as join researches between Japan and collaborator universities. We also think research projects as technique transfer.
- ✓ Professor Mari Marutani of Guam University: Regarding to student exchange program, the credit system of education of Guam University is compatible for providing credit certificate when students exchange to Guam University. This education cooperation system can be designed based on the discussion among universities. The project's budget could not be held by Guam University for short time researches and student exchange programs in Guam; because the budget had been spent by Japan University; this is a limitation in her case. How she control researches and project activities in next year?
  - Professor Takeshi Fujiwara: For the project's budget, that is the Japanese policy for this project system.
- ✓ Ms. Tran Thi Tu of Institute of Resources, Environment and Biotechnology - Hue University, Vietnam: She came here as a researcher exchange, a collaborator with a professor of Okayama University in this project. This time she also had field visits in Japan, She believed that this program will give her opportunities to improve her knowledge and possibility.

Finally, Professor Takeshi Fujiwara, Vice Director of Solid Waste Management Research Center, Okayama University, presented the closing remarks for this debrief meeting.



