

Newsletter



University of Malaya-Kyoto University
Secretariat



JSPS Asian Core Program

Research and Education Center for the Risk Based Asian Oriented
Integrated Watershed Management

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The 5th Comprehensive Symposium (CS5) was held successfully at ROHM Plaza, Graduate School of Engineering, Kyoto University (Katsura Campus) Japan on 19 - 20 November 2015. Forty six participants from Malaysia and 51 participants from Japan attended the symposium.

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- a) CS5 Gift exchange ceremony, **Dato' Seri Ir. Dr. Zaini Ujang** (Secretary-General Ministry of Higher Education, Malaysia) on the left and **Prof. Shinzaburo Ito** (Dean of KU Graduate School of Engineering) on the right.
 b) **Prof. Nik Meriam, Dato' Seri Ir. Dr. Zaini** and **Prof. Yoshihisa Shimizu** (left to right).
 c) Sharing the moment among the Malaysian researchers and **Dr. Yukiko Kada** (Former Governor of Shiga Prefecture)

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JSPS Asian Core Program 5th Comprehensive Symposium (CS5)

19 - 20 November 2015

ROHM Plaza, Graduate School of Engineering, Kyoto University at Katsura, JAPAN

As one of projects of the JSPS Asian Core Program, which is co-organized by core institutes in Japan and in partner countries, the Kyoto University Graduate School of Engineering and University of Malaya have been working on a joint project called "Research and Education Center for the Risk Based Asian Oriented Integrated Watershed Management". Its fifth and final Comprehensive Symposium was held at the ROHM Plaza on the Katsura Campus, with a total of 97 participants, 51 from Japan and 46 from Malaysia.

On the first day, an opening session was held in the morning, which started with a welcoming address by Professor Shinzaburo Ito, Dean of the Kyoto University Graduate School of Engineering. Professor Ito expressed his hope for maintaining the cooperative relationship between Kyoto University and University of Malaya. This was followed by three lectures from Dato' Seri Ir. Dr. Zaini bin Ujang, Secretary General of the Ministry of Higher Education, the Government of Malaysia; Professor Yoshihisa Shimizu, Kyoto University Graduate School of Engineering (Japan Coordinator); and Professor Dr. Nik Sulaiman, University of Malaya (Malaysia Coordinator). At the end of the morning session, members of each research and education group gathered for a group discussion. In the afternoon session, the group leaders presented their research achievements alongside 65 poster presentations. The first day concluded with a lecture by Dr. Yukiko Kada, President of Biwako Seikei Sport College and former Governor of Shiga Prefecture, offering participants further knowledge about Lake Biwa.

On the second day, following a special lecture by Dr. Zaini, the two coordinators reflected on the project achievements in the last five years and reaffirmed intentions to continue joint activities after the completion of this project. At the closing session, the award for excellence was given to superior poster presentations, concluding the symposium on a high note.

On the last day, participants from Malaysia took a tour to Okishima Water Treatment Center in Lake Biwa. They learned on-site about efforts that local residents make to manage water quality, and gained an outlook about their way of life and culture.



a) Prof. Yoshihisa Shimizu delivering his address during the CS5 opening session.

b) Dato' Seri Ir. Dr. Zaini Ujang delivering his address after the welcome remarks by Dean of Graduate School of Engineering, Kyoto University.

c) Prof. Dr. Nik Meriam Nik Sulaiman, the Malaysian Coordinator delivering her address during the CS5 opening session.

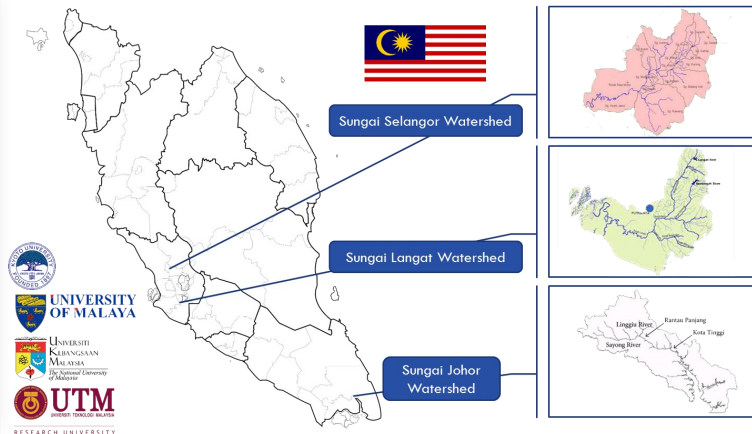
d) Prof. Yoshihisa Shimizu introducing the CS5 Keynote Speaker **Dr. Yukiko Kada** the former Governor of Shiga Prefecture.

e & f) The Heartware Group sharing the moment with **Dr. Yukiko Kada** and introducing the wearing of Malaysian batik sarong.



JSPS Asian Core Program

Research and Education Center for the Risk Based Asian Oriented Integrated Watershed Management



Group discussion on the first day of CS5 (19 November 2015).



Tour to Okishima Water Treatment Center at Okishima Island in Lake Biwa (21 November 2015). During the tour, delegates paid a visit to Saifuku-ji Temple in the island and history of the island were explained by Master Bunyu Chatani. The island community are so generous by preparing delegates lunch meals at the island community hall.



Outstanding Poster Presentation Award (out of 65 posters) was given to selected participants (Malaysian and Japanese) of CS5.



Cooperative Research Program (CRP)-Malaysian: Short Term International Student Attachment at Kyoto University

10 - 11 November 2015
Kyoto University, JAPAN



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Introduction

On November 2015, we are lucky enough to be selected as a short term international student for the graduate program of Graduate School of Engineering, Kyoto University. The invitation is extended by none other than the renowned Professor Yoshihisa Shimizu; our program host scientist. The duration of the program is from 10/11/2015 – 18/11/2015 which included an internship program with Kyoto University; in particular with Research Center for Environmental Quality Management (RCEQM) where we are given an opportunity to experience life as a student in Japan for a good few days.



Activities

Our first day of the program starts with a visit to fish waste recycling center, 'Osakana Eco kan'. We were joined by the delegates from Tsinghua University, China and a number of Kyoto University graduate students. In Kyoto City, they have a very systematic separation of wastes as fish bones and unused parts of fish from markets, restaurants, eating places, malls and even houses is collected and send to the recycling center. The recycling center is solely to facilitate recycling process of fish waste into two end products; fish oil and chicken feed in powder form. We were very impressed with the cleanliness as being a closed environment; the recycling center is free from strong fish odor. It's demonstrates the effectiveness of Japanese technology and also their working culture in keeping things sanitized. After the visit to the fish waste recycling center, we were having our lunch at AEON Mall in Gojo where later was slotted into a visit to waste separation and recycle unit of the mall. Once again it proves the culture of Japanese regarding cleanliness as the facility is kept tidy and with no strong smell of wastes. The last study trip for the day was a visit to Keage Water Purification Plant. We were told that the purification plant is the oldest in Kyoto and is responsible to purify water to be distributed to the Kyoto and Osaka city. The water resource is coming from Lake Biwa through a manmade canal designed by none other than Kyoto University professor hundreds year ago. The canal system is cut through a hill which separated Lake Biwa and the purification plant. We were mesmerized by the scenic view as the purification plant is located atop of a hill with a view of Kyoto City spreads in front of us. The day ended with a visit to Nanzenji temple; one of popular tourist spot in Kyoto for sightseeing.

Nilam & Haslina in front of RCEQM in Otsu, Shiga

Remarks

"First and foremost, thank you to Prof. Yoshihisa Shimizu for having us at Kyoto University and RCEQM, Dr. Siti Nurmaya Musa of Faculty of Engineering, UM for the shared knowledge and advices, Mr. Taishi Yazawa, Mr. Takashi Kondo, Ms. Fern, Mr. Ryosuke Homma and all our new friends at Kyoto University and RCEQM for entertaining and helping us while we are there. And also thank you to all the professors at RCEQM and Kyoto University. Not to forget a heartfelt gratitude to UM-ACP secretariat, En. Azizi Abu Bakar who went to great length to process our application and matters related to our visit to Kyoto University, Japan.". Arigato gozaimasu all for the hospitality, generosity and memorable experiences!!



For our second day, we attended the '1st International Workshop on Environmental Issues for Young Students and Researchers by Young Students and Researchers' organized by the postgraduate students of Kyoto University itself. The workshop was held at the Kyoto University's Katsura Campus. Participants for the workshop were a master and doctoral students from Kyoto University, University of Malaya, Tsinghua University and Universiti Teknologi Mara. It is a session to share various research fields conducted by these universities related to the environmental studies. The workshop also provides a platform for young researchers like us to present our research output and outcome. Later on, dinner was held in the evening for further networking session and we were joined by some of prominent Kyoto University professors. We were taking the opportunity to try various kinds of Japanese food and delicacies and also mingled around with the students.

Our third day is a slot to visit RCEQM facilities together with delegates from Tsinghua University, UiTM and a group of visitor from Vietnam. The day began with a short introductory briefing of the RCEQM history by Professor Hiroaki Tanaka. After the briefing, we were toured around and visited the laboratories inside the RCEQM building. Afterwards, we were taken to the Otsu Sewage Treatment Plant, located next to the RCEQM. This sewage treatment plant is also becoming some sort of living lab as RCEQM placed students to conduct research experiment here.



View from the outside of the 'Osakana Eco kan'



Visiting the RCEQM laboratories

The rest of the days during our stay in Japan were filled with series of discussion with students and faculty members at RCEQM. The topic of discussion is mainly focused on the management of the Selangor River's watershed. We received a lot of valuable feedbacks and suggestions during our interaction with the Japanese counterparts that can be used in our research regarding Sungai Selangor's watershed management. We were also helped in the preparation of JSPS-ACP 5th Comprehensive Symposium scheduled to be held on 19-20 of November 2015 on our last day with RCEQM.



A group photo with delegates from Japan, Malaysia and China after the graduate students workshop



Photo moment at Keage Water Purification Plant after the study trip



Cooperative Research Program (CRP)-Japanese: Field Survey and Technical Visit for the Understanding of Water Service Situations in Selangor River Watershed

October 2015

Selangor, MALAYSIA



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Introduction

Selangor State, the most urbanized and industrialized state in Malaysia, has difficulty in satisfying a huge water demand from natural water resource. In Selangor River Watershed, HORAS project, utilizing ex-mining ponds and groundwater, as well as two dams (*i.e.* Selangor Dam and Tinggi Dam) is expected to mitigate the water shortage issue in the future. On the other hand, the precious water resource (*i.e.* Sg. Selangor) has been polluted by anthropogenic activities, which results in harming water safety for the residents and causing other issues. Therefore, we conducted the field survey of such pollution sources and the technical visit to water treatment plant. The objective of this investigation was to develop the understanding of water treatment service situations in Selangor River Watershed.

Activities

Investigation of Livestock Farms

Chicken feces are utilized as organic fertilizer for agricultural lands. These feces are able to be transported into rivers with surface runoff, which causes microorganism contamination. Therefore, several poultry farms were investigated for the understanding of pollution sources of Sg. Selangor, which were indispensable water resource for the residents in Selangor state. As the demands for eggs and chicken meat increase, modernized and efficient breeding system has been employed in Malaysia. The closed style breeding system (Fig. 1) facilitates the growing of chickens due to the controlled lighting time. The farmers can keep chickens awake and eating for longer time than ones in open houses by turning the light on for long time such as 15 hours. After one cycle of breeding, the empty houses were cleaned and dried up to prevent disease for a while (*e.g.*, one month).

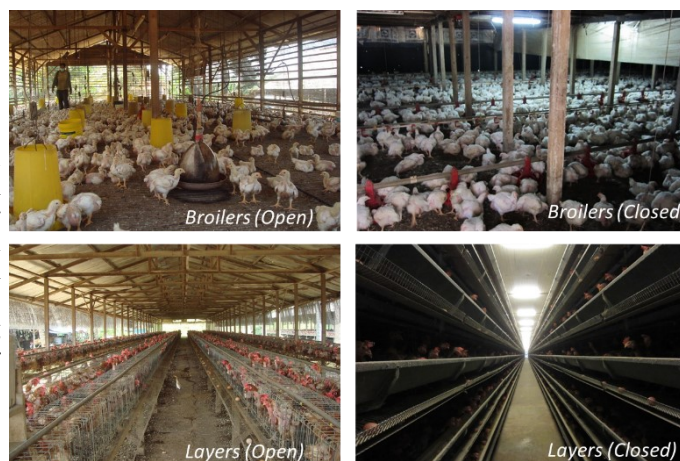


Fig. 1 Open and Closed Houses for Poultry



Composting of chicken feces was conducted at relatively huge and modernized farms, where 1.3 billion, 400 million and 300 million heads of layers were bred at respective farms. Only the biggest farm employed the machine operations, namely, advanced aerobic bio-fermentation process to produce bio-organic fertilizer. The other farmers placed collected chicken feces on the ground at composting sites, where a deadly odor was emitted (Fig. 2), and dried them up for 5-7 days. The bio-organic fertilizer was said to be free from odor and pathogen and contain much nutrient. However, the price was much higher than common fertilizer of chicken feces without any treatment. According to the interviews, the bio-organic fertilizer was sold for 380 RM per metric ton, while the common chicken feces were usually sold for 50 RM per metric ton. The products were mainly purchased by distributors and transported to Cameron Highlands.



Fig. 2 Composting Sites for Chicken Faeces

Technical Visit to Water Treatment Plant

Sungai Selangor Phase 2 Water Treatment Plant (SSP2 WTP) was investigated and we interviewed some officers on 24th October 2015. SSP2 WTP is one of the biggest treatment plants which are indispensable for satisfying a huge water demand in Selangor state. A rapid sand filtration system, namely, Actiflo system is employed in SSP2 WTP. This system can treat highly turbid water in relatively short time. Highly turbid raw water (7,000-9,000 NTU at the peak flow and 100-300 NTU at normal flow) is able to be treated to less than 1 NTU using the process. The river water pumped up from the water intake points is transported to aerators where Alum (aluminum sulfate) is mixed as a coagulant. The supernatant is overflowed into the Actiflo tanks which adopts a high speed micro-sand settling system. Afterwards, the supernatant is transported into a sand filtration, and then a disinfection process takes place in clear water tanks by contacting chlorine and fluoride for 30 minutes.

A huge amount of sludge produced in SSP2 WTP could cause a significant problem. The produced sludge from the WTP is settled down at wastewater recovery tanks (six tanks in total) for thickening the sludge. After the tanks, it is transported to sludge lagoons (100 m³/day in total). The plant had eight sludge lagoons (the half was on duty and the rest was in stand-by) of which the capacity is 260,000 m³ for each. The produced sludge is stored at the lagoons for 1.5 years. Water quality of the effluent from the lagoons is monitored every day. After 1.5 years, the sludge is dried up for six months and transported to dumping sites. The sludge contains a large amount of aluminum due to the coagulant and has been registered as SW 204 (Scheduled Waste 204) by the Department of Environment Malaysia (DOE), so it shall be disposed of at the dumping sites approved by DOE. The regulations has made the costs to dispose of the sludge more expensive and spaces for the expansion of dumping sites would gradually become limited. Based on the statistics by SPAN*, the total amount of sludge produced from the whole WTPs in Malaysia (462 WTPs where 11,536 MLD of water was treated) was 5,500 metric tons per day. In other words, the higher SS concentration in river water results in the larger amount of sludge production. Therefore, the SS load needs to be reduced for sustainable water supply in the future.



Fig. 3 Photo session in front of the Poultry House

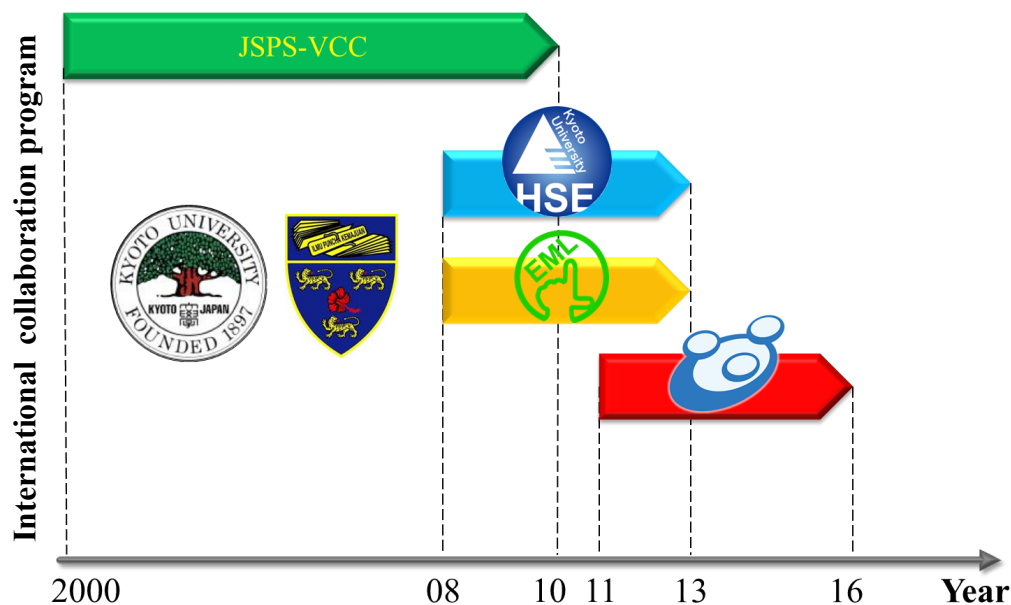
- ◆ National Water Services Commission (2010), Malaysia Water Service Industry & Water Treatment Sludge Issues, Malaysia-Japan Economic Partnership Program, Malaysia

Conclusion

The modernization and expansion of poultry industry was observed during the surveys of livestock farms. However, the effective treatment of chicken feces had been still uncommon in Selangor River Watershed, which would harm human health by the water quality deterioration of the important water resource. The further monitoring and regulations for the treatment and/or utilization of chicken feces are necessary. In case of water treatment situations at SSP2 WTP, the sustainable operation of the plants was threatened by high SS concentration of river water. The produced sludge is regulated by DOE, hence the disposal of it could cause serious land conflict because of the limited dumping sites. In summary, the field survey and technical visit revealed that water treatment situation in Selangor River Watershed was threatened. In the watershed, a holistic and sustainable management strategy (e.g., cost management) is needed to be discussed for the sustainable utilization of river water.

Message from Supervisor

"The main author of this article, Mr. Kondo, is, in March 2016, graduating the master course of Department of Environmental Engineering, Graduate School of Engineering, Kyoto University, Japan. I have been supervising him for last three years including a year in his undergraduate. For last three years, he has visited so many times and relatively long periods in Malaysia. With these experience in Malaysia, he decided to have his first career In JICA (Japan International Cooperation Agency). I would like to say to him, "Good Luck!" and also "Congratulations!". "He will be married in this March".



Programs and its duration under international collaboration between Kyoto University and University of Malaya

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