Japan-ASEAN Science, Technology and Innovation Platform (JASTIP)
Report of JASTIP-Net Activity

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<table>
<tr><td rowspan="5">1. Research partner</td><td colspan="2">Affiliated Organization</td></tr>
<tr><td>Name</td><td>Yoshihisa Shimizu</td></tr>
<tr><td>Affiliation</td><td>Graduate School of Engineering, Kyoto University</td></tr>
<tr><td>Position</td><td>Professor</td></tr>
<tr><td>Address</td><td>Research Center for Environmental Quality Management, Kyoto University
1-2 Yumihama, Otsu, 520-0811, Japan</td></tr>
<tr><td>2. Collaborative research</td><td>Collaborative research theme</td><td>Headquarters
☐ To Develop Operational Linkages and Human Resources among Academic Sector, Government Agencies, and Private Sectors in ASEAN countries and Japan.
■ To Introduce Various STI Collaborations for Effectively and Efficiently into the Society based on the three joint laboratories' activities.

Energy & Environment Joint Lab
☐ Studies on Rural/Community Renewable Energy.
☐ Development of Renewable Energy Technology adapted to the ASEAN region.
☐ Studies on Energy Policy/Security in the ASEAN region.

Bioresources & Biodiversity Lab
☐ Studies on Biodiversity in the ASEAN Region Contributing to the Improvement of Identification, Collection and/or Information.
☐ Sustainable Utilization of Bioresources for Biorefinery, Bioremediation, Wood Construction, Food or Medicine.
☐ Plant Improvement for Agroforestry Systems and Carbon</td></tr>
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		Sequestration Contributing to the Mitigation of and/or Adaptation to Climate Change. **Disaster Prevention Joint Lab** ☐ Innovative Ideas on Disaster Prevention, Mitigation and Recovery Technologies and Policies Peculiar to Each ASEAN Country. ☐ How to Cope with Trans-Boundary Disasters in the ASEAN Region Such as Tsunami, Flood, Drought and Haze. ☐ Understanding and Quantitative Evaluation of Disaster Risks Peculiar to ASEAN Countries.
	Collaborative research title	Introduction of New Engaging Way for STI Collaborations to the Society in the ASEAN region: Development and Dissemination of Urine-diverting Dry Toilet for Securing Sanitation in Disaster and Emergency Situations
	Host core-researcher	

3. Members

Name	Yoshihisa Shimizu		
Affiliation	Graduate School of Engineering, Kyoto University	Position	Professor
Name	Hirohide Kobayashi		
Affiliation	Graduate School of Global Environmental Studies, Kyoto University	Position	Associate Professor
Name	Hidenori Harada		
Affiliation	Graduate School of Global Environmental Studies, Kyoto University	Position	Assistant Professor
Name	Taketoshi Kusakabe		
Affiliation	Graduate School of Engineering, Kyoto University	Position	Assistant Professor
Name	Ayako Fujieda		
Affiliation	Kyoto University, University Research Administration Office	Position	URA
Name	Taro Sonobe		
Affiliation	Kyoto University, University Research Administration Office	Position	URA
Name	Monsinee Attavanich		
Affiliation	King Mongkut's Institute of Technology Ladkrabang	Position	Lecturer
Name	Kridsada Pollasap		
Affiliation	Greenspace Architect		
Name	Chanon Punnatrakul		
Affiliation	Greenspace Architect		
Name	Nitipat Chitavornrat		
Affiliation	Greenspace Architect		

4. Report of activities

Please describe 1) research activities and major findings and 2) their academic and social implications toward achieving the SDGs within 2 pages. You can include tables, figures and photos if necessary.

■ Background

Because securing sanitation was one of the great concerns after the Great East Japan earthquake of 2011, we developed a disaster-responsive portable toilet unit modeled after urine-diverting toilets (UD toilet unit)*1. The unit, which separates urine and feces, was produced from ready-to-assemble plastic cardboard, which facilitates transportation and stocking. Although 54 units had been provided to the disaster-affected areas of East Japan, where they have been evaluated positively and

acquired for future preparedness, we had not reached a point where we bring it to market. The purpose of this research is to make the UD toilet unit more accessible to public and to disseminate the idea beyond Japan by developing PR material as well as by utilizing the web platform

*1 Supported by Research Institute of Science and Technology (RISTEX)-Japan Science and Technology Agency (JST)

■ Activities

The research includes two parts: 1 improvement of the UD toilet unit to make it more accessible to public and 2 dissemination the idea of UD toilet unit beyond Japan by development of PR material.

1. Improvement of UD toilet unit

1-1 Evaluation of an existing model

By the end of August 2016, a Japanese company has developed a product to sell based on our idea we developed after the Great East Japan earthquake. We re-examined the product and identified two factors need to be improved; price and usability.

Fig 1. UD toilet unit developed after the Great East Japan Earthquake

1-2 Establishment of new partnership

In order to improve two factors mentioned above, we sought a new partner who would understand the concept and would have ability to bring new design ideas and to create a product and decided to collaborate with a group of designers in Thailand.

Fig 2. Modification of design with designers in Thailand

1-3 Development of plot type

Since December 2017, the initial prototype has been developed, where the design was modified to be easier to assemble with cardboard. By using cardboard instead of using plastic cardboard or specialized cardboard, the cost has been lowered though it needs to find other way to ensure waterproofing property in the next step. By the end July 2107, the second prototype was developed, where the detail was modified and the design was finalized (Fig. 3 and Fig. 4)

Fig 4. Plot type design

2. Dissemination of the idea

In order to disseminate our idea of UD toilet unit, PR material, 1 to 2 minutes animation, which introduces the concept and technology of UD dry toilet was created. The team members and animation creators have had meetings to specify the message and the target we want to deliver. The short movie was completed. https://www.youtube.com/watch?v=nQ66vJ9pqA4

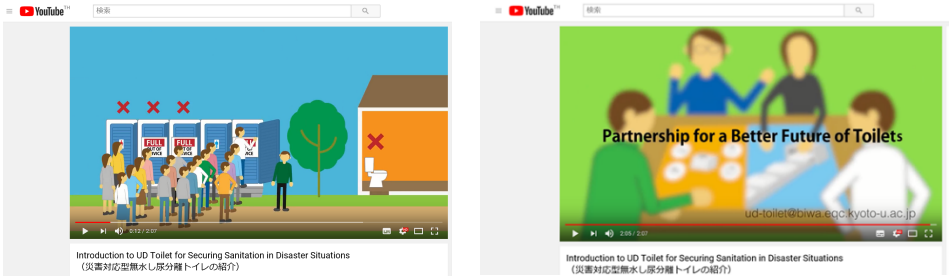

Fig 5 PR animation

■ Toward achieving the SDGs

A solution to secure sanitation in disaster affected area

Sanitation was one of the issues of most concern after the Great East Japan earthquake. To help cope with this problem, we developed a unique portable UD toilet unit and introduced it in the affected area. In order to bring it to market, we have engaged in a work to make the UD toilet unit more accessible to public to meet future needs in cooperation with designers in Thailand by this research. As the need for portable toilets changes dynamically after a disaster, adaptation of UD toilet unit brought one of a solution to secure adequate sanitation.

Research into practice

Effectiveness of treatment of urine and feces without water has been demonstrated by research in the field of environmental engineering. Like many other studies in academic institutes, it is not easy to bringing research into practice. This research challenges to fill the gap between research and practice by a developing marketable product in close collaboration with designers and by creating an easy-to-understand PR material and by utilizing web platform to spread the idea to wider community. The experience through this research illustrated an example to connect research and practice.

5. List of publications

Example of description: Navaporn Kaerkitcha, Surawut Chuangchote and Takashi Sagawa, "Control of physical properties of carbon nanofibers obtained from coaxial electrospinning of PMMA and PAN with adjustable inner/outer nozzle-ends," Nanoscale Research Letters, 11(1), 1-9, 2016

N/A

6. List of oral presentations

Example of description: Worasuwannarak N, Wannapeera J, Jadsadajerm S, and Miura K. Upgrading of rice straw and leucaena by degradative solvent extraction using 1-methylnaphthalene and kerosene at 350 oC. The 21st International Symposium on Analytical and Applied Pyrolysis, Nancy, France, 9-12 May 2016.

N/A