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# Sustainability Education in National Cheng Kung University, Taiwan

## Current status & Future perspectives

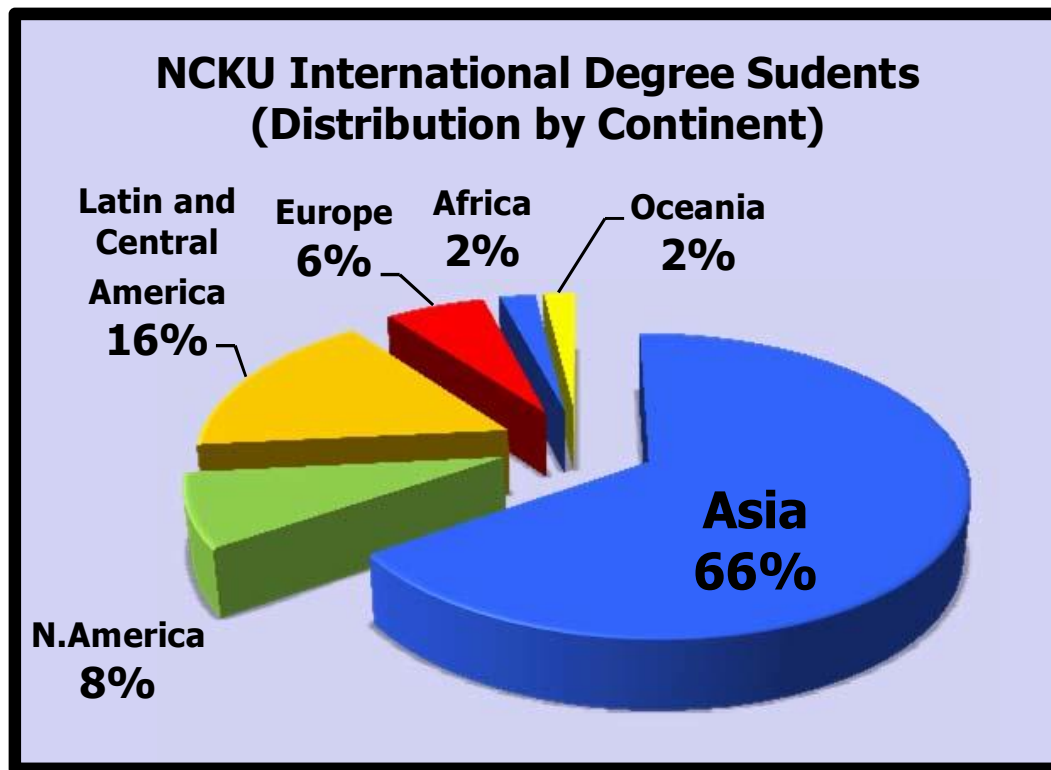
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Associate Professor, Department of Environmental Engineering  
Executive Director, Certificate Program in Sustainable Development  
National Cheng Kung University, Taiwan



# NCKU has 690 International Students coming from 67 countries (as of Oct. 2012)

- ① Vietnam: 126
- ② Indonesia: 115
- ③ Malaysia: 73
- ④ U.S.A.: 37
- ⑤ Thailand: 28
- ⑥ Paraguay: 20
- ⑥ Mongolia: 20
- ⑧ Japan: 19
- ⑨ Panama: 18
- ⑩ Russia: 15
- ⑪ Philippines: 13
- ⑫ Canada: 12



# Need an inter –national/-disciplinary program

## Topic: Sustainability Science

- Quest for “Sustainability” is a challenge that is facing the world
- Asian Region is NCKU’s main focus, and also is of high importance in sustainable development
- Many Asian countries need personnels, who can
  - Communicate sustainability challenges and solutions
  - Lead changes (institutional, cultural, technological, political) towards sustainability
  - Identify needs of theories identified in the field and put them on the list of challenges for the academic community



# Education activities: Summary

	<b>Undergraduate</b> 大學部	<b>Master</b> 碩士班	<b>Doctor</b> 博士班
<b>Methods</b> 方法	Individual Course	Interdisciplinary Certificate Program	Degree Program
<b>Objective</b> 目的	Introduction to sustainability science	Experience sustainability science through master thesis	Educate leaders, Create new frontiers of academic disciplines, develop new paradigms in practical problem solving
<b>Internal Status</b>	In operation since 2009 (Prof. Fukushima)	In operation since 2010	Internal preparation for application (exp. 2015-)
<b>Collaboration with HU</b>	Joint course via global classroom	Joint courses, Student exchange, Shared field studies, (Jointly offering certificates)	



# International Partnership & Support of NCKU top administration

Hokkaido University and NCKU became a sister university. One of the reason was its exchanges in Sustainability Education Programs. The president of NCKU expressed his support on development of our program.

黃正弘  
國際長

黃煌煒  
校長



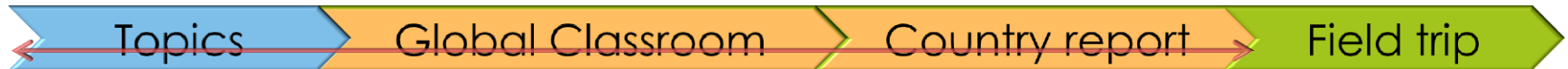
福島康裕  
副教授

Hokkaido  
University,  
April 3

Undergraduate

# “Introductions to Sustainability Science”

HU (April-July)



NCKU (February-June)

## ▣ Discussions on sustainability-related topics in English

- ▣ Elaborating on “environmentally friendly(環保)”, “ecological (生態)”, and “sustainable (永續)”
- ▣ Resource economics: Fish game (online, group)
- ▣ Globalization and Sustainability

## ▣ Global classroom lectures

- ▣ Fukushima and Chittenden,  
“A global classroom for a globalized market”, 2012

## ▣ Country introduction with a sustainability topic

- ▣ Ex. Waste recycling in Taiwan (2012)

History, Economic system of recycling, Social implementation of recycling, Environmental benefits of recycling



## Global classroom, a view from NCKU side

An article published from A&WMA in the special issue "Environmental Education"

em • feature

## A Global Classroom for a Dynamic Globalized Market

by Yasuhiro Fukushima  
and Anthony Chittenden

**Yasuhiro Fukushima** is an associate professor at the department of environmental engineering at National Cheng Kung University, Taiwan. He also serves as the executive director of Master's Program in Sustainable Development Practice, an interdisciplinary and international certificate program since 2010. **Anthony Chittenden** is a project assistant professor at the center for sustainability science (CENSUS), Hokkaido University, Japan responsible for developing curriculum for the StraSS program. E-mail: fuku@mail.ncku.edu.tw.

Recent advances in information and communication technologies (ICTs) have redefined what is possible within the classroom environment. This article considers how ICTs have met the environmental and sustainability education needs of a joint initiative between National Cheng Kung University (NCKU, Taiwan), Hokkaido University (HU, Japan), the University of Palangka Raya (UNPAR, Central Kalimantan, Indonesia), and Gadjah Mada University (UGM, Central Java, Indonesia).

Many developing regions in Southeast Asia, including Central Kalimantan and Central Java in Indonesia, are facing severe environmental challenges. If examined from an end-point perspective, these challenges often resemble those faced in the past by developed regions. However, the causal mechanisms are somewhat different, largely due to the enhanced degree of globalization. The total reliance of many developed regions on resources exploited from developing regions is a leading cause of both environmental and socioeconomic problems. Socioeconomic problems in developing regions can hinder development by limiting

available choices to such an extent that the only option is to continue unsustainable intervention into ecological systems, potentially leading to further socioeconomic problems, setting up a vicious cycle situation.

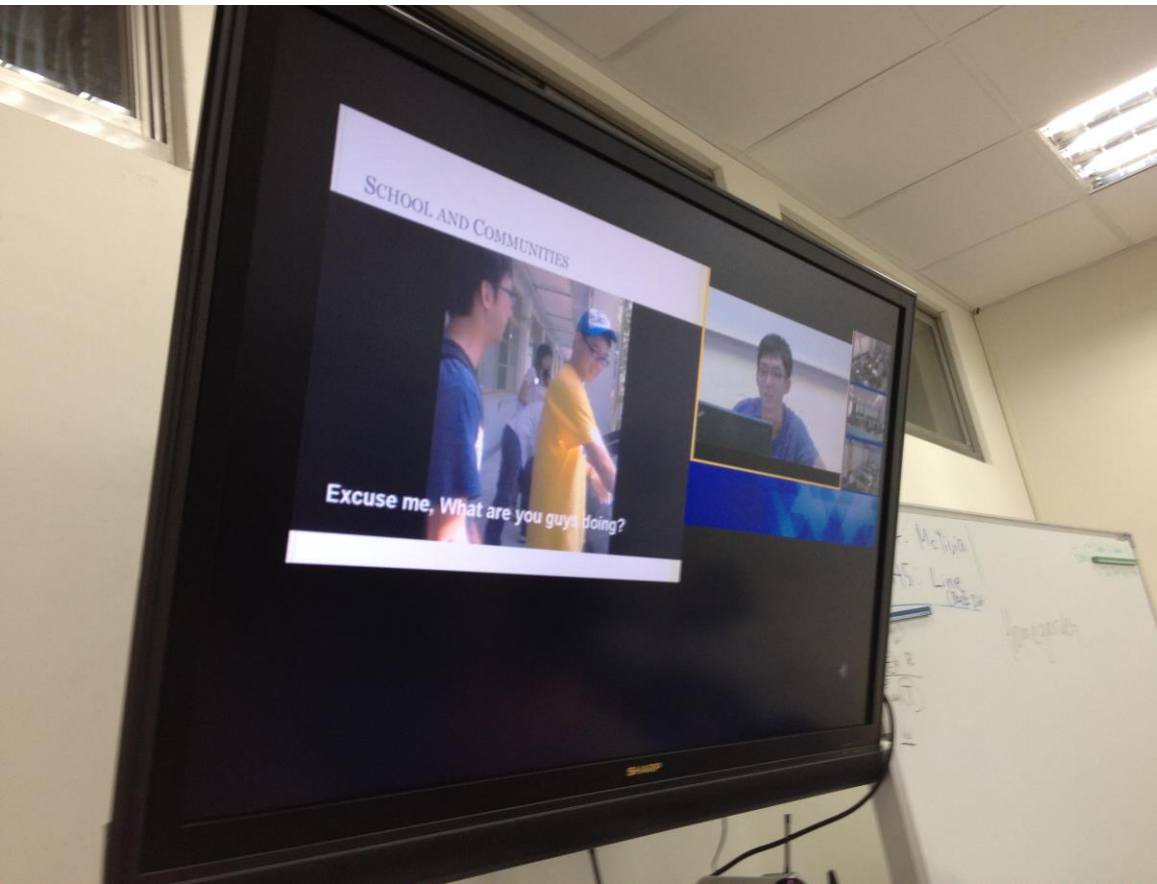
Economically advanced countries such as Japan and Taiwan on the other hand, face a completely different set of sustainability challenges, usually involving surging natural resource prices, cutting-edge technologies, and increasingly, severe competition. At the same time, these countries must meet international obligations to such global





# Country introductions

Based on sustainability topics introduced in the lectures, the students will decide on a topic and engage them with their own experiences. Then the students will introduce the topic to other students in the global classroom.



Students take videos & pictures, do interviews and conduct research on the topic outside classroom.

They will be able to receive feedback from other campuses.

# Certificate Program in Sustainable Development (CPSD)

## Summer intensive course (2)

- 1) Introduce CPSD courses, The University, Tainan culture
- 2) Form a team of students scattered around the campus
- 3) Practice how to link lectures with study items



## Elective courses (12)

Acquire Knowledge on theories

Learn how to work in team of different professions

Discussion with peers

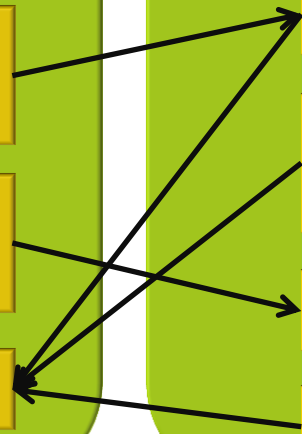
## Field Training (1)

Planning

Proposal writing & Presentation

Field training (6 weeks)

Reporting



# Courses

## ■ Environmental Engineering, Civil Engineering

- Sustainable Environment
- Contaminated Site remediation
- Water treatment technologies
- Cleaner production
- Sustainable material management
- Sustainability assessment of technologies
- Project Sustainability Management
- (Sustainable Construction Materials)

## ■ Environmental and Occupational Health

- Changing Environment and Health Implications

## ■ Urban Planning

- Spatial Planning

## ■ Life Sciences

- Biodiversity and conservation

## ■ Political Economy

- Environmental Policy
- Environmental Justice

## ■ Joint / Common

- Sustainability Indicators
- Interdisciplinary principles of sustainable development
- Research projects, Presentation and Discussions
- Field Training



# Summer Intensive Course

## Lectures Across Colleges, and Countries



1. Prof. Ishimura of Hokkaido University, (Japan) teaching Leadership Theories.
2. Prof. Chao (Environmental Engineering, NCKU) teaching cleaner production.
3. Discussions among the students.





# ***Studying Local Culture and Ecology***

***Taking advantage of the Tai-Jiang National Park & An-Ping Heritages***

- 1, 3) Experienced guide of the Sicao estuaries demonstrating traditional fishing methods.  
2) Prof. Hou (Life Science) giving lectures on ecology in the estuaries



# Visits to environmental facilities

## *Discovering industrial & urban metabolism*

1. Observing coagulation of sludge in a wastewater treatment center at the science park (left), 2. Prof. Jing (Environmental Engineering) explaining principles of composting on site (right).

1



2





# ***Utilizing local educational resources***

**We appreciate what we have in our neighbors!!**

Prof. Fukushima (Env. Eng.) translating discussions on biodiversity. Hundreds of seeds from around the island is displayed in this place operated by a local association.



Prof. Yang (Political Economy) and the participating students at Blackfoot Disease Museum.



## ***Feedbacks from the participants***

- “If possible, this course should be offered to all the incoming international students.”
- “At first, we did not know why we have to visit supermarket, café, rental cycle shops.. that kind of places. It was just amazing how these experiences integrated into a new idea when we sat together and worked.”
- “The course helped us understand part of Tainan City to the ground.”
- “My English is not the best, but we were not afraid of speaking out our idea because in this class, we could really believe others would listen to us and think together.”





Doctoral level

# International Doctorate Program in Sustainability Sciences (DPSS)

- A new interdisciplinary & international degree program  
(application to be submitted in 2013, start from 2015)
- Steering committee co-chairs
  - Vice president of NCKU (Prof. Su)
  - Chair of Department of Environmental Engineering (Prof. W.-J. Lee)
- Executive director
  - Prof. Fukushima
- Students: ~8 new enrollments every year



# Summary

- Understanding that **sustainability education requires interdisciplinary and international programs**, NCKU is making a progress.
- In the modern globalized world, **international collaboration in education is needed** to maintain competence of the program and to hold a core position in the global sustainability education efforts.  
→ NCKU is working on it together with Hokkaido University and other allied universities in Asia and Africa.
- **A standardized quality lectures and certificate** to attract students from developing world
- Exchange & Share: students and educational resources

