

# International Workshop on Sustainability Education: "Mobilizing Science and Technology towards Sustainability"

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# Date 13<sup>th</sup> February, 2007 [Tue] Venue Osaka University Nakanoshima Center 10F

## http://www.riss.osaka-u.ac.jp

Organized by Osaka University Research Institute for Sustainability Science (RISS) Integrated Research System for Sustainability Science (IR3S)

#### Supported by

Special Coordination Funds for Promoting Science and Technology of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan





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## Program

#### **Opening Remarks**

#### 13:30 – 13:50 Prof. Tatsuyoshi Saijo, Osaka University, Japan

### PART1: The role of S&T in the quest for Sustainability

13:50 - 14:30	Sustainability, Science and Education – The Need for New	1
	Paradigms	
	Prof. Pim Martens, Director, International Centre for Integrat	ed
	Assessment and Sustainable Development (ICIS), Maastric	eht
	University, Netherlands	
14:30 - 15:10	Building Capacity of Science and Technology to Promote 1	7
	Sustainable Development	
	Prof. Peijun Shi, College of Resources Science and Technology, V	ice
	President, Beijing Normal University, China	

15:10 - 15:30 Coffee break

#### PART2: Higher Education for Sustainable Development

15:30 - 16:10	Education's Contributions to Attaining the Millennium			
	Development Goals			
	Prof. Rosalyn McKeown, Director, Center for Geography	and		
	Environmental Education, University of Tennessee, USA			
16:10 - 16:50	Teaching Sustainability: Challenges and Opportunities for	69		
	Japanese Universities			
	Prof. Takashi Mino, University of Tokyo, Japan			

16:50 – 17:50 Round table Discussion:
 Capacity Building towards Sustainability in Asia:
 Designing a University Network
 Moderator: Prof. Tomo Suzuki, University of Oxford, UK

## **Closing Remarks**

17:50 – 18:00 Prof. Takashi Mino, University of Tokyo, Japan

# Sustainability, Science and Education: The Need for New Paradigms

Prof. dr. Pim Martens

#### Abstract:

It is clear that in making the concept of sustainable development concrete, one has to take into account a number of practical elements and obstacles. There is little doubt that integrated approaches are needed to support sustainable development. Therefore, a new research paradigm is needed that is better able to reflect the complexity and the multidimensional character of sustainable development. The new paradigm, referred to as sustainability science, must be able to encompass different magnitudes of scales (of time, space and function), multiple balances (dynamics), multiple actors (interests) and multiple failures (systemic faults).

The basic qualities that future sustainability scientists will need are: analytical insight, problem-solving qualities and good skills in both verbal and written presentation. No less important is knowledge of the diversity of instruments provided by the various disciplines involved, ranging from mathematics to history, from health sciences to economics. The range of skills needed is so wide that it can only be acquired through interdisciplinary study.

Today's students will be the business leaders, scientific researchers, politicians, artists and citizens of tomorrow. The extent to which they will be prepared to take decisions in favour of a sustainable future depends on the awareness, the knowledge, expertise and values they have acquired during their studies and in the subsequent years. For this reason, the concepts and themes of sustainability should be integrated into all levels of educational programming. Curricula must be revised so that sustainable development forms a guiding principle throughout the entire period of their studies – and afterwards too. New teaching methods must accompany this 'learning for sustainable development'.





















































# ICIS and education Bachelor programme University College Maastricht (UCM) Courses Introduction to Sustainable Development; Globalisation, Environment and Society ; Hands on Sustainability Master programme Maastricht Graduate School of Governance ICIS teaches the master on Sustainable Development. Cape Coast University, Ghana Together with MUNDO, IVM (Free University Amsterdam), and the Centre for Development Studies (CDS, Ghana), ICIS develops a MA programme 'Governance and Sustainable Development' at Cape Coast University, Ghana. Internships Various internships are offered by ICIS, where students can participate in one of the ongoing projects within ICIS PhD programme 'Sustainability Science & Practice' ICIS provides education and training of PhD students (founded through e.g. through the SENSE, NPT and the EU Marie-Curie Programmes.



- Active and self-directed learning
- Strong link between theory and practice
- Thematic/multidisciplinary approach
- Assessment is integrated part the of curriculum

- Scientific training is emphasized
- Information and communication technology as educational tool



# Building Capacity of Science and Technology to Promote Sustainable Development

#### Peijun Shi1, Qingxu Huang

#### 1. Brief Introduction to Sustainable Development Science in China

In 2002, Ministry of Science and Technology of China enacted the Program of Sustainable Development Science (2001-2010). Then, in 2006, the State Council of People's Republic of China enacted the Program of National Medium-term and Long-term Science and Technology Development Plan (2006-2020), which stated that the sustainable development in China would face lots of severe challenges in the next 10 years. Not only accumulated issues in those fields like population, resource and environment, but also the new issues accompanied with development need to be handled. The essential role of scientists should be promoting the better use of S&T to support our country's sustainable development. According to the in situ socioeconomic situation and the aim of strategy for sustainable development in China, scientists and researchers should mainly focus on promoting people's living standard and individual quality, exploiting and using resources reasonably, conserving ecological environment and boosting the development of related industries, which will be of tremendous help for harmonious development. Therefore twelve key research domains of China are selected: 1) Population control; 2) Health care and major diseases prevention; 3) Food security; 4) Water resource security; 5) Oil & Gas security; 6) Strategic mineral resources security; 7) Ocean monitoring and resource exploitation; 8) Clean energy and renewable energy; 9) Environmental pollution control and integrated ecology management; 10) Disaster reduction and prevention; 11) City and town development; 12) Global environmental issues. Researches on frontier issues in those domains must be implemented, including earth system process; resource, environment and disaster; scientific issues in agricultural sustainable development; mechanisms of human impact on earth system; global change and regional response; key issues in energy sustainable development and so on.

#### 2. Desertification Combating Technologies in China

Desertification in China may be a prominent manifestation of the impact of global warming. Area of Desertification is 27.46% of China's total land area. Government of China implement a series of major program for combating desertification, for example Sand Source Control Project, and Three-North Shelterbelt Project, and Program of Conversion from Cropland to Forest and Grassland, and Returning Land for Grazing to Pasture Project, and Sand storm sources control around Beijing and Tianjing etc.

In the recent years, about research for combating desertification, we had completed the Programs for combating desertification around Beijing (2000-2004) and Programs for combating desertification about the North China (2001-2005). The main achievements and measures about these programs have Optimized mode for recourses and technology for effective utilization fit for all kinds of land around Beijing, and Safe technology to control dust storm at bare land, and Forage introduction technology for wind proof and sand control, and Technology for extraction of remote sensing sandy land information and dynamic monitoring of land desertification and its accuracy validation, and Technique system for the vegetation recovery and regeneration at sandy area, and Technique system for biological resource development at sandy area, and Develop the model of sand industry under the different resource conditions.

At present, we take on the Program for combating desertification in China in the period of the eleventh five-year plan (2006-2010).

## Key Technologies R&D Program: Research and Demonstration of Key Technologies on Integrated Risk Governance

In China, we undergo a rapid development in recent years. Although we have developed some technologies on risk governance, there are some factors limiting our development, such as global environmental change, globalization and localization, shortage of energy and water, food supply, shortage of ecological service capacity, technology invention, market fluctuation, public security, and so on (Figure 2). In the field of integrated risk governance (IRG) research and technical development, the management has not transformed from response after disasters to prevention before disasters, which is stressed by the United Nations (We compare the difference between traditional technologies of public security and technologies of integrated risk governance in figure 1 and figure 2.). Aimed at such shortage, on the basis of existing researches, we implement a project named Research and Demonstration of Key Technologies on Integrated Risk Governance supported by National Key Technologies R&D Program in the period of the eleventh five-year plan (2006-2010). It's an implementation of building national integrated risk governance system under the overall objectives of Program of National Medium-term and Long-term Science and Technology Development Plan (2006-2020).



Fig. 1 Scientific and Technological System of Public Security

Global         Globalization         Energy         Feed         Technology         Pu           Environmental         &         &         Provision         Market         See	blic urity

Fig. 2 Scientific and Technological System of Integrated Risk Governance

There are four research domains we draw out in this project: 1) Technological system of risk identification and assessment; 2) Key technologies and simulation platforms of IRG; 3) Demonstration and application of IRG; 4) Policy and mechanism of IRG. In the mean time, the key technologies in the research include (Figure 3): risk identification, risk assessment model; Network databases of IRG, search engine, standardized auto-mapping, simulation modeling; Integrated platform of IRG, Main sectors' (sectors of disaster mitigation and insurance industry) enactments of countermeasures, Integrated prevention technologies on major risk (global environment change, globalization, ecological security, food security, energy security, water security, and so on). According to the research, we try to build national preliminary integrated scientific risk system, and to make the level of national integrated risk governance (assessment, response and adaptation) to meet the demand of national economic and social development



Fig. 3 Integrated Risk Governance Technical System

Sustainability Education Workshop, 2007, RISS, Okada, Japan

# Building Capacity of Science and Technology to Promote Sustainable Development

# Peijun Shi, Qingxu Huang

Academy of Disaster Reduction and Emergency Management, Ministry of Civil Affairs & Ministry of Education, the People's Republic of China College of Resources Science & Technology Beijing Normal University Corresponding Email: <u>spj@bnu.edu.cn</u>

February 13, 2007

# Contents

- Brief Introduction
- Desertification combating technology
- Key Technologies on Integrated Risk Governance

# **1. Brief Introduction**

# **1. Brief Introduction**Program of Sustainable Development Science (2001-2010), Ministry of Science and Technology of China, 2002 Program of National Medium-term and Long-term Science and Technology Development Plan (2006-2020), State Council of People's Republic of China, 2006 Scientists and researchers should mainly focus on promoting people's living standard and individual quality, exploiting and using resources reasonably, conserving ecological environment and boosting the development of related industries, which will be of tremendous help for harmonious development.

# Twelve key research domains

- Population control
- Health care and major diseases prevention
- Food security
- Water resource security
- > Oil & Gas security
- Strategic mineral resources security

- Ocean monitoring and resource exploitation
- Clean energy and renewable energy
- Environmental pollution control and integrated ecology
- Disaster reduction and prevention
- City and town development
- Global environmental issues.







Province	Area(hm²)	Percentage of China's total land area (%)	Province	Area(hm²)	Percentage of China's total land area (%)
Beijing	7246.6	0.0008	Hainan	36266.9	0.0038
Tianjin	10762.3	0.0011	Sichuan	467991.8	0. 0487
Hebei	2316669	0. 2413	Yunnan	34391.9	0.0036
Shanxi	1627715.6	0. 1696	Xizang	43348725.5	4. 5155
Neimenggu	62238226.3	6. 4831	Shannxi	2987801.8	0.3112
Liaoning	687261.5	0.0716	Gansu	19347754	2.0154
Jilin	202622.8	0. 0211	Qinghai	19166248.9	1. 9965
Shandong	993875.9	0. 1035	Ningxia	2974474.4	0.3098
Henan	10431.8	0. 0010	Xinjiang	107158291.1	11. 1623
			Total	263616800	27.46

# Area of Desertification in China







# Programs for combating desertification around Beijing (2000-2004)

- Optimized mode for recourses and technology for effective utilization fit for all kinds of land around Beijing
- · Safe technology to control sand storm at bare land
- · Forage introduction technology for wind proof and sand control
- Technology for extraction of remote sensing sandy land information and dynamic monitoring of land desertification and its accuracy validation













Programs for combating desertification in the period of the tenth five-year plan (2000-2005)
Technique system for the vegetation recovery and regeneration at sandy area
Technique system for biological resource development at sandy area
Develop the model of sand industry under the different resource conditions
Achievement for combating desertification
























## Programs on combating desertification in the eleventh five-year plan

- 1. Technology research of selection and rapid expansion and breeding of plant for sand protection and control
- 2. Reasonable water utilization and optimized vegetation distribution at sand area
- 3. Sandy land resource optimization and its effective utilization under ecological safety condition
- 4. Technology research of rapid restoration of extensive vegetation in sandy land
- 5. Technology research of farmland and pasture's wind erosion protection and control and habitat environmental security
- 6. Sand protection engineering technology in areal and linable sand sources land

- 7. Monitoring and early warning and project benefit assessment of blow-sand disaster and strategic research sand protection and control
- 8. Research and demonstration of vegetation reconstruction and control technology in Kerqin sand
- 9. Demonstration of animal husbandry techniques in xilin gol grasslands
- 10. Research and demonstration of vegetation rehabilitation and the use of technology in degraded pasture of sand in the east of ningxia river
- 11. Research and demonstrations of biological controlling technology in Mu us sandy land
- 12. Sand industrialization technology demonstration in Yongding river in Beijing suburbs

# **3**. Key Technologies on Integrated Risk Governance

- Shortage of Integrated Risk Governance (IRG) in China
- ✓ Present Program of IRG

# **Risk Governance in the Past**







# Research Content 1. Technological system of risk identification and assessment 2. Key technologies and simulation platforms of IRG 3. Demonstration and application of IRG 4. Policy and mechanism of IRG



Inte	grated Risk Gove	rnance Technical S	ystem
Action Steps	Key Tools	Action Steps	Key Tools
Risk Identification	Classifications	Risk Assessment	Database
	Standards		Code
Risk Modeling	Simulation		Model
	Warning System	Risk Adaptation	Planning
Risk Response	Preparedness		Risk Communication
	Insurance / Reinsurance		Governance
	Emergency		Safety Culture
	Relief		Action Program
	Recovery		Project
	Reconstruction		Paradigm



## Education's Contributions to Attaining the Millennium Development Goals

### Prof. Rosalyn McKeown,

### Abstract

The United Nations has four major educational initiatives related to education: Education For All, Millennium Development Goals (MDGs), Literacy Decade, and the Decade of Education for Sustainable Development. All are based on human rights and all support achievement of the MDGs. MDGs promise to address the deepest poverty and inequality in the world. Of the eight MDGs one is directly related to education-Achieve universal primary education-and another has an education target-Promote gender equality and empower women. The MDGs are interwoven; a solution for one goal can have positive results in other goals. MDG Report for 2006 shows progress on the goal of universal primary education although a gender gap still exists. Educating the girl child improves the quality of life for her and her children. Also, intractable problems like reducing the HIV/AIDS infection rate can improve with education. Some educational issues still need addressing to achieve universal primary education (e.g., school fees, mandatory uniforms, and lack of funding). Challenges to higher education to reorient education to address sustainability to help achieve MDGs include: providing multi-disciplinary opportunities to study sustainability issues, recognizing the importance of indigenous and traditional knowledge in the curriculum, conversing with students about lifestyle choices, teaching communication skills so that knowledge can be transferred and used by decisions makers and politicians, giving students the opportunity to have extended contact with people of other ethnicities and socio-economic backgrounds, and teaching skills (e.g., cultural sensitivity and listening) to help find locally relevant and culturally appropriate solutions to sustainability issues.















lucation, 1990 / 91 and 2003 / 04		
III III III III III III III III III II	education is in sight.	
	The graph shows the percentage of children enrolled in primary education in 1990	
	and 2003.	



















































































Stephen Sterling, 2001







# **Teaching Sustainability: Challenges and Opportunities for Japanese Universities**

Professor at Institute of Environmental Studies, Graduate School of Frontier Sciences Adjunct Professor at Integrated Research System for Sustainability Science The University of Tokyo MINO Takashi

Sustainability is easy to discuss, but difficult to define. Talking about sustainability is interesting because of its diversity and complexity, but it is difficult to come up with common and holistic understandings on it because of the same reason. How to teach something that is not clearly defined? The University of Tokyo (UT) has been involved in the organization of two short and intensive programs on sustainability: Youth Encounter on Sustainability (YES) and Intensive Program on Sustainability (IPoS). Through these experiences, we have realized the importance of developing literacy of sustainability within students, which should include: 1) structured knowledge on sustainability, 2) respect on diversity (cultural, academic, linguistic, etc) and minority, 3) practical skills for decision making and consensus building, and 4) systems thinking and imagination for holistic approaches. Now, UT is in the process of establishing a new Master's program on sustainability in collaboration with IR3S partner universities. In this program, we will test our strategies and concepts for sustainability education that have been developed through YES and IPoS.


# Teaching Sustainability: Challenges and Opportunities for Japanese Universities

Professor at Graduate School of Frontier Sciences Adjunct Professor at Integrated System for Sustainability Science (IR3S) The University of Tokyo MINO Takashi



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February 13, 2007, International Workshop on Sustainability Education: "Mobilizing Science and Technology towards Sustainability"

# Today's Presentation

- Introduction: Teaching Sustainability
- Experiences in Experimental Short Program on Sustainability (YES & IPoS)
- Lessons from YES & IPoS
- Regular Program on Sustainability at Master's Level (Under Development)
- Conclusion











IR3S

## Sustainability Science emphasizes on:

- Objectivity Benchmarks and indicators
- Diversity: Natural and cultural characteristics of the region/nation
- Simultaneous pursuit of: Understanding of phenomena and search for solutions/new systems
  - Uncertainties may remain in future prediction, yet actions should be taken.
- Precautionary approach





## Educational Components of IR3S at UT

- Experimental short programs
  - Youth Encounter on Sustainability (YES)
  - Intensive Program on Sustainability (IPoS)
- Development of Master's Program on Sustainability Science
  - Associated with Institute of Environmental Studies, Graduate School of Frontier Sciences, UT
  - Start in October, 2007





and the second		
Contents	of YES	

- 2weeks program, multidisciplinary and crosscultural in nature
- 4 modules
  - Social
  - Energy and Climate
  - Food and Water
  - Technology
- Excursion, discussion, different types of exercises, in addition to basic lectures
- Discussion among students
- Group work throughout the program followed by final presentation

February 13, 2007, International Workshop on Sustainability Education:				
55	Day 1	Introduction		lity"
	Day 2	Social Issues	G r	
	Day 3	Social Issues	o u	
	Day 4		р	
	Day 5	Energy & Climate	W o	
	Day 6	Group Work	r k	
	Day 7	Free Day		
	Day 8	Food & Water	G r	
	Day 9		o u	
	Day 10	Technology	р	
	Day 11	rechnology	W o	
	Day 12	Group Work	r k	
1	Day 13	Presentation		
	Day 14	Wrap-up		

## IPoS

### (Intensive Program on Sustainability)

- A program developed by UT and AIT to contribute to sustainable development in Asian regions
- Started in 2004 in Thailand and continues till now.
- 10 students from UT, 12 from AIT and a few from AGS partners (MIT, ETH and Chalmers) as well as IR3S universities (Kyoto U, Osaka U, Hokkaido U and Ibaragi U).
- Emphasis on Asia in terms of way of thinking, culture, regional factors, etc.
- A sub-topic under the big umbrella of sustainability is defined each year (ex. food safety and security for 2004, food and energy production for 2005/6). A special course of IPoS on transportation, sponsored by Nissan Science Foundation will be held in Japan in the coming December.



# Today's Presentation

- Introduction: Teaching Sustainability
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Key Issues at Y.E.S./IPoS (2) - Consensus -

- The more a problem is complicated, more stakeholders and experts are needed to solve the problem. Therefore, mutual understanding and consensus building among the concerned people get more and more difficult, but important.
- The "best" solution in terms of sustainability may not be accepted by the society. Similarly, something that may be good for the environment are not always favored by the people.



IR3S

February 13, 2007, International Workshop on Sustainability Education: "Mobilizing Science and Technology towards Sustainability"

### Key Issues in Sustainability Education

- Transdisciplinary, multicultural and highly diverse nature of sustainability issues
  - Academic discipline dealing with sustainability
  - Communication: ex. engineers vs social scientists
  - Handling of unequality/unequity/minority
- Analytical or integrative
  - Incentive system in research and education
- Pedagogy
  - Knowledge-based or experiential/ teaching or facilitating















IR3S

February 13, 2007, International Workshop on Sustainability Education: "Mobilizing Science and Technology towards Sustainability"

### Master's Program on Sustainability Science

### - Curricula -

- Two types of courses will be offered: 1) knowledge-andconcept-oriented courses on complex nature of sustainability and 2) experiential learning and skilloriented exercises
- Taught in English. (International students will be admitted)
- Exchange credits among IR3S partners (distance learning)
- Masters Degree on Sustainability Sciences
- Dual degree between two IR3S universities in the future





# Today's Presentation

- Introduction: Teaching Sustainability
- Experiences in Experimental Short Program on Sustainability (YES & IPoS)
- Lessons from YES & IPoS
- Regular Program on Sustainability at Master's Level (Under Development)
- Conclusion



# Education -

- (Kyou) + (Iku)
- Kyou = To teach
- Iku = To grow
- Education should be a process
  - to open eyes for something
  - to facilitate learning
  - => This aspect is particularly important in sustainability education.





### Thank you for your attention!



Kashiwa Campus, the Univ Tokyo

MINO Takashi

Speaker's Profile

#### **Pim Martens**

#### Education

1991	Msc., Biological Health Sciences, Maastricht University, The Netherlands
	Traineeship: Department of Medical Microbiology, University Hospital
	Maastricht.
1993	M.Sc., Environmental Health Sciences, Maastricht University, The Netherlands
	Traineeship: Department of Mathematics, Maastricht University
1997	Ph.D., Department of Mathematics, Maastricht University, The
	Netherlands
Professional C	areer
1993-1997	PhD-student, Maastricht University, Department of Mathematics, Maastricht, the
	Netherlands
1993-1997	Researcher project 'Global Dynamics and Sustainable Development', Dutch
	National Institute of Public Health and the Environment (RIVM), Bilthoven, The
	Netherlands
1997-1998	Assistant Professor, Maastricht University, Department of Mathematics, Maastricht,
	The Netherlands
1998-2004	Senior Researcher International Centre for Integrated assessment and Sustainable
	development (ICIS), Maastricht University, Maastricht, The Netherlands
2001-2003	Honorary Senior Lecturer, Department of Epidemiology and Population Health,
	London School of Hygiene and Tropical Medicine, UK
2004-present	Full Professor 'Sustainable Development', Maastricht University
Management d	uties
2001-2004	Deputy Director International Centre for Integrated assessment and Sustainable
	development (ICIS), Maastricht University, the Netherlands.
2004-present	Director International Centre for Integrated assessment and Sustainable
	development (ICIS), Maastricht University, the Netherlands.
Committee/Bo	ards
2002-present	Book-Series Editor 'Integrated Assessment Studies', Swets & Zeitlinger Publisher.
2003-present	Editor International Journal 'Ecohealth: Human Health, Conservation Medicine,
	Ecosystem Sustainability', Springer.
2006-present	Member Strategic Advisory Board UNESCO/UNU Regional Centre of Expertise
	'Learning for Sustainable Development'.
2006-present	Member Think-tank 'Sustainable Limburg', Province of Limburg.
2006-present	Research Director 'KNAW-Onderzoeksschool' SENSE (Socio-Economic and
	Natural Sciences of the Environment).

#### **Research Fields/Interests**

Sustainable Development/ Sustainability Science, Globalisation, Environmental Change and Society, Emerging Infectious Diseases, Integrated Assessment, Complex Adaptive Systems Selected Publications

Martens, P. & Zywietz, D. (2006). Rethinking globalisation: a modified globalisation index. *Journal of International Development*, 18, 331-350.

Martens, P. (2006) Sustainability: science or fiction? *Sustainability: Science, Practice and Policy*, 2(1), 1-5. (also published as: Solidarity & Sustainability, Reflections on Solidarity, Sustainability and Religious Violence, 2 (9), September 2006.)

Martens, P. & Rotmans, J. (2005). Transitions in a globalising world. *Futures*, 37, 1133-1144.

Martens, P. & Huynen, M.M.T.E. (2003). A future without health? The health dimension in global scenario studies. *Bulletin of the World Health Organisation*, 81 (12), 896-901.

Martens, P., Rotmans, J. and De Groot, R.S. (2003). Biodiversity: luxury or necessity? *Global Environmental Change*, 13 (2), 75-81. (also selected for publication in the *Virtual Journal of Environmental Sustainability*, 1(2), August 2003.)

#### Peijun Shi,

#### Education

- 1978 1982 Bachelor. of Geography Department of Inner Mongolia Normal University, China
- 1982 1984 Master of Lanzhou Desert Research Institute, Chinese Academic Institute, China
- 1986 1988 Doctor of Geography Department in Beijing Normal University, China
- 1995 1997 Post doctor of College of Natural Recourses and Environment Management, University of California at Berkeley, USA

#### **Professional Career**

- 1984 1986 Instructor, Institute of Natural Resources of Inner Mongolia, China
- 1988 1992 Associate Professor, Dept. of Geography, Beijing Normal University, China
- 1992 2003 Professor, College of Resources & Environment, Beijing Normal University, China,
- 2003. Professor, College of Resources Science & Technology, Beijing Normal University, China

#### Committee/Boards:

Deputy Director, Earth Science Group of the Scientific & Technological Committee of Ministry of Education of the PRC.

Committeeman, Consultative Committee of Science & Technology of State Environmental Protection Administration of China.

Deputy Syndic in Chief, Geographical Society of China.

Deputy Syndic in Chief, China Society of Natural Resources.

Research Fields/ Interests:

Environment change and natural disaster, especially on disaster risk assessment and disaster risk governance.

Organized and promoted the National Key Technologies R&D Program of China during the 11th Five-Year Plan Period "Key Technology in Integrated Risk Governance Research and Demonstration".

Assisted to organize the project National Key Technologies Supporting Program of China during the 11th Five-Year Plan Period "Key Technology in National Emergency Platform System Research and Demonstration".

#### **Selected Publications (max 5)**

Peijun Shi, et al. Land use pattern adjustment under ecological security: look for secure land use pattern in China. Geographical Review of Japan, 2004, 77 (12): 866-882.

Peijun Shi, et al. Palynological records of environmental changes in the middle part of Inner

Mongolia, China. Chinese Science Bulletin, 2003, 148(14): 1433-1438.

Peijun Shi, et al. Disaster reduction and sustainable development —the adjustment of disaster reduction strategies of China based on "the 2nd World Conference on Disaster Reduction 2005". Journal of Natural Disasters, 2005, 14(3): 2-7.

Peijun Shi. Theory on disaster science and disaster dynamics. Journal of Natural Disasters, 2002, 11(3): 1-9.

#### **Rosalyn McKeown**

#### Education

1986	Ph.D. University of Oregon, Geography.	
1977	M.A. University of Oregon, Geography.	
2006	M.S. University of Tennessee, Teacher Education.	
1974	B.A. University of California, Los Angeles, Geography.	
Professional Care	er	
1991 - 2002, 2004	- present	
	Director - Center for Geography and Environmental Education, University of	
	Tennessee, Knoxville	
2005 - 2006	Adjunct Senior Fellow, United Nations University - Institute for Advanced Studies	
	September	
2003 - 2004	Teacher - Spanish I and II, Oliver Springs High School	
2002 - 2003	Teacher - World Geography and Earth Science, Clinton High School	
2002	Joint Faculty - University of Tennessee / Oak Ridge National Laboratory	
2000 - 2001	Visiting Associate Professor - York University, Toronto, Ontario, Canada	
1990 - 1993	Assistant Professor - College of Education, University of Tennessee	
1991 – 1993	Director - Department of Energy / Lyndhurst Secondary Teacher Education	
	Program	
1990 - 1991	Co-director - Center for Environmental / Energy / Science Education	
1987 – 1990	Assistant Professor - Center for Science, Mathematics and Technology Education,	
	SUNY Stony Brook	
Committee/Boards		

1999 – present	Secretariat, UNITWIN/UNESCO Chair in Reorienting Teacher Education to
	Address Sustainability,

- 2000 2003 National Science Foundation Advisory Committee for Environmental Research and Education.
- 2000, 2002, 2004 and 2006

Co-organizer, Conferences of the International Network for UNITWIN / UNESCO Chair on Reorienting Teacher Education to Address Sustainability, 2000, 2002, 2004, and 2006.

- 1997 2002Secretary, Board of Director, North American Association for Environmental<br/>Education
- 1997 1999 President, Tennessee Environmental Education Association

#### **Research Fields/Interests**

For more than a decade, I have focused on defining and assessing environmental literacy. As part

of this effort, I created the Environmental Literacy and Citizenship Assessment Instrument (ELCAI) for assessing the effectiveness of college and university programs in raising the environmental literacy of undergraduate students. For the ELCAI, I identified the socio-political-cultural foundations of environmental education and created a valid framework for teaching, learning, and assessing environmental issues. I also created a conceptual framework for education for sustainable development (ESD).

#### **Selected Publications**

McKeown, Rosalyn (Ed.). Forthcoming 2007. "Good Practices in Education for Sustainable Development: Teacher Education Institutions." *Education for Sustainable Development in Action Good Practices no1.* Paris: UNESCO.

McKeown, Rosalyn. 2006. "Examining Teacher Education through the Lens of Sustainability." *Institute of Education Annual: Teacher Education.* p 59 – 75. Davies, R & Down, L. (Eds.). Kingston, Jamaica: Institute of Education, The University of the West Indies.
McKeown, Rosalyn. 2006. Approaches to Environmental and Geographical Education for Sustainability in the United States In *Environmental and Geographical Education for Sustainability: Cultural Contexts.* Lee, John Chi-Kin and Michael Williams (eds.). New York: Nova Science Publishers, Inc.

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#### **MINO** Takashi

#### Education

1978	Batchelor's Degree: Department of Urban and Environmental Engineering,
	The University of Tokyo
1979	Master's Degree: Department of Urban and Environmental Engineering, The
	University of Tokyo
1983	PhD Degree: Department of Urban and Environmental Engineering, The
	University of Tokyo

#### **Professional Career**

1983-1999	Research Associate, Assistant professor, Associate professor and professor at
	Department of Urban and Environmental Engineering, Faculty/Graduate
	School of Engineering, the University of Tokyo
1999-Present	Professor at Department of Socio-cultural Environmental Studies, Graduate
	School of Frontier Sciences, the University of Tokyo
1989-1991	Associate Professor at Department of Environmental Engineering, Asian
	Institute of Technology (Thailand)
1996-1997	Visiting Scholar at Department of Bioprocess Technology, Delft University of
	technology (The Netherlands)
2002-2004	Visiting Professor at Department of Water Environment Transportation,
	Chalmers University of Technology (Sweden)
2006-Present	Adjunct Professor at Integrated Research System for Sustainability Science,
	the University of Tokyo

Part-time Lecturer at Tsukuba University, Meisei University, Nagaoka University of Technology, Kyushu University, Nihon University, etc.

#### **Committee/Boards**

Member, Scientific Program Committee, International Water Association

Member, Editorial Board, Water Science and Technology, International Water Association

Executive Secretary, Environmental Engineering Committee, Japan Association of Civil Engineers

Chairman, Technology Evaluation Committee, Japan Sewage Works Association

#### **Research Fields/Interests**

Biological wastewater treatment; nutrient removal from wastewaters; activated sludge mathematical modeling; applied and environmental microbiology; microbial molecular ecology; environmental technology management; water pollution control; environmental education; sustainability education.

#### **Selected Publications**

Mino T., Kawakami T., and Matsuo T. (1984) "Location of Phos-phorus in Activated Sludge

and Function of Intracellular Polyphosphates in Biological Phosphorus Removal Process." *Wat. Sci. Tech.*, Vol.17, Amsterdam, pp93-106; (S. H. Jenkins Award 1986, the best paper published in journals issued by International Association on Water Pollution Research and Control in a two years' period)

Mino T., van Loosdrecht M.C.M., and Heijnen J.J. (1998) "Review : Microbiology and Biochemistry of Enhanced Biological Phosphate Removal Process", *Water Research*, Vol.32, No.11, pp3193-3207 (Selected in 2006 as one of the most influential top 10 papers published in *Water Research*)

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Seviour, R., Onuki, M. anc Mino, T. (2003) The Microbiology of Biological Phosphorus Removal in Activated Sludge Systems. FEMS Microbiol. Rev., 27(99-127).

Lee S.H., K. Otawa, M. Onuki, H.Satoh, and T. Mino (2006), Dynamic behavior of phage-host system related to Microlunatus phosphovorus in activated sludge with host inoculation. Journal of Microbiology and Biotechnology (in press)

Otawa K., S.H. Lee, A. Yamazoe, M.Onuki, H. Satoh, and T. Mino (2006), Abundance, diversity, and dynamics of viruses on microorganisms in activated sludge Micorobial ecology (in press)

#### **Tomo Suzuki**

#### Education

Bsc. in Management; Meiji UniversityMsc. in Philosophy of Science, London School of Economics (LSE), University of LondonD.Phil in Epistemology of Economic Reality, University of Oxford

#### **Professional Career**

Certified Public Accountant (Japan) Senior Lecturer, University of London University Lecturer and Official Fellow, Said Business School, Oxford University

#### **Committee/Boards**

Socio-Economic Review editorial board, and gust Editor Accounting Organizations and Society editorial board Price of Wales Trust, Accounting for Sustainability Principal Researcher

#### **Research Fields/Interests**

Epistemology of economic reality Accounting for environment and sustainability Institutional design for sustainability practices

#### **Selected Publications**

Suzuki, T. (2003a) The Accounting Figuration of Business Statistics as a Foundation for the Spread of Economic Ideas. *Accounting Organizations and Society*. Vol. 28. No. 1, pp.65.-95.
Suzuki, T. (2003b) The Epistemology of Macroeconomic Reality: The Keynesian Revolution from an Accounting Point of View. *Accounting Organizations and Society*. Vol. 28. No. 5, pp. 471-517.
Suzuki, T. (2007) Accountics: Impacts of Internationally Standardized Accounting on the Japanese Socio-Economy. *Accounting Organizations and Society*. Vol. 32. No. 3, pp. 263-301.
Suzuki, T. (2007 In Print Available at Science Direct) A History of Japanese Accounting Reforms as a Microfoundation of the Democratic Socio-Economy: Accountings Part II. *Accounting Organizations and Society*.

Suzuki, T. & Biondi, Y. (Forthcoming 2007) Accounting and Economics: Unexplored Impacts of IAS / IFRS on Socio-Economy. Introduction to the special edition of *Socio-Economic Review* October, 2007.

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