Report
—The 9th Kyoto University International Symposium—

Integrating Global Environmental Studies Towards Human Security

Kyoto University

報告書
—第 9 回京都大学国際シンポジウム—
「人間の安全保障のための地球環境学」

京都大学

KYOTO UNIVERSITY MISSION STATEMENT

Kyoto University states its mission to sustain and develop its historical commitment to academic freedom and to pursue harmonious coexistence within human and ecological community on this planet.

Research

1. Kyoto University will generate world-class knowledge through freedom and autonomy in research that conforms with high ethical standards.
2. As a university that comprehends many graduate schools, faculties, research institutes and centres, Kyoto University will strive for diverse development in pure and applied research in the humanities, sciences and technology, while seeking to integrate these various perspectives.

Education

3. Within its broad and varied educational structure, Kyoto University will transmit high-quality knowledge and promote independent and interactive learning.
4. Kyoto University will educate outstanding and humane researchers and specialists, who will contribute responsibly to the world's human and ecological community.

Relationship with Society

5. As a university committed to a broad social engagement, Kyoto University will encourage cooperation with local and national society, and will disseminate knowledge informed by the ideals of freedom and peaceful coexistence.
6. As an international institution, Kyoto University will promote foreign academic exchange and thereby strive to contribute to the well-being of the world.

Administration

7. In order to enhance the free development of learning, Kyoto University will pay due respect to the administrative independence of each of its component institutions, while promoting cooperation among them.
8. Kyoto University will conduct its administration with regard for the environment and respect for human rights and will be accountable to society at large.

Report

—The 9th Kyoto University International Symposium—

Integrating Global Environmental Studies Towards Human Security

報告書

第９回京都大学国際シンポジウム

「人間の安全保障のための地球環境学」

Kyoto University

PREFACE

It is our pleasure to issue this report of the 9th Kyoto University International Symposium, "Integrating Global Environmental Studies towards Human Security," held in Kyoto from 22nd to 23rd June, 2007.

The 9th symposium was the first time that a Kyoto University International Symposium has been held on the campus of Kyoto University itself. The last eight symposia, while being organized by the university, have been held abroad with the intention of achieving direct communication with people in other countries.

Global environmental problems, such as climate change, threaten the very basis of our life and survival. Recently, the importance of tackling these problems has been increasingly apparent. Recognizing that humankind in the 21st century is at a crossroads of its existence due to drastic anthropogenic ecosystem changes, Kyoto University has been conducting education and research for the sake of harmonious and sustainable coexistence within human and ecological community on this planet.

This symposium, in inviting various experts and practitioners from around the world, provided an opportunity for active discussion on global environmental issues with the aim of integrating and developing new environmental studies as well as providing policy suggestions.

This report is intended to disseminate the content of the symposium as widely as possible in order to build a basis for future academic exchange. It is expected that various presentations given at the symposium will be elaborated further and published in professional academic journals in their respective fields, notably, "Sansai," Kyoto University's English academic journal of global environmental studies. Therefore, the report contains only keynote speeches, a summary of the panel discussion, summaries of the presentations and discussions of the three separate sessions, and of the combined discussion session.

We would like to express our gratitude to President Kazuo Oike and the members of the Governing Board of Kyoto University for their kind support of the symposium. Thanks are also due to all the honorable guests and participants of the symposium, in particular, all the speakers and panelists, Professor Masashi Kamon, Dean of the Graduate School of Global Environmental Studies, and the other members of the Symposium Organizing Committee. In addition, we wish to express our renewed admiration and thanks for the generous financial support provided by the Kyoto University Foundation Inc. and by the Japanese Ministry of Education (MEXT)'s Strategic Fund for Establishing International Headquarters in Universities. We are also grateful to the staff of the International Affairs Division and the Graduate School of Global Environmental Studies, Kyoto University for efficiently taking care of all administrative matters relating to the symposium.

Toshio YOKOYAMA: Vice-President, Kyoto University
Kazuo MATSUSITA: Chair, Symposium Organizing Committee; Professor, Graduate School of Global Environmental Studies, Kyoto University

The 9th Kyoto University International Symposium
Integrating Global Environmental Studies Towards Human Security

Date	June 22 – 23, 2007
Venue	Centennial Hall and International Conference Hall Kyoto University Clock Tower, Kyoto, Japan
Organized by	Kyoto University
Coordinated by	Kyoto University Foundation (KUF) Graduate School of Global Environmental Studies (GSGES) The Organization for the Promotion of International Relations (OPIR)
Collaborated by	Field Science Education and Research Center (FSERC) Kyoto Sustainability Initiative (KSI)
Supported by	Ministry of the Environment Kyoto Prefecture Kyoto City Saijo City Society for Environmental Economics and Policy Studies The Japanese Geotechnical Society Japan Society of Civil Engineers Japan Association for Landscape Ecology, Benesse Corporation

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"Integrating Global Environmental Studies Towards Human Security"

Program

Symposium
Integrating Global Environmental Studies towards Human Security
(Centennial Hall)

June 22 (Friday), 2007

Opening Remarks **13:00 - 13:20**

Kazuo OIKE (President, Kyoto University)
Masashi KAMON (Dean, GSGES, Kyoto University)

Keynote Speeches **13:20 - 15:00**

13:20 - 14:00

The Interaction between Environmental Security and Human Security

Alan DUPONT (Professor, Centre for International Security Studies, University of Sydney)

14:00 - 15:00

Climate Security

Toshiro KOJIMA (Vice-Minister for Global Environment Affairs,
Ministry of the Environment, Government of Japan)

Panel Discussion **15:20 - 17:20**

Global Environmental Studies for Human Security

Moderator: Kazuo MATSUSITA (Professor, GSGES, Kyoto University)

Panelists: Alan DUPONT (Professor, Centre for International Security Studies,
University of Sydney)
C. M. M. BANDARA (Professor, Department of Geography,
University of Peradeniya)
Toshiro KOJIMA (Vice-Minister for Global Environment Affairs,
Ministry of the Environment, Government of Japan)
Takamitsu SAWA (Professor, Graduate School of Policy Science,
Ritsumeikan University)
Rajib SHAW (Associate Professor, GSGES, Kyoto University)

Closing Remarks **17:20 - 17:30**

Toshio YOKOYAMA (Vice-President, Kyoto University)

June 23 (Saturday), 2007

10:00 - 12:00	Sessions 1 ~ 3 Invited Lectures		(International Conference Hall I~III)
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12:00 - 13:00	Poster Presentation		(International Conference Hall III)
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15:30 - 17:30	Discussion Session		(International Conference Hall I & II)

Session 1 What is "Sustainability"?
(International Conference Hall I)

Co-Chair Kazuhiro UETA (Professor, GSGES, Kyoto University)
Yuzuru MATSUOKA (Professor, GSGES, Kyoto University)
Seiji IKKATAI (Professor, KSI, Kyoto University)

Invited Lectures **10:00 - 12:00**

Sustainability and Optimality in Economic Development: Theoretical Insights and Policy Prospects
Hossein FARZIN (Professor, Department of Agricultural and Resource Economics, University of California, Davis)
Commentator: Takashi TAKEBE (Professor, GSGES, Kyoto University)

Sustainability and Climate Change: Conceptual and Practical Foundations for Designing Post-Kyoto Protocol Global Agreement
P. R. SHUKLA (Professor, Public Systems Group, Indian Institute of Management)
Commentator: Akihisa MORI (Associate Professor, GSGES, Kyoto University)

Lunch (Poster Presentation: International Conference Hall III) **12:00 - 13:00**

Oral Presentation **13:00 - 15:00**

Critical Natural Capital and Sustainability
Kazuki KAGOHASHI (Doctoral student, KSI, GSGES, Kyoto University)

Environmental Valuation in Sustainability Studies
Masayuki SATO (Assistant Professor, KSI, GSGES, Kyoto University)

The Kyoto Protocol's Clean Development Mechanism and Local Sustainability in the South
Mari NISHIKI (Doctoral student, GSGES, Kyoto University)

Session 2 Civilizing the Modern Science and Technology for a New Civilization
(International Conference Hall II)

Co-Chair Toshio YOKOYAMA (Professor, GSGES, Kyoto University)
Mamoru MIMURO (Professor, GSGES, Kyoto University)

Invited Lectures **10:00 - 12:00**

Improving Environmental Quality through Innovation – a UK Prospective
Simon JACKMAN (Director, IPM-Net, University of Oxford)

COMEST Exploring International Action in Environmental Ethics
Sang-yong SONG (Fellow, Korean Academy of Science and Technology)

Scaling Approach Integrates Our Knowledge from Molecular to Ecosystem Levels
Ichiro TERASHIMA (Professor, Graduate School of Science, University of Tokyo)

The Civilization of Science and Technology for an Integrated System of Global Environmental Studies: An Interpretation of Hans Jonas's *The Imperative of Responsibility*
Hiroshi ABE (Associate Professor, Graduate School of Human and Environmental Studies, Kyoto University)

Lunch (Poster Presentation: International Conference Hall III) **12:00 - 13:00**

Oral Presentation **13:00 - 15:00**

Civility in a Polytheistic World: A Perspective from the Japanese Experience
Toshio YOKOYAMA (Professor, GSGES, Kyoto University)

Changes in Personal View of Nature through Evolution of Photosynthesis
Mamoru MIMURO (Professor, GSGES, Kyoto University)

For Accurate Discussion on Global Environmental Changes
Masahito SUGIYAMA (Professor, GSGES, Kyoto University)

Perspectives of Chemical Hazard Management
Tomonari MATSUDA (Associate Professor, GSGES, Kyoto University)

Session 3 Field and Community Experiences
(International Conference Hall III)

Co-Chair Yukihiro MORIMOTO (Professor, GSGES, Kyoto University)
Masami KOBAYASHI (Professor, GSGES, Kyoto University)
Yoshihiro NATSUHARA (Professor, GSGES, Kyoto University)

Invited Lectures **10:00 - 12:00**

Millennium Ecosystem Assessment: Follow-up Strategies in Japan
A. H. ZAKRI (Professor, Institute of Advanced Studies, United Nations University)

Taking Stock of the Status of the World's Ecosystems and the Services They Provide to Society and How to Make These Services Sustainable - The Millennium Ecosystem Assessment

Harold A. MOONEY (Professor, Department of Biological Sciences, Stanford University)

Research and Education of the Ecological Links between Forests and Coastal Waters

Yoh YAMASHITA (Professor, FSERC, Kyoto University)

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Invited Lectures **13:00 - 14:00**

Poverty Reduction and Environment: Lessons Learnt from Working with the Local Community in Vietnam

LE Van An (Director, Office for International Cooperation, Hue University)

Importance of Participation of Local People/Communities in the Wise Use of Wetlands: Some Practices in Asia

Reiko NAKAMURA (Secretary-General, Ramsar Center Japan)

Community Disaster Prevention: Disaster Preparedness Initiative of Saijo City

Kotaro ITO (Mayor of Saijo City)

Panel Discussion **14:00 - 15:00**

Coordinator: Ueru TANAKA (Associate Professor, GSGES, Kyoto University)

Panelists: Masami KOBAYASHI (Professor, GSGES, Kyoto University)
Yukihiro MORIMOTO (Professor, GSGES, Kyoto University)
Reiko NAKAMURA (Secretary-General, Ramsar Center Japan)

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Session 2 Shigeo FUJII (Professor, GSGES, Kyoto University)

Session 3 Miki YOSHIZUMI (Assistant Professor, GSGES, Kyoto University)

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International Conference Hall III

Poster Presentation

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2. GSGES Asia Platform Programs
3. Field Science Education and Research Center

Video Exhibition

Video Library of Activities on the GSGES Asia Platform Programs

PowerPoint Presentation

"PowerPoint Library of GSGES internship activities and relevant activities in GSGES research"

1. To Improve Sanitation in Hanoi, Vietnam
   Hidenori HARADA (Postdoctoral fellow, GSGES, Kyoto University)
2. Attempt at Technical Transfer for Combat Desertification
   Shinshichi SETO (Doctoral student, GSGES, Kyoto University)
3. Innovations in School Disaster Education
   Koichi SHIWAKU (Doctoral student, GSGES, Kyoto University)
4. Creating a Sustainable Community: Lessons from the Experience in Senri New Town
   Mayuko SHIMIZU (Doctoral student, GSGES, Kyoto University)
5. Impact of Rising Sea-Levels on Tuvalu
   Kazuki KAGOHASHI (Doctoral student, GSGES, Kyoto University)
6. Livelihood of Fishermen and the Fisheries in Chilika Lagoon, India
   Shinpei IWASAKI (Doctoral student, GSGES, Kyoto University)
7. Research on Tourism Projects in Ethnic Minority Villages, Vietnam
   Akitoshi IMAI (Master's student, GSGES, Kyoto University)
8. The Management of Animal Manure and Analysis of Microcontaminants
   Fumiko OTOBE (Master's student, GSGES, Kyoto University)
9. Flood and Land-Use in Mountainous Areas of Central Vietnam
   Hiroyuki OHASHI (Master's student, GSGES, Kyoto University)
10. Utilizing Traditional Skills for Supplemental Incomes
    Koichiro OGATA (Master's student, GSGES, Kyoto University)
11. Wildlife Management：Getting Involved in Field Research & Practicing Data Analysis.
    Makiko YABUHARA (Master's student, GSGES, Kyoto University)
12. Tsunami Recovery and Eco-Village in Sri Lanka
    Miwa IMURA (Master's student, GSGES, Kyoto University)
13. Community-Based Environmental Education in Urban Areas of Vietnam
    Nozomi HISHIDA (Master's student, GSGES, Kyoto University)
14. Survey of Housing Conditions in Mountainous Villages in Vietnam
    Ryunosuke SHIRASAKA (Master's student, GSGES, Kyoto University)
15. Intern Experience at the World Heritage Centre, UNESCO
    Toshinori TANAKA (Master's student, GSGES, Kyoto University)
16. Pastoralist and Water/Plant/NGOs under Drought - Kachchh, India
    Yoshihiko IIDA (Master's student, GSGES, Kyoto University)

17. Use of Forest Resources in the Upland Area of Central Vietnam
    Yuiko MURANAGA (Master's student, GSGES, Kyoto University)
18. Utilization of Fishery Ground and Resource Management in Sam-An Truyen Lagoon
    Yuki OKAMOTO (Master's student, GSGES, Kyoto University)
19. Research on Municipal Solid Waste in Hanoi, Vietnam
    Kousuke KAWAI (Graduate of GSGES, Kyoto University (Doctor of Global Environmental Studies, 2007))
20. Japan Overseas Cooperation Volunteer Experience in Nicaragua
    Kazu KAMEMURA (Graduate of GSGES, Kyoto University (Master of Global Environmental Studies, 2004))
21. Community-based Monitoring & Evaluation for Community Sustainability
    Aya OKADA (Graduate of GSGES, Kyoto University (Master of Global Environmental Studies, 2007))
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23. Characteristics and Use of Food Resources in Mountainous Vietnamese Villages
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Welcome Message from the President

Kazuo OIKE

President, Kyoto University

Global environmental problems, such as climate change, threaten the very basis of our life and survival. Recently, the importance of tackling these problems has been increasingly apparent. Recognizing that humankind in the 21st century is at a crossroads of its existence due to drastic anthropogenic ecosystem changes, Kyoto University has been conducting education and research for the sake of humanity's future.

In 2001, our university promulgated the Kyoto University Mission Statement in order to sustain and develop its historical commitment to academic freedom, and to pursue harmonious coexistence within human and ecological community on this planet. Within this mission statement, we clearly state that we strive for diverse development in pure and applied research in the humanities, sciences and technology, whilst simultaneously seeking to integrate these various disciplines. We also pledge ourselves to the promotion of education and international exchange in order to actively contribute to global well-being.

The year 2007 coincides with the 10th anniversary of the Kyoto Protocol and the 5th anniversary of the establishment of the Graduate School of Global Environmental Studies, Kyoto University. To mark this auspicious year, the 9th Kyoto University International Symposium will be a landmark event to present and disseminate multi-disciplinary scholarship of global environmental studies, with a view to applying that scholarship to policy design.

Human security is deeply dependent on environmental sustainability, the attainment of which requires the establishment and development of global environmental studies which combine the natural sciences, social sciences and humanities. For this reason, the principles in our mission statement will be of great relevance in considering the theme of this symposium: "Integrating Global Environmental Studies towards Human Security." Through conducting research and education activities such as this symposium, I firmly believe that we can accomplish our mission, and realize harmonious coexistence between all of the elements – human and non-human – which comprise the community of planet earth.

This symposium, in inviting various experts and practitioners from around the world, will provide an opportunity for active discussion on global environmental issues with the aim of integrating and developing new environmental studies. I sincerely hope that the achievements of this symposium will contribute to addressing global environmental issues which are of common concern to humankind, and to the future development of research and education in the field of global environmental studies.

Symposium Day 1 - June 22 -

Opening Remarks

Kazuo OIKE
President of Kyoto University

Good Afternoon Ladies and Gentlemen, my name is Kazuo Oike, and as Ms. Obata has already stated, this is the 9th Kyoto University International Symposium. The title of the symposium is "Integrating the Global Environmental Studies towards Human Security." These international symposia have been held as a university wide initiative since the year 2000. For the very first time we are holding the symposium here in Kyoto, at Kyoto University, so this is indeed an auspicious occasion.

As of this year, it has been ten years since the adoption of the Kyoto Protocol here in Kyoto, and it has been twenty years since the announcement of the Brundtland Committee Report, which first presented the notion of sustainable development, so this is indeed a year worthy of commemoration. In June of this year, the G-8 summit was held in Heiligendamm, Germany. At the G-8 summit the global warming issue was discussed as the most critical issue threatening the future of mankind. The global warming issue is strongly related to human security, and I hear that the term "climate security" was used during in the Summit.

Presenting for us today, we have Mr. Toshiro Kojima, vice minister for global environmental affairs from the Ministry of the Environment, and we also have Professor Alan Dupont, dean of the Center for International Security Studies at the University of Sydney. Global environmental issues, the most prominent among which is global warming, threaten our livelihoods and the foundation of our survival. The imperative to take up comprehensive initiatives to solve these issues is mounting. We are at a crossroads in terms of whether we can survive the changes in the natural environment which are being caused by our own actions.

Understanding environmental issues as being key issues of the 21st century, Kyoto University, has been actively involved in developing education and research to benefit the future of mankind. In 2001, Kyoto University drew up a mission statement in which it renewed its commitment to academic freedom, pledged to seek solutions to the diverse issues facing humanity and make a contribution to the harmonious coexistence of the global community. The mission statement is made up of eight points, including a pledge to strive for the development and integration of basic and applied research in the humanities and science and technology fields, and also a pledge to pursue harmonious coexistence within human and ecological community on this planet. We intend to make a contribution in those areas and to promote international exchange. It is very important to bear in mind the

philosophy contained in the mission statement when considering the topic of this symposium, as securing the sustainability of the environment is fundamental to human security. To this end we intend to develop global environmental studies which integrate our achievements in the natural sciences, the social sciences, and the humanities. In this way, we believe that we can make a contribution to harmonious coexistence within the global community. That is the aim of the university.

In this symposium, in addition to sharing our achievements in research and education in global environmental studies at our university, we are going to have contributions from experts and practitioners from Japan and overseas, and hope to hear their opinions on the future direction of environmental studies and consider their policy suggestions. We intend to send a message to the world. After the keynote presentations we are going to have a panel discussion. Tomorrow we will have three concurrent sessions which we hope will provide the opportunity for in in-depth exchanges of opinion.

I hope that this international symposium will provide a platform for active discussion, and for the integration and development of the study and research needed to deal with the global environmental issues which are currently being faced by mankind. I sincerely hope that our endeavors will be very fruitful. With these words I would like to close my speech. Thank you very much indeed for your attendance.

Opening Remarks

Masashi KAMON

Thank you for your kind introduction. My name is Masashi Kamon, and this year I am serving as dean of the Graduate School of Global Environmental Studies. It is a great pleasure to see so many people participating in this, the 9th Kyoto University International Symposium. I would like to extend my sincere thanks for your attendance. As the initial proposals for this symposium were made by the Graduate School of Global Environmental Studies, and as the graduate school's students and young faculty members were involved in much of the preparation, please allow me to say a few words to welcome all of the participants.

As President Oike mentioned, the year 2007 coincides with the 10th anniversary of the Kyoto Protocol, and this year also marks the 5th anniversary of the establishment of the Graduate School of Global Environmental Studies at Kyoto University.

In its Mission Statement, Kyoto University has pledged to pursue harmonious coexistence within human and ecological community on this planet. To achieve this objective Kyoto University will strive to generate world class knowledge, seek to integrate the humanities and science and technology fields, strengthen links with the local community as a university open to the community, and promote international exchange. These are exactly the same objectives that the Graduate School of Global Environmental Studies is trying to achieve. Established in April 2002, the Graduate School of Global Environment Studies is five years old. We have renewed our determination to fulfill the founding objective of the school, which is the firm establishment and strong development of new global environmental studies which aim to contribute to the wellbeing of the Earth.

In order to elucidate and solve global environmental issues, research must be conducted to analyze the overall effects of human action on the natural environment. Close links must also be formed between researchers in relevant science and technology fields and social systems that enable their advancement, so that a new philosophy of civilization can be formed that can contribute to striking a balance between sustainable development and a human society.

Unlike the conventional pursuit of economic advantage, efficiency and profit, we need to seek dignity for all human beings, and the harmonious development of society as a whole in order to achieve global well-being and harmonious coexistence within the human and ecological community on this planet.

This endeavor requires clear philosophical and ethical foundations to support the increasingly complex societies of the future. Going beyond the analytical tradition of modern Western science, a holistic understanding of the science of the East is necessary. The task is possible, as Kyoto University is capable of creating and disseminating new academic thoughts to the world, as the university continues to develop based on a tradition of Japanese culture nurtured in Kyoto.

Today and tomorrow, for the two-day program, the theme will be "Integrating Global Environmental Studies toward Human Security." Ms. Yuriko Koike, special advisor to the prime minister is not able to be with us today due to her having to attend a session of the Diet. However, she informed me by telephone that there may be a resolution made in the diet at around two o'clock today, and if possible, she will endeavor be with us at around 5:00 or 5:30. If she is able to do so, then we will be very happy to welcome her to the conference. We are also going to have a keynote speech by Professor Alan Dupont from the Center for International Security Studies at the University of Sydney, and on Ms. Koike's behalf we are going to hear from Mr. Toshiro Kojima, vice minister for global environmental affairs from the Ministry of the Environment, then finally we are going to have a panel discussion.

Tomorrow we will hold three parallel sessions together with poster presentations, and a general discussion. I sincerely hope that all of you will enjoy the program today and tomorrow. We have a simultaneous English and Japanese interpretation service today, but for tomorrow's program English will be the official language. I sincerely hope that many of you will participate in the two days' discussions so that we can make this symposium a success.

Thank you very much for your kind attention.

Keynote Speech

The Interaction between Environmental Security and Human Security

Alan DUPONT

Summary

In this paper I argue that a new class of environmental threats is emerging which have direct implications for the stability of states and human survival. Environmental degradation intensifies the problems of governance and development in poorer countries and precipitates trans-border and internal migration. The very existence of some states may be threatened by sea-level rise resulting from human-induced climate change. Access to food, energy and water is dependent on preserving and sustaining the earth's natural resource base.

However, it is the scale, gravity and interconnectedness of today's environmental ills that accounts for their new-found policy salience. At the beginning of the twenty-first century, the earth's physical environment is under unprecedented stress from the combined effects of reductions in arable land, soil fertility, potable water and critical natural resources due to overpopulation, pollution, deforestation and unsustainable development practices.

While ecological pressure may not be the ostensible or direct cause of military conflict, it is having a discernible impact on international security – far more than traditional security analyses have generally allowed. Military conflict is not the only yardstick for measuring the security-degrading effects of a deteriorating physical environment. Ecological factors will be increasingly important in shaping the economic and political environment and, by extension, its security environment. East Asia suffers from many tensions that have environmental sources, especially within states. Understanding security in East Asia therefore requires an understanding of environmental issues and their interaction with the other variables that cause conflict and instability.

In a world where the limits of sustainable development have already been breached, environmental scarcity will circumscribe the power of all states. Resource availability will become, in the words of Robert Mandel, 'a determining constraint, or a "ceiling," on national power', rather than a 'determining opportunity, or "floor," on national power.' States will be compelled to devote more capital and energy to preserving their natural resources from misuse, neglect and overexploitation. Developing states are particularly vulnerable to a range of atmospheric, terrestrial, and aquatic environmental pressures.

A degraded natural resource base will diminish the security of people, as well as states, pushing more people into penury, devaluing their lives and sometimes threatening their very survival. Environmental degradation resulting from human action cannot be compared with the random damage inflicted by naturally occurring earthquakes, tidal waves, storms and drought. The reality is that most contemporary environmental problems are caused by human actions. Unintended or not, the consequences of failing to preserve the physical environment will have direct consequences for the political and economic health of nation-states and the well-being of humankind.

Introduction

Embedded in the discourse of mainstream political and social history are well-documented accounts of human-induced environmental change and scarcity that resulted in economic decay, societal dislocation and death. Nearly 3700 years ago, the ancient Sumerians were forced to abandon their cities after discovering that their elaborate irrigation systems brought short-term bounty but eventually environmental disaster from rising levels of soil salinity and waterlogged agricultural fields. Overpopulation sowed the seeds of ultimate collapse for the tenth-century Mayan civilisation, while the demise of the old Norse settlement in Greenland at the end of the fifteenth century was in part due to significant climatic change. The decline of Greenland's sister colony in Iceland was a direct result of overgrazing and destruction of the forest cover, which allowed the harsh Icelandic weather to denude the island's fragile topsoil.[1]

In this paper I argue that a new class of environmental threats is emerging which have direct implications for the stability of states and human survival. Environmental degradation intensifies the problems of governance and development in poorer countries and precipitates trans-border and internal migration. The very existence of some states may be threatened by sea-level rise resulting from human-induced climate change. Access to food, energy and water is dependent on preserving and sustaining the earth's natural resource base. Environmental threats stem not from competition between states or shifts in the balance of power, but from human-induced disturbances to the fragile balance of nature, the consequences of which may be just as injurious to the integrity and functioning of states and their people as those resulting from military conflict. They may also be more difficult to reverse or repair, as global warming and the depletion of the ozone layer illustrate.

An extended definition of security accepts that abuse of the environment and scarcity of resources can be broadly destabilising and detrimental to human survival and represent the collective deprivation of all people and states. Deforestation results not only in the loss of a valuable resource for a local community or particular state. It can also trigger catastrophic flooding across national borders and contribute to widespread pollution and climate change that, in turn, may cause food shortages, population displacement, economic damage and death. Another important conceptual departure is the change to a circular mode of thinking which recognises that many of the security problems of the modern era do not have a distinct beginning, middle and end.

Conceived in this way, ecological breakdown is a root cause of migration, but the large-scale unregulated movement of people contributes, in turn, to environmental degradation. Both can cause conflict. The linear thinking and zero-sum calculations of traditional, security concepts, in which security is measured according to the relative losses and gains by competing nation-states, are of little use in understanding or assessing the threat from environmental degradation.

Human Security

Of course, threats comprise only part of the security problematique. There is also the question of the appropriate referent or object of security. Simply stated, who or what is to be protected? The state, the individual, or humanity at large? Realist notions of security assume that the security of the state is coterminous with that of the individual. This may be so in the world's genuine democracies but it is rarely the case in authoritarian or weak states, where governments may be responsible for violating or diminishing the security of their people.

There is increasing recognition of the need to distinguish between national security and individual, or human, security where the two clearly conflict. Advocates of human security go further and argue that the *who* or *what* of security should be the individual, as a rights-bearing person, or humanity in general, rather than the state. There are several permutations of this school of thought. The UN defines human security as safety from chronic threats such as hunger, disease and repression and 'protection from sudden and hurtful disruptions in the patterns of daily life'.[2] Others define the concept more broadly, maintaining that anything which reduces people's quality of life also diminishes their security,

just as anything that improves quality of life is an enhancement of human security.[3] Crucially, preserving the political sovereignty of the state is subordinated to protecting human rights and guaranteeing the safety and well-being of the individual. In effect, human security decouples security from national identity and the survival of the state.

Human security as a concept is not without its own failings. Its advocates need to explain better who is going to provide for 'the security of humankind' and how the concept can be effectively made operational.[4] There may be no clear answer to this particular dilemma because human security is more a statement of principle than a guide for action in areas such as defence and foreign policy. Protecting people from the manifold hurtful disruptions to daily life is a worthy societal goal, but giving meaningful effect to it may be problematic. Nevertheless, the concept of human security encapsulates a growing belief that the state is not the only legitimate object of security.

Environmental Security

Although the term 'environmental security' has firmly entrenched itself in the lexicon of international relations, there is considerable disagreement about its meaning and significance. In common with advocates of human security, many 'environmentalists' accept that security ought to extend beyond the boundaries of the state to include the individual as well as humanity in general, but others believe that environmental decline has an important security dimension mainly because it reduces state capacity (a measure of the ability of states to meet the basic nutritional, welfare and security requirements of their people).[5]

Sceptics contest the arguments of environmentalists on three grounds. First, they argue that it is misleading to conceive of environmental degradation as a threat to security since the traditional focus of national security is interstate or organised violence, which has little to do with environmental problems. There is a misfit between environmental well-being and national security from violence because of the differing degrees of intention involved. Violence is normally a highly directed human activity and combating it has little in common with environmental degradation, which is largely unintentional and has multiple causes. Should environmental stress be seen as a security issue simply because people die or are dispossessed as a consequence of it? If so, then how can this view of the link between the environment and conflict be reconciled with disease and crime, which 'routinely destroy life' but are not considered security threats, just as natural disasters are not events that threaten national security. Accordingly, attempts by environmentalists to redefine security more broadly only create conceptual muddle and 'sloppiness', resulting in a de-definition rather than a meaningful redefinition of security. If everything is a security matter, then nothing is.

Second, critics of the environmental case assert that the nexus between resource scarcity and conflict is weakening because there has been considerable progress in developing substitutes for many essential raw materials;[6] the robust character of the world trade system is lessening the resource vulnerability of national economies; and acquiring resources through military force is less attractive than it once was due to changing norms of state behaviour.

The first of these criticisms – that environmental issues fall outside the traditional focus of national security – is unconvincing. Even though many environmental threats are unrelated to state-sponsored violence, they can nevertheless imperil the state as well as human survival. Environmentalists are not asserting that all ecological threats have implications for security, but only those that demonstrably reduce the productive capacities of the state or result in significant political, social or military conflict. Most environmentalists do not argue that ecological stress is a discrete or direct cause of conflict but rather that a deteriorating physical environment can aggravate interstate tensions and domestic instability by interacting with other causes of conflict.

What of the contention that the nexus between resource scarcity and conflict is loosening, implying that the environmental case in this area is weak? It is certainly true that most of the world's non-renewable resources are already owned and protected under international law, which reduces the likelihood of conflict over them. There is also a greater range of substitutes for many strategically important metals and sources of energy, and a globalised economy can in theory deliver virtually any

commodity or service for a price, or at least encourage a move to cheaper alternatives. What critics tend to ignore, however, is the changing nature of resource scarcity and the impact of environmental decline on the capacity of states to meet the steadily rising demand for energy, food and water.

Environmental damage is creating new kinds of resource scarcity. The critical scarcities of the twenty-first century will be in resources that were once considered to be 'renewable', for which there are few, if any, substitutes. Water, forests and fresh air, as well as many plant and animal species, are being exploited to such an extent that they are becoming 'functionally non-renewable'. It is the assault on the planet's primary renewable resources, the abuse of the 'global commons', which differentiates the resource scarcity of this era from that of the past. These environmental scarcities do not mandate conflict nor, in most cases, will they become serious enough to jeopardise the survival of people or states. But they will add to the economic and resource pressures on governments in developing countries, heighten concerns about future food, water and energy security, and exacerbate disputes over contested river basins and areas that are rich in forests and fish.

East Asia

In East Asia, environmental degradation is heightening anxieties about future supplies of energy and water at a time when the security margins for both are becoming disconcertingly thin. While there is no absolute shortage of oil, concerns about energy security are rooted in the region's limited reserves of oil and rising demand for electricity and transport. Environmental issues will complicate energy choices as the transition from highly polluting fossil fuels to cleaner sources of energy gathers speed. In the short term this may exacerbate oil shortages resulting from sudden price rises, distribution problems or disruptions to supply, adding to strategic uncertainty. The perception that oil may become scarce, or more expensive, is accentuating friction over unresolved maritime disputes, while the region's dependence on oil from the volatile Middle East is increasing.

Once considered abundant and free, fresh water is becoming scarce and more expensive. It is an open question as to whether or not conservation and technological improvements will allow governments to manage future water shortages without conflict. The extent of the problem will vary significantly within and between states. China, Indonesia, Singapore and Thailand suffer endemic water shortages and other states may soon be affected. Long-term trends in use and supply point towards an accelerating deterioration in the region's reserves of fresh water. There is little prospect of reversing the trend without substantial and meaningful regional cooperation.

Water disputes in Southeast Asia have the capacity to widen tensions between Malaysia and Singapore, and eventually to reawaken traditional animosities between the riparian states of the Mekong River. Aside from its importance for industry, the declining availability of fresh water will heighten regional insecurity because of irrigation's critical role in hydro-electricity generation and rice-growing. Indeed, water's central importance to food production may well prove to be the most fundamental security linkage of all. Damage to the global maritime environment from overfishing, pollution, urbanisation and the degradation of ecologically sensitive marine coastal environments is particularly severe in Asia. Fishing disputes have become an increasingly frequent cause of naval clashes in the Pacific Ocean and the South China Sea. Governments which routinely proclaimed the mantra that 'growth is good' now accept that there are finite limits to resources once considered inexhaustible and 'free'.

Deforestation, Pollution and Climate Change

Deforestation, pollution and climate change are three environmental variables that are key indicators of the health of the biosphere and of the resource base on which humanity depends for its wealth and well-being. Deforestation and pollution of the water, soil and air are symptomatic of their parlous state as well as primary causes of environmental degradation, especially in East Asia, which is one of the regions most at risk. Rapid and substantial climate change in this century, which will directly affect food production and cause major population displacements, seems inevitable.

The symbiotic relationship between deforestation, pollution and climate change typifies the circular, interconnected weave of today's environmental ills. Deforestation is responsible for soil erosion, acute flooding and some of the greenhouse gases that are contributing to global warming and rising sea levels. Air pollution adds to global warming and creates acid rain that eventually falls back to earth, killing trees and marine life and polluting the soil. If these were isolated developments there would be little cause for concern. They are, however, widespread and it is virtually certain that deforestation, pollution and climate change will accelerate in the decades ahead.

Forest loss, worsening pollution and the rise in greenhouse gases all have potentially serious long-term implications for security, although not necessarily in the way that traditionalists conceive. Deforestation and security are linked in two ways. Logging and land-clearance practices that alienate indigenous communities who rely on the forests for their livelihood may lead to violent confrontation and deaths. But the real impact of deforestation is best measured in terms of population displacements, increases in greenhouse gases and crop damage resulting from the exposure of the soil to drought and flood-induced erosion. Floods that occur primarily as a result of human actions are a mounting cause of death and destruction, sometimes on a massive scale, as the Yangtse floods of 1998 tragically demonstrated. Worsening pollution is the unwanted legacy of East Asia's rapid economic development and is already a major environmental policy issue for the region's governments.

Pollution may be the unintended side-effect of the economic, social, environmental and demographic forces shaping East Asia's strategic environment, but it also has a security dynamic of its own. Smog from fires, acid rain, oil spills and toxic waste is an emerging source of contention between East Asian states, and its effects on human security is palpable and growing. For the millions of ordinary people whose livelihoods and health have been jeopardised, combating East Asia's worsening air, land and maritime pollution is more than just a social or environmental issue.

Even if the region returns to strong economic growth, pollution will continue to degrade the food chain and place further pressure on the region's agriculture and fresh-water resources. Pollution also kills people directly. Of the 2.7 million pollution-related deaths that occur globally every year, half are in Asia. Under economic and demographic duress, governments are more likely to pursue 'grow first, clean up later' policies that sacrifice sustainable development to political expediency. However, delaying rather than attacking the causes of pollution merely worsens the problem and shifts the burden of action to future generations, thereby increasing their insecurity.

Moreover, pollution and deforestation are responsible for the rise in greenhouse gases that are at the heart of concerns about global climate change. Rapid climate change now seems inevitable in this century. Some states could be profoundly affected, others less so, and not all climate change will be deleterious. However, the economic cost alone of managing climate change will be substantial, particularly if sea-level rise forces large numbers of urban dwellers to relocate and if fertile coastal strips, crucial to cropping and grazing, are rendered unusable by salt water intrusion. Fluctuations in rainfall patterns and greater temperature extremes could disrupt agriculture and worsen food, water and resource scarcity. More extreme weather patterns are also likely to result in greater death and destruction from natural disasters, adding to the burden on poorer states.

On the evidence to date, it is difficult to see climate change alone inducing major reconfigurations of the regional or global balance of power. Shifts of this order presuppose substantial redistributions of the relative productive capacities of nation-states, but current climate models are still not accurate enough to describe in detail how individual states will be affected. Even so, there is now sufficient data to conclude that the rate and degree of climate change in the twenty-first century will be of a magnitude never before experienced in human history. The net security consequences are unlikely to be benign, especially for developing states which, as Peter Gleick noted long ago,'are least responsible for the production of greenhouse gases, least able to adapt or mitigate the changes, and [have] little international or political clout'.[7] Regardless of the steps taken to cap and reduce greenhouse gas emissions, the rate of global warming and consequent climate change is unlikely to be reversed soon because of the build-up of greenhouse gases that has already taken place.

Climate change will further complicate East Asia's future security environment because weather extremes and greater fluctuations in rainfall and temperatures have the capacity to refashion the region's productive landscape and exacerbate food, water and resource scarcity in a relatively short time-span. If repetitive floods, or prolonged droughts, were to create even short-term food and water

shortages during times of rising social and political tensions, regional governments might find themselves hard pressed to deal with these exigencies. Sea-level rise is of particular concern because of the density of coastal populations and the potential for large-scale displacements of people.

Most of Asia's densest aggregations of people and productive lands are on, or near, the coast, including the cities of Shanghai, Tianjin, Guanzhou, Hong Kong, Tokyo, Jakarta, Manila, Bangkok, Singapore, Mumbai and Dhaka. The areas under greatest threat are the Yellow and Yangtse River deltas in China, Manila Bay in the Philippines, the low lying coastal fringes of Sumatra, Kalimantan and Java in Indonesia, and the Mekong, Chao Phraya and Irrawaddy deltas in Vietnam, Thailand and Myanmar respectively. Many of these locations have not previously been susceptible to climate induced risks and their vulnerability has increased due to extensive urbanisation and human settlement in coastal and riverine environments, exacerbated by extensive land use clearance. Heightening the risk is the fact that several large Asian cities are susceptible to cyclones driven by warm expanses of water that form in the west equatorial Pacific Ocean during summer. These cyclones produce strong tidal surges, especially in La Niña years, which can greatly increase the severity of coastal flooding and the consequent threat to lives, infrastructure, agriculture and fresh water.[8]

There are also concerns that climate change might cause mass migrations of environmental refugees and displaced persons, with serious consequences for international security. In the future, environmental refugees may constitute the fastest growing proportion of refugees globally. Norman Myers expects that by 2050 up to 150 million people may be displaced by the impact of global warming. Much of the anticipated impact will be in Asia because of the large number of cities and population aggregations on the coast. Asia already hosts more refugees and internally displaced people than any other region of the world. But climate change could add many more. Myers estimates that up to 26 million people in Bangladesh are at risk from sea-level rise, 73 million in China and 20 million in India.[9]

The economic costs of managing the effects of climate change are likely to be substantial; they will include reduced economic growth and depressed incomes, which will circumscribe the ability of developing states to meet the rising aspirations of their people. Anticipating and preparing for the consequences of climate change will also compound the already formidable problems of governance. For the developing states of East Asia, global warming will prove an unwelcome additional challenge to security which will be difficult to combat without meaningful regional cooperation.

Conclusion

It is true that some environmentalists have been guilty of alarmist talk of the effects of ecological degradation, conjuring up images of massive environmental breakdown leading to violent conflict and, eventually, social and political anarchy in the developing world. Those who see a close connection between environmental degradation and military conflict exaggerate their case: there are few examples of environmental problems being the primary cause of major sub-national conflicts or interstate wars. It must be remembered, however, that war is usually the result of multiple forces and there is little agreement on the identity and primacy of its causal variables.[10]

While ecological pressure may not be the ostensible or direct cause of military conflict, it is having a discernible impact on international security – far more than traditional security analyses have generally allowed. Military conflict is not the only yardstick for measuring the security-degrading effects of a deteriorating physical environment. Ecological factors will be increasingly important in shaping the economic and political environment and, by extension, its security environment. East Asia suffers from many tensions that have environmental sources, especially within states. Understanding security in East Asia therefore requires an understanding of environmental issues and their interaction with the other variables that cause conflict and instability.

In a world where the limits of sustainable development have already been breached, environmental scarcity will circumscribe the power of all states. Resource availability will become, in the words of Robert Mandel, 'a determining constraint, or a "ceiling", on national power', rather than a 'determining opportunity, or "floor", on national power'.[11] States will be compelled to devote more

capital and energy to preserving their natural resources from misuse, neglect and overexploitation. Developing states are particularly vulnerable to a range of atmospheric, terrestrial, and aquatic environmental pressures.

A degraded natural resource base will diminish the security of people, as well as states, pushing more people into penury, devaluing their lives and sometimes threatening their very survival. Environmental degradation resulting from human action cannot be compared with the random damage inflicted by naturally occurring earthquakes, tidal waves, storms and drought. The reality is that most contemporary environmental problems are caused by human actions. Unintended or not, the consequences of failing to preserve the physical environment will have direct consequences for the political and economic health of nation-states and the well-being of humankind.

[1] Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe,* 900–1900 (Cambridge University Press, 1986), p. 53.

[2] UNDP, *Human Development Report 1999: Globalization with a Human Face*, www.undp.org/hdro/Backmatter2.pdf. The late Japanese Prime Minister, Keizo Obuchi, declared that human security would be one of the essential principles of Japan's foreign policy: Ramesh Thakur and Steve Lee, 'Defining New Goals for Diplomacy of the 21st Century', *International Herald Tribune* 19 January 2000, p. 8.

[3] Ramesh Thakur, 'From National to Human Security', in Stuart Harris and Andrew Mack (eds), *Asia-Pacific Security: The Economics-Politics Nexus* (Allen & Unwin, Sydney, 1997), pp. 53–4.

[4] See Barry Buzan, 'Human Security: What it Means, and what it Entails', paper presented at the 14th Asia-Pacific Roundtable, 3–7 June 2000, particularly pp. 3–7; Ole Waever, 'Securitization and Desecuritization', in Ronnie Lipschutz (ed.), *On Security* (Columbia University Press, New York, 1995).

[5] The term 'environmentalists' is used here not in its general sense but rather to denote those who share the view that there is a discrete and important environmental dimension to security which has been neglected in the traditional security literature.

[6] For example, glass in fibre-optic cabling is replacing copper as a communication conduit and composite materials are lessening the amount of steel used in automobiles and aircraft.

[7] Peter H. Gleick, 'How Will Climatic Changes and Strategies for the Control of Greenhouse-Gas Emissions Influence International Peace and Global Security?', in G. I. Pearman (ed.), *Limiting Greenhouse Effects: Controlling Carbon Dioxide Emission: report of the Dahlem Workshop on Limiting the Greenhouse Effect: Options for Controlling Atmospheric Carbon Dioxide Accumulation* (John Wiley & Sons, Chichester, West Essex, England, 1992), p. 565.

[8] Kelly and Adger, 2000 cited in McCarthy, Canziani, Leary, Dokken and White, eds., *Climate change 2001: impacts, adaptation, and vulnerability - contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change*, section 11.2.4.5, at http://www.grida.no/climate/ipcc_tar/wg2/445.htm.

[9] The risk is from starvation, disease, poverty and the effects of forced displacement. Norman Myers, *Global Population Growth* (paper presented at the Seminar on Global Security Beyond 2000, University of Pittsburgh, 2 November 1995), pp 17-18 and Norman Myers, Environmental refugees: a growing phenomenon of the 21st century. *Philosophical Transactions of the Royal Society B* 357 (1420) 2002. According to Myers there were 25 million environmental refugees around the world in 1995 compared with 23 million 'traditional refugees'.

[10] Jack Levy, 'The Causes of War: A Review of Theories and Evidence', in Philip E. Tetlock et al. (eds), *Behavior, Society, and Nuclear War*, vol. 1 (Oxford University Press, 1989), p. 210.

[11] See Robert Mandel's comments in Richard Shultz, Roy Godson and Ted Greenwood (eds), *Security Studies for the* 1990s (Brasseys, New York 1993), p. 347.

Keynote Speech

“Climate Security”

Toshiro KOJIMA

I am Toshiro Kojima, vice minister for global environmental affairs of the Ministry of the Environment, Government of Japan.

The title of this speech is “The Notion of Climate Security.” one example of the international community’s response to climate change was the 1992 Earth Summit in Rio de Janeiro. Efforts were being made to establish the UNFCCC, the United Nations Framework Convention on Climate Change. They were to have come to an agreement for the convention by the time of Rio Summit in 1992. There was an understanding that unless there was a deadline for the agreement, the negotiations would go on forever, and the Rio Summit was that deadline.

This is a framework convention, and I believe it is well conceived; however, it is also accompanied by a set of problems. The convention was geared to addressing global warming and climate change with the ultimate objective of stabilizing the concentrations of greenhouse gas in the atmosphere at levels that would not adversely affect the ecosystem and mankind. Various measures would be necessary in order to achieve this objective; however, binding targets were not established. It is a rather lengthy and wordy agreement expressing the desired goal of having developed nations stabilize greenhouse gas emissions at 1990 levels by the year 2000. It soon became apparent that it would not be possible to achieve this target, and it was recognized that a protocol was required.

In 1995 the First Meeting of the Conference of the Parties (COP-1) was held in Berlin. The current Chancellor of Germany, Ms. Angela Merkel, was working on this process at that time. In 1997 COP-3 was held, and it was decided that a protocol should be adopted. As of 1995, the process was oriented toward establishing numerical targets for developed nations. Targets were not to be set for China and India, only for developed countries. The UNFCCC stated that developed nations would be required to stabilize greenhouse gas (GHG) emissions at 1990 levels. This was only a general statement, however, so the Kyoto Protocol had to establish more concrete targets. We should not forget this history, as people often talk about things while forgetting the history behind them. Developed nations were to take the initiative in reducing greenhouse gas emissions. That was the spirit of the convention.

So, legally binding targets were set for the developed countries, as proposed by the United States at the COP-2 meeting, which is completely the opposite of the current position of the United States. In those days, the United States was focusing on the concept of emission trading. And with such economic measures, if you are to make an international adjustment, then the targets for the developed

nations should be obligatory targets. Based on the proposal by the United States in COP-2, it was agreed that the targets for the developed nations would be legally binding. The numerical target for developed nations had been discussed at COP-3 in Kyoto in 1997, and as you may know, Japan's target was a reduction of 6%, the EU 7%, and the US 8%. A five year period to commence in 2008 was set to meet those targets. "Were these the right figures?" "Maybe 5-6-7 would have been better." There were a number of opinions regarding the actual targets. The targets were agreed upon during telephone negotiations between President Clinton, Prime Minister Hashimoto, and others at the presidential and prime ministerial level. There were those who protested that 6% was too high a target to be met by Japan.

Up till the Marrakesh Conference, there had been a whole range of negotiations. At the Kyoto meeting negotiations, Japan initially proposed a 2.5% reduction target for developed countries with an allowance of 2% for Japan, implying a 0.5% reduction in reality. At the end of the negotiations, a reduction target of 6% was accepted by Japan with additional clauses for sinks and the Clean Development Mechanism (CDM). Japan was initially against sinks and the Kyoto mechanisms, but taking them into account, the GHG emission reduction would have been the equivalent of only 0.5% which did not represent a significant change from our initial intention. So we agreed to sinks and the Kyoto mechanisms.

At the Heiligendamm Summit, Prime Minister Abe reiterated the need to meet the 6% reduction we'd committed to, as Japan would not be able to take a leadership role in this important issue in the international community otherwise. The first commitment period ending in 2013 has been a frequent subject of discussion in the international community, but not in Japan.

The title of this symposium is "Integrating Global Environmental Studies towards Human Security," so I would like to begin my discussion of climate security by asserting that climate issues are an important part of human security. This point was also recently made by the permanent representative of Japan to the United Nations, Mr. Kenzo Oshima at the UN Security Council.

What is the background of the term "climate security?" The term was used in the Stern Review which was issued in the UK last year. At the Gleneagles Summit, held in 2005, UK Prime Minister Tony Blair stated that Africa and climate change were the two critical issues for the summit, and that the UK strategy toward the climate was very systematic and well organized. There were three reasons cited by the US for its opposition to the Kyoto Protocol: lack of scientific evidence; the non-involvement of developing nations; and an adverse impact on the economy. Regarding the first reason, Mr. Blair repeatedly discussed the issue with US President George W. Bush at Gleneagles, and there was a communiqué. In the communiqué, Mr. Bush says that climate change is caused by humans.

This indicates that Mr. Blair was successful in persuading Mr. Bush on the first point. With respect to the second point, Mr. Blair came up with the Gleneagles Process, which adds the countries of South Africa, Brazil, Mexico, China, India and other countries to the top five emitters from the G-8 countries to form the G-20. The first meeting was held in the UK, the second in Mexico, the third in Germany, and the final meeting will be held in March 2008 in Japan, in Chiba at Makuhari Messe international convention complex. So, we face the great challenge of showing leadership in the forthcoming G-20 meeting. The final reason cited by the US was addressed in a report prepared in the UK over the course of an entire year by the former chief economist of the World Bank, Nicholas Stern: "The Stern Review." Mr. Stern had a team of more than twenty researchers from the Ministry of Finance who participated in drawing up the report. This report was a very organized response to the third point cited by the US for its opposition to the Kyoto Protocol, and had a strong impact on international negotiations.

The report compares the cost of action to the cost of inaction, and concludes that the cost of inaction would be greater. One particularly important passage reads, "Our actions over the coming few decades could create risks of major disruption to economic and social activity, later in this century and in the next, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century. "

Following the Stern Review, the US has begun to show increased flexibility. The US has been very sensitive to security issues, in general. The US Senate adopted the Lugar-Biden Climate Change Resolution, which holds that climate change would certainly have a serious impact on US security. In the same manner, for example, as the conflict in Sudan, where the increase in refugees and hunger would lead to more regional instability, which in turn could have repercussions internationally. The Lugar-Biden Resolution therefore clearly represents the stance of the US for negotiations. It is important that we have the US taking part in international negotiations taking place in the UN and other forums, and to eventually sign a legally binding agreement. This would protect the security of the United States. However, there is differentiated responsibility. The major emitters would have to agree to reductions and the participating developing countries should have a lower burden. We should come up with an international agreement, and there should be larger cuts in harmful emissions worldwide. When participating in international negotiations, the US adopts a stance based on the Lugar-Biden Resolution.

The United Nations has raised the priority level for climate change. At the twelfth session of the Conference of the Parties to the Climate Change Convention (COP-12), in Nairobi, former UN Secretary General Kofi Annan stated that climate change is a threat pertaining not only to environmental issues, but to every field imaginable. The new Secretary General Mr. Ban Ki-moon also

says that climate change is one of the highest priority security issues. At an April meeting of the UNSC chaired by the UK, Prime Minster Blair proposed that climate change become the agenda for the meeting, and persuaded the other members to adopt that agenda. UK Foreign Minister Ms. Margaret Becket took the initiative in discussing this issue, and it was an epoch making meeting. Mr. Ban then designated three special envoys, and decided to have a high level meeting on climate change on the 24th of September, just before the UN General Assembly. These actions have been very effective in raising the priority level of the climate change issue across the UN.

What are the implications of climate change? There have been many discussions, and the fourth report of the Intergovernmental Panel on Climate Change (IPCC) is being prepared. The first, second and third working groups are currently finalizing the report. The fourth report will state that the degree of certainty that climate change is caused by human activity is 90%, putting an end to that question. Regarding security, the Stern Review clarified the cost of inaction, likening the consequences to those of the two world wars and the great depression, and estimated that the economic cost would be the equivalent of 5-20% of the GDP. The IPCC estimates the economic impact at 1-5% of GDP. Some have said that the Stern Review is too pessimistic, but the basic issue is whether we accept the premise that the cost of action is lower than the cost of inaction. The issue is whether we are going to accept this assumption or not, as we try to implement effective measures. The Stern Review may highlight a perception gap between economists and policy makers.

The practice of discounting future value or undervaluing human life in economic calculation is contrary to common sense. I have discussed these issues with Dr. Stern. His estimation of 5-20% is based on the cumulative burden through to the year 2200, and assumes that the cost will be paid every year. The actual damage per year will increase as we approach 2200. So 5-20% is an approximation. But health, the environment, and ecosystems are areas that are quite difficult to assess in terms of monetary value; 11% has been proposed. There are vulnerable areas such as Bangladesh and island countries, for example, and the estimated cost for those areas may be a conservative estimate. The loss of 100 Americans and the loss of 100 Bangladesh may be estimated to be different in economic terms, and that would pose ethical problems. The loss of human beings is regarded as 20% of the GDP. So the Stern Review adopts a view somewhat different to that based on economics rationality.

What are the links between security and climate change? Traditionally when we have discussed security, we have focused on security related to military threats – about the territorial integrity of the state, and the efforts of the state to protect the lives and property of the people from military threats and external attack, including terrorism. The state is supposed to take necessary measures to achieve such security, including military measures. In the case of Japan, after WWII, military measures have been prohibited. Whenever we discuss the issue of security in Japan, the concept of human security

has been at the forefront of our discussions. We have been quite eager to promote the concept of human security, because this concept is not limited to traditional threats like threats from across the border, but includes human displacement, drugs, international terrorism, and other threats to individuals. Japan regards human security as an important issue, and we have made efforts to contribute to its advancement in the forum of the United Nations. The concept of "comprehensive security" was advanced by Prime Minister Ohira. Not only military measures, but also non-military measures are considered important in Japan's efforts to protect its security. The promotion of non-military measures to protect the country's security is a notion that is quite suitable to the situation of Japan. With respect to the issue of climate security, we have to determine what the threat is and how to protect ourselves against it. Basically, the state must protect the nation from threats, but it is quite difficult to determine who causes the threat with respect to climate change. Businesses and citizens may also be regarded as agents contributing to the causes of the problem as producers of greenhouse gases. So, all stakeholders must be regarded as agents of climate change.

What is to be protected? As the United Nations Framework Convention on Climate Change mentions, agricultural activity, economic activity, the safety of human beings, and the safety of the ecosystem for the current and future generations are to be protected. What are the direct threats? The impact from typhoons, damage from droughts that kill people and damage to property are typical examples of threats. In the case of Japan, we depend on imports for a large percentage of our food, and cannot guarantee food security based on the domestic level of production. We import a lot of foodstuffs from Argentina and the USA. So, with soybeans, for example, which is an important ingredient in many types of traditional Japanese food, we have to pay attention to what is happening in the United States and other producer countries. We need to reduce emissions, but whenever an impact is unavoidable, we have to think of how we can adapt to the situation at hand. Both mitigation and adaptation are necessary.

When I was in elementary school, I experienced the Ise Bay typhoon, which resulted in the deaths of 5,000 people in the Nagoya area. Typhoons of the same size have since hit the same area, but the damage was not so serious because of better preparedness against typhoons in Japanese society today. If a developing country is hit by a typhoon of the same size as the Ise Bay typhoon, the damage to human lives is likely to be similar to what we suffered back in 1960. So it is quite important that we reduce the vulnerability of such countries, as the disasters themselves are not avoidable.

What policies can be based on the concept of climate security? Climate security has been widely discussed in the United Nations recently. Security issues are very important, because they have a lot to do with the survival of the state. In the case of small island nations, states may disappear due to the non-military threat of rising sea levels, the loss of fresh water, and damage caused by surges. People

may be forcibly displaced and the country itself may disappear into the sea. It is clear that this is a security issue. This type of impact is faced only by small island nations, not, for example, by India or Japan. However, countries that are vulnerable to such threats could lose their land without there having been a military invasion, and that represents a very serious problem for those countries.

What can the international community do? We must achieve low carbon societies, and growth based on low carbon must be secured. The target is to reduce emissions by half by 2050. That was the major discussion in Heiligendamm. There may be a wide margin of error, but CO_2 emissions stand at 7.2 billion tons, and the capacity of carbon sinks is only 3.1 billion tons. So emissions are currently about double the capacity of the sinks. It is clear that greenhouse gas levels are rising. Stopping global warming is a campaign, but that means we need to at least stabilize greenhouse gas emissions or the climate will deteriorate. We need to reduce greenhouse gas emissions by half.

How can we achieve an economy that will produce only 3.5 billion tons by 2050? If the population is 10 million, that equates to basically 0.3 tons per person. In countries such as China and India, if they decide to do the same, the target per capita level of CO_2 emissions would be 0.3 tons per person, which would be quite difficult to achieve. But we need the political determination and political will to make it happen. International negotiations have now recognized that global society must take early measures. The threat of climate change is now recognized as a security issue, and if that is the prevailing concept the priority given to climate issues should increase. There was a question concerning the Copenhagen Consensus, and I think that this has to do with a question of priority. The implications of climate change are going to be very big according to the IPCC and the Stern Review, which came after the Copenhagen Consensus. Efforts towards sustainable development or efforts by the UN to try to eliminate poverty and promote economic growth will come to nothing if measures against climate change are not taken. The UN has come to realize the importance of climate issues, otherwise efforts in other areas will be meaningless.

Japan is promoting and guaranteeing security through non-military measures, and we feel that we can do a lot in this regard. Before the Heiligendamm Summit, Mr. Abe came up with a new program to cool the earth by 2050. In the EU we had discussions regarding the determination of the base year. Japan has been saying that there should be a common understanding among the major emitters and also all over of the world concerning sources and sinks. Prime Minister Abe is proposing that there be no changes to sources and sinks, and that emissions should be halved. This is the minimum that we have to achieve. He has been trying to achieve a consensus on this issue. We are wondering if it will be possible to discuss this issue as part of the agenda of the COP-13 and CMP-3 meetings in Bali in December, or include the concept as part of a resolution. We are realizing that there are many difficulties to be overcome to introduce this concept into international negotiations. Prime Minister

Abe talked about three principles: the participation of major emitters; a flexible and diverse framework; and the compatibility between environmental protection and economic development. The Kyoto Protocol divided the world into two communities: developed countries and developing countries. According to Prime Minister Abe the world is divided into four communities: developed countries; major emitting developing countries; other developing countries; and countries which are vulnerable to the impact of climate change. So he maintains that there should be four categories to consider in discussions regarding emissions reduction.

Let me add that concerning the issue of climate security, we have to determine if the climate can be a security issue or not. I agree with Prime Minister Blair and Foreign Minister Beckett that the discussions held by the UNSC meeting in April were quite epoch making. I am personally involved in international negotiations, and have frequently wondered why certain discussions were necessary, as I was quite pessimistic that a positive result could be achieved. We engage in negotiations on the climate issue because we feel that the issue of climate change is a threat, that the cost of inaction would be a threat to peoples' lives and industrial activity, which is why we discuss goals and measures for achieving those goals. In reality, however, when implementing measures against climate change, in terms of hampering the economic growth of nations and businesses, the cost of taking action also poses threats. So, which are the real threats?

We are aware that the cost of inaction represents a serious threat. What mitigating measures can be taken? According to Stern, the global community should aim to stabilize GHG emissions in the range of 450-550 parts per million carbon dioxide equivalent (ppm CO2e), and we should achieve a primary balance between emissions and removal so that the emissions levels are reduced by 2050. The rate of Category 1 and Category 2 emissions has to be slowed down by 2020. The IPCC says that we have to reduce emissions by half in order to keep the rise in global mean surface temperature to 2-3 degrees Celsius, but the issue is whether or not these basic assumptions can serve as the basis of international negotiations. Currently, many countries see the adoption of measures against climate change as a threat. So in reality, countries are attempting to avoid such negotiations. Only when it is necessary and at the last minute are states willing to participate in negotiations and adopt measures against climate change. Many states are saying that, although some island countries may be submerging, it's not my country; it's someone else's country, so they don't want to adopt measures. In order to change the attitudes of those countries, it is necessary to convince them that the cost of inaction is a serious threat.

Thank you very much for your kind attention. I will be happy to answer any questions you may have during the panel discussion.

Summarized by Kazuo MATSUSHITA, Ainslie KERR

Panel Discussion

Summary of Panel Discussion

The panel discussion began with opening remarks by **Professor Kazuo Matsushita**. The purpose of the panel was to discuss crucial global environmental issues and to identify the ways in which those issues are linked to the issues of human security. The discussion covered both theoretical and field issues.

The discussion proper began with comments from **Professor C. M. M. Bandara**. Professor Bandara stressed three basic issues relating to human security:

- One of the greatest environmental threats is concerned with water resources, notably the lack of safe sanitation. These issues have political aspects.
- Other threats to human security include economic, food, health and personal security threats, as well as threats to community and political security.
- The third issue raised by Dr. Bandara, education and research, brought into focus the need for re-thinking the form of education that should be developed to address the environmental issues that threaten human security.

Professor Bandara also stressed on the need for community security in contrast to individual security. While in some areas human security is linked to individual security, family and community ties should not be ignored. Citing an example from the 2004 Indian Ocean Tsunami Disaster in Sri Lanka, the professor explained that the role of the community is important in enhancing human security. Lastly, Professor Bandara also commented on the spiritual dimension of human security, which can be linked to other issues such as like environmental, economic and social sustainability.

The second set of comments was from **Associate Professor Rajib Shaw**. Professor Shaw stressed that the concept of human security goes beyond the traditional understanding of security as a state-centered concept related to threats and conflict, and asserted that more emphasis should be placed on a people-centered concept that focuses on enabling individuals and communities to respond and adapt to changes, whether by reducing vulnerability or by challenging the drivers of environmental change. The professor discussed the importance of the balance between “human” issues and “security” issues, citing two examples: one from Hue in central Vietnam, where human security is linked to climate change adaptation and its impacts on local agricultural livelihood. In that case, human security is related to livelihood security. The other example was from the southern part of India, where costal zone management is dependent on the participation of local communities and information sharing at the local level. The concept of human security in that case is related to information security. In summary, the professor concluded his remarks with two specific issues of human security: one concerned with the community dimension of human security, and the other related to the process-based approach to human security.

The third set of comments was from **Professor Takamitsu Sawa**. Professor Sawa spoke about the economic development of Japan and other countries. The professor discussed the economic development of Japan, Korea and China versus that of the western world. The concept of a “harmony based society” has been discussed in various ways with regards to the economic development of many countries. Citing the example of the Japanese government’s campaign to reduce greenhouse gasses (GHG), the professor stressed that climate change should be one of the crucial issues of human security, and that the setting of achievable targets is another important dimension of dealing with human security issues at the global level. The professor also asserted the importance of innovation

with regards to achieving human security, which will be related to developing new technologies to cope with new demands.

Based on the presentations of the three panelists, **Professor Alan Dupont** made the following comments:

- It is necessary to develop a firewall to enhance security at different levels. This should include security for food, energy and water – the three basic requirements of human beings.
- A transition strategy is required to enhance human security, including a transition from state based security to community based security.
- Climate change issues are at the core of the human security concept, including the consequences of human actions on the natural ecosystem.
- Consequence management is an important dimension of human security.

Vice-Minister Toshiro Kojima commented on the Japanese experience of human security, stressing that:

- UN negotiation is a process for solving human security issues in developed and developing countries.
- The cost of climate change adaptation is a concern in enhancing human security.
- Local political commitment is extremely important in enhancing human security.
- It is necessary to combine human security issues with poverty reduction and local environmental management.

In response to the questions and comments from the floor, **Professor Bandara** further stressed the role of indigenous knowledge and know-how in enhancing human security, also pointing out that learning from the past is an important element in this regard. **Professor Shaw** stressed the importance of demystifying the human security concept, and enhancing human security issues through process technology (involving people and different stakeholders in a participating process is regarded as process technology). The professor mentioned that professionals and academics should come out of their comfort zone to work in inter- and multi-disciplinary ways to enhance human security.

Finally, **Professor Matsushita** summarized the panel discussion with the following points:

- The balance of sustainable development, environmental management and human security is important.
- Human security and its relationship to global environmental issues such as climate change are highly relevant when considering human security.
- A balance of state and community security is needed for human security.
- While technological innovation is needed, it is also equally important to look at indigenous knowledge and traditional wisdom.
- Actions related to human security are more process-oriented rather than generating specific products to enhance security. A multi-disciplinary approach is needed in this regard.

Summarized by Rajib SHAW

Points of Discussion by **C. M. M. BANDARA**

Global Environmental Studies for Human Security

Despite the varying emphases of different speakers, the general theme of the conference seems to revolve around three key concepts, namely environment, security and education. The term 'human security' is in itself a neologism that has gained much currency in recent times in some countries of the west, and, as with many other such phrases that preceded it, may have its own life cycle. Nevertheless, human security as often observed, may take several dimensions among which environmental security performs an important role. Environmental security aims to protect people from the short- and long-term ravages of nature, man-made threats to nature, and deterioration of the natural environment. In developing countries, one of the greatest environmental threats is attributed to water resources, involving the lack of safe sanitation, and even causing political concerns. In industrial countries, and in some newly industrializing countries, one of the major threats to human security is air pollution. Global warming, caused by the emission of greenhouse gases, often adds more feul to the environmental security issue.

Other forms of threat to human security include economic, food, health and personal security as well as community and political security. It appears that, all these are related in some way or another to environmental security. If each sector is taken separately, that in itself can create situations where conflicts of interest may occur, threatening the very course of ensuring the much needed human security.

The third concept, education and research, brings into focus the need for re-thinking the form of education that should be evolved to address the environmental issues that threaten human security. Since the advent of the concept of 'sustainable development,' some attempts have been made towards the development of 'education for sustainability.' While this approach is very broad-based and often suffers from lack of clarity, more targeted approaches are needed to address the questions of human security. In any event the education available in the present curricula of universities and higher educational institutions is understandably inadequate in dealing with the environmental concerns of modern society. This is been exemplified by the recent tsunami disaster that affected several countries in the South Asian region. If adequate knowledge of how to deal with such a disaster was embedded in the community, a considerable proportion of the lives lost could have been saved in countries like Sri Lanka.

Most available forms of education and research in universities and research institutes, is too academic in content and often more concerned with the basics, than the real concerns of human society. Furthermore, they are often overspecialized and highly steeped in discipline-based trivia, rather than founding their studies in the grass roots of local concerns. What is necessary in this context is a search for new educational paths and a new paradigm that would link universities and higher educational institutions with studies of real world situations. The budgetary policies may have to be adjusted accordingly to accommodate field and participatory observations that are clearly problem oriented. There is also a need to convey the findings from such studies to the policy makers in a language they understand, in order to convert them into practical actions.

Points of Discussion by **Takamitsu SAWA**

From a Model of "Economic Growth" To a Model of a "Harmony-based Society"

Japan was considered to be a model of rapid economic growth. During 1980s and 1990s, almost all East Asian countries learned a lot from Japan about the attainment of rapid economic growth.

In terms of economic development, Japan, South Korea and China have achieved in two or three decades what it took Western countries more than a century to accomplish. Generally speaking, fast economic expansion creates a plethora of problems, including income gaps between individuals and between regions, disparities in income and infrastructure between urban and rural areas, environmental pollution and disruption, unemployment, and regional gaps in the standard of primary and junior high school education.

Until the 1990s, Japan was a rare model that achieved rapid economic expansion while minimizing disharmony and disequilibrium. In spite of the fact that disharmony and disequilibrium has subsequently occurred in almost every sector of Japanese society under the Koizumi Administration, Japan has still fewer problems of economic disparity than, for instance, the United States.

In addition, Japan successfully overcame serious air pollution and water contamination problems in early 1970s. Also, on May 24 of 2007, Prime Minister Shinzo Abe issued a statement concerning with global warming. Mr. Abe pronounced that we should try our best to reduce greenhouse gas (GHG) emissions in the world to half of their present level by the year 2050 by promoting the research and development of innovative technologies that contribute to the reduction of GHG emissions. It is a great pleasure of ours that the Prime Minister of Japan has proclaimed the government's definite policy to challenge the climate change. This was really the first time that a Prime Minister of Japan declared a national challenge against climate change. This implies that Japan is still a harmony-oriented nation.

At the National People's Congress in March 2006, Chinese President Hu Jintao announced a new national policy for establishing a "harmony-based society." The policy calls for an end to "disharmony" between coastal and inland regions, between the agricultural and industrial sectors and so on.

So far Japan has been a model of "economic growth" for East Asian developing countries. In the coming years, Japan should be a model of the "harmony-based society" for those countries, including China. I would like to strongly recommend that the governments and citizens of those countries view Japan not only as a model for economic growth, but also as a model of a "harmony-based society."

Points of Discussion by **Rajib SHAW**

Community Dimension of Human Security: A Process-based Approach

Human security is a multifaceted concept. Security is the state of feeling free from fear or anxiety. Security as ‘‘the assurance people have that they will continue to enjoy those things that are most important to their survival and well-being.’’[1] Human security is concerned with safeguarding and expanding people’s vital freedoms. It requires both shielding people from acute threats and empowering people to take charge of their own lives.[2] Human security is concerned with reducing and, when possible, removing the insecurities that plague human lives. The relationship between human security and the environment is most pronounced in areas of human dependence on access to natural resources.[3] Environmental resources are critical part of the livelihoods of many people. When these resources are threatened because of environmental changes, people’s security is also threatened, and people move from the rural areas to the marginal lands, which leads to a decline in the household income.

Human security goes beyond the traditional understanding of security as a state-centered concept related to threats and conflict. It needs more emphasis on a people-centered concept that focuses on enabling individuals and communities to respond and adapt to changes, whether by reducing vulnerability or by challenging the drivers of environmental change. Two examples can be cited in this regard. The coastal ecosystem is an area where the environmental changes are prominent, affecting the lives and livelihoods of communities. In the southern part of India (Tamil Nadu state), a few programs started to preserve mangroves in the coastal ecosystem to enhance the livelihood options of the local communities. The traditional fishing mechanism has been gradually destroyed through commercialization of fishing resources. Therefore, in this case, enhancing human security means providing better livelihood options to the fishing communities, and engaging them in preserving the coastal ecosystem.

The other example is from Vietnam for climate change adaptation. A project funded by the Asian Development Bank (ADB), and implemented by the GSGES, along with a Canadian NGO called CECI demonstrated that enhanced human security can be achieved through a three-step process: an assessment of the situation (producing a scenario), an action planning (producing a safer community plan and a safer production plan), and implementation of the priority activities of the plans.

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[1] Soroos M. (2007): The endangered atmosphere: preserving a Global commons, USC Press, Columbia

[2] Ogata S and Sen A. (2003) Human Security Now Report of the Commission of Human Security New York 159 pp.

[3] Shaw R (2006): Community-based climate change adaptation in Vietnam: inter-linkages of environment, disaster, and human security pp 521-547 In Multiple dimensions of global environmental change Sonak S (ed) TERI Press, New Delhi, India pp 726

The key element of both of these examples is the participation of the community and local government in the decision making process. The "process" (through participatory rural appraisal) included in the whole exercise is more important than the "product" (like making a sluice gate to protect saline intrusion or introducing high-yield rice seeds). This process-based approach provides ownership to the local communities, and encourages people to enhance human security through appropriate self security.

Closing Remarks on Day 1

Toshio YOKOYAMA

Distinguished guests, ladies and gentlemen, it is my great honor to say a few words, at the end of this first-day open symposium, to express, on behalf of Kyoto University, my deep gratitude to our guest speakers as well as every participant in this unique event.

Today's lectures and the panel discussion have thrown into our minds a serious question: 'What does it mean when the word *security* is used?' It is no longer limited to the business of keeping one's treasure in a safe, or shielding human communities with high-tech weapons.

Kyoto University has been known for its historical commitment to academic freedom and originality. This commitment has encouraged a thriving tradition of Kyoto scholars' field-sciences, where a long line of scholars have looked to the world beyond the written page in reconsidering their conventional notions and creating new concepts. Language-consciousness has been one of the major traditions of the academic community in Kyoto since the eighth century.

It is therefore significant for Kyoto that a new and challenging question about *security* has been raised here today. The question is bound to remind us of the Mission Statement of Kyoto University, published in 2001 – a lofty statement, which declared a new ideal: *'to pursue harmonious coexistence within human and ecological community on this planet.'* The drafting committee emphasized that this *community* should include non-humans ranging from animals and plants, to rocks and streams. I am sure that no one in this hall will fail to see the strong resonance between today's discussions and Kyoto University's unique mission statement.

At the first matriculation ceremony of our new imaginative graduate school for global environmental studies, held in 2002, Professor Kazuo Oike, a seismologist and, at that time, Vice-President of Kyoto University, advised the students in his characteristic polite manner to 'please get more acquainted with this planet earth.' Indeed, without a sufficiently integrated knowledge of this planet, our future steps to improve not only human lives, but also to achieve maximal life-fulfillment for every living existence cannot be advanced.

Kyoto University's efforts to integrate the increasingly diversifying modern sciences have been steadily continuing. One of our major campus-wide activities is the holding of the Kyoto University International Symposia. Since the 7th symposium, held in Bangkok, a new organization, named the Organization for the Promotion of International Relations, of which I am in charge, has been supporting these endeavors in accordance with the university's mission. In my view, Kyoto University's motivation, as such, is a part of the East Asian tradition of looking at human beings within the context of a grand cosmos. Whenever the classical East Asian word that equates more or less with the western notion of civilization are used – pronounced *Wenming* in Chinese, *Vanminh* in

Vietnamese, *Moonmyong* in Korean, and *Bunmei* in Japanese – it reminds many people of its core meaning, that is 'a radiantly interwoven harmony of the universe.'

I hope this international symposium on human security in this new century will be an important milestone not only for Kyoto citizens, but for everyone in the world who is concerned about a secure and non-stagnant future for this planet.

I referred at the beginning of my speech to the first-day *open* symposium. This does not mean that tomorrow's sessions will be closed to the public. They are open to everyone who is interested in joining further discussions in the English language. I now close my talk with my renewed thanks to everyone, and my best wishes for the success of this symposium. Thank you.

Symposium Day 2 - June 23 -

SESSION 1

What is "Sustainability"?

Summary of Session 1

Session one comprised of two invited lectures followed by commentary in the morning, and three presentations in the afternoon.

The first lecture was given by **Prof. Hossein Farzin,** who spoke on "Sustainability versus Optimality in Economic Development: Theoretical Insights and Policy Prospects."

The professor discussed sustainability as a question of intergenerational equality in economic welfare, while optimality is concerned with attaining the highest feasible level of social welfare. He focused on a basic question: Can an optimal economic development path be sustainable?

Prof. Farzin then highlighted the limitations and practical difficulties with the implementation of sustainability rule as implied by the maximin criterion of intergenerational justice. In particular, he emphasized the difference between internalizing the negative environmental externalities and the concept of sustainability, and stressed the role of scale in sustainability policy. The professor argued that while the maximin rule of sustainability may offer a sensible approach for rich industrial economies, a compromise development policy that adopts the utilitarian optimal growth approach but modifies it to account for intergeneration inequality may offer a more practicable and promising alternative for developing countries. Finally, the professor outlined some of the main elements of such a policy to promote the growth of future welfare and sustainability. Among these elements he stressed (1) the importance of greening the income accounts, (2) investment of natural resource rents in environmental assets and reproductive capitals such as human capital, knowledge capital, and social capital, and (3) the essential role of income distribution policies both within and between generations and at national as well as global scales.

Prof. Takashi Takebe asked several questions about Prof. Farzin's presentation. He asked for an explanation of "weak sustainability" as contrasted with "strong sustainability," which Prof. Farzin discussed in his presentation. He also asked for examples of how corrupt and undemocratic governments have disrupted sustainability, and asked how the elasticity level of substitution between natural resources and manufactured capital has changed over the years.

The second lecture was given by **Prof. P. R. Shukla** on "Sustainability and Climate Change: Conceptual and Practical Foundations for Designing Post-Kyoto Protocol Global Agreement".

In his presentation, Prof. Shukla explored conceptual and practical foundations for designing post-Kyoto protocol. He argued that concepts of 'sustainability' are central to building the global climate change regime beyond the year 2012. The professor asserted that interpretation of 'sustainability' through concepts of 'innovation' and 'co-benefit,' in the cc context, is the key to overcoming two shortcomings which have limited progress on responses to address climate change; i.e. the 'climate-centric perspective that has created a wedge between development and climate actions, and the normative approach to the justice questions which has confined the complex issues of inter and intra-generational equity and economic globalization to simplistic 'burden sharing' metaphor, thus sustaining the North-South divide.

Prof. Shukla drew four points as conclusions. First, climate change is a derivative problem of 'development.' Second, addressing climate change requires crafting solutions that balance efficiency and equity globally and over a long-term. Third, sustainability is well suited for crafting the long-term cc regime. Finally, the post-Kyoto negotiations will benefit from a shift in attention from a climate centric to a sustainable development oriented paradigm.

Prof. Akihisa Mori asked how to ensure "equity first" policy in actual climate change negotiations in which the US and several other countries refuse to assume any obligation.

Mr. Kazuki Kagohashi spoke on "Critical Natural Capital and Sustainability."

In his study, critical natural capital, or CNC, the loss of which is irreversible, is interpreted as the "minimum" natural capital required to achieve sustainable development. Therefore, it is critical to identify CNC from policy perspectives. However, Mr. Kagohashi argued that the conceptual framework for identifying CNC that has been considered so far offers little operational policy guidance because little consideration has been given either to social context or to issues concerning the uncertainty of substitutability. He therefore emphasized the importance of accumulating information about not only natural scientific knowledge but also about the social context of natural capital. His study presented an extended framework which can be operational in terms of identifying CNC by incorporating social context and issues concerning the uncertainty of substitutability.

Several questions were posed by Prof. Farzin and Prof. Shukla. One question was about the possibility that non-substitutability could send price signals, and another was about who the actor of social valuation would be.

Dr. Masayuki Sato spoke on "Environmental Valuation in Sustainability Studies: an Empirical Study of Environmental Valuation in Sustainability Studies."

In his presentation, Dr. Sato first examined the role of environmental valuation in the assessment of sustainability. He then went on to suggest a reinvestigation of sustainability conditions using the estimated accounting prices of various types of environmental capital instead of the market price of the environment, which was used in previous studies owing to poor data availability. To infer the accounting price of the environment, Dr. Sato used the "benefit transfer method." Using this method, he tried to get a step ahead of the previous framework for assessing sustainability, and invested his effort in the construction of a more theory-consistent framework.

The preliminary conclusion Dr. Sato drew from his empirical study is that from the methodological point of view this approach is more theory-consistent.

Dr. Sato mainly discussed how to keep accounts of human capital. In the report, education expenditure was a proxy variable for the investment of human capital. As Prof. Farzin said, however, human capital also should include factors such as health and happiness. In order to make a comparative study, Dr. Sato set up the same variables in this report as in previous studies. But it is important for future research to reconsider the variables in the assessment of sustainability.

Dr. Sato also discussed the definition of environmental values. In economic analyses, it is traditional to define the value of the environment as compensating surplus for change in the environment. In this context there was a discussion of the need to unify the definition of environmental value in benefit transfer. As Prof. Shukla recommended, it is desirable to improve the accuracy of the transfer function.

Ms. Mari Nishiki spoke on the "Clean Development Mechanism and Local Sustainability from the Perspective of Partnership Networks."

This research attempted to determine how clean development mechanism (CDM) projects could promote local sustainability under the current CDM rules. First, Ms. Nishiki defined CDM as partnerships, a definition based on a review of academic literature on CDM. Based on the partnership approach she then used a case study to analyze the relationship between participation by certain types of actor in a project network, and the achievement of local sustainability benefits. By categorizing the types of partnerships, she found that partnerships consisted mainly of businesses and NGOs in projects which were seen as contributing to high local sustainability. She also found that less attention was paid to "local" public policies while most attention was paid to global public policies, namely greenhouse gas (GHG) mitigation.

Two commentators raised questions, such as how to deal with additionality and transaction cost issues. One commentator argued that as CDM was developed on a climate-centric basis, not on a development-centric basis, there is little possibility of sustainable development in the South being taken into consideration under CDM. Ms. Nishiki argued that incorporating a notion of a "development-first approach" in CDM rules would be significant for the future of CDM discussion in terms of defining local sustainability.

Summarized by Yasuko MATSUMOTO

Summary of Speech by **Hossein FARZIN** (Invited Lecture)

Sustainability and Optimality in Economic Development: Theoretical Insights and Policy Prospects

This paper takes the view that sustainability is essentially a question of intergenerational equality in economic welfare, and focuses on the basic question: Is there a conflict between sustainability and optimality objectives? It begins by reviewing the main theoretical insights from the theory of optimal economic growth (Ramsey, 1928) and its extension when a natural exhaustible resource is essential to production (Dasgupta and Heal, 1974, and 1979). It then considers the extreme case of the notion of intergenerational justice as defined by Rawls' maximin criterion and discusses its implications for economic sustainability in a simple model (Solow, 1974 and Hartwick, 1977) and a more general model (Farzin, 2006). The paper then highlights the limitations and practical difficulties with the implementation of sustainability rule as implied by the maximin criterion of intergenerational justice. This is followed by a discussion of the important roles of scale, externalities, information, market and other institutions in the design of a sustainability policy. The paper concludes by arguing that while the maximin rule of sustainability may offer a sensible approach for the rich industrially advanced economies, a compromising policy that adopts the optimal growth approach but modifies it appropriately to account for intergeneration inequality may offer a more practicable and promising alternative for the less developed countries.

Summary of Speech by **P. R. SHUKLA** (Invited Lecture)

Sustainability and Climate Change: Conceptual and Practical Foundations For Designing Post-Kyoto Protocol Global Agreement

This presentation explores how concepts of 'sustainability' are central to building the global climate change regime in the post-Kyoto protocol era, beyond the year 2012. It addresses three questions:

a) Why are 'sustainability' concepts central to addressing global climate change?

b) How can goals of sustainable development and climate change be aligned?

c) What are the lessons for designing a robust post-Kyoto global climate agreement?

Arguably, the limited progress on responses to address global climate change is attributed to two shortcomings (Hourcade et. al., 2007 forthcoming). First, the 'climate-centric' perspective that has created a wedge between development and climate actions. And second, the normative approach to the justice question which has confined the complex issues of inter and intra-generational equity and economic globalization to simplistic 'burden sharing' metaphor, thus sustaining the North-South divide. The presentation exhorts that interpretation of 'sustainability' through concepts of 'innovation' and 'co-benefit,' in the climate change context, is the key to overcoming these limitations. Next, it is shown, with illustrations, how the actions oriented to sustainable development and climate change can be integrated and aligned in practice to reduce the 'burden' and why the diversity of configurations for such integration requires bottom-up structures for facilitating actors to coordinate diverse initiatives and organize cost-effective and welfare maximizing actions for gaining co-benefits vis-à-vis different development objectives (Halsnaes and Shukla, 2007). Finally, the lessons are drawn for designing the architecture of the future climate change agreement, beyond the Kyoto-protocol period, i.e. year 2012, which would make the climate regime part and parcel of attempts to master economic globalization and to narrow the North-South divide by overcoming the Pareto improving policies paradox (Stiglitz, 1998).

Summary of Speech by **Kazuki KAGOHASHI**

Critical Natural Capital and Sustainability

The substitutability between natural capital and human-made capital is a controversial issue which first appeared in Maler (1986) on the debate surrounding sustainable development. This issue brought to light the distinction between weak and strong sustainability, and especially created the concept of Critical Natural Capital (CNC) which denotes non-substitutability among any other form of capital. CNC was introduced in Pearce (1993) and was operationalized in Ekins et al. (2003); however, it has not fully examined what makes natural capital critical, and more specifically, what the 'criticality' of natural capital is. This paper aims to reexamine the 'criticality' of natural capital and to investigate the status and issues of CNC.

This paper consists of three sections. The first section surveys what factors of natural capital can be regarded as critical. In this section, it is explained that there are two paradigms to recognize the 'criticality' of natural capital: that is, the 'ecocentric' and 'anthropocentric' paradigms. These two paradigms make a difference to the natural capital which is identified as critical. For example, the former may regard all natural capital as critical while the latter regards it as critical only if life-support functions are related to it. The second section deals with the evaluation of the 'criticality' of natural capital to identify CNC. In this section, the following proposition is raised: when the threshold levels of natural capital are uncertain, it is essential to consider not only biophysical standards or loads, but also the 'social capacity' to recognize and control them pursuant to the precautionary principle. The third section demonstrates this proposition in the theoretical framework and suggests that the evaluation of 'criticality' should incorporate the institutions surrounding natural capital. The institutions can be considered here not only as an effect factor of 'social capacity' but also as a target of policy investment.

In conclusion, it is proposed to extend the 'criticality' of natural capital and to evaluate it within the developed CNC theoretical framework. Otherwise, it seems difficult for us to derive practical policy implications from the concept of CNC.

Summary of Speech by **Masayuki SATO**

Environmental Valuation in Sustainability Studies

This paper investigates the role of environmental valuation in sustainability studies. An economic analysis of sustainability often requires information about the value of the natural environment. In practice, however, it is quite difficult to take into account the value of the environment.

Previously, Arrow et al. (2003) formulated the conditions of sustainable development based well-being function, and Arrow et al. (2004) demonstrated an assessment of whether each country was meeting the conditions. However, in these studies, the price of the environment was the bottleneck of a theory-consistent empirical application. Dasgupta (2004) said that the price of the environment should be estimated by its accounting price. Estimating the price of the environment is a chief purpose of environmental valuation studies. Environmental valuation techniques have been developed, through much controversy, for the past three decades. Now they have a positive contribution to make to sustainability studies.

In this paper, I first examine the role of the environmental valuation in the assessment of sustainability, and then we collect up the difficulties in putting them into practice, particularly from a viewpoint of data availability. Secondly, allowing for the limited data availability, the possibility of benefit transfer is reexamined. Lastly, based on the above discussions, the challenges and perspectives are discussed in order to develop the methodology of assessing sustainable development.

Summary of Speech by **Mari NISHIKI**

The Clean Development Mechanism and Local Sustainability

When the Clean Development Mechanism (CDM) was first discussed in the Third Conference of the Parties (COP3) of the United Nations Convention for Climate Change (UNFCCC), it was described as a "win-win" mechanism because of its dual objective –to assist developed countries in achieving compliance with their quantified emission reduction targets *and* to assist developing countries in achieving sustainable development by implementing projects. Together with the other two flexibility mechanisms of the Kyoto Protocol, CDM was considered to be a highly innovative approach to tackling global environmental problems, by relying on market mechanisms.

Since 2004, more than 550 CDM projects have been registered by the UN Climate Secretariat, and 760 million certified emissions reductions (CERs) are to be issued by 2012 (as of March 2007). It seems that CDM and its carbon market are progressing satisfactorily, and approximately 1000 other projects are being prepared for registration. Those projects present a substantial contribution to greenhouse gas (GHG) mitigation at the global level. However, the contribution of the projects to sustainable development is often less clear. In particular, when it comes to benefits to the community on the local level, it is often reported that current CDM does not live up to its purpose.

One of reasons for this imbalance between success in terms of overall market development and failure with regard to sustainability is a CDM provision that was agreed at COP7. There, it was decided that the international supervisory board of the CDM (CDM Executive Board) is to assess GHG mitigation only, but the contribution to sustainability is to be assessed solely by the developing country in which the project is implemented. However, up to now, many developing countries have failed to establish strict assessment criteria. This failure has led investors of the North (industrialised countries) to concentrate on cost-effective carbon mitigation rather than sustainability.

Under these circumstances, it is difficult to describe CDM as a "win-win" mechanism. The question then is what sustainable development could mean in the context of CDM. Could it be carbon mitigation on the global level, or should it be something else on the local level. If its aim is benefit on local level, how CDM could projects promote those benefits under the current CDM rules?

This paper attempts to investigate options to implement CDM projects that contribute more to local sustainability, from a perspective of stakeholders' participation in the projects. In particular, it focuses on non-governmental organisations (NGOs) on the national and local level, and how they act in a project network of project participants. It first discusses what sustainable development is in the CDM context, with regard to links between climate change and sustainable development from the viewpoint of the South. Secondly, based on CDM debates in the literature, it analyses how CDM could be discussed focusing on local sustainability and NGOs' participation in networks. Third, a case study is used to analyse links between local sustainability and the actors involved in a project. By doing so, I will attempt to identify the key actors in the quest to promote further sustainable development through the CDM.

SESSION 2
Civilizing the Modern Science and Technology For a New Civilization

Summary of Session 2

The purposes of Session 2 were to examine what can be observed as a civilizing process in science and technology, and to discuss the social and cultural conditions necessary for such human endeavors to contribute to a new global civilization. The session was co-chaired by Professor Toshio Yokoyama and Professor Mamoru Mimuro, both of the Graduate School of Global Environmental Studies (GSGES), Kyoto University. The session consisted of three parts. The first part was brief explanation of the session's purposes by Professor Yokoyama. Then, in the second part, four invited speakers gave presentations. After a lunch break, four further presentations were made by GSGES members.

In the first part, Professor Yokoyama explained the following points as being common understandings among the symposium's planners: (1) human society has a duty to attain a sufficient civility level to maintain environmental stability and maximal life-fulfillment for all life on Earth; (2) modern science and technology is not currently under sufficient integrated control; and (3) the ideas of civilization in certain classical interpretations, with the emphasis on a higher form of "cosmic civility" might be helpful for the new process of civilization.

The first invited speaker was **Dr. Simon Jackman**, director of the Integrated Pollution Management Knowledge Transfer Network (IPN-Net), a government-funded body led by the University of Oxford. His presentation topic was "Improving Environmental Quality through Innovation – a UK Perspective." Dr. Jackman spoke about (1) present pollution problems such as endocrine disrupters, diffused pollution and global warming; (2) new countermeasures being taken in the UK; (3) case studies such as one involving nitrogen removal for diffuse pollution; and (4) technology transfer and technology diffusion. Dr. Jackman discussed the UK government's "hands-off" policy to encourage innovative measures created through dialogues among stakeholders at each site of environmental contamination.

The second invited speaker was **Professor Song Sang-yong**, fellow of the Korean Academy of Science and Technology, and vice-chair of COMEST (Commission Modiale d'Ethique des Connaissnces et des Technologies), a commission established in 1988 by UNESCO. His presentation was on COMEST's preparations for a policy document on environmental ethics. In his talk, Professor Song emphasized the importance of ethical reflection on the rapid development of science and technology, and explained the time-consuming efforts required to realize the publication of *Environmental Ethics and International Policy* (2006), a multi-authored book published by UNESCO which provides an overview of the ethical issues related to the environment and proposals for policy-making. On the basis of this book, said Professor Song, a draft for a policy document is currently in the process of being finalized. He discussed the normative aspect of the draft, particularly in relation to such issues as the value of non-human life forms, precaution principles, biodiversity and the rights of future generations.

The third invited speaker was **Professor Ichiro Terashima** of the Graduate School of Science, University of Tokyo. He spoke, from a biologist's viewpoint, about the way in which a scaling approach to research (comparative studies across different size scales) integrates our knowledge from the molecular to the ecosystem level. His presentation covered (1) the integration of research into leaf photosynthesis by scaling the research from the chloroplast level, through the level of the leaf and shoot, up to the level of an entire forest; (2) an explanation of systems which are identical at both the

molecular level and at the ecosystem level; (3) the way in which differentiation in leaf photosynthates between the branches of a single tree contribute to a more efficient tree shape; and (4) the importance of the employment of a solid and sincere approach to describing biology and other scientific subjects to the general public, avoiding sensational explanations.

The last invited speaker was **Dr. Hiroshi Abe**, associate professor of the Graduate School of Human and Environmental Studies, Kyoto University. As a scholar in philosophy, Dr. Abe gave a presentation entitled "The Civilization of Science and Technology for an Integrated System of Global Environmental Studies: an Interpretation of Hans Jonas's *The Imperative of Responsibility*." Dr. Abe's presentation covered (1) the way in which the civilization of science & technology would enable collaboration between those fields and the humanities and social sciences, providing security for human society; (2) issues surrounding global environmental studies, moral principles and their practical application, and hypothetical predictions; and (3) the importance of the balance between the principle of prevention and that of precaution for environmental policies.

Professor Toshio Yokoyama commenced the afternoon session of presentations and comments from the GSGES. The topic of his presentation was "Civility in a Polytheistic World: A Perspective from the Japanese Experience." Professor Yokoyama explained the state of civilization in pre-industrial Japan, in which the majority of the population felt that they shared the world with numerous gods, avoiding unnecessary conflicts with them, and receiving support from them when necessary. He pointed out that those numerous gods with whom people used to live might be interpreted as being equivalent to any of the powerful products of modern science and technology, the proper use of which would be beneficial, but any uncontrolled dependence on which could be disastrous.

Then, **Professor Mamoru Mimuro** gave a presentation entitled "Changes in Personal View of Nature through Evolution of Photosynthesis." In his presentation, Professor Mimuro explained (1) how modern sciences can provide a way of thinking holistically; (2) the consideration of human beings as one of the organisms on the earth; (3) decision making on future events in the global environment; (4) the establishment of a personal view of decision making on the global environment.

Professor Masahito Sugiyama was the third presenter. His presentation was entitled "For Accurate Discussion on Global Environmental Changes." Professor Sugiyama discussed (1) global and historical trends in environmental standards; (2) the importance of sufficient field data in discussing environmental issues, using an example of discussions of the environmental effects of river dam constructions in China; (3) the importance of accurate and comprehensive understanding of the global environment in the present and future; (4) environmental indices to be measured; (5) where and how to measure those indices.

The final presentation was given by Associate Professor **Dr. Tomonari Matsuda**. In his presentation entitled "Perspectives of Chemical Hazard Management," he emphasized that "the world is still uncivilized," and explained (1) the differences in environmental issues between developed and developing countries, for example the concerns of developing countries focus on sanitation whereas developed countries tend to focus on the management of chemical hazards to the environment; (2) problems which arose following the publication of Rachel Carson's environmentalist book "*Silent Spring*" in 1962; (3) POPs (persistent organic pollutants); (4) endocrine disrupters; (5) green chemical industries.

All of the presentations provoked thoughtful and creative comments and questions, and the session was successful.

Summarized by Shigeo FUJII
Ainslie KERR
Toshio YOKOYAMA

Summary of Speech by **Simon JACKMAN** (Invited Lecture)

Improving Environmental Quality through Innovation: A UK Perspective

Historical Background and Current Challenges

The recent UK government-commissioned report by Sir Nicholas Stern on the economics of climate change has led to the environment being at the top of the government's agenda. It has been recognised that unless we act soon, there may be serious consequences for future generations. However, it is not just the climate and global temperatures that are at threat. In the UK in particular, we face challenges associated with pressures on water resources, waste disposal and land degradation. As these issues will be viewed increasingly in the context of climate change and carbon budgets, there is a need to look across the environmental sectors of water, waste, land and air at how we can develop common regulatory approaches and implement appropriate technologies. The UK has a strong history of industrialisation having undergone the first industrial revolution two centuries ago. Whilst this led to a highly innovative and technological society, the country was left with significant pollution problems which we have had to deal with ever since. We now need to turn our innovative capabilities on dealing both with the history of pollution and with the current pressures on environmental quality and climate change. These issues need to be tackled by the global community in a collaborative fashion as there is a pressing need for innovation and flexible regulation. The UK is able to bring its historical experience of dealing pollution in our densely populated island, an experience which we share with the nation of Japan.

Developing Innovative Solutions for the Management of Pollution

The Integrated Pollution Management Knowledge Transfer Network (IPM-Net) has been funded by UK government to support innovation in environmental technologies in UK businesses. A recent strategic study conducted by the network has demonstrated that if the regulatory and fiscal frameworks for environmental technologies can be optimised this has the potential to move technological innovation forward and that this is the major current hurdle experienced by our industries. Technologies are required to treat pollution in the environment or before it reaches the environment. Measurement technologies are also key to understanding what contamination is present in what location. We are therefore undertaking to develop better technologies across the UK in this area.

IPM-Net has a role in tackling some of the more challenging issues faced in the UK. We are establishing a workshop with key researchers across the UK to identify the potential problems faced in the environment if Tamiflu was given to each member of the population in the event of a bird flu pandemic. The passage of Tamiflu through the human body and through water treatment works would lead to significant concentrations in rivers and other bodies with potentially significant consequences if it were taken up by virus-bearing birds. In Kazakhstan, we are working with USEPA on mercury pollution, helping local scientists develop solutions to a spill comprising 1,000 tonnes of mercury and we are helping Serbia develop competence in environmental chemistry and risk assessment following pollution incidents arising from the Balkan conflict. A number of other examples of how we are tackling environmental pollution in the UK will be presented at the conference.

Summary of Speech by **Sang-yong SONG** (Invited Lecture)

COMEST Exploring International Action In Environmental Ethics

In contrast to bioethics, which has been an established field for the last 30 years, environmental ethics is a newcomer. There have been numerous international declarations to protect and sustain the environment. None of them, however, addresses the ethical dimensions of environmental problems. The establishment of COMEST (Commission Mondiale d'Ethique des Connaissnces Scientifique et des Technologies) in UNESCO in 1998 reflects the increasing importance of ethical consideration in the light of the cultural and social effects of the rapid development of science and technology. Having completed the works concerning the ethics of fresh water use, COMEST has focused more explicitly on environmental ethics.

In 2003, a group of experts on ethics was invited to study state-of-the-art in environmental ethics and to propose possible international action for UNESCO. The proposals for international action are threefold: normative action, capacity-building and awareness-raising. Normative action includes a declaration of ethical principles on environmental ethics and implementation principles. *Environmental Ethics and International Policy* (2006) is an overview of ethical issues in relation to the environment and proposals for policy – made by the experts. The Policy Document on Environmental Ethics is being finalized.

For the last five years, there have been extensive discussions in COMEST on the principles of environmental ethics and implementation principles. Controversial issues including the respect for life, biodiversity, sustainability, precautionary principle and the rights of future generations are selectively reviewed.

Summary of Speech by **Ichiro TERASHIMA** (Invited Lecture)

Scaling Approach Integrates Our Knowledge From Molecular to Ecosystem Levels

We, scientists, have been contributing to progress in science by finding out new things, integrating existing knowledge, or putting forward new ideas one by one. Recent explosive progress in many scientific fields, however, makes it difficult, even for us, to overview the progress of neighboring research fields.

I agree on the point that we should explain our works to citizens or tax payers. There are many media for such purposes. However, items in even the modest newspapers are so catchy, sensational and provocative that modest readers would be perplexed and eventually be non-receptive to such items. I am worrying about this situation as a teacher, a father and a pure and poor scientist. For citizens, books or journals that describe our science in a solid and sincere way should be published. For this, it is necessary to reconsider education of scientific literacy. Also, science integrating our knowledge should be developed. So-called scaling approach might be one such science.

Unlike animals which have many organs, plants have only three organs, the leaf, stem and root, and the plant body is constructed by iterating these modules. Thus, so-called scaling approach, or comparative studies across different size scales, is particularly useful. In this talk, I review the current status of our knowledge concerning the construction and maintenance of photosynthetic systems at three different levels: a single leaf, an herbaceous plant and a tree. The scaling approach that we are taking helps us to integrate knowledge at different levels from the molecular level to the ecosystem level in a simple way. Moreover, this approach has considerable ability to predict underlying mechanisms which are still unknown. These photosynthetic systems can be understood as the optimum photosynthetic systems, realizing very high resource use efficiency. However, the mechanisms that are responsible for constructing such systems differ.

Summary of Speech by **Hiroshi ABE** (Invited Lecture)

The Civilization of Science and Technology For an Integrated System of Global Environmental Studies: An Interpretation of Hans Jonas's *The Imperative of Responsibility*

1. What does 'the Civilization of Science and Technology' Mean?

'Civilization', or 'to civilize' is 'to make something civil.' As a dictionary shows, the word 'civil' (Lat. 'civilis'; Gr. 'politikos') has three cardinal meanings: the first, 'of or concerning citizens' (op. 'natural'), the second, 'polite or refined' (op. 'wild or rough'), and the third, 'civilian' (op. 'military'). Although these three meanings are quite different, they are, in my opinion, derived from the original meaning of 'civil' that Aristotle suggested in his book *politics*, i.e. 'discussing common, important issues of our own society (*polis*) with each other.' Undoubtedly, one of the principal issues among them is the protection of social security. The civilization of science and technology means, therefore, letting science and technology participate with the humanities and social sciences in a discussion on how to secure human society.

2. The Triadic Structure of Global Environmental Studies

Then, how is it possible for science and technology to discuss the security of human society in collaboration with other disciplines? A suggestion concerning this problem, I insist, can be found in Hans Jonas's *The Imperative of Responsibility*, one of the most prominent books on environmental ethics in the 20th century. By interpreting the above text, I will endeavor to clarify what Jonas sketched out only roughly and obscurely, and explain the collaborative relationship between philosophy, the social sciences, and the natural sciences, which I call 'the triadic structure of global environmental studies.'

3. 'Principle of Prevention' or 'Principle of Precaution'?—Against the Fruitless Alternative

In order to maintain human security, it is necessary for us to protect not only all of the present members of human society, but also its 'outsiders,' such as nature and future generations. Then, what should be the first principle of such protection? Jonas replied that 'the prophecy of doom is to given greater heed than the prophecy of bliss.' However, his answer is so ambiguous that there are two ways of interpreting it: 'prevention' and 'precaution.' While both of them are usually regarded as alternatives, I would like to argue that one is complementary to the other.

Summary of Speech by **Toshio YOKOYAMA**

Civility in a Polytheistic World: A Perspective from the Japanese Experience

What might the stable societies of the past tell us when conceiving a global civilization? My story focuses on the experience of pre-modern Japanese society: the period spanning about 200 years from the late 17th century. Japanese society during that period was sustained by numerous factors including the seclusion of its islands from the outer world, an intricate ruling system structured under the motto of 'quietude,' and an overall balance between production and consumption which absorbed diverse local and temporal imbalances. The fact that this stability was not won at the cost of gloomy stagnation seems to owe a great deal to common people's spontaneous participation in the social order; they cultivated what they thought to be elegant civility towards other humans as well as non-humans in their daily lives.

Two genres of popular household encyclopedias, *setsuyôshû* and *ôzatsusho* played important roles in maintaining such orderly culture in Japanese society. The former provided instruction in self-depreciating forms of written communication, while the latter provided guidance on forms of un-offensive behavior which were recommended to be employed towards the numerous benevolent, but sometimes fearful, gods in heaven and on earth.

My studies of the nation-wide distribution and wear and tear of extant copies of these books reveal a society in which the Yin-Yang school of astrology and geomancy thrived. The page most universally consulted during the 18th and 19th centuries featured the *rokujû-zu*, or 'chart of sixty,' the key entry point to the instruction of the Yin-Yang school. This chart taught the reader his or her own cosmic attributes, in terms, for example, of the five elements of wood, fire, earth, metal, and water. The chart would then offer guidance on, for example, the compatibility between his or her attributes and those of a partner. The knowledge about such cosmic attributes was also indispensable when seeking instruction on any serious action scheduled on a certain day, as each day also carried, according to the Yin-Yang school, certain cosmic and divine attributes and the compatibility between one's intended act and the chosen day was often a grave matter.

Setsuyôshû and *ôzatsusho* civilized their users in three ways. First, they afforded the user a grand world view, together with a sense of his or her humble but unique position in the all-embracing cosmos; second, they urged the user to put more value on harmonious relations between the human and non-human constituents of a whole community than on any individual's merit; and third, they infused each user with a sense of blessed security whenever one's mode of life was thought to be properly conducted and therefore encouraged by surrounding gods.

The 19th century witnessed Japanese society's detachment, to a certain degree, from the Yin-Yang school. The change of intellectual climate, however, was slow and never violent, a testimony, perhaps, to the fact that the school had not assumed any character of rigorous orthodoxy, thereby avoiding harsh criticism from non-believers. The school's subtle civilizing influence survived in many parts of Japanese society well into present times.

Those numerous gods with whom people used to share one world might be interpreted as equivalent to any of the powerful products of modern science and technology, the proper use of which would be beneficial, but any uncontrolled dependence on them could be disastrous. To achieve harmonious coexistence with those new non-humans, the traditional sensitive mode of perceiving the relations between oneself and the environment on a cosmic scale might be of some help, as it can lead us to recognize what is lacking in our minds as we try to civilize modern human activities within the complex human and ecological community on this planet.

Summary of Speech by **Mamoru MIMURO**

Changes in Personal View of Nature through Evolution of Photosynthesis

Photosynthesis supplies molecular oxygen and carbohydrates, both of which are indispensable to human beings and almost all other organisms on the Earth. Cyanobacteria are the first organisms that supply the molecular oxygen through the cleavage of water molecules. Recent analysis suggests that cyanobacteria originated more than 2.7 billions years ago.

When plant scientists examine the molecular machinery of cyanobacteria, they notice that cyanobacteria inherited the essential parts from the ancestral anoxygenic photosynthetic bacteria; however the path of succession was not continuous and hard to explain with the traditional theory of evolution, mainly based on natural selection, so-called Darwinism. Even through Neo-Darwinism, discontinuous succession is not explained. A new idea is necessary to explain the evolution of cyanobacteria.

Modern sciences, founded on the development of technology, will force us to change our views of nature, including human beings. Typical examples of such sciences are: (1) molecular biology represented by the human genome project, (2) the whole history of the Earth represented by the snowball earth hypothesis, and (3) physical astronomy represented by the Big Bang and the inflation theory, predicting the expansion of the cosmos. Scientific results given by modern sciences are strong enough to change our historically-distilled views.

In the middle of the19th century, Charles Darwin published a book entitled “The Origin of Species,” and developed his idea on the evolution of organisms. His ideas influenced social science and were adopted by the social scientists after rephrasing and, occasionally, misunderstanding. The Social Darwinism proposed by Herbert Spencer is a typical example.

Compared with the impact of Darwin’s hypothesis, the impact given of the modern sciences is much stronger; modern science sometimes invades views or ideas that were historically regarded as the realm of God or religion. Therefore it is reasonable to assume that our views are likely to be modified by the modern sciences; however this does not seem the case with respect to the current lifestyle of human beings. Our views on nature are usually formed by education and personal experiences as we grow up. After growing-up and coming to the decision-making age, outdated education will hinder our ability to see the current status of our surroundings. Global environmental problems are typical examples of this.

I have been working on photosynthesis, especially from the aspects of physics and chemistry. As a scientist, I could contribute to the formation of people’s current view(s) by introducing the evolutionary aspects of photosynthesis on the basis of the interrelation between photosynthetic organisms and the environment of the Earth.

Summary of Speech by **Masahito SUGIYAMA**

For accurate Discussion on Global Environmental Changes

In recent decades, certain land and water areas which, distant from one another, had heretofore not been thought to be significantly interactive with each other have been found, through interdisciplinary studies produced through the integration of various global environmental science fields, to be closely environmentally connected. For example, the following phenomena have been found: Conservation of thick forests and woods in the upper areas of a river keep a fertile coastal area existing in its estuary; air dust originating from some continental deserts, for example yellow sand from China, is a main resource of materials supplied to pelagic oceans and affects their biological activity; Hydraulic alterations of long rivers, for example dam constructions, change material supply to its estuary and coastal areas, and affect their phytoplankton communities and food web systems.

However, when we discuss these environmental problems, especially environmental change which occurs over a long period, we are often faced with a certain difficulty, namely the lack of sufficient field data before and/or at the beginning of the environmental change. For example, with regards to the problem of the aforementioned hydraulic alteration, dam constructions in a river were reported to decrease the silica (SiO_2) supply to its estuary and shifted its dominant phytoplankton species from diatom to non-diatom ones. However, there are very few statistics for silica concentrations in river waters before the dam constructions. Therefore, it is very difficult to discuss accurately the change from the past to present. A great decrease in silica concentration was reported in the estuary of the Danube River flowing into the Black Sea. However, this discussion was based on only one report of silica concentration before the dam constructions, because this report is the only study available before the dam constructions. Although the same kind of research has been actively performed in Japan, there are few studies about silica concentrations in rivers in the 1950s and 1960s.

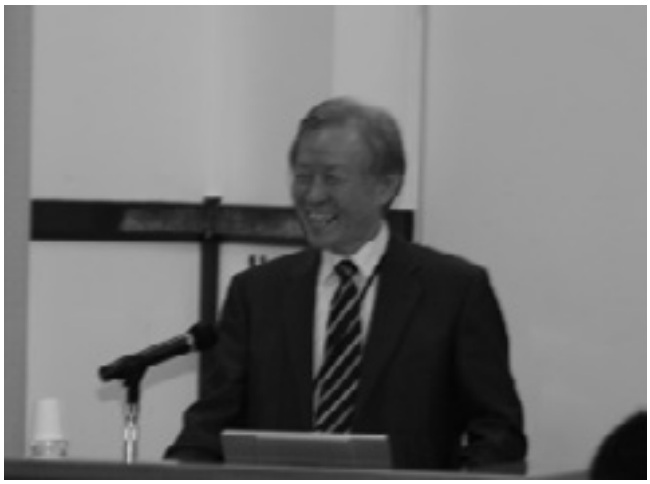
Considering such a situation, one of most pressing necessities in the field of environmental studies at present should undoubtedly be to establish a convenient and non-time-consuming system for gathering reliable and precise field data across a wide area on the earth over long period, because we cannot accurately discuss environmental change over a long period in future without a reliable and precise description of the environment in the present.

Summary of Speech by **Tomonari MATSUDA**

Perspectives of Chemical Hazard Management

Numerous kinds and massive amounts of man-maid chemicals are produced and distributed in commerce. Man-maid chemicals are ubiquitous in our daily life and in the environment. The current situation of chemical hazard management is far from civilized. Many problems still remain in developed countries like Japan and the problems are more serious in developing countries. Such problems include: (1) industrial accidents due to poor working conditions, (2) production of a large amount of waste which is discharged into the environment due to low manufacturing (reaction) efficiency, (3) difficulty of stock management due to large-scale production. We should take a multi-strata management approach on the level of factories, government, and on the international level. Of course, innovation of chemical engineering processes is essential.

Hazard assessment of newly developed or existing chemicals is also a serious issue. The endocrine-disruptor problem changed our mind-set from the human cancer paradigm to the paradigm of the reproductive effects of chemicals both in humans and wild-animals. Also, the development of new toxicity tests is required to reduce the use of laboratory animals. Newly developed biological technologies such as genomics, transcriptsome, proteome, metabolome and systeome are expected to provide a new approach for chemical hazard assessment.



SESSION 3

Field and Community Experience

Summary of Session 3

Session three comprised of six invited lectures, a panel discussion and a poster session.

The first lecture was given by **Prof. Abdul Hamid Zakri**, a director of the United Nations University Institute of Advanced Studies (UNU-IAS), who spoke on "Millennium Ecosystem Assessment, with special reference to Japan." Professor Zakri introduced the concept, framework, and development process of the Millennium Ecosystem Assessment (MEA), a five-year research effort promoted by the United Nations. Professor Zakri discussed the benefits provided by the ecosystem's provisioning, regulating and cultural services, and described how those services contribute to human well-being. After presenting the alarming findings of the MEA, he introduced the recent launch of a sub-global assessment (SGA) by UNU-IAS to assess the ecosystems and ecosystem services of *satoyama* and *satoumi* in Japan. *Satoyama* and *satoumi* are areas which encompass vital ecosystems, namely, secondary forests, agro-ecosystems, wetlands, grasslands, and marine and coastal ecosystems. He stressed that it is important to assess the condition and trends of *satoyama* and *satoumi* with the aim of providing policy responses needed to manage them on a sustainable basis.

The second lecture was given by **Prof. Harold A. Mooney** of Stanford University. The title of Professor Mooney's lecture was "Taking Stock of the Status of the World's Ecosystems - Global to Local." The professor presented the results of the MEA which were conducted at the global as well as subglobal level to evaluate the current capacity of the ecosystems to deliver services. The findings were that over 60% of the services provided by ecosystems were found to be degraded, and most scenarios for the future showed a continuing degradation, even allowing for many policy adaptations. Professor Mooney stressed the link between ecosystem services and human well-being, and the relationship between Millennium Development Goals (MDGs) and MEA. The professor went on to provide four MA scenarios: Global Orchestration, Order from Strength, Adapting Mosaic and TechnoGarden. Finally, he introduced some case studies at the local level, and stressed that it is necessary to develop tools to make ecosystem service assessments and applications practical and more quantitative at all levels – from local to global – through fostering new approaches and innovations for conserving vital ecosystem services and overcoming barriers to progress.

The third lecture was given by **Prof. Yoh Yamashita** of the Field Science Education and Research Center (FSERC), Kyoto University, who spoke on the topic of "Research and Education of the Ecological Links between Forests and Coastal Waters." Professor Yamashita pointed out various areas of environmental deterioration and its effects, such as decreasing commercial landings from coastal fisheries. The professor's talk explored the ecological links between forests and coastal waters, and also stressed the importance of research into the ecological links between forests and coasts. He also introduced a new research topic in the Field Science Education and Research Center of Kyoto University: Ecological Linkage Studies (Mori-Sato-Umi Linkage Studies).

The fourth lecture was given by **Ms. Reiko Nakamura**, secretary-general of the Ramsar Centre Japan, who spoke on "the Importance of the Participation of Local People/Communities in the Wise Use of Wetlands: Some Practices in Asia." Ms. Nakamura introduced the objectives and activities of the Ramsar Center Japan, which aims to promote the wise use of wetlands and disseminate the Ramsar Convention through the Asian Wetland Symposia and Workshops. The Children's Ramsar (*kodomo*

Ramsar in Japanese), one of the main activities, is a children's exchange program among the Ramsar sites. The program has been organized at locations throughout Asia in an effort to ensure the awareness and participation of the next generation with regards to the conservation and wise use of wetlands. In particular, Ms. Nakamura stressed the necessity of local participation and of local people learning about the ecosystem and value of the wetlands.

The fifth lecture was given by **Dr. Le Van An** of Hue University. The lecture was entitled "Poverty Reduction and Environment: Lessons Learnt from Working with the Local Community in Vietnam." Professor Le introduced a community-based natural resource management project designed to tackle poverty in upland areas of Vietnam, and the GSGES-Hue-JICA partnership project "Enhancing Community Resilience and Livelihood Security to Cope with Natural Disasters in Central Vietnam." He stressed that a participatory approach and local initiative in the projects are necessary to improve the incomes of local people and reduce poverty. The professor introduced several of the initiatives being undertaken in Hue such the as the re-appraisal of the traditional cultural value of architecture and textiles, and an environmental protection club initiated by school teachers and students.

The sixth lecture was given by **Mr. Kotaro Ito**, Mayor of Saijo City, Japan, who spoke on "Community-Based Disaster Management (CBDM) - A Case in Saijo City." Mayor Ito shared his experiences of, and lessons learned from an occurrence of a typhoon disaster in Saijo City. Saijo City addressed community based disaster management through community-conscious activities and public participation in disaster management. He also utilized a local festival as a tool of CBDM aiming to enhance local community cooperation and networking for disaster mitigation. In addition, Mayor Ito stressed the importance of disaster education for children and introduced the "12 Year-Old KIDS Program," a program to help children learn how to prepare for natural disasters.

Following the invited lectures, there was a panel discussion coordinated by **Dr. Ueru Tanaka** of the GSGES, Kyoto University. Three panelists participated in the session: **Professor Yukihiro Morimoto** and **Prof. Masami Kobayashi** of the GSGES, and **Ms. Reiko Nakamura** of the Ramsar Center. Dr. Tanaka asked the panelists about the significance of session three's theme, "Field and Community Experience." The panelists pointed out that local people are the first to be impacted by environmental change and that researchers should learn from field research and local communities. In addition, they stressed that linkages from local to global and from global to local are necessary, practical and feasible.

Session three also featured a poster session, in which posters about the GSGES internship program and the GSGES Asia Platform were exhibited. Twenty-three master's and doctoral students and graduates of the GSGES, gave presentations about their activities in Japan, Vietnam, India and Europe. There was also a video exhibition showing the GSGES Asia Platform project site in Hue, Vietnam.

Summarized by Miki YOSHIZUMI

Summary of Speech by **A. H. ZAKRI*** (Invited Lecture)

The Millennium Ecosystem Assessment: Follow-up Strategies in Japan

The four-year (2001-2005) Millennium Ecosystem Assessment (MA), a landmark United Nations study conducted by 1360 experts from 95 countries, is the most comprehensive assessment of the state-of-health of the world's ecosystems, and their impacts on human life. It is the first attempt by the scientific community, in consultation with governments, international institutions, businesses, NGOs and indigenous people, to provide a 'global check-up' and the prognosis is cause for concern: By and large, the state of the planet is declining, and the four main findings are:

- Humans have changed ecosystems more rapidly and extensively in the last 50 years than in any other period. This was done largely to meet rapidly growing demands for food, fresh water, timber, fiber and fuel. More land was converted to agriculture since 1945 than in the 18th and 19th centuries combined. Scientists said that this resulted in a substantial and largely irreversible loss in diversity of life on Earth.
- Ecosystem changes that have contributed substantial net gains in human well-being and economic development have been achieved at growing costs in the form of degradation of other services. Only four ecosystem services have been enhanced in the last 50 years, including crops, livestock and aquaculture. The use of two – capture fisheries and fresh water – is now well beyond levels that can sustain current, much less future, demands. Scientists say that these problems will substantially diminish the benefits for future generations.
- The degradation of ecosystem services could grow significantly worse during the first half of this century and is a barrier to achieving the UN Millennium Development Goals. The scientists warn that changes in ecosystems influence the abundance of human pathogens such as malaria and cholera, as well as the risk of emergence of new diseases.
- The challenge of reversing the degradation of ecosystems while meeting increasing demands can be met under some scenarios involving significant policy and institutional changes. However, these changes will be large and are not currently under way. Options exist to conserve or enhance ecosystem services that reduce negative trade-offs or that will positively impact other services.

Given these alarming findings, follow-up strategies are needed in the dissemination of outcomes, integration of findings into national plans and strategies, capacity-building, and conducting more sub-global assessments (SGAs). To date, numerous stakeholders are already beginning to use the findings and engage in such activities. One example is the recent launch of an SGA by UNU-IAS to assess the ecosystems and ecosystem services of *satoyama* and *satoumi* in Japan. Both *satoyama* and *satoumi* encompass vital ecosystems, namely, secondary forests, agro-ecosystems, wetlands, grasslands, and marine and coastal ecosystems. These ecosystems provide significant services, such as rice, clean water, clean air, timber, fish, seaweed and cultural values that contribute to the well-being of many people. Although more than 40 per cent of the land mass in Japan is classified *satoyama*, such area is declining due to a range of factors. The change in *satoyama* can take its toll on traditional functions, values and services, and consequently affect human well-being if action is delayed. The SGA intends to assess the condition and trends of *satoyama* and *satoumi* with the aim to provide policy responses needed to manage *satoyama* and *satoumi* on a sustainable basis. The possible scope of the SGA includes Ishikawa, Chiba, Seto Inland Sea region, Shiga, Aichi and Miyagi. ** It will be an integrated assessment that would be multidisciplinary and driven by multi-stakeholders. Major stakeholders for the SGA are the national and local governments, industry, research and academic institutions, NGOs and local communities. The outcome is intended for numerous users and purposes including incorporation into local and national plans and strategies, investment and business, educational purposes and improving the livelihoods of local communities. At the global level, the outcomes will be presented during the Tenth Conference of the Parties to the Convention on Biological Diversity (CBD COP/10) to be hosted by Japan in 2010.

* Co-Chair, Millennium Ecosystem Assessment Board
** The sites for the SGA listed here are tentative and further consultation through an open workshop with a wide range of stakeholders in Japan to determine and finalize the sites is being planned.

Summary of Speech by **Harold A. MOONEY** (Invited Lecture)

Taking Stock of the Status of the World's Ecosystems and the Services They Provide to Society and How to Make These Services Sustainable: The Millennium Ecosystem Assessment

Ecosystems Provide Benefits to Society

The face of the earth is covered by a rich diversity of organisms that interact locally with each other and with the atmosphere and the geosphere. These assemblages, or ecosystems, capture energy that is utilized to sequester carbon and to take up and recycle water and nutrients. These processes are termed ecosystem functions. The foundation for any ecosystem is the kinds, numbers and distribution of the organisms that are contained within it. These features in turn determine the rates of uptake, storage and recycling of physical resources and the stability and resilience of ecosystems under changing conditions. The functioning of ecosystems provides societal benefits that are termed "ecosystem services." These services include "provisioning services" such as food and fiber; "regulating services" including clean water, climate amelioration, erosion control, etc., and "cultural services" such as recreation and spiritual and religious values. Ecosystem services are directly related to human well being through human health, the basic materials of a good life, security, and social relations. Making these linkages explicitly is a major contribution, and their further quantification represents a continuing research challenge for natural and social scientists.

The Capacity of Ecosystems to Provide Ecosystem Services-Past, Present and Future

Due to concern about the increasing modifications of ecosystems on the face of the earth, global as well as subglobal analyses were conducted to evaluate the current capacity of these systems to deliver services and what the future might bring (The Millennium Ecosystem Assessment). The findings were not encouraging. Over 60% of the ecosystem services provided by ecosystems were found to be degraded and most scenarios for the future showed a continuing degradation, even with many policy adaptations. For the first time, analyses were made at local, to regional, to global levels revealing operational challenges at each, and opportunities for linking results at many levels.

What We Need to Do

There are a whole series of policy options that we can employ to significantly change the trend toward ecosystem service degradation. These include: investments in public goods (e.g., education) and poverty reduction; elimination of trade barriers and distorting subsidies; use of active adaptive management; investment in education; investment in new technologies, and, payments for ecosystem services. Similarly there is still a vast amount of research to be done by natural and social scientists in order to make seamless links among the science of ecosystem ecology and ecosystem services, public awareness of the value and importance of these services to human wellbeing, and the policy mechanisms to accomplish the many challenges in achieving the sustainable and equitable delivery of ecosystem services to society.

Summary of Speech by **Yoh YAMASHITA** (Invited Lecture)

Research and Education of the Ecological Links Between Forests and Coastal Waters

In Japan, commercial landings from coastal fisheries have shown a continuous decreasing trend following their peak in mid 1980s; they currently stand at approximately 65% of their peak year figures. There are four possible causes for this decline: climate change, overfishing, deterioration of the coastal environment, and deterioration of the natural links between terrestrial areas, rivers and the coastal environment. Landings have markedly decreased in semi-enclosed areas which have been greatly influenced by human activities; for example, declines of about 85% and 64% compared to the peak years in Ariake Bay and Seto Inland Sea, respectively. In semi-enclosed coastal areas, the fourth factor, in particular, is considered to play an important role in the decline of coastal biological resources.

Fishermen instinctively surmised that one of the causes of the declines was the deterioration of forests, and they began forest plantations several decades ago. However, the effectiveness of the fishermen's forest plantations is not clear and there has been little scientific evidence to show that healthy forests contribute to healthy biological production in coastal waters.

The Field Science Education and Research Center (FSERC) was established in 2003 by combining research facilities on forests, wild plants and coastal waters. To understand the ecological links between forests and coastal waters, we have been working on the research at three main fields: Yura River in Kyoto, Koza River in Wakayama and Niyodo River in Kochi. Our basic hypothesis is that the decrease of aquatic biological productivity and diversity can be attributable to disturbed and interrupted ecological links between forests and coastal waters due to 1. increased input of fine sediments to coastal waters from poorly managed artificial forests, paddy fields and dam lakes; 2. disturbed nutrient inputs and N:P:Si balance from terrestrial areas; 3. artificial control of river water discharge; and 4. obstruction of aquatic animal ontogenetic migration by dams and bank protections etc. Our research and student education activities on the ecological links between forests and coastal waters will be presented.

Summary of Speech by **LE Van An and CARD Team of Hue University** (Invited Lecture)

Poverty Reduction and Environment: Lessons Learnt from Working with the Local Community In Vietnam

Vietnam is a country with 83 million people. Over 70% of the country's population are living in rural areas and have livelihoods based on agricultural production, including forestry and aquaculture. There are about 2,000 communes, in the poorest of which, the income is below half a US Dollar per person/day. Vietnam has 54 ethnic groups: the largest, Vietnamese lowlanders (Kinh), and 53 other ethnic minorities. Most of the ethnic minorities are living in the uplands and mountains. In the past, they traditionally practiced slash and burn cultivation, but now they are shifting towards sedentary farming and living.

Hue University is one of the 5 biggest universities in Vietnam and one of the country's 14 major universities. The university has 7 colleges, 2500 teaching staff and 42,000 students. Since 1998 a research project on "Community-based natural resources management" was implemented by the researchers of the university's Center for Agricultural Forestry Research and Development (CARD) under the College of Agriculture and Forestry. The aim of the research project was to improve the livelihood of the upland community and to better protect the natural resources and environment which are being degraded by economic development activities. Since 2006, in collaboration with Kyoto University's Graduate School of Global Environmental Studies (GSGES), a research project on "Enhancing Community Resilience and Livelihood Security to Cope with Natural Disasters in Central Vietnam" has been implemented. The project works with local communities in the upland, midland and lowland in a watershed of Bo River in Thua Thien Hue province, central Vietnam.

The methodology of these research projects is to apply participatory approaches. The villagers and local people are encouraged to be involved in the whole process of the project. Researchers play a role in facilitating the participation of the local people by understanding their situations and finding appropriate solutions that can be implemented, managed by the villagers. Additionally, the researchers also provide the farmers with new ideas, and on-farm experiments are conducted with farmer participatory action research methodology.

In the last several years, the project members have made an effort to improve the livelihood of upland people with different solutions in agricultural production. Farmers who were interested in the same kind of farming were set up as groups. The farmers in these groups discussed how to solve their production problems. Some farmers tested these solutions as experiments. Other farmers participated in the whole process of the experiment to monitor and evaluate the results of these trials. Appropriate technologies are shared and discussed among farmers, then applied broadly in the community. The sharing of information and knowledge between farmers is encouraged. Therefore, the income farmers

gained from agricultural activities was increased.

To achieve sustainable development, it is necessary to not only increase productivity, but also enhance the villagers' capacity to cope with natural disasters such as floods, typhoons, landslides, forest fires and droughts in order to protect their lives and production. By involving the community to identify solutions for development, a number of activities, such as the conservation of traditional textile weaving by women's groups in the upland community, improvement of pig raising to cope with floods, education on the environment for pupils in the schools, on-farm experiments with goat raising, home-garden, and cultivating new varieties of vanilla plants and macadamia trees, were introduced.

The lesson learnt from the implementation of research projects with new approaches is the methodology of participatory approaches. How to approach communities to encourage sustainable development, how to understand local situations, how to empower communities and individuals so that they can gain confidence in working to improve their livelihood, how to increase the quality of local people's participation in the process of implementing research projects that are being documented and shared among researchers.

As these research projects continue, we are interested in both the results of the project in terms of the improvement in the livelihood of local people, and in the process of their implementation, which enables local people and researchers to learn together to develop and improve solutions for poverty reduction and environment protection.

Summary of Speech by **Reiko NAKAMURA** (Invited Lecture)

Importance of the Participation of Local People/Communities In the Wise Use of Wetlands: Some Practices in Asia

The wetlands, as defined under the Ramsar Convention on Wetlands, include various types of ecosystems such as inland wetlands (swamps, marshes, peatlands, lakes, rivers and underground water habitat), coastal wetlands (mangroves, tidal flats, estuaries, seagrass beds and coral reefs), and even manmade wetlands (rice paddies, dams, reservoirs and fish ponds). The Convention aims at the conservation of wetlands ecosystems as a whole and recommends promoting the wise use of wetlands.

Wetland ecosystems provide many services contributing to the safe and healthy lives of people in many ways, including: provision of food, freshwater, fiber and fuel; regulation of climate, hydrological flows, water purification, erosion, natural hazards; cultural services relating to spiritual and religious values, recreational opportunities, aesthetic value and educational/training opportunities; supporting soil formation and nutrient cycling and etc. Asia's large population has derived much of its sustenance from wetlands, and will continue to draw upon them in the future.

In the Asian region, however, lots of development programs which may seriously affect the wetland ecosystems have been carried out. Due to those development programs, local communities and people who have traditionally benefited from the wetlands and the resources they provide are paying the cost, some with increased cost of living, and some with their lives.

The wetlands are indispensable for sustaining the biodiversity of Asia and for the provision of livelihoods for local communities and people. Threats to the wetlands are also threats to local people. The successful conservation of the wetlands depends, to a large extent, on the active participation of local people. It is important that the local people should be fully aware of the value and benefits of wetlands and involved in their management. In this paper, some of the practices and challenges of local people's participation in wetlands conservation in Asia will be presented and discussed.

Summary of Speech by **Kotaro ITOH** (Invited Lecture)

Community Disaster Prevention: Disaster Preparedness Initiative of Saijo City

1. 2004 Typhoon #21
   5 deaths; serious calamity which cost Saijo City approximately 17 billion yen for recovery & reconstruction.

2. Recovery & Reconstruction
   Approximately 100% of post-typhoon damage was recovered and reconstructed by the end of March 2007

3. Disaster Preparedness
   Designed to increase the awareness of disaster prevention, 545 neighborhood councils in the city created original disaster evacuation maps according to the special characteristics of each region.

4. Education
   Education on disaster prevention starts at the early age of 12. Family members can then become more aware of the importance of disaster prevention through their children. This aims to serve the purpose of increasing the understanding of disaster prevention in the future.

5. Network Building via Festivals
   Local festivals (e.g. Lion Dances, *Danjiri* Portable Shrine festivals) are used to build networks to develop local cooperation and team work in case of emergency.

6. Other
   - Train 540 leaders of voluntary disaster prevention organizations about disaster management
   - Build small-scale dams in order to stop avalanches of rocks and mud carried by streams flowing from the mountainous regions; study and research risk management
   - Remove driftwood, earth and sand being washed downstream. Besides distributing the lumber free-of-charge, the lumber is used to manufacture benches which are distributed to local elementary and middle schools

7. Future Endeavors
   - Learn from the disasters in the past, including Typhoon #21 in 2004 and the Nankai Earthquake, and compile a 100 Year Disaster Prevention Record
   - Make a disaster control management record which takes weather fluctuation into account

Discussion Session

Summary of Discussion Session

The Direction and Prospects of The Global Environmental Studies in the Future

Moderator: Kazuhiro Ueta
Panelists: C.M.M. Bandara, Hossein Farzin, P.R.Shukla, Simon Jackman, Sang-yong Song, Ichiro Terashima, A.J.Zakri, Harold A.Mooney, Yoh Yamashita, Le Van An, Reiko Nakamura, Kotaro Ito
Rapporteurs: Yasuko Matsumoto, Shigeo Fujii, Miki Yoshizumi

Structure of Panel Discussion:

The session begins with a summary of each session by the three rapporteurs. This is followed by a three minutes speech by each of the panelists, then open questions from the floor and a second round of comments. Each panelist then gives a short address to the graduate students and young scholars. The session then ends with a summary of the discussion by the moderator.

Proceedings:

The panel discussion began with opening remarks by Professor Kazuhiro Ueta. The purpose of the panel was to discuss the direction and prospects of global environmental studies in the future. Each panelist presented their own view on the retrospects and prospects of global environmental studies.

Due to the wide variety in the specialization of the panelists and participants of the symposium, which included ethics, philosophy, sociology, biology, geography and toxicology among other fields, the issues raised during the panel discussion were many and diverse. Issues discussed included the meaning of ecosystem services, the relationship between ecosystem science and human well-being, sustainability versus optimality, intergenerational equality in well-being, the highest feasible level of social well-being, the optimal economic development path, the implementation of sustainability rule, the maximum criterion of inter-generational justice, the role of scale in sustainability policy, investment in environmental assets and reproductive capitals, including human capital, knowledge capital, and social capital. Panelists also emphasized the importance of communication among various stakeholders, for example local government and local community, experts and local people etc. Another point emphasized in the panel discussion was that communication among scientists, bureaucrats and industry is also indispensable to sharing information related to environmental issues. It was asserted that the linkage from local to global and from global to local should also be considered, and that we should find practical and feasible solutions to environmental problems which are in accordance with local and global context. In order to do that, we should reappraise the potential and

cultural diversity of local communities. We are able to, and have to, learn from the experience of community activity.

Finally, Kazuhiro Ueta summarized the panel discussion with the following two points:

- One of the key concepts of the symposium was the integration of knowledge. A precondition of the integration of knowledge is the construction and extension of the common base of different academic disciplines through dialogue and communication between those different fields and disciplines.

- Theory and practice are not always consistent with each other. Global environmental studies should combine a theoretical approach with an empirical approach in a co-evolutional way. Lessons from experiences on the internship program, field surveys and the Asia Platform Program in the Graduate School of Global Environmental Studies should be applied to theoretical research into global environmental studies.

Editor's Note

This report has been prepared in order to disseminate the results of the 9th Kyoto University International Symposium.

In preparing the report, an editorial board, composed of the following members, was set up within the symposium's organizing committee. The editorial board planned the outline and edited the report. Individual reports of the various presentations and workshops were contributed by the respective persons in charge. Some of the pre-symposium distributed materials have been included in order to provide an overall picture of the symposium. English drafts were supervised by Mr. Ainslie Kerr, and the photographs were provided by Mr. Masahiko Matano, both of the International Affairs Division, Kyoto University. I would like to express my gratitude to all of the report's contributors.

The editorial board is responsible for the report. No part of this report should be quoted or reprinted without prior permission from the office of Kazuo Matsushita.

(K.M.)

Editorial Board

Kazuo MATSUSITA : Chair, Symposium Organizing Committee; Professor, Graduate School of Global Environmental Studies, Kyoto University

Toshio YOKOYAMA : Vice-President, Kyoto University; Director General, the Organization for the promotion of International Relations, Kyoto University

Hideaki MIYASHITA : Associate Professor, Graduate School of Global Environmental Studies, Kyoto University

Ainslie KERR : International Communications Coordinator, International Affairs Division, Kyoto University

Toshinori TANAKA : Master's student, Graduate School of Global Environmental Studies, Kyoto University

第９回京都大学国際シンポジウム

人間の安全保障のための地球環境学

日時　　平成１９年６月２２日（金）～２３日（土）

開催地　　京都大学百周年時計台記念館　百周年記念ホール・国際交流ホール

主催　　京都大学

企画・実施　京都大学教育研究振興財団（KUF）
京都大学大学院地球環境学堂（GSGES）
京都大学国際交流推進機構（OPIR）

協力　　京都大学フィールド科学教育研究センター(FSERC)
京都サスティナビリティ・イニシアチブ（KSI）

後援　　環境省、京都府、京都市、西条市、環境経済・政策学会、地盤工学会、
土木学会、日本景観生態学会、株式会社ベネッセコーポレーション

はじめに

ここに「第 9 回京都大学国際シンポジウム―人間の安全保障のための地球環境学―」の報告書を刊行いたします。

京都大学国際シンポジウムは、京都大学を挙げて諸外国に語りかける催しとして、第 8 回までいずれも海外で開催されており、京都大学のキャンパスで開催するのは初めてのことでした。

地球温暖化に代表される地球環境問題は、我々の生活や生存の基盤をおびやかすものであり、その解決に向けた総合的な取り組みの重要性は近年ますます増大しています。人類が自ら起こした自然環境の変化のなかで、果たして生き残れるかどうか、その分かれ道に立っているのが21世紀であると京都大学では認識し、人類のみならず、地球社会を構成する生物、非生物の調和ある未来のための教育と研究に取り組んできました。

今回の国際シンポジウムは、京都大学におけるこれまでの地球環境学の研究教育の成果の上にたち、国内外から専門家のみならず実務家にも多く加わっていただき、深い対話を通じて地球環境学のこれからの方向をさぐるとともに、政策も含めた提言を世界に向けて発信することを目指しました。

この報告書は、シンポジウムの内容を、できる限り学内外に広め、今後この分野での国際学術交流の基礎にすることを目的としています。シンポジウムの各発表内容は、さらに充実させ、本学の地球環境英文学術誌 *SANSAI* をはじめ、さまざまな分野の専門誌につぎつぎと公表されることが期待されます。この報告書では、したがいまして、基調講演とパネルディスカッションの概要、分科会の発表とディスカッションの概要、総合討論の概要を掲載するにとどめました。

シンポジウム開催にあたりまして、ご高配をいただきました本学の　尾池和夫総長はじめ役員各位、来賓各位、すべての講演者、発表者、討論者、ポスター発表者、嘉門雅史地球環境学堂長はじめシンポジウム実行委員会各位、財政的支援を賜りました財団法人京都大学教育研究振興財団、そして事務担当の本学国際部国際交流課および地球環境学堂事務室の皆様に、敬意と謝意を表します。

京都大学副学長・国際交流推進機構長　横山俊夫
シンポジウム実行委員長（大学院地球環境学堂教授）松下和夫

総長の歓迎メッセージ

京都大学総長　尾池 和夫

気候変動に代表される地球環境問題は、我々の生活や生存の基盤をおびやかすものであり、その解決に向けた総合的な取り組みの重要性は近年ますます増しています。人類が自ら起こした自然環境の変化のなかで、果たして生き残れるかどうか、その分かれ道に立っているのが21世紀であると京都大学では認識し、人類の未来のための教育と研究に取り組んできました。

2001年には、創立以来築いてきた自由の学風を継承し、発展させつつ、多元的な課題の解決に挑戦し、地球社会の調和ある共存に貢献するため、8項目からなる京都大学基本理念を定めました。その中では、「基礎研究と応用研究、文科系と理科系の研究の多様な発展と統合」、「地球社会の調和ある共存」に寄与する教育や国際交流を推進する、といったことを明確に述べています。

本年は、ここ京都の地で京都議定書が採択されてから 10 年、京都大学の地球環境学堂・学舎が発足して 5 周年の記念すべき年に当たります。第 9 回京都大学国際シンポジウム「人間の安全保障のための地球環境学」は、この記念すべき年に京都大学におけるこれまでの地球環境学研究・教育の成果を政策的な提言も含め、世界に向けて発信するものです。

京都大学の理念は、本シンポジウムのテーマを考える上でも大変重要です。なぜなら、人間の安全保障の根幹は、「環境の持続可能性」の確保であり、そのためには、自然科学・社会科学・人文学の諸学の成果を統合した地球環境学の生成と発展が不可欠だからです。こうした研究・教育活動を通じて本学の目指す地球社会の調和ある共存に寄与することができると確信しております。

今回の京都大学国際シンポジウムでは、国内・国外から多くの専門家・実務家をお招きし、人類社会の重要課題となっている地球環境問題とそれに対処するための新たな学の統合・発展に向けた活発な議論がなされます。その成果が、人類共通の課題である地球環境問題の解決に寄与するとともに、今後の地球環境学研究・教育のさらなる発展に寄与することを心から期待しております。

プログラム概要

シンポジウム
人間の安全保障のための地球環境学
（百周年記念ホール）

6 月 22 日（金）

司会　　小畑 史子（京都大学地球環境学堂准教授）

開会の辞　13:00 - 13:20
尾池 和夫（京都大学総長）
嘉門 雅史（京都大学地球環境学堂長）

特別講演　13:20 - 15:00
13:20 - 14:00
「環境と人間の安全保障：相互の関連」
Alan DUPONT（シドニー大学国際安全保障研究センター所長）
14:00 - 15:00
「気候安全保障という考え方」
小島 敏郎（環境省地球環境審議官）

パネルディスカッション　15:20 - 17:20
「人間の安全保障のための地球環境学」
司会:　松下 和夫（京都大学地球環境学堂教授）
パネリスト:　Alan DUPONT（シドニー大学国際安全保障研究センター所長）
C. M. M. BANDARA （ペラデニヤ大学地理学科教授）
小島 敏郎（環境省地球環境審議官）
佐和 隆光（立命館大学大学院政策科学研究科教授）
Rajib SHAW （京都大学地球環境学堂准教授）

閉会の辞　17:20 - 17:30
横山 俊夫 （京都大学副学長）

6 月 23 日（土）

セッション 1～3	招待講演	（国際交流ホール I～III）	10:00 - 12:00
昼食			12:00 - 13:00
ポスター発表		（国際交流ホール III）	12:00 - 13:00
セッション 1～3	講演・発表・ﾃﾞｨｽｶｯｼｮﾝ	（国際交流ホール I～III）	13:00 - 15:00
休憩			15:00 - 15:30
総合討論		（国際交流ホール I &II）	15:30 - 17:30

［第１分科会］ サステナビリティを考える
（国際交流ホール I）

司会　　植田 和弘（京都大学地球環境学堂教授）
　　松岡　譲（京都大学地球環境学堂教授）
　　一方井 誠治（京都大学 KSI・経済研究所教授）

招待講演 10:00 - 12:00

Hossein FARZIN（カリフォルニア大学デービス校農業資源経済部門教授）
　コメンテータ： 武部 隆（京都大学地球環境学堂教授）
P. R. SHUKLA （インド経営大学院公共システムグループ教授）
　コメンテータ：森 晶寿（京都大学地球環境学堂准教授）

昼食 （ポスター発表、 国際交流ホール III） 12:00 - 13:00

一般発表 13:00 - 15:00

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佐藤 真行（京都大学 KSI・地球環境学堂助教）
錦　 真理（京都大学地球環境学舎博士課程）

［第２分科会］ 現代科学技術に求められる洗練とは何か
（国際交流ホール II）

司会　　横山 俊夫 （京都大学地球環境学堂教授）
　　三室　 守 （京都大学地球環境学堂教授）

招待講演 10:00 - 12:00

Simon JACKMAN（オックスフォード大学 IPM-Net 所長）
Sang-yong SONG（韓国学士院会員）
寺島 一郎（東京大学理学研究科教授）
阿部　 浩（京都大学人間・環境学研究科准教授）

昼食 （ポスター発表、 国際交流ホール III） 12:00 - 13:00

口頭発表 13:00 - 15:00

横山 俊夫（京都大学地球環境学堂教授）
三室　 守（京都大学地球環境学堂教授）

杉山 雅人（京都大学地球環境学堂教授）
松田 知成（京都大学地球環境学堂准教授）

［第３分科会］ フィールドとコミュニティから考える
（国際交流ホール III）

司会　　森本 幸裕（京都大学地球環境学堂教授）
小林 正美 （京都大学地球環境学堂教授）
夏原 由博 （京都大学地球環境学堂教授）

招待講演 10:00 - 12:00

A. H. ZAKRI（国連大学高等研究所所長）
Harold A. MOONEY（スタンフォード大学生物科学部門教授）
山下　洋（京都大学フィールド科学教育研究センター教授）

昼食 12:00 - 13:00
ポスター発表 12:00 - 13:00

招待講演 13:00 - 14:00

LE Van An（フエ大学国際協力部長）
中村 玲子（ラムサールセンター事務局長）
伊藤 宏太郎（西条市長）

パネル討論 14:00 - 15:00

司会:　　田中　樹（京都大学地球環境学堂准教授）
パネリスト:　小林 正美（京都大学地球環境学堂教授）
森本 幸裕（京都大学地球環境学堂教授）
中村 玲子（ラムサールセンター事務局長）

総合討論
「今後の地球環境学の方向性と展望」
（国際交流ホール　I & II）

司会　植田 和弘 （京都大学地球環境学堂教授）

15:30 - 17:30

各セッションからの報告

セッション１　松本 泰子 （京都大学地球環境学堂准教授）
セッション２　藤井 滋穂 （京都大学地球環境学堂教授）
セッション３　吉積 巳貴 （京都大学地球環境学堂助教）

総合討論

シンポジウムの概要

第 9 回京都大学国際シンポジウムは、「人間の安全保障のための地球環境学」を全体テーマとして、2007 年 6 月 22 日から 2 日間、京都大学で開催されました。第 8 回までの一連の京都大学シンポジウムはいずれも海外で開催されており、京都大学で開催するのは初めてのことでした。

2007 年は京都議定書が京都の地で採択されてから 10 周年、そして京都大学の地球環境学堂・学舎・三才学林が発足してから 5 周年の節目となる年です。さらには「持続可能な発展」の概念を世界に広めたことで知られている「環境と開発に関する世界委員会」（ブルントラント委員会）が「われら共有の未来」という歴史的な報告書を公刊した年から 20 周年でもありました。

折しも直前にドイツで開かれた主要国首脳会議（ハイリゲンダム・サミット）で、地球温暖化問題が主要テーマとされ、「2050 年までに温室効果ガスを半減することを真剣に考慮する」との趣旨の首脳宣言が採択されたばかりでした。

このようにシンポジウムのテーマが極めてタイムリーであったことから、時に激しい雨の降る悪天候にもかかわらず約 400 名の聴衆が京都大学の時計台記念館をうずめました。

第 1 日目はシドニー大学のアラン・デュポン教授の「環境と人間の安全保障 : 相互の関連」と、小島敏郎・環境省地球環境審議官による「気候安全保障と国際交渉の姿勢」というタイトルの基調講演があり、その後、地球環境学堂のショー・ラジブ准教授、ペラデニア大学バンダラ教授、立命館大学佐和隆光教授を加えてパネルディスカッションが行われました（司会は松下）。

人間の安全保障の概念は、従来の国家を対象とした安全保障から個々の人間の生存に注目し、「人間の生にとってかけがえのない中枢部分を守り、すべての人の自由と可能性を実現すること」と定義され、その根幹を成すのが「環境の持続性」であるといえます。

デュポン氏は、気候変動をはじめ地球環境問題が国際政治上および人類の生存基盤を脅かす重要課題であることを強調し、特にアジアにおける環境安全保障の観点からの新たな協力の可能性を論じました。

小島氏は国際交渉の最前線に関わっている立場から、気候変動が安全保障の問題となって国際政治上の重要課題となっている半面、現実の交渉がともすれば「各国にとっての対策に要するコストをいかに削減するか」になってしまっている現状を指摘しました。さらに、人類の持続可能な未来のためには、気候変動の「影響」を人類にとっての脅威と捉え、地球益の立場から各国の協力が必要であると強調しました。

パネルディスカッションにおいては、ショー氏は現実にコミュニティで生活している人々の視点の重要性を提起し、バンダラ氏は東洋的な調和の思想の意義を強調するとともに、温暖化対策においても汚染者負担の原則、すなわち先進国の責任を明確にすることを求めました。佐和氏は技術開発と経済的なインセンティブの重要性を指摘し、地球環境問題に取り組むことを通じて新たな経済社会の展望が開かれる可能性を論じました。

人間の安全保障、そして気候安全保障の考え方を踏まえ、多様な学問分野の成果を生かし、それを統合して、どのようにして新たな地球環境学を構築していくことができるか。さまざまな視点から課題が提起され、今後の大学の役割にも深い問いかけがなされました。

第 2 日目は 3 つの分科会（「サスティナビリティを考える」（コーディネーター：一方井誠治・松岡譲・植田和弘京大教授）、「現代科学技術に求められる洗練とは何か」（コーディネーター：横山俊夫・三室守京大教授）、「地域とフィールドから考える」（コーディネーター：森本幸裕・小林

正美・夏原由博京大教授）に分かれ、各国からの招待講演者の発表や討論が行われました。

招待講演では、インド経営大学院のプリアダルシ・シュクラ教授（持続可能性と気候変動)、カリフォルニア大学のホセイン･ファルザン教授（経済発展における持続性と最適性）（以上第 1 分科会)、オックスフォード大学のサイモン・ジャックマン博士（地域共同型技術革新による環境改善)、韓国学士院会員のソン・サンヨン教授（環境倫理に基づく国際行動）(以上第 2 分科会)、国連大学高等研究所長のアブダル・ハミッド・ザクリ博士（ミレニアム生態系評価とそのフォローアップ戦略)、スタンフォード大学のハロルド・ムーニー教授（世界の生態系の現状と生態系サービスの持続可能性）(以上第 3 分科会) など各分野の錚々たる碩学から興味深い報告がされました。

各分科会では、招待基調講演の後、京都大学の教員や若手研究者、さらには国内他機関の研究者、アジア・プラットフォームの協力大学であるベトナムのフエ大学、西条市長、環境 NGO の実践家（ラムサールセンター中村玲子さん）も加わってそれぞれのテーマにつき活発な討論が展開されました。参加した研究者・専門家・実践家の間で交流が深まり、今後の連携と協力の可能性も探られました。

また、昼休みの時間を活用して、京都大学地球環境学堂・学舎の活動紹介や、その教育プログラムの特色であるインターンシップの成果、ベトナムを拠点とするアジア･プラットフォームの活動を紹介するポスター･セッションも開かれました。

最後に参加者全員が一堂に会して新たな地球環境学の方向性を討議する全体総括セッションが持たれました（司会は植田教授)。まず各分科会の報告担当者から分科会の議論の概要の報告があり、それまでの議論を共有した上で、今後の地球環境学の方向性、特に大学の役割について議論が行われました。

京都大学では 2001 年にビジョンを定め、その中で、「基礎研究と応用研究、文科系と理科系の研究の多様な発展と統合」、「地球社会の調和ある共存」に寄与する教育や国際交流を推進する、といったことを明確に述べています。これは今後ますます重要となる地球環境問題の解決に向け、大学として文理の枠組みを越えた統合を果たしていく意思を表明したものでした。

今回のシンポジウムは、地球環境学堂・学舎をはじめ、京都大学の地球環境研究・教育の成果を踏まえ、今後の展望を拓くことを目指して開催されたものでした。

シンポジウムでは、人類社会の重要課題となっている地球環境問題とそれに対処するための新たな学の統合・発展に向け、きわめて質の高い議論が展開されました。もとより今回のシンポジウムで掲げたテーマは一朝一夕に結論を出せるものではありません。しかしながらこのシンポジウムをひとつの契機とし、人類共通の課題である地球環境問題の解決への鍵についての理解が深まり、今後の地球環境学研究・教育がさらに発展していくことを期待したと思います。

（文責：松下和夫（シンポジウム実行委員長、大学院地球環境学堂教授)。なお。本稿は「グローバルネット」2007 年 8 月号の原稿に加筆したものである。）

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2. 砂漠化対処のための技術移転の試み
   瀬戸 進一　（地球環境学舎・博士課程）
3. 学校防災教育の新しい展開のために
   塩飽 孝一　（地球環境学舎・博士課程）
4. 持続可能なコミュニティづくり：千里ニュータウンの経験からの教訓
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6. インド・チリカ湖の漁業と漁民の生計
   岩崎 慎平　（地球環境学舎・博士課程）
7. ベトナム中部少数民族村におけるツーリズム調査
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小川 菜穂子（地球環境学舎・卒業生（2007 年修士号取得））
23. ベトナム山村の食料資源の特徴と利用
山崎 香織　（農学部・卒業生（2007 年修士号取得））

編集後記

本報告書は、第 9 回京都大学国際シンポジウムの概要を報告することを目的として作成されたものです。

報告書作成に当たっては、シンポジウム実行委員会の中に下記のメンバーからなる編集委員会を編成し、ここで全体の構成を企画しました。そして全体会合（基調講演とパネルディスカッション)、分科会（発表と討論)、総合討論の概要をそれぞれの担当者に作成を依頼し、英文の校閲（ケア氏担当）と全体の編集を行いました。分科会の発言要旨等、一部シンポジウム配布資料と重複する部分がありますが、今回のシンポジウムの全体像を示すために、改めて収録しました。シンポジウムの写真は、京都大学国際部国際交流課の俣野雅彦氏が撮影したものです。原稿作成にご協力いただいた方々に改めて御礼申し上げます。

なお、本報告書の文責は編集委員会にあります。(本報告書を引用または転載される場合は、京都大学大学院地球環境学堂の松下和夫研究室宛ご連絡ください。)（松下記）

編集委員会：
松下和夫（京都大学大学院地球環境学堂）
横山俊夫（京都大学国際交流推進機構、地球環境学堂）
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エインズリー・ケアー[Ainslie Kerr]（京都大学国際部国際交流課）
田中俊徳（京都大学大学院地球環境学舎）

第九回京都大学国際シンポジウム報告書
Report of the 9th Kyoto University International Symposium
「人間の安全保障のための地球環境学」
“Integrating Global Environmental Studies Towards Human Security”

編者　松下和夫・横山俊夫・宮下英明・エインズリー ケアー・田中俊徳
Editors　Kazuo MATSUSHITA, Toshio YOKOYAMA, Hideaki MIYASHITA, Ainslie KERR & Toshinori TANAKA
発行者　京都大学国際交流推進機構・京都大学大学院地球環境学堂
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本文用紙に再生紙を使用。

京都大学基本理念

京都大学は、創立以来築いてきた自由の学風を継承し、発展させつつ、多元的な課題の解決に挑戦し、地球社会の調和ある共存に貢献するため、自由と調和を基礎に、ここに基本理念を定める。

研究

1．京都大学は、研究の自由と自主を基礎に、高い倫理性を備えた研究活動により、世界的に卓越した知の創造を行う。
2．京都大学は、総合大学として、基礎研究と応用研究、文科系と理科系の研究の多様な発展と統合をはかる。

教育

3．京都大学は、多様かつ調和のとれた教育体系のもと、対話を根幹として自学自習を促し、卓越した知の継承と創造的精神の涵養につとめる。
4．京都大学は、教養が豊かで人間性が高く責任を重んじ、地球社会の調和ある共存に寄与する、優れた研究者と高度の専門能力をもつ人材を育成する。

社会との関係

5．京都大学は、開かれた大学として、日本および地域の社会との連携を強めるとともに、自由と調和に基づく知を社会に伝える。
6．京都大学は、世界に開かれた大学として、国際交流を深め、地球社会の調和ある共存に貢献する。

運営

7．京都大学は、学問の自由な発展に資するため、教育研究組織の自治を尊重するとともに、全学的な調和をめざす。
8．京都大学は、環境に配慮し、人権を尊重した運営を行うとともに、社会的な説明責任に応える。


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