The 7th Conference of the Science Council of Asia (SCA)

PROCEEDINGS

June 14-16, 2007
Okinawa Convention Center, Okinawa, Japan

Organized by
Science Council of Japan (SCJ)

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Chairperson’s Summary

Chairperson's Summary

The Seventh Conference of the Science Council of Asia (SCA)
June 14 – 16, 2007
Okinawa

I. Organizational Matters

1. The 7th Conference of the Science Council of Asia (SCA) was convened by the Science Council of Japan (SCJ) at Okinawa Convention Center in Japan, from June 14 to 16, 2007, on the theme "Energy and Environment." During the conference, two Management Board Meetings, two General Assemblies and the Parallel Session were held as well as the SCA / PSA Joint Symposium.

2. The conference was attended by nine member countries: China, Indonesia, Japan, Republic of Korea, Malaysia, the Philippines, Singapore, Thailand and Viet Nam. As observers, representatives from five international, regional or national organizations participated in the conference: International Council for Science (ICSU) Regional Office for Asia and the Pacific; UNESCO Office, Jakarta; Pacific Science Association (PSA); Qingdao Association for Science and Technology, China; and Vietnamese Academy of Science and Technology.

3. The conference was chaired by Prof. Ichiro Kanazawa, President of the SCA and the SCJ.

II. Proceedings of the Conference

A. Management Board Meetings and General Assemblies [June 14-15]

4. During the Management Board meetings and the General Assemblies convened on June 14 and 15, the following items were discussed and determined.

(1) The 7th SCA Annual Report was adopted. It was suggested that the next annual report should include progress reports on the SCA Joint Projects which are currently under way.

(2) Three new SCA Joint Projects were proposed and approved: "Genomics-based Comparative Analyses of Gene Expression of Wild Asian Honeybees for Improving European Domestic Honeybees" proposed by Dr. Kiyoshi Kimura, "Space and

Lithosphere Environment Changes in Indonesia" proposed by Prof. Kiyofumi Yumoto and "Institutional Design of Global Information Commons for Asia" proposed by Prof. Shuichi Iwata.

(3) After the deliberation including the discussion at the Informal Meetings, the 7th SCA Conference Joint Statements on "Energy and Environment" and "the Future of the SCA" were unanimously adopted. The process of adopting the statements provided an invaluable opportunity to discuss common challenges, experiences and the way forward. On adoption, the Chairman observed that these statements were the beginning of the SCA members' collective endeavors, and thus called for the members' active participation in future activities. In implementing the contents of the statements, starting with selecting the themes for the Joint Research Projects, the SCA Secretary-General will communicate with respective member organizations in due course.

(4) New SCA officers were elected from among the members of the Management Board. Prof. Feng Changgen, Executive Secretary of the China Association for Science and Technology (CAST), was elected President; Associate Prof. Lam Kong Peng, Executive Director of the Singapore Immunology Network, Agency for Science, Technology and Research (A*STAR), was elected Vice-President; and Prof. Yoichi Muraoka, Vice-Chairperson of the SCA Organizing Committee of the SCJ, was elected Secretary-General / Treasurer.

(5) China presented the draft plan of the 8th SCA Conference in Qingdao in 2008. It was confirmed that the main theme would be "Coastal Oceans: Their Sustainability and Responses to Global Change," and the conference would be held in combination with the International Forum on Marine Sci-tech and Economic Development 2008, which is cosponsored by the SCA, the China Association for Science and Technology (CAST) and the Qingdao Municipal Government, on June 24 – 27, 2008 in Qingdao, China.

(6) It was confirmed that Singapore would be the host country for the 9th SCA Conference in 2009 and the Philippines would be the host country for the 10th SCA Conference in 2010.

B. Parallel Session [June 15]

5. Among the SCA Joint Projects which are in progress, four projects, namely, "Gender," "Aquatic Environment," "Natural Disasters" and "Ocean Security,"

concurrently held individual sessions during the morning of June 15. The summary of each session was reported at General Assembly II; Prof. Matori Yamamoto from the SCJ gave a presentation on "A Comparative Study of the Research Conditions of Women Scientists and the Present States of Women's / Gender Studies in Asian Countries Towards Sustainable Development," Prof. Tetsuya Kusuda from the SCJ gave a presentation on "Management of Sustainable Aquatic Environment," Prof. Masanori Hamada from the SCJ gave a presentation on "Construction of a Secure and Safe Society against Global Changes of Natural Disasters" and Prof. Tadao Kuribayashi from the SCJ gave a presentation on "International Cooperation in Securing the Oceans in Asia – Transportation and Disposal of Radioactive Material at Sea." In addition, Prof. Mazlin Bin Mokhtar from the Institute for Environment and Development (LESTARI), Malaysia, gave a presentation at General Assembly I on "Sustainability Science for Sustainability Governance: A Study on Science-Governance Symbioses," a SCA Joint Project which is currently in progress.

C. SCA / PSA Joint Symposium [June 16]

6. At the SCA / PSA Joint Symposium on June 16, after the opening remarks by Dr. Ichiro Kanazawa, President of the SCA / SCJ and Dr. Nancy Lewis, Secretary-General of the PSA, the congratulatory address by Mr. Hirokazu Nakaima, Governor of Okinawa, and the introduction of the message from Prime Minister Shinzo Abe, His Imperial Highness Prince Akishino delivered a special address on " Greeting for 7th Science Council of Asia ." This was followed by two keynote speeches by Dr. Rajendra Pachauri, Chairman of the Intergovernmental Panel on Climate Change, on "The Challenge of Climate Change – Dealing Energy and Environment Policy –," and by Prof. Leo Tan, President of the Singapore National Academy of Science, on "The environment: A global snapshot of some issues with perspectives from Singapore." The Symposium then moved on to lively Panel Discussion Sessions on specific themes: "Energy and Environment," "Education and Environment" and "Water Resources." It is worth noting that among the panelists were students of Okinawa Prefectural Miyako Agriculture and Forestry High School who made a presentation entitled "Protecting the Life-sustaining Groundwater of Miyako Island: The Development of an Environmentally Friendly Organic Fertilizer utilizing Phosphorus Accumulated in the Soil" during the session on "Water Resources." The Symposium concluded with closing remarks by Prof. Ichiro Kanazawa, President of the SCA / SCJ.

Officers

President/Secretary General/Treasurer

Ichiro Kanazawa(Japan/SCJ)

Vice President/President-Elect

Feng Changgen(China/CAST)

Immediate Past President
(Absent)
Andre Beteille(India)

Member countries

China

Liang Yingnan

Yang Xi

India

(Absent)

Indonesia

Rochadi Abdulhadi

Japan

Norihisa Doi

Yoichi Muraoka

Republic of Korea

Ho-Wang Leo

Dong Ki Kim

Malaysia

Mohd Nordin Hasan

Mazlin Bin Mokhtar

Mongolia

(Absent)

The Philippines

Olivia C. Caoili

Filomeno V.Aguilar, Jr.

Singapore

Lam Kong Peng

Alice Khong

Thailand

Montri Chulavatnatol

Sumontha Promboon

Vietnam

Hoang Van Sinh

for: **Luu Nam Phuong**

Program

June.14(Thu.)	June.15(Fri.)	June.16(Sat.) **The SCA/PSA Joint Symposium Co-operated by JST**
	9:30–12:30 **Parallel Session A** SCA Joint Project Workshop "Gender"	9:50–10:00 **Opening Remarks** ・Ichiro Kanazawa; SCA President ・Nancy Lewis; PSA Secretary-General ・Hirokazu Nakaima; Governor, Okinawa Prefecture
	Parallel Session B SCA Joint Project Workshop "Aquatic Environment"	10:00–10:30 **Special Adrress** ・H. I. H. Prince Akishino
	Parallel Session C SCA Joint Project Workshop "Natural Disasters"	10:30–11:30 **Keynote Speeches** ・Rajendra Pachauri ・Leo Tan
	Parallel Session D SCA Joint Project Workshop "Ocean Security"	11:30–13:00 **Panel Discussion Session A** **"Energy and Environment"** ・Kenji Yamaji (Moderator) ・Mohamad Ali Hassan ・Li Ji ・Rajendra Pachauri ・Junichiro Tsutsumi
	12:30–13:30 Lunch Break	13:00–14:00 Lunch Break
13:30–14:30 **Registration**	13:30–14:45 Informal Meeting of SCA Members	
14:30–16:00 **Management Board Ⅰ**	14:45–15:30 **Management Board Ⅱ**	14:00–15:30 **Panel Discussion Session B** **"Education and Environment"** ・Fumiko Kasuga (Moderator) ・Norman Okamura ・Katsunori Suzuki ・Randy Thaman ・Makoto Tsuchiya
	15:30–15:45 Break	15:30–15:45 Break
16:00–17:30 **General Assembly Ⅰ**	15:45–17:30 **General Assembly Ⅱ**	15:45–17:15 **Panel Discussion Session C** **"Water resources"** ・Kunitoshi Sakurai (Moderator) ・Gemunu Herath ・Shinichiro Ohgaki ・Mafizur Rahman ・Kazuhiro Maesato ・Marika Sunakawa ・Rina Hamakawa ・Manami Kakazu ・Tomomi Nagasaki ・Chika Yonaha
17:30–19:00 Informal Meeting of SCA Members	17:30–18:00 **Closing Ceremony**	17:15–17:30 **Closing Remarks** ・Ichiro Kanazawa; SCA President

List of Participants

List of Participants in the 7th SCA Conference

SCA Officers

Note: * shows Management Board members.

President/Secretary General/Treasurer
Ichiro Kanazawa *
President, Science Council of Japan (SCJ)

Vice President/President-Elect
Feng Changgen *
Executive Secretary, China Association for Science and Technology (CAST)

Immediate Past President [Absent]
André Béteille *
Chairman, Indian Council of Social Science Research (ICSSR), India

Member Organizations

【Representatives】

China
China Association for Science and Technology (CAST)
Liang Yingnan
Deputy Director General, Department of International Affairs

Yang Xi
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India
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Indonesia
Indonesian Institute of Sciences (LIPI)
Rochadi Abdulhadi
Executive Secretary

Ministry of National Education
None

Japan
Science Council of Japan (SCJ)
Norihisa Doi
Vice President

Yoichi Muraoka
Member

Republic of Korea
National Academy of Sciences (NAS)
Ho-Wang Lee *
Member

Dong Ki Kim
Member

Korean Academy of Science and Technology (KAST)
None

Malaysia

Academy of Sciences Malaysia (ASM)
Mohd. Nordin Hasan *
Fellow

Ministry of Science, Technology and Innovation (MOSTI)
None

Institute for Environment and Development (LESTARI)
Mazlin Bin Mokhtar
Director

Mongolia

Mongolian Academy of Sciences (MAS)
None

The Philippines

National Research Council of the Philippines (NRCP)
Olivia C. Caoili *
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Philippine Social Science Council (PSSC)
Filomeno V. Aguilar, Jr.
Chairperson

Philippine Association of Marine Science (PAMS)
None

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Agency for Sciences, Technology and Research (A*STAR)
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Alice Khong
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Thailand

Thai Academy of Science and Technology (TAST)
Montri Chulavatnatol *
Vice President

Science Society of Thailand (SST)
Sumonta Promboon
President

Vietnam

Ministry of Science and Technology (MOST)
Hoang Van Sinh
Deputy Director, International Cooperation Department

Luu Nam Phuong
Senior Officer, International Cooperation Department

Ministry of Health (MOH)
None

Observers

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Director

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Katsunori Suzuki
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China

Qingdao Association for Science and Technology

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Yukiko Fukagawa

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Toyoko Imae

Hideaki Karaki

Fumiko Kasuga

Masaru Kono

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Noriko Osumi

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Senior Scientist

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Senior Advisor, Gender Equity in S & T

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Science council of Japan (SCJ)

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Osamu Kusakabe

Tetsuya Kusuda

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SCA/PSA Joint Symposium

Bangladesh

Bangladesh University of Engineering and Technology

Md. Mafizrur Rahman
Teaching, Research, Consultancy Associate Professor, Department of Civil Engineering

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Asian Pacific Energy Research Center

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Senior Researcher

India

The Energy and Resources Institute

Rajendra Pachauri
Director-General

Fiji

The University of the South Pacific

Randy Thaman

Japan

Tokyo International Exchange Center

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Rina Hamakawa, Student

Manami Kakazu, Student

Tomomi Nagasaki, Student

Marika Sunakawa, Student

Chika Yonaha, Student

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Shinichi Ishihara
Section Chief, Accounting Division

SCA Joint Statements

The 7th Science Council of Asia (SCA) Conference

Joint Statement on Energy and Environment

Energy and environmental issues are taken as a common challenge to humanity. The dimensions of the challenge are social, technological, economic, and political as well as global. The issues are particularly serious for Asia-Pacific region where dynamic economic development is proceeding. We, as the members of the SCA, hereby pledge to further reinforce our partnership and collaboration to promote interdisciplinary research on energy and environment, and thus, contribute to the enhancement of the public awareness and political will which tackle these global issues.

(1) Continuous commitment with a long term perspective

The academia, the industry, and the government are urged to play their respective role for our society. Scientists are requested to acquire more academic evidence, while the private sector is required to reinforce its effort to put such knowledge into practical use. The government should take initiative in promoting strategic research and development. It is important for the academia to create an interdisciplinary field of science. Continuous effort is also desired to improve intellectual infrastructures, including human resource development as well as statistical and global monitoring systems.

(2)Technological and social innovations

To cope with energy and environmental issues, two major tasks are required: continuous development of individual technologies and the integration of such technologies. Technological development should be managed in a flexible manner to reflect regional differences and temporal changes of social needs. In addition to technological innovation, social innovation is inevitable for the solution of energy and environmental issues. Environmental harmony must be taken into consideration in the development of social infrastructures. Also, educational and publicity activities should be encouraged to review and reform societies' lifestyle.

(3)Equitable allocation of efforts

Since the energy and environmental issues involve all countries, an international consensus should be established to build a global framework, under which efforts shall be allocated in an equitable manner among countries and generations for achieving sustainable development. Developing countries are expected to consume more energy in accordance with their economic growth and improvement of living standards. Developed countries are encouraged to transfer their technologies to developing countries in order to help them "leapfrog" to modern energy technologies and take advantage of such technologies to ensure both economic growth and efficient use of energy.

The 7th Science Council of Asia (SCA) Conference
Joint Statement on the Future of the SCA

Preamble

In cooperation with each member, we experienced six SCA conferences to date, starting the 1st Conference in Bangkok 2001. We, the members of the SCA convened in Okinawa, Japan on 14-15 June 2007 to hold the 7th SCA Conference, recognized that it is now time to take further steps to build up the SCA activities along the "Objectives of the SCA" for the benefit of our respective members. Recognizing that this significant step will eventually enable us more to bring scientific insight and knowledge into the policy making process and promote closer ties among member countries, we affirm the following as the shared view of all participants of the conference.

Concrete Action for the Future of the SCA

1. We reaffirm the "Objectives of the SCA" and focus on improving the function of each member, making reports on issues of Asian countries' common concerns and submitting them in the form of recommendations to policy makers.

2. We adopt a three-year strategic plan for the SCA activity, if possible, at the 8th Conference in China next year.

3. We set up new joint SCA projects in the future on problems of great urgency by putting more emphasis on members' needs. The themes might be "energy," "climate change," "water," "innovation," "information," "agriculture," "food," "natural disaster," "biodiversity" and "improvement of the member function in Asia." One or two themes are chosen every year on a resolution of the General Assembly, and the reports are published to the governments, persons related to academies, media etc. after the completion of the project(s). Every project should be reviewed every 2 years. Also existing projects should be reviewed as well.

4. We build collaboration with the ICSU Regional Office for Asia and the Pacific, proposed by our Malaysian colleague, Prof. Nordin Hasan, member of the Management Board of the SCA and Director of the ICSU Regional Office for Asia and the Pacific.

5. We continue our effort to pursue ways of facilitating solid financial basis so that we can provide the financial support for the above mentioned projects, including the use of financial support available from both public and private sectors.

Opening Address
by
President of SCA

Opening Address
at
The 7th Conference of the Science Council of Asia (SCA)

Dear Colleagues, Distinguished Delegates, Ladies and Gentlemen,

I would like to first extend a warm welcome to you all to Okinawa today. On the occasion of the opening of the 7th Science Council of Asia (SCA) Conference, I would like to say a few words of greeting to you on behalf of the organizer of the conference, the Science Council of Japan (SCJ).

Okinawa is currently in its rainy season, but I sincerely hope you can enjoy the start of the Japanese summer here in the prefecture.

Thanks to the efforts of the member organizations of the SCA and endeavors by individuals, we have been able to hold a total of six conferences to date. I would like to express my profound respect to all those involved during that period. These people and organizations have succeeded in promoting joint research and cooperation in a wide range of scientific areas in the Asian region through a number of joint projects.

Ladies and Gentlemen, I would like to take this opportunity to introduce to you an overview of the 7th SCA Conference.

As has been the case with past conferences, the core part of the conference will be taken up by reports on the results of joint projects. The joint projects that will be reported on today include “Gender,” “Aquatic Environment,” “Natural Disasters,” “Ocean Security,” and “Science for Governance.” All of these are timely themes and I imagine that all the delegates will be greatly interested to hear the reports.

One of the points of the conference on this occasion is that on the third day of proceedings we plan to hold a joint symposium with the Pacific Science Association (PSA). The PSA was founded in 1920 with the aim of developing science and technology to support sustainable development in the Asia-Pacific region. The association holds international conferences that seek to achieve such a goal, and this year the PSA has been holding its 21st Pacific Science Congress from June 12, here in Okinawa. We decided to take the opportunity and hold a joint PSA-SCA symposium on June 16.

Of particular note is that His Imperial Highness Prince Akishino will attend the joint symposium, at which he will deliver a Special Address. His Imperial Highness has a strong interest himself in cooperation among the countries of Asia through his own research on living creatures. His Imperial Highness has also made time in his busy

schedule to attend a reception on the evening of June 15, and at that time he hopes to exchange opinions with you. As keynote speakers we have also invited Dr. Rajendra K. Pachauri of India, Chair of the Intergovernmental Panel on Climate Change (IPCC), and Professor Leo Tan, President of the Singapore National Academy of Science, has been nominated to speak by the PSA. In addition during the symposium we are planning panel discussions on the themes "Energy and Environment," "Education and Environment," and "Water resources."

Today marks the opening of the 7th General Assembly of the SCA. This provides us an opportunity to further cement the activities of the SCA, and with that aim in mind I will be proposing a Joint Statement titled "The Future of the SCA" to you all. In addition, I will also be proposing a Joint Statement titled "Energy and Environment." I would like to hear from you the broadest possible range of opinions on these two Joint Statements, and informal meetings have been arranged for that purpose today and tomorrow. At these informal meetings, which will be attended by all members, I very much hope that you can discuss the content of the Joint Statements, and if we can come to agreement, I will announce the outcome at the end of the Conference.

Finally, I would like to reiterate my warm welcome to you, and express the hope that the three days of meetings from today will serve to further advance one of the aims of the SCA, namely, to deepen mutual understanding and trust among the scientific communities of Asia.

Thank you very much.

Prof. Ichiro Kanazawa
President, Science Council of Asia (SCA)
President, Science Council of Japan (SCJ)

Closing Remarks
by
President of SCA

Closing Remarks
at
The 7th Conference of the Science Council of Asia (SCA)

Distinguished guests, fellow members, Ladies and Gentlemen,

On behalf of the participants of this Science Council of Asia, SCA, and Pacific Science Association, PSA, Joint Symposium, I would like to give you a closing remark.

As you know, the PSA was founded in 1920, that is 87 years ago, whereas the SCA was born in 2000, that is only 7 years ago. Therefore, age-difference between these two organizations is 80 years for ever. And, this is the very first event for a grandmother, PSA, and a grandson, SCA, to hold a joint symposium together.

In this respect, I very much appreciate the great contributions of His Imperial Highness, Prince Akishino for his deeply impressive special address, and keynote speakers, Dr. Rajendra Pachauri and Dr. Leo Tan, for their stimulating presentations. I also appreciate the big contributions of other speakers and discussants at the three Panels for their activating the symposium. I am sure that all of you enjoyed the Symposium and I can confidently declare that the Symposium was finished successfully.

Keywords appeared in the keynote speeches and the Panel discussions, such as energy, environment, water, and so forth, are, of course, exactly the same as those appeared in other academic and political organizations of global bases, such as G8 summit, G8 academies, IAP, IAC and so forth. It is because we are on the right way. I hope, therefore, that the activities of SCA and PSA would continue to con tribute to the sustainable development of human beings.

Finally, I would like to express our sincere thanks to Okinawa Prefecture, Ryukyu University and Local Organizing Committee of the Symposium, for their efforts too big for words.

Thank you very much for your attention and see you again, sometime, somewhere on this beautiful planet, the earth. SAYONARA.

Prof. Ichiro Kanazawa
President, Science Council of Asia (SCA)
President, Science Council of Japan (SCJ)

SCA Joint Project Workshop

These papers are translated from the papers which originally contributed to the September issue of "SCJ Forum" published by the Japan Science Support Foundation.

Parallel Session A:

Gender

Report on the Gender Workshop

Hiroko Hara, Matori Yamamoto

A gender workshop hosted by members of the Joint Project on Gender took place on June 15, 2007 from 9:30 am to 12:30 pm at the 7th Science Council of Asia (SCA) held in parallel with the Pacific Science Congress. The panelists, the commentators and the attendees, including participants from the Pacific Science Congress, had a lively discussion.

How the Joint Project on Gender was started

The Joint Project on Gender, as one of the SCA joint projects, deals with "A Comparative Study of the Research Conditions of Women Scientists and the Present Conditions of Women's/Gender Studies in Asian Countries towards (Human Centered) Sustainable Development," and as the third in the series, the theme this time was "Academic Pursuit and Family Life."

The Joint Project on Gender originated from the two keynote speeches at the third SCA (Denpasar, Indonesia in 2003) entitled "The Gender Studies/Women's Studies in Asia" by Hiroko Hara (the Science Council of Japan (SCJ)) and "Connecting the Unconnected: Science and Technology Policy Challenges for Asia in the 21st Century – the Gender Dimension and Poverty Alleviation" by Stephen Hill (Jakarta UNESCO Office), followed by a review on gender studies in Asian countries by Sjamsiah Achmad (LIPI, Indonesia). The Joint Project on Gender was first recognized as one of the SCA joint projects at the fourth SCA (Seoul, Korea in 2004). There have been two gender workshops, have been held so far, the first one at the fifth Council (Hanoi, Vietnam in 2005) on "Gender Issues in Science and Technology" and the second at the sixth Council (Delhi, India in 2006) on "Gender, Science and Technology." This will be the third workshop.

Presentations at the third Gender Workshop

After Sjamsiah Achmad (LIPI, Indonesia) briefly explained the circumstances and the purpose of the Joint Project on Gender, five panelists made their presentations. Below are the summaries of their presentations.

1. Carolyn I. Sobritchea (University of the Philippines Diliman, Philippines) "Public Policies and Programs to Harmonize Work and Family Life: Focus on Women in Education, Science and Technology"

The Philippines is often seen as having many female researchers and hence being relatively open to gender. The reality, however, is that female researchers and engineers are filling gaps left by male researchers and engineers who outmigrate and work overseas. But men still tend to hold positions of managers and representatives of organizations. To make it easier for women to work under these circumstances, various measures are being devised and implemented.

2. Achie S. Luhulima and Sjamsiah Achmad (LIPI, Indonesia) "Academic Pursuit and Family Life: the Challenges and Opportunities for Gender Equality" (joint report)

   The two spoke about their experiences of taking in part in formulating policies for gender equality in Indonesia as well as making family life and work compatible. One of the challenges for Indonesia now is to remove the obstacles of gender equality, including the Indonesian family law which still approves of polygamy.

3. Wati Hermawati (UNESCO Jakarta Office, Indonesia) "The Impact of Technology Transfer on Family Life from A Gender Perspective: A Case Study from Iptekda Program in Central Lombok, West Nusa Tenggara, Indonesia"

   She reported how technology transfer has actually influenced the family life of those families running small- and medium-sized independent manufacturing operations in Indonesia. On the whole, income has increased. However, the fact is that the burden of working wives has increased.

4. Hiroko Hara (Josai International University; SCJ, Japan) "Academics and their Family life in Japan: Based on a Survey Conducted in fiscal 1996-1997"

   She reported on the findings of a questionnaire survey on some 2000 Japanese researchers regarding their experiences of academic pursuit and their family life. According to the survey, the higher the achievement of male researchers, the more children they have. In case of female researchers, the opposite is true. That is, the higher the achievement the fewer children they have, which suggests that female researchers are shouldering the burden of family life.

5. Emiko Ochiai (Kyoto University, SCJ, Japan) "Gender analysis of Kyoto University: Report on Survey of Attitudes and Realities Towards of Gender Equality at Kyoto University"

   The investigation conducted in 2006 indicated that the conditions generally improved in terms of gender equality but gender gaps still exist. First, the percentage of faculty and staff members with a spouse and children are lower in case of women. Second, although there are more cases of parental leave, it is taken mostly by female staff members.

Comments

Three commentators made their comments on the assigned presentations: Nancy Lewis (East-West Center, Pacific Science Association, U.S.A.) on the second and third, Yasuko Muramatsu (Tokyo Woman's Christian University, Japan) on the fourth, and Noriko Osumi (Tohoku University, SCJ, Japan) on the fifth and sixth.

In addition to her comments on the specific presentations, Lewis made the following points on the workshop as a whole. She stressed a need to perceive both the common and peculiar features of these presentations. She said that, while the situation has improved considerably compared with the period around 1995 when the theme of gender was raised at the UN Conference on Women, as apparent in an increase in women's participation in public affairs, it is important to keep observing the future outcome at the level of management. Even in the Philippines, where women's participation is greater, there are some remaining issues. As a multi-cultural society, promoting women's participation itself will be a challenge to Indonsia.

Muramatsu, by asking detailed questions about Hermawati's presentation, clarified the gender situation in rural areas in Indonesia. The religious leaders there still have exclusive power such that whether gender equality can be achieved depends on their view on gender.

Touching on her questionnaire research targeting science researchers, on which she reported at the Gender Session of the Pacific Science Congress the day before, Osumi pointed out that it essential to continue this kind of research because grasping the actual conditions by obtaining statistical data should prove extremely useful in improving the research conditions of female researchers.

Discussion

Subsequently, a discussion was held, taking opinions and comments from the floor. One of the participants as a female researcher, Sumonta Promboon (Chulalongkorn University, Science Society of Thailand, Thailand) briefly reported on the situations in Thailand. She said that Thailand, like the Philippines, has an outstanding number of women working in the educational and technological fields, but the ratio of men at management level is much higher than that of women.

Another participant, Hideaki Karaki (University of Tokyo, SCJ, Japan) underlined the importance of raising gender awareness, citing an example of male researchers' prejudice against women. A questionnaire published in the report "Issues of graduate school education from the viewpoint of female researchers" by Science System Permanent Committee (Aug. 30, 2005) found that some male researchers said women

have no ability to pursue philosophy and therefore female philosophers are not necessary.

In conclusion, Sjamsiah Achmad summarized the entire Workshop, saying: “Gender equality is not only for women but also for men. We need to make continued efforts to achieve it. The family is the basic unit of society and women’s participation in society should not result in isolation of women’s families. For this reason, various measures are required at the policy-making level. Let us continue various types of surveys and explore new measures and programs.”

Note that Takako Sodei (Ochanomizu University, SCJ, Japan) moderated the Workshop; Matori Yamamoto (Hosei University, SCJ, Japan) was responsible for recording.

Future Prospects

The next three SCA gender workshops will highlight “Women and Information & Communication Technology of Small and Medium Enterprises” in Qingdao, China in 2008, “Gender, High Technology and the Global Financial Market” in Singapore in 2009, and “International Migration and Science & Technology in the Perspective of Gender” in the Philippines in 2010.

Parallel Session B:
Aquatic Environment

The New Sustainable Sanitation System

Naoyuki Funamaizu

Introduction

At the workshop of the 7th SCA Conference, six presentations were given on the outcome of collaborative research projects related to the new sanitation system, which is designed with the keywords “No mixing” and “No collecting.” All attendants took part in the productive discussion on this matter. This project is part of the SCA Conference’s collaborative research project being conducted by Prof. Kusuda from The University of Kitakyushu, and it is partly supported by CREST (Core Research for Evolutional Science and Technology) as well as Japan-China international cooperation, propelled by the Strategic International Cooperative Program by the JST (Japan Science and Technology Agency). The following is a sequential outline of the presentation’s contents.

The concept of the new sanitation system and the report on actual experimental proof

To begin with, Professor Kusuda, the chairman of the convention, gave an explanation of the purpose and outline of this workshop. He introduced the current status relating to sanitation, mainly in Asia, and the pending water-related issues as one of the Millennium Development Goals. He also discussed the role of research on the new sanitation system as one of the key measures to solve water-related problems.

After that, presentations were given in order. The first presenter was Prof. Funamizu of Hokkaido University, who pointed out the necessity of a new system based on key concepts, such as “Don’t collect” and “Don’t mix,” by discussing eight major points, such as: 1) to achieve the Millennium Development Goals; 2) the current status of the global economy; 3) basin control; 4) water resources management; 5) the relationship between resource collection and agriculture; 6) public sanitary; 7) water processing technique and reuse of discharged water; and 8) control of micro-pollutants, including pharmaceutical residues from human. Also, further reports were made on the latest research achievements on the compost-type toilet, which is a significant factor in materializing the concept of “Don’t collect” and “Don’t mix” within the new system. Then he presented an overview of collaborative research activities between China and Indonesia.

Next, Dr. Neni from LIPI offered general information on water resource shortages, pollution of rivers and the on-going promotion of water-supply facilities and sanitation facilities in Indonesia. Dr. Neni pointed out in his discussion that the major factor increasing water consumption is the increasing use of water-washing toilets and the custom of cleaning one's body by using the remaining water from the toilet (in some slum areas, 40% of water consumption was for toilets). She also explained that insufficient water processing is related to water pollution. On the other hand, this result shows the local residents' consciousness of sanitation as well as their particular culture. She continued her report on an interesting case of testing the acceptability of the new sanitation system in Indonesian culture, by means of experimentally supplying an Islamic school with toilets equipped with a water-spray function for washing the body in order to reduce water consumption, along with the water-free compost-type toilets. The reasons why the experiment took place at an Islamic school were: 1) 88% of the total population are Moslems; 2) the acceptance of a new system depends on how it complies with Islamic rules; and 3) the students in this school are gathered from all over the country and stay there for up to five months to learn, not only about religion, but also science, technology and the environment. These students are expected to become leaders of their local region after graduation. A two-hour course was given at this school on Indonesian water resources, water pollution, the current status of sanitation facilities, the culture of water and toilet usage, the compost-type toilet as a new system, and a report on actual practices. The questionnaire for users of the toilets installed in the dormitory produced favorable results: 1) 95% of the users agreed to the continued use of the new system; 2) 31% of the users thought the new prototypes were better than the conventional type and 50% thought they were equivalent; 3) 75% of the users used the spray function four to five times, 4) 67% of the students agreed to reduce the number of sprayings; and 5) using toilet rolls was not acceptable.

Next was a presentation by Prof. Wang from Xi'an University of Architecture and Technology that highlighted the current situation in the poverty-stricken area in Northern China, where there are insufficient water resources, as well as the necessity of reusing discharged water. He suggested a new system to solve these problems, with the key concepts of "Don't collect" and "Don't mix", that is to say, separating off the human waste and miscellaneous drainage by using a dispersive-type facility to reuse the processed drainage. In addition, he reported on three practical examples, such as a project to design a campus facility which will not dispose of water, development of public housing containing 1,500 residents, which is equipped with a system that reuses miscellaneous drainage for environmental purposes, and an area-designing project that exploits a natural lake. Prof. Wang concluded that such a new system would contribute

significantly to resolving the water-shortage in Northern China and improve the urban environment.

The fourth presenter was Prof. Ishikawa from the Tokyo Institute of Technology, who emphasized the difficulties of sustaining an independent sanitation system, separate from the social structure. He argued that it should be incorporated into numerous social infrastructural facilities, existing social systems and in relation to the culture, which would require a new system to adapt to the various environmental criteria and boundary condition (physical and social, etc.). He added that he felt there was a huge gap between the orientation of science progress and the reality in each local society, as he had conducted local research in Manila, Philippines, China and Indonesia. He considered that the gap might have come from the methodology of current science, and pointed out the necessity of facing reality and moving away from the conventional analytical research method regarding sanitation system.

After that, Dr. Ito from Hokkaido University showed the detailed measurement results of demonstration experiments on the new sanitation system, which is being undertaken in Chichibu City, Saitama Prefecture at present. After giving an overview of the facilities used for this experiment, he showed the measurement results as follows: For the compost-type toilet: 1) the energy consumption structure and required amount of energy; 2) drying speed of the moisture; 3) coliform bacterial count; and 4) inorganic salt and hormone-like substance reserves. For the miscellaneous drainage processing system using a gradient soil layer: 5) the concentration of organic matter, nitrogen and phosphorus. He then reported that as a result of applying the compost-type toilet and miscellaneous drainage processing using gradient soil layer: 1) 95% elimination efficiency was achieved for nitrogen and phosphorus and 80% elimination efficiency for organic matter; 2) the collection rate was 50% for nitrogen and 95% for phosphorus; and 3) the compost produced by the toilet meets Japanese standards.

Lastly, Mr. Yokota from the Corporate Strategy & Research Department of Mitsubishi Corporation gave a presentation on the strategy and policy of promoting the new sanitation system in Japan. He pointed out the significance of three approaches in developing an innovative technique, such as: an approach for the users' benefit; an approach for consistency with the social system; and an approach to seek consistency between the traditional local system and the new system, regarding water and sanitation. A report was drafted on the case of community-based practices in Chichibu.

Attendants' discussion followed these presentations, where each attendant eagerly took part in a lively discussion by giving examples of the introduction of the sanitation

system in different areas around the world, referring to the cases reported in the above-mentioned presentations. A participant from Malaysia especially asked for presentations to be given at the Southeast Asia Water Forum, which will be held in Kuala Lumpur, Malaysia, next October.

Summary

The highlight of this workshop was the discussion focusing on the promotional strategy for the new sanitation system and the consistency between the system and the culture, religion and custom of each region/country, adding to the technological aspect. It is expected that the range of such collaborative projects will expand to other countries in Asia in future.

Parallel Session C:

Natural Disasters

Natural Disasters

Tsuneo Katayama, Kenji Satake, Masanori Hamada

Background

Asian nations have recently experienced frequent natural disasters such as earthquakes and floods. In each of the earthquakes that happened in India in 2001, in Iran in 2003, and in Pakistan in 2005, tens of thousands of people died.

The tsunami that occurred in the Indian Ocean in December 2004 generated over 200,000 victims in Indonesia, India, Sri Lanka, Thailand, and other Asian nations.

Under these backgrounds, a joint project on natural disasters was adopted at the fifth SCA meeting held in Vietnam in May 2005.

At the international conference held in Tokyo at the end of 2005 to commemorate one year after the enormous earthquake and tsunami in the Indian Ocean, an international symposium (supported by SCJ and SCA) on recommendations for international collaboration in science and technology for the reduction of natural hazards took place. A total of 178 persons from 11 nations and 2 international organizations participated in the symposium to discuss recommendations for the reduction of natural hazards towards the national governments in Asia. The SCJ published the results as a SCA report in March 2006. (SCA Report Natural Hazard Reduction: Recommendations for International Collaboration)

On the other hand, the SCJ established the Committee on Creation of Safe and Secure Society against Global Change of Natural Disasters last year. The discussions made by the Committee were summarized as an external report in May 2007. To promote discussions further by releasing the achievements widely to Asian nations without limiting them only in Japan, a natural disaster workshop was organized at the seventh SCA meeting held in Okinawa. For this workshop, experts were invited from China, India, and Indonesia, as well as key members of the above Committee, to make discussions by introducing research and countermeasures for natural hazards implemented in such nations.

Topics Provided by Japan

First, Prof. Masanori Hamada (Waseda University) mentioned the process to establish the the Committee and the outline of its external report. At the Committee meeting, experts in natural hazards, engineering, social science, and medicine gathered for interdisciplinary discussions. There were three presentations from aspects of natural science.

Prof. Kojiro Irikura (Aichi Institute of Technology) introduced the current situations about prediction and forecast of earthquakes. Since the Great Hanshin-Awaji (Kobe) Earthquake in 1995, research has shifted from short-term prediction to long-term forecasting in Japan. Recently, a national seismic hazard map has been completed. In addition, the earthquake early warning system has been put into practical use to transmit information soon after the occurrence of an earthquake before people feel tremors.

Prof. Akimasa Sumi (The University of Tokyo) referred to the reproduction and forecast of global warming by large-scale computer simulation. In the latest IPCC (Intergovernmental Panel on Climate Change) report, the fact that global warming is caused by human activities has been confirmed. When calculations are made with atmospheric and oceanic models of the globe, considering effects from human activities and natural fluctuations, it is clear that not only the number of rainy days during the rainy season but also the number of non-rainy days will increase.

Dr. Kenji Satake (National Institute of Advanced Industrial Science and Technology) introduced infrequent large-scale disasters. Tsunamis caused by earthquakes and enormous-scale eruptions are the disasters that happen only once per several hundred years to several thousand years. However, once such a disaster occurs, that brings devastating damages like the Great Hanshin-Awaji Earthquake and the tsunami in the Indian Ocean. The enormous eruption that happened in the south part of Kyushu (Kikai Caldera) several thousand years ago affected the ancient Jomon culture with a large amount of ash falling all over Japan.

Then, two reports were presented from a standpoint of engineering.

Prof. Osamu Kusakabe (Tokyo Institute of Technology) emphasized that the vulnerability to disasters has increased due to changes in the national land structure. Risks of various damages are growing both in overpopulated large cities and in depopulated and aging rural areas. The existing infrastructures, which were designed based on the past disasters, may suffer unknown types of damages in the future. He has also pointed out that the disaster prevention facilities are also aging, and that the budgets and personnel allocated to disaster prevention measures are decreasing.

Prof. Shunsuke Ikeda (Tokyo Institute of Technology) talked about proper standards of infrastructures. As for the disasters to come, we have to prepare software against infrequent enormous disasters in addition to the development of infrastructures (so called hardware) against usual disasters. In determining the proper standards for these measures, it is necessary to consider effects on the nation and its society from a long-term viewpoint, as well as effects on global economy, international competitiveness, national security, and other key factors.

Efforts for Natural Disasters in Asia

Dr. Kuniyoshi Takeuchi (Public Works Research Institute) advocated the international standards (ISO) on prevention of disasters. Some standards are required for local communities to prepare for disasters and to promptly recover from their damages. This does not mean the installation of disaster prevention facilities or equipment, but the preparation of procedure manuals with a disaster forecast system integrated, which are always practicable under the actual conditions of the local community. All of these must be constantly reviewed and continually improved. It is important to oblige each local government to introduce such international standards. Efforts to formulate the standard for flood disasters have already started.

Prof. Zhaoyin Wang (Tsinghua University) introduced the current conditions and countermeasures for debris flows in China. Sichuan, Yunnan, and Tibet in China are frequently suffered by mudflow. Besides the research on its mechanism, various countermeasures are taken by establishing detection and alarm systems, constructing drainage canals, and building dams for flood control. However, it is hard to detect and forecast the disaster on a short-term basis at present.

Dr. Harsh Gupta (National Geophysical Research Institute) talked about natural disasters in India. A variety of disasters occur in India, of which the territory is large with diversified geographical and geological conditions integrated. He introduced a recent successful case in mid-term forecast and short-term (imminent) prediction of earthquakes. The damages by cyclones have been reduced by observation with radars and warnings. Since the tsunami in the Indian Ocean in 2004, the tsunami warning system is now being constructed.

Dr. Jan Sopaheluwakan (Indonesian Institute of Science) introduced the current conditions of Indonesia. Due to its geological conditions, Indonesia has many volcanoes and earthquakes. Indonesia has suffered from sudden disasters, as well as gradual disasters due to climatic environmental changes because of its location of facing both the Pacific Ocean and the Indian Ocean. To cope with these disasters, the national government takes measures by promoting basic research on disasters, constructing tsunami warning systems, and implementing educational activities for its people for formation of local communities resilient for disasters.

Toward the Future

Prof. Tsuneo Katayama (Tokyo Denki University) summarized these presentations and made comments. Looking back to the presentations in this workshop, particularly those as policy recommendations, many proposals focused on what is important and

what we should do, but the concrete suggestions on how to solve problems were only a few. The situations in Japan such as collapse of local communities due to aging society with reduced birthrate, and increasing urban vulnerability due to excessive overpopulation in cities may differ from those in other Asian nations. Considering the possibility that other Asian nations may follow the same fate as Japan soon or later, it is necessary to establish long-term national land use policy with disaster prevention measures incorporated not to repeat the same mistakes as Japan.

In discussing the reduction of natural hazards, poverty and starvation are the key factors. In fact, many of the victims in natural disasters of the world are poor people. For reduction of the victims of natural disasters, it would be effective to reduce the world's poor people by half in accordance with the UN millennium development goal. Many of the world's natural disasters happen in Asia. International cooperation for natural disasters in Asia is imperative. Japan, which has suffered natural disaster damages, is also a leading county in research and measures in disaster prevention. Japan is expected to take the initiative in promoting such activities. Based on our experience, Japan has to make policy recommendations for national governments in Asia to reduce natural hazards in the region by continually making discussions at the SCA and other meetings. Therefore, statements from Japan must be made based on the actual situations of developing nations in Asia.

Parallel Session D:
Security of Ocean in Asia

Security of Ocean in Asia

Tadao Kuribayashi

International Movement over the Order of the Sea

The system of the international law of the sea, based on the "UN Convention on the Law of the Sea (UNCLOS)" which was signed in 1982 and entered into force in 1994 (Japan ratified it in 1996), comprehensively reexamined the international order of the sea which had been maintained under the principle of "freedom of the seas" for a long period and has gradually established the order of the international law of the sea designed for "ocean governance". In particular, the introduction of the new system where the 200 nautical mile "Exclusive Economic Zone" (EEZ) shall come under exclusive authority and governance of coastal nations significantly expanded and strengthened their responsibilities and roles, bringing about drastic changes to the conventional principle of freedom of the seas. In addition, It is also striking to have defined the deep seabed area, beyond the limits of national jurisdiction of coastal nations composed of EEZ and continental shelves, and its resources as "the common heritage of mankind" (CHM), and to have established the system to develop and manage the area and its resources by the new international organization, the International Seabed Authority (ISA). Furthermore, the UNCLOS system largely revised the international law of the sea in wide and diverse fields in accordance with the current situation of the sea, including islands, archipelagic waters, and international straits, as well as various systems for security of ocean traffic, protection and conservation of ocean environment, scientific research of oceans, development and transfer of ocean engineering, and settlement of ocean disputes.

However, such a substantial expansion of national jurisdiction of coastal nations has often triggered overlaps and conflicts of national jurisdiction between neighboring nations all over the world. In addition, as often seen in many Asian nations, there are actually a lot of nations with insufficient capacity to govern their expanded national jurisdiction. In these situations, each nation is required to urgently deal with numerous and various issues including control on sea crimes by pirates, armed robberies, and terrorists, conservation of ocean environment against impacts of "land" development, and settlement of disputes between national interests claimed over living and mineral resources in the sea.

On the other hand, the Rio Declaration agreed at "UN Conference on Environment and Development (Earth Summit)" (UNCED) in 1992, 10 years after the UNCLOS

was adopted, proclaimed the principle of “Sustainable Development” to integrate environment and development as indivisible things while the action plan “AGENDA 21 (agenda in the 21st century)” was adopted.

It proclaimed wide policies on comprehensive governance of the ocean which imposed a duty on each coastal nation to domestically develop integrated policies and decision-making processes for comprehensive management of the coastal and ocean environment under its jurisdiction and sustainable development. This movement was followed by 2002 “World Summit on Sustainable Development” (WSSD) in Johannesburg.

Purpose and Point of this Study Project

Considering this international situation over the sea, we launched a study project over security of ocean in Asia as a Joint Project of the Science Council of Asia (SCA). While still in the process of trial and error since being proposed at the 3rd SCA Conference (in Indonesia), this project builds on the fundamental concept of “security of ocean” or “securing the ocean”. Recognizing implementation of ocean governance as an essential part of “security of ocean” from the standpoint of extensive “security”, it is intended for comprehensive implementation of a varied ocean governance over peaceful use, military operation, resource exploitation, environment conservation, and scientific research of the sea, and consequent realization of peace and sustainable development of the sea. We search for ways to apply this concept to resolve various issues arising in Asian waters which involve not only the geographical features of a semi-enclosed sea but also politically, economically, and socially complicated properties. Filled with a variety of complicated issues, Asian waters appear to most seriously require the establishment of comprehensive ocean governance fulfilled by international cooperation.

The goal of our study has remained the same since the beginning. The 1st goal is promoting exchanges among researchers and practitioners of the international law of the sea and ocean policies in Asian nations. The 2nd goal is, in addition to sharing recognition on Asian waters, promoting development of political decisions in Asian nations from the standpoint of researchers about the necessity of academic exchange and political collaboration for peace and security of the sea. The 3rd goal is the establishment of a new organization for research cooperation in this field in Asia as an achievement of the SCA through these approaches.

Achievements through Okinawa Workshop

Considering "Energy and Environment", the major theme of the 7th SCA Conference held in Okinawa, our workshop of this term was constructed incorporating the issue of transportation and disposal of radio-active materials in Asian waters. Following the opening remarks of me as a moderator about the purpose of this study project and how this project proceeded, each speaker presented reports as listed below: Prof. Shigeki Sakamoto, Kobe University, Japan, "Development of the International Law over Ocean Transportation of Radio-Active Fuels and Wastes"; Associate Prof. R. Beckman, National University of Singapore, Singapore, "'Securing the Ocean' Approach to Ocean Governance over Malacca-Singapore Straits"; Vice Admiral and President J. DeSilva, Center for Marine Conservation & Ocean Studies, India, "International Cooperation to Improve Ocean Governance over Marine Conservation in Asia (and Related Systems over the Sea) – with Particular Focus on Indian Ocean –"; Dr. Hiroshi Terashima, Executive Director, Ship & Ocean Foundation (OPRF), Japan, "Searching for Cooperation Structure for Securing Asian Seas" and "The New Japanese Fundamental Law of the Sea"; Prof. Lee Chang Wee, Daejong University, The Republic of Korea, and Prof. Chanho Park, Pusan University, The Republic of Korea, "Joint Research of Ocean Science at Interim Waters between Korea and Japan". Detailed comments were added to these reports by Prof. Akira Kotera, The University of Tokyo, Japan, Prof. Atsuko Kanehara, Rikkyo University, Japan, and Prof. Lee Keun Gwan, Seoul National University, The Republic of Korea. In closing, from the standpoint of comprehensive summary, Prof. Naoya Okuwaki, The University of Tokyo, Japan, presented a report entitled "Cooperation for Integrated Ocean Governance in Asia".

Both these reports and comments were distributed to all participants as the materials of the conference. It was a first time attempt for this workshop to prepare all papers as bound documents in advance. It was a paperwork improvement but it made a new step forward. These papers, including ones submitted in the past terms, are expected to be accumulated to bring about integration as a study report in the future. While this workshop achieved significant results with a lot of reports and comments presented, the presentations took more time than anticipated and this largely reduced the time for discussions, an issue which must be reviewed. Although issues over the sea in Asia are substantially wide and diverse, there remains a challenge for the next workshop to plan and operate a workshop focusing on individual themes within the framework of a general theme, and bring about achievements of discussions joined by all participants if possible.

After several years have passed since this project of the SCA was launched, the concept of “security of ocean” or “securing the ocean” appears to eventually reach deeply into researchers as a common recognition. In addition, not only the direction and content of study but also expansion of the human network among participating researchers will be stably promising. It is totally different from several years ago when I proposed alone a joint research in this field at the SCA. I earnestly desire that this study further widens the circle among researchers and practitioners of the international law of the sea and ocean policies throughout Asia.

SCA/PSA Joint Symposium

Special Address
by
H. I. H. Prince Akishino

Greeting for 7th Science Council of Asia

1. Opening

It is my great pleasure to see that the 7th Conference of Science Council of Asia is being held here in Okinawa Prefecture as a joint symposium organized by the Science Council of Asia and the Pacific Science Association with attendance by many participants from the Asia Pacific region. I am also very delighted that the Conference of Science Council of Asia is being held for the first time in Japan and that many participants from within the prefecture are present at today's symposium.

It is highly significant that, under the world-scale theme of "Energy and Environment", presentations and discussions will unfold from the viewpoint of the richly diverse Asia Pacific region. Also, various problems concerning energy and the global environment are important and are long-term issues related to the survival of humankind. In that sense, efforts from the transdisciplinary viewpoint based on knowledge over a wide sphere of disciplines are essential, and the expectations and demands placed on scientists around the world are anticipated to increase in the future.

It is my sincere wish that the efforts and performance of participants in this conference will contribute to the further sustainable development of science in the Asia Pacific region and to the deepening of mutual understanding and trust among scientists.

2. For the solution of "environmental problems": from competition to collaboration

While the main theme of this conference of the Science Council of Asia is "Energy and Environment", in board terms, it can be interpreted as "environmental issues". I consider these "environmental issues" remain in the 21st century as unfinished business left from the results of human activity in the 20th century, namely, the results of their economic activities. More specifically, it is the environmental problem: the negative legacy left from the industrialization "competition" of nations and the rise of mass consumption civilization.

In other words, although many benefits were obtained, it seems that in the 20th century the extreme competition for industrialization made people forget the importance of calculating in the environment cost. It could be said that while earnestly engaged in the competition humans failed to pay attention to the importance of the natural environment.

Can this tendency of competition be seen in the world of science even today as well as in the 20th century? It is possible that if researchers become too much absorbed in pursuing short-term results and are driven by the competition in a narrow

field, they could forget the need of a broader perspective. There is no denying the possibility that scientific research may have advanced with hardly a look at the environment even though the research possessed a high level of expertise.

In order to solve such environmental issues in the 21st century left behind by the 20th century, the attitude of extreme competition, even in the world of learning, which characterized the 20th century, should be shifted toward the attitude of cooperation and promoting joint efforts among the different disciplines to find solutions for the issues. Environmental issues cannot be solved in a study that is fixed to an extremely narrow specialized field. It is not until diversified disciplines are synthesized that the direction toward solutions for environmental issues can be found. I believe that, beyond environmental issues, science in the 21st century must be directed toward cooperation and collaboration. Wouldn't you agree that various problems can be clearly seen only when a wide variety of methods are mutually proposed and exchanged?

Today, I'd like to tell you about a couple of cases I experienced myself in this regard.

One case is about the importance of beginning environmental preservation from the local community, and the other is about the interdisciplinary approach to pursue such efforts.

3. Example of regional environmental preservation: From the preservation of freshwater fish

I have attended several environment-related events and sites in the past. Some of them aimed at developing a theory for solving environmental issues, others included efforts made by companies and local governments and activities promoted by local communities. Among them, the theme I am highly interested in is the preservation of species. This is probably because, in addition to my own interest, I myself am related to zoos and aquariums. I have had some practical involvement particularly with freshwater aquatic organisms, especially freshwater fish, an important component of biota in the freshwater environment, and the preservation of the water environment supporting it. Since these living creatures inhabiting freshwater are used as one of the indexes for water environments, I can say that the existence of these creatures is directly related to the environment we live in.

A wide variety of freshwater fish inhabit Japan from the cold water region to the warm water region according to respective geographic conditions. The number of species is said to be about 300 at present including subspecies. However, due to the deterioration of their habitat environment in the recent years, many specifies are facing

extinction. A report organized by Japan's Ministry of the Environment shows that there are three species for which extinction has already been confirmed, 76 species that are in danger of extinction, and 12 species that are essentially endangered species. I assume there have also been some species that disappeared unbeknownst to humans.

The reasons for the decreasing number of freshwater fish species and inhabiting population include the influence of over fishing and introduction of alien species as well as the effects of development and urbanization as a matter of course. In reality, various factors are intricately intertwined. It can be said that these are man-made changes in the environment, and therefore, the preservation of these species depends on our further responses.

Speaking of my own experience, among a population of salmonid fish inhabiting a certain area in Japan, I found a group of individuals in which individuals having an extremely rare form appear. Although this has not yet been reported to the academic community, this fish cannot be seen recently. Currently, a survey to confirm whether it has become extinct is underway, but unfortunately, since people living in the area inhabited by this fish did not recognize it has as rare or precious, even liquefied specimens no longer exist. Therefore, the present situation is that we are left to collecting information from the few dried specimens available.

Then, what efforts should we make to preserve freshwater fish, which are merkmals for our living environment, and, furthermore, how should we improve the overall environment?

One method is to have researchers examine the related sites, make the results public and then have administrative authorities or organizations involved in nature conservation take initiative in the preservation. However, unless the people living in the area truly understand its needs, I consider this difficult to achieve no matter how much other people call for conservation. I feel that having local people involved in protecting the nature in their area will, in a sense, lead to the real environment preservation. Of course, it is also essential to maintain close ties with administrative authorities and researchers and to consider the issues from various perspectives.

4. Importance of interdisciplinary study: From the lineage of chickens to the history of varietal differentiation

Next, let us consider the necessity of collaboration in solving the environmental issues I mentioned earlier. Here, I'd like to speak about the necessity of interdisciplinary or transdisciplinary study, which is one aspect of what cooperation or collaboration means.

Please excuse the fact that the example is on my own experience and a matter not directly related to energy and environment.

I became conscious of interdisciplinary study because I originally was interested in domestic livestock. As you know, livestock are animals created by mankind for some particular purposes. Basically, I am interested in livestock in general, but among others, I feel an affinity with fowls such as chickens, domestic ducks, and geese. This is probably because my family reared some fowls when I was a child.

It is in the late 1980s I stayed in Britain for a time. During that period, I had opportunities to observe many kinds of fowls that are reared in Europe, and as I saw the reared fowls, I became eager to make photographic records of them and publish a pictorial book. This was because, since the 1930s, there had been no books issued in Japan that cyclopaedically introduced the fowls in Europe. Fortunately, using the pictures taken then, I was able to publish the "Illustrated Encyclopedia of European Poultry" (*Heibonsha*, 1994).

As I am basically fond of fowls, after having completed such work, I began to be curious about the origin of chicken, the lineage of each type and their interrelationships. As for chickens, there are a variety of types in terms of shape and color, and if likened to a wild species, their variety is such as being like different genera.

In order to investigate the ancestors and lineage of chickens that have such a variety of shapes, I adopted and implemented what was considered to be the most suitable method. A method in which blood from wild chickens called jungle fowl and other types of chickens was drawn to extract mitochondrial DNA, so to compare their base sequences. But actually, I made comparisons with sequences of a small portion of the control region instead of the complete base sequence. From this, I discovered that wild chickens, the ancestors of today's chickens, are derived from the Red Jungle Fowl, which is one of the four species of jungle fowl, and further discovered that among the Red Jungle Fowls that inhabited areas in Asia, they were made from those inhabiting the southeastern part of the Asian Continent such as Laos, Thailand, and Vietnam. This was somewhat taken up by the news at that time, and I felt that something considerably interesting had been discovered. I also used that as the theme of my doctoral thesis.

However, when I went to Yunnan Province in China to examine fowls a while after that, I started to have more than a few doubts about the current methodology, namely, the genetic method. This was due to the following situation. In China, pictorial books of livestock and poultry are issued by each province. Naturally in which the name of each species is written in Chinese characters. As I visited there without much knowledge about this, I thought they were real names. Since I was too

conscious of China as a “country” surrounded by borders, I forgot to recognize the “cultural spheres”. For example, in the case of the Xishuangbanna Dai Autonomous Prefecture in Yunnan Province, the people living there are Thai people, they speak a Thai language and the area does not belong to the Chinese character cultural sphere. The place-name, “Xishuangbanna”, is in Thai and is a transliteration of “Sipsong Panna” that meant approximately 12 thousand rice fields. This pertained to the administrative regional system of the Thai tribe that suddenly rose into power in this region around the 13th century. Therefore it is impossible to understand the meaning from names written in Chinese characters. Moreover, many other non-Thai minorities also live in this region. These people living in Yunnnan, Laos, Myanmar and Thai were ruled by a Thai tribe that governed a small kingdom in the basin country called Muan. Considering this complicated ethnic distribution and their histories, I could understand that there is a varietal differentiation based on the customs and beliefs of each people and village besides those based merely on the regional area. This suggested something very important to me on carrying my research on livestock.

On careful thought, it is quite natural that more than a single language exists in an area inhabited by many ethnic groups. In addition, domestic livestock such as chickens were created by people to meet the needs of each society. Therefore, what I learned was the rather obvious fact that the habitual practices of people always came first in regards to breeds of livestock in such a region, which were made accordingly. Setting aside why and how wild animals were domesticated, can be understood only when it is considered in the light of the mind-set of the people who where trying to create the breed. Even though results are obtained by examining mitochondrial DNA extracted from a completed organism, it does not reveal the history of the interactions with the people that was complexly mixed at the process of varietal differentiation.

Well then, the question is in which fields should collaborate in order to understand to understand “organisms” like the livestock that were created by people? From what I mentioned so far, at least the fields of ethnology, folklore, and biology are mandatory fields. In addition, archaeology and historical science are necessary as we try to identify records of the livestock that existed in the past from relicts and textual materials, and linguistics is indispensable for understanding the spread of the livestock. Besides, as I mentioned on considering things in terms of cultural spheres instead of national boundaries, we can expect to see cultural differences among people living in an area inhabited by multiple ethnic groups. Furthermore, differing cultures may even be seen among the same ethnic group due to some factors. In the case with livestock culture, differences in shape and color originating from differences in habitual practices, and methods of rituals can be mentioned. To consider these “some

kind of factors", geography is an important field for examining topography and the spatial positions of villages.

Meanwhile, it may be possible to examine these matters in one's country to some extent, but in order to really learn about the subjected "organisms" and their actual conditions, researchers must go to the actual sites and conduct an examination through dialogue with the local people. It seems to me that the importance lies in building a relation of trust with the other side and how the researchers show respect for the informants. No matter how familiar they are with subject matter, there are many cases in which researchers have not had continuous contact with the subject area for many years. In this case, the informants become teachers imparting knowledge. Chances are that very significant information that enables understanding actual experiences can be obtained. This is something that should be valued. Even if the information include matters that can be identified as superstition or falsehood, they should be regarded as one of the ways of thinking or ways of explaining in that culture, and researchers should accept them with sincerity. Needless to say, the interpretation of such information must be left to the judgment of each researcher.

5. Conclusion: Field-focused principle and interdisciplinary study

As such, the simple use of the study of livestock that happens to be one of my interests as an example shows that it will be very difficult to advance our understanding without the involvement of quite a number of fields and people. If it was 20 years ago, satisfactory results could probably have been obtained from the knowledge within a differentiated sphere, and hereafter, there is no doubt that work in a single sphere will continue to advance beyond where it is today. However in the age to come, even after looking back on my own experience as I mentioned, I think the interdisciplinary or transdisciplinary approach of science, where people holding various expertise exchange and share their opinions, will become increasingly important.

Although advocating the importance of interdisciplinary approach, I do feel a little awkward in constraining the use of the term "interdisciplinary". It may be just my perception, but this is because I don't think the interdisciplinary approach comes first, rather I would say that the interdisciplinary approach is one in which concerned fields naturally blends in the process of pursuing the subject, when, regardless of the theme, the anxiousness to know something arouses in a person. In other words, I feel that becoming interdisciplinary in a natural way from within instead of being forced from outside is the essential way of interdisciplinary science.

Now, can't the same thing as what I have said thus far be said in regards to the "environment, which is one of the themes of this conference?

One of the means for solving the environmental issues is to value field work. In other words, I feel it necessary to respect what informants in the field say and to pay attention to the cultural differences within the particular cultural sphere. It is necessary to have direct contact with the area faced with the issues and the people living there.

Another point is, to reiterate, that issues concerning the environment cannot be solved based on narrow-viewed thinking. It is important to delve deeply into a specialized field, but there are many cases where this will not expose the issues. Unless each of the related fields of specialization develop, it is inevitable the situation will become more uncertain. In other words, I consider it necessary for the related fields to transdisciplinaryly integrate in a natural way as required while deepening specialization in each field.

Personally I consider that such development will contribute greatly to development of the world of science in the future.

With this, I would like to conclude my speech. Thank you very much for your attention.

Keynote Speech
by
Dr. Rajendra Pachauri

Extract

This Extract is an English translation of the Japanese article*, contributed to the September issue of "SCJ Forum" published by the Japan Science Support Foundation.

***Note: This Japanese article was edited based on the original speech delivered by Dr. Rajendra Pachauri, by the Secretariat of the SCA under its responsibility.**

The Challenge of Climate Change: Dealing with Energy and Environment Policy

Dr. Rajendra K. Pachauri
Director-General, TERI & Chairman, IPCC

Extract

I feel it is an important duty for me to convey to you largely the findings of the three working group reports of the IPCC, the Intergovernmental Panel on Climate Change, and to place before you some issues that I think are general, the importance of the role of scientists and the demands that society is going to place on them in the coming years.

The IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, essentially in response to the growing awareness that the world's climate was being affected by human actions, not as a UN body but as an autonomous intergovernmental body. The IPCC has brought out three assessment reports prior to the ones that have recently been issued, and three working group reports have been completed as a part of the fourth assessment report. We still have the synthesis report, which contains the elements and the knowledge of the three working group reports, which will be issued in November of this year.

I will highlight the enormous importance of science in framing human actions and decisions in the future and the fact that science will have to play a much greater role in public policy and decision-making. I would say that I am privileged to place before you the record of the IPCC, because in several respects this is a unique organization and in a short period of time it has certainly had a profound influence on the awareness of the public on issues of climate change and certainly on some decisions that have been taken by policy makers in this area.

I think Japan is a great model of this interaction between science and public policy, and it is really a tribute to the leadership of this great society that even in periods when the economy did not do quite as well as one would have expected, the support for science and technology has remained strong not only from the government but also from the private sector, and the results of that are clearly obvious. It is also uniquely important that Japan has been able to combine science and technology with basic cultural values and ethics.

I would like to quote from Mahatma Gandhi who was a person before his time, he highlighted some of these issues in his own inimitable way and in his profound expression of speech, and I think this is particularly relevant for scientists, for policy makers. What he said is, "Democracy must in essence therefore, mean the art and

science of mobilizing the entire physical, economic and spiritual resources of all the various sections of the people in the service of the common good of all." When I started, I highlighted the importance of Japan's preservation of its cultural identity, which clearly is part of the spiritual resources that are referred to over here, because solving the problems of society in the future is not a technical fix, it is not merely a question of finding the right technology, and it requires a combination of changes in mindsets. I might mention in the IPCC working group three reports, we have highlighted the importance of lifestyle changes and changes in consumption patterns. I think that is going to be an extremely important part of the changes that we must bring about, the solutions that we must implement. And I think each one of us has to do this in our own individual interest and for the global interest.

I will end by mentioning a small little anecdote. This morning, I had gone for a swim in the hotel, and in the locker room I found there was an electric dryer where I suppose you could dry your swimming costume, and I was tempted to use it, but then I said no, I am not going to do it, I will take it and hang it up in my room and it will dry by the evening. This reminded me of a visit to my institute by the former senator of the U.S., he was wanting to understand how India uses energy, and then he asked how many electric dryers do you have for clothes? So I took him to the window and I said, "Senator, that is our dryer up there, that is the sun." Most people in India use sunshine for drying their clothes. We do not use electric dryers, and I think all of us can make a difference in that regard.

Keynote Speech
by
Prof. Leo Tan

Extract

This Extract is an English translation of the Japanese article*, contributed to the September issue of "SCJ Forum" published by the Japan Science Support Foundation. The content of this Extract was confirmed by Prof. Leo Tan.

***Note: This Japanese article was edited based on the original speech delivered by Prof. Leo Tan, by the Secretariat of the SCA.**

The environment: A global snapshot of some issues with perspectives from Singapore

Professor Leo Tan Wee Hin
President, Singapore National Academy of Science

Extract

The Earth, our only home, is a spaceship cruising in outer space at a speed of 30 kilometers per second. In this cosmic odyssey, the inhabitants have to do with whatever is available on board, they are all finite resources really. A conducive environment or a habitable atmosphere, an ocean teeming with marine life and a terrestrial terrain with resources and other life forms constitute this little ecosystem, we call Mothership Earth. The objectives of this presentation that I would like to make today is to explore a selection of issues, obviously we cannot cover everything, which affects our environment; our environment, I am talking about our Planet Earth, and to share some of Singapore's experiences in dealing with these issues because we are a very tiny and resource- poor nation.

One issue revolves on water. Only 0.003% of fresh water is available either as surface water or ground water, and even then it is under threat from human activity. This water shortage is already a problem; increasing population, industrialization, urbanization are depleting natural water resources at an alarming rate. In our experience, we have always been dependent on 60% of our water being imported from our northern neighbor and 40% from our reservoirs. Fortunately, our island gets about 3,000 millimeters of rain a year, and the advantages of this trapping our precipitation is that the rain water is not wasted, every drop can be caught before it goes into the rivers or the sea. The second is our reticulated system of having aquifers to connect and trap as much rainwater as possible. The third is desalination, and the fourth is to recycle every drop of water that is produced domestically, industrially; that means taking water from the sewer and transforming it into pure water. When I mentioned recycled water at an international conference in Perth, most of the Australians looked at me and said "You must be crazy, right? To drink that, it is..." then I looked at them and I said, "But have not you been drinking recycled water all your life?" Rainwater is only the natural hydrologic cycle. The cost of producing Newater is only Singapore 35 cents, 20 U.S. cents per cubic meter compared to the world average of $1.68 for producing desalinated water in arid regions.

The second issue, deforestation: the Earth's forests play a useful role, as we have heard, in removing carbon dioxide, produce oxygen for our respiratory needs, control soil erosion and so forth. The traditional method is to cut these trees down and use

them for timber and other purposes, but if they are used as fuel or burnt in order to refertilize the land, the carbon dioxide then goes back into the environment, and so although you have got a cheaper and economical fuel, you are not solving the problem of carbon dioxide, because you are still putting it back into the air. Building cattle ranches in Central America to produce raw and canned beef is wasteful because each 60 gm of hamburger that is made from beef means the loss of tropical forest the size of a small kitchen everyday. After use for 5 years, the land can no longer be used for grazing, and more forest has to be cleared as a result of the land becoming impoverished. In fact 70% of the tropical forests in Central America have been lost in the past 25 years and converted into range land to produce animal fats or food. However, Singapore has planted in the last 30 years, 1.4 million trees and 7 million shrubs, which makes what we described as a city in the garden. Despite deforestation, we still have about 5% of greenery and 15% of agricultural land in Singapore.

And so that brings me to my third issue, that of promoting sustainable agricultural practices. What is not commonly realized is that agriculture uses more of the Earth's resources than any other human activity. Sustainable modes of agricultural practices are necessary.

In land-scarce Singapore, we do not have any traditional fields, but we have moved to agricultural practices of a technological nature. In fact there are over 54 leaf vegetable farms occupying 95 hectares, and we intend to add another 240 hectares from the land we save from our new sewerage system. Currently we have got six agro technology parks and they produce 7,500 tones of vegetables annually. The agro farm technological parks use a mixture of aeroponic and hydroponic cultivation. In other words you can grow plants over concrete using minimal water and minimal land (ie optimization of land use, increases in yield per hectare, no use of fertilizers, less use of water, and sustainability).

Overpopulation. This is why we are putting great pressure on spaceship earth's resources. You can see that from 1.6 billion in 1960, we have now six billion plus people in 2000. Singapore, because of our small size and rapid birth rates in the sixties, we practiced family planning. We were so successful that now we no longer reproduce ourselves. What is commonly overlooked is that declining birth rates is not the sole answer, because global life expectancy has also increased. Japan and Singapore have the same problem of an ageing population, and in the long run, it would lead to increase in the uneconomic use of the resources of the country.

Finally, especially to the young people present here today, education about environmental issues: education holds the key to addressing the issues facing our environment. There is a need to do a drastic rethink on lifestyle and business practices

to ensure that the next generation inherits or continues to have an inhabitable ecosystem. Our policy measures, our action programs, and our technological solutions need to be embarked on more vigorously for the sake of the next generation. Now it is time for us to repay our debt to the future generation by going for sustainable lifestyle practices.

Panel Discussion Session A: Energy and Environment

This paper is translated from the paper which originally contributed to the September issue of "SCJ Forum" published by the Japan Science Support Foundation.

Energy and Environment

Kenji Yamaji

This is a report on the "Panel discussion A" that focused on Energy and Environment at a symposium that was open to the public and organized jointly by the Science Council of Asia (SCA) and the Pacific Science Association (PSA). As panelists, Ms. Li Ji (Energy Research Institute of the National Development and Reform Commission, now staying at The Asia Pacific Energy Research Centre, The Institute of Energy Economics, Japan) from China, Professor Mohamad Ali Hassan (University Putra Malaysia) from Malaysia, Professor Junichiro Tsutsumi (University of the Ryukyus) from Okinawa, and Doctor Rajendra Pachauri (Director, The Energy and Resources Institute (TERI), India / Chairman, IPCC), who made a keynote speech, participated in this panel discussion. Professor Kenji Yamaji (The University of Tokyo) joined the discussion as the moderator.

Firstly, Ms. Li outlined the energy supply and demand situation, and the efforts being made to address environmental problems in China. Then, she introduced the eleventh five-year plan and made recommendations for cooperation in the Asian region. China's current primary energy demand is over 1.5 billion TOE(ton oil euquivalent), which is about three times that of Japan's. In recent years, energy demand has been increasing drastically: in the 21st century, energy demand has been growing faster than the GDP growth rate. Although about 70% of China's energy is supplied by coal, oil demand has been increasing significantly due to the recent increase of cars. Under the surging demand for electricity, the capacity of power generating units has exceeded 500 million kW. China's power consumption amounts to about three times that of Japan's. In China environmental problems are serious due to the consumption of such a large amount of energy. SO_2 emissions have increased by 30% since beginning of the 21st century. Acid rain falls on one-third of the land, mainly in the south. CO_2 emissions have increased so drastically that China is now the second largest CO_2 emitter in the world. Under the eleventh five-year plan, the Chinese government intends shifting to clean energy by increasing the natural gas ratio, as well as targeting a 20% reduction in the energy demand per GDP. As key areas in international cooperation, Ms. Li has referred to policy tools, energy-saving technologies and the development of human resources.

Professor Ali Hassan reported mainly on the use of biomass energy in Malaysia. The tropical zone is rich in biomass resources, of which energy has been well-utilized in recent years. In Malaysia, the biomass resources usable as energy are estimated to be

around 70 million tons per year. Particularly, the residues and side products of the palm oil industry have attracted attention. The fibers contained in the pomace generated in the process of extracting oil from coconuts are used as energy resources at the palm oil factory. A project to incinerate empty fruit bunches (EFBs), which are hard to dispose of, for a cogeneration system has been introduced. Professor Hassan also introduced the research done on palm oil as an alternative to light oil, and a project that uses methane generated from landfill waste. Regarding international cooperation, he referred to a project that utilizes the CDM of the Kyoto Protocol, and methane fermentative treatment for the waste liquid generated from palm oil factories, implemented jointly with Japan.

Professor Tsutsumi's report focused on the use of waste energy in island regions. On a small island, material input is larger than output and disposal of waste is a huge task. On the other hand, it is hard to secure sufficient energy there. Introducing the research on material flow analysis, including water in the Okinawa region, Professor Tsutsumi pointed out the importance of using waste energy. It is difficult to clarify the amount of waste generated by tourists and the logistics related to the U.S. military bases. In Okinawa, according to his analysis, the amount of material flow (excluding water) is 27 million tons a year, the amount of material recycling 1.2 million tons, and the amount of final disposal 0.6 million tons. The key problem in Okinawa's material flow is that the amounts of material flow per capita and per space are large. He mentioned that it is important to effectively use large amounts of waste, although the economies of scale do not work on a small island. He has also introduced the use of renewable energy in the Okinawa region, such as wind power generation on Miyako Island.

Doctor Pachauri introduced the energy situation in India. As an energy issue unique to developing nations, he emphasized the importance of disseminating modern energies such as electricity and gas in local areas. The traditional way of using the biomass of wood fuel and livestock manure causes big problems in energy use efficiency, as well as in the natural environment and human health. The largest problem in developing nations is poverty. It is necessary to comprehensively tackle energy environmental issues from a social point of view. In addition, energy demand has been increasing drastically in India due to rapid economic growth, similar to China. Doctor Pachauri reported that a stable energy supply and conservation of the domestic environment, as well as global warming measures, are the key tasks in India.

During the discussion in the last half of the session, the selection of a lifestyle and education were argued vigorously, regardless of the severe time constraints.

Lifestyle choice is important in the creation of a sustainable society, and is also important in tackling environmental energy problems, which were referred to in the

keynote speech prior to the panel discussion. While lifestyle is rooted in local history, climate and culture, the selection thereof is not easy, unlike the selection of technology. However, lifestyle has a great effect on energy demand and is closely related to the selection of technology. Lifestyles should be chosen by individuals and their society, and should not be given forcibly. However, the choice of a wise lifestyle should be recommended, based on proper knowledge of the energy situations and environmental conditions. In the Asian region, the lifestyle of living together with nature has been formulated through its long history, unlike Western civilization. A certain panelist pointed out that this is a precious spiritual asset of Asia in tackling global environmental issues. For example, when an efficient and clean energy supply is actualized by connecting traditional biomass use with modern technologies, the use of social wisdom of living in harmony with local nature will lead to a sustainable energy supply.

It is needless to mention the importance of education in resolving environmental energy problems. In the panelists' lectures, the need for cooperation in the development of human resources in the Asia-Pacific region was emphasized. In the discussion, a variety of opinions on the role of education were exchanged from a wider point of view, related to the choice of lifestyle. Particularly in the case where associated scientific knowledge accompanies uncertainty, like global warming issues, it is important to disclose accurate knowledge, including the uncertain elements. What we should do is disclose the seriousness of the problems without emphasizing the threat of global warming excessively and thus sustain long-term efforts. How should we convey technical issues, particularly the various technological effects of energy and environmental measures, for proper evaluation based on realistic conditions without being excessively optimistic? The significance of these educational tasks has been raised. In the context of the efforts to resolve environmental energy issues, it is not sufficient to correctly understand individual knowledge, but it is more important to generalize the knowledge of the resolution of the problems that leads to concrete action.

Many local high school students attended the public joint symposium and listened to the lectures enthusiastically. We hope that this panel discussion raised awareness of the tasks facing us regarding energy and environment in the Asia-Pacific region and that this will be a good opportunity for the next generation to take the initiative.

Panel Discussion Session B: Education and Environment

This paper is translated from the paper which originally contributed to the September issue of "SCJ Forum" published by the Japan Science Support Foundation.

Education and Environment

Fumiko Kasuga

Selection of the Session Themes and the Program Concepts

We selected Education and the Environment as the theme of the second session of the SCA/PSA joint symposium. As one of its tasks, the SCA subcommittee is involved in the Ubuntu Alliance. Soon after the start of the 20th term of the Science Council of Japan, I was assigned to that task of the SCA subcommittee. Therefore, I had an idea of introducing this Ubuntu Alliance as the coordinator of this session, where education and the environment would be discussed. This idea was also supported by Professor Kiyoshi Kurokawa, the former President of the Science Council of Japan, who promoted participation in the Ubuntu Alliance and its activities thereafter. Consequently, I consulted with Mr. Katsunori Suzuki, a senior researcher of the United Nations University-Institute of Advanced Studies, the secretariat of the Ubuntu Alliance. As a result, we determined to regard the Ubuntu Alliance and the Asia Pacific Initiative (API), another educational project of the United Nations University, as two columns of this session, while inviting lecturers from the University of the South Pacific in Fiji, the University of Hawaii, and the University of the Ryukyus that are involved in the activities of the Ubuntu Alliance and the API. Then, we also consulted with Professor Makoto Tsuchiya of the University of the Ryukyus, who was a member of the SCA subcommittee and the secretary-general of the PSC organized by the PSA this time. We, the three persons, gathered and held electronic meetings in preparation. Professor Kimio Uno, an emeritus professor of Keio University, who had promoted the API, also gave us advice through Mr. Suzuki.

In addition, we planned to reproduce the remote lecture class implemented as one of the missions of the API in the general discussion for the audience of the site. In cooperation with the Computing and Networking Center of the University of the Ryukyus, we started preparations for connecting the venue to the University of Hawaii with cameras and via the internet for a several-minute, real-time lecture from the University of Hawaii.

Organization of the Program and Outlines of the Lectures

1. Mr. Katsunori Suzuki, Senior Researcher of the United Nations University-Institute of Advanced Studies (UNU-IAS)

Title: Decade of Education for Sustainable Development and Global Learning Space

The main theme was the progress of the United Nations Decade of Education for the Sustainable Development (DESD) that started in January 2005 under the initiative taken by Japan. Based on the concept that closer cooperation between educators and scientists/researchers is essential in the nurturing of human resources towards a sustainable society, the Ubuntu declaration was adopted on the occasion of the Johannesburg Summit in 2002. The Ubuntu Alliance is comprised of eleven scientific and higher educational institutions that signed the declaration, and the SCA is one of its members. It is said that Ubuntu means “Alliance” or “cooperation” in the South African language. As one of the policies to boost the DESD, the United Nations University promotes formation of Regional Centres of Expertise (RCEs), where the features of each region are utilized, under the public-private-academic cooperation. The Ubuntu Alliance also acknowleges RCEs for support. As of May 2007, 35 RCEs work throughout the world including Japan. In the Pacific region, the RCE Pacific is established, and the University of the South Pacific is one of its core institutions. Mr. Suzuki also outlined the API activities as the base of the university Alliance network.

2. Professor Randolph R. Thaman, The University of the South Pacific

Title: The University of the South Pacific, Biodiversity, Ethnobiodiversity and Education for Sustainable Island and Ocean Development

Professor Thaman introduced the vulnerability of islands and oceans to changes in the environment, as well as maintaining biodiversity as the base of sustainable development in the island regions by showing many beautiful photos. Professor Thaman defined the concepts of biodiversity and the languages fostered in local cultures as Ethnobiodiversity. This includes the knowledge, uses, beliefs, management systems, conservation ethics, taxonomies (classification systems) and language that different cultures (including modern scientific and international AID and development communities) have for BIODIVERSITY. Professor Thaman has asserted that it is a serious crisis that ethnobiodiversity is being lost. In addition, he introduced a variety of RCE activities at the University of the South Pacific, particularly education at the graduate school and remote education (USPNet).

3. Professor Norman Okamura, University of Hawaii

Title: API Advanced Seminar Series, Challenges and Opportunities

Professor Okamura explained the roles of the University of Hawaii in the API, while comprehensively introducing the organization and activities of the API. He also referred to actual examples of real-time classes via the internet and the details of the courses, as well as the functions of the member universities. Several Japanese

universities have also joined in the API, and further development is planned. According to Professor Okamura, the advantage of the API is cost reduction by system sharing, while the issues to solve are coordination of the lecturers, and standardization and evaluation of the lectures.

4. Professor Makoto Tsuchiya, University of the Ryukyus
Title: Island research and education in the Asia-Pacific region

Professor Tsuchiya talked about wide topics of cooperation between the University of the Ryukyus and research institutes in the Asia-Pacific region, and the roles of the tropical and semi-tropical environments in global environmental issues, which were organized well for smooth understanding. The University of the Ryukyus participates in the above-mentioned API, while putting an emphasis also on face-to-face education through international exchange such as the acceptance of students from abroad. Making good use of the historical and geographical features of Okinawa, the university is promoting cooperation with the Asia-Pacific region and contributions to local communities. Professor Tsuchiya introduced coral bleaching and the crisis in the mangrove ecosystem in detail using photos. At the end of the lecture, he introduced international cooperative research on integrated analysis of biodiversity in the coral reef island system.

5. Real-time Lecture from the University of Hawaii

When we started the general discussion and the screen was switched, Professor Christina Higa, the coordinator of the University of Hawaii, appeared on the screen. Professor Higa introduced the lecturer, Ms. Vera Zabonelli. She started the lecture under the title of Catching the Next Big Wave: Disaster Management & Humanitarian Assistance at the University of Hawaii. During the message from Ms. Zabonelli, images were transmitted from Hawaii, while in the lecture I operated the slide projector on the podium at the venue. Ms. Zabonelli comprehensively introduced the curriculum for disaster control and humanitarian support, information systems, and international cooperation at the University of Hawaii in a short time. The lecturer in Hawaii also answered the questions from the venue in Japan.

General Overview

In this session, we gave top priority to the audience’s smooth understanding so that Japanese lecturers and the coordinator spoke in Japanese. Furthermore, Japanese lecturers prepared slides both in Japanese and English, and we also translated English on the slides provided in advance for the remote lecture from the University of Hawaii

into Japanese. Nevertheless, I prepared the coordinator's script both in Japanese and English in advance for the interpreters since simultaneous interpreters would have difficulties in frequently switching the interpretation from English to Japanese into that from Japanese to English.

Although Mr. Suzuki and Professor Tsuchiya helped me greatly, I only met some lecturers on the morning of the day of the symposium for the first time, and some of the lecturers gave us their original drawings for slides just before their lectures. As a result, I could not understand their lectures fully enough as their coordinator, about which I have regrets. At the session, I paid so much attention to time management for the symposium that I could not make time for enough discussions between the lecturers and the audience, as well as a summary of the session. As the coordinator I feel regret.

However, Professor Tomio Takara, the Director of the Computing and Networking Center, University of the Ryukyus, and its staff, as well as Professor Christina Higa and other people of the University of Hawaii, repeated the telecommunication test for preparations, although they were very busy with PSC in session. It was a great achievement to the session that we could actualize the real-time lecture at the venue away from the ordinary lecture room.

I think that this remote lecture helped us smoothly introduce how education utilizing the features of the Asia-Pacific region should be, particularly the environmental education, to the citizens of Okinawa including high school students. Education should not be provided only for children but also for all people in every part of the world. I am certain that it is of great significance to have shown the Science Council of Japan is involved in education for a sustainable society and its development under the framework of the SCA in cooperation with the Alliance of the international education institutes and research institutions such as the United Nations University.

I would like to express our deepest gratitude to Mr. Suzuki, Professor Tsuchiya, and all persons that cooperated with us in making this session such a success.

Panel Discussion Session C: Water Resources

This paper is translated from the paper which originally contributed to the September issue of "SCJ Forum" published by the Japan Science Support Foundation.

Water Resources

Kunitoshi Sakurai

Introduction

Today, 6.5 billion people live on the earth. During the 20th century, the world's population tripled, but the need for water increased six-fold. As a result, while it is said that the 20th century was the age of territorial conflict, the 21st century will be the age of water conflict. Water, both surface water and underground water, causes lots of problems among human beings due to its limited quantity and deteriorated quality. Now, the century of water crisis has come.

The only water resource we can use is fresh water like that found in rivers and underground. The huge amount of ice at the Poles is made of fresh water but inaccessible. We can only use the fresh water found in rivers and underground. For this symposium, we have determined to focus on underground water from the water resources available. Unlike surface water found in the rivers and lakes, we cannot directly see underground water, but its quantity is much larger than the surface water. It is said that the amount of underground water is 60 times more than the useable surface water. Underground water, which is precious to human beings, is rapidly deteriorating both in quantity and quality. In this water resource symposium, therefore, we discussed underground water in particular.

There is another reason why we put an emphasis on underground water. The joint symposium was also open to people in Okinawa, expecting them to feel familiar with the Science Council of Asia and the Pacific Science Congress. Consequently, we selected underground water, about which students of Miyako Agricultural Senior High School well known in Okinawa were studying, as its theme, inviting the students as presenters. The students of Miyako Agricultural Senior High School had been continuing research activities into the prevention of the underground water of Miyako Island from being contaminated by human activities including agriculture under the guidance from Mr. Kazuhiro Maesato, their teacher. Their research was highly evaluated, and they were granted the Stockholm Junior Water Prize, which was also called a Nobel Prize in Water, in 2004.

Presenters and Presentations

The first presenter was Professor Shinichiro Ohgaki of the Graduate School of the University of Tokyo. His topic was "Groundwater Management in Asia." His presentation was based on the research promoted by the Institute for Global

Environmental Strategies (IGES), and disclosed the current situations and issues on management of underground water in Asian cities such as Tokyo, Osaka, Tianjin (China), Ho Chi Minh City (Vietnam), Bangkok (Thailand), Bandung (Indonesia), Colombo (Sri Lanka), and Kandy (Sri Lanka). The presentation, which helped us understand the overall image of the underground water issue, was excellent.

The second presenter was Associate Professor Gemunu Herath of the University of Peradenia in Sri Lanka, who is a joint researcher of Professor Ohgaki. Based on the above IGES research, his report focused on Colombo and Kandy in Sri Lanka. It is particularly worth noting that he referred to the effects of the tsunami in December 2004 on the underground water resource along the coast of Sri Lanka in his presentation. It must have been a surprise to many of the audience to know that there are still some after effects in the underground water even after two years have passed since the disaster.

In their reports, both Dr. Ohgaki and Dr. Herath emphasized as follows; For decades, underground water has been stably supplied as high-quality yet inexpensive water for homes, industries, and agriculture. Underground water has been regarded as a highly valuable resource. Many cities of the world have depended on underground water for smooth water supply, and have used this resource for economic activities. However, rapid urbanization and industrialization in Asian cities have often caused an exhaustion of the resource and ground subsidence by excessive pumping of underground water to meet the growing demand for water, increasing impacts on this precious resource. The underground water-bearing layer has been contaminated further by a variety of contaminants. Also in farm villages in Asia, underground water has been excessively used due to dissemination of the irrigated agriculture, which accelerates exhaustion of the resource. In many cities and farm villages in Asia, therefore, the underground water issue attracts much attention, and it is important to implement joint measures regionally and internationally to conserve this valuable resource. In developing nations, the actual situations of their underground water resource, which has been rapidly changing, are not understood well due to limitation of research resource. Consequently, proper measures are not taken in time to protect the resource. In the 21st century, the century of water, the water crisis is growing globally and we cannot over-emphasize the importance of international cooperation.

The third presenter was Dr. Mafizur Rahman, senior lecturer of Bangladesh University of Engineering and Technology. Bangladesh has experienced contamination of underground water by natural arsenic on the largest scale in the world. Tens of millions of people are affected by arsenic poisoning. Originally, Bangladesh was frequently hit by floods, which caused a lot of sanitary problems such as diarrhea due

to water contaminated by human waste. Therefore, the government tried to spread shallow wells in cooperation with UNICEF. Ironically, that caused serious arsenic contamination. Dr. Rahman reported that it was unlikely to settle the issue soon regardless of the various efforts made nationally and internationally. The seriousness of the issue is clearly shown in the fact that many people are not aware of the existence of the arsenic contamination problem.

The last presenters were five students of the environment team from Miyako Agricultural Senior High School: Marika Sunakawa, Rina Hamakawa, Manami Kakazu, Tomomi Nagasaki, and Chika Yonaha. The advisor to the environment team, Mr. Kazuhiro Maesato, supported them. Miyako Island, which is an elevated coral reef, has no rivers, and the people living there fully depend on underground water. The underground water has been contaminated by urban sewage, waste water from livestock, and fertilizer used for sugarcane farming. The concentration of nitrate is likely to exceed the drinking water standard, and the situation is extremely serious. The students of the environment team of Miyako Agricultural Senior High School had been tackling the development of agricultural techniques that would not cause contamination of underground water under the guidance from Mr. Maesato. As I mentioned before, the students won the Stockholm Junior Water Prize called a Nobel Prize in Water in 2004 for their outstanding achievements.

At the symposium, they released their research achievements thereafter. According to their research, cultivation of Japanese buckwheat utilizing residual nitrogen after harvesting sugarcanes will be able to conserve underground water. Buckwheat is highly sought-after and profitable, and Japanese buckwheat after harvest has good green manure effects. This solution is also attractive to sugarcane farmers in Miyako Island. The audience and other presenters attending the symposium highly admired the excellent research achievements made by high school students.

Conclusion

The four reports have shown that today underground water conditions are both quantitatively and qualitatively severe in cities and farm villages throughout Asia. The reports have also told us that a variety of measures are being taken regionally, nationally, and globally in order to overcome the current situations.

In Japan, we have a proverb ‘let the past drift away with the water’. This proverb is based on our view of the nature of water that is always circulating and various problems generated from human activities can drift away by the circulation of water. However, the scale of human activities is now equal to or over carrying capacity of the earth. Such problems are not solved naturally any more. Water does not circulate

smoothly in quantity and in quality. It is indispensable for us to manage water as a limited resource.

As a conclusion of this symposium, we have understood that every stakeholder of water as a limited precious resource should acquire the capability to manage water as his or her own resource. We are now living in such an era. All citizens, corporations, local governments, nations, international institutions, and experts are required to enhance the ability to manage water as a limited resource in their own situation, cooperating with each other. Confirming this key task, we closed the symposium.