

INTERNATIONAL SYMPOSIUM
Establishing Guidelines for Environmental Education
Based on Environmental Ethics

28-30 January 2006



Organisers

Asia-Pacific Network for Global Change Research(APN)

Hyogo Prefectural Government

The General Institute for the Environment, Konan University

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Message

Hiroki HASHIZUME
Director, Asia-Pacific
Network for Global Change Research

I would like to express my special thanks to all participants, particularly those who have come all the way to Kobe from their homeland to participate in this international symposium. I would also like to thank our stakeholder, the Hyogo Prefectural Government and Project Leader, Professor Taniguchi, of Konan University, for his endeavor in hosting and organising this international symposium in Kobe.

The APN, an inter-governmental network created to foster global change research in the Asia-Pacific region, to enhance developing countries' participation in research, and to strengthen interactions between the science community and policy makers, recently celebrated its tenth anniversary since its establishment in 1996.

The Hyogo Prefectural Government has hosted the APN since the Secretariat was relocated to Kobe from Tokyo, in 1999. The APN is also grateful to the Australian Greenhouse Office, the Japanese Ministry of the Environment, the New Zealand Climate Change Office and the National Science Foundation, USA for their contributions and support.

The APN conducts a number of activities that include: (1) supporting regional cooperation in research on global change issues through its competitive Annual Regional Call for Proposals (ARCP) process (2) developing and enhancing scientific capacity in developing countries through the CAPaBLE Programme, and (3) providing opportunities for scientists and policy-makers to discuss regional research priorities and other global change issues.

This APN supported symposium, entitled "Establishing Guidelines for Environmental Education based on Environmental Ethics" is strongly encouraged by and organized in collaboration with the Hyogo Prefectural Government. The promotion of environmental education is a current international initiative, originally proposed by the Japanese Government, expressed in the United Nations "Decade of Education for Sustainable Development". Environmental education will be promoted for the next ten years all over the world using various mechanisms. I expect this symposium will further promote information exchange on practical approaches and researches on environmental education in the Asia-Pacific region and become an excellent reference.

I would like to encourage future collaboration and cooperation with the Hyogo Prefectural Government by supporting activities that share the same objective: to "create a sound material cycle society living with nature".

Message

Fumiaki TANIGUCHI
Director, General Institute for the
Environment, Konan University, Japan

Azizan BAHARUDDIN
Director, Centre for Civilisational Dialogue,
University of Malaya, Malaysia

Main objectives of the international symposium

Environmental Education is implemented as a major approach for sustainable development and is the interaction between the science community, policy-makers and those involved in the education sectors (primary, secondary & tertiary). In this sense, environmental education is an important approach to materialise one of APN's goals of linking science and policy.

The fundamental objectives of the project of *Guidelines for Environmental Education Focusing on Environmental Ethics and Human Dimension of Global Change* cooperated between Konan University, Japan and University of Malaya, Malaysia are:

- (i) To make full use of participating countries' experience & knowledge of global change research to formulate guidelines for environmental education & sustainable development.
- (ii) To fill the existing gaps among teachers & other stakeholders involved, such as global change experts, decision-makers, etc., by developing methods/modules for environmental education that can be used as a basis for countries in Asia.

The project is planned for approximately two years from November, 2005 to December 2007, and will include two "sets" of international symposia and workshops the first in Kobe, Japan, and the second in Kuala Lumpur, Malaysia. These symposia and workshops will:

- (i) Share the experiences of participating countries in environmental education & sustainable development.
- (ii) Discuss how to mobilise these experiences particularly, for this project, in the Asian context.
- (iii) Discuss the potential roles of networks in the Asia-Pacific region with respect to environmental education and sustainable development and begin to formulate/develop guidelines for environmental education.
- (iv) The outcomes of both sets of symposia and workshops will be used to formulate guidelines that can be used by countries in Asia to develop environmental education guidelines to suit the needs of their own countries.

Some of outcomes of the project

The outcomes of the projects will be:

- (i) To hold a symposium and workshops that will:
 - a. Elaborate the concept of environmental education that focuses on ethics and the human dimensions of global change.
 - b. Elaborate and identify the potential role of networks such as APN in the region.
 - c. Establish skeletal guidelines for environmental education that are flexible to suit the needs of countries in the Asian region.
- (ii) To hold short courses/workshops and site visits in order to: develop Curriculum and Materials, and develop documentaries on DVD/CD-ROM.
- (iii) To introduce curricula and models that can be used in mainstream education systems (curricula will be written in a way that will allow straightforward adaptation for the needs of individual countries).
- (iv) To publish and disseminate information on environmental education and sustainable development that highlights the latest discoveries, techniques, technologies, and strategies for environmental sustainability.
- (v) To establish a network of resource persons for environmental education and sustainability.
- (vi) To establish empowered communities who have increased awareness of their roles and contributions to environmental and sustainable issues.

PROGRAMME



International Symposium

Establishing Guidelines for Environmental Education

Based on Environmental Ethics

Background

In order to assist in the development and promotion of knowledge of natural science related to global change research, the International Symposium aims to share viewpoints of knowledge and expertise from invited guests in the fields of natural sciences, social sciences, and human sciences.

Studies on “Environmental Education” have not yet been sufficiently integrated to solve environmental issues. In order to have a common understanding of environmental issues based on environmental ethics, internationally recognized guidelines for environmental education need to be established. The symposium aims to establish preliminary guidelines and discuss the role of networks in environmental education in the Asia-Pacific region.

Environmental education is embedded into all “natural, social and human sciences.” Therefore, the objective of the symposium is to establish preliminary international guidelines for environmental education and, in the process, establish initial partnerships in the Asia-Pacific region between many countries including Australia, Canada, India, Japan, Malaysia, Thailand and the USA.

On Day One of the symposium, keynote speeches followed by a number of presentations that focus on environmental education will be made. The focus of these speeches and a panel discussion will be to call for Standardization of Global Guidelines for Environmental Education and will be made by pioneering scholars and practitioners from Asia-Pacific countries. The symposium audience will then have an opportunity to exchange opinions during an open and dynamic dialogue session with the presenters.

On Day Two, two workshops will be held. The first will be on developmental procedures to create materials for environmental education, and the second will focus on demonstrating e-Learning activities in environmental education programmes between universities. The aim of the workshops is to improve the quality of teaching and training skills for environmental education for the general public, teachers, NGOs and local government officials. A second panel discussion will focus on common Materials for Environmental Education in the Asia-Pacific Region.

On Day Three, the organizers will promote the establishment of preliminary Guidelines for Environmental Education Based on Environmental Ethics. These guidelines will be generated from a specialists’ study meeting and will incorporate environmental education as well as outline the role of networks in the region in implementing the guidelines at local, national and regional levels.

Symposium Outline

- Dates: 28-30 January 2006 (Saturday – Monday)
 Venues: Hyogo Prefectural Museum of Art, Museum Hall / Konan University, Building 5 & 9
 Organiser(s): The General Institute for the Environment, Konan University; Asia-Pacific Network for Global Change Research (APN)
 Sponsored by: APN & Hyogo Prefectural Government
 Supported by: APN, Hyogo Prefectural Government, Ministry of the Environment, JAPAN; Hyogo Prefecture Board of Education; Kobe City Board of Education; Institute for Global Environmental Strategies (IGES) Kansai Research Centre; International Centre for the Environmental Management of Enclosed Coastal Seas (EMECS), the Japanese Society of Environmental Education, Kansai Branch; the International Association of Earth Environment and Global Citizen/ Hyogo Environmental Advancement Association

Programme

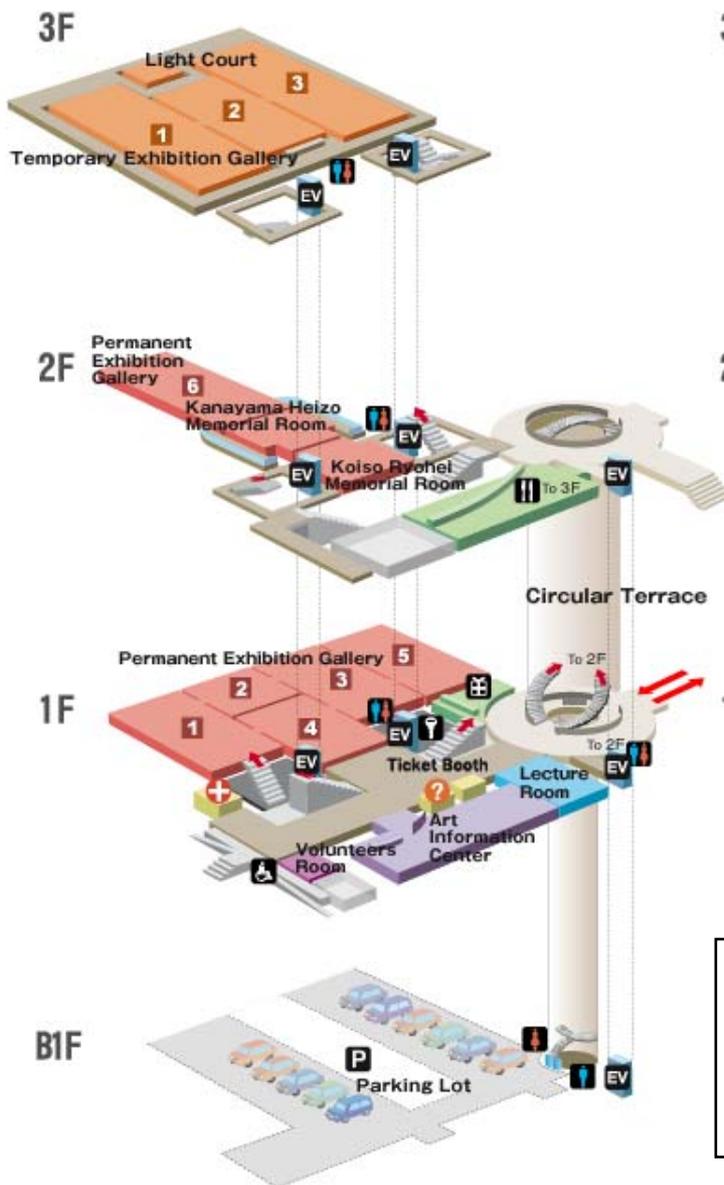
Day One - Saturday, 28 January	
10:00 - 10:30	Participant Registration (Hyogo Prefectural Museum of Art)
10:30 - 10:50	Opening Remarks: Mr. Hiroki HASHIZUME, Director, Asia-Pacific Network for Global Change Research (APN) Mr. Akira HARADA, Director General Environment Bureau, Hyogo Prefectural Government
10:50 - 11:40	Keynote Speech I: Dr. Shiro NAKAGAWA, President, Japanese Association of Museums, JAPAN "Development of Environmental Education in Japanese Museums: Guidelines for Museums"
11:40 - 12:30	Keynote Speech II: Prof. Azizan BAHARUDDIN, University of Malaya, MALAYSIA "Proposal of Environmental Education Based on Religious Ethos: Environmental Education based on Common Values in Diverse Cultures and Religions"
12:30 - 13:30	Lunch
13:30 - 14:20	Keynote Speech III: Prof. Fumiaki TANIGUCHI, Konan University, JAPAN "Development of Environmental Education in Japan and Environmental Education Based on Environmental Ethics: Regarding Fundamental, Themes of Nature, Life, Agriculture, Culture, Religion and Ethics"
14:20 - 14:30	Tea Break
14:30 - 16:00	Panel Discussion I : Toward Standardization of Global Guidelines for Environmental Education Coordinator: Prof. Azizan BAHARUDDIN, University of Malaya, MALAYSIA Panelists: Dr. Shiro NAKAGAWA, Director Emeritus, Ibaraki Nature Museum, JAPAN "Standardization of Environmental Education in Museums from the Global Viewpoint" Prof. Freya MATHEWS, La Trobe University, AUSTRALIA "Standardization of Environmental Education Based on Environmental Philosophy from Viewpoint of Deep Ecology" Prof. Jariya BOONJAWAT, Chulalongkorn University, THAILAND "Standardization of Environmental Education on Biochemical Education from the Viewpoint of the Relationship between Life and Environment" Dr. Hakobu NAKAMURA, Former President, Pan-Pacific Forum, JAPAN "Standardization of Environmental Education on Biology from the Viewpoint of the Life-Chain: All kinds of the organisms are connected each other through the genes"
16:00 - 16:15	Tea Break

16:15 - 17:00	Panel Discussion
17:00 - 17:15	Summary
Day Two - Sunday, 29 January	
09:00 - 09:30	Participant Registration (Konan University, Building 5, No. 5-22)
09:30 - 10:50	Workshop A: Development Process of Teaching Materials on Marine Environmental Education in Canada: Guidelines for Developing International Environmental Education Manuals and Programs Coordinator: Gloria SNIVELY, University of Victoria, CANADA
10:50 - 11:00	Tea Break
11:00 - 12:20	Workshop B: Demonstration of Environmental Education Using On-line TV-net Meeting System: Application of a TV-net Meeting System through the Internet for ESD(Education for Sustainable Development) Coordinator: Prof. Kazuyuki MIKAMI, Miyagi University of Education, JAPAN Collaborators: Prof. Yoshihiro Ugawa, Miyagi University of Education, Mr. Yukihiro OIKAWA, Mr. Yuichi HATAKEYAMA, Mr. Masato ABE, Ms. Chieko ONODERA, Mr. Kazuhiro OIKAWA, Ms. Naomi SUZUKI, Omose Elementary School, Kesen-numa City, Mr. Hijiri ARAAKE, Mr. Kiyoshi TAKINOSAWA, Mr. Katsuhiko ITO, Mr. Takao NAGANO, The Affiliated Elementary School, Miyagi University of Education
12:20 - 13:30	Lunch
13:30 - 13:50	Opening Remarks: Mr. Hiroki HASHIZUME, Director, Asia-Pacific Network for Global Change Research (APN) Message: Prof. Yoshimi SUGIMURA, President, Konan University, JAPAN
13:50 - 14:30	Keynote Speech: Dr. Gloria SNIVELY, University of Victoria, CANADA "Guidelines for Environmental Education in Canada and Manuals on Capacity Building: Environmental Education Principles that Ensure Coexistence between People and Nature"
14:30 - 15:40	Panel Discussion II: Common Materials for Environmental Education in the Asia-Pacific Region Coordinator: Prof. Fumiaki TANIGUCHI, Konan University, JAPAN Panelists: Prof. Jariya BOONJAWAT, Chulalongkorn University, THAILAND "Materials for Environmental Education in Thailand: Regarding a Concept of Life" Prof. Freya MATHEWS, La Trobe University, AUSTRALIA "Materials for Environmental Education in Australia: Regarding Environmental Ethics"
15:40 - 15:50	Tea Break
15:50 - 17:30	Panel Discussion: Dr. Rajib SHAW, Kyoto University, JAPAN "Materials for Environmental Education in India: Focusing on Environmental Education towards Pro-Active Action" Prof. Siritwat SOONDAROTOK, Phranakhon Rajabhat University, THAILAND "Materials for Environmental Education in Thailand: Agriculture and Sustainable Development" [using TV-net meeting system between Thailand and Japan]
17:30 - 17:50	Summary
17:50	Closing Remarks
Day Three - Monday, 30 January	
09:00 - 09:30	Participant Registration (Konan University, Building 9, Conference Room 5)
09:30 - 12:00	International Study Meeting International Comparative Study of Environmental Education Based on Environmental Ethics: Establishing Guidelines for Environmental Education

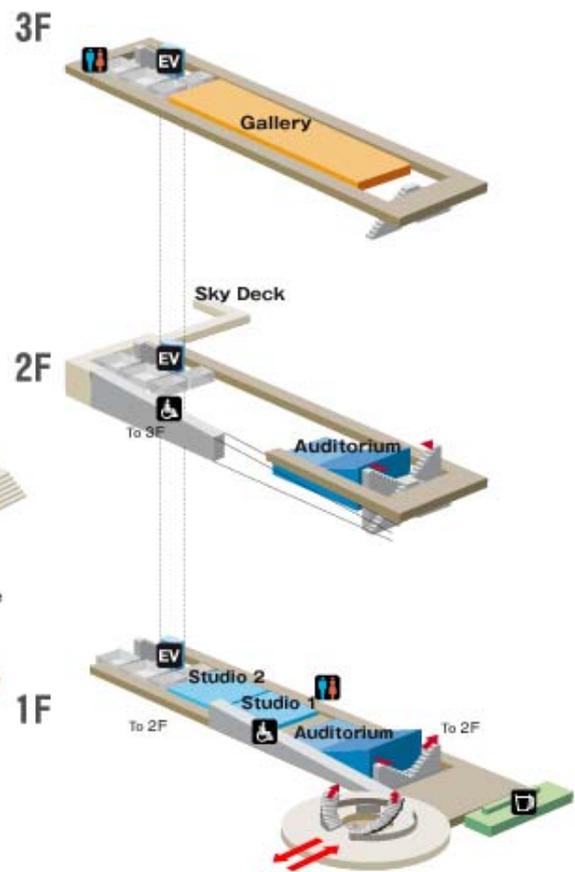
Site Map on Day 1: Saturday, 28 January

Hyogo Prefectural Museum, Museum Hall; Auditorium

Exhibition Galleries



Gallery for rental



Location/Contact

1-1-1 Wakihama Kaigandori,
Chuo-ku, Kobe 651-0073, Japan
TEL: +81-78-262-0901
e-mail: museum@artm.pref.hyogo.jp

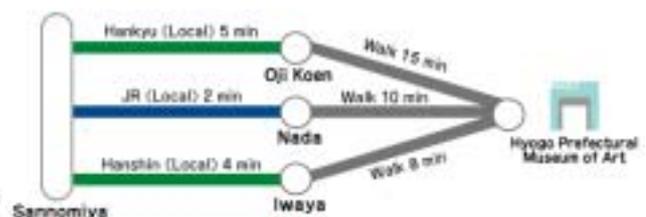
Access to the museum

By Road

Exit the Kobe Route on the Hanshin Expressway at the Maya Interchange and drive for about 5 minutes.



By Train/Bus



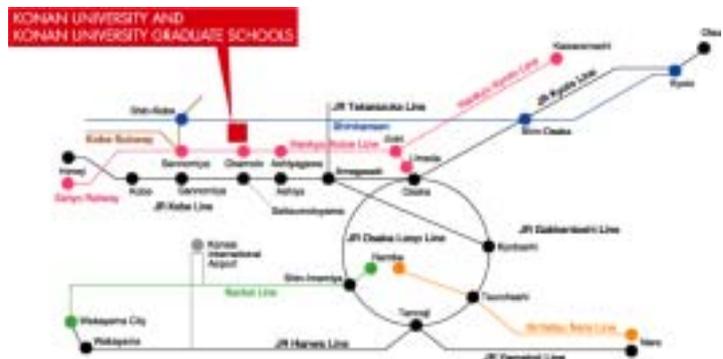
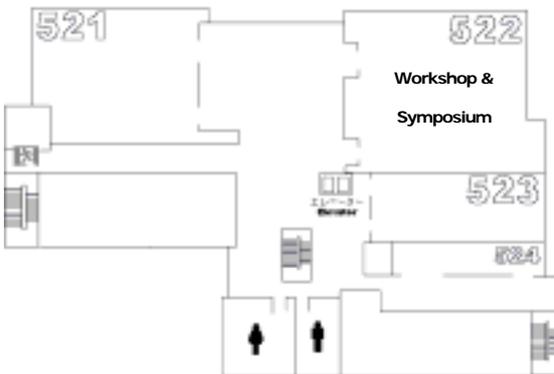
Map of Conference Room on Day 2 & 3:

Sunday, 29 January – Monday, 30 January

Konan University, Building 5, Room Number 5-22

&

Konan University, Building 9, Conference Room 5



Location/Contact
 8-9-1 Okamoto, Higashinada-ku
 Kobe 658-8501, Japan
 TEL: +81-78-431-4341

DAY 1
Keynote Speeches

Keynote Speech I

Development of Environmental Education in Japanese Museums: Guidelines for Museums

Shiro NAKAGAWA

President, Japanese Association of Museums, Japan

Present State and Characteristics of Japanese Museums

Japan is one of the most advanced countries in the world in comparative terms of total number of museums. According to a 2002 investigation by the Japan Ministry of Education, there are 5,363 museum facilities in Japan; this is second in number only to the 8,000 facilities in the United States. However, in-depth examination of the details of Japanese museums reveals that overall they are relatively newer and on a smaller-scale than their Western counterparts. The average Japanese museum has the following profile: the number of years in operation is 20, the gross area of the building site is 4,311 square meters, the amount of floor space is 1,350 square meters, the number of total employees is three and number of curators is one, the number of cultural artifacts and natural history materials is 2,500 and 1,000 respectively, the annual number of days in operation is over 300, and the number of annual visitors is 5,000.

The major reason for the current circumstances of Japanese museums is the fact that Japanese museums were more recently established than those in Western countries. During the centuries of isolation from the outside world between 1604 and 1868, no concept of museums existed in Japan. It wasn't until the Meiji Restoration in the second half of the 19th century that this Western notion was introduced in Japan. Due to this relatively late introduction, the present Tokyo National Museum was established only in 1872, and almost 80 percent of present-day museums were established after 1975. Also, the current laws governing the establishment of museums were not enacted until after World War II, in 1951.

However, it is important to recognize that while the concept of museums is comparatively new in Japan, the collection and preservation of cultural and natural artifacts has been taking place for centuries. During the Edo Period from 1604-1868, the medical discipline of "Honzou-gaku", which originated in China, was pervasive in Japan society. It was at the center of natural science and medicine with a practical approach and the aim of medical treatment. In addition to this emphasis on the pragmatic that included the study of zoology, botany, and earth science, it also acknowledged the contribution of ethnology, art, and regional culture such as religious faith, to scientific understanding. Due to this integrated disciplinary approach, the archives of "Honzou-gaku" ultimately served as the foundation of Japanese scientific and cultural museums.

While "Honzou-gaku" provided the framework for contemporary Japanese museums, it also influenced the small size of such museums due to its emphasis on local culture. Today, the majority of Japanese museums are intimately connected with regional culture, and 41% of museums were established by local municipalities. In fact, 80% of these local museums do not meet the national museum criteria dictated by the Japanese government. However, by nature of their small size and intimate community connection, these museums serve a unique cultural function in small towns throughout Japan.

In conclusion, Japanese museums developed via two distinct streams. "Honzou-gaku" provided the original impetus for the collection and preservation of natural and cultural artifacts prior to the Meiji Restoration in 1868. During the decades of outside influence that followed, the modern-day concept of museums based on scientific classification merged with the previous approach to preservation, and current Japanese museums were born.

The Change of the Status of Museums and the Japan Association of Museums

In the late 20th century, the status of museums was transformed on a grand scale around the world.

One of the major changes represented a shift towards a societal emphasis on lifelong learning. Prior to this, education had taken place in designated arenas (schools and universities) at designated ages; however, as modern society diversified and became more sophisticated, lifelong learning in a wide variety of settings became essential. In the past, museums were relegated to a complementary role to the education provided by schools. The shift of emphasis towards lifelong learning has encouraged museums to emerge as comprehensive educational centers, which is resulting in an expansion of museum services and activities.

Another factor in the transformation of museums is the destruction of the natural environment by modern technological advances in the last century. In 1972, the United Nations Conference on the Human Environment held in Stockholm announced the *Declaration of the United Nations Conference on the Human Environment*: "To defend and improve the human environment for present and future generations has become an imperative goal for mankind." And then in 1980, the *World Conservation Strategy* was announced as the global objective. Eight years later in Rio de Janeiro in 1990, the Conference on Environment and Development (UNCED) announced the *Rio Declaration on Environment and Development*. However, in spite of the recognized importance of these declarations, the destruction of the global natural environment continues. The progression of rapid overpopulation throughout the cities of the world increases the disjunction between humans and nature, and the ensuing result is continued environmental destruction. One of strongest potentials in turning the environmental tide is in education, and this is where modern museums have a monumental role to play.

Museums are the most suitable facilities to fill the integral role of aiding the pursuit of lifelong learning and using education to halt environmental destruction. In order to take full advantage of museums and increase their usefulness and power, the Japanese Association of Museums put forth a set of guidelines and a course of action for the last five years. The connection between museums and local communities fostered by unique museum exhibits enables the museums to provide various necessities to local citizens and deepen local understanding through education. Neither the pursuits of lifelong learning nor environmental education can possibly be achieved without cooperation between citizens and museums. Museums can offer the opportunity, but people must take advantage of it in order to achieve either of these two goals. The guidelines for *Dialogue and Cooperation (2000)* also encourage cooperation between large and small museums in order to enhance the educational opportunities. Finally, the course of action set forth in the "Desirable Museums of the Future" (2003) reveals the common standard for achievement.

Environmental Education on Museums and *The Earth Charter*

The mission of museums is to collect materials, analyze them, present the results to the public, and hand them down to the next generation. This essential objective can be condensed down to what we can learn from the past, know in the present, and predict about the future. The materials are classified into natural, cultural, and complex resources, which are each essentially connected with human life and which need to be viewed from a comprehensive viewpoint in order to be fully grasped. All living things on this earth, including humans, come to be recognized as members of "The Community of Life". Conventional environmental education is treated as a part of natural science dependent on science and technology; however, it is now imperative to recognize it as an integrative study without distinction between natural and human elements. For example, in the 20th century the extinction of living species accelerated, and in light of biodiversity we must cope with endangered species. From the standpoint of natural history, it is vital to understand the enormous loss of vast resources by the extinction of just one species. The rationale behind the goal of preservation of all species is that every DNA cell provides a tremendous archive of information. In contrast, the cultural resources created by humans are unique heritages that evolve and disperse through space and time, a phenomenon that R. Dawkins referred to as cultural "meme" (1989). The future of humans can be viewed to depend on a balance of DNA and meme. In this sense, in order to establish guidelines for environmental education in a museum setting it is valuable to examine *The Earth Charter (2003)* by way of the *Declaration of the United Nations Conference on the Human Environment (1972)* and the *Earth Summit (1992)*. In this Charter, we can find integrative wisdom in which environmental education with knowledge of natural science is indivisible from the knowledge of social and human science.

Keynote Speech II

Proposal of Environmental Education Based on Religious Ethos: Environmental Education Based on Common Values in Diverse Cultures and Religions

Azizan BAHARUDDIN
Director, Centre for Civilisational Dialogue,
University of Malaya, Malaysia

The reality of the ecological crisis attacks us from many directions. Many perspectives, including those arising from religion and philosophy, are necessary in the important task of re-thinking human-earth relations. The examination of the different religious/cultural worldviews should be deemed critical in the task of analyzing the possible causes of the environmental crisis as well as proposing solutions.

To be universal in our appeal we have to be inclusive in our approach. Just as biological diversity is critical in the physical environment, so too cultural diversity must be sustained for our proper moral survival. When looking at religions, however, we must be aware of the disjuncture between ideals and reality. We also need to remind ourselves that the traditional world religions and cultures have not been faced with the scale of environmental crisis that we see today. Nonetheless, because of the predominance of religious influence today, it is imperative and critical that we are able to draw upon the resources of religions as a means of finding more adequate perspectives on nature and the environment whilst developing a more functional environmental ethics as a basis for Environmental Education. For example, although religions/cultures may have developed ethics for human and social interactions, there may not yet be similar codes of ethics that would include 'biocide' and 'geocide' in the religious mentality.

Because we know that various religions and cultural worldviews have and can shape attitudes towards nature, we must strive to ensure that out of these worldviews a method for action could emerge. Therefore, by studying and presenting the various worldviews we hope to obtain a broader context for a code of environmental ethics as the basis for environmental education.

Perhaps we can propose to do our job in the following way:

- (a) By re-examining the resources of the world's spiritual traditions to assist us in balancing the current dominant mechanical/enlightenment mentality.
- (b) By exploring the textual, ritual, and experiential evidences that religions offer in terms of earth-human relationships.
- (c) By looking at the range of contemporary ecological 'non-religious' perspectives also being put forward. The purpose of this is to show that a paradigm shift has already begun to take place in terms of our perceptions and values in regard to nature.
- (d) If it is not already been done implicitly, we need to combine and harmonize the above with substantive scientific (chemical, physical, and biological) principles that would augment the actual meanings and reasons behind the ethos prescribed by the beliefs and worldviews regarding nature. Another way of saying this is that by crystallizing a), b), and c), we would have then 'standardized' the environmental ethics based on religions/cultures as part of the basis for Environmental Education, the other half being the scientific knowledge component.

Keynote Speech III

Development of Environmental Education in Japan and Environmental Education Based on Environmental Ethics: Regarding Fundamental, Themes of Nature, Life, Agriculture, Culture, Religion and Ethics

Fumiaki TANIGUCHI

Director, General Institute for the Environment,
Konan University, Japan

1 Introduction

Environmental Education is implemented in various and diverse fields, themes, and methods, and has contributed to the resolution of environmental problems to some extent. However, the character of too many themes, fields, and methods of environmental education makes it rather vague for both teachers and students to understand which way to be led, which objective to understand among many subjects, what meaning to attach to the field activities, and so on.

In this case, in order to be effectively communicative, environmental education needs to establish a common ground by means of vocabulary standardization through the translation of technical scientific terms into common and readily understood words and by the consolidation of diverse materials into common sets of materials. After these procedures it could be possible for us to establish "The Guideline of Environmental Education Based on Environmental Ethics".

In order to carry out these tasks, we have to discuss the significance of the fundamental themes of environmental education such as nature, life, agriculture, culture, religion, and ethics, all of which will be addressed in this symposium.

2 Development of environmental education in Japan

(1) Historical outline of environmental education in Japan

In Japan, environmental education started as pollution education in the 1960s in order to cope with the destruction of the environment caused by industry. And environmental education began to gain importance when the Japan Society of Environmental Education was founded in 1990. In those days, researchers, teachers, politicians, and NGOs engaged in serious discussions regarding the definition of environmental education. This was because most people could not understand the meaning of environmental education. After that period, many events in environmental education were sponsored by regional governments around the country, these events were a public success. Additionally, environmental education in school gained ground, and school teachers tried to introduce it into their school systems. As for academic researchers, they have engaged in the work of creating theories of environmental education for more than a decade. While these movements were going on, the Law for Promotion of Natural Preservation and Environmental Education (2002), the Fundamental Guide for the Law of Promotion of Preservation (2003) by the Ministry of Environment, and the Guidance of Comprehensive Learning (2002) by Ministry of Education were also enacted. Furthermore, the UN Decade of Education for Sustainable Developmental (ESD) started in 2005 by United Nations.

(2) Environmental education in school and its tasks

It is only recently that environmental education has become acknowledged in the general public and put into practice in terms of activities involving local citizens. Since 2002, comprehensive learning in school has been implemented in elementary, junior high and senior high school according to teachers' government guidelines. In universities and colleges, environmental education is often lectured on as a subject by liberal arts professors, even though they lack any specific environmental school or faculty.

However, in order to be successful in the environmental education classes, teachers and instructors are required to be competent in teaching without textbooks. The tasks concentrate on the ability of teachers and the common guidelines of environmental education for the teachers.

(3) Environmental education in lifelong learning

Environmental education should also be implemented in social education as well as in formal academic schooling. It is usually done in museums and outdoor facilities. Needless to say, museums have courses on environmental education in order to enhance public awareness of the environment, and museums also have research responsibilities to preserve endangered species and genes for bio-diversity.

3 Fundamental themes and methodology of environmental education

(1) Significance of fundamental themes of environmental education

i) Nature: original experience in nature

Since the birth of the earth, lives are chained together by the history of evolution for 4.6 billion years. All living things adapted to the natural environment to ensure their survival. Today, we can have the "original experience in nature", which will be the eternal measure for judging the absolute value of nature.

ii) Life: unification of environment with life

As E. H. Haeckel asserted, "Ontogeny repeats phylogenies". Such a repetition of life-history condenses down in time like a set of nesting boxes. All lives are connected in the ecological system in time. On the other hand, all lives are moulded by the formation of outer environment in space because the mechanism of auto-forming or auto-organizing is working in the circular, ecological system.

iii) Plants and Agriculture: interaction of human and nature

Of course, wilderness is irreplaceable, but we should be aware that agriculture is becoming an alternate form of nature since it is based on interaction between humans and the environment. In this sense, agriculture and ecoforestry should be well managed by humans.

iv) Society and Culture: spring of Ethics and Religion

Humans are different from plants and animals by virtue of their construction of society and culture. It is human society and peculiar cultures that create ethics and religion, which have prevented humans from arrogance. There is a spring in such ethical and religious feeling from which environmental ethics is derived. We must put stress on the important roles of feeling, sense, and sentiment in the human dimension in society and culture as well as on the function of reason, logic and rationalism.

(2) Theory and Methodology of environmental education

i) Three categories of environment

The concepts of environment can be divided into the following three categories of nature, society and mind, in order to facilitate an orderly discussion on the complicated contents of environmental education. These categories are very important for standardization of words and materials for environmental education along with environmental ethics.

ii) Origin of environmental ethics

Western and modern people have sought their happiness in the outer world, in both the natural and social environment; however, Eastern and religious people are content with their own happiness in their inner mind environment, which is the origin of environmental ethics.

iii) Methodology for environmental education

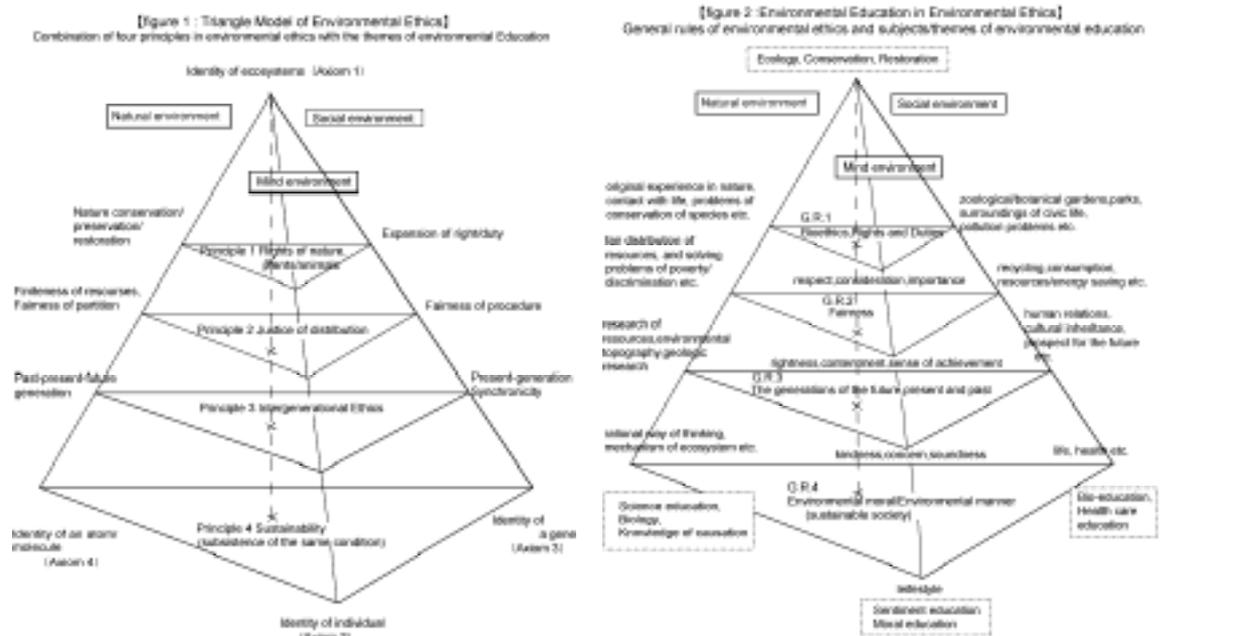
We must get over scientific causation, dualism and rationalism, and synthesize causation and chance apart from determinism, reason and passion, rationalism and irrationalism. This synthesis is completed by delving into the total human dimension, not just the scientific dimension only.

4 Environmental education based on environmental ethics

The principle of environmental ethics has four axioms: to maintain each the identities of ecological systems, individuals, genes, and atoms/molecules. These are theoretical foundations within the framework of environmental ethics such as intergenerational ethics, right of nature and plants/animals, and justice of fair distribution of resources. Under this principle, for example, it is proved that both environmental ethics and bioethics have a common root in their identity. To use a concrete example, genetically engineered corn destroys the identity of genes and kills insects by poison while also disturbing the natural order by breaking the identity of the ecosystem.

Environmental education based on the environmental ethics formulated by these axioms is able to point to a common direction towards diverse environmental education.

However, the philosophy of environmental education and that of environmental ethics are not yet established completely. So, for now, we must be content with the guideline. However, it is very important for practical environmental education to rely on one common direction such as a common guideline based on environmental ethics.



5 Conclusion

The aim of environmental education doesn't have the objective of using education to directly solve environmental problems; instead, the goal is to foster warmhearted children in the younger generation by providing them with personal and intimate experiences in nature. That way, if environmental pollution and destruction occurs, they will recognize the danger of the problems and act positively to solve the environmental issues. Furthermore, environmental education based on environmental ethics provides the younger generation with the capacity to solve problems, offers a common direction for different environmental actions, and proposes the duty to realize a "sustainable sound material cycle community".

Panel Discussion I

Panel Discussion I

Toward Standardization of Global Guidelines for Environmental Education

Coordinator:

Azizan BAHARUDDIN

Professor, University of Malaya, Malaysia

In Panel Discussion I, we will discuss the standardization of the high-technical terms used by a specialized community of scientists, researchers and policy-makers into ordinary, common words. This would allow a common language within environmental educator for all involved. For example, the term “environment” is used by physicists to imply a vacuum is the ideal space, by biologists to refer to ecological systems, and by ordinary people to describe the surroundings of everyday life. In this case, if we want to discuss environmental issues, we need to make the concept of environment commonly standardized. For this purpose, we first aim to translate high-technical terms into common daily words that everybody can easily understand. After that, we will try to connect the independent specialized fields with the general public by using common words via environmental education.

Therefore, this Panel Discussion I reflecting the human dimension has two objectives. First, by means of environmental education, we will try to make high-technical terms easily understandable words. Second, we will connect the different specialized fields. In other words, this Panel Discussion I will attempt to provide us with the standardization of environmental education into common words.

We will exchange frank opinions in Panel Discussion I regarding natural history and environmental education based on deep ecology, biochemistry and the issues of circulation of lives.

Procedure of Panel Discussion I (the first half: 90 min. /the latter half: 60 min. /total : 150 min.)

Simultaneous Interpretation

14:30-14:40	(Coordinator) Azizan BAHARUDDIN	(10min)
	Procedure of Panel Discussion I (Presentation by panelists)	
14:40-15:00	Shiro NAKAGAWA	(20 min.)
	<i>Standardization of Environmental Education in Museums from the Global Viewpoint</i>	
15:00-15:20	Freya MATHEWS	(20 min.)
	<i>Standardization of Environmental Education Based on Environmental Philosophy from Viewpoint of Deep Ecology</i>	
15:20-15:40	Jariya BOONJAWAT	(20 min.)
	<i>Standardization of Environmental Education on Biochemical Education from the Viewpoint of the Relationship between Life and Environment</i>	
15:40-16:00	Hakobu NAKAMURA	(20 min.)
	<i>Standardization of Environmental Education on Biology from the Viewpoint of the Life-Chain: All kinds of the organisms are connected each other through the genes</i>	
16:00-16:15	Tea Break	(15 min.)
16:15-17:00	Discussion	(45 min.)
17:00-17:15	Azizan BAHARUDDIN	(15min.)
	Summary	

Panel Discussion I

Standardization of Environmental Education in Museums
from the Global Viewpoint

Shiro NAKAGAWA
Director Emeritus,
Ibaraki Nature Museum, Japan

Introduction of New Natural Education in Museums

The role of museums is to collect materials, preserve them, and then hand them down to the next generation. A more concise definition of this role as outlined by the International Council of Museums (ICOM) states that a museum is “in the service of society and its development...which acquires, conserves, researches, communicates, and exhibits, for purposes of study, education, and enjoyment, material evidence of people and their environment”. Museums can provide the chance to discover intellectual joy and enrich daily life, while also bearing the responsibility for researching and analyzing materials before presenting them to the public. Especially, National Science Museums are required to secure accurate information and present it in a concise and intelligible way. This is imperative since the development of industry has destroyed the ecosystem and led to the extinction of species, which in turn has made possible the threat of human extinction. 4.5 million years ago, humans diverged from chimpanzees. It was 200 million years ago that mammalian species evolved from reptiles and came into existence. And 3.6 billion years ago, life itself came into being. Our life is a part of a huge stream of lives. This is why life is so precious and also inherently interdependent. Today, we need to gain knowledge about all other living things in order to successfully co-exist.

Standardization of Environmental Education in Museums

The major objective of Natural History Museums is to allow people to see natural materials such as animals, plants, rocks, and fossils. The basic responsibilities of such museums are to collect, classify, arrange, and preserve natural materials and to present research results to the public. The first reason for the necessity of these functions is the role the museums play as storehouses of knowledge and information. Since the natural environment is changing and is being destroyed so rapidly, it is crucial to preserve, arrange, and study natural resources and materials. The second reason is that more and more is being asked of the role of the Natural History Museums in terms of real education. After conducting relevant research, the Ministry of Education, Culture, Sports, Science and Technology announced that “children who have more opportunity to commune with nature and experience nature are more adaptable in society”. On the basis of this result, the Central Council for Education has determined the necessity of the “enhancement of social experiments and field experiments” and introduced a system of comprehensive learning. These social and field experiments are to take place

outside of the formal education setting, on days off from regular school. The third reason for these functions is the provision of public service. The board of directors for the Association of Museums in the USA announced a revolutionary policy motto of “Excellence & Equity”. This motto incorporates the goal of presenting information in a comprehensive and readily understood manner for the entire public (equity) with stress on also maintaining high intellectual standards (excellence).

The mission of the museum curator is to provide all levels and ages of society with accurate knowledge and skills by using a variety of techniques and materials. Natural Science involves the study of the five senses; therefore, it is critical that museum exhibits contain a variety of materials to fully engage all the senses of the visitor. A famous proverb says, “Memory until the age of five is memory etched on a stone. Memory in adulthood is memory etched on water”. It is the responsibility of the curator and the duty of the museum to take advantage of the opportunity to imprint vivid memories on the minds of children.

Standardization of Environmental Education in Museums and International Trends

According to the definition by ICOM, the three main objectives of museums are Study, Education, and Entertainment. The fundamental difference between museums and other educational institutions is the goal of Entertainment in addition to Study and Education. Although Entertainment and Study may seem to be unlikely partners, it can't be denied that knowledge acquisition via an enjoyable means is a powerful tool. Museums based on real education and experimental education are the typical institutions. In a world where lifelong learning has become increasingly imperative, a chance to learn throughout all stages of life, particularly outside of the standard educational arenas, is indispensable. Museums can meet this rising need by supplying the framework for lifelong learning. It is also important to recognize that in complex fields such as Environmental Education which intertwine social and natural factors, the cooperation between national museums and other museums of varying sizes and types is instrumental in the effectiveness of each. At the 1995 International Council of Museums in Stavanger, Norway a powerful statement was made that to save the earth from a crisis, it is vital to take full advantage of the enormous archives that have been preserved in the 6,500 national museums around the world. The knowledge to be gained from such archives has the potential to induce powerful activities by groups of specialists and researchers. Therefore, activities should not be limited within museums. Instead, museums should be integrated into society while cooperating with administrations and NGOs. This objective is based on both the slogan of “Sustainable Development” from the 1992 United Nations Conference on the Environment and Development in Rio de Janeiro, Brazil, and on “Agenda 21”. The subtitle of “The Charter” announced at The Hague in the Netherlands in 2000 (“Values and Principles for a Sustainable Future”) also reveals that desirable museums of the future will play this crucial role. In light of recognizing the monumental future potential, Japan's museums aim to take part in Environmental Education at the global level, cooperating with the International Committees of ICOM.

Panel Discussion I

Standardization of Environmental Education Based on Environmental Philosophy
from Viewpoint of Deep Ecology

Freya MATHEWS
Professor, La Trobe University, Australia

The core of environmental ethics, historically speaking, is the distinction between anthropocentric and biocentric approaches to the natural world. Deep ecology was one of the first streams of ecological philosophy to enunciate this distinction. It challenged the anthropocentric premises of Western thought, and called for a rethink of basic assumptions regarding the human relation to the natural world. In particular it challenged the mind/matter, culture/nature dualism at the heart of the Western intellectual tradition.

According to Arne Naess, founder of deep ecology, a biocentric approach to the natural world is generated not merely by rational deliberation, emanating in an ethical code of conduct, but by a certain process of identity formation: through appropriate experiences in the more-than-human world, the human self comes to understand its inextricability from the rest of nature. It grasps that its own identity is a function of its relations with elements of its environment. The identity of the self, in other words, implicates and is implicated in the larger world. Appropriate attitudes to the environment flow from this expansion of self: the "ecological self" defends the rest of nature because in doing so it is really defending itself.

To follow the deep ecology approach would clearly have far-reaching implications for environmental education. Educators would need not only to put forward rational arguments - both ethical and instrumental - for protecting the natural environment. They would also need to provide students with opportunities for profound experiences of interconnectedness with the natural world. Deep ecology education normally involves taking students into wild or remote places where they can encounter "free nature", and experience their own emotional and psychic responses to it. These responses do indeed often seem to be potent, dislodging deeply entrenched anthropocentric attitudes and generating more biocentric attitudes in their place.

However, I argue that the deep ecology approach to environmentalism, and hence to environmental education, is itself residually dualistic. Although deep ecology tries to close the traditional Western divide between humanity and nature by insisting that humanity is part of nature, it is really, I argue, just reducing humanity to nature. Humanity is understood as being in nature, but nature is not understood as being in humanity, and hence in our technologies and industries and cities. This reduction of humanity to nature in deep ecology shows up in a preference for nature in its unaltered state, and hence in a hands-off ethos of basically letting nature be, free from human intervention. Although there is indeed an urgent need for nature reserves in the present era of drastically declining biodiversity, we also need a philosophy that enables us to work with nature in our practical lives. Such a philosophy must be truly non-dualist - and hence neither biocentric nor anthropocentric - since it must not conceive nature as entirely "outside" of us but must also enable us to find, and work with, nature in our technologies and industries and cities. The step to such a philosophy might be conceived as a step from deep environmentalism to deep sustainability.

In the remainder of this presentation I will outline, very briefly, one such "deep sustainability" position that seeks to break down the dualism that still infects deep ecology. I will then consider the agenda this position suggests for environmental education.

Panel Discussion I

Standardization of Environmental Education on Biochemical Education
from the Viewpoint of the Relationship between Life and Environment

Jariya BOONJAWAT
Associate Professor,
Chulalongkorn University, Thailand

In my opinion, guidelines for environmental education are based on “The Buddhist’s Life Standards [Matrathan Cheewit Khong Chao Phut]” to attain **the three fronts of objectives: for one’s own benefit, for other people’s benefit, and for the mutual or collective benefits including environmental conditions.** Using these objectives, the first step in environmental education should start with our universe and the solar system, in which, Earth, our home planet, is the only planet in our solar system known to harbor life in very diverse forms. How did life begin on Earth? Recent research indicates that microorganisms can survive short travel in a space shuttle and meteorite; therefore, the “**Panspermia Hypothesis**” posits that living cells or their precursors could have emerged on another planet (Mars?) or moon billions of years ago and then hitched a ride to Earth on a meteorite. Since then, the evolution of living organism proceeded from prokaryotes to small eukaryotes (3,800 -510 million years ago), and complicated plants and animals have evolved only during the past 570 million years. The primary forms of living organisms used energy ranging from solar radiation to chemical energy. Based on photochemical reactions, they produced organic compounds which were deposited on land and distributed in the ocean and which changed the Earth’s atmosphere to a more aerobic condition. Mammals appeared on Earth during the last 65 million years, and human beings separated from the great apes only 7 million years ago.

The clever *Homo sapiens* has been believed to be the sole human species on the earth for the past 25,000 years. This view, however, has been upended by the discovery of remains of a dwarf species of *Homo floresiensis* who lived 13,000 years ago on the island of Flores in Indonesia. They were called “**ebu gogo**” or “**orang pendek**” in Malay folklore, and their small size may have been due to a limited food supply on a small island. The ability of modern humans to make sophisticated stone tools changed their environmental conditions. Archeological evidence such as primitive arts, preserved bones and skulls, and dried seeds, indicates that the domestication of animals and cultivation of plants began thousands of years ago. Between 8000 and 1000 B.C., horses, camels, oxen, and various breeds of dogs (derived from the wolf family) were domesticated, and selective breeding soon followed. The cultivation of many plants, including maize, wheat, rice and date palm, began around 5000 B.C. Human awareness of heredity and the genetic manipulation of useful species were thus apparent during prehistoric times.

The origin of rice can be traced back to the time of Gondwanaland, 230-600 million years ago, before the earth split continents. *Oryza gramineae* was the wild rice species that spread through tropical Africa, South and Northeast Asia, Australia, and Central and South America. Wild rice cultivation began around 15,000 years ago and developed into rice farming when the human population increased around 10,000 years ago during the Neolithic Revolution. Based on archeological evidence, rice cultivation in the Southeast Asian region began in Northern Thailand, the Shan state of

Myanmar, and the adjacent area of Laos, where the monsoons, warm and humid climate, and fertile soil offered a suitable environment for *Oryza sativa* cultivation. The first variety of Asian rice ancestors that spread in the lowlands of the Yellow River of China was known as “**Sinica**” before spreading to Korea and to Japan, the so-called “**Japonica**”. The second variety, called “**Indica**”, grew in Southern India, Sri Lanka, the Malay Peninsula and the Yangtze River basin. The third variety, “**Javanica**”, grew in Indonesia and then spread to the Philippines and Japan. Rice cultivation has been associated with the wisdom of local irrigation, seed and food technology, social culture, and economy. Prominent land-use changes have been “changing from forest to rice ecosystem”. Rivers, canals and water reservoirs were made for rice farming, and rice became the strategy to establish the Kingdom, the law, and the international trading and communication systems. In Thailand, since the reign of Sukhothai, the king pays respect and honors the mother spirit of rice and performs many royal rituals for farmers, such as the Buddhist plowing ceremony and the Rain-Pleading ceremony. There are also many local rice rituals on the folk level.

Biochemical education and molecular genetics are considered very young sciences considering the fact that the 50th anniversary of the discovery of the double helix structure of DNA in 2003 coincided with the completion of the Human Genome Project (HGP). However, molecular biologists have long focused on just a small portion of DNA, the 2% that contains the blueprint for proteins, while the remaining 98% of human DNA was often dismissed as junk. Just recently the discovery of many hidden genes that work through RNA, rather than proteins, revealed the major role of these genes in regulating gene activities, as the “**riboswitch**”. The new big picture involves looking for active RNA-only genes in humans and other higher species. Applied research in biochemistry and genetics led to recombinant DNA and genetic engineering technology. Diseases related to genetic disorders have been diagnosed, and gene therapy began in 1990. DNA microarrays and genetic screening have been developed and have great benefits in the treatment of cancer and many genetic disorders. Alongside this rapid advancement of technology, profound legal, social and ethical issues have been raised. The Ethical, Legal, and Social Implications (ELSI) Program was established to address the concern in four areas: (1) privacy and fairness in the use and interpretation of genetic information, (2) how genetic knowledge should be transferred from research laboratory to clinical practice, (3) informed consent for participants in genetic research, and (4) public and professional education.

In the last decade, new products such as insulin production from bacteria, transgenic crop plants with herbicide resistance, edible vaccines, and transgenic animal hosts and pharmaceutical products, were produced using recombinant DNA technology. After the cloning of Dolly, cloning of farm animals became common, and the prospect of cloning human cells for therapeutic purpose is no longer a fantasy. The topic of human cloning has become *the* controversial topic and the challenge for regulation.

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Panel Discussion I

Standardization of Environmental Education on Biology from the Viewpoint of the Life-Chain:
All kinds of the organisms are connected each other through the genes

Hakobu NAKAMURA
Former President, Pan-Pacific Forum, Japan

Evolution of Life

The unit of life is a single cell and thus a multi-cellular organism such as a human consists of construction of multiple lives. The first life, proto-cell, was borne in the primitive sea of the Earth about four billion years ago. Therefore, all kinds of organisms are descendants of the most primitive single ancestor. This fact has been demonstrated by studies on genetics and molecular biology since the discovery of DNA by Watson and Crick (1953). We designate as evolution the historical development in morphologies, metabolisms, and functions in organisms on Earth. You can see the situation of the biological evolution of the life-chain the figure presented.

System of Biological Classification

All kinds of organisms have been classified since the start of the study of natural history under a standard unit “species”. The number of living species has been estimated as about 13 million species, although only approximately ten percent of them are taxonomically identified at present as shown below.

Phyletic lineage of the living organisms identified

	Plant world		Animal world
Angiosperumea	200,000 species	Invertebrata	200,000 species
Gymnospermae	600	Insect	750,000
Pteropsida	10,000	Pisces	23,000
Bryophta	20,000	Amphibia	2,000
Algae	20,000	Aves	8,700
Fungi	70,000	Mammalia	4,500
Bacteria	1,000		
Total	321,600		993,200

We humans belong to the system of Primates and thus we recognize that to be Primates means to have the special heads, brains. Some persons say that human beings are the lords of creation. However, evolutionary biology has clearly shown that (1) the evolution of the brain happened in stages because the evolutionary stage depends on a special state of genes, namely DNA structure, and the progression of a certain stage is started by a single or more mutation(s) of the gene(s), and (2) I have a theory that wide transfer of the useful information in the society, namely the Education.

Co-evolution and Mimicry

In the biological world there are many species of organisms which are living with more effective relationship among animals, plants, or animal and plant. For example, in many cases of flowering in the insect pollination, the pollination of a stamen with a pistil in the flower is conducted by a specific insect, and a fertilization between the male and female genes is then completed. Interestingly, both the flower and the insect are constructed to meet each other through a long process of evolution.

In mimicry, on the other hand, the form of oneself is modified to the dangerous other, or the former to the eatable latter. In nature, there are too many kinds of mimics to mention between animals and also among animals and plants. The phenomena creates a battlefield in nature.

DAY 2
Workshops

Workshop A

Development Process of Teaching Materials on Marine Environmental Education in Canada: Guidelines for Developing International Environmental Education Manuals and Programs

Coordinator

Gloria SNIVELY

Professor, University of Victoria, Canada

During the last three decades, much has been written about the global need for environmental education in general, and the local need for teacher training in environmental education. Perhaps the first significant event leading to global recognition of this was the first intergovernmental Conference on Environmental Education in 1977, sponsored by UNESCO in Tbilisi, USSR. The final report stated that teacher training in environmental education (EE) was considered to be a priority activity. Yet, almost three decades later world wide teacher training in environmental education is scarce at best.

Filho (1993) identified seven problems faced by both “developed” and “developing” countries trying to implement environmental education programs. These problems are summarized below:

- a lack of government and institutional support for the development of teacher training courses in EE;
- the presence of a great diversity of concepts, theories and ways of doing EE, presenting it as a complex confusing area of study;
- a lack of materials and support, especially in developing countries;
- the need to encourage communication networks, exchange of information, programs, and experiences at national and international levels;
- a lack of information about the environment in an accessible form for teachers;
- the need for greater awareness, commitment and involvement of the scientific community in all aspects of EE;
- the competitive public/state educational exam system in many countries, which does not recognize EE, gives no credit for field work, and discourages “extra-curricular activities”.

In reviewing curriculum materials worldwide, it becomes increasingly apparent that the traditional curriculum in most countries is geared towards learning facts, passing exams and getting into university or getting a good job. Care for the environment and citizenship easily becomes marginalized due to the competition for curriculum time from other established subjects. Environmental educators have experienced great difficulty in finding curriculum time for even a little environmental education, let alone the whole spectrum of approaches that a sound environmental education curriculum requires.

The challenge for educators is to match activities and curriculum materials with the periods of development in childhood. First, children need to develop empathy for the creatures of the natural world. Next they need safe opportunities to explore their sense of place—their urban and rural landscapes. Then they need opportunities to work on problems in their local communities, and last opportunities to explore problems of global proportions.

An appropriate and responsive curriculum must inform students about the earth's complex ecological system, of important resource issues, of cultural sensitivities, and of the values that we associate with environmental issues. Strategies must be found for helping students make reasoned judgments at both the personal and the societal levels in a fast changing, interdependent world.

The task of developing an appropriate course for EE for teachers globally is enormous, and for all intents and purposes, impossible, given the scope of such a task and the very real differences and needs in teacher education programs around the world. As Filho and Hale (1992) noted, “Environmental education must develop inside countries, it cannot be imported from outside”. And as Staniforth (1995), noted: “It is

impossible to impose a single core course or set of strategies for educators on the myriad of countries, cultures, local environments, and learning situations”.

Good environmental education is experiential and personal, it comes from involvement at the community level and from within oneself, and must be designed with learner’s experiences, background and culture as integral components.

Contrary to what many people think, environmental education is not tied solely to the science curriculum, it cuts across all subject areas including language arts, social studies, mathematics, the arts, economics, geography, history, economics, business, law, and cultural studies.

This workshop presents guidelines to help teachers plan for successful environmental programs, and provides sample examples of existing environmental activities and courses for students at the primary, intermediate and secondary grade levels. It encourages the identification and articulation of key environmental concepts, skills, attitudes and behaviors. It describes how to write environmental concept statements, measurable learning outcomes, teaching procedures, and evaluation methods.

The guidelines are for curriculum developers, teachers, educators at colleges and universities, and other educators who work with school students. Teachers are encouraged to facilitate local needs and develop cultural relevance in courses through the integration of local examples and relevant environmental issues. Innovative teaching strategies such as creative and critical thinking skills, hands-on discovery, guided fantasies and cooperative learning activities facilitate environmental understandings.

If we want our children to take up the all-important challenge of working to sustain both human communities and the environment we must encourage them to experience nature and value it positively. We must also model interest in understanding and protecting complex natural systems locally and globally. Schools need to offer opportunities for students to study, reflect upon and discuss possible, probable and preferred futures. A student exploring new perspectives, alternative versions of the past and future, inevitably begins to critically examine his or her assumptions, values and behavior.

When addressing environmental issues, teachers are encouraged to think about five questions. First, what environmental problems are confronting the community? The country? Second, which problems are most significant to the country? The students? Third, will the students be able to solve the problem, or contribute towards solving the problem? Forth, what problems are appropriate for the grade level (the age level)? Fifth, what information and skills do the students need to have so they will be able and motivated to work towards solving the problems?

As educators, you possess the power to change lives and serve as role models for your colleagues and students. I hope you find this presentation helpful, and wish you much success.

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Workshop B

Demonstration of Environmental Education Using On-line TV-net Meeting System:
Application of a TV-net Meeting System through the Internet for
ESD (Education for Sustainable Development)

Coordinator

Kazuyuki MIKAMI

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On the grounds of the progress of information technology using the internet, the possibilities of educational methods in schools seem to be spreading. Especially, the Internet TV-meeting system makes a marked advance in offering high quality and large capacity at a high speed as we can now quickly transmit animated pictures. The biggest advantage is the cost is much less to use a television circuit than to use a telephone circuit. And, the operating methods are easier than before.

On the other hand, in terms of the integrative study in schools the support from universities, institutes, facilities and specialists of various fields is required. While having an active international exchange, we can trade raw data in real time, and communicate with each other more closely. Above all, the TV net-meeting system via the internet is available as educational methods.

In this project, we study the possibilities and the tasks of a TV-meeting System based on a case study between Omose Elementary School, Kesen-numa City and The Affiliated Elementary School, Miyagi University of Education.

Keynote Speech

Keynote Speech

Guidelines for Environmental Education in Canada and Manuals on Capacity Building :
Environmental Education Principles that Ensure Coexistence between People and Nature

Gloria SNIVELY
Professor, University of Victoria, Canada

Recognition that humankind is integrally connected to planet-wide systems is critical to our survival on earth. This presentation illustrates some of the connections that people have with the planet and challenges environmental educators to promote this concept in their programs. The point is made that we must be equally concerned with the human element as well as the non-human aspects of nature. This approach stresses respect for all forms of diversity: personal, cultural and ecological. The challenge set forth to educators is to comprehend the key connections that exist among people, trees, rocks, fish, crabs, and other entities and to design more effective programs that help students develop personal environmental ethics of ecological harmony which is probably our only hope for achieving both sustainable cultures and sustainable environments.

But just as our understanding of environmental connections and environmental ethics is vague and ambiguous, we need to establish a set of principles for environmental education. The principles outlined in this paper help us to get at the roots of the environmental crisis and require us at both the local and global levels to make fundamental ecologically responsible changes in education programs, curriculum materials and in our personal lives. The situation is serious and our response must be equally serious and perhaps even fearless. We are now obliged to examine certain modern values and, as well, we must face the possibility of providing leadership that will help to bring fundamental change into our modern cultures.

The following principles are intended to help teachers design units of study that foster coexistence between people and nature.

Direct Experience. Provide students with direct experience with the environment. Such opportunities help provide a deeper understanding of natural systems and the impact humans have on those systems.

Aesthetic Appreciation. Awaken in students a sensitivity to the beauty and value of natural environments.

Complex Systems. Accurately and adequately describe the various ecosystems, making connections to global systems. Teach basic ecology concepts such as habitat, life cycle, food chain, energy flow, interdependence, adaptation, limiting factors, endangered species, loss of habitat.

Interdependence. Human well being is inextricably bound with environmental quality. Humans are part of the natural order. We and the systems we create -- our societies, political systems, economies, religions, culture, technologies -- impact the total environment. Since we are part of nature, rather than outside of it, we are challenged to recognize the ramifications of our interdependence.

Actions Have Consequences. Human decisions and actions have environmental consequences at the local, national and global levels.

Responsible Action. Provide opportunities for students to decide what constitutes responsible action toward the environment and begin to practice it.

Environmental Ethic. Education must help develop an ethical awareness of all forms of life with which humans share this planet, respect all life cycles and impose limits on humans' exploitation of other forms of life.

Diversity of Viewpoints. Support students to identify and articulate their own viewpoints and the viewpoints of others. Making reasoned decisions and taking responsible action requires an examination of values.

Cultural Sensitivity. Depict with sensitivity and accuracy the diverse cultures, subgroups, philosophies and practices of the various global peoples. Acknowledge the contributions of indigenous cultures to modern science and to long-term sustainability. Knowledge proven effective over long periods of time can be extremely important.

Nature of Science. Address both the real opportunities and the false expectations for managing our marine and aquatic resources through advances in science and technology.

Critical Thinking and Problem Solving Skills. Emphasize the complexity of environmental problems and thus the need to seek information and develop answers to questions. Teach skills for gathering and organizing information such as observing, questioning, inferring, predicting, mapping, measuring and recording, building models, adapting, evaluating.

Home Place. Begin close to home, learners need to make connections with, explore, and understand their immediate surroundings. These understandings provide a base for moving out into larger systems, broader issues, and an expanding understanding of causes, connections, and consequences.

Global Understandings. Knowledge about major global conditions, trends and developments, sources of power and wealth, the dynamics of conflict and co-operation, and a capacity to reflect on long-term trends and developments.

Cooperative Practice. Engage students in individual and group work that involves collaborative situations that require learners to listen to the ideas of others, respect different opinions, and work cooperatively to generate and carry out a plan of action.

Communication Skills. Learners should use many forms of communication to communicate their understandings and express ideas and conclusions; ranging from oral and written communication to theatre, and from dance and music to the visual arts.

Teach a Reverence for the Past and the Future. There is a constant interplay between past, present, and future. Our present is shaped by our past and is also informed by our hopes and expectations for the future. Engage students in thinking about possible and preferred futures, and encourage a positive outlook.

The principles outlined in this paper do not describe an ultimate curriculum, but a philosophy for multilevel cooperative and practical curricula and actions. It enables us to get at the roots of the environmental crises in our own particular places and selves. It requires that we make fundamental ecologically responsible changes in educational programs, curriculum materials, and in our personal lives. If we formulate educational policies and actions guided by these principles, we will help to further a local and global program of studies for cooperative solutions to social and environmental problems.

Panel Discussion II

Panel Discussion II

Common Materials for Environmental Education in the Asia-Pacific Region

Coordinator

Fumiaki TANIGUCHI

Director, General Institute for the Environment,
Konan University, Japan

The theme of Panel Discussion II is: “Common Materials for Environmental Education in the Asia-Pacific Region” regarding the outcomes of Panel Discussion I, “Toward Standardization of Global Guidelines for Environmental Education,” and Workshop A: “Development Process of Teaching Materials on Marine Environmental Education in Canada,” and Workshop B: “Demonstration Using On-line TV-net Meeting System of Environmental Education: The Development of e-Learning between Universities”.

This panel discussion aims at establishing common materials for environmental education according to the themes of: “Materials for Environmental Education in Thailand: Regarding a Concept of Life,” “Materials for Environmental Education in Australia: Regarding Environmental Ethics,” and “Materials for Environmental Education in India: Focusing on Environmental Education Pro-Active Actions”.

In addition, Prof. Siriwat SOONDAROTOK and his colleagues present “Sustainable Agriculture” by using the TV-net system from Phranakhon Rajabhat University in Thailand.

E-Learning with TV-net meeting system is available for promoting environmental education at global and local levels. Both Workshop B and this Panel Discussion include a demonstration of using the internet and the TV-net meeting system to connect between Japan and Thailand in real time.

We would like to formulate common words and materials for environmental education following the outcomes of the Day 2 and looking towards Day 3, “International Study Meeting”. In the end, through the standardization of specific terms into common words and the sharing of common materials, we will achieve global guidelines for environmental education based on environmental ethics.

Procedure of Panel Discussion II (the first half: 70 min. /the latter half: 120 min. / total 190 min.)

Consecutive Interpretation

14:30-14:40	(Coordinator) Fumiaki TANIGUCHI	(10 min.)
	Procedure of Panel Discussion II (Presentation by panelists)	
14:40-15:10	Jariya BOONJAWAT	(30 min.)
	<i>Materials for Environmental Education in Thailand: Regarding a Concept of Life</i>	
15:10-15:40	Freya MATHEWS	(30 min.)
	<i>Materials for Environmental Education in Australia: Regarding Environmental Ethics</i>	
15:40-15:50	Tea Break	(10 min.)
15:50-16:20	Rajib SHAW	(30 min.)
	<i>Materials for Environmental Education in India: Focusing on Environmental Education towards Pro-Active Action</i>	
16:20-16:50	Siriwat SOONDAROTOK	(30 min.)
	Laddawan KANHASUWAN / Chinatat NAGASINHA	
	<i>Materials for Environmental Education in Thailand: Agriculture and Sustainable Development</i>	
16:50-17:30	Discussion	(40 min.)
17:30-17:50	Fumiaki TANIGUCHI	(20 min.)
	General Summary	

Panel Discussion II

Materials for Environmental Education in Thailand:
Regarding a Concept of Life

Jariya BOONJAWAT
Associate Professor,
Chulalongkorn University, Thailand

Since 1978, Environmental Education has emerged in the curricula of the Thai educational system. Courses are offered during the six years of basic primary schooling curricula, during the three years of lower secondary education for those students who plan to enter directly into special occupations, and during the three years of upper secondary education for those students who wish to enter higher education or a university. Efforts to raise the overall educational standards of the nation to meet modern development needs have resulted in the expansion of basic education from the previous minimum of six years to the current minimum of nine years. At the university level, "Man and Environment" seems to be a popular course offered for basic and general education. Recently, environmental management for sustainable development is another issue of great concern. Problems related to waste management, water resource management, and air pollution have become related topics in environmental education. Green and clean technologies have been introduced in the fields of science and technology. Regarding the concept of life, human health and quality of life are the focus in both rural and urban areas, with emphasis on the control of infectious diseases such as malaria, tuberculosis, and typhoid, alongside with the prevention of HIV/AIDS, SARS, and bird flu.

Through enhancement of social welfare and physical fitness programs, environmental education related to public health includes instruction in nutrition, biochemistry, food technology, and life style to prevent people from drug addiction, smoking, obesity, diabetes, heart disease, and cancer.

At the regional level, the South-East Asia Ministers of Education Organisation (SEAMEO) has engaged in close consultation with the ASEAN Committee on Education (ASCOE) and ASEAN University Network (AUN) to promote ASEAN awareness and solidarity among education institutions. The exchange among the AUN of materials for environmental education on regional environmental issues focuses on: forest fires and haze, nature conservation and biodiversity, management of coastal and marine environment, and, last but not least, biomedical technology.

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Panel Discussion II

Materials for Environmental Education in Australia:
Regarding Environmental Ethics

Freya MATHEWS
Professor, La Trobe University,
Australia

In my first presentation I spoke about the deep ecology approach to environmental ethics. I explained how such an approach in environmental education includes an experiential dimension: students are typically taken into wild or remote places in order to experience their interconnectedness with larger ecological realities. The deep ecology educator intends this experience of interconnectedness to produce a sense of ecological selfhood, from which environmental attitudes will flow spontaneously.

The deep ecology approach does not have particular resonance in Australia, since vast areas of Australia are sparsely populated, due to arid conditions. Wild and remote places thus already figure prominently in the national psyche. Although there is little in the way of an organized deep ecology movement in Australia, contemporary Australian culture is full of themes that might be described as ecospiritual, inasmuch as they are concerned with the profound effect of land and landscape on the identity of both indigenous and non-indigenous Australians. Yet this preoccupation - it is almost a national obsession - with mythopoetic issues of land and identity is by and large not reflected in environmental practice in Australia.

Environmental management is generally insulated from the wider community and culture, and dictated by purely instrumental considerations. Even the resulting policies of "resource conservation" are generally compromised by short term economic motives. There is, in other words, a disjunction in Australia between culture, which is pervasively ecospiritual, and techno-environmental management, which is the province of the economy. A mythopoetic ecology without technical and economic means is, of course, mere romanticism. But techno-environmentalism without mythopoetic feeling for the land is powerless to ignite the imagination - or mobilize the political will - of society.

Environmental education in Australia needs to address this disjunction. CERES (Centre for Education and Research in Environmental Strategies), an environment park in Melbourne, provides a case study in a form of community environmental education that integrates techno-environmentalism with mythopoetic ecology. I also look at curriculum materials in Australian schools that address the disjunction.

Panel Discussion II

Materials for Environmental Education in India: Focusing on Environmental Education towards Pro-Active Action

Rajib SHAW
Associate Professor,
Graduate School of Global Environmental Studies
Kyoto University, Japan

Background

The United Nations Conference of Human Environment in Stockholm in June, 1971 was one of the pioneering events to discuss the environment issue globally. Two specific recommendations were: 1) the creation of United Nations Environment Programme (UNEP), and 2) the development of a foundation framework for cooperative efforts through raising environmental awareness. As a natural choice, environmental education is considered the most important vehicle to enhance the awareness. In order to develop knowledge, skills, values, attitudes and awareness relevant to environment, education plays an important role. The environment and the experiences of the children outside the school vary from place to place. Therefore, school education plays an important role in providing a homogeneous base of environmental information for the students. Needless to say, school education helps to establish the base of the environmental issues, which requires further development through practicing the acquired knowledge in daily life.

Environmental Education: Concept and Characteristics

“Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his bio-physical surroundings. It also entails practice in decision-making and self-formulation of code of behavior about problems and issues concerning environmental quality.”
UNESCO Working Committee (1970)

Following are the main characteristics of environmental education (Srivastava, 2004):

- It refers to the knowledge and understanding of physical, biological, cultural and psychological environments, and the perception of their relevance to real life situations.
- It identifies the imbalances in the environment and tries to improve it in view of sustainable development.
- It entails practice in decision-making and self-formulation of a code of behavior regarding problems and issues concerning environmental quality.

- It involves people's investigation and systematic exploration of their own natural and social environment in order to prepare themselves to solve problems and improve quality of life.
- It develops skills, attitudes, feelings, and values needed to play productive roles in improving lives and values.
- It provides the basis for construction and creative skills for the practice of healthy living and improvement.
- It is problem-centered, interdisciplinary, value and community oriented, and is concerned with people's survival and development. It concerns both the present and the future.
- It utilizes educational approaches, methods, and techniques of teaching to identify the real causes of environmental problems and to practice problem-solving skills in formal and non-formal situations.
- It is a process of recognizing the interrelatedness among people and their cultural and biological surroundings.
- It involves both theoretical and practical approaches to the environment in order to remedy the imbalances and prevent further deterioration or pollution of it.
- It appears to be a process that equips human beings with awareness, skills, attitudes, values, and commitments to an improvement of the environment.

Environment Education in India

In India, an environmental education curriculum is in place from the primary level to higher education.

- Primary education (age group 6 to 10): Here, the emphasis is mostly on building up awareness, which is followed by real-life situations and conservation. The goal is to sensitize children to the environment.
- Lower secondary education (age group 10 to 16): The focus is more on real-life situations, conservation, and sustainable development. The objective is to enhance the skills of problem identification.
- Higher secondary education (age group 17 to 18): Here, the emphasis is on conservation and assimilation of knowledge, problem identification, and action skills.
- College education (age group 19 to 21): At this level, the main emphasis is on knowledge regarding sustainable development based on experiences with conservation and real-life situations.
- University education (age group 19 to 24): At the university level, there are options of environmental engineering, conservation and management, environmental health, and social ecology. Broadly, these are categorized as: environmental studies (social sciences), environmental science (physical and natural sciences), environmental engineering, and teacher education programs.

In school education, NCERT (National Council of Education, Research and Training) has been playing a vital role in designing syllabi, text, books, and teaching materials. In university education, it is the University Grants Commission (UGC) who dictates the syllabus. There are also informal education processes, in which government and non-government organizations play important roles through adult education, rural youth education, children's activities and clubs, eco-development camps, etc. The Center for Environmental Education (CEE), a national center formed by the Ministry of Environment of Government of India, plays an important role in both formal and informal environmental education in India.

Towards Standardization: Contents versus Process

The standardization of environmental education is best known as "Kids ISO 14000", which is a set of standard educational materials for different levels of education aimed at primary, middle high school, and upper high school students. The most characteristic part of the Kids ISO is the promotion of environmental actions while linking education to such actions. Certification from ISO, UNEP and UNU are also valuable additional incentives to the students.

While discussing the standardization process, it is necessary to keep in mind the wider cultural, social, and geo-political issues around the Asia and the Pacific region. There is a strong need to standardize the process of environmental education rather than the contents of it. A standard process of environmental education will be helpful to different countries in developing their own content and to unify the process to monitor and review the educational impacts on the children.

Proactive Action: Education versus Learning

The crucial issue of environmental education is the gap between knowledge and practice. Over the past 30-40 years, there has been significant development in the knowledge base of environmental issues. However, when it comes to applying this knowledge, there still remains a significant gap. "School Education", in the strict sense cannot fill this gap. Instead, there needs to be an emphasis on "learning" which should involve family, the community, and self-learning. The key emphasis is on "learning by doing", in which pro-active steps should be taken in real-life scenarios. Only then can environmental education achieve its goal and objective.

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Panel Discussion II

Materials for Environmental Education in Thailand:
Agriculture and Sustainable Development

Siriwat SOONDAROTOK

Director, Environmental Education Center,
Phranakhon Rajabhat University, Thailand

Laddawan KANHASUWAN

Specialist, Environmental Education Center,
Phranakhon Rajabhat University, Thailand

Chinatat NAGASINHA

Vice Director, Environmental Education Center,
Phranakhon Rajabhat University, Thailand

Agriculture was the most important occupation in Thailand for a long time. The way to transfer agricultural knowledge was to pass it down from generation to generation in a family. Formal education was aimed solely at the ability to read and write. After World War II, Thailand was opened to development by the West. Agriculture also changed from production for family and the community to large-scale production. The easiest way to increase agricultural production was to increase the amount of farmland. Deforestation was a means of achieving this, and the amount of forested land in Thailand was dramatically reduced. In 1960, forested land accounted for 60% of the total land area of Thailand; by 2005, this was down to just 25%. Deforestation was followed by the introduction of agricultural technologies. Chemicals such as herbicides, insecticides, and chemical fertilizers were widely used in order to increase the yield.

Deforestation and the use of agricultural chemicals proved to be the joint causes of the ensuing problems. First, the ecological balance was lost which affected the weather and also caused epidemics of pests and weeds. Second, the quality of life was decreased because of the chemical residue in food, which caused serious diseases such as cancer. Third, social stress was increased as the needs of the people changed from food to money. Thailand started developing industries, and people from the agricultural sector moved into this new industrial sector. This transfer of the workforce increased the use of machinery, which in turn affected the cost of production as petrol prices were changed dramatically. Foreign laborers were imported to replace Thai labor and caused many social problems. The number of foreign laborers in Thailand is estimated at more than two million.

The education in Thailand separated into 5 levels:

First level: year 1 to year 3.

Second level: year 4 to year 6

Third level: year 7 to year 9.

Fourth level: year 10 to year 12.

Fifth level: University.

Compulsory education includes the first and second levels and will be expanded to the fourth level in the future. Environmental education was integrated into the sciences curriculum and focuses on the surroundings of the student. During 2002-2004, the Department of Education worked on a project to increase the strength of environmental education in schools and prepared workshops for teachers focusing on sensory awareness and skills, problem solving, recording data and analysis, and solving community environmental problems. Examples of such workshops are as follows:

- A water detection project to train students to learn about the organisms in water and use those organisms as an index of water quality.
- A project revolving around the ecological system of the paddy field in order to study rice and all living things in the paddy field.
- The study of the ecological system of the forest, urban study, and also wildlife study.
- The projects involved an exchange of teachers from different environments and allowed those teachers to use the experiences gained in the exchange to teach their own students.

Moreover, a national network of environmental education was established. This network worked in concert with the Ministry of Education, the Ministry of Environment and Natural Resources, and the private sector.

Unfortunately, environmental education is not a popular topic for students because most of the students are interested in occupations that can guarantee a high income such as medicine, engineering, and architecture. Environmental education is just another subject in class which the students must study to graduate.

Profile

Keynote Speaker/Panelist



Shiro NAKAGAWA

Educational Background

D.V.M Veterinary Medicine Dept., Graduated Utsunomiya University, 1957

Professional Career (Including Position)

- | | |
|------------|--|
| 1962-1968 | Chief Veterinarian Ueno Zoological Garden, Tokyo |
| 1968-1969 | Study at London Zoological Society ,G.B |
| 1971-1974 | Curator of Animal Keeping Dept, Ueno Zoological Garden |
| 1974-1984 | Curator of Animal Keeping Dept, Tama Zoological Park, Tokyo |
| 1984-1987 | General Director of Tama Zoological Park, Tokyo
Vice Chair of Japanese Association Zoo & Aquariums
A member of International Zoo Director Association
A Board member of WWF Japan |
| 1987-1993 | General Director of Ueno Zoological Garden, Tokyo
Chair of Japanese Association Zoo & Aquariums
Vice President of Japanese Association of Museums |
| 1994 -2005 | Director of Ibaraki Nature Museum (-June 2005)
Director, emeritus of Ibaraki Nature Museum
President of Japanese Association of Museums
A Board member of WWF Japan
A Member of Nature Conservation Council of Environmental Agency
Visiting Professor of Tokyo University of Agriculture |

Field

Zoology; environmental education

Keynote speaker/Coordinator



Azizan BAHARUDDIN

Educational Background

BSc Hons Biology, University of Tasmania, 1978

M.Sc Philosophy of Science, University College London, 1979

Ph.D History and Philosophy of Science (science and religion), University of Lancaster, 1989

Professional Career (Including Position)

She is currently a professor at the department for Science and Technology Studies, as well as the Director at the Centre for Civilisational Dialogue, University of Malaya. Thus far she has published about 10 books and 90 articles in the areas mentioned. In the field of environmental education and

ethics, her most recent publications include:

- (i) Richard Foltz, Azim Nanji, Azizan Baharuddin (eds.). 2003. *Islam and Ecology: A Bestowed Trust*. University of Harvard Press.
- (ii) Azizan Baharuddin (ed.). 2002. Proceedings of the Japanese Society for the Promotion of Science Workshop on Environmental Ethics, Regulation and Education. 7-8 January 2002. Universiti Malaya, Kuala Lumpur.
- (iii) Azizan Baharuddin (2001). *The Role of Dialogue of Civilizations in Peace Education*. Proceedings of First SEACSN Malaysian National Workshop. 7-9 November 2001. pp. 41-42.
- (iv) Azizan Baharuddin. 1996. *Youths, Values and Development*. Yayasan Kobena, Kuala Lumpur.
- (v) Azizan Baharuddin (ed.). 1995. *Environment and Development: Ethical and Educational Considerations*. Institute for Policy Research, Kuala Lumpur.

Azizan is also actively involved as a consultant for various government, ministries and NGO's in projects/areas related to her field of interest.

Field

The impact of science on society, science and religion; environmental ethics; inter-religious and inter civilisational dialogue

Keynote speaker/Coordinator



Fumiaki TANIGUCHI

Educational Background

BA Economics, 1969, Konan University, Japan

MA Philosophy & Ethics, 1977, Osaka University, Japan

Professional Career (Including Position)

1993-present Trustee, Japan Academy for Health Behavioral Science

1995-present Philosophy Professor, Konan University

1997-present Honorary Visiting Professor, The School of Education, HEBEI University, China

1998-present President, Association of Earth-Environment and Global Citizen

2000-2005 Secretary-General, the Japan Society of Environmental Education

2000-present Honorary Visiting Professor, Center of Environmental Science, Peking University, China

2004-present Director, The Environmental Education Committee of Environmental Council of Hyogo Prefecture

2005-present Director, General Institute for the Environment, Konan University

Field

Environmental ethics; bioethics; environmental education

Keynote speaker/Coordinator



Gloria SNIVELY

Dr. Gloria Snively is an Associate Professor in the Faculty of Education at the University of Victoria, Canada where she teaches science, environmental and marine education; as well as graduate level research courses. She is the Director of the Environmental Education Graduate Program at the University of Victoria. Her professional interests include curriculum development, qualitative research methods, and metaphorical learning theories.

She was a primary, intermediate and junior high school teacher, and for the past 35 years she has conducted nature workshops with schools and groups. Her best selling field guide *Exploring the Seashore in British Columbia, Washington, and Oregon*, 1978 is now in its 11th printing. She has published several marine education curriculum books and numerous professional and research articles. Her interests include giving natural history talks and walks to teachers, park interpreters and community groups; and, of course, exploring seashores firsthand.

Dr. Snively has a strong interest in Aboriginal education and has taught curriculum development and conducted workshops with Aboriginal communities on environmental, marine education and cultural projects. She is particularly interested in the ecological, political, cultural and conceptual problems specific to rural and urban environments where elements of our society are locked in debate and struggle. She is the co-principal investigator for the Aboriginal Knowledge and Science Education Research Project, funded by the Aboriginal Enhancements Branch of the Ministry of Education. The main purpose of the project is to determine why Aboriginal students are under-represented in high school science classrooms, to find ways to significantly improve their involvement and achievement in both elementary and high school science leading to post secondary, and to encourage Aboriginal people to consider science related occupations.

Field

Environmental education; marine education; Native Indian education; global education

Coordinator



Kazuyuki MIKAMI

Educational Background

BA Education, 1970, Yokohama National University

Ph. D. 1976, Tohoku University

Professional Career (Including Position)

1983 Research Fellow of Alexander von Humboldt-stiftung, Germany

2000-2005 Director of Environmental Education Center of Miyagi University of Education

Present Professor of Environmental Education Center, Miyagi University of Education, and concurrently principal of the

Affiliated Elementary School, Miyagi University of Education.
Field of study: (1) Research on development and utilization of teaching materials for environmental education, and (2) Developmental genetics on protista of inland waters and its application for environmental education.
College class in the MUE: Environmental science, Environmental Education etc.,
Graduate course: Methods for Environmental Education, Biology, etc.
Award: The award of the Japanese Society of Protozoology (1995).
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Field

Environmental education and developmental genetics

Panelist



Freya MATHEWS

Freya Mathews is an Associate Professor of Philosophy and Environmental Enquiry at La Trobe University in Melbourne, Australia. She has published widely in the field of ecological philosophy, particularly ecological metaphysics and its implications. Her books include *The Ecological Self* (Routledge, 1991), *For Love of Matter: Towards a Contemporary Panpsychism* (SUNY, 2003) and *Reinhabiting Reality: Towards a Recovery of Culture* (SUNY, 2005). She is co-editor of the on-line journal *PAN (Philosophy Activism Nature)*.

Outside of the university she has been active in disseminating ecophilosophical ideas in the community and she served for a time as "community philosopher" at CERES (Centre for Education and Research in Environmental Strategies), a visionary environment park in Melbourne.

Field

Ecological philosophy; philosophy of place;; indigenous philosophy; Taoism

Panelist



Jariya BOONJAWAT

Educational Background

BA Science, 1968, Chulalongkorn University
MA Science (Biochemistry), 1970, Mahidol University
Ph.D. Biochemistry, 1974, Mahidol University

Professional Career (Including Position)

1975 Lecturer, Department of Biochemistry, Faculty of Science, Chulalongkorn University, Bangkok, Thailand .
1977 Assistant Professor, Department of Biochemistry.
1981 Associate Professor, Department of Biochemistry.
1981-1983 Director of Graduated Studies, Faculty of Science, Chulalongkorn University .
1984-1988 Head, Department of Biochemistry, Faculty of Science, Chulalongkorn University.
1990-1991 Chairperson, Biochemistry Branch, Science Society of

1993-1995 Thailand under the Patronage of His Majesty the King.
 IGBP National Committee.
 1995-1996 Interim Technical Director of SEA START RC.
 1996- 2000 Director, Southeast Asia START Regional Centre [START:
 Global Change System for Analysis, Research and Training]
 c/o Environmental Research Institute, Chulalongkorn
 University .
 1997- 2002 International Global Atmospheric Chemistry (IGAC)
 Scientific Steering Committee (SSC) of the International
 Geosphere Biosphere Programme (IGBP)
 1998-2005 Coordinator: TJTTP-JBIC Research Profile 6: Utilization of
 Natural Rubber
 2003-2005 Scientific Planning Group (SPG) of Asia Pacific Network
 (APN) for Global Change Research

Field

Environment and others

Panelist



Hakobu NAKAMURA

Educational Background

MA Science, 1958, Natural Science, Graduate School of Kyoto University
 Ph. D. Science, 1961, Graduate School of Kyoto University
 1968 - 1969 Palo Alto Medical Research Foundation,
 California, USA, Studied Molecular Genetics.

Professional Career

1958 - 1999 Faculty of Science, Konan University, Teached Molecular
 Biology.
 1972 Professor of Konan University
 1999 Emeritus Professor of Konan University

In Konan University Age

Assist of President of Konan University, Dean of Faculty of Science, Chairman
 of Konan University, President of Pan-Pacific Forum and others.

Publications Professional Papers : more than 230 .
 Professional Books : more than 40 .

Field

Biology

Panelist



Rajib SHAW

Educational Background

MA 1997, Yokohama National University

Ph. D. 1999, Osaka City University

Rajib Shaw is currently an Associate Professor in the Graduate School of Global Environmental Studies of Kyoto University, Japan. A graduate of Yokohama National University, and Osaka City University, he joined a private consulting firm in Tokyo, and worked for the overseas projects of Japanese ODA (JICA) and United Nations. He then worked for the United Nations Centre for Regional Development (UNCRD) from 1999 to 2004 before joining Kyoto University. Rajib Shaw worked within different contexts in developing countries in Asia for several UN projects, working closely with the local communities, NGOs, governments and international organizations. Beside UNCRD, he has worked closely with different UN agencies and development banks. His main expertise is on environment and disaster management, and his research interests are: community based risk management, urban risk management, development learning (risk education) and climate change adaptation. He has written more than 40 papers in national and international journals, and edited more than 10 volumes.

Panelist



Siritwat SOONDAROTOK

Educational Background

BA Science, 1975, Kasetsart University

MA Science, 1981, Kasetsart University

Certificate in media development San Hose University USA

Environmental Education from University of Strathclyde in Glasgow Scotland

Professional Career (Including Position)

1979-1980 Training in agriculture from Oregon State University USA

1971-1981 Lecturer at Nakhonsawan Teachers College

1982 Study tour in environmental education at New South Wales Australia

1983 Study Tour in environmental education in Japan

1982-1986 Deputy head of department of agriculture at Nakhonsawan Teachers College

1989-present Lecturer in department of agriculture at Phranakhon Rajabhat University

2002-present Head of Environmental Education Center, Phranakhon Rajabhat University

Field

Environmental education; agriculture

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