



**CRI/ICEIT
NEWSLETTER**

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Chalabhorn Research Institute

INTERNATIONAL CENTRE FOR ENVIRONMENTAL AND INDUSTRIAL TOXICOLOGY (ICEIT)

CRI's ICEIT has been designated as a
"UNEP Centre of Excellence for Environmental and Industrial Toxicology".

**"The UNEP Gold Medal...a tribute to
the renowned work of Their Majesties
the King and the Queen..."**



His Majesty King Bhumibol Adulyadej receives the UNEP Gold Medal of Distinction from UNEP Executive Director Mostafa Tolba at Chitralada Palace.

UNEP Executive Director Mostafa Tolba presented the UNEP Gold Medal of distinction to Their Majesties King Bhumibol Adulyadej and Queen Sirikit. He paid a tribute to Her Majesty the Queen for her "outstanding, successful and notable" efforts to improve the quality of life of the rural Thai people. The following is Dr. Tolba's citation honouring Her Majesty the Queen, delivered during the opening ceremony of the Second Princess Chalabhorn Science Congress on 2 November 1992.

Your Majesty Queen Sirikit of Thailand,

It is indeed a great honour and special privilege for me personally, and on behalf of the United Nations Environment Programme, to have this opportunity to pay a special tribute to Your Majesty for the exemplary and outstanding dedication Your Majesty has devoted to the enhancement of the quality of the environment and in promoting nature conservation in the Kingdom of Thailand. The long and unceasing work of the Royal Family of Thailand, led and exemplified by His Majesty King Bhumibol of Thailand in various fields, including the many aspects related to the environment, natural resources and nature conservation, is recognised and

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"The UNEP Gold Medal...a tribute to the renowned work of Their Majesties the King and the Queen..."

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appreciated. This Congress itself, held in commemoration of the fifth cycle anniversary of Your Majesty's birthday underscores the inter-linked and reinforcing activities of the Royal Family of Thailand.

The many projects and programmes inspired and implemented by Your Majesty has given encouragement, hope and action oriented example in the field of nature conservation and environment.

Your Majesty's profound concept of Pah-Rak-Nam (Forest-Loves-Water) and the integrated ecological, social and economic strategies for the rehabilitation of deforested land, as well as protecting forests, have provided many benefits to the people, particularly in the rural areas. Sustainable livelihoods

have been generated, traditional skills and knowledge preserved, appropriate and environmentally sound technology injected, and the income and well-being of the people significantly improved. This is a clear example of the integration of environment and development thus paving the way to the implementation of the concept of sustainable development.

There are, of course, many other outstanding, successful, and notable activities concerning promotion of the better quality of life for the rural people, initiated by Your Majesty. What underlines the work of Your Majesty is Your Majesty's care and compassion of people, and the recognition that there is an imperative need for the people to be in harmony with nature.

Your Majesty:

A few years ago when reporters enquired what would be Your Majesty's birthday wish, Your Majesty's reply was that the best present would be for all the people in the Kingdom of Thailand to love and protect nature.

The UNEP Gold Medal of Distinction, which is occasionally awarded for outstanding achievements, is a tribute to the renowned work of Their Majesties the King and the Queen of Thailand.

Please allow me, Your Majesty, to have the honour and privilege on behalf of the UNEP, to present this tribute to Your Majesty on this auspicious occasion of Your Majesty's birthday.

UNEP GOLD MEDAL OF DISTINCTION

The United Nations Environment Programme (UNEP) established the Gold Medal of Distinction in 1982 to commemorate the tenth anniversary of its foundation. Since then, the Gold Medal has been awarded to:

- His Majesty King Carl XVI Gustaf of Sweden;
- His Excellency President Daniel Arap Moi of Kenya;
- Maurice Strong, the Secretary General of the 1992 United Nations Conference on Environment and Development;
- His Holiness Pope John Paul II;
- His Excellency Li Peng, Prime Minister of China;
- His Excellency the Former Prime Minister of Jamaica.

On the occasion of its twentieth anniversary in 1992, the UNEP presented the Gold Medal of Distinction to Their Majesties King Bhumibol Adulyadej and Queen Sirikit for their dedication and outstanding achievements in improving the quality of life of the Thai people.



QUEEN SIRIKIT OPENS THE SECOND PRINCESS CHULABHORN SCIENCE CONGRESS



Her Majesty Queen Sirikit opened the Second Princess Chulabhorn Science Congress on 2 November 1992, with a statement calling for global efforts to help lessen the adverse impact of the rapidly growing population on the world's environment and natural resources.

"When the population was small, the use of natural resources did not have much impact on the world's rich environment", she said. "Since the world's population has greatly increased, the demands on natural resources have multiplied, thus creating a severe pressure on the environment".

The global population has increased rapidly, but the world's natural resource supplies are being depleted.

"If we do not take care in using them (natural resources), a host of environmental problems will follow", she said. "The land, sea and air would become polluted. Biodiversity would be lost, with serious ecological consequences. Drought resulting from the destruction of tropical rain forests and the depletion of the ozone layer through excessive use of CFCs would create widespread environmental problems that have no boundaries, and that cannot be solved by any one country on its own".

The five-day Congress, entitled "Environment, Science and Technology: the Challenge of the 21st Century", was organised by the Chulabhorn Research Institute (CRI) to commemorate Her Majesty Queen Sirikit's 60th birthday. Some 1,000 scientists, engineers, environmentalists and policy makers from more than 40 countries attended the Congress to exchange

knowledge and discuss multi-disciplinary approaches to global environmental problems.

The Scientific Programme of the Congress included lectures, symposia, workshops, panel discussions and poster sessions in environmental health, toxic chemicals, hazardous wastes, biodiversity and biotechnology.

The Thai Government, the United Nations Environment Programme, the Deutsche Gesellschaft für Technische Zusammenarbeit, Thai Airways International and the Petroleum Authority of Thailand provided financial and other supports to the Congress.

Her Majesty the Queen said that the large number of scientists and other experts taking part in the Congress demonstrated the will of the international community to save the earth's environment and natural resources.

"We are grateful to all participants who have come from all parts of the world to help solve these serious global problems...".

The convening of such an important meeting as the Second Congress

indicated that Thailand is fully committed to safeguarding the global environment, Her Majesty said.

"It is most appropriate and timely that this Second Princess Chulabhorn Science Congress is being held, so as to further the resolutions passed at the Earth Summit (the United Nations Conference on Environment and Development)".

Her Majesty the Queen herself is a keen environmentalist, who, in 1982, started the "Forest Loves Water" project in the northeast of Thailand to help reforest the once bleak and barren land in the area.

During the 40 years of accompanying His Majesty King Bhumibol to visit the people in the rural areas, she said she had seen how the country's environment had deteriorated.

"Our tropical forests have shrunk. Some species of wildlife are on the verge of extinction. Rivers and streams have silted up. The northeastern region has suffered from drought and, if neglected, will become desert-like", Her Majesty the Queen said.

Ignorance and poverty are the two main causes of environmental destruction, she said, adding that "once these crucial factors can be eliminated, serious environmental problems will be greatly diminished".

UNEP Chief presents risks assessment publication to Princess Chulabhorn



UNEP Executive Director Mostafa Tolba presents a joint UNEP-ICPEMC publication, "Assessing the Risk of Genetic Damage", to Her Royal Highness Princess Chulabhorn. On the left is Dr. Nay Htun, Director of the Bangkok-based UNEP Regional Office for Asia and the Pacific.

Dr. Mostafa Tolba, Executive Director of the United Nations Environment Programme (UNEP), presented a publication on risk assessment of mutagenic agents on human health to Her Royal Highness Princess Chulabhorn during the opening session of the Second Princess Chulabhorn Science Congress on 2 November 1992.

The publication, entitled "Assessing the Risk of Genetic Damage", is a

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*The Second Princess Congress
"Environment Science and Technology:
The Challenges of the 21st Century"*

The Congress, which brought together many of the world's leading scientists and environmentalists, was organized by the Chulabhorn Research Institute to honour the 5th cycle birthday anniversary of Her Majesty Queen Sirikit of Thailand.

The theme and topics covered by the Congress focused on the five priority issues in Environmental Science and Technology in accordance with the areas identified and discussed at the United Nations Conference on Environment and Development at the 1992 Earth Summit in Rio de Janeiro for the benefit of the world environment. These priority issues involve concepts that are exemplified in the work of Their Majesties King Bhumibol Adulyadej and Queen Sirikit in promoting nature conservation in the kingdom of Thailand. Environmental Science and Technology has been a subject of great interest and concern of Their Majesties for decades under Their Majesties' guidance a number of projects have been implemented.

On this occasion, in recognition of this renowned work, the UNEP GOLD MEDAL OF DISTINCTION was presented to Their Majesties by Dr. M.K. Tolba, Executive Director of United Nations Environment Programme.

This issue of the Chulabhorn Research Institute newsletter reports on the main highlights of the Congress.

**HRH PRINCESS
CHULABHORN'S KEYNOTE
LECTURE**

In her keynote lecture at the Second Princess' Congress, Her Royal Highness Princess Chulabhorn called on all nations to help save the world from the brink of environmental disaster by adopting sustainable development policies.

The past decades' economic growth had occurred at the expense of the environment and through excessive exploitation of natural resources. This unbalanced growth had already caused many serious environmental problems including climate change, deforestation, and industrial toxic wastes.

Princess Chulabhorn emphasised that sustainable development must be adopted to stop abuses of the world's environment and natural resources: "These environmental problems ... present serious constraints to future economic and industrial growth. Clearly, the present patterns of development and conversion of natural resources need to undergo drastic changes..."

Her Royal Highness expressed her belief that science and technology can help promote better understanding of sustainable development and thus assist its implementation.

"The first step towards improving the scientific basis for long-term strategies for sustainable development is a better understanding of the earth systems, including the life support systems. Science can provide this understanding through increased research and the application of modern effective and efficient means that are now available.

Princess Chulabhorn is President of the Chulabhorn Research Institute, the organizer of the Congress. At the United Nations Earth Summit held five months earlier, Her Royal Highness led the Thai delegation and there, Thailand signed the conventions on Climate Change and Biodiversity.

**UNEP Executive Director
Dr Mostafa Tolba's Keynote
Lecture**

The theme of application of effective and efficient means of sustaining development while reducing global en-

vironmental degradation was further emphasized by UNEP Executive Director Dr. Mostafa Tolba whose keynote lecture stressed that cleaner technologies held the key solution to global environmental problems.

Dr. Tolba said that the developing countries have the opportunity not to follow the development path of the industrialised economies, providing they have access to cleaner technologies at affordable prices to help slow down global environmental degradation.

"There is an urgent need to ensure that the technologies made available to developing countries create patterns of industrial development radically different from the tarnished record of the developed world... If developing countries follow the shortcuts of inefficient technologies... then our planetary destruction is assured", Dr. Tolba stated.

A solution to the problem is to strengthen international cooperation to promote the transfer of cleaner technologies from developed to developing countries at low cost. However, Dr. Tolba warned that obsolete technologies continue to flow from developed to developing countries because new technologies are expensive and protected by intellectual property rights and patents.

Persistent economic and social problems, such as poverty, high unemployment, and burgeoning population growth, force developing countries to accept old, inefficient technologies. The acquisition of cleaner technologies requires large sums of money not readily available to most developing countries.

The UNEP Executive Director called on governments to promote technology transfer by providing a fair compensation to industries for allowing necessary know-how to move from the developed to the developing countries.

Dr. Tolba also urged that the developing countries must build their own scientific capability and expertise in environmentally suitable technologies, and concluded, "The push towards sustainable development is only beginning : UNCED was not a culmination of past advocacy, but the introduction of a new age. Yet, there are not easy answers to forging policies that create a durable alliance between economic growth and environmental protection. Technologies can, and are, creating a bridge towards a sustainable future. It is up to us, today, to make sure it is a bridge fit for our children to cross".

The Scientific Programme of the Congress

Within the framework delineated in the keynote addresses, the Congress directed its scientific investigation into five main areas of research : Environmental Health, Toxic Chemicals, Hazardous Wastes, Biotechnology and Biodiversity.

Parallel to this scientific programme, the Congress addressed the main concerns of a social science programme to emphasise a fully integrated attitude towards protection and management of the environment involving broad-based participation of all population groups.

The work of the Congress was organized around symposia, workshops, seminars and panel discussions in each area, bringing together representatives from developed and developing countries, from government, international agencies, academic institutions and industry. Highlights of the work of the Congress are reported here under each area of scientific activity.

Environmental Health

The area of environmental health was introduced by Professor Moeller^{1/}. In his plenary lecture he defined the subject area as that concerned with assessing, understanding and controlling the impacts of people on the environment and the impacts

of the environment on people. The environment has a great influence on human health. Chemical constituents and contaminants, biological contaminants, physical factors (including radiation), and socio-economic conditions are among the key environmental factors that pose a health risk to humans.

The focus of the environmental health sessions that followed concentrated on a specific health issue: cancer. In his plenary lecture, Professor Becker^{2/} made the point that over 80 per cent of human cancer is induced by chemicals in our food, in the environment and in our general life style. He outlined the multi-stage process involved in carcinogenesis and the complexity in the mechanism at the molecular and cellular levels, and warned that discrepancies in research findings require careful interpretation and caution when drawing conclusions.

The symposium on environmental carcinogenesis and occupational cancer identified several groups of cancer-causing chemicals including food contaminants, industrial toxic substances, pesticides and metals. The meeting also discussed a classification system of chemicals, their estimated risk, and future research activities.

The molecular epidemiology of human cancer, the limitations in applying biological measures in epidemiological research and carcinogen-DNA adducts as markers for exposure to genotoxins were also discussed. The symposium concluded with a presentation of the molecular epidemiology of cancer of two specific target organs, the oesophagus and the liver, which are prevalent in this region.

Another symposium described new methods for comparing and combining short-term genotoxicity data and human biomonitoring for carcinogen exposure in the workplace.

Toxic Chemicals

The rapid increase in the development and introduction of new chemicals in recent years underlines the necessity of adequate testing to ensure their safe use.

^{2/} Dr. Frederick Becker, Vice President for Research and Scientific Director, M.D. Anderson Cancer Centre, the University of Texas.

In his plenary lecture, Dr. Douglas Morton^{3/} presented an industrial approach to the toxicity testing of new chemicals. The decision to introduce a chemical, he said, depends on the balance between benefit and risk. Through risk assessment, the toxic and dosage level for the safe use of chemicals can be determined by testing them on laboratory animals. Dr. Morton said that before a chemical could be used commercially, it should be tested and retested under different climatic, environmental and social conditions. To improve risk assessment, more studies on toxicokinetics, toxicodynamics, and effect and exposure modelling are necessary.

The justification for such requirements was clearly exemplified in the symposium on factors influencing toxicity in which nutritional factors, environmental factors host-intrinsic factors and other chemical agents were shown to have effects on the toxicity of chemicals as well as causing alterations in response to toxins.

Risk assessment procedures provided the focus of presentations and discussions in a number of symposia, one of which was the UNEP-ICPEMC joint study on assessment of comparative risk associated with exposure of human and non-human biodata to genotoxic agents. Other presentations in the area of toxic chemicals focused on the subject of DNA damage repair, specifically DNA repair and mutagenesis, a mechanism believed to be crucial in carcinogenesis as well as in other forms of toxicity.

A panel discussion provided a forum for exchange of ideas on the importance of public awareness on toxicity issues.

Hazardous Wastes

The Congress discussed various aspects of hazardous wastes and made a number of recommendations. These are some of the points made at the Congress.

^{3/} Dr. Douglas Morton is Vice President of Lilly Research Laboratories, Eli Lilly and Company, U.S.A.

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Because of rapid industrialisation and inadequate management and control, hazardous wastes present serious global environmental problems. There is no uniform standard for the classification of hazardous wastes. A toxic waste may be labelled hazardous in one country but not in another.

Standardised classification of hazardous wastes is necessary to avoid confusion when these substances are moved across borders. An international labelling standard for hazardous wastes should be developed.

The traditional "end-of-the-pipe" method of treating hazardous wastes is found to be ineffective. Instead, new emphases are on pollution prevention and cleaner production and on the reduction of wastes at factories by modifying production processes and by changing types of raw materials.

The Congress made the following recommendations for improving the management and control of hazardous wastes:

- Conduct more research on technologies that promote cleaner industrial production and waste reduction;
- Stabilise hazardous wastes to minimise adverse consequences on the environment;
- Strengthen cooperation among the government, industries and academic institutions to improve hazardous waste control;
- Monitor the implementation of hazardous waste control at the national and international levels.

Biotechnology

Professor Jeff Schell^{4/} gave a plenary lecture on "Plant Biotechnology and Sustainable Agriculture", focusing on the potential of genetic manipulation in increasing food production. The use of genetically engineered disease-resistant plants, an effective method to increase crop outputs, shows promise of becoming a sustainable agricultural technology.

^{4/} Dr. Jeff Schell is Director of the Max Plank Institute, Cologne, Germany.

"Methods have been developed to introduce well defined single genes in plants. Research in the molecular biology of plants allows any genetic trait, whether from other plants or from bacteria, yeasts, fungi or animals, to be transferred or expressed in plants and to be transmitted to the progeny through seeds," Professor Schell said. "If we are to solve staggering problems posed by the need to produce food, energy and feed-stocks for ever increasing populations without destroying the environment, we will have to urgently develop and intelligently exploit these powerful methods".

In his keynote lecture on "Bioremediation: Biotechnological Approaches to Problems of Environmental Pollution", Professor Ananda Chakrabarty^{5/} stressed the importance of the use of microbes in degrading pollutants and in cleaning sites contaminated by man-made chemicals

Evolution of biodegradative genes allows micro-organisms to metabolise and effectively remove toxic chemicals from the environment. These microbes can be genetically manipulated by the recombinant DNA technology to degrade a wider range of pollutants more efficiently.

Both keynote lectures emphasised the need for basic research in helping develop new technologies useful to both developed and developing countries. The lectures set the theme for further discussions on various aspects of biotechnology, including the use of biosensor technology for genetically manipulating plants and microbes, biodegradation of organic and heavy metal pollutants, the use of microbes in the recovery of metals and safety and biotechnology risk assessment.

Biodiversity

For centuries, diversity has provided stability to the earth's ecosystems. Plants and animals have been used, for food, building materials and medicines. Plants continue to be sources of health-care products to over 85 per cent of people in developing countries.

^{5/} Dr. Ananda Chakrabarty teaches at the University of Illinois at Chicago, U.S.A.

In his keynote lecture, Dr. Otto Solbrig^{6/} stated that, recently, there has been an increasing concern about the loss of species and reduction in the genetic diversity of crops. This concern has arisen because of the drastic transformation of natural landscapes taking place all over the world, particularly in the tropics. Tropical countries including Thailand harbour some of the richest sources of biodiversity in the world.

Diversity is essential for the proper functioning and survival of living organisms. Biodiversity provides the population, species and ecosystems with the elements needed to cope with change. However, nobody knows the exact role of biodiversity in the functioning of living systems.

Excessive exploitation, high market demands, and inappropriate technology and management are the major causes of the loss of biodiversity. Monitoring and research, conservation and sustainable use of biodiversity are among the broad measures recommended by the Congress to help save species and plants from disappearing from the earth. Policies must be implemented at the local, national and international levels.

The Social Science Programme of the Congress

The challenge of an inter-disciplinary approach integrating political, social, economic, cultural and environmental perspectives was the dominant theme of the four-day social science programme at the congress. The programme was organised around a symposium, eleven panel discussions and four free communication presentations, under the chairmanship of Khunying Ambhorn Meesook.^{7/}

The issue of mobilization and participation was raised consistently during the discussions. Sustainable development should encompass protection of the environment concomitantly with the satisfaction of human

^{6/} Dr. Otto Solbrig is Bussey Professor of biology at Harvard University, U.S.A.

^{7/} Khunying Ambhorn Meesook, Social Science Secretary for Princess Chulabhorn Science Congress II.

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needs : education, health, food, water and employment. A broad-based public involvement in the decision-making process would be an effective way of mobilising action for environmental protection.

Participants in the social science programme stressed the essential role of the non-governmental sector in promoting community participation. Examples of inputs from non-governmental organizations were heard from Nigeria, Pakistan, Nepal, Thailand and Australia. In Nigeria, non-governmental organizations have placed emphasis on women's participation in projects on the environment. In Pakistan, these organizations are involved with quality of life projects such as literacy, health, clean water and sanitation, which have impact on the immediate family environment as well as the external environment. In Thailand, parallel organizations are promoting wild life conservation and have mobilized the public against forced relocation, of villagers from forested areas; and in Australia, organizations are concentrating more on environmental education and influencing the Government.

The interrelationship between science, technology, and the environment was clearly acknowledged by discussants. The positive aspect of science and technology for community based sustainable development was evident in a variety of projects cited during the discussions on water resources, harvesting, sanitation, irrigation, community forestry and rural infrastructure. On the negative side, it was submitted that science and technology have led to over-exploitation of natural resources, causing environmental degradation and pollution.

Of the many conclusions and recommendations that emerged from discussions, a common call was for greater emphasis on "people-centered development" to enhance the role of people in decision-making, implementation evaluation and benefit-sharing in community projects. This requires according greater priority to human development as a complement of environmental protection, and more political will to decentralize power and provide adequate budgets.

BROAD-BASED PARTICIPATION OF PEOPLE TO HELP PROTECT ENVIRONMENT

More people, especially women, should be involved in helping shape development policies to provide greater protection to the environment, according to a report adopted by the Second Princess Chulabhorn Science Congress.

To meet the people's needs without damaging the environment, development policies should contain social, cultural and environmental, as well as economic considerations, the report says. Development should be people centered. Public involvement in the decision-making process must begin at the grassroots level.

The report says that the past over-emphasis on economic growth has resulted in unbalanced development. A broad-based community participation would be an effective way of mobilising the people's involvement in the environmental protection. Non-governmental organisations play an important role in promoting community participation.

The report adopted at the end of the Social Science Programme of the Congress contains recommendations, such as the adoption of an interdisciplinary approach to development, poverty eradication, hazardous waste and water resource management, appropriate use of science and technology, environmentally sound agricultural practices, and education and information dissemination.

"A common call is to enhance the people's role in decision-making, implementation, evaluation and sharing of benefits", the report says. Policies "should aim for the decentralisation of power...to enable local groups to participate more fully in decision-making on environmental questions".

Of many population groups, women can contribute significantly to sustainable development. Because they have been left out of the decision-making process, the report points out that women often are major victims of environmental mismanagement. Sexual discrimination and lack of equal opportuni-

ties, it says, hamper women's participation in environmental conservation. Their multiple roles as housewives, workers and child-bearers are not equally shared by men. These responsibilities leave women little time to pursue their own career, education and training.

"Women have been marginalised or bypassed by much of the development process", the report says. Greater access to key decision-making positions should be ensured to women. Men should assume an equal share of household and child-rearing responsibilities with women, it says.

Poverty is a major cause of environmental degradation. The poor and disadvantaged can play a major role in preventing environmental destruction, it says.

In Sri Lanka and Indonesia, for example, farmers form cooperative groups and small-scale enterprises to improve their income without disturbing the environment. Poverty alleviation is therefore an effective counter-measure against environmental destruction.

The report also suggests that the middle-income urban population group, whose number is rapidly increasing, should be encouraged to play their part in helping save the environment. These people consume large amounts of energy and manufactured goods, thereby causing the earth's natural resources to deplete and environment to deteriorate rapidly.

Unfortunately, "this group...has not been given sufficient attention" as a contributor to environmental conservation, the report says.

Low-income rural and urban population groups should also have access to policy-making decisions that will affect their future.

"Their economic needs have influence on the natural environment surrounding them", the report says. "Unless the government or the community mobilises efforts to elevate their livelihood, broad respect for the environment may not be ensured".

Thailand to Host International Course on Health Hazards from Mutagens and Carcinogens

A course on the detection of health hazards in human populations exposed to mutagens and carcinogens will be held in Bangkok on 15–26 November 1993.

Comprising plenary lectures, study groups and practical laboratory sessions, the course will identify and seek solutions to the health hazards from mutagens and carcinogens in urban and rural populations in South-east Asia.

The International Agency for Research on Cancer, the International Programme on Chemical Safety, the World Health Organization, and the United Nations Environment Programme are organisers of the events, in collaboration with the Chulabhorn Research Institute.

The Coordinators of the course's scientific programme are Dr. Harri Vainio and Dr. Christopher Wild, both from the International Agency for Research on Cancer, Lyon, France.

Other lecturers and speakers will include:

- Wagida Anwar, Ain Shams University, Cairo, Egypt;
- George Becking, International Programme on Safety, Research Triangle Park, N.C., U.S.A.;
- John Groopman, The John Hopkins University, Baltimore, M.D., U.S.A.;
- Kari Hemminki, Centre for Nutrition and Toxicology, Huddinge, Sweden;
- Monica Hollstein, International Agency for Research on Cancer, Lyon, France;
- Hing Peng Lee, Singapore Cancer Registry, National University of Singapore;
- Raquel Quitco, National Postharvest Institute for Research and Extension, Nueva Ecija, the Philippines;
- Mathuros Ruchirawat, Chulabhorn Research Institute and Mahidol University, Bangkok, Thailand;
- Stitaya Sirisinha, Chulabhorn Research Institute and Mahidol University, Bangkok, Thailand;

- Virasakdi Chongsuvivatwong, Faculty of Medicine, Prince of Songkla University Hat Yai, Thailand.

Further information and application forms may be obtained from:

*The Unit of Education and Training
International Agency for Research
on Cancer*

150, cours Albert Thomas
F-69372 Lyon Cedex 08
France
Tel. (33) 72 73 84 85
Fax. (33) 72 73 85 75

For Thai participants, please contact:

*Dr. Mathuros Ruchirawat
Chulabhorn Research Institute
Mahidol University
Rama VI Road,
Bangkok 10400
Tel: 247-1900
Fax: 247-1222*

UNEP Chief presents risks assessment publication to Princess Chulabhorn

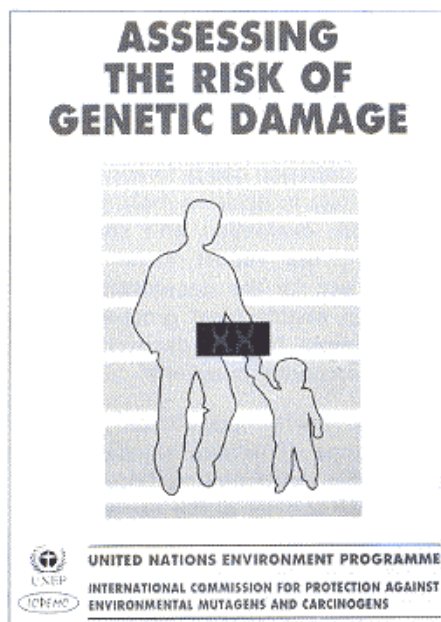
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product of a joint study by UNEP and the International Commission for Protection against Environmental Mutagens and Carcinogens (ICPEMC).

Mutagenic agents are hazardous to human health and the environment. But, current knowledge about their effects on humans and other living organisms is limited. Their presence in the environment should be restricted or controlled.

The UNEP-ICPEMC study develops a series of principles and recommendations for assessing the genotoxic hazards of environmental agents.

The publication is intended for creating awareness among decision makers and the public of the problems caused by genotoxic agents.



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Correspondence should be addressed to:

ICEIT NEWSLETTER
Chulabhorn Research Institute
Office of Scientific Affairs
c/o Faculty of Science,
Mahidol University
Rama 6 Road, Bangkok 10400,
Thailand

Telex: 84770 UNIMAH TH
Telefax: (662) 247-1222
Tel: (662) 247-1900