

# **GEA International Conference '05: Climate Change and its Effect on Sustainable Development**

*Chairman's summary*

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## **Introduction**

The Conference for Climate Change and its Effect on Sustainable Development was organized by the Global Environmental Action (GEA) on October 15 and 16, 2005 in Tokyo, Japan with the participation of world leaders in relevant fields from all over the world.

It was the seventh international conference convened by GEA, co-organized with the UN Department of Economic and Social Affairs (UNDESA) and relevant ministries of the Government of Japan.

In 2000, GEA hosted "Global Environment 2000" to review the environmental problems of the 20<sup>th</sup> century and look at the major global-scale challenges of the 21<sup>st</sup> century as well as measures for tackling them. The outcomes of this meeting bore fruit as proposals from the Asia-Pacific region in the Conference on Global Environmental Crisis held in 2001. The proposals were brought to the World Summit on Sustainable Development in Johannesburg and contributed to the success of Japan Day at the Summit by stimulating international public opinion, with the cooperation of various international organizations.

The GEA International Conference '05 was held with the aims of discussing future actions needed to tackle the effects of climate change on sustainable development, keeping in mind the importance of collaboration of policy makers and scientific researchers. The conference urged that the latest scientific knowledge on climate change be reflected in policy. The findings of this conference are expected to be reflected in various international dialogues, including the eleventh session of the conference of the parties to the UNFCCC and the first meeting of the parties to the Kyoto Protocol.

The conference was honored by the presence of Their Imperial Highnesses Crown Prince Naruhito and Crown Princess Masako. His Imperial Highness welcomed the participants, emphasizing his concerns over recent extreme climate and weather events which might be linked with climate change. His Imperial Highness encouraged the conference to send a strong message on future policy to the world, so that humankind can continuously enjoy the blessings of nature with all life on earth. Prime Minister Junichiro Koizumi in his address emphasized the importance of immediate actions and the involvement of more countries. He encouraged GEA to take the lead in realizing a sustainable society through active discussions.

Dr. Paul J. Crutzen, Nobel laureate in Chemistry 1995, Emeritus Director of the Max-Planck Institute for Chemistry, in his special address on “The Anthropocene: The Current Human-Dominated Geological Era: Human Impacts on Climate and the Environment,” introduced various scientific findings that suggest population growth and increased human activities are becoming serious burdens to the environment. He introduced the concept of the word “anthropocene,” a word which he had coined, as the time period starting at the beginning of the 19<sup>th</sup> century which had witnessed drastic changes of nature as a result of rapidly increasing activities of mankind. He also introduced the latest scientific knowledge on climate consequences, including effects on hydrological cycles and sea level rise, emphasizing our responsibility to conserve our global environment for future generations.

### **General Message**

The conference included sessions on four topics. Major discussions of the sessions are summarized in the Annex. Based on the discussions, the participants shared the following observations:

- An increase in climate variability and some extreme events is projected. Models project changes in frequency, intensity and duration of extreme events, such as more hot days, heat waves, heavy precipitation events and fewer cold days.
- As global warming progresses, significant impacts can be expected including future impacts on the strength of hurricanes and typhoons, which may bring huge impacts on water resource management, food security and disaster management as well as human health, among other areas. While it is important to accumulate scientific knowledge, the world already has sufficient a scientific basis to take immediate actions.
- Besides the effects of the greenhouse gases on climate, it is of great importance to include the effects of aerosols on the radiation balance and cloud properties in climate models. In particular the impact of air pollution on regional climate is an issue of great significance, such as, in Asia.

The participants agreed on the following recommendations:

- Strong political will for action is necessary for strengthening climate change policy towards a sustainable future. Developed countries should take the lead in this respect.

- It is the necessary to work to attain the ultimate objective of the UNFCCC, namely, the stabilization of the atmospheric concentrations of greenhouse gases, and to establish clearly the needed long-term response measures and launching actions in the near future.
- In addition to the steady implementation of the Kyoto Protocol, it is essential for the period beyond the first commitment period that an effective framework through which all countries can participate be established. In this context, the benefit of mitigation options for sustainable development should be recognized. Both adaptation and mitigation measures should be promoted in an integrated manner.
- A long-term, clear vision for a sustainable society, including perspectives on desirable urban structures and based on the most efficient production and use of energy, should be developed. Such a vision will guide us towards policy priorities to be implemented both in the short and long terms, especially by the back-casting approach. Such a vision will lead to shifts in paradigms, policy and consumption patterns.
- In advancing climate change measures, technologies play an important role. In addition to the development of innovative technologies that make substantial future reductions of GHGs possible, further efforts need to be carried out to spread existing technologies.
- An international knowledge management and diffusion network may be considered to facilitate R&D and foster technology diffusion. A bilateral framework to promote joint projects for creating win-win situations, including both governments and businesses, may be developed for successful technology transfer.
- Some promising policy measures that are effective in the short term include energy efficiency improvement, promotion of renewable energy, economic instruments such as emission trading and carbon taxation and the policy mix of various policy measures. Decision-making should include external costs and long-term benefits and should be based on innovative incentive structure making use of market mechanisms.
- Sustainable use of biomass for application in the energy sectors (e.g., biofuels) has significant potential, especially in developing countries, and should be investigated in greater detail.
- The Clean Development Mechanism (CDM) will play an important role to promote mitigation measures and technology diffusion in developing countries but it still has much room for improvement. Efforts should be continued to improve CDM procedures and make the CDM more understandable for the private sector.

- Analyses on climate change impacts at the national and local levels and their dissemination contribute to the development of adaptation strategies and the raising of public awareness, since it is crucial to inspire and mobilize people for the successful implementation of climate policies. International cooperation for such analyses should be promoted between developed and developing countries.
- To minimize uncertainty, research must be pursued to greater depth and the latest findings must be disseminated to all. Immediate and responsible actions must be taken based on the precautionary principle in order to mitigate or eliminate impacts by extreme climate events. In addition to that, policies that involve all stakeholders must be chosen.
- To act responsibly and contribute to the successful implementation of climate policies, the involvement of all stakeholders is essential. In this connection, awareness raising and education for creativity, for imagination, and for their innovative combination are crucial.
- Continuous and timely cooperation by various mass communication media is highly recommended in order to obtain world-wide recognition, especially by the general public, of the importance, progress, and state-of-the-art knowledge of global environmental problems.

The participants, recognizing the clear importance of initiative taken by world experts, welcomed GEA's leadership in taking actions towards a sustainable future through its political initiatives.

### Summary of the Sessions

#### Session 1: The current state of scientific knowledge in climate change

In his leadoff address, Dr. Klaus Töpfer, Executive Director of the United Nations Environment Program (UNEP), stated that it was time for the world to take actions since both the Johannesburg Summit and Gleneagles G8 Summit had noted that there already existed a sufficient scientific basis for immediate actions. He emphasized that while clear conclusions had already appeared in the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), a fourth report is now being prepared because of the need to incorporate the latest scientific knowledge. Dr. Töpfer reminded the participants that insufficient scientific knowledge does not constitute an “alibi” for inaction, insofar as human beings have always made decisions despite uncertainty. He emphasized the importance of: (i) the integration of adaptation into the development agenda, such as through climate-robust poverty alleviation strategies; (ii) improved mitigation policies which simultaneously facilitate economic development and environmental protection, noting the prominent role of renewable energies; (iii) disaster management, which will result in a new “win-win-win” situation.

The second leadoff speaker, Dr. Tokunosuke Fujitani, Director General of the Meteorological Research Institute, Japan Meteorological Agency, presented an overview of the state of the art of global warming research. Dr. Fujitani introduced various examples of data in the Third Assessment Report of the IPCC: observation indicates that the average temperature of the earth surface increased by  $0.6 \pm 0.2$  °C over the past 100 years while the snow cover of the earth has decreased by 10% since the late 60’s; projections include that anthropogenic activities will raise atmospheric CO<sub>2</sub> concentrations to 540–970 ppm by the year 2100, mean temperatures will rise by 1.4 to 5.8 °C, and the sea level will increase by 0.09 to 0.88 m. Dr. Fujitani showed predictions of regional changes in temperature and precipitation patterns that his institute developed by using the Earth Simulator, one of the most powerful supercomputers in the world. Dr. Fujitani emphasized that, to enhance the quality of climate change predictions, additional systematic and sustained observations, modeling, and process studies are necessary. He also highlighted the importance of integrating this research into various strategies and analyses involving mitigation and adaptation activities.

Dr. Akimasa Sumi, Professor, Center for Climate System Research, the University of Tokyo, followed up as a discussant, presenting simulation results for climate change, which the University of Tokyo, the National Institute for Environmental Science, and the Frontier Research Programme/JAMSTEC had conducted jointly by using the Earth Simulator. Dr. Sumi presented examples of the high-resolution output made possible through the Earth Simulator,

including the differences in climate impacts on the eastern and western coasts of Japan, changes in the *baiu* (Japan's rainy season), and changes in the Kuroshio Current and Kurile Current. The scientific community is ready to move into the stage of providing information to respond more directly and concretely to the needs of society regarding regional impacts of climate change. Dr. Sumi emphasized that such specific information provision would enhance public awareness while contributing meaningfully to the development of adaptation strategies. He noted that if the precision of simulations was to be increased, a budget which would provide continuous infrastructural and human resource support was indispensable.

The participants shared the following views:

- While it is important to accumulate scientific knowledge, the world already has sufficient scientific basis to take immediate actions.
- Analyses on climate change impacts at the national and local levels contribute to the raising of public awareness and the development of adaptation strategies. International cooperation in this field should be promoted between developed and developing countries.
- Linkage of the study of climate modeling and the analysis of impacts increases the efficiency of climate change study.
- It is difficult to resolve the question of causality between recent extreme climate events and anthropogenic climate change, but the possibility of a causal relationship exists.
- Typical impacts of climate change on Japan potentially include hydrological issues such as increases in torrential rains and decreases in snowfall.
- Climate science is different from experimental science in that it cannot prove causality incontrovertibly. Scientific insights are generated from modeling. It is necessary to take policy decisions despite uncertainty, on the basis of the precautionary approach.
- Besides the effects of greenhouse gases on climate, it is of great importance to include the effects of aerosols on the radiation balance and cloud properties in climate models. In particular the impact of air pollution on regional climate is an issue of great significance, such as, in Asia. Observations are needed to test models in the atmosphere from space.

Session 2: Climate change and water management, food security, and risk management

In Session 2, in his leadoff speech, Ian Johnson, Vice President of the World Bank, emphasized the potential for climate change to result in significant negative social and economical impacts by 2050, including decreased water availability and reduced food security, decreased reliability of hydro power, increased incidence of diseases such as malaria and dengue fever, and storms with greater intensity, noting that certain populations and areas will be disproportionately affected. He suggested eight areas as being of particular urgency: (i) preparedness for both climate change-related disasters and disasters in general, (ii) R&D, such as that for agricultural productivity to generate climate-resilient crops, and research on linkages between public health and climate change, (iii) a re-examination of infrastructure-related standards, modalities, and best practices and a subsequent reconsideration of developmental and urban planning, (iv) investment in natural infrastructure, such as mangroves, as a low-cost means for disaster mitigation, (v) effective future needs assessment, (vi) identification of the most cost-effective strategies, (vii) financial and investment strategies, and (viii) more creative financing policies, particularly those which incorporate both public and private entities. In closing, he noted that recent events reminded us that poor people in both rich and poor countries are at particular risk from disasters. He also urged participants to move away from the misconception that mitigation is global in nature while adaptation is local.

As the first discussant for Session 2, Dr. Koutarou Takemura, President of the Foundation for Riverfront Improvement and Restoration, next addressed the conference on climate change and water cycle management in Japan, citing the possibility of climate anomalies, subtropical weather reducing snow volume and thereby the volume of spring thaw water, negatively affecting river flow and rice irrigation. He also discussed the possible effects of sea level rise on Japan, a country with 50% of its people and 75% of its industry in low-lying plains which had originally been wetlands. He raised the possibility that Japan may have to revise its land use in the long-term.

The second discussant, Dr. Takeshi Horie, Professor, Kyoto University, highlighted the difficulties in increasing food production per unit area despite a projected 40% increase in food needs over the next few decades. He emphasized the interconnection of food struggles and environmental pressures, citing the vicious circle of environmental degradation resulting in low food productivity, which increases encroachment on natural lands and consequently intensifies degradation. He cited the development of more productive cropping systems, adaptable to each region, as a priority.

The third discussant, Dr. Kaoru Takara, Vice Director and Professor, the Disaster Prevention Research Institute, Kyoto University, addressed the conference regarding extreme climate events

and disaster resistance capacity. Noting the critical nature of incorporating both structural and non-structural measures into efforts to create a disaster-resistant society, Dr. Takara emphasized the importance of enhancing awareness and preparedness of the general public, governments, and the international community; of increased investment in the public sector to prepare against extreme events; of raising social capabilities against disasters; of making the social structure scalable and expandable in light of increasing threats; and of improving risk finance, such as insurance.

Participants voiced the following comments in the ensuing discussion:

- Policy makers must act now, even though it is difficult to put priority on perceived but unproven risks, and especially difficult when the effects are felt not immediately but rather by future generations.
- It is imperative to give greater attention to the effect of environmental impacts on human health and livelihood.
- Governance, including issues of what level of risk is acceptable and who decides it, is an issue of great importance.
- Renewable energy, mitigation, and other projects should consider climate-proofing aspects during the planning stages to ensure greater cost efficiency.

Session 3: Measures for mitigating climate change/Adaptive strategies, technologies and technology transfer as well as collaborative research

Session 3-1: Measures for mitigating climate change/Adaptive strategies and technologies

In Session 3-1, Mr. Seth Osafo, Senior Legal Advisor of the UNFCCC, gave a lead-off speech in which he overviewed progress in the international climate regime and emphasized that while climate is already changing, procedures and processes have been developing, with particular prominence seen in the Clean Development Mechanism under the Kyoto Protocol. He emphasized that tackling climate change will require a change in development priorities and underscored the urgency of bringing the issue to the fore of public policy, insofar as many of the investments being undertaken now will define emission trajectories for the next 30 to 50 years.

As discussant, Dr. Shuzo Nishioka, Executive Director of the National Institute for Environmental Studies, Japan introduced the scientific basis of the climate system, citing the importance of both mitigation and adaptation to achieve the ultimate goal of the UNFCCC. There is a need for assistance to developing countries and for an increase in attention to adaptation. Dr. Nishioka showed projections with model calculations demonstrating that a tremendous amount of GHGs needs to be cut for the world to avoid approaching a dangerous level, which might be set at a mean global average temperature increase no greater than 2 degrees. He urged participants to work for actions now, both in urban structures and social attitudes, because many changes will require several decades to bring about. He also emphasized the importance of having a robust society and community systems which can survive and thrive despite changes, referencing development in Tuvalu.

The ensuing discussion including the following points:

- The carbon market is promising thanks to the recent development of a regional emission trading system in the EU and positive movement in other countries, but means of integrating large, intensively growing countries to these markets must be developed.
- The complicated process involved in using the CDM discourages private sector participation. CDM rules need to be simplified and understandable to the private sector.
- Short commitment periods would discourage private sector investment and thus involvement; minimum commitments of ten years would increase the likelihood of the CDM being fully utilized.
- Focusing on the positive aspects of the climate regime, such as the new markets and opportunities being generated, rather than burdens and sacrifices, would encourage participation by developing countries.
- Now that the development of methods and processes has been completed, approval of CDM projects is likely to proceed more quickly.

- Latecomers to the emissions trading system would be disadvantaged.
- The role of nuclear energy may be discussed in future years in light of the need to pursue low-carbon energy options.

Session 3-2: Technology transfer and collaborative research

In his leadoff address, Dr. Peter Hennicke, President of the Wuppertal Institute for Climate, Environment and Energy, addressed the conference on measures for mitigating climate change, focused on technology transfer as well as collaborative research. Highlighting the challenges and possibilities in the energy sector, he emphasized that among the greatest messages emerging from various scenarios is that CO<sub>2</sub> emission reductions of 30-40% are believed to be achievable in a cost-effective manner mainly through increases in energy efficiency. He also emphasized key future directions in Germany and other European countries, including, among others, decentralized energy systems, notably decentralized cogeneration technologies, reductions of energy losses during energy conversion and transmission, and improved building efficiency. The economic benefits of such future directions were also mentioned. Citing cooperation gaps that still exist, he proposed working to create joint R&D initiatives between Europe and Japan, such as one with Switzerland, the EU, and Japan on the creation of a “2000 watt per capita society” and an international knowledge sharing and diffusion network through which advanced technologies could be disseminated to developing countries.

The second leadoff speaker, Dr. Hans van Ginkel, Rector of United Nations University, Under-Secretary-General of United Nations, highlighted the Millennium Ecosystem Assessment, a major collaborative project. He emphasized that knowledge transfer seems to be particularly successful in the framework of joint projects, creating “win-win” situations through bilateral cooperation of countries by both governments and individuals. He also pointed out that it is crucial to inspire people, mobilize them and challenge their creativity and imagination. In order to be effective in mitigation and in adaptation he stressed the necessity to think creatively, out-of-the-box, and act with imagination, referring to a floating city rather than higher dikes as a new approach for sustainable future cities.

Prof. Dadi Zhou, Director-General of the Energy Research Institute of National Development and Reform Commission, China, followed as a discussant, stating that technology was key for successful climate change mitigation and adaptation. He stated that the current state of technology was still unable to mitigate or adapt to climate change sufficiently because new technologies were still expensive and not competitive in terms of quality of service. He pointed out that there was still tremendous potential for improvement in energy efficiency. He argued that the cooperative development of technology is a more effective way for developing countries to access technologies rather than the purchasing of licenses one by one from owners. He encouraged Japan to play a leading role in the development and spread of technologies.

Dr. Vo Quy, Honorary President of the Centre for Natural Resources Management and Environmental Studies, Vietnam National University, Hanoi, reminded the participants of the

urgency of combating climate change, particularly in light of the human suffering and negative economic impacts that will result if humans continue on their current path. Noting that poor people and communities would suffer disproportionately in such a case, he recommended collaborative international research and support from developed countries to developing countries. He also cited the important role that community-based education can play and the need for greater success in raising public awareness about climate change.

The following views emerged during the ensuing discussion.

- It is important to set long-term, ambitious targets to promote scientific innovation.
- The creation of a “positive list” of technologies—that is, a list of technologies that are particularly useful—could streamline and accelerate the procedure of getting technologies through the CDM.
- Existing technologies, such as those available in certain household appliances and light bulbs hold substantial potential for immediate energy saving.
- Intellectual property rights issues affect technology transfer substantially. Government facilitation of private-sector technology transfer may increase the willingness of private entities to participate in transfer schemes.
- Biofuels hold enormous potential in utilizing wastelands and in providing farmers with an added role of energy providers in addition to their historical role of food producers. Cooperative work by researchers across disciplines will assist in identifying appropriate crops and utilizing land to its fullest potential.
- Development policy should include recognition of population shifts to coastal areas in order to mitigate the degree of suffering and damage resulting from severe storms, sea level rise, and so on.
- Integration into the market system of both the value of nature and the services provided by ecosystems should be investigated further.

#### Session 4: Policy options for sustainable development

In his leadoff speech, Dr. Michael B. McElroy, Director of Center for the Environment, Professor of Harvard University, explained his vision on climate change and policy options to ensure a successful path to a sustainable future. He expressed his concern about growing population, which helps fuel to the unsustainable demands on resources and environmental degradation. He also touched upon recent unanticipated variability in extreme climate events including the devastating hurricane that struck the United States a month ago, and referred to the fact that the damage occurring in New Orleans caused collateral influence on the economy, for example, on world oil markets. He explained that the recent development of the ability to predict climate events could bring opportunities to cope with their effects in advance, and he emphasized the importance of multidisciplinary interaction among all environmental and social sectors which would be affected by climate change.

As the discussant for Session 4, Prof. Mitsutsune Yamaguchi, Professor of Economics of Teikyo University, remarked upon the importance of participation of all countries in the world in the formulation of a global and long-term strategy for climate change. He mentioned that accelerating technological innovation is a key to success in the formulation of strategies for both mitigation and adaptation. He stated that a “best combination” of R&D and demand-driven policy measures is required in order to secure technological innovation. He emphasized that facilitating institutional change for a sustainable society will ultimately play a crucial role.

The participants shared the following views:

- Developed countries have to start to consider the long-term strategies and targets for “beyond Kyoto.” Policy makers should demonstrate strong initiatives to lead to the right models.
- A long-term, clear vision for a sustainable society, including perspectives on desirable urban structures and based on the most efficient production and use of energy, should be developed. Such a vision will guide us towards policy priorities to be implemented both in the short and long terms, especially by the back-casting approach. Such a vision will lead to shifts in paradigms, policy and consumption patterns.
- A strong political will for actions is necessary for strengthening climate change policy towards a sustainable future. Developed countries should take the lead in this respect.
- Methods for the promotion of investment into scientific activities and R&D should be addressed in order to promote technology innovation.
- Sharing scientific facts and a common understanding of climate change and its effects helps every country to consider its participation in the various policies, strategies and programmes which address climate change mitigation and adaptation.

- Various policy measures were identified as useful tools in the climate change agenda in the short/long term.
- To act responsibly and contribute to the successful implementation of climate policies, the involvement of all stakeholders is essential. In this connection, awareness raising and education for creativity, for imagination, and for their innovative combination are crucial.
- The Clean Development Mechanism (CDM) will play an important role to promote mitigation measures and technology diffusion in developing countries but it still has much room for improvement. Efforts should be continued to improve CDM procedures and make the CDM more understandable for the private sector.