

CLIMATE ALERT

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Developing Country Impacts, Responses Major Focus of Cairo Climate Conference

Impacts of climate change on developing nations and strategies to mitigate these impacts will be a central focus of the World Conference on Preparing for Climate Change December 17-21, 1989 in Cairo, Egypt. The first world climate meeting to be held in a developing country, the Cairo Conference is drawing a diverse assemblage of scientists, policy makers, environmentalists, business leaders and concerned citizens, as well as representatives of most of the major international organizations.

Dr. Mostafa Tolba, the Egyptian Executive Director of the United Nations Environment Programme (UNEP) will be honored at the opening night awards dinner for his leadership in effectuating the Montreal Protocol to protect the ozone layer. His close colleague, Dr. G.O.P. Obasi, Secretary General of the World Meteorological Organization (WMO), co-sponsor with UNEP of the Intergovernmental Panel on Climate Change, will chair the Science and Policy Overview Panel Monday December 18. In a major breakthrough the Cairo Conference has secured the active participation of many other international organizations, UNDP, UNESCO, UNIDO, FAO, Habitat and the World Bank.

The Cairo Conference has drawn extraordinarily high level Egyptian involvement. Mrs. Suzanne Mubarak is Honorary Chairman and will address the conference at the opening session Sunday December 17.

Egyptian Cabinet Ministers participating in the conference include H.E. Dr. Atef Sidky, Prime Minister of Egypt, H.E. Dr. Atef Ebeid, the Minister Responsible for Environmental Affairs, H.E. Dr. Esmat Abdel Meguid, Minister of Foreign Affairs, H.E. Dr. Boutros Ghali, Minister of State for Foreign Affairs, H.E. Eng. Maher Abaza, Minister of Power and Electricity, H.E. Mohammed Abdel Wahab, Minister of Industry, H.E. A. Kandil, Minister of Petroleum, H.E. Dr. Youssef Wally, Deputy Prime Minister and Minister of Agriculture, H.E. Dr. Essam Radi, Minister for Public Works and Water, H.E. Fouad Sultan, Minister of Tourism, and H.E. Dr. Farouk Hosni, Minister of Culture.

A large assemblage of senior diplomats will be attending including Sir Crispin Tickell, Permanent Representative of the United Kingdom to the United Nations and author of some widely read speeches on environmental refugees, Ambassador Alexander Borg Olivier, Permanent Representative of Malta to the United Nations and author of the December 1988 UN General Assembly resolution on climate change, Ambassador Dr. Nabil El Araby, the Permanent Representative of Egypt to the United Nations, Geneva and Sir Ninian Stephen, Special Ambassador for the Environment and former Governor General of Australia. Also playing a central role will be Stephen Lewis, Canada's former Ambassador to the United Nations and the Chairman of the June 1988 Toronto Conference on the Changing Atmosphere, and Ambassador Richard Benedick, who represented the United States in the negotiations resulting in the Montreal Protocol. Ambassador Lewis drew a standing ovation last year for his stirring speech to the Second North American Conference on Preparing for Climate Change. Together with two internationally renowned scientists, F. Sherwood Rowland and J. Murray Mitchell, Jr., Benedick was an honoree of the 1988 Climate Institute awards dinner for his efforts in the climate field. This year the sole awardee will be Dr. Mostafa Tolba.

Among the senior environmental officials participating in the Cairo Conference are Hon. David Trippier, Minister for the Environment, United Kingdom; Hon. Tom Roper, Minister for Planning and Environment of Victoria, Australia, the first state to adopt the Toronto Conference 20 percent carbon dioxide reduction goal as official



Mrs. Suzanne Mubarak

policy, Lt. Col. Christine K. Debrah, Chairman of the Environmental Protection Council of Ghana and keynoter of the May 1989 Conference on the Implications of Climate Change for Africa; Dr. Roger Blakeley, Secretary of the Environment for New Zealand; and Dr. Abdel Barr El Ghaini, Director of the National Meteorological Service of Saudi Arabia and Vice Chairman of the IPCC.

Senator Dr. Mohammed Kassas, Faculty of Science at Cairo University, will chair the Conference Resolution Committee. Egypt's best known ecologist and an internationally acclaimed scientist, Dr. Kassas is also a member of the Egyptian Senate.

The Cairo Conference Resolution, already being described as a Cairo Compact, is expected to seek practical means to ensure that developing countries receive necessary technical assis-

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AGENDA FOR WORLD CONFERENCE ON PREPARING FOR CLIMATE CHANGE

Cairo, Egypt

December 17-21, 1989

Convened by: Climate Institute,
United Nations Environment Programme,
and the Government of Egypt

Early Co-Sponsors: Ministry of Housing, Physical Planning and
the Environment of The Netherlands
Stockholm Environment Institute
Japan Overseas Environmental Cooperation Center
The Environmental Pollution Control Journal (Japan)
The William Bingham Foundation
Charles Stewart Mott Foundation
World Resources Institute
The Conservation Foundation/World Wildlife Fund
U.S. Environmental Protection Agency
U.S. National Climate Program Office
U.S. Department of Energy
National Institute for Environmental Health Sciences
Center for Global Change, University of Maryland
GE Foundation
Geneva Steel
Texaco Philanthropic Foundation
Commission for the Future, Australia
Greenhouse Action Australia
United Nations Development Program
Intergovernmental Oceanographic Commission of UNESCO
World Health Organization
Arab Center for Studies of Arid Zones and Dry Lands



Dr. Mostafa Tolba



Dr. G.O.P. Obasi



H.E. Dr. Atef Ebeid



H.E. Dr. E. Abdel Meguid

SUNDAY DECEMBER 17

OPENING SESSION: 5:30 - 6:45 p.m.

Dr. Hind Sadek, World Conference Director, Introductory Address

H.E. Dr. Atef Ebeid, Minister for Cabinet Affairs and Minister Responsible for Environment, Welcoming Address

Dr. Mostafa Tolba, Executive Director, United Nations Environment Programme, Keynote Address

Mrs. Suzanne Mubarak, Honorary Conference Chairman, Opening Address

AWARDS BANQUET: 7 - 10 p.m.

Tribute to Dr. Mostafa Tolba by international environmental leaders

Banquet Speaker: H.E. Dr. Esmat Abdel Meguid, Minister of Foreign Affairs of Egypt

MONDAY DECEMBER 18

MORNING PLENARY SESSION: 8:30 a.m. - 1 p.m.

CLIMATE CHANGE: OVERVIEW PANEL

Chairman: Dr. G. O.P. Obasi, Secretary General, World Meteorological Organization, United Nations, (Geneva), "Introducing the Issue of Climate Change"

Panelists: Dr. Stephen Schneider, National Center for Atmospheric Research, Boulder, Colorado, U.S.A.
Dr. James Hansen, Director, Goddard Institute for Space Studies, New York, "What Regional Changes do our Climate Models Suggest?"
Dr. Pier Vellinga, Coordinator, Netherlands Climate Program
Sir Crispin Tickell, Permanent Representative from the United Kingdom to the United Nations
Dr. Akio Morishima, Professor of Law, Nagoya University, Japan

REFRESHMENT BREAK

PANEL ON STRATOSPHERIC OZONE DEPLETION

Chairman: Dr. Mostafa Tolba, Executive Director, UNEP

Panelists: Hon. David Trippier, Environment Minister, U.K.
Dr. Rumen Bojkov, Director, Climate Program, World Meteorological Organization

LUNCHEON BREAK

AFTERNOON PLENARY SESSION:

CLIMATE CHANGE: THE IMPACT

Chairman: Dr. Gunnar Kullenberg, Secretary, Intergovernmental Oceanographic Commission of UNESCO

Panelists: Eileen Claussen, U.S. Environmental Protection Agency, "Implications of Stratospheric Ozone Depletion and Climate Change for Humanity"
Senator Dr. Mohammed Kassar, Faculty of Science, Cairo University, Egypt, "Ecological Impacts of Climate Change"
Dr. Wilfred Kreisler, Director, Division of Environmental Health, WHO, Geneva, Switzerland, "Implications of Global Warming and Stratospheric Ozone Depletion on Human Health"
Dr. Martin Parry, University of Birmingham, U.K., "Potential Impact of Climate Change on World Agriculture"
Dr. Stephen Leatherman, Chairman, Climate Institute and Director, Laboratory for Coastal Research, University of Maryland, "Implications of Climate Change and Sea Level Rise for Coastal Areas"



Dr. Hind Sadek



H.E. Dr. Fouad Sultan

MONDAY DECEMBER 18

Dinner: 7 p.m. - 9:30 p.m.

CLIMATE, PARKS AND TOURISM

Chairman: H.E. Dr. Fouad Sultan, Minister of Tourism, Egypt

Panelists: Dr. Hind Sadek, Senior Consultant, Climate Institute, WRI Council Member, Washington, DC
Paul Pritchard, President, National Parks and Conservation Association, U.S.A.
Michel Pommier, Division Chief, Infrastructure, The World Bank, Washington, DC
Dr. Michael Robinson, Director, National Zoological Park, Smithsonian Institution Washington, DC

TUESDAY DECEMBER 19

PLENARY SESSION: 8:30 a.m. - 10:30 a.m.

CLIMATE CHANGE: THE RESPONSE

Chairman: Dr. C.J.B. Zoeteman, Ministry of Housing, Physical Planning and Environment, The Netherlands

Invited

Panelists: Dr. Fred Bernthal, Assist. Secretary of State for Oceans Environment and Science, U.S.A., "Response Strategies Group IPCC"
Dr. Abdel Barr El Ghaini, Director, National Meteorological Service, Saudi Arabia, Vice Chair, IPCC

Dr. Pier Vellinga, Coordinator, Netherlands Climate Program, "Strategy alternatives to protect coastal areas"

Dr. Serge Antoine, Government of France, "Responses to climate change in the Mediterranean Region"

Prof. Dr. Genady Golubev, Moscow State University, U.S.S.R., "A Global Strategy to Respond to Climate Change"

Nelson Quinn, First Assistant Secretary, DASETT, Australia, "Response Strategies for Australia and the Pacific Islands"

Dr. Jean Ripert, Ministry of Foreign Affairs, France, "Response Strategies for Western Europe"



H.E. Eng. Maher Abaza



H.E. Dr. Youssef Wally

THREE SIMULTANEOUS PANELS: 11 a.m. - 1 p.m., 2:30 p.m. - 5:30 p.m.

A. ENERGY, INDUSTRY AND TRANSPORTATION

Chairman: H.E. Eng. Maher Abaza, Minister of Power and Electricity, Egypt

Co-Chairmen: H.E. Eng. Mohammad Abdul Wahab, Minister of Industry, Egypt
H.E. A. Kandil, Minister of Petroleum, Egypt

Director: Amory Lovins, Rocky Mountain Institute, U.S.A.

Rapporteur: Eng. Ibrahim Sadek, Engineering Consultant

*Presenters**and Discussants:*

Dr. El-Mohamady Eid, Chairman, EEAA, Egypt
Youssef Mazhar, Undersecretary, Industry Ministry, Egypt
Hal Holmes, Greenhouse Action, Australia
Michael Walsh, U.S.A.
Carlo LaPorta, R&C Enterprises, U.S.A.
Dr. Jovan Jovanovich, University of Manitoba, Canada
John Busterud, Ecology & Environment Inc., U.S.A.
Dr. Michael Oppenheimer, Environmental Defense Fund, U.S.A.
Dr. Issa El-Ayouty, Chairman, The Nile Bank, Egypt
Eng. Said Issa, Chairman, Egyptian Electricity Authority
Dr. Mostafa Swidan, Vice-Chair, Egyptian Electricity Authority
Dr. Ali El Saïdy, Chair, Nuclear Power Station Authority, Egypt
Dr. E. Dahmouh, Chair, Textile Industries Corp., Egypt
Alain Streicher, RCG/Hagler, Bailly
Dr. Shafik Gabr, Artoc Suez, Egypt
Eng. Ramzi Roshdi, American Chamber of Commerce of Egypt
Dr. Shuzo Nishioka, National Institute for Environmental Studies, Japan
Roger Mueller, Ministry of Foreign Affairs and Trade
Dr. Alberto Araoz, UNIDO
Dr. Ismail Wafa Kamel, UNIDO
Teymour Kooros, First American Bank, U.S.A.
Bernard Manowitz, Brookhaven National Laboratory, U.S.A.
Dr. Osama Khalifa, Chairman of the Board, Bechtel, Egypt
Dr. Mostafa El-Haiwagy, Director, Johnson Wax, Egypt
Dr. Ibrahim Elwan, World Bank
John Marrs, Managing Director, Xerox, Egypt

B. AGRICULTURE, FORESTRY AND WATER RESOURCES

Chairman: H.E. Dr. Youssef Wally, Deputy Prime Minister & Minister of Agriculture, Egypt

Co-Chairman: H.E. Dr. Essam Radi, Minister for Public Works and Water, Egypt

Director: Dr. Martin Parry, University of Birmingham, U.K.

Rapporteur: Dr. Abbas Kasseba, IFAD, Rome, Italy

*Presenters
and Discussants:*

Dr. Farouk El-Baz, Center for Remote Sensing,
Boston University
Dr. Olga Linares, Tropical Research Institute, Panama
Dr. Norman Myers, World Wildlife Fund, U.K.
Dr. M. Abu-Zeid, Chairman, Water Research Center, Egypt
Dr. Ata Qureshi, Pakistan, Climate Institute
Dr. Maggie McLeod, Founder, Tree Project, Australia
Dr. Dewey McLean, Virginia Polytechnic Institute, U.S.A.
Mme. Turkiya Ould Dadda, Embassy of Mauritania
Dr. Hassan Khedr, Undersecretary of Agricultural Economics,
Egypt
Dr. D.F.W. Pollard, Forests Canada
Dr. Teshome Wondafrash, National Medical Center
Dr. William Bolhofer, National Climate Program Office, U.S.A.
Dr. Y.A. Salah, FAO, Egypt
Prof. Nicholas Polunin, Switzerland
Dr. Ismail El-Bagouri, Director, Desert Research Institute, Egypt
Dr. Peter Gleick, Pacific Institute, U.S.A.
Dr. James Salinger, New Zealand Meteorological Services
Dr. Joyce Starr, Georgetown Strategic Center, U.S.A.
Dr. Philip Rutter, President, American Chestnut Foundation
Dr. Andrew Bennett, OEA, Great Britain
Gil Freeman, Greenhouse Action, Australia
Dr. Mohamed El-Khash, ACSAD

C. COASTAL AREAS, FISHERIES AND MARINE RESOURCES

Co-Chairmen: Honorable Tom Roper, Minister for Planning and Environment,
Victoria, Australia
Dr. Roger Blakeley, Secretary for the Environment, New Zealand

Director: Dr. Stephen Leatherman, Laboratory for Coastal Research
University of Maryland, U.S.A.

Rapporteur: Dr. Pier Vellinga, Coordinator, Netherlands Climate Program

Presenters

and Discussants: Prof. Bahaa' Bakri, Cairo University, Egypt
Prof. Mahmoud El-Sayed, University of Alexandria, Egypt
Lt. Col. Christine Debrah, Environmental Protection, Ghana
Dr. Gunnar Kullenberg, IOC, UNESCO
Clare McGee, Victoria Government, Australia
Dr. Farkhonda Hassan, Egypt
John P. Bond, Climate Institute, U.S.A.
Dr. Robert Worrest, EPA, U.S.A.
Mrs. Aliza Ames, University of Puerto Rico, U.S.A.
Dr. Mukang Han, Beijing University, People's Republic of China
Dr. William Hare, Australian Conservation Council, Australia
Dr. Alla Tsyban, Hydrometeorology, U.S.S.R.
Dr. M. Asaduzzaman, Bangladesh Institute of Development



H.E. Dr. Farouk Hosni

DINNER PANEL: 7:30 p.m. - 9:30 p.m.

Speaker: H.E. Dr. Farouk Hosni, Minister of Culture, Egypt

WEDNESDAY DECEMBER 20

SIMULTANEOUS PANELS: 9:00 - 12 00 noon

CLIMATE CHANGE: CAUSE, IMPACT AND RESPONSE

D. HUMAN HEALTH

Chairman: Dr. Wilfred Kreisel, WHO, Geneva
Director: H.E. Dr. Mamdouh Gabr, former Minister of Public Health,
Egypt
Rapporteur: Dr. Frederick Urbach, Temple University, U.S.A.
Presenter: Dr. David Rall, Director, National Institute for Environmental
Health Sciences, U.S.A.
Discussants: Prof. Dr. Aiy Massoud, Ain Shams University, Egypt
Dr. Shafika Nasser, Egypt
Dr. Dewey McLean, Virginia Polytechnic Institute, U.S.A.
Dr. Shuzo Nishioka, National Institute for Environmental
Studies, Japan

E. HUMAN SETTLEMENTS

Chairman: Dr. A. Ramachandran, Director, Habitat, Nairobi, Kenya
Director: Daniel Power, Climate Institute, U.S.A.
Rapporteur: Mme. Turkiya Ould Dadda, Embassy of Mauritania
*Presenters
and Discussants:* Professor Dr. Hassan M. Ismail, PACER Consultants, Egypt
Dr. Orman Granger, Trinidad and Tobago
Prof. Richard Odingo, University of Nairobi, Kenya
Dr. Pier Vellinga, National Climate Program, The Netherlands
Hon. Winsome McCaughey, Former Lord Mayor of Melbourne,
Australia
Dr. Shafika Nasser, Egypt
Dr. Maggie McLeod, Founder, Tree Project, Australia
Colin Franklin, Ecological Planning, U.S.A.
Dr. Nadia Atif, U.N. Consultant, Egypt

F. ANTIQUITIES AND CLIMATE CHANGE

Chairman: Dr. Hind Sadek, Egypt/U.S.A.
Director: Dr. Sayed Tewfik, Director of Antiquities, Egypt
Rapporteur: Dr. Fayza Haikal, Professor of Egyptology, A.U.C., Egypt
*Presenters
and Discussants:* Dr. Gamal Mokhtar, Antiquities Organization, Egypt
Lady Tickell, U.K.
Dr. Hassan Fekri, Ministry of Culture, Egypt
Dr. Stephen Leatherman, Climate Institute, U.S.A.
Nestor Benavides, Cultural Attache, Embassy of Peru
Paul Pritchard, President, NPCA, U.S.A.
Dr. Kent Weeks, ARCE, Egypt
Dr. Peter Dorman, Chicago House, Luxor
Dr. Margaret MacLean, Earthwatch, U.S.A.

G. LEGAL AND INSTITUTIONAL DEVELOPMENTS

Chairman: Sir Crispin Tickell, Permanent Representative to the United
Nations, U.K.
Director: H.E. Ambassador Dr. Nabil El Araby, Permanent Representative
of Egypt to the United Nations, Geneva
Rapporteur: Ambassador Richard Benedick, The Conservation Foundation,
U.S.A.

Presenters

and Discussants: Ambassador Alexander Borg Olivier, Permanent Representative of Malta to the United Nations
 Ambassador Abdel Halim Badawi, Egypt
 Ambassador Ahmed Sidki, Ambassador to France, Egypt
 Linda Topping, Esq., U.S.A.
 Phillip Noyce, Commission for the Future, Australia
 Dr. Peter Gleick, Pacific Institute, U.S.A.
 Dr. Hans Kaltenecker, UNESCO
 Eng. Ghaleb Abdel Rahman, Consultant, Egypt
 Alan Brown, Department of Foreign Affairs and Trade, Australia
 Mark Goldberg, Climate Institute, U.S.A.
 Sir Ninian Stephen, Ambassador for the Environment, Australia
 Dr. Fuad K. Hussein, Arab International Bank, Egypt
 Dr. Akio Morishima, Nagoya University, Japan
 Per Bakken, Ministry of Environment, Norway

H. CLIMATE RESEARCH

Co-Chairmen: Professor Gordon Goodman, Executive Director, Stockholm Environment Institute, Stockholm, Sweden
 Dr. Craig Black, Director, Natural History Museum of Los Angeles, U.S.A.

Director: Dr. Michael Oppenheimer, Environmental Defense Fund, U.S.A.

Rapporteur: Dr. Alan Hecht, U.S. National Climate Program Office

Presenters and Discussants: Dr. El-Mohamady Eid, Chairman, EEAA, Egypt
 Dr. William Riebsame, University of Colorado, Boulder, Colorado, U.S.A.
 Dr. H.N. Dalfes, Research Institute of Basic Science, Turkey
 Dr. A.F. Abdel Latif, Chairman, Science Academy, Egypt
 Dr. Ahmed El Masry, Director, Egyptian Meteorological Service, Prof. Dr. M. El-Shahawy, Egypt
 Abubaker Hashim, Nigeria
 Mohammed Kadi, Algeria
 Gian Vascotto, Ontario Hydro Research Division, Canada
 Dr. W. Degefu, Director, National Meteorological Service, Ethiopia
 Dr. David Stokes, Victoria College, Australia

WEDNESDAY DECEMBER 20: 12:30 p.m. - 2:00 p.m. (1 hour 30 min.)

LUNCHEON SPEAKER: Amb. Stephen Lewis, Chair, 1988 Toronto Conference



H.E. Boutros Ghali



Ambassador Stephen Lewis

CONFERENCE SITE

**Hotel Semiramis Intercontinental
 Cairo, Egypt
 Telephone: 355-7171
 FAX: 356-3020**

Cairo Conference (from page 1)

tance and financing to prepare for global warming, sea level rise and other anthropogenic changes in climate.

It is expected to encompass coastal mitigation responses, agricultural and water resource planning and technology transfer to encourage greater energy efficiency.

The Cairo Conference resolutions are expected to provide a major input to the IPCC process. To that end the Climate Institute is organizing an International Workshop on a Draft Framework Convention and Associated Protocols to be held in Washington, DC February 2-4, 1990. This meeting will seek to translate to convention and protocol language the concrete recommendations of the Cairo

RESOLUTIONS AND DRAFTING SESSIONS: 2:30 p.m. - 5:30 p.m. (3 hours)

Chairman: Senator Dr. Mohammed Kassar, Cairo University, Egypt
Drafting groups of panel chairpersons, directors and rapporteurs to develop reports to be submitted to Plenary Session Thursday December 21.

DINNER PANEL: 7 p.m. - 9:30 p.m.

Chairman: H.E. Boutros Ghali, Minister of State for Foreign Affairs, Egypt

Confirmed

Panelists:

Congresswoman Claudine Schneider, Rhode Island, U.S.A.
 Lt. Col. Christine Debrah, Chairman, Environmental Protection Council, Ghana
 Ambassador Stephen Lewis, Chairman, 1988 Toronto Conference, Canada
 Ambassador Alexander Borg Olivier, Permanent Representative of Malta to the United Nations

THURSDAY DECEMBER 21

BREAKFAST: 7:30 - 8:45 a.m.

ALL-DAY PLENARY SESSIONS: 9:30 a.m. - 12:30 p.m. & 2:30 p.m. - 5:30 p.m.

Chairman: Dr. Mostafa Tolba, Executive Director, United Nations Environment Programme (UNEP)

Discussants: Chairpersons of panels and invited participants

Session A: 9:30 a.m. - 12:30 p.m.

1. Summary review of panel resolutions presented to Chairman Mostafa Tolba by Conference Director, Dr. Hind Sadek
2. Presentation and discussion of each resolution by respective Chairpersons; open to discussion by conference participants; mediated by Chairman Tolba.

Luncheon Panel: 12:45 - 2:15 p.m.: NON-GOVERNMENTAL RESPONSES

Chairman: Dr. Mohamed T-El-Ashry, Vice President, World Resources Institute

Invited

Panelists: Manuel Guerra, Ashoka Society, Mexico City
 Phillip Noyce, Greenhouse Action, Australia
 Dr. Michael Oppenheimer, Environmental Defense Fund, U.S.A.
 Dr. Richard Odingo, Nairobi University, Kenya

Session B: 2:30 p.m. - 5:30 p.m.

Summation and recommendations by Chairman Dr. Mostafa Tolba.

CONCLUDING SESSION: 5:30 p.m.: Speech by H.E. Dr. Atef Sidky, Prime Minister of Egypt



H.E. Dr. Atef Sidky

Conference and its predecessor climate meetings.

The Conference Director is Dr. Hind Sadek, a Harvard Ph.D. in anthropology with broad experience in environmental and scientific areas including service as Director of the National Museum of Natural History of Iran and as Egypt's representative to the Fourth World Wilderness Congress. A Senior International Fellow at the Climate Institute, Dr. Sadek has played a pivotal role in encouraging wide scale participation from top governmental, corporate and cultural leaders in Egypt as well as United Nations organizations.

The Netherlands Ministerial Conference Agrees CO₂ Should Be Stabilized

Environmental officials from 68 countries, meeting by invitation from The Netherlands on November 6 and 7, agreed on a declaration affirming the need to stabilize carbon dioxide emissions as soon as possible. Carbon dioxide is a principal contributor to the greenhouse effect. The Ministerial Conference on Atmospheric Pollution and Climatic Change was the first on such a level to deal solely with global warming. The group noted that many industrialized nations believe such a goal should be reached by the year 2000.

As emissions have been rising at a rate of 3 to 4 percent a year, the goal of maintaining them at the present level would actually involve significant cuts in future growth. It would require big advances in energy conservation, large investment in renewable fuel sources like solar energy and greatly increased automobile fuel economy.

Representatives at the non-binding discussions also decided the specific level of emissions to be stabilized should be set at the Geneva World Climate Conference, to be convened in November 1990 following the report by the Intergovernmental Panel on Climate Change. The U.S., Japan and the U.S.S.R. had insisted that specific emissions goals should await the completion of the IPCC process.

The nine-page declaration issued by the gathering included a pledge that governments should work toward adoption of an international treaty on global warming by 1992, a commitment to 30 million acres of annual reforestation and a promise to explore methods of funding for Third World countries to help them lower emissions. In addition to the Dutch government, the meeting was sponsored by the U.N. Environment Programme and the World Meteorological Organization.

According to 1985 U.N. figures, the United States produced 23 percent of carbon dioxide in the atmosphere, the Soviet Union 19 percent, China 10 percent, Japan 5 percent, West Germany 4 percent, Great Britain 3 percent, and France, East Germany and Poland each 2 percent.

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Arctic Conference Highlights Human Impacts of Global Warming

A unique element of the Climate Institute's conference on the Arctic and Global Change was the bringing together of scientists and policy makers with the people who would experience the effects of melting permafrost and glaciers, shifts in the caribou and fish populations on which they depend, and the building of hydroelectric dams and transmission lines (for "clean" energy) which disrupt their lives.

The 3-day meeting was held at the Skyline Ottawa Hotel in Ottawa on October 25-27 and included luncheon addresses by two Canadian ministers as well as talks by specialists in the many disciplines concerned about the Arctic and representatives of native peoples.

The Conference was followed by a workshop on permafrost organized by the Geological Survey of Canada.

On the opening day Canadian Minister of the Environment Lucien Bouchard reported that just two days previously at the U.N. he had pledged Canada's support for concluding a convention on climate change by 1992. He had also "added Canada's name to a small but growing list of countries calling for the first of the implementation protocols to be negotiated simultaneously."

He listed the policy options before governments in Canada and other industrialized nations: (a) to eliminate CFC consumption by 1999, (b) to reduce CO₂ emissions by 20 percent of 1988 levels by the year 2005. In Canada this would mean learning to produce a unit of GNP with less than half of current CO₂ emissions.

Many of the conference speakers pointed out the extreme sensitivity of the Arctic to global change. "The Arctic is the World's canary," said Dr. Pat Webber of the University of Colorado, and global change in northern areas does not just encompass climate change but, in addition to acid deposition, ozone depletion and air pollution, it also includes industrialization, urbanization and waste disposal.

The Arctic contains the only truly polar ocean on earth, said Dr. Vera Alexander of the University of Alaska, and nowhere else do the terrestrial and marine ecologies merge so intimately. The cold waters, despite their low temperatures, exhibit extremely high biological productivity and are home to the major fishery areas of the

world and to spectacular populations of marine birds and mammals including whales. Arctic ice serves as a substrate allowing plants to grow at the ice/water interface and support an incredibly diverse community, comparable in richness to that of a tropical reef. A possible consequence of global warming--the reduction in sea ice--would strongly affect phytoplankton growth and the fish, sea birds and mammals that rely on it.

In the northern biosphere, the increase of the greenhouse gas methane must be added to the more commonly expressed concerns about the increase in CO₂. A molecule of methane has the capacity to do as much damage as 30 molecules of CO₂, said Gordon MacDonald of the Mitre Corporation. A one percent temperature increase may lead to a 10 percent increase in methane production in the Arctic region. Climate warming could release some of the north's enormous supply of methane clathrates--the reservoir of methane locked in the permafrost in a frozen state.

Half of Canada and the U.S.S.R. are underlain by permafrost, according to Professor Hugh French of the University of Ottawa, and some zones of permafrost may consist of 30-40 percent ice. Fifty percent may be lost by runoff or evaporation during global warming. The effects on technology and on society could be enormous--on roads, pipeline design, the installation of facilities in the Arctic.

The planning of settlements should come before the building of the highways, pipelines and bridges, said Dr. Peter Oberlander of the University of British Columbia. Since the choice of where people want to live and where they can

Continued on page 11

CLIMATE ALERT

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Antarctic Ozone Hole Reaches Record Size Again

The ozone hole over Antarctica this year has equaled the record-setting hole of 1987, according to NASA scientists.

From early August the hole dropped approximately 1.5 percent per day, reaching a minimum value of ozone within the hole of 45 percent by October 5. The observations were monitored by the Total Ozone Mapping Spectrometer on board NASA's Nimbus-7 satellite.

The size of the hole and the degree of depletion vary from year to year depending on temperature and polar wind conditions. When the polar vortex, a mass of rapidly rotating air constrained by surrounding weather systems, is undisturbed and temperatures are especially cold, conditions are set for a larger hole. These "ideal" conditions existed in August and September this year.

In the months of austral spring as sunlight returns, the light acts on the ice clouds that formed in the lower stratosphere--an altitude of 6 to 12 miles--during the dark, cold winter, initiating a chain reaction between the chlorine from the CFCs and ozone.

Stratospheric ozone loss in the southern hemisphere covers a wider area than previously thought, according to a recent report in the British journal *Nature*. It began 342 miles outside the boundary of the polar vortex, which covers most of Antarctica, and reaches almost to Cape Horn at the southern tip of South America, the article reported. The findings are based on an analysis of August 1987 measurements, made in stratospheric flights.

The ozone-depleted area is not expected to increase nor to threaten populated areas. The ozone loss is also not as great as that surrounding the hole itself. Nevertheless, it surprised and perplexed atmospheric scientists. It was found to result not from air transported from the polar vortex but probably from reactions between ozone and other chemicals in the regions outside of Antarctica.

Other investigators have found air partly depleted of ozone has been carried to New Zealand and southern Australia after the ozone hole breaks up in late spring.

The planetary waves of air govern not only Antarctic weather but the jet stream and storm fronts around the world. It is not

known what effect the annual ozone destruction is having on global ozone levels. There is evidence conditions for formation of an ozone hole in the Arctic may also be developing although they are not as severe as at the South Pole.

The Montreal Protocol--ratified by 45 countries--which went into effect January 1, 1989 freezes CFC production at 1986 levels starting in 1990 and reduces it in steps until it has been cut in half by 1998. Recently, because ozone depletion is so severe, there has been serious discussion of a complete CFC phaseout by the year 2000.

The EPA announced in October that more large companies have agreed to eliminate CFCs and halons in their worldwide operations. The firms, among the largest users of the chemicals, include the Boeing Company, Digital Equipment Corporation, Ford Motor Company, General Electric, Honeywell, Inc., Motorola, Inc., and Texas Instruments. The companies have agreed to share technical information on new alternatives and work with their suppliers and others to curb the use of the chemicals.

American Telephone and Telegraph Company, Northern Telecom Inc. of Canada and Seiko Epson of Japan have already pledged to end the use of CFCs in the near future. In 1988, the duPont Company pledged to cut output of CFCs by 95 percent by the year 2000.

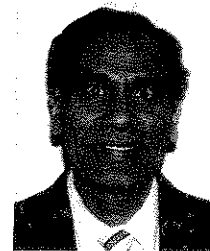
Early toxicity tests results from a consortium of 15 chemical producers worldwide suggest that three leading alternative products--hydrochlorofluorocarbon (HCFC) 123, HCFC 141b and hydrofluorocarbon (HFC) 134a--are not significantly toxic. One time-consuming test remains--administration of low doses to rodents for two years to determine whether the products are carcinogenic. Among drawbacks to the new chemicals are that they do not perform as well as CFCs and are more expensive.

The Underwriters Laboratories, a consumer-products testing concern, in September endorsed several new machines that will recycle the refrigerants used in auto air conditioners. Although the machines cost from \$2,500 to \$7,000 apiece, manufacturers argue they will quickly pay for themselves as the cost of CFC-12 rises with slowed production; in addition, they will help the environment.

The U.S. Department of Interior Secretary Manuel Lujan, Jr. has announced that non-biodegradable products, primarily cups, plates and trays, will be banned from

Forestry Symposium

Forest experts from the U.S., Canada and other nations will assemble in Washington in May 1990 to consider ways to meet the threat of climate change to North American forests. The conference, which will be held May 15-17 at the Quality Inn Capitol Hill Hotel, will be convened by the Climate Institute, the U.S. Forest Service and the U.S. Environmental Protection Agency.



Dr. Ata Qureshi

Representatives of Forests Canada, the American Forestry Association, the Adirondack Park Agency, and other organizations will actively participate in an examination of response strategies to protect forests and natural ecosystems. They will discuss the utility of enhancing reforestation rates on public and private forest lands, afforesting surplus agricultural lands, tree planting in urban areas and highway corridors, research on energy efficient plantations and other mitigation and adaptation strategies.

Policy makers and public and private sector decision makers will meet in workshops with scientists, forestry and natural resources personnel, and representatives of trade associations and environmental organizations to hammer out concrete actions of use to public and private land managers.

Conference preparations are underway just as Senator Patrick Leahy of Vermont, Chairman of the Committee on Agriculture, Nutrition and Forestry, has unveiled a comprehensive bipartisan bill to promote reforestation as a major element of an aggressive effort to address the prospects of global warming. President Bush's administration is also considering major reforestation initiatives. Dr. Ata Qureshi, who is a Senior Scientist at the Climate Institute and has previously chaired a world Tropical Forest Land Assessment and Management Conference, is serving as Conference Director. A Conference Registration form can be found on page 15.

the Department's main cafeteria starting November 1, as a step to demonstrate concern about the environment. He is urging concessionaires at national parks to adopt a similar ban. CFCs are used in production of some plastic food covers.

Climate News Around the Globe

Argentina

During the May 1989 Montreal Protocol Conference in Helsinki, the Argentine delegation pledged support for the initiative to eliminate total production of CFCs by the year 2000. The Vienna Convention has been ratified by the Argentine Parliament. The Montreal Protocol is in the process of being ratified. The Argentine Aerosol Board has also pledged support for the Montreal Protocol. The Board had decided to cease production by 1992 of CFCs used as propellants.

Australia

Prime Minister Hawke, joined by state premiers from New South Wales, Victoria and South Australia, issued on July 20 a major federal statement on environment. This will include a review of environmental research (with intent to upgrade) and stronger Australian participation in international environmental issues, particularly for the development of framework conventions on climate change and biological diversity. The government pledged to add \$72 million (U.S.) over three years to the budget for environmental projects. The government will commit \$15 million (U.S.) over four years for special environmental assistance projects within its foreign aid program. A new position, Ambassador to the Environment, has been created. Former Governor General Sir Ninian Stephen has been appointed as the first ambassador. Australia has announced it will plant 1 billion trees by 2000.

Brazil

The wettest year during a dry season in a decade has reduced the number of Amazon forest fires this year. In addition, Brazil has made several policy changes that are believed to have slowed the burning. The government has suspended tax incentives that made it artificially profitable for landowners to clear large expanses of jungle for cattle ranches. Also a constitutional provision has been adopted which no longer penalizes owners of unproductive or "unimproved" lands.

Forestry agents of the Brazilian Institute of Environment and Renewable Natural

Resources have levied \$10 million in fines in the month preceding mid-September to landowners burning forest lots without a permit. No permits were granted for clearing of more than 200 hectares (just under 500 acres).

An \$8-million low-interest loan from the World Bank, matched by an appropriation from Brazil's Congress was used to rent helicopters, buy pick-up trucks and pay forest agent salaries. Five helicopters and 60 pick-up trucks strengthened the fire-prevention campaign.

A 3-year old monitoring campaign is directed by Alberto Setzer using photographs taken by a National Oceanic and Atmospheric Administration satellite. During the first half of this year's four-month dry season, the satellite recorded that 59,000 fires destroyed 13,000 square miles of forest—an area about the size of New Jersey and Connecticut.

The Brazilian Institute for Environment and renewable natural resources (IBAMA) issued a regulation establishing the integrated forest/industry plan (PIFI). Under PIFI, businesses which use native forest products as raw material or as a source of energy will not be able to use virgin forest products after 1995.

Bulgaria

Foreign diplomats and delegates from 35 nations attended an international conference on environmental protection held in Sofia, Bulgaria, from October 16 to November 3. On the last day, an unofficial ecology group called Eco-Glasnost organized a brief march and rally outside the National Assembly in the country's first mass protest in 40 years.

Six Eco-Glasnost members handed a petition on environmental problems, containing 11,545 signatures, to National Assembly Deputy President Angel Dimitrov. He said it would be considered. The crowd cheered, sang the national anthem, shouted for democracy and glasnost, and dispersed after about 15 minutes.

Canada/U.S.

Saying that gains in controlling pollution over the last two decades have been endangered, officials of the two nations called for

an expanded commitment to clean up the lakes, the world's largest surface source of fresh water.

Speaking at simultaneous news conferences were William K. Reilly, Administrator of the U.S. EPA, in Chicago, and Jim Bradley, minister of the environment for the Province of Ontario, and Perrin Beatty, Federal Health Minister for Canada. They said the lakes are facing a "critical situation" because of toxic contamination and destruction of wildlife habitat. They concluded that urgent action is needed by Federal, state, provincial and local governments to reverse widespread, long-term environmental degradation of the Great Lakes. Mr. Beatty said Canada has recently doubled the amount it would spend on pollution cleanup in the lakes.

Costa Rica

An iguana farming project at Orotina, Costa Rica, is part of a multi-pronged, internationally financed project to persuade peasants to save tropical forests by saving their trees as a home for iguanas. The researchers see iguana farming as the first step toward the creation of a diverse agriculture system based on the forest. Instead of changing the environment to suit the needs of livestock, the farmers would select animals that complement the natural vegetation.

Reared in captivity and released into the wild as yearlings, the iguanas can produce at least as much high protein meat per acre as cattle and taste somewhat like chicken. At present the iguana is virtually extinct in Costa Rica.

The Projects were started seven years ago by the Smithsonian Tropical Research Institute, and iguana farming was originally financed by the W. Alton Jones Foundation of Virginia. The research is now supported by the World Wildlife Fund, the Dutch Government, the U.S. Fish and Wildlife Service and the International Conservation of Nature and Natural Resources.

Europe

Environmental ministers from the European Community's 12 member nations agreed in June to impose emission standards for new small cars in 1992 similar to

those enforced in the U.S. since 1983. Standards for large cars were scheduled to take effect October 1 although some countries, including Britain, are resisting them.

Finland

On September 13 in Moscow, Finnish Minister of the Environment, Kaj Barlund, and Soviet Environment Minister, Nikolai Vorontsov, agreed to a mutual reduction of trans-border air pollution. This is probably the world's first such bilateral agreement. The protocol was signed in Moscow in September and the agreement itself during Gorbachev's visit to Helsinki in October.

A Coalition for Environment and Development, headquartered in Helsinki, is planning to mobilize a major people's movement against the "ditching" (draining) of peatlands. A memorandum from the group states, "When peatlands are ditched, the organic material in them starts to decompose by a much accelerated rate, and peatlands are transformed from carbon sinks to important sources of carbon dioxide."

Finland has already ditched about half of its peatlands (amounting to one-fifth of the land area of the whole country), according to the memo, and may already have caused larger carbon dioxide emissions than the burning of fossil fuels.

Many important questions on the impact of draining of peatlands remain to be answered, and the importance of the issue will increase if climate warming leads to the melting of Arctic permafrost which could produce an important new source of methane, the second most important greenhouse gas after carbon dioxide. The group calls for governments to initiate an international research program, investigating "how the draining of different kinds of peatlands in different climate zones affects their methane and carbon dioxide production."

France

French research minister Curien presented France's 1990 civilian R&D budget estimated at \$7.2 billion (U.S.), representing an increase of 7.1% over the previous fiscal year. Included will be a 13 percent increase for the ministry of environment and a 30 percent increase for the national meteorological agency.

France is hosting the 15th Antarctic Treaty Consultative Party (ATCP) in Paris, October 9-19. The role of Antarctica in understanding and monitoring global

change, including the ozone layer is an agenda item.

Federal Republic of Germany

On June 21, 1989, the federal cabinet passed the program, "Environmental Research and Technology, 1989-1994," providing the framework for the federal environmental policy for the coming years. It is budgeted at \$297 million (U.S.) for 1989. The federal minister for research and technology, Heinz Riesenhuber, announced within this framework a new priority research project on the greenhouse effect. This project would focus on the coordination of scientific measurements and investigations about causes and consequences of global warming. A long term goal is to provide techniques for forecasting global climatic changes as well as regional changes of temperature and precipitation in correlation with changing concentrations of trace gases. This project will be funded up to \$8 million (U.S.) through 1993.

In a recently released report, the federal ministry for food agriculture and forestry states that forest damage in many European countries is linked to worldwide climate warming. The report urges measures to restore forests to counter the effects of climate change.

Greenland

The 2nd Greenland Ice Sheet Project, a cooperative effort of 11 major research institutions, in June began a 5-year ice drilling activity in central Greenland. Scientists will retrieve, analyze and interpret a 3,000 meter ice core, drilled to the base of the sheet, to retrieve a high-resolution climatic time series over the last glacial cycle, hoping to attain a clearer understanding of the mechanisms that drive the earth's climate system.

Hungary

The Foreign Ministers of four Central European countries, Hungary, Italy, Austria, and Yugoslavia, met in Budapest on a mid-November weekend to start a regional cooperation group. The assemblage was unusual because it included a Warsaw Pact member, a NATO member, and representatives of one neutral and one Communist non-aligned country.

The four agreed their association would be open to newcomers. They will explore how they can deal with each other on concrete projects, and plan to set up special groups to coordinate action on, among other topics, environmental protection and their common environmental problems.

The National Meteorological Service of Hungary planned to start issuing a quarterly newsletter, *Atmoszfera*, providing information on climate variability, potential climate change, atmospheric pollution, and climate-related ecological and economic impacts. It will be distributed among experts, researchers, and decisionmakers in the fields of meteorology, hydrology, agriculture, and environmental and energy management. It will be issued in Hungarian, but a special section on "climate variability and climate change" will be in English as part of a review published by the Ministry for Environment and Water Management.

Initiative for the newsletter comes from a UNEP-sponsored international workshop last spring organized by NCAR's Environmental and Societal Impacts Group. Editors are: Z. Ivanyi, T. Farago and J. Zakonyi, P.O. Box 38, H-1525, Budapest, Hungary.

Malaysia

Malaysia acceded to the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on August 29, 1989 when it deposited its ratification note with the U.N.

Mexico

The Mexican national development plan for 1989-1994 has named water, ecology and environment as the top areas for priority consideration in future Mexican S&T international cooperative programs.

The Netherlands

A public opinion poll by the University of Amsterdam among Dutch households showed that the Dutch are prepared to pay an extra 20 dollars per month as of November 1989 for environmental measures to be implemented under the government's national environmental policy plan. This is 1.5 times more than currently required.

On September 15, Environment Minister Nijpels submitted his 1990 environmental budget calling for 580 million dollars.

Additional money will be sought during 1990 to cover spending announced in the National Environment Policy Plan. Minister Nijpels has requested over 12,000 large Dutch companies which pose extra risk to the environment to draw up an environmental control plan within five years.

Niger

During their annual meeting in Addis Ababa from April 13 to 28, the ministers responsible for economic development and planning of the United Nations Economic Commission for Africa (ECA) agreed to establish an African Center for Meteorology as it Applies to Development (ACMAD), headquartered in Niamey. The organization will deal with all matters related to meteorology. ACMAD will require an estimated financial backing of some ten million dollars during its first five years of operation.

Norway

In Norwegian national elections in September, the Labor Party of Prime Minister Harlem Gro Brundtland lost 10 percent of its support. (Mrs. Brundtland addressed the Toronto Conference on the Changing Atmosphere in June 1988 and earlier chaired, at the request of the Secretary-General of the United Nations, the World Commission on Environment and Development which issued what is known as the Brundtland Report, entitled "Our Common Future.")

Mrs. Brundtland officially stepped down October 13 and her government was replaced by a coalition of right-wing parties.

South Pacific

An intergovernmental meeting of countries (island nations) of the South Pacific was held in Majuro, Marshall Islands, July 16-20, 1989. The purpose was to identify climate change problems which can be addressed throughout individual government planning agencies and by regional and inter-regional cooperation.

Spain

After one of the driest winters this century and a hot, parched summer, Spain is suf-

fering one of its worst years of forest fires, according to the National Institute for Nature Conservation.

The brunt of the fires is concentrated on the northern Atlantic seaboard, known as "green Spain," stretching from Galicia in the east to the Basque country. Normally the wettest and coolest region in the country, Galicia has had 50 percent of the fires this year and more than 30 percent of the land destroyed.

As of late August, 11,420 fires have destroyed 547,000 acres in the country since January, compared to 3,392 fires and 91,000 acres for the same period last year. While the fierce heat and severe drought contributed to the rise in forest fires this year, only 4 percent of all fires in Spain can be traced to natural or accidental causes. Officials of the Institute say that, in Galicia especially, dangerous and obsolete agricultural practices like the burning of pastures or brushland in spring, fanned by strong southerly winds, are a principal cause. Arson is another important cause, either to settle accounts with a neighbor or, as a potential buyer, to pay less for damaged timber.

The consequences, in the medium and long term, are serious, leading to degradation and loss of soil fertility. Stripped of undergrowth, the land is then subject to flooding in heavy rains.

Turkey

A recent paper argues that introduction of hydrogen as a main energy carrier can reverse the building concentration of carbon dioxide, although there would be a delay of between three and six decades.

The study, "Remediation of Greenhouse Problem Through Replacement of Fossil Fuels by Hydrogen," was originally a Ph.D. thesis of I. Guerkan of Anadolu University, Ekisehir, Turkey. Co-authors of the present paper, published in the April 1989 issue of the International Journal of Hydrogen Energy, include M.M. Padki of the University of Miami's Clean Energy Research Institute and R. Nejat Veziroglu, present of the International Association for Hydrogen Energy.

United Kingdom

Britain and Brazil have recently reached an agreement to cooperate on rainforest conservation. Brazil and Britain will work together on projects concerned with the management and steady renewal of tropical forests.

Secretary of State for the Environment, Christopher Patten, gave a major address to the Conservative Party conference at Blackpool on October 11, where he outlined his plans for the formulation of an environmental white paper over the course of the next year which would establish an environmental agenda for the rest of this century.

The Association for the Conservation of Energy issued a study in July suggesting that CO₂ emissions cuts of 18 to 23 percent are possible in the next 15 years. This efficiency scenario--described as "economic growth that is greenhouse friendly"--emphasized efficiency improvements in appliances, motors, and automobiles, some switching to natural gas, and development of cogeneration. Copies of the report, Solving the Greenhouse Dilemma, A Strategy for the U.K., are available from ACE in London, 01-935-1495.

U.S.S.R

Bowing to demands by worried local residents, the Soviet Union dropped plans to complete a plant to dispose of chemical weapons at Chapayevsk on the Volga River. The move was an indication of the increasing willingness of Soviet authorities to listen to the country's growing environmental lobby. The plant will be converted to a training center for industrial methods of eliminating toxic agents, according to a Tass news report. Ecology and the environment also figured as important issues in recent political maneuvering in the Turkic Republics of Azerbaijan, Uzbekistan, and Kazakhstan.

United States

New Jersey recently adopted a Global Climate Change Initiative which was implemented in an executive order signed by Governor Kean on October 23. The initiative proposes seven strategies to reduce the state's greenhouse gas emissions and prepare for anticipated effects of climate change: (1) reduce the State's energy consumption and CFC use, (2) encourage energy conservation and emission reduction by regulatory and other means, (3) consider regulatory steps to reduce CFC use, (4) maximize the number of trees in New Jersey, (5) understand and plan for sea level rise, (6) use greenway policies (providing corridors for migration of plants and animals) to aid natural adaptation to global

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Thatcher Advocates Climate Treaty After 1990 IPCC Report

In an address to the United Nations General Assembly devoted solely to global warming, Prime Minister Margaret Thatcher of Great Britain warned of resulting devastating floods and food shortages over wide areas. Her speech, on November 8, urged the body to complete a treaty by 1992 that would require action stabilizing the world's climate.

She said the treaty should be supplemented by specific, binding agreements regulating the production of greenhouse gases that could raise global temperatures, melt glaciers, raise sea level and disrupt rainfall patterns. She warned of the particular difficulty of limiting greenhouse gas emissions because it involves restricting consumption of oil and other fossil fuels. Unless the restrictions are obligatory and carefully mon-

itored, she said, the countries respecting them would be put at a competitive disadvantage in world trade because of the burdens the regulations would impose on industry.

However, Mrs. Thatcher said the steps taken should be based on sound scientific analysis of the effects of the different gases and the ways they can be reduced. The world should wait for an international scientific panel to submit its report on global warming next summer, she advised, before making detailed plans for action.

The U.N. General Assembly is expected to approve a resolution in December setting up a negotiating body to draft a climate stabilization treaty for approval of the World Environment Conference, scheduled to meet in Brazil in 1992.

Arctic Conference

Continued from page 6

make a living is not only affected by climate but actively affects climate, this interdependence must be taken into consideration. We should increase our knowledge base of the factors involved, he continued, and then act on that knowledge in patterns of planning for the future.

Global warming could bring increased problems to defense in the north, in the shape of more clouds, fog and icebergs, said Lt. Col. Ian Cowan of National Defence Canada. Its significant effect on ice, precipitation and permafrost would have to be monitored carefully as would the possible opening in summer of a north-west passage, because of security considerations.

The dinner speech on the second evening by John Amagoalik, President of the Inuit Papisat, and the final panel the following morning chaired by Jim Bourque, Deputy Minister of Renewable Resources of the Northwest Territories, brought a viewpoint rarely seen at climate conferences.

Global change could be as big a threat to our society as our introduction to white society has been, said Norma Kass, a member of the Yukon Legislative Assembly for Old Crow.

What will be the effect on trapping for furs of milder winters--and a lesser demand for fur asked Bill Klassen, a deputy minister of Yukon Territories.

My income depends on commercial fishing, said Adeheid Hermann, a State Representative from Bristol Bay, Alaska, and the returns from salmon fishing are declining. She is apprehensive global warming may bring disaster to her and her fellow fishermen.

The limit in the capacity of the earth to sustain us on our present course is staring us in the face. A shift in our thinking and a redirection in our resources must be the catchword of the 1990s, John Amagoalik stated.

Conference Director, J.A.W. McCulloch, introduced Dr. Kenneth Hare for final reflections on the meeting. How much time do we have? Hare asked. We need to make decisions now about objectives five decades down the road. Everything conspires against this--our own individual thinking and that of politicians. But we have begun to understand that we have begun to undermine the foundations on which we live. We must begin to ask not what can "they" do but what can we do, he concluded.

Energy Meeting Switches Focus from Price to Environment

Concern about the environment, particularly global warming, dominated discussions, technical papers and major addresses at a World Energy Conference meeting in Montreal in September. "Environmental policy is driving energy policy," said Dr. Elihu Bergman, executive director of Americans for Energy Independence, a conservation organization based in Washington, DC. The conference demonstrated a sharp shift in focus for the 3,400 delegates from 91 countries whose worries at the last meeting three years ago had centered on price and supply.

If the developing world population increases its energy consumption at a modest rate of 2.3 percent a year, the combination of population growth and higher consumption would quadruple world energy demand in 75 years, according to one speaker. It was pointed out that each North American uses seven times as much energy as people of the third world, whose major concerns are food supply and fuel for cooking and warmth. India uses a barrel of oil per year per person, Brazil 3 barrels, and the U.S. 45, illustrating the relative energy contribution to the carbon dioxide buildup. A fair allocation of the burden of cutting emissions from fossil fuels will obviously be very difficult.

A study on energy growth, "Global Energy Perspectives 2000-2020," predicted that with moderate economic growth, third world use of coal would triple between 1985 and 2020; use of oil would double and use of natural gas would more than triple. Around the world, according to the study, coal use would be up 51 percent, oil 66 percent and natural gas 58 percent. Nuclear power use was assumed to more than triple, amounting to 7 or 8 percent of the total compared with 4 percent now.

Netherlands Meeting (from p.6)

Eduardus Nijpels, Netherlands interim Environment Minister, told the conference The Netherlands would cut carbon dioxide emissions in 1990 by 2 percent, and continue to curb it at that rate up to a total of 8 percent in 1994, making it the first country to take such action. Although the Dutch government recently reshuffled, the new Christian Democrat-Socialist coalition which took office in early November, said it would put the plan into action.

Around the Globe

Continued from page 10

climate change, and (7) improve public information about the causes and effects of global climate change.

Yugoslavia

Participants in the recently concluded ninth summit of the non-aligned movement issued for the first time an 11-point summary containing their positions concerning the future course of negotiations and work on global environmental issues. NAM summit participants noted their support for both the convening of the proposed Second United Nations Conference on Environment and Development in 1992 and the offer of Brazil to host it.

Japanese Program

Continued from page 16

of carbon dioxide that year were 416 for Sweden, 426 for West Germany, 448 for the U.S.A., 1,135 for the U.S.S.R. and 2,730 for China.

The Chairman's Summary for the Tokyo Conference made the following recommendations: strong support for the activities of the Intergovernmental Panel on Climate Change (IPCC), international support for research to reduce uncertainties about likely climate changes, intensified efforts to make technological breakthroughs in energy conservation and in low greenhouse gas technologies and on means of removing carbon dioxide, consideration of technical and legal aspects of a framework convention on climate change to ensure its early adoption, a tightening of controls over CFCs and other ozone depleting substances, and international assistance to developing countries to enable them to respond to climate change. The statement also endorsed aggressive action to end destruction of tropical forests, to provide national parks, sanctuaries and biosphere reserves for the conservation of biological diversity, as well as a massive program of reforestation.

The Tokyo Conference statement already appears to be emerging as a strategy guide to Japan's international development assistance program as it seeks to implement Prime Minister Kaifu's multi-billion dollar environmental aid package.

North American Conference Proceedings Available

Demand has been brisk for the Climate Institute's volume, Coping With Climate Change (John C. Topping, Jr., Editor, Climate Institute, 316 Pennsylvania Avenue, S.E., Suite 403, Washington, D.C. 20003, 1989), the Proceedings of the Second North American Conference on Preparing for Climate Change.

Copies are still available. The book may be ordered directly from the Institute for \$35.00 plus shipping and handling (\$2.50 within U.S., \$6.00 for Canada, \$10 surface mail elsewhere; air shipping overseas available at recipient's expense). The 710-page volume, weighing approximately 5 pounds, contains contributions from 150 co-authors on climate change effects, ranging from global warming's effects on mammalian reproduction to implications for insurance companies.

The volume includes convenient segments--a policy overview, scientific overview, and chapters on oceans and atmosphere, human health, agriculture, ecological effects, water resources, urban planning, corporate planning, coastal policy, energy strategies, and international climate cooperation, as well as chapters on seven regions: the Caribbean, the Arctic, Atlantic Canada and New England, the Great Lakes, the Southern U.S., the Chesapeake Bay and California.

Temperatures in Central China Highest Since Last Ice Age

Ice cores from the Tibetan plateau reveal that temperatures in central China have been higher in the last fifty years than in any period since the end of the last ice age about 10,000 years ago, according to a report published in October.

Lonnie Thompson of the Byrd Polar Research Institute at Ohio State University and Xiaoling Wu of Lanzhou Institute of Glaciology and Geocryology removed three 450-foot cores from the Dunde icecap in central China. Changes in dust and in chemicals such as sulfates in the layers of the cores enabled the research team to fix dates with precision back 4,500 years. Models of ice flows assisted them in dating

Report Details Climate Change Effects on Sub-Saharan Africa

Scientists from 13 African countries participated in a workshop on the effects of global climate change on the sub-Saharan countries of Africa from September 11-15 in Saly, Senegal. Representatives from Japan, Venezuela and the United States also participated in the sessions which focused on impacts on the agriculture and ecology of the region.

Cornell University's Global Environment Program, the meeting's sponsor, has already issued a workshop report which also provides updated evaluations of climatological models as well as methodologies for evaluating effects of climate change on agriculture and ecology. Other sponsors of the project include Organization of African Unity/SASGRAD and ISRA.

Copies of the volume, The PAN-Earth Sub-Saharan Africa Workshop Report, are available from Global Environment Program, Center for Environmental Research. Contact Mark Harwell, (607) 255-5186.

older ice which was twisted and compressed by the heavy layers above it.

The scientists were able to ascertain ancient temperatures by investigating the ratio of different types of isotopes of oxygen trapped in the ice. The molecular weights of the oxygen isotopes vary leading them to evaporate at different rates. These differences yield clues about how warm it was thousands of years ago.

Warm and cold periods have succeeded each other during the time since the last ice age ended, the cores reveal, but temperatures in central China have been highest in this century. The cores also showed that temperatures in the last 50 years were two to 5 degrees Fahrenheit warmer than in the previous 50 years.

Climate modelers have said large land masses such as central China are significant places to look for global climate trends because they are less subject to the mitigating influences of the oceans which tend to absorb excess heat and dampen signals of warming.

The research team hopes to compare its results with ice cores taken from Greenland and Antarctica under drilling programs at the National Science Foundation.

1989 - 1991 Calendar of Climate-Related Events

1989

- December 11-14 *Cairo, Egypt*
International Seminar on Climatic Fluctuations and Water Management, sponsored by Ministry of Public Works and Water Resources, Government of Egypt, United Nations Environment Programme, International Water Resources Association.
Contact: Asit Biswas, U.K., (0865) 57608
- December 11-15 *Cairo, Egypt*
Pesticides, Environment and Public Health, Third World Conference on Environmental and Health Hazards of Pesticides, organized by Board of Egyptian Society of Pesticides Hazards.
Contact: Mahmoud M. Amr, (202) 24 33224
- December 11-15 *Brisbane, Australia*
IPCC Model Predictions, Working Group 1 Subgroup.
- December 17-21 *Cairo, Egypt*
World Conference on Preparing for Climate Change, convened by Climate Institute, United Nations Environment Programme, Government of Egypt.
Contact: Hind Sadek, 202/547-0104
- December 31 *World TV*
The Earth Concert, 12-hour live TV concert.

1990

- January 4-6 *New Delhi, India*
Energy-Environment-Development--12th Annual International Conference of the Tata Energy Research Institute. Discussion of sustainable global development with representation from developed and developing countries.
Contact: Kapil Thukral, Telex: 031-61593 TERI UN
- January 21-24 *Chapel Hill, NC*
Environmental Change and Public Health: The Next 50 Years, organized by University of North Carolina School of Public Health.
Contact: Brenda Mauer, 919/966-4032
- January 28-31 *Mayaguez, Puerto Rico*
Symposium on Ocean Remote Sensing of Caribbean Basin. Sponsors: Marine Sciences Dept. and Sea Grant Program, Univ. of Puerto Rico, Mayaguez; National Ocean and Atmospheric Administration; Caribbean Div. of American Association for the Advancement of Science.
Contact: Pablo Clemente-Colon, 301/763-4244

February Date Undecided (Tentative)

- Nagoya, Japan*
United Nations Environment Programme/ILEC Expert Group Workshop on River/Lake Basin Approaches to Environmentally Sound Management of Water Resources. Terrestrial Ecosystems Branch.
Contact: J. Balek, UNEP
- Washington, DC*
February 2-4
International Workshop on Greenhouse Framework Convention and Associated Protocols: A Nongovernmental Perspective, organized by the Climate Institute.
Contact: John Topping, 202/547-0104
- Anaheim, CA*
February 4-9
70th Annual Meeting of American Meteorological Society. Will include: Special Session on Climate Variations; Joint Session on Hydrology and Climate Variations; Symposium on the Role of the Oceans as a Source and Sink of Trace Substances that Influence Global Change; Symposium on Biometeorology and Global Change; and Symposium on First ISLSCP Field Experiment.
Contact: AMS: 617/227-2425
- Boulder, CO*
February 5-6
Our Changing Environment, sponsored by Front Range Branch, American Geophysical Union.
Contact: Conv. Serv. Ctr., POB 18-P, Denver, CO 80218
- Washington, DC*
February 5-7
IPCC Third Session
- New Orleans, LA*
February 12-16
Oceans Sciences Meeting of American Geophysical Union and American Society of Limnology and Oceanography.
Contact: 90 Oceans Sci Mtg, AGU, 202/462-6903
- Saskatoon, Saskatchewan, Canada*
February 13-14
Application of Remote Sensing in Hydrology, sponsored by National Hydrology Research Institute of Environment Canada and Canadian Water Resources Association.
Contact: Geoff Kite, NHRC, Environment Canada, 11 Innovation Blvd, Saskatoon, Sask., S7N 3H5, Canada
- Charleston, SC*
February 19-22
Global Change: A Southern Perspective, sponsored by Southeast Regional Climate Center, SC Water Resources Commission, et al.
Contact: John C. Purvis, 803/737-0800
- Kenya*
February 26-28
Global Warming and Climate Change: Perspectives from Developing Countries, organized by Woods Hole Research Center and African Academy of Sciences.
Contact: WHRC, 508/540-9900

March 12-13 *London, UK*

Modeling the Physics, Biology and Chemistry of the Upper Ocean, and its Interaction with the Atmosphere, joint workshop of the Global Ocean Flux Study and International Geosphere-Biosphere Program.

Contact: Mike Fasham, Inst. Oceanog. Sci., Brook Road, Wormley, Godalming, Surrey GU8 5UB, UK

March 19-23 *Williamsburg, VA*

Chapman Conference on Biomass Burning--Atmospheric, Climatic and Biospheric Implications, sponsored by American Geophysical Union and National Air and Space Administration.
Contact: Biomass Burn Cong., AGU, 202/462-6000

March 20-22 *Los Angeles, CA*

Tropospheric Ozone and the Environment, sponsored by Air and Water Management Assoc.
Contact: AWMA, 412/232-3444

SPRING *Washington, DC*

Technologies for Environmentally Sustainable Development, sponsored by Environmental and Energy Study Institute in cooperation with the Congressional and Energy Study Conference.
Contact: EESI, 202/628-1400

April 4-6 *Lincoln, NB*

Looking Back from the 21st Century: Impacts of Climate Change on the Great Plains, 14th Annual Interdisciplinary Symposium of the Center for Great Plains Studies, Univ. of Nebraska-Lincoln.
Contact: Ken Dewey, 1213 Oldfather Hall, U. of Nebraska-Lincoln, Lincoln, NB 68588-0314

April 17-19 *Sacramento, CA*

Coping with Extremes, 58th Annual Meeting of Western Snow Conference.
Contact: Neil Berg, 415/486-3456

April 20-22 *East Lansing, MI*

Fourth Conference of Society for Human Ecology. Among discussion topics: "Development and global change." Michigan State University.
Contact: Suzanne Sontag, 204 Human Ecology, Dept. of Human Environment & Design, Michigan State University, East Lansing, MI 48823

April 22-29 *United States*

National Celebration of the Outdoors in Recognition of Earth Day 1990.
Contact: The Conservation Foundation, 202/293-4800

April 24-27 *Greenbelt, MD*

Conference on Climate Impact of Solar Variability, sponsored by NASA Goddard Space Flight Center.
Contact: Al Arking, Code 613, NASA Goddard Space Flight Center, Greenbelt, MD 20771

- May (No Date Specified) *Liege, Belgium*
 22nd International Liege Colloquium on Ocean Hydrodynamics. Will focus on sea-ice processes and modelling, biological oceanographic processes. Contact: J.C.J. Nihou, Modenvironment, Univ. de Liege, Sart Tilman, B5, 4000 Liege, Belgium
- May 5-7 *Bergen, Norway*
 Youth Action for a Common Future, Conference on Environment and Development for Youth Organizations in the Economic Commission for Europe Countries.
- May 8-11 *Bergen, Norway*
 World Care Action, 1990, International Environment Exhibition
- May 8-12 *Bergen, Norway*
 The Conference on Sustainable Development, Science and Policy
- May 8-16 *Bergen, Norway*
 Action for a Common Future, Economic Commission for Europe, regional follow-up on Our Common Future (Brundtland Report). Contact: 1990 Conf. Secy, 34 59 98
- May 15-17 *Washington, DC*
 "North American Conference on Forestry Responses to Climate Change," convened by the Climate Institute. Contact: Ata Qureshi, 202/547-0104
- May 16-18 *Washington, DC*
 Caring for Creation, Inter-continental conference organized by North American Conference on Religion & Ecology, Omni Shoreham Hotel. Contact: Donald B. Conroy, 202/462-2591
- May 17-18 *Vienna, Austria*
 11th European Conference on Environmental Pollution. Contact: V.M. Bhatnagar, Alena Enterprises of Canada, 613/932-7702
- May 19 *Washington, DC*
 Festival of Creation, sponsored by Washington Cathedral in collaboration with the North American Conference on Religion and Ecology (see May 16-18 entry) and the World Wildlife Fund. Contact: Canon Hamilton, 202/537-6226
- May 25-26 *Victoria, B.C., Canada*
 Robert W. Stewart Symposium. Speakers include: F. Bretherton on climate response; F.W. Dobson on air/sea interaction; P.H. LeBlond on coastal processes; and C.I. Wunsch on ocean circulation. Contact: RWS Symp., Dept. of Physics & Astron., University of Victoria, 604/721-7689
- June 7-8 *Toronto, Canada*
 10th International Symposium on Environmental Pollution. Contact: V.M. Bhatnagar, Alena Enterprises of Canada, 613/932-7702
- June 7-9 *Hempstead, NY*
 The Environment: Global Problems - Local Solutions. Interdisciplinary conference organized by Hofstra University. Contact: Athelene A. Collins, 516/560-5669
- June 11-15 *Fairbanks, AK*
 International Conference on Role of Polar Regions in Global Change. Sponsors: American Geophysical Union; Arctic Research Consortium of U.S.; American Meteorological Society; Oceanography Society; International Council of Scientific Unions. At University of Alaska-Fairbanks. Contact: Gunter Weller, 907/474-7954
- June 13-15 *Lake Chelan, WA*
 Hydrologic Aspect of Global Climate Change, sponsored by American Geophysical Union. Contact: AGU, 202/462-6900
- June 18-20 *Sao Paulo, Brazil*
 Regional Conference on Global Warming and Sustainable Development: Perspectives from Developing Countries, organized by Woods Hole Research Center and University of Sao Paulo. Contact: WHRC, 508/540-9900
- June 25-26 *Geneva, Switzerland*
 IPCC Bureau Meeting
- June 25-28 *The Hague, The Netherlands*
 Symposium on Global Change and Relevant Space Observations at Plenary Meeting of Committee on Space Research. Contact: Dr. Jean-Louis Fellous, (France), 33 10 45087648
- July 2-6 *Queensland, Australia*
 Climatic Risk in Crop Production: Models and Management for the Semi-Arid Tropics and Sub-Tropics, International Symposium and Workshop, sponsored by Commonwealth Scientific Industrial Research Organization Division of Tropical Crops and Pastures, at University of Queensland. Contact: V.R. Catchpole, CSIRO, Div. of Tropical Crops & Pastures, Cuninghame Lab., 306 Carmody Road, St. Lucia, Queensland 4067, Australia
- July 9-13 *Clermont-Ferrand, France*
 World Meteorological Organization International Conference on Data Assimilation in Meteorology and Oceanography, organized by Laboratoire de Meteorologie Dynamique and Laboratoire Associe de Meteorologie Physique. Contact: Olivier Talagrand, 33-1-43 29 12 25
- July 10-12 *Saskatoon, Saskatchewan, Canada*
 Northern Hydrology Symposium, sponsored by National Hydrology Institute and Canadian Water Resources Association. Contact: Terry Prowse, 306/975-5737
- July 16-20 *Honolulu, HI*
 International Tropical Ocean Global Atmosphere Scientific Conference, convened by World Meteorological Organization and other international scientific societies. Contact: TOGA Proj. Off., WMO, Switzerland, 41 22 34 31 81
- July 22-27 *Honolulu & Waikoloa (Big Island), HI*
 World Hydrogen Energy Conference #8, sponsored by the Hawaii Natural Energy Institute, University of Hawaii at Manoa; and International Association of Hydrogen Energy. Contact: Mary Kamiya, 808/948-8890
- August 9-12 *Beijing, PRC*
 International Symposium on Climatic Change, organized by Chinese Academy of Sciences. Contact: Zhang Peiyuan, BISOC Conf. Secretariat, Inst. Geog., CAS, POB 771, 100012 Beijing, PRC
- August 27-30 *Saskatoon, Saskatchewan, Canada*
 Aquatic Ecosystems in Semi-Arid Regions, sponsored by National Hydrology Research Institute and Rawson Academy of Science. Contact: NHRI, 306/975-4022
- August 27-31 *Stockholm, Sweden*
 4th Session of IPCC
- September 2-5 *Skagen, Denmark*
 Symposium on Coastal Geomorphology, Littoral Drift, Climate Development, Greenhouse Effect, Sea Level Rise and its Consequences, Erosion and Protection, sponsored by Journal of Coastal Research and the Skagen Spit Project of the Scandinavian Countries. Contact: Lars Holst, Skagen Historic Soc., P.K. Nielsen's Vej, Skagen 9990, Denmark
- September 11-14 *Minneapolis, MN*
 2nd International Symposium on Gas Transfer at Water Surfaces, sponsored by U.S. Army Engineer Waterways Experiment Station and University of Minnesota. Contact: Steven Wilhelms, 601/634-2475
- September 24-28 *Bern, Switzerland*
 International Conference on Past and Present Climate Dynamics: Reconstruction of Rates of Change, sponsored by Swiss Academy of Sciences et al. as contribution to International Geosphere Biosphere Program. Contact: K. Kelts, 031-212114
- September 25-27 *Bangkok, Thailand*
 International Conference on Global Warming and Sustainable Development: An Agenda for the 90s, organized by Woods Hole Research Center and Thailand Development Research Inst. Contact: WHRC, 508/540-9990

October 1-3 *Strasbourg, France*

International Conference (suggested title, "Environmental Equilibrium and Economic Development"), sponsored by Committee for Economic Progress (German) and Institut de l'Entereprise.
Contact: Robert C. Holland, 202/296-5860

October 1-4 *Barcelona, Spain*

4th International Conference on Environmental Contamination, co-sponsored by United Nations Environment Programme, World Health Organization and several Spanish institutions. Two of themes: atmospheric environmental impact of increased CO2 and UV-B radiation, and biomonitoring.
Contact: Environ. Contam. Secy., CEP Consultants Ltd., Edinburgh, 031 357 2478

October 16-19 *Miami Beach, FL*

International Symposium on Ecological Indicators, sponsored by U.S. EPA.
Contact: Janet McDonald, 919/781-3150

November 12-16 *Geneva, Switzerland*

Second World Climate Conference, sponsored by World Meteorological Organization, United Nations Environment Programme, and ICSU. Timed to receive and debate report of WMO/UNEP Intergovernmental Panel on Climate Change.
Contact: Howard Ferguson, Casa postale N. 2300, CH-1211, Geneva 2, Switzerland

1991

January 27-February 1 *Ibaraki, Japan*

International Conference on Climatic Impacts on the Environment and Society, organized by Japanese Study Group for the WCIP and WCAP, United Nations Environment Programme, and World Meteorological Organization, at University of Tsukuba.
Contact: T. Kawamura, 0298(53)4400

March 3-6 *The Woodlands, TX*

Suggested working title: Responding to Global Climate Change: What Regions Should Do.
Contact: Jurgen Schmandt, 713/363-7913

April 3-8 (Tentative) *Melbourne, Australia*

World Conference on Preparing for Climate Change, sponsored by Australian Greenhouse Information Service, Commission for the Future, and Climate Institute. Associated sessions anticipated in up to 9 other Australian cities.
Contact: P.J. Noyce, 03-663-3281

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Japan Launches Multi-Billion Dollar Program of Environmental Aid, Climate Research and Development

Prime Minister Toshiki Kaifu announced September 11 that Japan would commit \$2.25 billion (U.S.) over the next three years to assist developing countries to meet environmental problems, including those posed by climate change and sea level rise. This announcement came in his speech opening the three-day Tokyo Conference on the Global Environment and Human Response Toward Sustainable Development.

Accompanying this environmental assistance initiative, by far the most sweeping yet announced by any industrialized country, Prime Minister Kaifu also announced, "Japan intends to marshal its domestic forces and to actively develop and introduce technology whose efficiency is high, energy systems that emit less 'greenhouse gases,' energy that is carbon dioxide free, as well as technology to separate and fix carbon dioxide gas."

Although no price tag has yet been placed on this technology development effort, it appears to be a major priority of Japan's powerful Ministry for International Trade and Industry (MITI).

Just three days before the opening of the Tokyo Conference the Japanese Meteorological Agency concluded an agreement with the World Meteorological Organization (WMO) to assume responsibility for the WMO World Data Centre for Greenhouse Gases. "Data from the expanding network of stations which

measure greenhouse gases around the world, in the WMO Global Atmosphere Watch system, will be quality controlled, stored and made available to scientists everywhere through this new World Data Centre here in Tokyo," Dr. G.O.P. Obasi, General Secretary of WMO, told the conferees.

Hailing Japan's environmental assistance initiative, Dr. Mostafa Tolba, Executive Director of the United Nations Environment Programme (UNEP), suggested that a major focus of this aid should be directed at supporting energy, agricultural, industrial and forestry strategies and projects that reduce greenhouse gases.

Participating in the Tokyo Conference were over 60 senior level international scientists and policy makers, about 140 observers and a large contingent from the Japanese and international news media. Participants included Barber Conable, President of the World Bank, Dr. M.S. Swaminathan, Chairman of the Indian Academy of Sciences and President of the International Union for Conservation of Nature, India, Dr. Yury Izrael, Chairman of the U.S.S.R. State Committee on Hydrometeorology, Dr. Emil Salim, Minister for Population and Environment of Indonesia, Dr. M.G.K. Menon, President of the International Council of Scientific Unions, A. Umana Quesada, Minister of Natural Resources, Energy and Mines of

Costa Rica, and James Gustave Speth, President of the World Resources Institute.

The Conference Chairman was Dr. Saburo Okita, a highly respected former Foreign Minister of Japan and current Chairman of the World Wildlife Fund of Japan. The Conference Keynote Speaker and Vice Chairman was Dr. Jiro Kondo, President of the Science Council of Japan and former Director of the National Institute for Environmental Studies.

Throughout the Tokyo Conference speakers and participants cited Japan's experience in energy efficiency as a key to meeting global greenhouse concerns. Japan's success in simultaneously achieving population stability, rapid economic growth



P.M. Toshiki Kaifu

and a reduction in overall energy consumption was cited as a model for developing countries.

Japan's carbon dioxide emissions per GNP are far lower than for any other country or region according to a chart presented by Dr. Kondo. The Japanese generated 274 thousand tons of carbon dioxide per million dollars of GNP in 1985. Comparable numbers in thousands of tons

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Reminder

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The Climate Institute is a private nonprofit organization formed to advance public understanding of global warming produced by the greenhouse effect and of strategies to avert stratospheric ozone depletion.