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Co-ordinating Committee on
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RELATED ACTIVITIES TO THE WORK OF THE COORDINATING COMMITTEE ON THE OZONE LAYER BEING IMPLEMENTED BY UNEP

submitted by UNEP

Annex IV

Related activities to the work of the CCOL being implemented by UNEP

The purpose of the paper is to inform the Coordinating Committee on the Ozone Layer of activities being undertaken by the United Nations Environment Programme to address global environmental issues concerning the atmosphere.

Two problems were identified by the UNEP Governing Council for study as part of the UNEP Outer Limits sub-programme:

Risks to the Ozone Layer; and
The Climate Change question.

Although originally considered as different problems, it has more recently been appreciated that the issues are closely interconnected in view of possible ozone redistribution in the vertical column being a likely factor in future climate change and the increasing concentrations of gases with the potential to modify the ozone layer are in most cases also greenhouse gases which can impact upon surface temperatures in a manner similar to that of carbon dioxide. Previously, the risk of future climate change had been almost totally associated with changing concentrations of carbon dioxide alone whereas it is now realised that greenhouse gases other than CO_2 may have an effect on surface temperatures equivalent to or greater than of carbon dioxide alone.

UNEP's initial role in the ozone layer issue was an overall coordinating function in the assessment of ozone layer depletion and its impact based upon research results of national programmes undertaken in accordance with the World Plan of Action on the Ozone Layer. The Coordinating Committee on the Ozone Layer was established to support UNEP in its task.

The CCOL is meeting in its eighth session since first being convened in 1977. The assessments which have been made have confirmed the potential risk to human health and the environment through increased UV-B penetration to the earth which have led nations to cooperate in the development of a global framework convention for the protection of the ozone layer. In 1981 an ad hoc Working Group of legal and technical experts was established by UNEP for the purpose of elaborating the draft convention. Its basis for work was the technical and scientific information supplied to it by the CCOL through a common UNEP secretariat.

The Vienna Convention for the Protection of the Ozone Layer was adopted by states at a Conference of Plenipotentiaries in March 1985 and consists of 21 Articles and two Technical Annexes on Research and Systematic Observations and on Information Exchange. However, agreement was not reached on the content of any protocol to the Convention. Consequently, the UNEP Governing Council at its Thirteenth Session in May 1985, requested the Executive Director, on the basis of the work of the ad hoc Working Group of Legal and Technical Experts to convene a Working Group to continue work on a protocol that addresses both short-term and long-term strategies for the equitable control of the global production, emissions and use of fully halogenated chlorofluorocarbons.

The Council also urged interested parties, in order to facilitate work on such a protocol, to cooperate in studies leading to a more common understanding of possible scenarios for the global production, emission and use of chlorofluorocarbons and other substances affecting the ozone layer and the costs and effects of various control measures, and to that end to sponsor a workshop on the subject under the auspices of UNEP.

In response to the decision, the Executive Director established a steering committee for the workshop composed of representatives of a selection of interested Governments and Organizations. The Committee has met twice, in September 1985 in London and in December 1985 in Brussels and agreement was reached on the form and content of the workshop as follows:

1. Workshop on chlorofluorocarbons

The workshop will be held in two parts: Part 1 will take place in Rome from 26-30 May 1986 and Part 2 in Washington D.C. in late September. Six topics would be discussed in working groups convened for that purpose during the Workshop. Papers and information relevant to each of the topics have been solicited. Submissions received are being coordinated by members of the steering committee designated for that purpose.

The selected topics for discussion at the workshop is attached as Annex I.

Participants in the workshop will be designated by interested Governments and international organizations.

2. International Conference on Health and Environmental Effects of Ozone Layer Modification and Climate Change

Over the past few years, a major research effort has been mounted to better understand atmospheric processes and the effects of changing concentrations of trace gases. Some of the major consequences of a changing atmosphere concern an increase in ultraviolet radiation reaching the earth associated with a depletion of the ozone shield and alterations in the earth's climate due mainly to the 'greenhouse effect'. It is considered timely to undertake an in-depth review of the potential effects of atmospheric change in particular to assess the effects of ozone layer modification.

The planned Conference jointly sponsored by UNEP and EPA will take place in Washington DC in June 1985 and will give an opportunity to policy makers, economic planners and scientists to hear the most recent scientific findings on effects resulting from increased exposure to UV-B radiation on the productivity of important agricultural crops, aquatic organisms and ecosystems; the incidence of melanoma and non-melanoma skin cancers; the suppression of the human immune response system; the formation of ground level air pollution oxidants; and the degradation of polymers. They will also learn of the possible effects of projected climatic change on the growth of crops and forests, the availability and supply of water, the potential rise in global sea level, and the many possible ecological effects accompanying changes in the earth's atmosphere.

Suggested Conference topics include:

1. Effects of increased exposure to UV-B radiation on human health
   - non-melanoma and melanoma skin cancers (both epidemiological and lab research)
   - suppression of the human immune response system
   - other health effects related to UV-B exposure

2. Effects of increased exposure to UV-B radiation on plants
   - results from field and lab experiments on major crops
   - effects on microorganisms
   - effects on ecosystems

3. Effects of increased exposure to UV-B on aquatic organisms
   - results of studies on phyto- and zooplankton
   - potential effects on the aquatic food chain

4. Effects of UV-B radiation on air pollution
   - effects on oxidant formation
   - interrelationships between CO, methane and atmospheric lifetimes of pollutants

5. Effects of UV-B on materials damage
   - relationship between UV-B and accelerated weathering of plastics
   - effects of UV-B on pesticides and other materials

6. Effects of climate change on water resources
   - regional analyses of effects of changes in water availability
   - specific effects in changes in water availability on crops, drinking water, etc.

7. Effects of sea level rise resulting from global warming
   - potential effects on wetlands and river deltas
   - case studies of economic effects and potential adaptations
   - effects on erosion

8. Effects of climate change on agriculture, aquatic organisms, and forests
   - direct effects on plant growth
   - case studies on specific crops, tree species or aquatic organisms

The results of all three activities - the Eighth Session of the Co-ordinating Committee on the Ozone Layer, the Workshop on Chlorofluorocarbons and the Conference on Health and Environmental Effects of Ozone Modification and Climate Change will be made available to an ad hoc working group to elaborate a protocol on chlorofluorocarbons, should governments declare that such a protocol to the Vienna Convention based on the available scientific and technical evidence will be convened as many times as necessary during the latter half of 1986 and early 1987 with a view to elaborating the content of a draft protocol for adoption at a diplomatic conference tentatively scheduled prior to the fourteenth session of the UNEP Governing council in June 1987.

3. Assessment of the Greenhouse Gas/Climate Issue

As a parallel activity to UNEP's programme concerning the risks to the ozone layer is a programme undertaken jointly with the World Meteorological Organization and the International Council of Scientific Unions, the Organizations responsible with UNEP for the implementation of the World Climate Programme, to make an assessment of the greenhouse gas/climate issue.

A first assessment of the role of carbon dioxide in climatic variability and its associated impacts was made at Villach, Austria in 1980. In response to the recommendations of the Joint UNEP/WMO/ICSU meeting of experts which made the assessment, a broad research programme has been encouraged and also supported by UNEP through projects implemented by the International Institute for Applied Systems Analysis, Austria and the International Meteorological Institute, Sweden.

A review Conference on the issue with particular emphasis given to the sensitivity of ecosystems and society to climate change was held in Villach in September 1983 and a second assessment of the climate change problem took place, again at Villach with the support of the Government of Austria, in October 1985. This Conference took due account of the role of greenhouse gases other than CO2 in assessing the likely impacts associated with a climate change and also made a preliminary investigation of the societal, economic and political connotations of climatic variability and change associated with increasing greenhouse gas concentrations in the atmosphere. A Conference statement containing the conclusions of the Conference, an outline of current scientific understanding of the problem and recommended actions to be undertaken by Governments, intergovernmental and non-governmental organizations is attached as Annex II.

Of immediate importance to UNEP, are the recommendations to improve public information efforts on the issues of greenhouse gases; the call to support the analysis of policy and economic options and the suggestion that a small task force on greenhouse gases be constituted to follow-up the Villach 1985 recommendations, ensure periodic assessments are undertaken, provide advice on further actions, encourage research and give consideration to the possible need to develop a global convention on the issue.

UNEP, by means of information releases, newsletters and press conferences, through the preparation of an audio-visual information kit on the subject for use in educational establishments and the wide dissemination of the Villach meeting report is responding to the call for improved public information. It is encouraging national Governments and interested organizations to cooperate in regional analyses of socio-economic impacts of future climates and of policy responses in several of the areas recommended for study by the Villach Conference (studies in Europe, the Great Lakes and the Arctic are presently being considered). A variety of methods for undertaking policy exercises are being considered and at least two regional analyses in tropical regions will be undertaken prior to 1990 with the support of UNEP.

An Advisory Group on Greenhouse gases is presently being established by UNEP, WMO and ICSU. The six or seven internationally recognized scientists who will comprise the group will meet first in April 1986 and then at two-yearly intervals and will help guide the international programme on the greenhouse gas/climate issue including providing advice and review for the projected policy exercises.

An analysis of national perception of the role of climate in economic decision-making and the extent that climate change is under consideration in future policy development is being made and will be discussed at a UNEP supported Workshop in July 1986 on climate impact assessment with selected senior policy advisors and scientists involved in climate impact study.

Other UNEP supported projects, including the International Satellite Land-Surface climatology project which has an overall objective to routinely monitor season and long-term changes on the earth's surface of importance to climate impact studies and to use such information for socio-economic decision making; and the project, Integrated Approaches to Climate Impact Assessment : the vulnerability of food production in marginal areas are being encouraged to show increased consideration of ozone layer modification and climate change and its impacts within the project activities.

not for inclusion

TOPICS FOR CFC WORKSHOP

PHASE I

TOPIC 1.

Background factual paper(s) on current production capacity, production, use, emissions, trade, and current regulation of CFCs separately by country and/or region.

TOPIC 2.

Under regulations or guidelines applied to date, projections of demand for CFCs, production capacity, production, use, trade and emissions and their concentration in the short term (up to the year 2000) and in the long-term, taking into account demand-increasing or demand-reducing technologies. Evaluation of methodologies for projecting demand, including for the short-term market-based studies and for the long-term analyses of GNP and population. Analysis of constraints to supply esn evaluating future production.

TOPIC 3.

Under regulations or guidelines applied to date, review of the costs and effects in terms of changes in production, use, emissions, production capacity and trade in CFCs and the demand for other products.

TOPIC 4.

On a sector by sector basis, identify the range of existing and developing technological options for control, their potential costs and effectiveness in terms of reducing demand, production, use, emissions, or capacity for producing CFCs.

TOPIC 5.

Estimates of the production, use and emission of substances other than CFCs that could modify the ozone layer sufficiently to affect possible control strategies for CFCs.

PHASE II

TOPIC 6.

Identify and analyse various possible regulatory strategies, including such new alternatives as quotas and financial incentives, in terms of their:

(a) Effects on the demand, production, and emissions of CFCs;

(b) Effects on the atmosphere and the environment including the use of model calculations of the effects of control measures;

(c) Cost effectiveness and, where possible, cost-benefit analysis; and

(d) Equity, trade impacts, and ease of implementation and monitoring.

not for inclusion

CONFERENCE STATEMENT

INTERNATIONAL ASSESSMENT OF THE ROLE OF CARBON DIOXIDE AND OF OTHER GREENHOUSE GASES IN CLIMATE VARIATIONS AND ASSOCIATED IMPACTS

Sponsored by UNEP/WMO/ICSU

VILLACH, AUSTRIA, 9-15 OCTOBER 1985

A joint UNEP/WMO/ICSU Conference was convened in Villach (Austria) from 9 to 15 October 1985, with scientists from twenty nine developed and developing countries, to assess the role of increased carbon dioxide and other radiatively active constituents of the atmosphere (collectively known as greenhouse gases and aerosols) on climate changes and associated impacts. The other greenhouse gases reinforce and accelerate the impact due to CO_2 alone. As a result of the increasing concentrations of greenhouse gases, it is now believed that in the first half of the next century a rise of global mean temperature could occur which is greater than any in man's history.

The Conference reached the following conclusions and recommendations:

1) Many important economic and social decisions are being made today on long-term projects - major water resource management activities such as irrigation and hydro-power, drought relief, agricultural land use, structural designs and coastal engineering projects, and energy planning - all based on the assumption that past climatic data, without modification, are a reliable guide to the future. This is no longer a good assumption since the increasing concentrations of greenhouse gases are expected to cause a significant warming of the global climate in the next century. It is a matter of urgency to refine estimates of future climate conditions to improve these decisions.

2) Climate change and sea level rises due to greenhouse gases are closely linked with other major environmental issues, such as acid deposition and threats to the Earth's ozone shield, mostly due to changes in the composition of the atmosphere by man's activities. Reduction of coal and oil use and energy conservation undertaken to reduce acid deposition will also reduce emissions of greenhouse gases, a reduction in the release of chloro-fluorocarbons (CFCs) will help protect the ozone layer and will also slow the rate of climate change.

3) While some warming of climate now appears inevitable due to past actions, the rate and degree of future warming could be profoundly affected by governmental policies on energy conservation, use of fossil fuels, and the emission of some greenhouse gases.

These conclusions are based on the following consensus of current basic scientific understanding:

- The amounts of some trace gases in the troposphere, notably carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), ozone (O_3) and chloro-fluorocarbons (CFC) are increasing. These gases are essentially transparent to incoming short-wave solar radiation but they absorb and emit longwave radiation and are thus able to influence the Earth's climate.

- The role of greenhouse gases other than CO_2 in changing the climate is already about as important as that of CO_2. If present trends continue, the combined concentrations of atmospheric CO_2 and other greenhouse gases would be radiatively equivalent to a doubling of CO_2 from pre-industrial levels possibly as early as the 2030's.

- The most advanced experiments with general circulation models of the climatic system show increases of the global mean equilibrium surface temperature for a doubling of the atmospheric CO_2 concentration, or equivalent, of between 1.5 and 4.5°C. Because of the complexity of the climatic system and the imperfections of the models, particularly with respect to ocean-atmosphere interactions and clouds, values outside this range cannot be excluded. The realization of such changes will be slowed by the inertia of the oceans, the delay in reaching the mean equilibrium temperatures corresponding to doubled greenhouse gas concentrations is expected to be a matter of decades.

- While other factors such as aerosol concentrations, changes in solar energy input, and changes in vegetation may also influence climate, the greenhouse gases are likely to be the most important cause of climate change over the next century.

- Regional scale changes in climate have not yet been modelled with confidence. However, regional differences from the global averages show that warming may be greater in high latitudes during late autumn and winter than in the tropics, annual mean runoff may increase in high latitudes, and summer dryness may become more frequent over the continents at middle latitude in the Northern Hemisphere. In tropical regions, temperature increases are expected to be smaller than the average global rise, but the effects on ecosystems and humans could have far reaching consequences. Potential evapotranspiration probably will increase throughout the tropics whereas in moist tropical regions convective rainfall could increase.

- It is estimated on the basis of observed changes since the beginning of this century, that global warming of 1.5°C to 4.5°C would lead to a sea-level rise of 20-140 centimeters. A sea level rise in the upper portion of this range would have major direct effects on coastal areas and estuaries. A significant melting of the West Antarctic ice sheet leading to a much larger rise in sea level, although possible at some future date, is not expected during the next century.

- Based on analyses of observational data, the estimated increase in global mean temperature during the last one hundred years of between 0.3 and 0.7°C is consistent with the projected temperature increase attributable to the observed increase in CO_2 and other greenhouse gases, although it cannot be ascribed in a scientifically rigorous manner to these factors alone.

- Based on evidence of effects of past climatic changes, there is little doubt that a future change in climate of the order of magnitude obtained from climate models for a doubling of the atmospheric CO_2 concentration could have profound effects on global ecosystems, agriculture, water resources and sea ice.

RECOMMENDED ACTIONS

1. Governments and regional inter-governmental organizations should take into account the results of this assessment (Villach 1985) in their policies on social and economic development, environmental programmes, and control of emissions of radiatively active gases.

2. Public information efforts should be increased by international agencies and governments on the issues of greenhouse gases, climate change and sea level, including wide distribution of the documents of this Conference (Villach 1985).

3. Major uncertainties remain in predictions of changes in global and regional precipitation and temperature patterns. Ecosystem responses are also imperfectly known. Nevertheless, the understanding of the greenhouse question is sufficiently developed that scientists and policy-makers should begin an active collaboration to explore the effectiveness of alternative policies and adjustments. Efforts should be made to design methods necessary for such collaboration.

(i) Governments and funding agencies should increase research support and focus efforts on crucial unsolved problems related to greenhouse gases and climate change. Priority should be given to national and international scientific programme initiatives such as (a) the World Climate Research Programme (WMO-ICSU), (b) present and proposed efforts on biogeochemical cycling and tropospheric chemistry in the framework of the Global Change Programme proposed by ICSU, (c) National Climatic Research Programmes. Special emphasis should be placed on improved modelling of the ocean, cloud-radiation interactions, and land surface processes.

(ii) Support for the analysis of policy and economic options should be increased by governments and funding agencies. In these assessments the widest possible range of social responses aimed at preventing or adapting to climate change should be identified, analyzed and evaluated. These assessments should be initiated immediately and should employ a variety of available methods. Some of these analyses should be undertaken in a regional context to link available knowledge with economic

decision-making and to characterize regional vulnerability and adaptability to climatic change. Candidate regions may include the Amazon Basin, the Indian subcontinent, Europe, the Arctic, the Zambezi Basin, and the North American Great Lakes.

4. Governments and funding institutions should strongly support the following:

(i) Long-term monitoring and interpretation with state-of-the-art models of:

(a) radiatively important atmospheric constituents in addition to CO_2, including aerosols;

(b) solar irradiance; and

(c) sea level.

(ii) Study and interpretation of the past history of climate and environment, specially regarding interactions among the atmosphere, oceans and ecosystems.

(iii) Studies of the effects of atmospheric composition and of changing climate and climatic extremes on sub-tropical and tropical ecosystems, boreal forests, and on water regimes.

(iv) Investigations of the sensitivity of the global agricultural resource base with respect to:

(a) direct effects of increases in atmospheric CO_2 and other greenhouse gases;

(b) effects of changes in climate; and

(c) probable combinations of these.

(v) Evaluation of social and economic impacts of sea level rises.

(vi) Analysis of policy-making procedures under the kinds of risks implied by a significant greenhouse warming.

5. UNEP, WMO and ICSU should establish a small task force on greenhouse gases, or take other measures, to:

(i) help ensure that appropriate agencies and bodies follow up the recommendations of Villach 1985;

(ii) ensure periodic assessments are undertaken of the state of scientific understanding and its practical implications;

(iii) provide advice on further mechanisms and actions required at the national or international levels;

(iv) encourage research in developing countries to improve energy efficiency and conservation;

(v) initiate, if deemed necessary, consideration of a global convention.