Report to the 10th Session of SBSTA on the Status of the IPCC

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Distinguished delegates, it is a real pleasure and honor for me to be invited to address you today. I, and all my colleagues associated with the Intergovernmental Panel on Climate Change (IPCC), appreciate the close collaboration that exists between the IPCC and the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), the subsidiary bodies to the UNFCCC, and the Secretariat to the UNFCCC. There continues to be excellent collaboration with the FCCC and its subsidiary bodies (SBSTA and SBI) through Joint Working Group meetings, and coordinated meetings of SBSTA and IPCC experts, such as those related to Articles 3.3 and 3.4 of the Kyoto Protocol.

Since I last had the opportunity to address you six months ago in Buenos Aires, Argentina, the IPCC has continued to make significant progress. We now have the most intense work program ever, largely in response to requests made by the Subsidiary Body on Technological and Scientific Advice (SBSTA) of the UNFCCC. These requests from SBSTA, I believe, reflect the importance that the UNFCCC places on the high-quality and impartial scientific and technical information that is provided by the IPCC, and acknowledges the expertise and dedication of many hundreds of scientific, technical and socio-economic experts from all over the world from universities, government agencies, the private sector, and non-governmental organizations.

Since Buenos Aires, the IPCC held a Bureau meeting in Geneva in March, 1999 and a Plenary session in Costa Rica in April 1999. It was very encouraging to observe that all delegates to these meetings worked with a common purpose, and were willing to constructively seek compromises when differences of opinion surfaced. I believe that this demonstrates that the IPCC has continued to mature even while the work load has increased and the issues that we have been asked to address by the UNFCCC are becoming scientifically and technically more complex and, at times, closer to policy. However, the IPCC has continued to ensure that while the assessments are policy-relevant, they are policy-neutral and not policy prescriptive.

A major milestone was achieved at the Plenary meeting in Costa Rica. We finally approved the Procedures for the Preparation, Review, Acceptance, Approval and Publication of IPCC Reports, which will become an Annex to the Principles Governing IPCC Work that were approved in Vienna, in October, 1998. The Principles and Procedures will ensure that all aspects of the IPCC, including the selection of coordinating lead authors, lead authors and review editors, and the expert and government/expert review processes, will continue to be open and transparent, hence ensuring the credibility of the IPCC process.

In addition, the IPCC approved and accepted the Special Report on "Aviation and the Global Atmosphere" and approved the list of Policy-Relevant Scientific Questions that will be addressed in the Synthesis Report of the Third Assessment Report (TAR) at the Plenary in Costa Rica. Substantial progress has also been made on the preparation of the TAR and three Special Reports: (i) Methodological and Technological Aspects of Technology Transfer: Opportunities for Technology Cooperation; (ii) Emissions Scenarios of Greenhouse Gases and Aerosol Precursors; and (iii) Land-Use, Land-Use Change and Forestry.

Let me briefly summarize the status of our current work program, and in particular I would like to focus my comments on the main conclusions from the Special Report on "Aviation and the Global Atmosphere", which was approved and accepted in Costa Rica, and describe the approved list of Policy-Relevant Scientific Questions that will be addressed in the Synthesis Report of the TAR. My brief remarks will be amplified in three side-events/workshops this week, which have been organized to discuss the Special Reports on "Methodological and Technological Aspects of Technology Transfer: Opportunities for Technology Cooperation", "Aviation and the Global Atmosphere", and "Emissions Scenarios of Greenhouse Gases and Aerosol Precursors" on Tuesday, Wednesday and Friday lunch-times, respectively. I urge as many of you as possible to attend these workshops for a more detailed description of the work of the IPCC. These workshops will provide a venue for a discussion between IPCC experts and yourselves on a number of key issues that are of direct relevance to your work. This discussion will also help ensure that the work of the IPCC is appropriately focussed on the issues of greatest importance to the UNFCCC and the Kyoto Protocol.

Special Report "Aviation and the Global Atmosphere"

The IPCC Special Report "Aviation and the Global Atmosphere" was approved/accepted at the IPCC plenary in Costa Rica in April 1999. The Report assesses the effects of the past, present and potential future fleets of subsonic and supersonic aircraft on climate and atmospheric ozone and is the first report for a specific industrial sub-sector. The key findings of the Report include:

- ***Aviation Traffic:*** Passenger traffic has grown since 1960 at nearly 9% per year, 2.4 times the average Gross Domestic Product over the same time period. Global passenger air travel is projected to grow by about 5% per year between 1990 and 2015, where-as total aviation fuel use (passenger, freight and military) is projected to increase by about 3% per year, the difference being due largely to improved aircraft efficiency. The assessment developed a number of long-term (1990 – 2050) emissions scenarios for both subsonic and supersonic aircraft, including a reference scenario which used mid-range assumptions for each of the key determinants, using a range of assumptions for economic and traffic growth and fuel burn, which is dependent upon rates of change in technology and air traffic management.

- ***Aircraft Emissions***: Aircraft emit gases and particles directly into the upper troposphere and lower stratosphere where they have an impact on atmospheric composition. These gases and particles alter the concentration of greenhouse gases, including carbon dioxide, ozone, water vapor and methane, trigger the formation of condensation trails (otherwise known as contrails), and may increase cirrus cloudiness – all of which contribute to climate change.

- ***Radiative Forcing:*** The major contributors from aircraft emissions to the radiative forcing, which is a measure of a change in climate, are carbon dioxide, ozone, methane (negative effect) and contrails, with minor contributions from water vapor, sulfate aerosols (negative effect) and soot. The contribution from cirrus clouds is projected to be positive and could be quite significant, but our current lack of scientific understanding precludes a quantitative assessment of its contribution. While the contributions from carbon dioxide, ozone, methane (opposite sign) and contrails are comparable in magnitude, the uncertainties associated with ozone, methane and contrails are much larger than those associated with carbon dioxide.

- ***Current Impact of Aviation Emissions on Climate:*** The best estimate of the radiative forcing in 1992 by aircraft is 0.05 Wm-2 (0.01 to 0.1 Wm-2) or about 3.5% of the total radiative forcing by all human activities. These estimates of forcing combine the effects of changes in all greenhouse gas concentrations, aerosols and line-shaped contrails, but do not include possible changes in cirrus.

- ***Projected Impact of Subsonic Aviation Emissions on Climate***: For the reference scenario used in this assessment, the projected radiative forcing from subsonic aircraft emissions in 2050 is 0.19 Wm-2 or 5% of the radiative forcing in the mid-range IS92a scenario. For the full range of scenarios considered in the report, the radiative forcing is projected to grow to 0.13 to 0.56 Wm-2 in 2050, 2.6 to 11 times the value in 1992, and compares to the mid-range IS92a scenario of 3.8 Wm-2 in 2050.

- ***Projected Impact of Supersonic Aviation Emissions on Climate***: One possibility for the future is the development of a fleet of second generation supersonic, high speed civil transportation aircraft. If a fleet of supersonic aircraft were developed to cruise at an altitude of about 19km, they would emit carbon dioxide, water vapor, oxides of nitrogen and sulfur, and soot directly into the lower stratosphere. Assuming a fleet of supersonic aircraft started operation in 2015, growing to a fleet of 1000 by 2040, displacing a portion of the subsonic fleet in the reference scenario, by 2050 the combined subsonic and supersonic fleet is projected to add a further 0.08 Wm-2 to the 0.19 Wm-2 radiative forcing projected for the reference scenario. Most of this additional forcing is due to the increased concentration of stratospheric water vapor.

- ***Options to Reduce Aviation Emissions:*** There is a range of options to reduce aviation emissions, including changes in aircraft and engine technology, fuel, operational practices, and regulatory and economic measures. While substantial aircraft and engine technology advances and air traffic management improvements are already incorporated in the aircraft emissions scenarios described above, further measures are feasible. However, it should be recognized that a number of factors will govern the rate at which technology advances and policy options related to technology can reduce aviation emissions: safety of operation, operational and environmental performance, cost, and the typical life expectancy of an aircraft of 25 to 35 years.

- ***Conclusions and Issues for the Future:*** The Report recognizes that there has been a steady improvement in characterizing the potential impacts of aviation on the global atmosphere, that the effects of some types of aircraft emissions are well understood, while the effects of others are not because of the many scientific uncertainties, and that aircraft emissions can be reduced through technological advances, infrastructure improvements, and regulatory or market-based measures. However, further work is required to reduce

scientific and other uncertainties, to understand better the options for reducing emissions, to better inform decision-makers, and to improve the understanding of the social and economic issues associated with the demand for air transport.

Third Assessment Report

At our Plenary in Vienna, October 1998, the IPCC approved the scope, structure, time-table and lead authors for the three Working Group Reports for the TAR, which will be approved/accepted between late January and late February 2001.

- Working Group I will assess the scientific aspects of the climate system and climate change;
- Working Group II will assess the scientific, technical, environmental, economic and social aspects of the vulnerability (sensitivity and adaptability) to climate change of, and the negative and positive consequences (impacts) for, ecological systems, socio-economic sectors and human health, with an emphasis on regional sectoral and cross-sectoral issues;
- Working Group III will assess the scientific, technical, environmental, economic and social aspects of the mitigation of climate change.

The philosophy of the TAR will emphasize the regional dimensions of climate change, embrace the concept of sustainable development, and place the issue of climate change more centrally within the evolving socio-economic context. In addition, given the emerging recognition that local, regional and global environmental issues need to be addressed in a more integrated manner, the TAR will assess the scientific and policy linkages, and the synergies and trade-offs, among these issues and their impact on sustainable development. The TAR will build upon the Second Assessment Report, the Special Reports and the Technical Papers and will involve an increased number of experts from developing countries, countries with economies in transition, industry, business and environmental NGOs. It will place particular emphasis on:

- observed trends in climatic parameters and the issue of attribution;
- regional scale climate projections, non-linearities, and extreme events, natural climate variability (e.g., the El-Nino phenomenon);
- regional impacts of, and adaptation measures to, climate change;
- costs and benefits of utilizing a range of technologies, policies and practices, and timeframe for, reducing greenhouse gas emissions;
- cross-cutting issues, such as uncertainties; development, sustainability and equity; costing methodologies; and decision-making frameworks; and
- linkages with other local (air pollution), regional (acid deposition), and global (loss of biodiversity, land degradation and stratospheric ozone depletion) environmental issues.

Synthesis Report

In addition to the three Working Group reports of the TAR, the IPCC Plenary in Costa Rica approved the scope, structure, approval/adoption process, and the specific Policy-Relevant Scientific Questions for the Synthesis Report. The Synthesis Report will consist of a 3-5 page Summary for Policymakers and a longer (30-50 pages) report. It will synthesize and integrate materials contained within the Assessments Reports and Special Reports and will be written in a non-technical style suitable for policymakers and address a broad-range of policy-relevant, but policy-neutral questions that were submitted by governments through SBSTA. The Synthesis Report will be completed by mid-summer 2001. The Policy-Relevant Scientific Questions (abbreviated), include:

1. What can scientific, technical and socio-economic analyses contribute to the determination of what constitutes dangerous anthropogenic interference with the climate system as referred to in Article 2 of the Framework Convention on Climate Change?
2. What is the evidence for, causes of, and consequences of changes in the Earth's climate since the pre-industrial era?
3. What is known about the influence of the increasing atmospheric concentrations of greenhouse gases and aerosols, and the projected human-induced change in climate regionally and globally?
4. What is known about the inertia and time-scales associated with the changes in the climate system, ecological systems, and socio-economic sectors and their interactions?
5. What is known about the regional and global climatic, environmental, and socio-economic consequences in the next 25, 50 and 100 years associated with a range of greenhouse gas emissions arising from scenarios used in the TAR (projections which involve no climate policy interventions)?
6. How does the extent and timing of the introduction of a range of emissions reduction actions determine and

affect the rate, magnitude, and impacts of climate change, and affect the global and regional economy, taking into account the historical and current emissions?

7. What is known from sensitivity studies about the regional and global climatic, environmental and socio-economic consequences of stabilizing the atmospheric concentrations of greenhouse gases (in carbon dioxide equivalents), at a range of levels from today's to double that or more, taking into account to the extent possible the effects of aerosols. For each stabilization scenario, including different pathways to stabilization, evaluate the range of costs and benefits, relative to the range of scenarios considered in question 5.
8. What is known about the interactions between projected human-induced changes in climate and other environmental issues, e.g., urban air pollution, regional acid deposition, loss of biological diversity, stratospheric ozone depletion, and desertification and land degradation? What is known about the environmental, social and economic costs and benefits and implications of these interactions for integrating climate response strategies in an equitable manner into broad sustainable development strategies at the local, regional and global levels?
9. What is known about the potential for, and costs and benefits of, and timeframe for reducing greenhouse gas emissions?
10. What are the most robust findings and key uncertainties regarding attribution of climate change and regarding model projections of: (i) future emissions of greenhouse gases and aerosols; (ii) future concentrations of greenhouse gases and aerosols; (iii) future changes in regional and global climate; (iv) regional and global impacts of climate change; and (v) costs and benefits of mitigation and adaptation options?

Special Reports

As noted, the IPCC is currently preparing three Special reports: (i) Methodological and Technological Aspects of Technology Transfer: Opportunities for Technology Cooperation; (ii) (ii) Emissions Scenarios of Greenhouse Gases and Aerosol Precursors; and (iii) Land-Use, Land-Use Change, and Forestry. All three reports will be completed early next year, i.e., between January and May.

Land-Use, Land-Use Change, and Forestry: Following the Kyoto Protocol, SBSTA requested IPCC to prepare a Special Report on Land-Use, Land-Use Change and Forestry. At the IPCC plenary in Vienna the scope, structure and lead authors for this report were approved. This Report will contain information of use to Parties in operationalizing the Kyoto Protocol, hence will address a series of scientific and technical issues associated with a number of the Articles of the Kyoto Protocol, in particular, Articles 3 (3.1, 3.3, 3.4 and 3.7), 6, 7.1 and 12. Key issues to be addressed include:

- the implications of different definitions, including forests, afforestation, deforestation and reforestation;
- which carbon pools (i.e., above ground biomass, below ground biomass, soil carbon, forest products) should be considered when evaluating the implications for net carbon emissions associated with afforestation, reforestation, deforestation and other land-use activities;
- what is the accuracy of measurements (stocks and flows) for each type of carbon pool in the full range of forested and non-forested ecosystems;
- to what extent can the effects of direct post-1990 human interventions be differentiated from pre-1990 actions and indirect human activities;
- what activities are defined as "direct human-induced activities";
- what are the factors that need to taken into consideration in setting baselines;
- how could issues of "national and cross-border" leakage be addressed;
- how permanent are carbon sinks;
- what is the carbon sequestration potential of different ecosystems;
- what are the implications of land-use, land-use change and forestry activities on other environmental (biodiversity, land degradation, etc.) and socio-economic issues (e.g., poverty, development, employment); and
- what is the adequacy, or lack there-of, of the IPCC National inventory guidelines.

The close working relationship between the IPCC and SBSTA during the early phases of the preparation of the Special Report on Land-Use, Land-Use Change and Forestry has been very useful. Meetings were held in Rome, Italy to discuss Article 3.3 of the Kyoto Protocol – Afforestation, Reforestation and Deforestation, and in Indianapolis, USA to discuss Article 3.4 – other land use activities. These meetings have ensured that the IPCC experts understand the key issues that governments want to be addressed. These meetings have in no way compromised the independence of the IPCC, yet have provided us with an opportunity to further understand the needs of the Parties to the Kyoto Protocol.

Inventories Work

The inventories work has been given more prominence since the Kyoto Protocol specifically mentions that the IPCC methodologies will be the basis for estimating greenhouse gas emissions. A special task force has been established to oversee the technical aspects of the work, the Joint IPCC/SBSTA Working Group will oversee the policy issues, and the Government of Japan has kindly agreed to establish a technical support unit to manage the program of work.

Communications and Outreach

The IPCC Secretariat and the Technical Support Units of the three Working Groups are placing an increased emphasis on communicating the work of the IPCC through an increased use of the world-wide web system. We are exploring the potential use of the world-wide web system and e-mail as a forum for peer-review of draft IPCC reports and for distribution of final IPCC reports.

We are also enhancing our outreach through booths and side-events at the SBSTA/SBI meetings of the FCCC. For example, as noted earlier, there will be three two-hour workshops at this SBSTA/SBI meeting on the conclusions of the Special Report on "Aviation and Global Atmosphere"; and the status of the ongoing work on "Methodological and Technological Aspects of Technology Transfer: Opportunities for Technology Cooperation", and "Emissions Scenarios of Greenhouse Gases and Aerosol Precursors", and I will be meeting with business, industry and environmental NGOs.

Budget

There is however, a significant budget problem because of: (i) the large number of special reports, coincident with the preparation of the TAR; (ii) the enhanced regional emphasis, and (iii) the increased participation of experts from developing countries and countries with economies in transition. Dr’s Obasi, Topfer and myself wrote to governments alerting them to this situation, but with limited response to date. At present just a few countries, including those that support the costs of a Technical Support Unit of a working group, provide the majority of the financial resources. If IPCC is to continue to serve the needs of the Parties to the UNFCCC and the Kyoto Protocol additional governments will have to contribute to the IPCC Trust Fund, and those that who routinely contribute will have to increase their contributions. The financial task group is examining alternate sources of funding, e.g. foundations, but this search for funds just adds an additional and unnecessary burden on those who contribute to the work of the IPCC, which is largely a volunteer organization. I appeal to each government representative at this meeting to discuss this serious situation with the relevant agency in your government to help resolve this situation.
