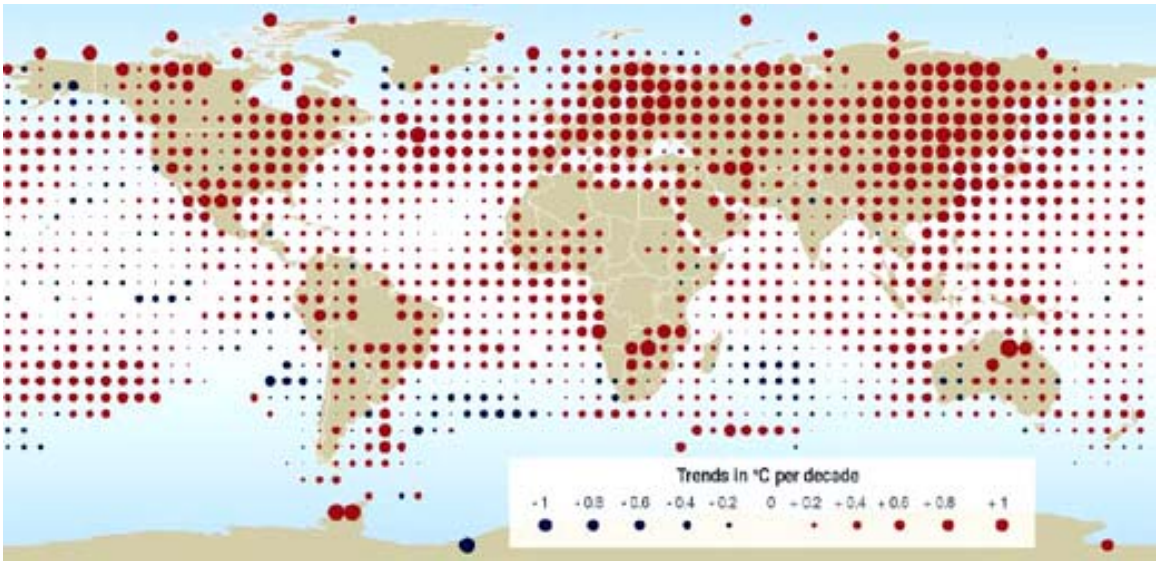
WMO INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE UNEP



16 Years of Scientific Assessment in Support of the Climate Convention

December 2004

Foreword

Sixteen years ago UNEP and WMO established the Intergovernmental Panel on Climate Change (IPCC) to provide independent scientific advice on the complex and important issue of climate change. The Panel was asked to prepare, based on available scientific information, a report on all aspects relevant to climate change and its impacts and to formulate realistic response strategies. The first assessment report of the IPCC served as the basis for negotiating the United Nations Framework Convention on Climate Change (UNFCCC). At the occasion of the 10-year anniversary of the Climate Convention it is therefore appropriate to describe the history of the IPCC and its role for the evolution of the UNFCCC.

Even after entry into force of the Convention the IPCC remained the most important source for its scientific, technical and socio-economic information and had a strong impact for its further development. The relationship between the UNFCCC and the IPCC has become a model for interaction between science and decision makers and several attempts have been made to establish a similar assessment process for other environmental issues. What are the unique features that have made IPCC so successful? One of the most important principles of the IPCC is to be policy relevant but not policy prescriptive. Other important factors are scientific integrity, objectivity, openness and transparency, achieved through a rigorous review process for all IPCC reports and an adoption and approval process that is open to all member governments.

But the success of the IPCC also depends on the enthusiasm and cooperation of thousands of experts from all regions of the world that have contributed over the years to the preparation of IPCC reports as authors and reviewers. We express our grateful and sincere appreciation to all scientists who gave their time very generously and committed themselves to an enormous physical and intellectual effort, and to the governments and to the governments and institutions who supported them. We also want to express our sincere thanks to the governments that contributed over the years generously to the IPCC Trust Fund and enabled the participation of experts from developing countries and countries with economies in transition in activities of the IPCC. Finally we want to take this opportunity to express our special gratitude to Professor Bert Bolin and Dr. Robert Watson who have guided the process as the first IPCC Chairmen. We also want to express our gratitude to the present Chair of the IPCC Dr. Rajendra K. Pachauri and wish him and the IPCC all success for the future.

M. Jarraud
Secretary General
World Meteorological Organization

K. Töpfer
Executive Director
United Nations Environment Programme

Role of the IPCC:
The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. Review by experts and governments is an essential part of the IPCC process. The Panel does not conduct new research, monitor climate-related data or recommend policies. It is open to all member countries of WMO and UNEP.

IPCC – Past Achievements and Future Challenges

Mr. Rajendra K. Pachauri ***Chairman, IPCC***

Any discussion of the history of the UNFCCC and its activities would be incomplete if the evolution of the IPCC is not described in some detail. Most commentators refer to the IPCC in terms of the influence it has had on the process of decision-making by advancing information and knowledge on various aspects of climate change. Indeed, the assessments produced by the IPCC have been treated with a great deal of attention by several organisations, and officials dealing with climate change. In fact, it was the First Assessment Report of the IPCC that was used by the Intergovernmental Negotiating Committee (INC) as the scientific basis for arriving at the Framework Convention on Climate Change. However, far more exciting, in my view is the evolution of the personality of the IPCC, which is directly responsible for any impact that the organisation may have had on decision-making. It is the ethos, the work culture and the procedures and rules established by the IPCC that have provided it with a unique quality to fully ensure the policy relevance of the work that the Panel does, but at the same time scrupulously adheres to a high level of objectivity and credibility in all that it produces. This fact is as much a function of the intergovernmental nature of the IPCC structure as its established ability to mobilize the best scientific talent that is available throughout the world on various aspects of climate change. In its history of sixteen years, the IPCC has also been instrumental in creating research and analytical capacity around the world, which is the result of a conscious effort to draw in scientific expertise that represents a geographical balance. Hence, the IPCC needs to be seen not only as an organisation that has produced work of unique value but also as a community that has helped to create substantial capacity worldwide to meet the challenges ahead.

The successive Assessment Reports of the IPCC have clearly demonstrated the growing level of expertise that the organisation has been able to harness. As a consequence it has also been able to deal with aspects of climate change the importance of which has appeared from time to time. It is with this in view that every successive report attempts to address existing gaps in knowledge. The intrinsic approach of the IPCC is to base its assessments on published literature. Fortunately the growing body of research on issues related to climate change, and the extent and depth of published material available today makes it feasible to bring about a progressive strengthening and deepening of work carried out by the IPCC. It is in this spirit that the Fourth Assessment Report is also attempting to address certain cross cutting themes including, among others, a comprehensive treatment of water, sustainable development, technology and the integration of mitigation and adaptation. There are growing concerns globally on the nexus between climate change and some of these themes, which require integrated treatment in IPCC reports to the extent this is possible.

I should at this juncture of the history of the IPCC offer a tribute to the scientific community that is the bulwark and most valuable resource for the work of the IPCC. It is a uniquely gratifying aspect of IPCC work that none of the several hundreds of authors that carry out the assessment of climate change are paid a single penny by the IPCC for the time and expertise that they provide. What is even more pleasing is the fact that more and more authors from around the world are willing to involve themselves in the work of the Panel, and it is a result of this trend that authors now represent an improved geographical balance, greater and more balanced gender representation, and a widening base of disciplines. There is, however, still a greater need for social scientists to get involved in work related to climate change, so that the biophysical aspects of climate change can be converted and interpreted effectively in socio-economic terms. It is only then that society would fully appreciate the implications of climate change for the human race as well as for other species on this planet. This is also a requirement that I perceive the UNFCCC and discussions around it would want the IPCC to meet consciously in the Fourth Assessment Report and subsequent efforts by the Panel.

Before the IPCC

In 1979 the first "**World Climate Conference**" organized by the World Meteorological Organization (WMO) expressed concern that "continued expansion of man's activities on earth may cause significant extended regional and even global changes of climate". It called for "global cooperation to explore the possible future course of global climate and to take this new understanding into account in planning for the future development of human society." The Conference appealed to nations of the world "to foresee and to prevent potential man-made changes in climate that might be adverse to the well-being of humanity".

In 1985 a joint UNEP/WMO/ICSU Conference was convened in Villach (Austria) on the "Assessment of the Role of Carbon Dioxide and of Other Greenhouse Gases in Climate Variations and Associated Impacts". The conference concluded, that "as a result of the increasing greenhouse gases it is now believed that in the first half of the next century (21st century) a rise of global mean temperature could occur which is greater than in any man's history." It also noted that past climate data may no longer be a reliable guide for long term projects because of expected warming of the global climate; that climate change and sea level rises are closely linked with other major environmental issues; that some warming appears inevitable because of past activities; and that the future rate and degree of warming could be profoundly affected by policies on emissions of greenhouse gases. As a follow-up, UNEP, WMO and ICSU set up the **Advisory Group on Greenhouse Gases (AGGG)** to ensure periodic assessments of the state of scientific knowledge on climate change and its implications.

In 1987, the 10th Congress of the WMO recognized the need for objective, balanced, and internationally coordinated scientific assessment of the understanding of the effects of increasing concentrations of greenhouse gases on the earth's climate and on ways in which these changes may impact socio-economic patterns. In its follow up the WMO Executive Council asked the Secretary General of WMO in co-ordination with the Executive Director of UNEP to establish an ad hoc intergovernmental mechanism to provide scientific assessments of climate change. The Executive Director of UNEP and the Secretary General of WMO agreed that efforts should be channelled into two different streams.

One stream would concentrate on assessment of available scientific information. The other stream would focus on the formulation of realistic response strategies for national and global action.

1988 - The establishment of the IPCC

At its 40th Session in 1988 the WMO Executive Council decided on the establishment of the Intergovernmental Panel on Climate Change (IPCC). The UNEP Governing Council authorized UNEP's support for IPCC. It was suggested that the Panel should consider the need for:

(a) Identification of uncertainties and gaps in our present knowledge with regard to climate changes and its potential impacts, and preparation of a plan of action over the short-term in filling these gaps;
(b) Identification of information needed to evaluate policy implications of climate change and response strategies;
(c) Review of current and planned national/international policies related to the greenhouse gas issue;
(d) Scientific and environmental assessments of all aspects of the greenhouse gas issue and the transfer of these assessments and other relevant information to governments and intergovernmental organisations to be taken into account in their policies on social and economic development and environmental programmes.

WMO and UNEP set up the IPCC Secretariat at WMO headquarters in Geneva. In November 1988 the IPCC held its first Plenary Session. Mr. Bert Bolin of Sweden was elected Chairman, Mr. Abdulbar Al-Gain of Saudi Arabia was elected Vice Chair and Mr. Kolawole Rufai of Nigeria Rapporteur.

The Panel agreed to establish three working groups that would prepare assessment reports on:

- Available scientific information on climate change,
- Environmental and socio-economic impacts of climate change, and
- Formulation of response strategies.

Working Group I was chaired by the United Kingdom (Mr. John T. Houghton), Working Group II by the USSR (Mr. Yuri A. Izrael), and Working Group III by the United States of America (Mr. Fred M. Bernthal, later replaced by Mr. Robert Reinstein). Working Groups I and II had a core membership of 13 countries and WG III of 17 countries. Experts from other countries were welcome to participate and contribute. A small Bureau of 15 members was established to oversee the work of the Panel. The IPCC also established collaboration with various intergovernmental and non-governmental organisations such as FAO, IAEA, ITTO, OECD, IEA, IIASA, RIIA, SEI, TERI, WEC and WRI.

Call from the United Nations General Assembly (UNGA)

At the same time various other fora including the United Nations General Assembly (UNGA) recognized the need for international cooperation on climate change with a view for adopting effective measures within a global framework. In its resolution on "Protection of the global climate for present and future generations of mankind" the 43rd UNGA (1988) endorsed the action of WMO and UNEP to establish the IPCC and requested as soon as possible "a comprehensive review and recommendations with respect to:

(a) The state of knowledge of the science of climate and climatic change;
(b) Programmes and studies on the social and economic impact of climate change, including global warming;
(c) Possible response strategies to delay, limit or mitigate the impact of adverse climate change;
(d) The identification and possible strengthening of relevant existing international legal instruments having a bearing on climate;
(e) Elements for inclusion in a possible future international convention on climate"

In 1989, the 44th session of the UNGA requested the report by the IPCC to be submitted to its 45th Session and it agreed to take, after the adoption of the IPCC report, a decision on ways, means and modalities for pursuing negotiations of a framework convention. Such negotiations would be coordinated with the preparations for the UN Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. UNGA called also for a wider participation in the IPCC work, in particular of experts from developing countries.

1990 - First IPCC Assessment Report

Responding to this request, the IPCC adopted its first assessment report on 30 August 1990 in Sundsvall, Sweden.

Working Group I addressed in its scientific assessment a broad range of topics including greenhouse gases and aerosols, radiative forcing, processes and modelling, observed climate variations and change, and detection of the greenhouse effect in the observations. The experts concluded that they are certain that emissions from human activities are substantially increasing the atmospheric concentrations of greenhouse gases and that this will enhance the greenhouse effect and result in an additional warming of the Earth's surface. Models available at that time predicted under business as usual a rate of increase of the global mean temperature during the 21st century of 0.3°C per decade with an uncertainty range of 0.2°C to 0.5°C, and an increase of the global mean sea level of 6 cm per decade with an uncertainty range of 3 to 10 cm per decade. They pointed out a number of uncertainties including sources and sinks of greenhouse gases and the role of clouds, oceans and polar ice sheets.

The **Working Group II** assessment summarized the scientific understanding of climate change impacts on impacts on agriculture and forestry, natural terrestrial ecosystems, hydrology and water resources, human settlements, oceans and coastal zones and seasonal snow cover, ice and permafrost. It highlighted important uncertainties with regard to timing, magnitude and regional patterns of climate change, but noted that impacts will be felt most severely in regions already under stress, mainly in developing countries.

Working Group III, the response strategies working group, established subgroups to define mitigative and adaptive response options in the areas of energy and industry; agriculture, forestry and other human activities; and coastal zone management. The resource use and management subgroup focused on natural resources of common interest, i.e., food, water, land, and biological resources. The report also addressed emissions scenarios and the implementation of mitigation measures. In its summary for policy makers the report presented a flexible and progressive approach comprising of shorter-term mitigation and adaptation measures and proposals for more intensive action over the longer-term. The group developed also possible elements for inclusion in a framework convention on climate change. The special committee on the participation of developing countries presented proposals to promote as rapidly as possible full participation of developing countries in IPCC activities.

1990 Establishment of the Intergovernmental Negotiating Committee (INC)

The UNGA at its 45th session in 1990 noted the findings of the IPCC and decided to initiate negotiations of an effective framework convention on climate change, which should be completed prior to the **UN Conference on Environment and Development in June 1992.** It also requested the head of the ad-hoc secretariat to co-operate closely with the IPCC to ensure that the Panel can respond to the needs and requests for objective scientific and technical advice during the negotiating process. In the negotiation the work of the IPCC had to be taken into account, in particular the paper on legal measures.

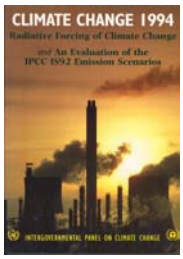
1992 - IPCC Supplementary Reports

To meet the need for up-to-date information of the negotiating process the IPCC prepared Supplementary Reports addressing six tasks:

- assessment of national net greenhouse gas emissions, a task, which eventually became the national greenhouse gas inventories programme,
- predictions of regional distributions of climate change and associated impact studies,
- energy and industry related issues,
- agriculture and forestry related issues,
- vulnerability to sea level rise, and
- emissions scenarios, which resulted in the six so-called IS92 scenarios.

1994 - IPCC Special Report

In its 1994 Special Report, IPCC addressed selected key topics of particular interest to UNFCCC for the first Conference of the Parties. It provided updated information on "Radiative Forcing of Climate Change", in particular improved estimates for methane and aerosols forcing and updated values of global warming potentials (GWP). It evaluated the IPCC IS92 emission scenarios and made recommendations for developing further scenarios. The report contains also the "IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptation" and the "IPCC Phase I Guidelines for National Greenhouse Gas Inventories". The latter provided direct input to the convention process as greenhouse gas inventories are an essential part of the national communications that have to be prepared by Parties to the Convention.



Definition of Climate Change in the IPCC

Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.

Note that the *United Nations Framework Convention on Climate Change* (UNFCCC), in its Article 1, defines "climate change" as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." The UNFCCC thus makes a distinction between "climate change" attributable to human activities altering the atmospheric composition, and "climate variability" attributable to natural causes.

Procedures for preparing IPCC Reports

The preparation of IPCC Reports follows strict procedures that have been agreed by the Panel.

The reports are prepared by **teams of authors**, which have been selected specifically for this task, based on their expertise.

They undergo a **two-stage review**, a first review by experts and a second by experts and governments.

Final reports are **accepted** at a Plenary session and the Summaries for Policymakers are **approved** line by line.

1992 - Adoption of the UNFCCC
1994 - Entry into force of the UNFCCC

The UNFCCC was adopted on 9 May 1992, and opened for signature in June 1992 at the UN Conference on Environment and Development UNCED 92. The Convention entered into force on 21 March 1994. Under the Convention, a "Subsidiary Body for Scientific and Technological Advice" (SBSTA) is established.

1995 – COP-1

The First Conference of the Parties to the UNFCCC (COP-1) met in February 1995. It clarified the functions carried out by SBSTA and its relation with the IPCC. It requested SBSTA to:"

Summarize and, where necessary, convert the latest international scientific, technical, socio-economic and other information provided by competent bodies including, inter alia, the Intergovernmental Panel on Climate Change (IPCC), into forms appropriate to the needs of the Conference of the Parties, including in support of the review of the adequacy of commitments;

Compile and synthesize scientific, technical and socio-economic information on the global situation on climate change, provided by, inter alia, the IPCC, as well as on the latest developments in science, to the extent possible, and assess the implications thereof for the implementation of the Convention; and formulate requests to competent international scientific and technical bodies." …

…to seek advice from IPCC on the development, improvement and refinement of comparable methodologies for: "

- National inventories of emissions and removals of greenhouse gases;
- Projecting national emissions and removals of greenhouse gases and comparison of respective contributions of different gases to climate change;
- Evaluating the individual and aggregated effects of measures undertaken pursuant to the provisions of the Convention;
- Conducting impact/sensitivity analyses;
- Assessing adaptation responses;"

and to consider the IPCC Second Assessment Report.

COP-1 also agreed on the so-called Berlin Mandate, a process aiming at strengthened commitments for Parties included in Annex I to the Convention. The Mandate specified, that:

"the process will be carried out in the light of the best available scientific information and assessment on climate change and its impacts, as well as relevant technical, social and economic information including, inter alia, reports of the IPCC."

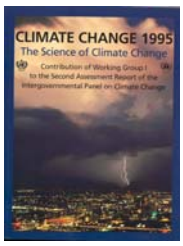
SBSTA at its first session in December 1995 agreed on an initial list of areas in which the IPCC could provide relevant inputs:"

(a) Full assessments (every 4 or 5 years) similar in scope to the Second Assessment Report of the IPCC.
(b) Detection of climate change and trends therein due to anthropogenic causes.
(c) Further development of emission inventory guidelines (for example, for emissions of new greenhouse gases, land-use change, forestry and biomass burning, agricultural soils, solid waste disposal), including the reassessment of emission factors, conversion coefficients and also emissions from bunker fuels.
(d) Development and assessment of methodological and technological aspects of transfer of technology.
(e) Development and refinement of methodologies including, for example, those used in the estimation of present greenhouse gas emissions and projections of these gases, and those used in the estimation of global warming potentials and in the evaluation of the effects of measures being undertaken pursuant to the provisions of the Convention.
(f) Scientific, technical and socio-economic bases for further interpreting Article 2 of the Convention, including the necessary modelling of different scenarios for the stabilization of greenhouse gas concentrations in the atmosphere.
(g) Further identification and assessment of emission sources, sinks and the chemistry of greenhouse gases, particularly the carbon cycle and the role of precursor gases.
(h) Reducing scientific uncertainties, including the role of particulate matter and tropospheric ozone.
(i) Refinement and updating of high resolution regional scenarios of climate change.
(j) Economic, environmental, sectoral and regional impacts of both climate change and the current and proposed response measures, including the economic impacts of these policies and measures on developed and developing countries.
(k) Adaptation measures.
(l) Identification of technical and socio-economic aspects of Articles 4.8, 4.9 and 4.10 of the Convention.
(m) Other specific emerging issues related to the implementation of the Convention."

The IPCC responded to these requests throughout the Special Reports, Methodology Reports, Technical Papers (see text box) and Assessment Reports.

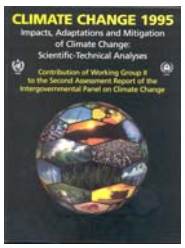
1995 - Second IPCC Assessment Report

In 1991 the IPCC decided to prepare a second comprehensive assessment report, which included as a new subject area socio-economic aspects of climate change. The scope of the reports of Working Groups II and III was adjusted to better meet this requirement. The membership of the IPCC was expanded to all member countries of WMO and UNEP. It was also agreed that each Working Group should be lead by two Co-chairs, one from a developed and one from a developing country and that the government of the Co-chair from the developed country sponsored the Technical Support Unit (TSU) for the Working Group. Mr. John T. Houghton (UK) and Mr. Luiz G. Meira Filho (Brazil) were elected as Co-chairs for Working Group I, Mr. Robert T. Watson (US) and Mr. Marufu C. Zinyowera (Zimbabwe) as Co-chairs for Working Group II and Mr. Jim P. Bruce (Canada) and Mr. Hoesung Lee (Republic of Korea) for Working Group III. The Second Assessment Report (SAR) was completed in late 1995.



Working Group I highlighted the considerable progress in the understanding of climate change made since 1990. The headings of the Summary for Policymakers (SPM) point towards these new findings:

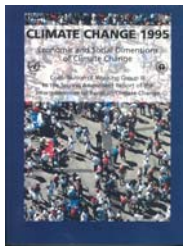
- greenhouse gas concentrations have continued to increase;
- anthropogenic aerosols tend to produce negative radiative forcing;
- climate has changed over the past century;
- the balance of evidence suggests a discernible human influence on global climate;
- climate is expected to continue to change in the future; and
- there are still many uncertainties.



Working Group II broadened the scope of its assessment to include information on the technical and economic feasibility of a range of potential adaptation and mitigation strategies. Major findings were summarized in the headings, as follows:

- Human-induced climate change adds an important new stress;
- Most systems are sensitive to climate change
- Impacts are difficult to quantify, and existing studies are limited in scope;
- Successful adaptation depends upon technological advances, institutional arrangements, availability of financing and information exchange;
- Vulnerability increases as adaptive capacity decreases
- Detection will be difficult, and unexpected changes cannot be ruled out
- Further research and monitoring are essential.

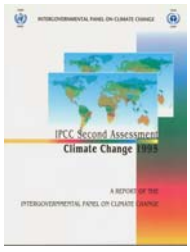
Furthermore, the report assessed options to reduce greenhouse gas emissions, especially CO2, CH4, Halocarbons, sulphur hexafluoride (SF6) and nitrous oxide (N2O) and enhance sinks of greenhouse gases in various sectors and discussed cross sectoral issues and policy instruments.



Working Group III addressed the social and economic dimensions of climate change, its impacts, and adaptation and mitigation of climate change over both the short and long term and at the regional and global levels.

A number of insights that may be useful to policymakers were highlighted such as, a prudent way to deal with climate change is through a portfolio of actions aimed at mitigation, adaptation and improvement of knowledge; earlier mitigation action may increase flexibility in moving toward stabilization of atmospheric concentrations of greenhouse gases; significant "no-regrets" opportunities are available in most countries and that the risk of aggregate net damage due to climate change, consideration of risk aversion, and application of the precautionary principle provide rationales for action beyond no regrets. The value of better information about climate processes, their impacts and responses and the need for more research and analysis of economic and social issues related to climate change are highlighted.

The **Synthesis Report** of the SAR addressed issues raised by Article 2 of the UNFCCC, the ultimate objective of the Convention, including the likely impact of different levels and time scales of stabilization. It provided scientific, technical and socio-economic information that can be used, inter alia, in evaluating whether the projected range of plausible impacts constitutes "dangerous anthropogenic interference with the climate system," and in evaluating adaptation and mitigation options that could be used in progressing towards the ultimate objective of the UNFCCC.



1996 - COP-2

The IPCC SAR was presented to the Second Conference of the Parties. In the Geneva Ministerial Declaration Ministers and other heads of delegations present at COP-2:"

1. *Recognize* and *endorse* the Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) as currently the most comprehensive and authoritative assessment of the science of climate change, its impacts and response options now available. Ministers believe that the Second Assessment Report should provide a scientific basis for urgently strengthening action at the global, regional and national levels, particularly action by Parties included in Annex I to the Convention (Annex I Parties) to limit and reduce emissions of greenhouse gases, and for all Parties to support the development of a Protocol or another legal instrument; and *note* the findings of the IPCC, in particular the following:

   - The balance of evidence suggests a discernible human influence on global climate. Without specific policies to mitigate climate change, the global average surface temperature relative to 1990 is projected to increase by about 2C (between 1C and 3.5C) by 2100; average sea level is projected to rise by about 50 centimetres (between 15 and 95 centimetres) above present levels by 2100. Stabilization of atmospheric concentrations at twice pre-industrial levels will eventually require global emissions to be less than 50 per cent of current levels;

   - The projected changes in climate will result in significant, often adverse, impacts on many ecological systems and socio-economic sectors, including food supply and water resources, and on human health. In some cases, the impacts are potentially irreversible; developing countries and small island countries are typically more vulnerable to climate change;

   - Significant reductions in net greenhouse gas emissions are technically possible and economically feasible by utilizing an array of technology policy measures that accelerate technology development, diffusion and transfer; and significant no-regrets opportunities are available in most countries to reduce net greenhouse gas emissions;

2. *Believe* that the findings of the Second Assessment Report indicate that the continued rise of greenhouse gas concentrations in the atmosphere will lead to dangerous interference with the climate system, given the serious risk of an increase in temperature and particularly the very high rate of temperature change;

3. *Recognize* also the need for continuing work by the IPCC to further reduce scientific uncertainties, in particular regarding socio-economic and environmental impacts on developing countries, including those vulnerable to drought, desertification or sea-level rise;"

The Conference further "

Welcomes the commitment of the Intergovernmental Panel on Climate Change to undertake the work programme requested in support of the Subsidiary Body for Scientific and Technological Advice and the Ad Hoc Group on the Berlin Mandate; and

Urges continuing cooperation between the Convention bodies and the Intergovernmental Panel on Climate Change."

1997 – COP-3

The Berlin Mandate process led to the adoption of the **Kyoto Protocol** at COP-3.

COP-3 e*xpressed*

*"*appreciation to the Intergovernmental Panel on Climate Change for its contribution to the Convention process, particularly through its prompt response to requests from the Subsidiary Body for Scientific and Technological Advice for technical papers, special reports and Guidelines for National Greenhouse Gas Inventories, as well as for its plans for the preparation of the Third Assessment Report; and, in this connection, *requests* the Subsidiary Body for Scientific and Technological Advice to give further consideration to issues related to the work of the Intergovernmental Panel on Climate Change and to formulate policy-relevant questions which should be addressed in the Third Assessment Report;"

and invited the subsidiary bodies to continue their cooperation with the IPCC.

2001 - Third IPCC Assessment Report

In 1997 the IPCC initiated its Third Assessment Report (TAR). The mandates of the Working Groups II and III were adjusted to better meet new requirements. Working Group II was asked to assess the scientific, technical, environmental, economic and social aspects of the vulnerability to climate change, and the negative and positive consequences for, ecological systems, socio-economic sectors and human health, with an emphasis on regional, sectoral and cross-sectoral issues; Working Group III was mandated to assess the scientific, technical, environmental, economic and social aspects of the mitigation of climate change, and methodological aspects of cross-cutting issues (e.g., equity, discount rates and decision making frameworks).

Mr. Robert Watson (USA) was elected chairman. Mr. John T. Houghton and Mr. Yihui Ding (China) were elected Co-chairs of Working Group I, Mr. Osvaldo Canziani (Argentina) and Mr. James J. McCarthy (USA) Co-chairs of Working Group II and Mr. Ogunlade Davidson (Sierra Leone) and Mr. Bert Metz (The Netherlands) Co-chairs of Working Group III.

The report of **Working Group I** analysed observational records, forcing agents that cause climate to change and the response of the climate system to these forcing agents and it addressed the question of human influence on today's climate and what could the possible future climate be.

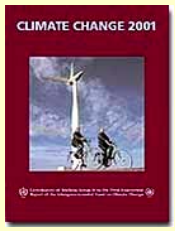
The main headings of the Summary for Policymakers highlight key new findings:

- An increasing body of observations gives a collective picture of a warming world and other changes in the climate system;
- Emissions of greenhouse gases and aerosols due to human activities continue to alter the atmosphere in ways that are expected to affect the climate;
- Confidence in the ability of models to project future climate has increased;
- There is new and stronger evidence that most of the warming over the last 50 years is attributable to human activities;
- Human influences will continue to change atmospheric composition throughout the 21st century;
- Global average temperature and sea level are expected to rise under all IPCC SRES scenarios;
- Atmospheric climate change will persist for many centuries; and
- Further action is required to address remaining gaps in information and understanding.

The report of **Working Group II** assessed vulnerabilities of and adaptation possibilities for major sectors and regions of the world. It explored the implications of climate change for sustainable development and reviewed information relevant for interpreting Article 2 of the UNFCCC.

Emergent findings are summarised in section 2 of the Summary for Policymakers under the following headings:

- Recent regional climate changes, particularly temperature increases, have already affected many physical and biological systems;
- There are preliminary indications that some human systems have been affected by recent increases in floods and droughts;
- Natural systems are vulnerable to climate change, and some will be irreversibly damaged;
- Many human systems are sensitive to climate change and some are vulnerable;
- Projected changes in climate extremes could have major consequences;
- The potential for large scale and possibly irreversible impacts poses risks that have yet to be reliably quantified;
- Adaptation is a necessary strategy at all scales to complement climate change mitigation efforts;
- Those with the least resources have the least capacity to adapt and are the most vulnerable; and
- Adaptation, sustainable development, and enhancement of equity can be mutually reinforcing.



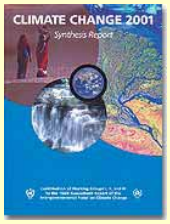
The Report of **Working Group III** assessed mitigation options in the various sectors, their costs and co-benefits, as well as barriers, opportunities, polices, measures and instruments. It placed climate change mitigation in the context of sustainable development.

The report confirmed the findings of the SAR that earlier actions, including a portfolio of emissions mitigation, technology development and reduction of scientific uncertainty, increase flexibility in moving towards stabilization of atmospheric concentrations of greenhouse gases.

However, the desired mix of options varies with time and place. Some other key findings include:

- Alternative development paths can result in very different greenhouse gas emissions;
- Climate change mitigation will both be affected by, and have impacts on, broader socio-economic policies and trends, such as those relating to development, sustainability and equity;
- Significant progress relevant to greenhouse gas emissions reduction has been since the SAR in 1995 and has been faster than anticipated;
- Forests, agricultural lands, and other terrestrial ecosystems offer significant carbon mitigation potential. Although not necessarily permanent, conservation and sequestration of carbon may allow time for other options to be further developed and implemented;
- Most model results indicate that known technological options could achieve a broad range of atmospheric CO2 stabilization levels, such as 550ppmv, 450ppmv or below over the next 100 years or more, but implementation would require associated socio-economic and institutional changes;
- Some sources of greenhouse gas emissions can be limited at no or negative social costs to the extent that policies can exploit no regrets opportunities;
- Emission constraints in Annex I countries have well established, albeit varied "spillover" effects on non-Annex I countries, and
- The effectiveness of climate change mitigation can be enhanced when climate policies are integrated with the non-climate objectives of national and sectoral policy development.

The TAR Synthesis Report (SYR)



The Synthesis Report provided a synthesis and integration of information contained in the TAR and previous IPCC Reports. Nine policy relevant scientific technical and socio-economic questions addressed:

- Scientific technical information relevant for the ultimate objective of the UNFCCC;
- Attribution of observed changes in climate and ecological systems since the pre-industrial era;
- The impact of future emissions of greenhouse gases on climate, including changes in variability and extreme events and in ecological and socio-economic systems;
- Inertia in the climate, ecological systems, and socio-economic sectors, and implications for mitigation and adaptation;
- Near and long term implications of stabilizing atmospheric concentrations of greenhouse gases;
- Technologies, policies, and costs of near and long term mitigation;
- Interaction between climate change and other environmental issues and development; and
- robust findings and key uncertainties.

2001 COP-7

COP-7 expressed its appreciation and gratitude to the IPCC for the completion of the TAR, encouraged the IPCC to continue its work, including, *inter alia*, preparation of the Fourth Assessment Report; and *Encouraged* Parties to make full use of the information contained in the TAR.

A follow-up workshop explored how the TAR can facilitate the work of SBSTA and other Convention bodies. The SBSTA in its next session agreed that the TAR should be used routinely as a useful reference for informing the deliberations on agenda items of the COP and its subsidiary bodies. Research and systematic observations; scientific, technical and socio-economic aspects of impacts of, and vulnerability and adaptation to, climate change; and scientific, technical and socio-economic aspects of mitigation were identified as areas which could be considered by SBSTA.

2002 COP-8

In the Delhi Ministerial Declaration on Climate Change and Sustainable Development, the Ministers and other heads of delegation present at COP-8 recognized:

"with concern the findings of the IPCC Third Assessment Report, which confirms that significant cuts in global greenhouse gas emissions will be necessary to meet the ultimate objective of the Convention, and recognizing the on-going consideration in the Subsidiary Body for Scientific and Technological Advice of the implications of this report,"

2003 COP-9

Following further consideration of the TAR by SBSTA, COP-9 requested SBSTA:

"to initiate its work on scientific, technical and socio-economic aspects of impacts of, and vulnerability and adaptation to, climate change, and on scientific, technical and socio-economic aspects of mitigation, and to focus on exchanging information and sharing experiences and views among Parties on practical opportunities and solutions to facilitate the implementation of the Convention;"

2007 – Fourth IPCC Assessment Report

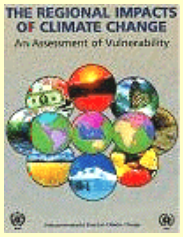
After the completion of the TAR, the IPCC decided to continue to prepare comprehensive assessment reports, but with an aim to emphasize new findings. The structure and mandates of the Working Groups remained unchanged. In order to ensure a better treatment and coordination of matters that are dealt with in more than one Working Group the following cross-cutting themes were identified, uncertainty and risk, regional integration, integration of mitigation and adaptation, Article 2 of the UNFCCC and key vulnerabilities, sustainable development, water, and technology. In April 2002 the Panel elected Mr. Rajendra K. Pachauri (India) as Chair of the IPCC, Ms. Susan Solomon (USA) and Mr. Qin Dahe (China) as Co-chairs of Working Group I, Mr. Osvaldo Canziani (Argentina) and Mr. Martin Parry (UK) as Co-chairs of Working Group II, and Mr. Ogunlade Davidson (Sierra Leone) and Mr. Bert Metz (the Netherlands) as Co-chairs of Working Group III. The Fourth Assessment Report (AR4) is scheduled to be finalised in the year 2007.

IPCC Special Reports and Technical Papers

Since SBSTA-1 in 1995 the UNFCCC has asked the IPCC to provide scientific technical and socio-economic advice on certain topics. The IPCC responded to such requests through preparing Special Reports or Technical Papers or by addressing the topic in its comprehensive assessment reports. While Special Reports provide a full assessment of the topic in question Technical Papers have to be based on material already assessed in previous IPCC reports. Sometimes COP requested a TP, but IPCC decided that in order to address the question adequately the preparation of a Special Report is necessary. The IPCC was also asked by other international conventions to prepare Special Reports and Technical papers on the interlinkages between climate change and the issues addressed under their instrument.

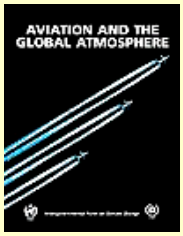
Special Reports:

Regional Impacts of Climate Change: An Assessment of Vulnerability (1997)



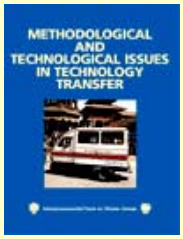
This report was prepared in response to a request from SBSTA and built on the Working Group II contribution to the SAR. While the SAR examined the potential effects of climate change for certain sectors primarily at a global scale, the Special Report explored the potential consequences of changes in climate for ten continental- or sub-continental-scale regions. This regional approach revealed wide variation in the vulnerability of different populations and environmental systems and represented an important step in the evolution of the impact assessment process for the IPCC.

Aviation and the Global Atmosphere (1999)



Requested by the International Civil Aviation Organization (ICAO) and the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer the report was prepared by IPCC Working Groups I and III in collaboration with the Scientific Assessment Panel to the Montreal Protocol on Substances that Deplete the Ozone Layer. It considers the role of aircraft emissions in modifying the chemical and radiative properties of the atmosphere and the ozone layer and how potential changes in technology, aircraft operations, and in the institutional, regulatory and economic framework might affect emissions in the future.

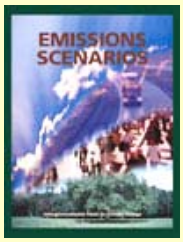
Methodological and Technological Issues in Technology Transfer (2000)



This Special Report has also been prepared by IPCC Working Group III in response to a request by SBSTA and takes into consideration technical questions raised by COP-4. It addresses the technology transfer problem in the context of all relevant provisions of the Climate Convention, in particular Article 4.5, while emphasizing the sustainable development perspective. Technology transfer is defined as the broad set of processes covering the flows of know-how, experience and equipment. The report assesses social, economic, political, legal, and technological factors that influence the flow and quality of technology transfer, such as consumer and business awareness, access to information, availability of a wide range of technical, business, management and regulatory skills locally, and sound economic policy and regulatory frameworks.

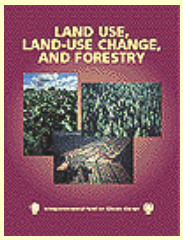
The Special Report provided input to further SBSTA considerations on technology transfer. COP-7 agreed on a framework for meaningful and effective actions to enhance the implementation of Article 4.5 and provided for the establishment of an Expert Group on Technology Transfer (EGTT).

Special Report on Emissions Scenarios (SRES) (2000)



In 1996 the IPCC decided to develop a new set of emission scenarios, which address changes in the understanding of driving forces and emissions and methodologies since the completion of the IPCC IS92 scenarios. The SRES scenarios are based on an extensive assessment of driving forces and emissions in the literature, alternative modelling approaches and an "open process" that solicited wide participation and feedback. They cover a wide range of the main driving forces of future emissions, from demographic to technological and economic developments, but, as requested in the terms of reference, none of the scenarios included future policies that explicitly address climate change. Four different storylines were developed to describe consistently the relationship between emission driving forces and their evolution and add context to the scenario quantification.

Land Use, Land-Use Change and Forestry (2000)



After the adoption of the Kyoto Protocol SBSTA requested an IPCC Special Report examining the scientific and technical implications of carbon sequestration strategies related to land use, land-use change, and forestry activities and relevant Articles of the Protocol. This report examined key questions relating to the exchange of carbon between the atmosphere and the terrestrial pool of above-ground biomass, below-ground biomass, and soils and how humans are changing the natural rate of exchange of carbon between the atmosphere and the terrestrial biosphere through land use, land-use change, and forestry activities. It also looked forward and examined how carbon flows between different pools and how carbon stocks change in response to afforestation, reforestation, and deforestation (ARD) and other land-use activities.
Following completion of the report COP-7 agreed in the so called Marrakech Accords on a draft decision for the first Conference of the Parties serving as meeting of the Parties under the Kyoto Protocol that affirm principles that govern treatment of land use, land use change and forestry activities and adopted definitions, modalities, rules and guidelines relating to LULUCF activities under Articles 3, 6 and 12 of the Kyoto Protocol. COP-7 invited the IPCC also to prepare Methodology Reports for LULUCF activities, which are described under NGGIP.

Two Special Reports are currently being prepared for release in 2005:

- **Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons** The report is prepared by IPCC Working Group I and Working Group III jointly with the Technology and Economic Assessment Panel (TEAP) of the Montreal Protocol in response to the decisions by COP-8 to the UNFCCC and the Fourteenth Meeting of the Parties to the Montreal Protocol.

- **Carbon Dioxide Capture and Storage** COP-7 expressed its interest in carbon capture and storage by inviting the IPCC to prepare a Technical Paper on geological carbon storage technologies and report on it for the consideration of the 2nd COP/MOP. Considering the very limited material covered in the IPCC TAR IPCC decided to prepare a special report on that matter.

Technical Papers:

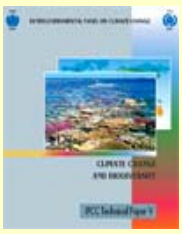
TP-1 Technologies, Policies and Measures for Mitigating Climate Change (1996)

TP-2 An Introduction to Simple Climate Models used in the IPCC Second Assessment Report (1997)

TP-3 Stabilization of Atmospheric Greenhouse Gases: Physical, Biological and Socio-Economic Implications (1997)

TP-4 Implications of Proposed CO2 Emissions Limitations (1997)

TP-5 Climate Change and Biodiversity (2002).



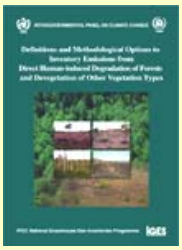
A Technical Paper on Climate Change and Water is planned for release in late 2007.

The IPCC National Greenhouse Gas Inventories Programme (NGGIP)

Under the UNFCCC all Parties are required to "develop, update periodically, publish and make available to the Conference of the Parties (COP) their national inventories of anthropogenic emissions by sources and removals by sinks, of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies, to be agreed upon by the COP." In 1991 Working Group 1 of the IPCC started the development of guidelines for these inventories under the *IPCC/OECD/IEA Programme on National Greenhouse Gas Inventories*. The first Guidelines were approved by the IPCC in 1994 and in 1995 the UNFCCC COP-1 adopted them for the preparation of national communication by Annex I Parties. In 1996 COP-2 recommended these guidelines also for use by non-Annex I Parties. Recognising that the guidelines are a living document the IPCC approved already in 1994 a second phase for the activity. In 1996 the revised IPCC guidelines were presented. They improved the existing guidelines by adding new methodologies and revising existing methodologies, based on new scientific understanding.

In 1999 the IPCC decided to establish a Task Force on National Greenhouse Gas Inventories, with a Task Force Bureau that would provide guidance to the programme. Mr. Taka Hiraishi (Japan) and Mr. Buruhani Nyenzi (Tanzania) were elected Co-chairs of the Task Force Bureau. In 2002 Ms. Thelma Krug (Brazil) replaced Mr. Nyenzi. A Technical Support Unit was set up in Japan.

Since its establishment the Task Force has completed a number of reports requested from the UNFCCC. In order to assist countries in preparing national inventories that are neither under nor overestimates and in which uncertainties are reduced as far as possible the report on Good Practice Guidance and Uncertainty Management in Greenhouse Gas Inventories (GPG) was completed in the year 2000. The good practice guidance report, which did not replace the *IPCC Guidelines*, but rather provides advice consistent with them, was endorsed by COP. The *GPG2000* did not cover land-use change and forestry (LUCF) because during that time the IPCC was also preparing the *Special Report on Land Use, Land-Use Change, and Forestry* (SR LULUCF) and parallel work on *Good Practice Guidance for LULUCF* would have carried a risk of inconsistency with the Special Report. Furthermore, significant negotiations on LULUCF were underway in the UNFCCC process. Following an invitation from COP-7 contained in the "Marrakech Accords" the IPCC finalized in 2003 the "IPCC Report on Good Practice Guidance for Land Use, Land-Use Change and Forestry " and a report on "Definitions and Methodological Options to Inventory Emissions from Direct Human-Induced Degradation of Forests and Devegetation of Other Vegetation Types".



Recently a major revision of the inventory guidelines has started which will result in the 2006 IPCC Guidelines on National Greenhouse Gas Inventories.

The two previous Chairmen of the IPCC, Prof. Bert Bolin and Dr. Robert Watson, provided contributions to this brochure. For technical reasons they are contained in an attachment.

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