

## THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

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### Summary

The historical development of the climate change issue leading up to the formation of the Intergovernmental Panel on Climate Change (IPCC) in 1988 is described briefly. Its formation implied a change in the way the scientific community might become engaged in assisting the political process to reach agreements on how to address a major environmental issue. The resolution adopted by the United Nations General Assembly that same year, asking the IPCC to present a more comprehensive analysis to serve as a basis for negotiating a climate convention, was seen as a major challenge by the scientific community. A first IPCC assessment report was completed in August 1990 and the Framework Convention on Climate Change (FCCC) was adopted in 1992 at the United Nations Conference on Environment and Development in Rio. While the IPCC was preparing for its second assessment report (SAR, completed in 1995), the FCCC entered into force. At the first session of the Conference of the Parties of the Convention (in Berlin, 1995), the stage was set for negotiating a protocol to the convention containing binding commitments by developed countries. The SAR served as the scientific basis for this political process and an agreement was reached in Kyoto in 1997. A third assessment was completed in 2001. In order to bring home the overall message, a synthesis report is being prepared on the basis of a set of questions formulated by the Subsidiary Body for Scientific and Technical Advice of the convention. The IPCC has been able to provide scientific information about climate change in a manner that is supported by the vast majority of active scientists in the field. The political process to reach agreement on how to protect human activities from

setbacks because of a global climate change has thereby progressed more rapidly and with less controversy than otherwise might have been the case.

## **1. The Formation of the Intergovernmental Panel on Climate Change and Its Task**

The Intergovernmental Panel on Climate Change (IPCC) was created in 1988 jointly by the World Meteorological Organization (WMO) and the United Nations Environmental Programme (UNEP) in response to the appeal by the United Nations General Assembly (UNGA) in December 1987 to address the issue of a possible future, human-induced climate change. This in turn was the outcome of the report of the United Nations' (U.N.) World Commission on Environment and Development that had been prepared under the chairmanship of Norway's Dr. Gro Harlem-Brundtland (and that is frequently referred to as the Brundtland Report) and submitted to the U.N. earlier in the year.

## **2. The Historical Background**

The realization that human activities might change the global climate was not new. Already at the end of the nineteenth century Svante Arrhenius, professor of chemistry at Stockholm's Högskola (University), deduced that the global mean temperature might increase by 5°C–6°C if the carbon dioxide concentration in the atmosphere were doubled. He did not, however, expect that this would happen in less than 1000 years.

It would take almost 80 years until a more reliable analysis of a possible human-induced climate change became available. S. Manabe at the Geophysical Fluid Dynamics Laboratory (GFDL), Princeton, N.J., USA, presented in 1974 a careful analysis of the sensitivity of the climate system to changes of the atmospheric carbon dioxide concentration. The sensitivity of the climate system to a doubling of carbon dioxide concentrations in the atmosphere, as estimated by Arrhenius, was reduced to an increase of 2°C–4°C (i.e. by about 50%).

An early assessment with the specific aim to inform particularly politicians about a possible future change of climate due to human activities was initiated by the U.S. National Academy of Sciences (NAS) in 1979 and was carried out by a group of eight scientists under the chairmanship of Professor Jule Charney of Massachusetts Institute of Technology (MIT). It came about because of U.S. President Jimmy Carter's interest in the issue based on evaluations by the U.S. Council on Environmental Quality.

The International Council of Scientific Unions (ICSU), UNEP, and WMO jointly commissioned an international assessment in 1980. Scientists from a number of countries were invited to take part, and Professor Bert Bolin of the International Meteorological Institute (IMI) in Stockholm, Sweden, led the work. The assessment became more international, but did not penetrate the problem in more detail than the NAS assessment about a year earlier.

The Climate Research Board of the NAS's Climate Research Committee initiated a more comprehensive study about another year later. It was led by Professor J. Smagorinsky of the GFDL, where major research efforts addressing the climate change issue were under way.

The report is one of the first attempts to analyze the seriousness of the climate change issue more carefully. For example, it was concluded that U.S. agriculture was not particularly threatened, although individual farmers in marginal areas might well suffer serious losses. On the other hand, merely two degrees warming and a reduction of precipitation by 10% might cause considerable damage to irrigated lands. The report also brought home the message about uncertainties in an interesting way: "There is probably some positive association between what we can predict and what we can accommodate. To predict requires some understanding, and that same understanding may help us to overcome the problem. What we have not predicted, what we may have overlooked, may be what we least understand. And when it finally forces itself on our attention, it may be harder to adapt to, precisely because it is not familiar and well understood. There may yet be surprises. Anticipating climate change is a new art. In our calm assessments we may be overlooking things that should alarm us."

After the completion of the first international assessment in 1980 it became obvious that more truly international engagement that would go beyond an analysis of the physical aspects of climate change was needed. An agreement was reached in 1983 between Professor Bert Bolin, the director of the IMI, and UNEP to launch a more comprehensive assessment of the climate issue and in that context pursue in more detail the role of the global ecosystems both because their changes in turn might influence climate and because their fundamental role in securing the basic material needs of people and countries, particularly in the developing world, would be analyzed in more detail.

The work was completed in 1985/86 and the report brought the issue of human-induced climate change to the forefront of attention:

- In the course of the assessment a study of the possible role of other greenhouse gases than carbon dioxide became available, which concluded that the collective effect of the human-induced increases of greenhouse-gas concentrations in the atmosphere might be equivalent to a doubling of atmospheric carbon dioxide concentrations by about the middle of the twenty-first century.
- The likely increase of the sea level because of global warming was assessed and showed that the melting glaciers and the expansion of sea water due to global warming might become a most important factor during the twenty-first century.
- The impacts of climate change on ecosystems would probably also be appreciable and substantial intermediate and long-term responses in the composition, size, and location of forest ecosystems were projected.

During the last stages of the completion of the report, UNEP, WMO, and ICSU jointly organized an international conference in Villach, Austria, in October 1995 on "The assessment of the role of carbon dioxide and of other greenhouse gases in climate variations and associated impacts." Possible human-induced climate change was taken seriously by the conference and a declaration was adopted.

Discussions in which several countries took part, notably the USA, about an effective mechanism for a follow up of this assessment had begun in 1986. The idea of an

intergovernmental process emerged. Direct governmental influence on the work rather than through two existing organizations was thereby ascertained. Any climate convention later agreed to was also necessarily to be intergovernmental. The WMO congress in May of 1987 and the UNEP governing council later that same year agreed that the executive heads of the two organizations should take steps to organize jointly an intergovernmental assessment panel on climate change.

After further discussions and consultations, the secretary general of WMO on behalf of the two organizations in March 1988 invited countries to meet and agree on the establishment of such a panel. An agreement was also reached by the executive councils of the two organizations about the terms of reference that should govern the work. This paved the way for the first meeting of the Intergovernmental Panel on Climate Change, usually known now as the IPCC, in November that year.

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### **Biographical Sketch**

**Dr. Bert Bolin** was born in 1925. He received his Ph.D. at the University of Stockholm in 1956 and became director of the International Meteorological Institute in Stockholm in 1957 and a professor in meteorology at the University of Stockholm in 1961. He has published about 160 scientific papers in professional journals. Dr. Bolin has served as scientific advisor to the Swedish prime minister (1986–1991) and from 1967 to 1971 was chairman of the Joint Organizing Committee for the Global Atmospheric Research Program (GARP), which later became the World Climate Research Program (WCRP). He was chairman of the preparatory committee that led to the formation of the International Geosphere Biosphere Program (IGBP) and was chairman of the Intergovernmental Panel on Climate Change from 1988 to 1997. Dr. Bolin is a member of about a dozen academies and has received numerous medals and awards.