Management and Impacts of Climate Change Programme
GICC
CRP 2001

3/01- Reinforcing long-term scenario-building capacities: data control and model coupling

Summary of Final Report

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The findings presented in this report are the result of a two-year collaboration between four institutions that share, to various degrees, the same research topic – climate change.

They were originally motivated by the persisting evidence – on reading the summaries for policymakers of IPCC's third report – of a want of consistency, both in the elaboration of socio-economic scenarios of greenhouse gases emissions and in their use for assessing the costs of climate change.

The keys to progress on these two points are to be found in the clarification of the complex relationships that link the future-oriented dimensions that underlie the studied issue: the long-term consequences of climate change and of the mitigation or adaptation policies it brings about must be examined at the meeting point of climatology, economics, demography and the advances of energy production and consumption techniques, the last being the main sources of man-made greenhouse gas emissions. As a direct consequence of this awareness, the collaboration between these future-oriented fields - highly diverse in content and in the 'cultural background' of the researchers involved – and the achievement of real progress regarding the scientific quality of the outputs, are conditioned by the prerequisite construction of reliable and harmonized information bases in each discipline involved.

In this perspective, the research programme whose findings are presented here explored specific directions, focusing not just on the mere production of directly applicable scientific results but also on the development of tools to facilitate the production of such results. Two approaches were followed:

A first part of the research centred on coupling the models produced by the different fields identified. It dealt with the economy-climate feedback and led to the identification of the novel concept of *climatic cost of growth*, i.e. the proportion of acquired growth that is eventually lost through economy-climate feedback mechanisms (10 % in a median scenario). At the same time, this research led to the elaboration of integrated prospective scenarios of CO_2 emissions, proposed as an alternative to the SRES scenarios of IPCC, compared to which they have a higher degree of uncertainty and higher base level, reflecting a more pessimistic vision of the challenges to be met through mitigation and/or adaptation.

The second part of the research focused on the constitution of an integrated database in an attempt to cover the wide set of parameters needed for studying the fields pertaining to economics, energy and demography.
Achievements include:

- The development of a programming code for the production of GTAP-based integrated input-output tables with, importantly, the correction of the aggregation of bilateral exchanges;
- The development of a tool to reconstruct input-output tables for earlier periods, combining 1997 GTAP tables with a set of external data among which demographic and economic data. This particular tool was used to reconstruct past equilibria of the global economy in 6 sectors and 13 regions.