

Scenarios

Any changes which take place as the results of increasing emissions must be viewed against a background of changes which are already occurring and which will continue to occur as a result of other factors such as:

- Natural changes - these include long-term changes which are driven by solar and tectonic factors, and short-to-medium term changes which are driven by ocean and atmospheric circulation patterns.
- Population increase - the predicted world population is expected to be above 10 billion by the middle of the next century; this growth will be unevenly distributed on a regional basis and will impact on already vulnerable areas.
- Land use changes - the clearing of forests for new agricultural production, together with more intensive use of existing agricultural land, will contribute to land degradation and increase demands for water resources.

In an ideal world, Working Group I would have had the time to produce scenarios for emission-induced climate change which could have been used as a basis for the analyses of this Working Group. However, this was precluded because work proceeded in parallel. As a result, and in order to complete its work in time, Working Group II has used a number of scenarios based on existing models in the literature.

The scenarios generally have the following features:

(i) an effective doubling of CO₂ in the atmosphere over pre-industrial levels

between now and 2025 to 2050 for a 'business-as-usual' scenario, with no changes to present policy;

(ii) an increase of mean global temperature in the range 1.5°C to 4.5°C corresponding to the effective doubling of CO₂;

(iii) an unequal global distribution of this temperature increase, namely half the global mean in the tropical regions and twice the global mean in the polar regions;

(iv) a sea-level rise of about 0.3 to 0.5 m by 2050 and about 1 m by 2100, together with a rise in temperature of the surface ocean layer of between 0.2° and 2.5°.

These scenarios can be compared with the recent assessment of Working Group I which, for a 'business as usual' scenario, has predicted the increase in global temperatures to be about 1°C above the present value by 2025 and 3°C before the end of next century. However, it has also estimated the magnitude of sea-level rise to be about 20 cm by 2030 and about 65 cm by the end of next century. Nevertheless, the impacts based on 1-2 m rise serve as a warning of the consequences of continued uncontrolled emissions.

The smaller rise does not lessen the anxiety, for their continued existence, of the small island countries, particularly the Pacific and Indian Oceans and the Caribbean, or of the larger populations in low-lying coastal areas such as Bangladesh. It is difficult to predict the regional effects of sea-level rise with any certainty. Significant variations of sea-level already occur for a variety of reasons, while there are considerable