

**CLIMATE CHANGE**

G L O B A L E N V I R O N M E N T O U T L O O K

The fourth *Global Environment Outlook – environment for development (GEO-4)* assessment report is published in 2007, exactly two decades since the World Commission on Environment and Development (WCED) published its seminal report – *Our Common Future* – which placed sustainable development on the agenda of governments and other stakeholders. *GEO-4* is the most comprehensive UN report on the environment prepared by about 390 experts and reviewed by more than 1 000 others across the world.

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**Living in a warming world**

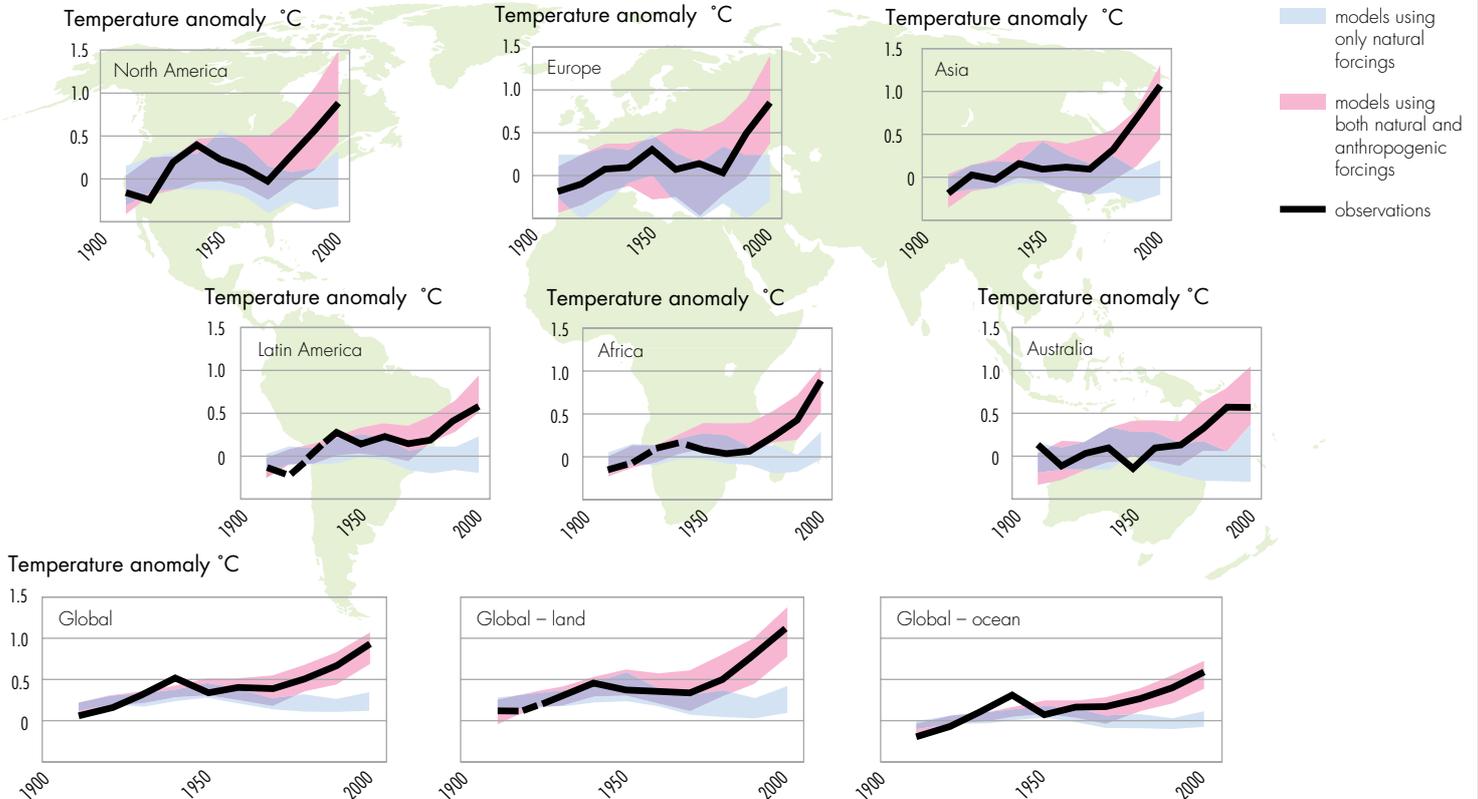
*GEO-4* concludes that climate change is a major global challenge that will have significant and long-lasting impacts on human well-being and development. It constitutes an obstacle to meeting basic development needs, such as those identified in the Millennium Development Goals.

Global warming is happening now, with 11 of the last 12 years (1995-2006) ranking among the warmest years since 1850. There is conclusive evidence of climate change impacts including increase in the Earth’s average temperature by approximately 0.74°C over the past century. The visible evidence of this

warming includes a number of shrinking mountain glaciers, thawing permafrost, earlier breakup of river and lake ice, lengthening of mid- to high-latitude growing seasons, changes in precipitation patterns and ocean currents, and increasing frequency and intensity of heat waves, storms, floods and droughts in some regions.

Alterations of water availability and food security are projected to dramatically affect millions of people. Sea-level rise threatens both inhabitants and major economic centres in coastal areas and the very existence of small island states.

**Observed warming over the 20th century compared with climate model calculations**



Source: IPCC

Poor communities, especially those in developing countries, rely heavily on rain-fed subsistence agriculture and natural resources. They are deeply dependent on climate patterns such as the monsoons, and are most vulnerable to the devastation of extreme weather events such as hurricanes. Similarly, within relatively affluent societies the poor or vulnerable suffer the most from weather extremes as was demonstrated by Hurricane Katrina in 2005 and by the European heat wave of 2003.

Continued warming is expected to cause shifts in the geographic range and seasonality of certain infectious diseases, including vector-borne infections such as malaria and dengue fever; and food-borne infections, such as salmonellosis. Morbidity and mortality caused by malnutrition, diarrhoea and malaria and associated with warming climate is increasing worldwide every year, especially in Africa and in some Asian countries.

### Challenges and opportunities

Anthropogenic greenhouse gas (GHG) emissions (principally CO<sub>2</sub>), are the main drivers of climate change and since 1987 there has been a continuing rise in these emissions.

Various scientists and policy experts have identified a 2°C increase in the global mean temperature above pre-industrial levels as a threshold beyond which climate impacts become significantly more severe, and the threat of major irreversible damage more plausible. The warming over this century is projected by the UNEP/WMO's Intergovernmental Panel on Climate Change to be between a further 1.8 and 4°C – well above the threshold. The corresponding sea level rise ranges from 0.18 to 0.59 m. This will intensify the impacts of climate change, leading to potentially massive consequences.

The rate of temperature change will depend critically on choices that society makes regarding the reduction of GHG emissions. In the meantime adaptation to anticipated climate change is now a global priority. Drastic steps need to be taken to reduce GHG emissions from energy, transport, forest and agricultural sectors to prevent future severe impacts from climate change.

There are international agreements to address the problem, such as the Kyoto Protocol, but it is far from being adequately addressed globally. There has been a remarkable lack of urgency in tackling GHG emissions during most of the past two decades. The policies and technologies required to reduce

emissions of GHG are currently available and many of them are economically viable, especially when the co-benefits of increased energy security, reduced energy costs and lower impacts of air pollution on health are considered. These include improvements in energy efficiency and a shift to low-carbon and renewable resources such as bio-fuels, solar, wind and geothermal energy. Another technological solution may be carbon capture and storage, for example by storing CO<sub>2</sub> deep underground. Societal changes are also necessary.

Recent studies show that mitigation measures do not necessarily imply exorbitant costs, and that total cost would remain a very small fraction of the global economy output. On the other hand the long-term risks from climate change strongly encourage the use of a precautionary approach.

Adaptation to climate change is necessary even if major mitigation measures are rapidly implemented. The array of potential adaptive responses available to human societies is very large, ranging from purely technological (such as sea defences), through behavioural (such as altered food and recreational choices) to managerial (such as modified farm practices), to policy (such as planning regulations). However, there are formidable barriers to adaptation. For developing countries, availability of resources and building adaptive capacity are particularly important.

Mitigation and adaptation to climate change can be integrated into development policies by pursuing innovative and emerging solutions, which will also create opportunities and jobs. The use of economic policy instruments and public and private sector investments in new technologies, clean and renewable energy, energy efficiency, nuclear energy and carbon sequestration are some of the many options already being used.

The ultimate success of global efforts can be realized only if climate concerns are mainstreamed in development planning at national and local levels, especially in sectors such as energy, transport, agriculture, forests and infrastructure development. Some nations and communities have already started to implement aggressive policies and measures to move towards low-carbon societies.

Sources and credits for the information presented here are available and fully referenced in the **Fourth Global Environment Outlook - environment for development** report.



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