

THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

AND SOUTH AFRICAN POLICY ON CLIMATE CHANGE

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Climate change, the most pervasive and truly global of all issues affecting humanity, poses a serious threat to our environment. The world is now concerned, with increasing belief and apprehension, that the pattern of global climate is being altered by humankind's own actions. The most crucial environmental issues of the next few decades will be those relating to the earth's atmosphere - greenhouse gases, the depletion of the ozone layer, transboundary air pollution, etc.

RESPONSE

These global issues and their potential impacts on agriculture, water resources, energy, terrestrial ecosystems, and the social and economic sectors have generated calls for urgent response by the international community to mitigate the effects. The World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) responded through the joint establishment of the Intergovernmental Panel on Climate Change (IPCC) to provide authoritative advice on the science and policy options related to climate change.

During the eighties, scientific evidence about the possibility of global climate change led to growing concern. By 1990, there were urgent calls for a global treaty to address the problem. UNEP and WMO responded by establishing an intergovernmental working group to prepare for treaty negotiations. By all standards, rapid progress was made, in part also because of the work by the IPCC and by meetings such as the 1990 Second World Climate Conference.

In response to the working group's proposal, the United Nations General Assembly at its 1990 session set up the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change (INC/FCCC). The INC/FCCC was given a mandate to draft a framework convention and any related legal instruments it considered necessary. Negotiators from more than 150 states met during five sessions between February 1991 and May 1992. They adopted the United Nations Framework Convention on Climate Change on 9 May 1992 at UN Headquarters in New York.

The United Nations Framework Convention on Climate Change, the first binding international agreement dealing directly with threats to the world's climate, entered into force on 21 March 1994, less than two years after it was signed by 155 governments at the Rio Earth Summit. The chairperson of the Intergovernmental Negotiating Committee, a respected diplomat and Argentina's Ambassador to the People's Republic of China, stated that "the Convention represents our best long-term hope for dealing effectively with the risk of man-made climate change. The ultimate objective of the

Convention is "stabilising greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system" of the world. It must be done "within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner". It has now been six years since the IPCC took on the responsibility of assessing the scientific-technical knowledge about the potential threat of such enormous change to the earth. The Chairman of the IPCC is of the opinion that "there has been considerable progress during these years". He also stated: "Our understanding of the scientific, technical and socio-economic aspects of climate change has increased considerably".

THE BASIS

Scientific objectivity should be the basis of IPCC work, acknowledging, on the one hand the basic physical understanding of the climate system that leads to the expectation of human-induced climate change and, on the other hand, the many gaps that remain in knowledge, gaps that scientists and other experts are working hard to bridge so that international actions can rest on firmer factual foundations.

Many evaluators are of the opinion that present progress in policy formulation is slow, while others have argued for no further action, because of the potential costs involved. This is a result of the uncertainties in scientific-technical knowledge. The Convention declares that "Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures ...". But it is also important to analyse the possible implication of long-term preventive actions, and in doing so recognise part of the Objective of the Convention which states that "... economic development [should] proceed in a sustainable manner". To achieve these multiple goals will require careful management based on good scientific and other applicable information.

It is clear that radiative forcing of the climate system due to anthropogenic emissions is still increasing in 1995 at almost

the same rate as during the 1970s and 1980s. It will continue to do so during decades to centuries, if no further precautionary measures are taken. Stabilization of greenhouse gas concentrations will require reduction in global emissions.

PRESENT CONCLUSIONS

In the context of such a serious message, the following conclusions from IPCC reports are particularly important:

1. The increase of greenhouse gas concentrations in the last century, due to human actions, is equivalent to about a 50% increase in carbon dioxide concentrations.
2. The concentration of carbon dioxide itself has increased by 29% only. The rate of increase remains rather constant except for a temporary decline in 1991 to 1993, possibly due to the eruption of Mount Pinatubo.
3. About 70% of the current increase in the concentration of carbon dioxide is due to emissions that occurred over the last 50 years. The IPCC scenarios of future emissions show that the same amount will be emitted again within about 20 years, if no preventive measures are taken.
4. Stabilisation of atmospheric concentrations of methane and nitrous oxide require reductions of emissions by about 10 and 50% respectively. If stabilisation were desired for these gases, present efforts are inadequate to reach such goals.
5. Continued industrialisation of many countries, particularly in the developing world, will further increase air pollution, especially if development is not undertaken in a careful way. The resulting increases in the concentrations of tropospheric ozone would further enhance the greenhouse effect.
6. There is uncertainty about the most likely change of climate that would be associated with a given increase of greenhouse gases in the atmosphere, but earlier estimates of warming by 1.5 to 4.5°C for a doubling of the equivalent carbon dioxide concentration, remain unchanged. It is important to stress that this range does not include zero. In other words, the scientific community is confident that, if greenhouse gases continue to increase, there will be a climate change.
7. Such changes will be regionally uneven with some areas warming more than the average and some small areas possibly even showing a relative cooling.
8. An increase of temperature lags behind an increase in greenhouse gases and for this reason the expected change might also still at present be partly hidden in natural climate variability.
9. Key greenhouse gases disappear only very slowly from the atmosphere. This implies that once a significant change of climate has occurred, it will be with us for decades to centuries.

10. The magnitude of human interference with the climate system becomes clear when we realise that global forcing caused by human greenhouse gas emissions presently corresponds to about 1% of the solar energy that is absorbed by the earth. This amount of energy is about one hundred times larger than today's energy supply in the world as a whole.

The key issue that is coming to the fore is: how serious is the climate change that is being envisaged and how rapidly will a change occur? The answer to this question will obviously influence the need and urgency for action. It is not possible to give a very specific answer at this time, since regional patterns of the expected global climate change cannot yet be derived with sufficient confidence.

It is important to realise that uncertainty about the details of potential climate change does not diminish risks; it merely makes it more difficult to assess them quantitatively.

From the IPCC point of view the following statement is also very important:

"The climate change issue is a long-term issue. The global system responds to anthropogenic greenhouse gas emissions with a delay that may be several decades. This means that early detection of serious threats is difficult. Also, when changes are on the way, major reductions in forcing factors may well be required in order then to change course. The socio-economic system, however, can only be changed gradually in order to give societies time to adjust and accept changes. And above all, while initial measures may not involve large costs, later short-term interventions, if required, might be much more costly. The need for possible early actions should be carefully assessed, keeping in mind that they must not seriously compromise necessary development".

SOME APPLICATIONS

1. A warmer climate would directly affect the temperature-sensitive sectors of the economy: agriculture, forestry, fisheries; and construction. Because of the risk of drought, arid and semi-arid regions are likely to be most vulnerable to warming. A warmer climate may also encourage the increase of insect populations. This, in turn, is likely to decrease agriculture yields in some regions.
2. A warmer climate would hurt agriculture in some regions and help in others. Recent global studies found that Northern temperate regions could benefit, particularly for small increases in temperature, but low latitude areas could lose. The global studies show significant losses from climate change alone that are significantly offset by the direct beneficial effect of higher ambient levels of carbon dioxide on plant growth. Most analysts expect that agriculture can adapt without significant added costs for the world as a whole (although some regions will suffer greater-than-average losses), in part because of crop shifting and other adaptation by farmers.

3. Trade in international commodity markets can ensure that agricultural prices change only moderately, though particular regions may gain or lose significantly.
4. A warmer climate implies both a poleward movement of forests and changes in forest composition. The result would be to increase boreal forests and, by a smaller percentage, to decrease tropical forests. On balance, doubling CO₂ concentrations would modestly reduce both standing biomass and forest area. Some analysts also calculate an additional temporary decline in forest cover during the transition to a warmer climate. This decline could last for several hundred years. Higher CO₂ concentrations might also increase tree growth, partially offsetting direct losses from warming.
5. Some analysts conclude that a warmer climate would significantly reduce water supply. Most climate models now predict hotter and drier weather for the mid-latitude continents. If this occurs, the downward pressures on water supply will be intensified by upward pressures on water demand.
6. Global mean sea level appears to have risen 10 to 29 cm over the past century. The IPCC has projected a warming-induced rise in mean sea level of 21 to 71 cm by 2070.
7. A rising sea level could inundate some small island nations, flood some low-lying coastal cities, damage coastal farmland, and contaminate water supplies. More severe storms would accelerate coastal erosion and affect aquifers, intensifying problems existing today. Warmer oceans might damage coral reefs, a natural defence for some coastal areas. To account for the costs of the protective measures, the costs of protecting the world's developed coastlines against a 1 m rise over the next 100 years have been estimated to range from 0,01% for the former USSR to 0,74% for Indian Ocean small islands, with a world average of 0,028% of Gross National Product per annum.

SOUTH AFRICAN POLICY

South Africa has developed a policy document during recent years. It is available at this stage as a discussion document due to an ongoing process and the needs for transparency and greater involvement of all stakeholders. I wish to quote as follows from it:

"The principal elements of South Africa's policy on climate change are to be:

A holistic approach which acknowledges that proposed actions in any one sector may have repercussions in other sectors.

A consistency with balanced development is to be provided in a way by which the country is able to anticipate, adapt to, and take advantage of climate change without affecting essential growth or prejudicing future generations.

Policy should be pragmatic and implementable. It should also be beneficial to the country, irrespective of whether global change occurs or not.

Broad descriptions of strategies are proposed to achieve the policy objectives in a cost-effective manner. These include ongoing regular review of actions, strategies and research; proper coordination of global climate change policy and actions at all levels, preferably building on existing structures such as the Sub-committee: Climate Change and the South African International Geosphere Biosphere Committee; promotion of public awareness and appropriate education; and further development and adaptation of the expertise and measures that already exist to manage natural climate variability.

SOUTH AFRICAN REALITIES

South Africa releases greenhouse gases into the atmosphere and accordingly is contributing, albeit in a small way, to the international greenhouse issue. In 1990 South Africa was ranked as the 18th highest producer of greenhouse gases in the world, emitting some 300 million tons of carbon dioxide into the atmosphere annually (equivalent to 7,7 tons per inhabitant), as well as greenhouse gases such as CFCs, methane and the oxides of nitrogen. This emanates from the developed sector of the economy, the large informal sector, and biomass burning. Atmospheric pollution in South Africa is controlled by the Atmospheric Air Pollution Prevention Act, 1965 (Act No. 45 of 1965). This Act seeks to control noxious or offensive gases, smoke, dust and emissions from vehicles, but at this stage does not control CO₂ emissions. Likewise, the ratification in 1990 of the Montreal Protocol on CFC use and production by South Africa, was to protect human health by arresting further damage to the ozone layer, rather than to control CFCs as greenhouse gases. It is clear that South Africa cannot ignore the possibility of its contribution to global environmental change.

South Africa contributes approximately 1,6% to fossil fuel based global carbon dioxide emissions. Because of the nature of its industry, economy, and population structure, and its inefficient energy use, South Africa is an energy intensive society. This results in a high per capita emission of carbon dioxide. The main reason for this is the country's dependence on coal as a primary energy source.

South Africa has a mixture of both developed and developing economies. Many observers judge this country by first world standards, whereas many of its problems are of a developing nation nature. The South African population, at about 40 million presently is projected to increase by some 2,3% per annum.

Energy requirements and, by implication, carbon dioxide emissions in South Africa, are projected under moderate-growth economic conditions to increase at 3,5% per annum. There is little scope for significant reduction in these trends in the short to medium term, without harming essential economic growth and development. In this respect attention

is drawn to the fact that about 66% of the country's population does not have access to electricity and currently makes use of less efficient forms of combustion for cooking and heating. Care is to be taken to ensure that emissions of greenhouse gases are minimized in an effective energy efficiency programme.

South Africa's basic energy policy is to make clean, consistent, affordable and appropriate energy available to all sectors of the country's community. Strategies which promote a balanced least-cost mix of energy supply and demand are being promoted within this policy framework. Coal is by far the most important source of energy and provides roughly 80% of the country's primary energy needs. It will undoubtedly continue to dominate the South African energy scene for many years to come.

A major factor limiting growth in South Africa is the **shortage of water**. South Africa's rainfall is highly variable over time and is patchy in its distribution. The greater part of the country is semi-arid and subject to droughts, floods and high evaporation. South Africa's industrial, agricultural and domestic users are heavily dependent on this highly variable water supply and thus are very vulnerable to any potential climate change which increases aridity or rainfall variability.

Water structures such as dams and distribution networks, as with other heavy industrial **infrastructure**, are designed for long lifetimes (several decades) and also require long lead times from conception, through design to construction. This highlights the need for a timeous response to possible changes in climate which might affect the design and siting of such structures.

Except in times of drought, South Africa is largely self-sufficient in terms of **food production**. A major component of the population is involved directly or indirectly in various forms of agriculture, fishing and forestry. The formal agricultural/forestry/fishing sector contributed more than 11% of the gross domestic product in 1990.

Much of South Africa's crop production and forestry is practised on marginal land. Hence it is highly sensitive to variability and change in rainfall and climate. Environmental variability is also known to have caused major changes in a number of South African marine fish resources.

Natural resource degradation resulting from processes such as soil erosion has already reached serious proportions and is likely to be considerably enhanced through global warming. South Africa, situated in the Southern Hemisphere and influenced by three major oceans, has a climate in which the oceans play a key role. Changes in these oceans and in their current systems associated with global environmental change have implications both for South Africa and globally because of the complex heat transport processes south of Africa. Climate monitoring systems in South Africa and adjacent areas, in particular the Southern Ocean, are inadequate for local operational and research purposes.

The "win-win" approach as defined should be central to any policy on global environmental change. Such an approach should be treated holistically. South African policy should take full advantage of the opportunities which possible predictable global climate change presents, whether or not climate change takes place. These opportunities include *inter alia*

- development of energy efficient technologies,
- making better use of all resources,
- playing a leading role in Africa and helping neighbouring countries in alleviating environmental problems.

Through these actions the right policy should enable South Africa to manage its environment and improve the quality of life of its inhabitants, make the country more competitive in trade, promote optimal use of its resources, and benefit tourism, irrespective of whether climate change takes place or not.

THE INTERNATIONAL SCENE

Full cognizance should be taken of international efforts to address climate change. Appropriate international and regional cooperation should be facilitated. For South Africa to move effectively on the regional and global stage of Climate Change, an awareness has to be created of the fast movement within the organisational sphere, lots of confusion created by complexities around and within the applicable science and the organisational characteristics of a most complex and new international treaty mechanism.

South Africa must also get its own house in order. Organisational and functional responsibilities must be put in place to drive an inclusive process towards climate change responsibilities. A South African delegation attended the first Conference of the Parties in Berlin in March/April this year. By some this huge international gathering was described as a non-event. Others see some hope in the fact that the nations could get together to negotiate some serious issues - for example, the issue of adequacy of commitments by which the industrial world has to increase its responsibility towards additional reduction of greenhouse gas emissions. We had observer status only. It is my firm conviction, and I am supported by many knowledgeable persons, that South Africa must ratify the FCCC immediately. This will give us opportunities on the international stage as never before; not even to mention such advantages like access to the Global Environment Facility.

Thank you for the privilege to have addressed the members of such an important Association. Your knowledge and efforts may contribute in a meaningful way to protect the atmosphere of Planet Earth to the good of future generations.