Conservation and Management of Resources for Development

Chapter 9 Protection of the atmosphere

Protection of the atmosphere is a broad and multi-dimensional endeavour involving various sectors of economic activity. The options and measures described in this chapter are recommended for consideration and, as appropriate, implementation by governments and other bodies in their efforts to protect the atmosphere.

It is recognized that many of the issues discussed in this chapter are also addressed in such international agreements as the 1985 Vienna Convention for the Protection of the Ozone Layer, the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as amended, the 1992 Framework Convention on Climate Change, and other international, including regional, instruments. In the case of activities covered by such agreements, it is understood that the recommendations contained in this chapter do not oblige any government to take measures which exceed the provisions of these legal instruments. However, within the framework of this chapter, governments are free to carry out additional measures which are consistent with those legal instruments.

It is also recognized that activities that may be undertaken in pursuit of the objectives of this chapter should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty.

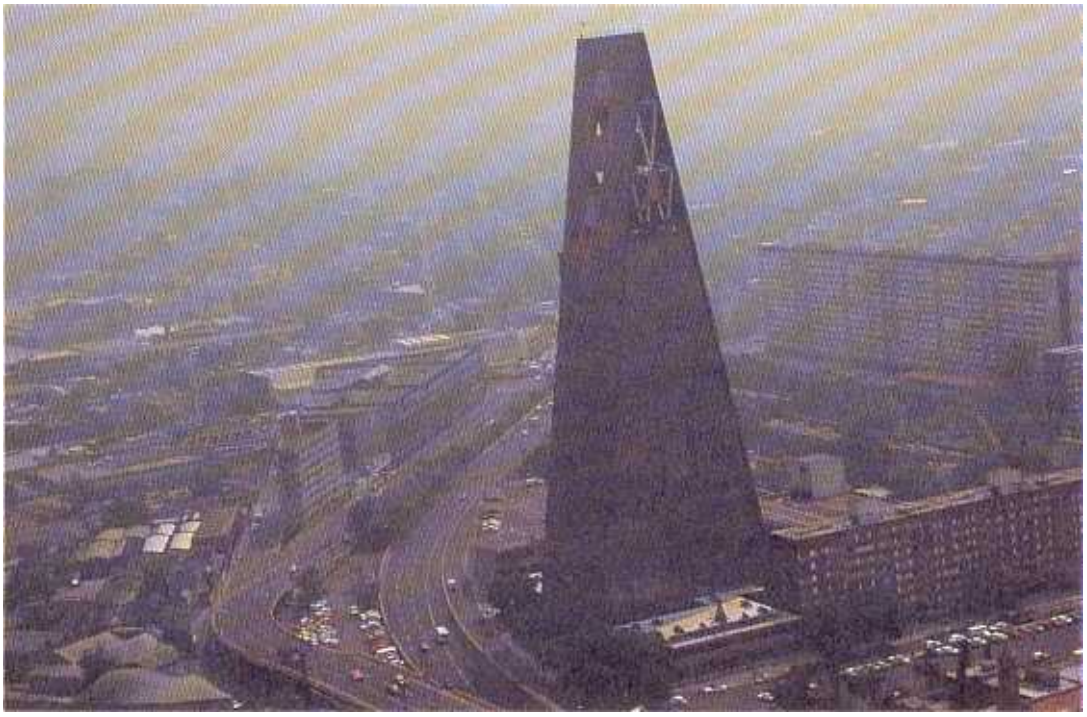
In this context particular reference is also made to Programme Area A of Chapter 2 of Agenda 21.

A Addressing the uncertainties: improving the scientific basis for decision-making

Basis for action Concern about climate change and climate variability, air pollution and ozone depletion has created new demands for scientific, economic and social information to reduce the remaining uncertainties in these fields. Better understanding and prediction of the various properties of the atmosphere and of the affected ecosystems, as well as health impacts and their interactions with socio-economic factors, are needed.

Objectives The basic objective of this programme area is to improve the understanding of processes that influence and are influenced by the Earth's atmosphere on a global, regional and local scale, including, *inter alia*, physical, chemical, geological, biological, oceanic, hydrological, economic and social processes; to build capacity and to enhance international cooperation; and to improve understanding of the economic and social

Industry is essential for production but the activities of industry often result in harmful emissions into the atmosphere and environment. Industrial development should be encouraged to minimize adverse impacts.



11,000 tons of pollutant hangs over Mexico City. 83 per cent of this brown haze is produced by cars; the balance is made up of human excrement, which dries to dust, and factory emissions.

consequences of atmospheric changes and of mitigation and response measures addressing such changes.

Activities Governments at the appropriate level, with the cooperation of the relevant United Nations bodies and, as appropriate, intergovernmental and non-governmental organizations, and the private sector, should:

a Promote research related to the natural processes affecting and being affected by the atmosphere, as well as the critical linkages between sustainable development and atmospheric changes, including impacts on human health, ecosystems, economic sectors, and society

b Ensure a more balanced geographical coverage of the Global Climate Observing System and its components, including the Global Atmosphere Watch, by facilitating, *inter alia*, the establishment and operation of additional systematic observation stations, and by contributing to the development, utilization and accessibility of these databases;

c Promote cooperation in

i the development of early detection systems concerning changes and fluctuations in the atmosphere, and

ii the establishment and improvement of capabilities to predict such changes and fluctuations and to assess the resulting environmental and socio-economic impacts;

d Cooperate in research to develop methodologies and identify threshold levels of atmospheric pollutants, as well as atmospheric levels of greenhouse gas concentrations, that would cause dangerous anthropogenic interference with the climate system and the environment as a whole, and the associated rates of change that would not allow ecosystems to adapt naturally.

e Promote, and cooperate in the building of scientific capacities, the exchange of scientific data and information, and the facilitation of the participation and training of experts and technical staff, particularly of developing countries, in the fields of research, data assembly, collection and assessment, and systematic observation related to the atmosphere.

B. Promoting sustainable development

A *Energy development, efficiency and consumption*

Basis for action Energy is essential to economic and social development and improved quality of life. Much of the world's energy, however, is currently produced and consumed in ways that could not be sustained if technology were to remain constant and if overall quantities were to increase substantially. The need to control atmospheric emissions of greenhouse and other gases and substances will increasingly need to be based on efficiency in energy production, transmission, distribution and consumption, and on growing reliance on environmentally sound energy systems, particularly new and renewable sources of energy.[1] All energy sources will need to be used in ways that respect the atmosphere, human health, and the environment as a whole.

The existing constraints to increasing the environmentally sound energy supplies required for pursuing the path towards sustainable development, particularly in developing countries, need to be removed.

Objectives The basic and ultimate objective of this programme area is to reduce adverse effects on the atmosphere from the energy sector by promoting policies or programmes, as appropriate, to increase the contribution of environmentally safe and sound and cost effective energy systems, particularly new and renewable ones, through less polluting and more efficient energy production, transmission, distribution and use. This objective should reflect the need for equity, adequate energy supplies and increasing energy consumption in developing countries, and the need to take into consideration the situations of countries that are highly dependent on income generated from the production, processing and export, and/or consumption of fossil fuels and associated energy-intensive products and/or the use of fossil fuels for which countries have serious difficulties in switching to alternatives, and of countries highly vulnerable to adverse effects of climate change.

Activities Governments at the appropriate level, with the cooperation of the relevant United Nations bodies and, as appropriate, intergovernmental and non-governmental organizations, and the private sector, should:

a Cooperate in identifying and developing economically viable, and environmentally sound energy sources to promote the availability of increased energy supplies to support sustainable development efforts, in particular in developing countries;

b Promote the development at the national level of appropriate methodologies for making integrated energy, environment and economic policy decisions for

UNCED confirmed that environmental problems must be addressed in a global context. For Canada, sustainable development is a prerequisite of our prosperity and a safeguard of our identity and we were proud to be one of the original co-sponsors of the United Nations resolution calling for UNCED. The main challenge of UNCED was to bring the North and South together to work towards the goal of sustainable development. The Summit's conventions on climate change and biodiversity were indicative of the great strides we have made in achieving our objective. However, success will be measured not in words, but in actions. Our children's future depends on the steadfastness of our commitment.

Brian Mulroney
Prime Minister
Canada

sustainable development, *inter alia* through environmental impact assessments;

c Promote the research, development, transfer and use of improved energy-efficient technologies and practices, including endogenous technologies in all relevant sectors, giving special attention to the rehabilitation and modernization of power systems, with particular attention to developing countries;

d Promote the research, development, transfer and use of technologies and practices for environmentally sound energy systems, including new and renewable energy systems, with particular attention to developing countries;

e Promote the development of institutional, scientific, planning and management capacities, particularly in developing countries, to develop, produce, and use increasingly efficient and less polluting forms of energy;

f Review current energy supply mixes to determine how the contribution of environmentally sound energy systems as a whole, particularly new and renewable energy systems, could be increased in an economically efficient manner, taking into account respective countries' unique social, physical, economic and political characteristics, and examining and implementing, where appropriate, measures to overcome any barriers to their development and use;

g Coordinate energy plans regionally and sub-regionally, where applicable, and study the feasibility of efficient distribution of environmentally sound energy from new and renewable energy sources;

h In accordance with national socio-economic development and environment priorities, evaluate and, as appropriate, promote cost-effective policies or programmes, including administrative, social and economic measures, in order to improve energy efficiency;

i Build capacity for energy planning and programme management in energy efficiency, as well as for the development, introduction, and promotion of new and renewable sources of energy;

j Promote appropriate energy efficiency and emission standards or recommendations at the national level[2], aimed at the development and use of technologies that minimize adverse impacts on the environment.

k Encourage education and awareness-raising programmes at the local, national, subregional and regional levels concerning energy efficiency and environmentally sound energy systems;

l Establish or enhance, as appropriate, in cooperation with the private sector, labelling programmes for products to provide decision makers and consumers with information on opportunities for energy efficiency.

B *Transportation*

Basis for action The transport sector has an essential and positive role to play in economic and social development, and transportation needs will undoubtedly increase. However, since the transport sector is also a source of atmospheric emissions, there is need for a review of existing transport systems, and the more effective design and management of traffic and transport systems.

Objectives The basic objective of this programme area is to develop and promote cost-effective policies or programmes, as appropriate, to limit, reduce or control, as appropriate, harmful emissions into the atmosphere and other adverse environmental effects of the transport sector, taking into account development priorities as well as the specific local and national circumstances and safety aspects.

Activities Governments at the appropriate level, with the cooperation of the relevant United Nations bodies and, as appropriate, intergovernmental and nongovernmental organizations, and the private sector, should:

a Develop and promote, as appropriate, cost effective, more efficient, less polluting and safer transport systems, particularly integrated rural and urban mass transit, as well as environmentally sound road networks, taking into account the needs for sustainable social, economic and development priorities, particularly in developing countries;

b Facilitate at the international, regional, subregional and national levels the access to and the transfer of safe, efficient, including resource-efficient, and less polluting transport technologies, particularly to the developing countries, including the implementation of appropriate training programmes;

c Strengthen, as appropriate, their efforts at collecting, analysing and exchanging relevant information on the relation between environment and transport, with particular emphasis on the systematic observation of emissions and the development of a transport database;

d In accordance with national socio-economic development and environment priorities, evaluate and, as appropriate, promote cost effective policies or programmes, including administrative, social and economic measures, in order to encourage use of transportation modes that minimize adverse impacts on the atmosphere;

e Develop or enhance, as appropriate, mechanisms to integrate transport planning strategies and urban and regional settlement planning strategies, with a view to reducing the environmental impacts of transport;

f Study, within the framework of the United Nations and its regional economic commissions, the feasibility of convening regional conferences on transport and the environment.

C *Industrial development*

Basis for action Industry is essential for the production of goods and services and is a major source of employment and income, and industrial development as such is essential for economic growth. At the same time, industry is a major resource and materials user and consequently industrial activities result in emissions into the atmosphere and the environment as a whole. Protection of the atmosphere can be enhanced, *inter alia*, by increasing resource and materials efficiency in industry, installing or improving pollution abatement technologies and replacing chlorofluorocarbons (CFCs) and other ozone-depleting substances with appropriate substitutes, as well as by reducing wastes and by-products.

Objectives The basic objective of this programme area is to encourage industrial development in ways that minimize adverse impacts on the atmosphere by, *inter alia*, increasing efficiency in the production and consumption by industry of all resources and materials, by improving pollution-abatement technologies, and by developing new environmentally sound technologies.

Activities Governments at the appropriate level, with the cooperation of the relevant United Nations bodies and, as appropriate, intergovernmental and non-governmental organizations, and the private sector, should:

a In accordance with national socio-economic development and environment priorities, evaluate and, as appropriate, promote cost effective policies or programmes, including administrative, social and economic measures, in order to minimize industrial pollution and adverse impacts on the atmosphere;

b Encourage industry to increase and strengthen its capacity to develop technologies, products and processes which are safe, less polluting, and make more efficient use of all resources and materials, including energy;

Leaf loss on a beech tree in Knole Park, United Kingdom illustrates the impact atmospheric emissions can have on trees. Freshwater and marine ecosystems and biodiversity are also affected. Right: Sweden. Lime is dumped into a lake to neutralize the acid which is killing it.

c Cooperate in development and transfer of such industrial technologies and in development of capacities to manage and use such technologies, particularly with respect to developing countries;
d Develop, improve and apply environmental impact assessments to foster sustainable industrial development;
e Promote efficient use of materials and resources, taking into account the life cycles of products, in order to realize the economic and environmental benefits of using resources more efficiently and producing less wastes;
f Support the promotion of less polluting and more efficient technologies and processes in industries, taking into account area-specific accessible potentials for energy, particularly safe and renewable sources of energy, with a view to limiting industrial pollution and adverse impacts on the atmosphere.

D *Terrestrial and marine resource development and land use*

Basis for action Land-use and resource policies will both affect and be affected by changes in the atmosphere. Certain practices related to terrestrial and marine resources and land use can decrease greenhouse gas sinks and increase atmospheric emissions. The loss of biological diversity may reduce the resilience of ecosystems to climatic variations and air pollution damage. Atmospheric changes can have important impacts on forests, biodiversity, and freshwater and marine ecosystems, as well as on economic activities, such as agriculture. Policy objectives in different sectors may often diverge and will need to be handled in an integrated manner.

Objectives The objectives of this programme area are:
a To promote terrestrial and marine resource utilization and appropriate land-use practices that contribute to:
i Reducing atmospheric pollution and/or limiting anthropogenic emissions of greenhouse gases;
ii The conservation, sustainable management and enhancement, where appropriate, of all sinks for greenhouse gases;
iii The conservation and sustainable use of natural and environmental resources;
b To ensure that actual and potential atmospheric changes and their socio-economic and ecological impacts are fully taken into account in planning and implementing policies and programmes concerning terrestrial and marine resources utilization and land-use practices.

Activities Governments at the appropriate level, with the cooperation of the relevant United Nations bodies and, as appropriate, intergovernmental and non-governmental organizations, and the private sector, should:
a In accordance with national socio-economic development and environment priorities, evaluate and, as appropriate, promote cost effective policies or programmes, including administrative, social and economic measures, in order to encourage environmentally sound land-use practices.
b Implement policies and programmes that will discourage inappropriate and polluting land-use practices and promote sustainable utilization of terrestrial and marine resources;
c Consider promoting the development and use of terrestrial and marine resources and land-use practices that will be more resilient to atmospheric changes and fluctuations;
d Promote sustainable management and cooperation in the conservation and enhancement, as appropriate, of sinks and reservoirs of greenhouse gases, including biomass, forests and oceans, as well as other terrestrial, coastal and marine ecosystems.

C Preventing stratospheric ozone depletion

Basis for action Analysis of recent scientific data has confirmed the growing concern about the continuing depletion of the Earth's stratospheric ozone layer by reactive chlorine and bromine from man-made CFCs, halons and related substances. While the 1985 Vienna Convention for the Protection of the Ozone Layer and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer (as amended in London in 1990) were important steps in international action, the total chlorine loading of the atmosphere of ozone-depleting substances has continued to rise. This can be changed through compliance with the control measures identified within the Protocol.

Objectives The objectives of this programme area are:
a To realize the objectives defined in the Vienna Convention and the Montreal Protocol and its 1990 amendments, including the consideration in those instruments of the special needs and conditions of the developing countries and the availability to them of alternatives to substances that deplete the ozone layer. Technologies and natural products that reduce demand for these substances should be encouraged;
b To develop strategies aimed at mitigating the adverse effects of ultraviolet radiation reaching the Earth's surface as a consequence of depletion and modification of the stratospheric ozone layer.

Activities Governments at the appropriate level, with the cooperation of the relevant United Nations bodies and, as appropriate, intergovernmental and non-governmental organizations, and the private sector, should:
a Ratify, accept or approve the Montreal Protocol and its 1990 amendments; pay their contributions towards the Vienna/Montreal trust funds and the interim multilateral ozone fund promptly; and contribute, as appropriate, towards ongoing efforts under the Montreal Protocol and its implementing mechanisms, including making available substitutes for CFCs and other ozone-depleting substances and facilitating the transfer of the corresponding technologies to developing countries in order to enable them to comply with the obligations of the Protocol;
b Support further expansion of the Global Ozone Observing System by facilitating – through bilateral and multilateral funding – the establishment and operation of additional systematic observation stations, especially in the tropical belt in the southern hemisphere.
c Participate actively in the continuous assessment of scientific information and the health and environmental effects, as well as of the technological/economic implications of stratospheric ozone depletion; and consider further actions that prove warranted and feasible on the basis of these assessments;
d Based on the results of research on the effects of the additional ultraviolet radiation reaching the Earth's surface, consider taking appropriate remedial measures in the fields of human health, agriculture and marine environment;

Above: the Australian Slip Slap Slop campaign educates the public on the dangers of sun exposure and its link to skin cancer. Below: A traffic policeman in Bangkok protects himself from harmful emissions with a mask.

e Replace CFCs and other ozone-depleting substances, consistent with the Montreal Protocol, recognizing that a replacement's suitability should be evaluated holistically and not simply based on its contribution to solving one atmospheric or environmental problem.

D Transboundary atmospheric pollution

Basis for action Transboundary air pollution has adverse health impacts on humans and other detrimental environmental impacts, such as tree and forest loss and the acidification of water bodies. The geographical distribution of atmospheric pollution monitoring networks is uneven, with the developing countries severely underrepresented. The lack of reliable emissions data outside Europe and North America is a major constraint to measuring transboundary air pollution. There is also insufficient information on the environmental and health effects of air pollution in other regions.

The 1979 Economic Commission for Europe Convention on Long-range Transboundary Air Pollution, and its protocols, have established a regional regime in Europe and North America, based on a review process and cooperative programmes for systematic observation of air pollution, assessment and information exchange. These programmes need to be continued and enhanced, and their experience needs to be shared with other regions of the world.

Objectives The objectives of this programme area are:
a To develop and apply pollution control and measurement technologies for stationary and mobile sources of air pollution and to develop alternative environmentally sound technologies;
b To observe and assess systematically the sources and extent of transboundary air pollution resulting from natural processes and anthropogenic activities;
c To strengthen the capabilities, particularly of developing countries, to measure, model and assess the fate and impacts of transboundary air pollution, through, *inter alia*, exchange of information and training of experts;
d To develop capabilities to assess and mitigate transboundary air pollution resulting from industrial and nuclear accidents, natural disasters and the deliberate and/or accidental destruction of natural resources;
e To encourage the establishment of new and the implementation of existing regional agreements for limiting transboundary air pollution;
f To develop strategies aiming at the reduction of emissions causing transboundary air pollution and their effects.

Activities Governments at the appropriate level, with the cooperation of the relevant United Nations bodies and, as appropriate, intergovernmental and non-governmental organizations, the private sector and financial institutions, should:
a Establish and/or strengthen regional agreements for transboundary air pollution control and cooperate, particularly with developing countries, in the areas of systematic observations and assessment, modelling and the development and exchange of emission control technologies of mobile and stationary sources of air pollution. In this context, greater emphasis should be put on addressing the extent, causes, health and socio-economic impacts of ultraviolet radiation, acidification of the environment and photo-oxidant damage to forests and other vegetation;
b Establish or strengthen early warning systems and response mechanisms for transboundary air pollution resulting from industrial accidents and natural disasters and the deliberate and/or accidental destruction of natural resources;

c Facilitate training opportunities and exchange of data, information and national and/or regional experiences;

d Cooperate on regional, multilateral and bilateral bases to assess transboundary air pollution, and elaborate and implement programmes identifying specific actions to reduce atmospheric emissions and to address their environmental, economic, social and other effects.

Financial and cost evaluation For programme Area A about $640 million from the international community on grant or concessional terms. For the four-part programme under Programme Area B about $20 billion from the international community on grant or concessional terms. For programme Area C in the range of $160-590 million on grant or concessional terms.

1 New and renewable energy sources are solar thermal, solar photovoltaic, wind, hydro, biomass, geothermal, ocean, animal and human power, as referred to in the reports of the Committee on the Development and Utilization of New and Renewable Sources of Energy, prepared specifically for the Conference (see A/CONF.151/PC/119 and A/AC.218/1992/5).

2 This includes standards or recommendations promoted by regional economic integration organizations.