UNITED NATIONS

A E

General Assembly

Economic and Social Council

Distr.
GENERAL

A/44/339/Add.7 ✓
E/1989/119/Add.7
14 August 1989
ENGLISH
ORIGINAL: ENGLISH/FRENCH/
RUSSIAN/SPANISH

GENERAL ASSEMBLY
Forty-fourth session
Item 83 (f) of the provisional agenda*

ECONOMIC AND SOCIAL COUNCIL
Second regular session of 1989
Agenda item 7 (f)

DEVELOPMENT AND INTERNATIONAL ECONOMIC CO-OPERATION: ENVIRONMENT

Progress made towards sustainable and environmentally sound development

Addendum

Report submitted by the World Meteorological Organization

---

* A/44/150.

ENVIRONMENTALLY SOUND AND SUSTAINABLE DEVELOPMENT THE ROLE OF METEOROLOGY AND HYDROLOGY

INTRODUCTION

The fundamental foundations for the renewable natural resources are climate and water. In important respects, Earth's atmosphere itself can also be considered as a resource, and one on which man's activities are now having a significant impact. It is not then surprising, from these perspectives, that WMO has a vital interest in the concept of "sustainable development", and can make a significant contribution to planning for sustainable and environmentally sound use of natural resources.

The World Commission on Environment and Development in its report "Our Common Future" has challenged governments, enterprises and international organizations to move quickly towards more sustainable forms of development and use of the world's natural resources. In particular the chapter on energy in "Our Common Future" draws attention to the probable effects of current energy policies on contamination of Earth's atmosphere and resulting climatic and environmental effects. WMO and national meteorological agencies have major roles to play in these specific climatic and environmental issues, but also recognize the great importance of their more traditional programmes in weather, climate and water resources, as a scientific underpinning to achieving sustainable development of natural resources. In United Nations Resolutions 42/187 and 42/186 specialized agencies were requested to report to the United Nations General Assembly on their contributions to sustainable development as outlined in the report of the World Commission on Environment and Development "Our Common Future" and in "Environmental Perspectives to the Year 2000 and Beyond". This is a brief initial report from WMO.

WEATHER, CLIMATE, WATER AND NATURAL RESOURCES

A few examples of the applications of climatic and hydrological data, and of weather predictions, being widely used to ensure efficient and sustainable use of natural resources illustrate the actual and potential benefits.

Agriculture:

1. Daily agrometeorological advisories to farmers reduce crop losses due to drought, heavy rains, frosts, insects and diseases and at the same time minimize applications of fertilizers, pesticides and irrigation waters;

2. Monthly or seasonal predictions, now in experimental stages, including onset of droughts, and delays or advances of rainy seasons, are used to time sowing of crops, husband irrigation water supplies, stockpile food, initiate trade and aid arrangements, in order to alleviate human suffering;

3. Climatic data are analyzed to provide climatic zoning information for appropriate crop selection, to predict livestock and some crop yields several months in advance, and to determine irrigation water requirements.

Water Resource Management:

1. Hydrological and meteorological data is used to forecast both floods and low river and lake levels, and thus save lives and property damage, and permit advance planning for low water supplies;

2. Assessment of available water resources, and their variability, from hydrological and meteorological data, permits efficient design of water projects (reservoirs, irrigation systems) and equitable long-term water allocations to various users and uses, and between nations;

3. Hydrological data are essential to management of water quality, prediction of dispersal of pollutants and assessment of aquatic habitat.

Energy:

1. Assessment of potentially available renewable energy, wind, solar and hydro-electric, requires long-term records and careful analysis of weather and hydrological parameters;

2. Energy conservation, especially in building design and siting, depends upon reliable climatic information;

3. Operation of systems for production, distribution and consumption of energy can be made more efficient through use of hydrological and meteorological information. Prediction of supply and consumption, and forecasting sectors of high and low demand, (transportation, heating, air conditioning, etc.) also depend upon weather information.

WMO ACTIVITIES RELATED TO SUSTAINABLE DEVELOPMENT

1. World Weather Watch comprises the operational meteorological networks and facilities operated by the 160 Member countries of WMO, organized and co-ordinated in three global components: the Global Observing System of 9,000 observing stations on land, 7,000 ships at sea, and 8 weather satellites; the Global Telecommunication System providing for the real-time collection of global weather data and timely exchange of analyses and forecasts generated by the Global Data-processing System. These are made freely available to Members according to an agreed overall plan.

The WWW system serves as the basis for all operational meteorological services and for many research projects. It enables WMO Members to fully profit from the high quality data and products available in the system and also provides the necessary infrastructure and data services for many international programmes initiated by WMO and other organizations.

The WWW and the following programmes are also supported by an extensive WMO Technical Co-operation Programme funded by UNDP and national donors.

2. World Climate Programme, co-ordinated by WMO, comprises:

(a) World Climate Data Programme for standardizing observations and data processing methods, and technical co-operation to improve collection, processing and use of data in all countries;

(b) World Climate Applications Programme to develop and disseminate improved methods for applying climate information in all economic sectors, and technology transfer of methodology;

(c) World Climate Research Programme conducted jointly with ICSU and Unesco (IOC) to improve monthly and seasonal prediction capability and to assess climatic changes due to greenhouse gases;

(d) World Climate Impact Programme conducted by UNEP, assesses the socio-economic impacts of climate variability and change, and the policy implications.

3. Hydrology and Water Resources activities are directed towards improvements in and standardizing of methods for observing, applying, analysing and predicting all types of hydrologic information. This includes river flows, lake levels, groundwater, sediments and river water quality; for use in river flow and lake level forecasting and irrigation scheduling, and for undertaking water resource assessments by the hydrologic agencies of Member countries. Technical co-operation projects to assist this work are currently underway in 41 Member countries.

4. Environmental Pollution Monitoring and Research activities under the Global Atmosphere Watch include operation and analysis of data from the Global Ozone Observing System, Background Air Pollution Monitoring for world-wide assessment of greenhouse gases, toxic and acid substances in the air and precipitation; mathematical modelling for prediction of transport of air pollutants from regular emissions or accidents; assessing contributions of air contaminants to pollution of regional seas, oceans, lakes, forests and fields; water quality monitoring guidelines are also provided by WMO. These programmes contribute also to UNEP/GEMS system.

5. Research on weather prediction and tropical meteorology provides a better knowledge of atmospheric mechanisms to improve weather prediction at all space and time scales, including phenomena which have major impacts on economic development of tropical countries, such as monsoons, tropical cyclones, droughts, etc. This research also includes improving knowledge of cloud physics which could lead to weather modification possibilities.

BUT WHAT OF THE ATMOSPHERE ITSELF?

THE CHANGING ATMOSPHERE

Earth's thin layer of air is essential to sustaining all life and renewable resources on Earth. The present life forms have grown in harmony with the composition of Earth's atmosphere and the climates it produces. But there is increasingly disturbing evidence that man's activities are rapidly changing the chemical composition of the atmosphere, and that this, in turn, is changing the life-sustaining balances. Global emissions of carbon dioxide went from 1639 to 5330 million metric tons (as carbon) from 1950 to 1984. Chlorofluorocarbons (CFC F-11 and F-12) are powerful greenhouse gases and a serious threat to the stratospheric ozone layer. Production and release increased from zero in 1930 to a total of 1.3 million metric tons in 1984. Many other toxic and hazardous pollutants are being released into Earth's atmosphere in quantities far exceeding those of two or three decades ago. We have gone beyond the point where sustainable use of the atmosphere, as a highly mobile dump for man's wastes, is possible without serious consequences. The most serious of these consequences are acid and toxic precipitation; depletion of the stratospheric ozone layer; and a looming major change in climate.

Long-range transport of pollutants

Acidic and toxic pollutants as well as radioactive substances from accidents are carried by the winds far beyond their countries of origin, and are a major source of damage to fresh water bodies, fields, forests, and even to the oceans.

The ozone layer

The most recent appraisal of the state of the ozone layer, by an international scientific panel under the auspices of WMO/NASA/UNEP in 1988, indicates that the major depletion in spring over the Antarctic is largely due to chlorofluorocarbons (CFC's) trapped in the winter circumpolar vortex, and

the spring-time reduction will probably occur for decades. In addition, the panel found that over the mid-latitude northern hemisphere the records from the WMO co-ordinated Global Ozone Observing System, show a measurable decline in total column ozone during the past two decades. At the same time low level tropospheric ozone concentrations have increased by more than 1% per year due to exhaust gases in the combustion process.

Climate Change

On the matter of climate change analyses of historical climates and a number of General Circulation Models continue to provide predictions of consequences of projected greenhouse gas increases consistent with the assessments of the 1985 WMO/UNEP/ICSU Conference held in Villach, Austria. If present trends of increases in greenhouse gases in the atmosphere continue, the global mean atmospheric temperature near Earth's surface will increase by 1.5 to 4.5°C by the mid-21st century. The impact of an unprecedented change of this magnitude in such a short time will be very great. Sea levels will rise, and major effects will occur on the distribution of forests, on water resources, floods and hydro-electric power generation, on agricultural production, on spread of tropical diseases, on energy uses for heating and cooling, and on most of man's other economic activities.

Specific actions undertaken and planned in 1989-1990:

1. Support the work of the WMO/UNEP Intergovernmental Panel on Climate Change (first meeting held from 9 to 11 November 1988, Geneva) with its three Working Groups, in completing a report by September 1990 on:

(i) Assessment of available scientific information on climate change;

(ii) Assessment of environmental and socio-economic impacts of climate change;

(iii) Formulation of response strategies.

The Bureau of the Panel met to co-ordinate the efforts of the working groups, on 9 and 10 February 1989 in Geneva and the full Panel met in Nairobi from 28 to 30 June 1989 to review progress.

2. Convene, with UNEP and Unesco, the Second World Climate Conference, Geneva, 12 - 21 November 1990 to review the science, and policy implications, and permit countries to respond to the first assessment report of the Intergovernmental Panel on Climate Change.

3. Published the results of the Changing Atmosphere Conference (Toronto, June 1988) and supported the workshop on policy and legal aspects of global atmospheric pollution in Ottawa, February 1989.

4. Convene and follow-up special co-ordination meeting of heads of UN agencies responsible for World Climate Programme, WMO, UNEP, Unesco. Invited heads of other UN agencies with related interests, e.g. FAO, UNDP, WHO, World Bank (most recent held on 9 February 1989).

5. Convene with Government of Finland, Conference on Climate and Water, in Helsinki, 11-15 September 1989.

6. Strengthen observational programme, quality control, publish and ensure widespread use of data from the Global Atmosphere Watch which includes the Global Ozone Observing System (GOOS) and the Background Air Pollution Monitoring Network (BAPMoN) (greenhouse gases, precipitation, contamination).

7. Provide leadership to scientific assessments of the adequacy of the Montreal Protocol on Substances that Deplete the Ozone Layer and participate in scientific meetings and activities related to the Vienna Convention for the Protection of the Ozone Layer.

8. Under the Research component of World Climate Programme, strengthen, with ICSU and Unesco, ocean-atmosphere interaction studies in TOGA (Tropical Ocean-Global Atmosphere) and WOCE (World Ocean Circulation Experiment), studies of the atmosphere's energy and hydrologic cycles (GEWEX) and of the role of the greenhouse gases, with a view to:

(a) improving estimates of future climate change; and

(b) improving capability to predict monthly and seasonal climatic conditions.

9. Undertake with IAEA, intercomparisons of mathematical models to predict atmospheric and water transport and dispersion of radioactive and toxic chemical contaminants from accidental releases and put in place a globally co-ordinated communication and prediction system for such accidents.

10. Develop a system for co-ordinated international meteorological support for responses to marine pollution incidents, especially to predict movement of oil spills, in the high seas.

CONCLUSION:

WMO will continue to work through its 160 Members to provide authoritative scientific measurements, assessments and predictions of the state of the global atmosphere and of earth's fresh water resources. At the same time WMO will promote increasingly effective applications of meteorological and hydrological information in seeking environmentally sound and sustainable economic development. WMO continues to call attention to the need for global action to reduce pollution of the atmosphere, based on the scientific information now available.
