

# Chapter 1

## Introduction: Origins of the Inquiry

On 19 October 1987, His Excellency Mr Maumoon Abdul Gayoom, President of the Republic of the Maldives, addressed the United Nations General Assembly on the issues of environment and development. In that address he spoke of the implications of predicted global warming and sea level rise, especially for coastal and island nations, and drew attention to the vulnerability of his own country, little of which rises more than two metres above sea level.

1.2 President Gayoom had raised these concerns with Commonwealth Heads of Government, meeting in Vancouver shortly before he spoke to the General Assembly. The Heads of Government:

- a) expressed great interest in the memorandum submitted by the Government of the Maldives on Sea Level Rise and its Predicted Impacts on Low-Lying Areas of the World;
- b) noted the study which the Government of the Maldives had already put in hand;
- c) asked the Secretary-General to consider (following the expression of concern of President Ershad of Bangladesh) the problems posed for member countries by the apparently growing incidence of natural disasters, especially floods;
- d) asked him to convene a group of experts to examine the implications for Commonwealth countries of rises in sea level and other natural disasters resulting from possible climate change;
- e) called for this study to cover the problem of flooding.

1.3 Our Expert Group was duly constituted by the Secretary-General. A list of members is given at Annex 1. It was assigned the terms of reference set out in Annex 2. The members of the group were selected not only to provide a suitable blend of professional expertise and practical experience, but to give representation to the Commonwealth countries especially concerned. As a consequence, experts from the developing world predominated in the membership of the Group.

### **The Context of the Group's Work**

1.4 Our Group met first in May 1988. Between that date and our third and final meeting in July 1989 the issues with which we were concerned assumed an unexpected and unprecedented prominence in the debates of the world's leaders and in the mass media. Her Majesty the Queen referred to them, and defined the Commonwealth's role, in her 1989 Commonwealth Day Message, which had an environmental theme:

“The threat to the environment takes many forms, of which some are so far-reaching that it is difficult to grasp them. We hear, for example, of the possibility of radical changes in our climate leading, among other things, to a rise in the sea level, with all that that would mean for small islands and low-lying regions. The Commonwealth has a particular part to play in facing up to such issues as these. A concern for the resources we share in common means partnership not only across the oceans but also between generations. A recognition of what our predecessors have bequeathed to us increases our responsibility to transmit these gifts unspoilt to the future inhabitants of our planet”.

1.5 Because environmental concerns are so far-reaching, the subject of our inquiry has not only been the subject of a number of parallel scientific evaluations, conferences and debates but has been accompanied by the discussion of many other environmental themes. The United Nations General Assembly has endorsed the proposal to convene a World Conference on Environment and Development in June 1992, and preparations are already beginning. The report of the World Commission on Environment and Development, published in 1987, and the United Nations Environmental Perspective to the Year 2000 and beyond, have given impetus to these discussions. It is now widely accepted that environmental resources constitute a large part of the world's 'natural capital' on which development to meet human needs depends. Any development which dissipates that capital and jeopardises the functioning of the planetary life-support system is neither sound nor durable. As a consequence, governments have come to accept that 'the environment' can no longer be treated as the concern of just one among many ministries or departments of State (and that

one commonly a comparative newcomer), but has to be regarded as a truly unifying and comprehensive theme taken into account in the determination of national land use, industry, energy and investment policies in general.

1.6 Our Report has to be read in this wider context. But its theme is none-the-less crucial. Decisions about the use of our environment, from the level of international and national strategy down to the day-to-day decisions of the individual, depend on assumptions about climate and weather. People have commonly assumed that the climate of the next decade will—despite the inevitable fluctuations and occasional memorable extremes—be on average the same as that of the past ten years. The massive investment in many countries in sea defences, ports, coastal settlements and resorts certainly appears to be based on the assumption that the sea will remain within its historic bounds. What we are saying in this Report is that those assumptions are invalid.

1.7 Our Report needs to be viewed against another trend in attitude. Over the past 20 years much writing about the world environment has been of the variety castigated as ‘gloom and doom’. There is sound scientific foundation for many stories of environmental degradation and consequent disaster and loss. It is a fact that soil, forests, water resources and the biological richness of the earth are being squandered by mismanagement in ways that make it less and less likely that rapidly rising human populations, many in great poverty and with major unmet material needs, *will* come into balance with nature in ‘a world that is more secure, more prosperous, and more sustainable both economically and environmentally’ (to quote the Global Possible Conference of 1984). But the world community shows clear signs of determination to grapple with these problems rather than bemoan them. International co-operation is increasing, as the essential indivisibility of the world environment is recognised. There are increasing demands for incorporation of environmental concerns and considerations into development planning and policies, a point recognised by the Governing Council of the United Nations Environment Programme at its Fifteenth Session in May 1989. The members of the Commonwealth are among the leaders of this international quest for a durable solution to the present problems of the world environment, and this report has to be viewed as one of many inputs to that continuing process.

### **The Interpretation of the Group’s Mandate**

1.8 At its first meeting, the Group considered the interpretation of its mandate. It emphasised that, with so much turning on the soundness of its conclusions, these had to be based on a thorough review of the substantial volume of scientific evidence and assessment concerning

recent and likely future changes in climate, and the underlying causes, especially those involving human agency. On the other hand, the Group had neither the time nor the expertise to engage in new and original investigations. Review, not research, was its business.

1.9 Such reviews were not an end in themselves. They were designed to lead on to an examination of what the most plausible of projected climate changes would mean for the environment, human societies and economies of the Commonwealth countries. Although the Group was requested to focus especially on islands and other low-lying areas, and to look especially keenly at the impacts of sea level rise, it was agreed that it could not be unduly exclusive. The environment is a system of wide-ranging interactions, and casual connections need to be traced widely. Similarly, while the Commonwealth was the central area of concern, it does not exist in isolation and will be affected by what happens to other countries. A wide survey of the world situation was therefore appropriate.

1.10 The Group agreed that its task was to evaluate probabilities. Certainty is unattainable at present. A balance has to be struck. The Group needed to be as clear as possible in its conclusions, but must not mislead Heads of State and Government by over-assertive statements that could lead to unnecessary alarm and to misplaced investments.

1.11 Particular stress was placed on the third and fourth terms of reference, concerning the measures the countries likely to be affected could take and the scope for complementary action at international level. The Group recognised that it was expected to produce a practical Report emphasising the actions that could be taken, the likelihood of their success, and the policies that should be considered to facilitate these actions and successes. Such policies needed to be developed both nationally and internationally. This was inevitable, for man-induced climate change is the most global of all today's environmental problems. All countries share in its cause, and all will experience its effects, though causes and effects are not evenly distributed.

1.12 The Group commenced its work with a review of the scientific evidence, summarised by three consultants<sup>1</sup>. The conclusions of this survey appear in Chapter 2. The initial analyses led the group to commission certain additional studies, and thanks to the generous support of the Australian Government, the following have been carried out:

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1. Warrick R. A., Jones P. D. and Russell J. E., (1988), *The Greenhouse Effect, Climatic Change and Sea Level: An Overview*, University of East Anglia, Norwich, UK; Lewis J., (1988). *Sea Level Rise: The Implications of Sea Level Rise for Island and Low-Lying Countries*. Datum International, Marshfield, Wiltshire, UK; Jäger J., (1988). *Developing Policies for Responding to Climatic Change*, Beijer Institute, Stockholm, Sweden.

- a) Separate case studies of the possible socio-economic impact of sea level rise in *Bangladesh, Guyana, Maldives* and a group of low-lying *Pacific* atolls in *Tonga, Kiribati and Tuvalu*<sup>1</sup>. The case studies set out to define areas of vulnerability to flooding or saline intrusion; identify the implications for current patterns of agriculture, residence and other economic activities and for any future plans that are based on the assumption of unchanged sea level; sketch out strategies for adaptation which seem feasible in the particular circumstances (relocation, sea defences, more ambitious systems of disaster management); attempt rough estimates of the economic costs likely to be incurred; summarise the implications of possible sea level rise for coastal and estuary management; treating the above as being in the nature of a pre-feasibility study. The main conclusions of these studies and their policy implications are incorporated in the text of the report, while some, at least, of the studies are likely to be published separately;
  
- b) a survey of the literature and of current research into how farming communities in Africa have adapted to climate change in recent years; in particular how cropping and livestock patterns can be modified to deal with growing aridity. A consultant was engaged to visit the main centres in Africa to assemble this data<sup>2</sup>;
  
- c) A review by IUCN, the World Conservation Union, of the ecological implications of climate change and sea level rise<sup>3</sup>. This examined the main habitat types likely to be affected and the way in which species and ecosystems would be likely to redistribute themselves, noting consequences for the earth's biological diversity and the adequacy of national parks and protected areas. It focused especially on coastal habitats and ecosystems such as coral reefs, mangroves and coastal marshes, and suggested parameters which the countries concerned should examine as a basis for environmental impact analysis.

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1. Mahtab F. U., (1989), *Effect of Climate Change and Sea Level Rise on Bangladesh*; Camacho R. F., (1988). *The Implications of Sea Level Rise For The Coastlands of Guyana*; Lewis J., (1989). *Sea Level Rise: Tonga and Tuvalu*, Datum International; Edwards A. J., (1989). *The Implications of Sea Level Rise For The Republic of Maldives*, Centre for Tropical Coastal Management Studies, University of Newcastle upon Tyne; McLean R., *Implications of The Projected Rise in Sea Level For Kiribati*, Dept. of Geography and Oceanography, University College, Australian Defence Force Academy.

2. Mascarenhas O., (1989), *Response To Climate Change in Eastern and Southern Africa*, University of Dar es Salaam.

3. IUCN (1989). *The Impact of Climate Change and Sea Level Rise on Ecosystems*, Gland, Switzerland.

1.13 As noted above, neither the environment nor the world community stood still while the Group completed its work. There were disastrous floods in Bangladesh in September 1988, which led to increasing emphasis on this aspect of the problem. The summer of the same year brought severe drought to much of the cornlands of North America, leading to public alarm about the threat such phenomena would pose, if they became more frequent, to the security of the world's food supply. Many international studies were carried forward, supporting the increasing tempo of policy debate. Some of the more important of these have been taken close note of by the Group in its work.

### **International Analysis and Debate**

1.14 Almost innumerable scientific conferences have been convened in the past 18 months to address some aspect of the world's environmental problems. In addition several programmes of international co-operative scientific research of real importance are in progress. They are reviewed in more detail in Annex 3.

1.15 *The World Climate Programme*, and within it the World Climate Impact Programme, is operated by the World Meteorological Organisation jointly with the United Nations Environment Programme, the International Oceanic Commission of UNESCO and the International Council of Scientific Unions. Initiated in 1979 as a result of the First World Climate Conference, it seeks to provide an institutional framework for research and data collection, specifically to improve understanding of the world's climate system, and to assess its likely impacts. The current phase of the Programme will culminate in the Second World Climate Conference to be held in 1990.

1.16 *The International Geosphere-Biosphere Programme* of the International Council of Scientific Unions was established in 1986 to 'describe and understand the interactive physical, chemical and biological processes that regulate the total Earth system . . . the changes that are occurring in this system, and the manner in which they are influenced by human actions'. This programme builds upon and integrates other work by ICSU, especially through its Scientific Committee on Problems of the Environment (SCOPE).

1.17 *The Inter-Governmental Panel on Climate Change (IPCC)* was established in 1988, by WMO and UNEP, with three specific tasks:

- i) to assess the scientific information related to the various aspects of the climate change issue;

- ii) to evaluate the environmental and socio-economic impacts of climate change;
- iii) to formulate realistic response strategies for the management of the greenhouse issue.

The immediate task of the IPCC is a first assessment report to the 1990 Second World Climate Conference and an evaluation of the results of the World Climate Programme. Longer term objectives include the stimulation of scientific work in the developing world on the climate issue.

1.18 Arising from this scientific work, and also prompting it, have been a series of important recent meetings that have served to focus attention on the policy implications. Of these, the Group has taken particular note of:

- a) the Villach Conference in October 1985, which reached a consensus that the accumulation of carbon dioxide and other greenhouse gases in the atmosphere will lead to a rise in global mean temperature of between 1.5°C and 4.5°C. The conclusions are discussed more fully in Chapter 2;
- b) a second Villach Conference in September 1987, followed by a meeting in Bellagio, Italy, in November of that year, which considered how climate change resulting from greenhouse gas accumulation could affect different regions of the earth in the next century, and what policy steps might be taken in the near future to limit or adapt to change. The Bellagio meeting also considered the institutional arrangements needed to implement such policies;
- c) a Conference at Toronto in June 1988, which included the Prime Ministers of Canada and Norway, among other political leaders, and which produced a consensus 'call for action' including:
  - i) general acceptance and ratification of the Montreal Protocol on Substances that Deplete the Ozone Layer;
  - ii) adoption of energy policies to reduce carbon dioxide emissions by 20 per cent of 1988 levels by the year 2005 and by 50 per cent as soon as practicable;
  - iii) adoption of a target of 10 per cent improvement in energy efficiency by 2005;
  - iv) development of a comprehensive global convention on the protection of the atmosphere, backed by a World Atmosphere Fund (financed in part by a tax on fossil fuel consumption in industrialised countries);

- v) measures to promote intergovernmental co-operation and public awareness.

The work of the Commonwealth Expert Group was reported to this conference by the former Deputy Secretary General, Sir Peter Marshall.

- d) The 43rd Session of the United Nations General Assembly in 1988 which adopted a resolution introduced by Malta on 'The protection of global climate for present and future generations of mankind', with special emphasis on the role of the IPCC;
- e) Conferences in London and Helsinki in February and March 1989, which agreed on the strengthening of the Montreal Protocol and the acceleration of its implementation, with the aim of the earliest practicable elimination of chlorofluorocarbons and other substances which deplete the ozone layer;
- f) a Conference in the Hague in March 1989, involving 24 governments, many represented at Head of Government level, which issued a declaration on the atmosphere and climate change and called for a strengthening of international law, and assistance to countries so as to ensure that their development is not inhibited by the need to set higher environmental standards;
- g) the Fifteenth Session of the Governing Council of the United Nations Environment Programme in May 1989, attended by representatives of over 100 governments, many of them of Ministerial rank, which endorsed the work of the IPCC and called for the preparation of a new International Convention on the Protection of the Atmosphere;
- h) the World Meteorological Organisation's Executive Council meeting in June 1989, which established a special fund for climate and atmospheric environment studies to assist developing countries to measure and analyse their climate and climate changes, and to improve global observation networks of climate and greenhouse gases. In addition the Executive Council called for WMO to continue to support IPCC, to work with UNEP towards a global framework convention on climate change, to establish a world-wide climate change detection project, and to organise the Second World Climate Conference (12-21 November 1990) in two inter-locking segments of a technical and policy (Ministerial) nature. This Conference will provide the major opportunity for intensive consideration of an assessment report of the Intergovernmental Panel on Climate Change;

- i) a Conference on Global Warming and Climate Change held in New Delhi in February 1989 organised by the Tata Energy Research Institute, the Woods Hole Research Centre, UNEP and the World Resources Institute. This was one of the few meetings to have focused in detail, and with particular emphasis, on the concerns of developing countries. Since the concerns of that meeting were in many respects close to those of our Expert Group, we have summarised its main conclusions in Box 1.1.

## **The Commonwealth Dimension**

1.19 Commonwealth countries were active in all the major conferences and programmes described above, and initiated or hosted several of the main meetings. Scientists from the Commonwealth are active in the IPCC and other major professional bodies. There are, in addition, distinctive Commonwealth scientific and technical networks, such as the occasional meetings of Commonwealth Meteorological Officers. There is no reason to doubt that there will continue to be a vigorous and informed Commonwealth contribution to the global debate about science and policy.

1.20 On the other hand, there are particular Commonwealth concerns that may not receive sufficiently detailed attention in the wider fora. The problems of climate change and sea level rise will manifest themselves in multifarious ways that alter the lives of individuals and of small communities in a fashion that depends closely on precise local circumstances. The Commonwealth has a large number of small states with low incomes that may face particular difficulties in forecasting, evaluating and adjusting to those changes. But the Commonwealth also brings together a distinctive membership that includes countries with major scientific and technical institutions, and there are well-established traditions and frameworks for professional and economic co-operation. It may well be that by analysis of these issues on a Commonwealth basis, needs will be assessed more precisely, and practical co-operation more exactly targeted, than in the complexities of the wider world. If so, the Commonwealth may not only aid itself by its united efforts, but guide the world by its example. This Report is written and offered in that hope.

**Box 1.1: Major Conclusions of the New Delhi Conference on Global Warming and Climate Change: Perspectives from Developing Countries**

**1. Keys to the Future**

- a) Act now—it is already too late to prevent significant damage;
- b) Give priority to efficiency in the use of fossil fuels;
- c) Accelerate the development of technology that is not based on fossil fuels;
- d) Phase out CFCs as quickly as possible;
- e) Halt deforestation;
- f) Stabilise human populations.

**2. Responsibilities of Nations**

- a) Developed countries must make the first and largest response;
- b) But there must be an equal partnership with the developing world in the formulation of plans for sustainable growth.

**3. Specific Actions by Developed Countries**

- a) Increase energy efficiency, using fees and taxes to deter greenhouse gas emissions;
- b) Do not allow the oil industry to make gasoline cheap;
- c) Use revenues gained to finance research and development, technology transfer to the developing world, and reforestation (including reforestation in the developing countries).

**4. Specific Actions in Developing Countries**

- a) Develop the national information base for government and public;
- b) Adjust energy policies and investment priorities;
- c) Favour renewable energy sources, biomass, natural gas, and a transfer from coal and fuelwood to oil in the short term;
- d) Halt deforestation and encourage reforestation;
- e) Enhance research and training.

*Source:* Woods Hole (1989)