THE CLUB OF ROME

October 8, 1990

International Conference on The Contribution of Science and Technology to Global Environmental Policy

SUMMARY REPORT

1. Background and Purpose

An International Conference took place from 1st to 3rd October 1990 at the Villa Borsig, Berlin on the subject "The Contribution of Science and Technology to Global Environmental Policy".

The Conference brought together some thirty experts and officials from a wide variety of fields, and from twelve different countries. It was jointly organised by the Development Policy Forum of the German Federation for International Development, and by the Club of Rome. And it was made possible by the financial support of UNESCO.

As a result of intense and growing concern with the environmental problems which threaten our world, a large number of conferences take place today on environmental issues - and many have been held in recent years. But they have had very limited success in provoking effective action in relation to the scale of the problems we face.

The purpose of this conference was not therefore to examine and to propose solutions to specific environmental problems. It was intended to focus on the processes through which scientific knowledge can lead to policy decisions and these decisions to action.

The conference is part of an overall programme initiated by the Club of Rome and UNESCO on the broad topic, "Mobilising Science and Technology to face Global Challenges."

Three further small conferences will be arranged of a similar kind, each focussed on the conceptual, the ethical and the organisational dimensions of one major international issue:

- Evolving Concepts of International Cooperation for Development;
- Improving Education and Access to Knowledge;
- Promoting sustainable and equitable Growth of the World Economy.

At the end of the programme, it is hoped that a final conference at UNESCO will be able to draw some broad if modest conclusions on the conceptual, ethical and organisational problems which confront humanity in facing up to the new global challenges of the 21st Century.

Underlying Questions.

Within the field of global environmental policy, the discussions centered on the concepts and the analytical methods, the values and the ethical considerations, the organizational arrangements and the processes through which knowledge and concern must lead to action.

Three central questions emerged, reflecting the common concerns of all the participants, from both developing and industrialized countries and from East and West:

- Do we, at the end of this century, properly understand our world, or are our concepts and approaches no longer adapted to meet the complex and dangerous problems we face?

- Why, in spite of growing concern over several decades, and many international debates, and many serious proposals, have action and practical results been so limited?

- What suggestions can be made to improve the effectiveness of the processes which should convert widespread concern into practical action?

2. Opening Session.

At the opening session, statements were made by the Director-General of the German Federation for International Development, Dr. Hans-Rimbert Hemmer; by Dr. Clemens Stroetmann, Secretary of State in the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety; and by M. Bertrand Schneider, Secretary General of the Club of Rome.

3. Agenda Item I: "A Review of the Major Environmental Problems Confronting Mankind".

3.1. Key Points in the discussion:

- There is a "knowledge deficit" in many areas, but it is not certain that more resources and effort devoted to research will necessarily lead to greater certainty. We know a lot, but we understand little.

- We must therefore learn to act in the face of continuing uncertainty. Politics is in fact the art of taking decisions under uncertain conditions. And, because of this abiding uncertainty, we must adapt our approaches and our institutions to achieve greater flexibility and to react more quickly.

- The risks which decision makers must confront are often uncertain and long term - for example, in the field of global warming - but there are real short term costs associated with their decisions. Decisions are more easily reached when costs are small: this argues for early action.

- A central challenge is how to reconcile economic language and concepts with ecological language and concepts. Two approaches are possible: Environmental aspects can be added to economic analysis or the economic approach can be integrated within a broader ecological view.

  Great care and precise thinking are needed in this area. And it is important to recognize the distinctions between different types of economics: macro-economics, micro-economics and environmental or ecological economics. We must find ways to integrate environmental aspects more effectively with the established and powerful approaches of both macro and micro economics.

- The role of the market, and its relations to the role of Government are of vital importance in seeking to manage and resolve environmental problems. No ideal market solutions exist in the real world. All Western countries for example have developed mixed economies in which governments provide a framework of regulations, incentives and support to the activities of the private sector.

- It has been found that the market approach alone cannot handle problems of common property resources or issues of long-term common interest. Government must provide the boundary conditions in the public interest.

- Environmental problems cannot be solved in isolation: public education and learning, and public information are essential. Social movements and public mobilization are vital forces for change.

- We must shift from a vision of man as conqueror and exploiter of the natural world to man as a steward of nature on a sustainable basis.

- The problems we face are not only intellectual and analytical: real interests and the structure of power are at stake.

  The real world includes contradictory interests. We need to establish a normative approach but we must find arrangements through which agreements on action can be reached among nations and groups which have - and will continue to have - very different values, norms, cultural traditions and interests.

- Although global efforts are clearly necessary to face some truly global issues, we must continue to operate at various levels - global, regional, national and local for example. We must not jump too fast to higher levels when local or regional efforts can be more successful. In fact, substantial impacts can be made, even on large scale issues, through multiple actions on a small scale.

- We must promote the role of science and technology to address environmental problems, in spite of their limitations, of which we must be very conscious. And we must take notice of the results of scientific research to guide our action. But we must avoid over-enthusiasm for the possibilities which can be realistically offered by science.

- The problems now faced by humanity in the environmental field are quantitatively - and in some respects, qualitatively - different from those we have faced in the past. They could lead to irreversible change.

- Human activities, if they continue on their present track, risk the de-stabilisation of the world environment. Our species has a common origin. It is our common interest to act on the environmental problems which now threaten - for the first time - our very existence.

3.2. Characteristics of the present situation:

1. In assessing the true nature of our problems and in comparing various options, we face great uncertainties of both a scientific and an economic nature. We must however make decisions in spite of uncertainty and risk. Even the failure to take a considered decision is itself a decision by default.

2. We now perceive more clearly than in the past the inter-linkages among the many issues which confront us. If these links are ignored, action in one field can aggravate problems in another. But governments, international institutions and disciplines are organised by sector or speciality.

   Systems thinking is essential. However, we cannot consider all aspects at the same time or decision and action will be paralysed. We need a judicious combination of a general and a specific approach.

3. We now increasingly recognize the long term consequences and risks which result from our action or from our inaction. It is also clear that there is a long lead-time between our perception of a problem and the results of any corrective action.

Time has an ethical value. We are therefore obliged to act in the face of a deteriorating situation. We have drifted into this dangerous situation, but we cannot expect simply to drift out.

We must find ways of motivating and maintaining public support for outward-looking and perhaps painful policies over the long period of time needed to contain global environmental problems. This is a critical challenge to the leaders of democracies.

4. We now appreciate the rapid rate of change in every aspect of the modern world, but the complex processes of measurement, analysis, negotiation and implementation are slow. Our institutions and processes are adapted to a more leisurely pace.

5. There has been an evident increase in interdependence among nations in recent decades. This requires strengthened international cooperation, and broad international participation in the face of environmental problems which recognize no national boundaries. But such processes are slow.

We are groping for new patterns of decision-making, organisation and action to face the new reality of interdependence in a rapidly changing world.

6. We are increasingly aware that there may be real limits in many fields beyond which there is the risk that the problems created for humanity will be irreversible.

7. Dominant Western ideas have stimulated economic growth and progress in a large part of the world. But we must have the humility to recognise that there are many serious problems, imbalances and inequities associated with the Western approach, not least the impact of man's activities on nature.

Other cultures value more highly the harmony of man with nature. In searching therefore for values and norms to guide humanity at this critical time, the virtues and contributions of different cultures must be recognized and respected. In a pluralist world, we must open up our spirits to concepts, ideas and values from a wide variety of cultures and traditions.

4. Agenda Item II: "Our ability to understand and analyze Environmental Problems"

Three central themes emerged:

4.1. The respective roles of government and of the market.

- Government must define the boundaries within which the market can function. This is because the market is ill-adapted to deal with long term effects, common property resources and inter-generational issues. The limitations of the market should be recognised, even in those countries which are now vigorously moving from centrally planned to market oriented economies.

- Government must provide a progressive framework of regulations and incentives to the private sector. It has been found in regulation for example, that one successful approach is to consider the cost implications of achieving alternative levels of pollution reduction. On the basis of these alternatives, public debate can lead to decisions in the political arena, where they properly belong.

- Prices must play an essential role in influencing the use of energy and natural resources. But it is a difficult matter to judge what the "correct" prices should be in any situation. It is nevertheless clear that if prices are too low, they stimulate waste and provide no incentive for technological investment to improve efficiency.

- Government policy can - and should where possible - be used to encourage the development of technology beyond the best-available technology at a given time. It can encourage radical new advances in technological solutions by setting firm targets, for example, in establishing international protocols for the reduction of pollution.

  Policy can be aimed at two objectives: to correct and repair undesirable effects arising from the activities, of the market oriented to the short term exploitation of resources; and in parallel, actively to promote significant advances in technology towards longer-term sustainability.

- An underlying issue is, how must regulation be conceived and administered so as to incorporate ecological aspects.

4.2. Techniques of analysis.

- It was generally agreed that existing techniques of economic analysis do not work well in the assessment of environmental problems. One reason is that the techniques used to compare alternatives cannot take proper account of longer term benefits or costs. The technique of Discounted Cash Flow, which seeks to consolidate flows of benefits and costs over many years ahead, can distort the real choices open to policy makers. With realistic interest rates, short term results are generally emphasised over medium and longer term effects.

  Another reason is that most ecological and environmental problems can only be understood by thinking in systems terms. Traditional analytical techniques can be profoundly misleading when applied to the analysis of systems.

  Because these difficulties have been long recognized, new approaches are emerging, such as cost-effectiveness analysis and social impact assessment.

- There is also a growing recognition that national accounts and established methods of calculating economic growth and Gross National Product do not take proper account of environmental aspects and the depletion of resources. While national accounts will certainly remain useful for many purposes in their present forms, efforts to complement them with new approaches should be encouraged. Policy makers and the public will then have a better understanding of the real costs and benefits of their choices.

  There is also real potential in techniques based on energy accounting. These can be used at all levels, from the national to the enterprise levels, and for specific projects.

- When considering the relation of scientific research and analysis to policy making, it is important to recognize that all policy analysis is value-loaded - in terms of its assumptions, its inclusiveness and its approach. It therefore inevitably has political content. For this reason it is extremely important to consider explicitly who should participate in defining the goals and assumptions on which studies are based, and which actors and interests will be affected and involved in decision and action.

- Because of the complexity of environmental problems, a broadly based inter-disciplinary approach is needed. But how this can be successfully organised in practice is difficult. Specialists in different fields have very different approaches and traditions.

- There is a need for new styles of training and new curricula to produce analysts with high-quality expertise but also with the will and the attitudes necessary to cooperate in multi-disciplinary teams. In this respect, the traditional educational system and universities in particular, should be more prepared to innovate than in the past.

4.3. Specific problems of the developing countries.

The Conference heard brief presentations on the policies and methods adopted in the People's Republic of China, Taiwan, India, Japan and the Soviet Union in seeking to reduce environmental problems and to move towards more sustainable patterns of development. The following points emerged from the discussion which followed:

- The developing countries face acute problems in trying to analyse complex environmental and policy problems. They suffer from a lack of skilled people, data, researchers and organisation. (At present only around 5% of world research and development is carried out in developing countries).

  If the developing countries are to achieve sustainable development, it is a pre-condition that they should acquire the capacities to carry out the necessary scientific, economic and policy research and environmental management.

  In the absence of such capacities, the essential cooperation between developing and industrialised countries on environmental problems of common concern - such as the preservation of tropical forests - is unlikely to succeed.

- Genuine development leads to an increase of human potential on a sustainable basis. But in many developing countries the path of economic growth is influenced and driven by immediate economic imperatives and external constraints.

- One fundamental condition for the achievement of sustainable progress in harmony with nature is the limitation where necessary, of population growth.

5. Agenda Item III: "The values and goals on which action is based".

The discussions were opened by the presentation of a paper on "Ethics and the Environment: Themes and Constructs". which was presented by Dr. Robert Myers, President and Mr. Joel Rosenthal, Director, of the Council on Ethics and International Affairs.

5.1. Main themes of the introduction.

- Time has an ethical value: we must act in spite of uncertainty.

- Distributive justice is fundamentally important: who will pay and who will benefit from our actions?

- Changes in the concept of sovereignty: the relation of global issues and responsibilities to national and group interests. Environmental issues are breaking down traditional notions of sovereignty.

- The concept of progress: what constitutes real progress? Can we invent our way out of the present crisis? "Technology is our hope and our horror."

- The definition of rights and duties What are our obligations? Do we have obligations to other living things and to the natural world in general?

5.2. Key points of the discussion.

- Our economic system is based on competition and motivated by self interest and ultimately, by greed. It is the development of our economic system which has de-stabilized the relationship between man and nature.

- Competition within a market economy does lead to efficiency in the current allocation of resources. It is a system with flaws: but no other system has been found which is more efficient.

  Market-oriented activities should be carried out on an ethical basis. But government is still required to provide a firm framework of regulation and incentives in the public interest. And it must effectively correct abuses.

- Different cultures have established different relationships between man and nature. The Western tradition is particularly arrogant and self confident in its exploitation of the natural world, in the name of progress. Other cultures can live in harmony and reverence for nature.

- There are critical moral issues and choices related to the direction of scientific and technological advance. In fact, technology evolves to meet the values and economic signals of particular societies. Modern technology is therefore most appropriate to meet and respond to the conditions, values and goals of the advanced industrialised countries.

- Government can, and must therefore play a role in directing and correcting economic and technological progress which does not happen by itself according to the intrinsic nature of scientific discovery. Government should strive to encourage major advances and new orientations of technology in the long term public interest.

- International actions can be founded on enlightened self-interest and also, on sincere concern for the disadvantaged. Solidarity with the people of Africa at the present time will be one acid test of the present ethical basis of international action.

- Action at any level is determined not only by knowledge but also by the structure of power, and by political attitudes and particular interests. The lack of effective action is not therefore derived simply from a lack of insight or awareness.

- To achieve international action on global environmental issues therefore, the system must be influenced in many different ways at the same time: through scientific and expert persuasion; by influence on top-level decision-makers in the public and the private sectors; through non-governmental organisations; and by mobilising and informing the public.

- It is essential to increase public awareness, education and empowerment. This will be fundamental to provide a basis for international action to tackle long term problems, particularly in democracies.

- We must strive to create a new human consciousness. We need an ethical structure for survival, drawing on the wisdom of different cultures throughout the world. This will reflect: the rights of other living beings and of nature in general; the rights of future generations; and the rights of those who are disadvantaged today. We must strive to achieve a decent common present, without which there will be no common future.

- A sound ethical basis is critical for effective and durable action. But values shift over time: we must judge how far our situation requires new values.

- Finally, ethics cannot bear the burden alone. It is essential to stimulate more debate on this vital dimension of human action in the face of world environmental problems.

6. Agenda Item IV: "Our ability to take effective action".

6.1. The Japanese experience.

The discussion started with a presentation by Mr. Kikujiro Namba, President of Technova Corporation, on the approaches used in Japan to take effective action when confronted by the price shocks of the seventies, and by the threats from pollution. Three elements were identified which led to the successful adaptation of the Japanese economy:

1. A successful combination of business action guided by incentives from Government. This effort was stimulated however by external pressures: the oil price rise and the threat of stringent automobile exhaust emission controls in the US market.

   Structural adaptation and rapid response to change by the Japanese economy has been achieved by paying careful attention to - and establishing targets and standards for - the end-uses to which technology and investment are directed.

2. Close collaboration between the public and private sectors, particularly through publically financed research programmes initiated by MITI, with wide participation of private enterprises.

3. Forward looking government policies, which can rely on their acceptance by industry and by the public after due consultation.

6.2. The German approach.

The approach adopted in the Federal Republic of Germany was then described by Mr. Michael Bohnet, Counsellor in the Federal Ministry for Economic Cooperation. Three tracks are used to act on environmental problems: commissioned research, including the analysis of the practical problems of implementation; parliamentary hearings; and the mobilising of public opinion.

The mobilising of public opinion has proved to be the most effective and lasting method.

A new task force has been set up within the Ministry for the Environment to react quickly to gaps in knowledge and to accelerate decisions.

6.3. Action in the Soviet Union.

The Conference also heard of the approach adopted in the Soviet Union, outlined by Dr. Sergei Pegov, Director at the All Union Institute for Systems Studies of the USSR Academy of Sciences.

A major programme is being initiated to tackle environmental problems. With the cooperation of all the organisations and interests concerned, an environmental programme has been drawn up for the next fifteen years. After careful review of alternatives, targets for improvement have been agreed, and scenarios for action, practical measures and regulations have been drawn up. The budgetary implications have also been assessed.

6.4. Key points of the discussion.

- It is essential to act globally to deal with certain global problems. But effective national action is a precondition for success, even of global efforts. And we must act locally as well.

- The present international machinery must be improved and streamlined to meet new challenges. But besides their own problems, international organisations are seriously affected by a lack of coordination and coherence, and by short term thinking at the national levels.

  Individual governments must therefore be prepared to make organisational improvements and to develop new approaches in their own operations: on this, efficient international cooperation to meet global problems must be based.

- Some participants felt that there must gradually be a move towards some form of world government if humanity is to surmount the problems which threaten the planet.

- There is a very real and growing risk of conflict arising from the competition for scarce resources throughout the world.

  Water resources in some areas are already critical, and the deterioration of soils, forests and the natural habitat is leading to the creation of large numbers of environmental refugees who must move to other areas to survive. These problems can be tackled through effective regional cooperation among the countries concerned, within a global framework.

- The problems arising from the electoral cycle in democracies must be recognised: they can lead to short-sightedness and to an unwillingness to raise and to face important longer term issues. They can disrupt continuity in efforts to resolve global and longer term problems, and also reduce the effectiveness of the civil service in sustaining action.

  It was suggested that environmental issues should be de-politicised as far as possible, perhaps through the establishment of interparty committees in the legislature. Also the creation of committees chaired by the Prime Minister or head of government, involving ministers, business leaders and experts could lift the discussions above inter-departmental rivalries.

- It is particularly important to examine the alternative ways in which proposals and research results can be introduced into the policy process. There are many informal and effective channels and opportunities.

- Whatever efforts may be made through improvements in analysis, organisation or policy, global environmental problems will not be resolved without the application of substantial resources.

  Voluntary contributions to multilateral activities will continue to play a major role. But there is a great deal of disappointing experience which shows that high expectations can be easily disappointed where one or two major countries fail to participate in a commonly agreed effort. Urgently required international action is then held hostage by one reluctant government.

  It will be important therefore to find a more secure basis to generate the resources which will undoubtedly be needed to face world environmental problems over the longer term: this may ultimately result in some form of international taxation.

- Government's role at the international level will remain fundamental, as will the role of business. But the importance of the activities of non-governmental organisations is also increasing. By their nature, particularly their ability to take direct, informal action at the grass roots level, NGO's make a vital contribution to resolving environmental problems throughout the world.

- Action by governments, by international business and by other organisations will be necessary, if humanity is to resolve the environmental problems which threaten. But it will not be sufficient.

- Commitment and action by individuals and by the public at large are ultimately the keys to global action on environmental problems.

- The media - newspapers, radio and television etc. - have a critically important role to play, and a corresponding responsibility. They must inform, stimulate and motivate the public towards awareness and action, even though the issues may be serious and painful.

  Only through such efforts will the foundations of public support be created on which democratic governments will be willing and able to act in the wider, global interest, and to maintain their efforts over an extended period of time.

7. Agenda Item V: Conclusions and Recommendations.

In the final report of the conference, the recommendations and conclusions will be set out in some detail. In this summary, only some of the most interesting have been selected. They are presented in the same order as the items of the agenda.

7.1. Our ability to understand and analyse environmental problems.

- The environmental phenomena with which we are concerned can best be understood as non-linear systems. Small changes at a critical point can often lead to abrupt transformations.

- A systematic effort is required to reform the tools of analysis in order to understand how these systems work in a more dynamic, less static way.

- Chairs of environmental or ecological economics should be established in universities and a new emphasis should be placed on training and education to prepare experts to participate in multi disciplinary-teams. International bodies such as UNESCO, OECD or the European Commission should actively promote such an evolution.

- There is a lack of convergence between the language of economics and the language which expresses environmental concerns. UNESCO, the European Commission and other relevant institutions should stimulate cooperation between Northern and Southern centres of higher learning in the design of trans-disciplinary training courses, seminars and research projects in the emerging field of ecological economics.

- These same organisations should also encourage and give assistance to developing country governments, so that they can go beyond national accounting to adopt systems of resources accounting and energy analysis. This will enable them to assess more realistically, the implications for sustainability and carrying capacity of their development programmes and projects.

- Renewed efforts must be made to strengthen the scientific and technological capacities of developing countries including their ability to measure, analyse, assess and manage environmental problems.

- An international committee on environmental information should be established: to assist in improving the data base in developing countries and their access to available information; to identify consultancy resources available; and to provide more systematic access to technical training. Such an international committee, at the global level could be associated with similar efforts to meet the needs of particular economic and ecological regions.

- National dialogues on the social and ecological impacts of science and technology should be encouraged. These dialogues should be considered as essential instruments to bring together the various interests and value systems in each society and to link scientific research and social action. Such efforts could lead to the emergence of a new socio-economic paradigm to guide the emergence of the societies of the future.

7.2. The Values and goals on which action is based.

- We must be more explicit about ethics and values in the environmental area, for this will become an ethical battle ground for the future. Foundations, and the competent international organisations such as UNESCO, should stimulate further debate on the ethical choices and dimensions of environmental problems.

- Concern with the prospects of future generation is important: but this cannot be an escape from the problems of the present generation. The profligate life style in the industrialized countries must be diminished through a slowing down of consumption. And renewed efforts must be made to encourage sustainable development and the elimination of poverty throughout the world.

- The behaviour, the aspirations and the value systems of people must change. Only this will lead to changes in the lifestyles. This will not be easy to accept for their will be real costs and pain associated with serious measures to manage environmental problems.

- Public awareness and education are essential elements, to bring an end to environmental illiteracy. An explicit analysis should therefore be made as to how the world media could be most effectively mobilised to these ends. As a first step, research surveys of public opinion on environmental matters across the world could be undertaken.

7.3. Our ability to take effective action.

- Market forces enable humanity to apply its energy and realise its innovative potential. They can be mobilised as a positive force for environmental improvement. Increased efforts must be made to strengthen the ethical basis of business activities and reinforce the growing concern with the environment. However market forces are not by themselves sufficient to ensure sustainable development.

- Governments must recognise that it is their responsibility to correct market failures. At present they act both as a stimulant to business, but they also ensure that the undesirable effects of business activities are repaired. They must carefully prescribe and regulate the area in which business is allowed to exploit natural and human resources.

- Governments and international institutions should aim to achieve a major impact on environmental problems by increasing the resources and other incentives for research in the public and private sectors. Research should be aimed both correcting current problems and also at stimulating technological breakthroughs.

- They must also strengthen and encourage international cooperation in research: objective scientific endeavour can be a powerful force to bring emerging problems to public and official attention.

- An important entry point to tackle global environmental problems is to focus on the energy dimension. A substantial increase in energy prices would stimulate radical new approaches. It could lead to new systems for supplying and conserving energy, a matter of vital long term importance.

- If however, an increase in energy prices is perceived as only temporary it will be unlikely to stimulate long term investment and sustained research into new technologies. Governments should therefore step in, to define a clear longer term price structure on which long term investment and research can then be based.

- The viability of systems of taxation based on the consumption of energy and non-renewable resources should be assessed.

- Governments in many countries still maintain a number of policies, aimed at other objectives, which indirectly stimulate energy use and even the destruction of the environment. As has been done in other fields, the competent international organisations should undertake regular reviews of such policies. This will provide a powerful incentive to reform them.

- Institutional reform is needed at the international and national levels. Governments should explicitly and objectively review the present arrangements through which they participate in international efforts to address global environmental problems.

- Existing international institutions should be used as much as possible to deal with environment issues and concerns - but it may be necessary to establish some new machinery where this is clearly required. It was suggested that an International Foundation for Environmental Protection should be set up which, on a scientific basis, could provide loans to various partners engaged in improving the environment in developing countries.

- It will be necessary in due course, to find a way of generating financial resources for international action on a continuous and predictable basis. The Club of Rome may undertake an assessment of this matter recognising that many approaches are possible to generate the financial and other resources required.

- There are several different ways in which ideas, proposals and research results can be effectively conveyed to policy makers. A systematic and targeted approach should be developed to influence key decision makers across the world by presenting information in a refreshing and dramatic way. This can include direct briefings of Heads of State or Government.

- Finally, the participants explicitly agreed that the programme envisaged by the Club of Rome and UNESCO should continue as planned.