OECD
DEVELOPMENT ASSISTANCE COMMITTEE

Guidelines on Aid and Environment

No. 4

Guidelines for Aid Agencies on Global Environmental Problems

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DEVELOPMENTASSISTANCE COMMITTEE
Guidelines on Aid and Environment

The OECD Development Assistance Committee (DAC) seeks to improve and co-ordinate Member policies which will integrate development and environment imperatives. The Guidelines are designed to help policy-makers and practitioners address serious national, regional and international environmental problems.

Guidelines No. 4: *Guidelines for Aid Agencies on Global Environmental Problems* offer ways that developed countries can promote international collaboration on environmental problems which transcend boundaries to become regional or global in nature. Aid agencies are taking steps to help developing countries participate in the world-wide response, including ways to assist them to meet their obligations under international environmental agreements. The basic objectives are laid out in a clear, succinct format for non-specialists, explaining concerns and recommended priority actions on:

- *climate change, with particular attention to*
- *energy, forestry and sea-level rise,*
- *ozone depletion*
- *hazardous wastes, and*
- *loss of biodiversity*

In December 1991, OECD Ministers of Environment and Development Co-operation endorsed these, and other guidelines, on environmental impact assessment, country environmental surveys and strategies, involuntary displacement and resettlement in development projects. This consensus of OECD Member countries is indicative of strong donor support for the efforts of developing countries to manage and protect the environment and to minimise environmental effects of economic development.

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THE ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)

Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;

- to contribute to sound economic expansion in Member as well as non-Member countries in the process of economic development; and

- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter: Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971), New Zealand (29th May 1973), Mexico (18th May 1994), the Czech Republic (21st December 1995) and Hungary (7th May 1996). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

In order to achieve its aims the OECD has set up a number of specialised committees. One of these is the Development Assistance Committee, whose Members have agreed to secure an expansion of aggregate volume of resources made available to developing countries and to improve their effectiveness. To this end, Members periodically review together both the amount and the nature of their contributions to aid programmes, bilateral and multilateral, and consult each other on all other relevant aspects of their development assistance policies.

The Members of the Development Assistance Committee are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, the United States and the Commission of the European Communities.

DAC GUIDELINES ON AID AND ENVIRONMENT

The OECD Development Assistance Committee (DAC) seeks to improve and co-ordinate Member policies which will integrate development and environment imperatives. Through its Working Party on Development Assistance and Environment, the DAC is preparing a series of Guidelines on subjects relating to Aid and Environment. These Guidelines are designed to help policy makers and practitioners in donor agencies and developing countries to devise strategies to address serious national, regional and international environmental concerns.

In December 1991, OECD Ministers of Environment and Development Co-operation endorsed the first set of guidelines adopted by the DAC:

1. *Good Practices for Environmental Impact Assessment of Development Projects;*
2. *Good Practices for Country Environmental Surveys and Strategies;*
3. *Guidelines for Aid Agencies on Involuntary Displacement and Resettlement in Development Projects;*
4. *Guidelines for Aid Agencies on Global Environmental Problems.*

This consensus of OECD Member countries is indicative of strong donor support for the efforts of developing countries to manage and protect the environment and to minimise environmental effects of economic development.

Guidelines No. 4 ***Guidelines for Aid Agencies on Global Environmental Problems*** offers ways that developed countries can promote international collaboration on environmental problems which transcend boundaries to become regional or global in nature. Aid agencies are taking steps to help developing countries participate in the world-wide response, including ways to assist them to meet their obligations under international environmental agreements. The basic objectives and concerns are laid out in a clear, succinct format for non-specialists with recommended priority actions for donors on climate change, ozone depletion, hazardous wastes and loss of biodiversity.

These Guidelines are only one aspect of many DAC activities which bear on sustainable development. The subject of recommendations in the near future will pertain to areas of high priority interest to developing countries as well as to aid agencies. These include chemical management, including accident prevention and prior informed consent; pesticides and integrated pest management; natural disaster reduction; primary environmental care; environmental economics and environmental capacity building.

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GUIDELINES FOR AID AGENCIES ON GLOBAL ENVIRONMENTAL PROBLEMS

Introduction

Since the early 1970s increasing attention has been given to environmental problems which transcend boundaries to become regional or global in nature. Public concern in developed countries has generated a growing number of initiatives by OECD Governments to promote international collaboration to tackle problems of this nature. It is widely recognised that the origin of many of these problems is found primarily within developed countries. As a consequence it is accepted that the developed countries will take the lead in international efforts to tackle problems such as climate change and biological diversity. OECD countries are aware of their responsibilities and are progressively taking actions, within the framework of national policies, to reduce their contribution to global environmental problems. Many of the measures proposed in these guidelines for aid agencies are equally applicable to domestic policies in developed countries. An effective worldwide response, however, requires the full participation of developing countries. Bilateral and multilateral development agencies have a substantial role to play in helping developing countries participate in this global effort.

One particular focus of attention has been on ways to assist developing countries meet their obligations under international environmental agreements. Such agreements to date cover substances that deplete the ozone layer (through the Vienna Convention and the Montreal Protocol) and transboundary movements of hazardous wastes (through the Basel Convention). Work is underway towards a framework convention on climate change and a convention on the conservation of biological diversity, both of which are expected to be important contributions to the UN Conference on Environment and Development (UNCED) to be held in Brazil in June 1992. Discussions are also taking place on an international agreement on the conservation and development of the world's forests; and a number of regional agreements exist or are under consideration addressing the pollution of international waters.

Since its inception in 1989, the DAC Working Party on Development Assistance and Environment has been examining what role bilateral aid agencies might have in assisting developing countries tackle global environmental

problems. In a number of important international fora many Members have accepted the need for resources additional to ODA to address global environmental issues. In many cases aid agencies will have a major role in addressing these issues, both as effective mechanisms for programme delivery, and through the use of ODA resources when complementarities between meeting local development priorities and global environmental needs can be demonstrated. Most aid agencies, before the late 1980s, had limited experience and expertise in assisting developing countries in this area. Recently, however, their capacity has been strengthened, although some aid agencies have taken more steps in this direction than others. Therefore it is hoped that the

policy guidelines included in this paper could serve to suggest supporting activities which could be undertaken by other governmental agencies when the sharing of responsibilities calls for it.

As a result of its investigation, the Working Party has produced this paper which contains a series of policy guidelines for aid agencies on global environmental issues. The issues treated in the paper are climate change, protection of the ozone layer, hazardous wastes, pollution of international waters and the loss of biological diversity. On climate change, separate sections treat the issues of sea-level rise, energy aspects and forest aspects. It is important to note, however, that the focus in the energy and forest sections is on those concerns with particular relevance to climate change; wider environmental concerns relating to energy and forests would be expected to be addressed under sectoral policies of each donor's aid programmes. The Working Party is considering what further work it might do on non-climate environmental issues relating to energy and forests.

Not addressed in this paper are issues related to the financing of actions in developing countries to tackle global environmental problems. Some DAC Members have already made special new arrangements, separate from existing aid programme, for financial assistance to developing countries for global environmental problems. An interim multilateral fund has been established under the Montreal Protocol on substances that deplete the ozone layer. A Global Environment Facility has been established under the auspices of the World Bank, the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP), financing project activities in the fields of ozone protection, the limitation of greenhouse gas emissions, the protection of biological diversity and the protection of international waters. Finance and funding mechanisms are being discussed extensively in the preparations for the UN Conference on Environment and Development and during negotiations on climate change and biological diversity. This paper does not address or pre-empt those discussions.

At the same time much can be done within the existing mechanisms of bilateral aid to refocus assistance priorities in the face of global environmental threats without compromising the priority goal of promoting sustainable economic and social development. With their particular expertise and experience bilateral development agencies have a special leading role to play in the efforts of OECD Member governments to help developing countries tackle global environmental problems.

This document provides supporting analyses and guidelines which are intended as a preliminary contribution by the Working Party. Numerical estimates on many of these issues are subject to significant margins for error. They are not official OECD figures but are drawn from authoritative sources. Policy recommendations are presented on each issue. They cover priority actions for donors and assistance for developing countries to generate the institutional capacity and expertise necessary to address global challenges. These guidelines for donors will be strengthened and revised in the course of future work and in the light of the results of ongoing international negotiations.

Climate Change

Background

International consideration of the issue of global warming and climate change has centred on the work of the Intergovernmental Panel on Climate Change (IPCC). IPCC was established in 1988 under the auspices of UNEP and the World Meteorological Organisation (WMO). Its three Working Groups (WG) deal with the science of climate change (WGI chaired by the United Kingdom), the impacts of climate change (WGII chaired by the Soviet Union), and response strategies to adapt to and limit the effects of climate change (WGIII chaired by the United States). Following the publication of the IPCC's first assessment report in August 1990 and the Ministerial Declaration of the Second World Climate Conference of 7 November 1990, negotiations were started through the Inter-Governmental Negotiating Committee (INC) established by the United Nations General Assembly (UNGA) on the preparation of a framework convention on climate change.

In its first assessment report, the IPCC concluded that there remain major uncertainties in our understanding of climate change. The IPCC noted that the total increase in atmospheric concentrations of greenhouse gases attributable to human activities is currently equivalent to an increase of about 50 per cent in concentration of CO_2 since about 1850 IPCC's best estimate, if no action is taken, is for a rate of increase in global mean temperature during the next century of about 0.3°C per decade. This would be a more rapid rate of increase than any seen over the last 10,000 years. This would result in an average increase of global mean temperature of about 1°C above present levels by 2025 and 3°C by 2100. Global mean surface temperatures have increased by an estimated 0.3°- 0.6°C over the last 100 years, with the five warmest years on record being in the 1980s.

Precise predictions of the regional impacts of climate change are not at present possible. Some general conclusions, however, can be drawn. If no

preventive measures to limit increases in man-induced greenhouse gas emissions are taken, an average rate of global mean sea level rise of about 6cm per decade is projected. A one metre rise would affect 360 000 kilometres of coastline, render some island countries uninhabitable, displace tens of millions of people, threaten low-lying urban areas, flood productive land and contaminate fresh water supplies. A third expected effect -- apart from temperature and sea-level rise -- is the shifting of vegetation zones.

Reduced agricultural productivity might be expected in regions of high vulnerability or fragile ecosystems, where the ability to adjust is limited. Some natural terrestrial ecosystems would be affected because the pace of climate change is likely to be faster than the ability of some species to adjust. Comparatively small changes in climate could cause large water resource problems. The availability of water and biomass might be significantly affected and both are major energy sources in many developing countries. Overall, the IPCC predicts that developing countries may suffer first and worst from the adverse impacts of climate change.

The IPCC Response Strategies Working Group has identified a wide range of limitation measures which could help tackle climate change. These cover sectors such as energy, forestry and agricultural sectors and coastal zone management in terms of resource use, economic and financial measures, public awareness and education, legal provisions (in particular the proposal for a climate change convention) and technology transfer. Those response strategies were put forth for consideration by all countries, though it was acknowledged that developing countries had specific needs and would require external assistance to play their full part in the international response. A special Committee on the Participation of Developing Countries in the IPCC made recommendations to ensure that the circumstances of developing countries are taken properly into account and that developing countries are closely involved in the future work of the IPCC.

At its fifth Plenary Session in Geneva, 13-15 March 1991, the IPCC adopted work plans for further scientific research into climate change and its potential impacts, in particular sea-level rise, and to develop technical analyses of responses in the energy and forestry sectors.

Guidelines for donors

A number of priority actions for bilateral donors relating to generic climate change activities are suggested below to help developing countries identify their

own interests in addressing climate change and participate more effectively on the global front. Both the IPCC and INC have trust funds to assist developing countries, in particular in international negotiations. Actions by bilateral donors could include the following:

- collaboration with developing countries on studies to assess the incremental costs of measures to meet their foreseeable obligations under the forthcoming framework convention on climate change and its related instruments, including the identification and costing of technological needs;
- collaboration with developing countries on the preparation of country studies on the potential economic and other impacts of various degrees of climate change and their incorporation in country environmental studies and national strategies;
- assistance with the compilation of comprehensive national inventories of greenhouse gas emission (sources and sinks) and with the development of research and monitoring programmes producing climate related data and the establishment of national co-ordinating mechanisms or networks;
- support for developing country scientists and policy makers to attend international meetings on climate change, in particular regarding the future work of the INC and the IPCC;
- support for seminars for Ministers and high level decision makers in developing countries on the conclusions of the IPCC and the likely impact of climate change in those countries;
- assistance with public awareness and education programmes;
- assistance with institution building and training to facilitate decision-making with respect to responding to the climate change problem and specifically to limit green house gas emissions;
- assistance with formulating national strategies or programmes which aim at diminishing greenhouse gas emission, enhancing sinks of greenhouse gas and adapting to climate change.

Other activities which might be considered include:

- development, through research and pilot programmes, of methodologies to assess climate change effects and incorporation of these methodologies into existing environmental assessment procedures;

- measures to ensure that the expertise and experience of development assistance agencies is properly taken into account in international discussions on climate change issues;
- the establishment of a system for information exchange to assist developing countries on the issue of climate change, e.g. to exchange information between donors and recipients on country climate change studies.

Energy-related concerns arising from climate change

As mentioned in the Introduction, the intention of this and the following section is to propose guidelines for donors on the basis of the climate-related concerns from energy and forests. Both sectors are major targets for development assistance; hence the treatment here is limited to these aspects.

Guidelines for donors

Developing countries contribute about 25 per cent of total global emissions of energy related greenhouse gases, with emissions of approximately 650 million tonnes of carbon equivalent per year. Both the absolute level of developing country emissions and their share of global emissions are expected to grow as a result of projected economic development and population growth. There is, however, substantial potential for containing increases in energy related emissions in developing countries in ways which will support development efforts. The main opportunities lie in improvements in the efficiency of existing systems and a re-orientation of the expected expansion of energy supply and demand towards sources with lower or non-carbon dioxide content, and the full use of economic renewable sources of energy. All measures for the implementation of an environmentally oriented energy policy assume that there is an increasing understanding in the developing countries of the complex relationships among the problems and also that industry, the public and the decision makers join at all levels in the strategies which are pursued. Donors should encourage and assist work towards the establishment of comprehensive national assessment, monitoring and planning systems for all forms of energy use.

There are substantial opportunities for investment in areas which are economically attractive in their own right and/or which produce important local or national environmental benefits while at the same time contributing to tackling climate change. These options should receive first priority in

development co-operation. They include activities in the field of energy saving and improved efficiency in energy production, distribution and end-use in industry, transport and private households. Investment in these areas can produce increases in the energy available to end-users without proportionate increases in primary fuel consumption or capital investment (or the maintenance of a given level of service while reducing the demand on primary energy sources).

There are important barriers to achieving major progress on energy efficiency in developing countries. First, other investment options compete with those needed for energy efficiency and for a variety of reasons, such as certainty of return on investment, may be more attractive to governments, firms or individuals. Secondly, implementation of activities promoting energy efficiency may face administrative, institutional and political problems. Donors will need to take into account economic viability as well as technical and institutional constraints in selecting projects and programmes for priority assistance. Thirdly, in many cases there is a lack of information about ways to increase energy efficiency and about the associated financial and economic benefits.

Perhaps the most important consideration is to ensure that support for particular projects or programmes takes place within a macro-economic and sectoral framework that promotes efficient energy use. Here, the major problem in many developing countries is a pricing structure that does not reflect the cost of energy and other environmental effects and thus impedes allocative efficiency. This problem often involves public policy which promotes subsidisation or otherwise distorts the market. Firm managers therefore lack appropriate incentives to introduce full cost energy pricing. A further problem is the lack of competition among energy suppliers which reduces incentives to develop and implement cost reduction strategies. Current subsidy structures generate uneconomic and distorted patterns of demand and lead to the misallocation of resources. These arguments in favour of institutional reform in the energy sector are well known but are given additional weight by the new challenge of climate change. To assist in overcoming these problems, donors should support developing countries in their analysis of energy options and design of domestic regulations, including pricing, training programmes, technology co-operation and the building of institutional capacity.

In the past, institutional reform, including changes in the price and tariff structure, has been addressed most prominently through policy dialogue, donor co-ordination meetings and structural/sectoral adjustment lending. The degree of subsidisation has been quite substantial in a number of countries. The political and institutional difficulties in achieving full cost recovery within a

short period will be severe: in some cases prices would need to rise drastically. The donor community should therefore define a range of minimum cost recovery, particularly in electricity supply. Two-thirds cost recovery could be considered as an appropriate minimum. Beneath that level, one option might be for donors to decline to finance specific projects. Even in these cases, however, energy policy reform should be supported through sector and structural adjustment programmes.

Short-term priorities

There are a number of options which could generate a sizeable reduction of greenhouse gas emissions within the short-term. The following proposals are included not only for their potential for reducing emissions, but also for their generally high rates of economic and financial return without extensive efforts for institution-building.

A further issue is acid rain, caused by the burning of fossil fuels, which can contribute indirectly to climate change through its effect on forests as CO_2 sinks. There may be scope for aid agencies to help developing countries in the use of low-sulfur or de-sulfurized coal to reduce acid rain.

The demand side offers an important area for increasing the efficiency of energy use. First, revisions to the tariff structure can provide energy consumers with incentives for conservation. Second, complementary activities such as improving the collection of rates, particularly from institutional customers, and individual metering should be given greater attention. Third, there may be significant potential for savings in industry, offices, tourist facilities and high-income households. Efforts are required to provide these customers with information services and better access to energy efficient appliances.

Great potential may lie in the improvement of the efficiency of electricity supply and consumption systems, depending on the specific site and country. Options include the optimisation of existing grids, the rehabilitation of fossil fuel generating stations, their conversion into co-generation units and the rehabilitation of distribution networks. Necessary measures will usually include a package of activities, ranging from training programmes, improvement of managerial capacities, the provision of spare parts to the financing of larger investments. Reductions in energy losses from such investments often exceed 20 per cent and provide other economic benefits as well as lower greenhouse gas emissions per unit of energy consumed. Research on the benefits of combined

biomass/electricity systems for residues and woody biomass should be encouraged.

Fuel substitution. Notwithstanding the opportunities for energy saving, it is clear that energy demand in developing countries -- especially in order to develop rural areas -- will grow, and an increase in energy supply will remain a high priority in development plans. The role of development co-operation should be to help increase energy supply with sources resulting in lower greenhouse gas emissions, notably by substituting less CO_2 intensive fossil fuels, primarily natural gas, and by using renewable sources of energy. About 50 developing countries now have proven reserves of natural gas, but only half are exploiting these sources. Increased efficient use of natural gas for private households, industry and electricity generation should be a high priority in the transition to longer term solutions. At the same time, efforts will also be required to limit the leakage of methane from natural gas production, transmission and distortion as well as from emissions from coal, agriculture and other sources. There are means, other than use of natural gas which may be preferable, depending on the situation. For example, there may be lower cost -- low CO_2 options -- e.g. direct investment in energy efficiency, renewable biomass, etc.

Hydropower. Another energy source with virtually no direct greenhouse gas emissions is hydropower. The operation of most hydropower stations is free of CO_2 emissions, though the loss of CO_2 sink in forest area arising from the impoundment of reservoirs in the construction stage (up to 200 tonnes of carbon per hectare) makes a modest contribution to net greenhouse gas emissions. In many developing countries low cost sites are becoming scarcer, and the remaining sites require longer transmission lines so that an expansion of hydropower often can be financed only after tariff reforms. Small-scale hydropower units may be more promising in view of their lower investment costs and fewer associated environmental problems.

Hydropower, however, does have a number of social and other environmental drawbacks, including those associated with resettlement of local people, increases in water-borne diseases, and changes in river hydrology and morphology. These issues need to be addressed and the cost of measures to compensate or abate negative environmental effects needs to be covered by energy tariffs. Environmental management tools, such as an environmental impact assessment should provide the basis for making a decision on whether to implement the project and on which measures would be necessary to mitigate potential adverse environmental and social impacts.

Other renewable energy sources. The use of other renewable energy sources, including geothermal, solar energy, biomass and wind power has been found to be economically attractive in some cases, for example in providing decentralised energy supplies to rural areas. Particular applications include electricity supply in areas without a grid connection, warm water generation, health services, water pumping, co-generation based on bioresidues and a grid connection.

Hydroelectric power and biomass already play a significant part in energy production. The use of biomass for electricity generation does not contribute to net increases in CO_2 emissions where it is replaced in volume by natural growth or replanting. Since biomass is the major energy source for rural populations, greater attention should be given to identifying efficiency gains in woodburning, biogas generation and other rural technologies using biomass. Solar and wind energy have been extensively developed, but the technology is not yet widespread. In some cases this is due to higher costs to the user than traditional sources of power, but also to the low priority given to the development of renewables in most countries. Intensified research and development in these areas is a priority for donor assistance. The more that progress has been made towards adjusting energy prices for fossil fuels to reflect long-run marginal costs and environmental externalities, the more renewable energy sources become economically competitive.

Industrial sector energy efficiency. The improvement of the efficiency of energy use in the industrial sector constitutes a major component of an emission reduction strategy. Improvements can be made through various measures: pricing policies, rehabilitation of plants, recycling of wastes and reduction of leaks. In this sector, energy pricing plays the most important role as an incentive for energy savings. The highest potential for savings lies in the energy intensive sectors, such as the metallurgical, petrochemical, cement, fertiliser and pulp and paper industries. Especially after reforms to the pricing structure, the rehabilitation and renovation of existing plants may be profitable. Such measures will often require technical assistance, training and finance for new investment. A further area for consideration is the use as fuels of the wastes from industrial processes (including the manufacture of pulp and paper, food and beverages). Additionally, reductions can be made in methane leaks in natural gas distribution systems and leaks of refinery gases in petroleum refining. Because of its potency as a greenhouse gas, the reduction of methane leaks, which reach up to 5 per cent, could make a significant contribution to overall limits on greenhouse gas emissions.

Transport sector energy efficiency. The transport sector in developing countries contributes an increasing proportion of total greenhouse gas emissions and hence offers potential for effective action. Moreover, transportation in these countries, results in a very high percentage contribution to ozone precursor emissions (NOx and CO) which contributes to the greenhouse effect. This sector tends to lag far behind developed countries in technology and control approaches which effects both CO_2 (through efficiency) and other greenhouse gas or precursor emissions. There are no technologies to remove CO_2 emissions from automobiles although improvements in engine and vehicle design could be made that lead to lower energy consumption. Thus, modernisation of the automobile stock could make significant contributions towards CO_2 reductions. Low incomes and the lack of enforcement of technical and emission standards and fuel subsidies in many developing countries result in automobiles that tend to be more CO_2 intensive than in industrialised countries. Increased development co-operation in the introduction and enforcement of emissions standards, e.g. reduction of NOx and CO, (ozone precursors) to similar levels as found in OECD, would generate other environmental benefits beyond CO_2 emissions. Perhaps more promising are measures to improve urban public transport and in particular to increase the fuel efficiency of bus fleets.

Household sector energy efficiency. Private households contribute to CO_2 emissions as consumers of electricity, fuelwood, mineral oil products and coal. The options are limited but possible actions for reducing energy input include improvements to housing design, increased efficiency of electrical household appliances for middle and higher income groups and improved efficiency of cooking stoves for fuelwood-dependent low income households in urban and rural areas. The main area for donor assistance is adaptation of existing technologies to the circumstances of different countries and assistance with the diffusion of appropriate technologies. Substantial amounts of energy are wasted due to climatically inappropriate design of buildings and indoor spaces. Possibilities to reduce energy consumption for cooling and heating of residential buildings, offices, factories, schools, hospitals, etc. by climatically well adapted house and lay-out designs and efficient use of natural ventilation, are considerable and should be pursued in development assistance projects.

Overall, donors should be ready to assist developing country efforts to minimise CO_2 emissions and other greenhouse gases from the energy sector by financing incremental costs accruing through the selection of environmentally beneficial investments. There is scope for activity here by bilateral donors as well as for multilateral initiatives such as the Global Environment Facility.

Longer-term priorities

Additional options might need to be included in the longer term. One such option is technological developments which promise to raise thermodynamic efficiency of conventional fossil fuel technologies and to expand the range of applications of alternative technologies. Another is taking the external costs of energy use which may be taken into account in the pricing structure in developing countries.

Technological developments in advanced combustion, combined cycles and clean coal technology in power plants in the industrialised countries offer considerable potential for improving thermal efficiency. Technological developments are also instrumental in the adaptation of alternative appropriate technologies, including solar energy, fuel cell, desulfurization and biomass, to the conditions of developing countries. Expected reductions in the price of solar power and other units will expand the range of application. Cost reduction is mainly a function of market size, and considerable economies of scale in production are expected. The scope for introducing these technical innovations into developing countries, many of which are major consumers of coal, requires examination.

To the extent that industrialised countries bring their energy prices fully in line with the social and environmental costs of energy use, demand will adjust and the energy intensity of GNP will continue to fall in due course. The share of the various energy sources will shift according to the resulting change in relative prices, which is expected to favour the alternative or renewable sources. The developing countries may also need to adjust their energy prices to reflect environmental as well as financial costs.

On the basis of the above analysis DAC Members agree that an increase in energy supply to end-users will remain a priority in development plans. While they acknowledge that this entails a further increase of CO_2 emissions, they also see a wide-range of opportunities to limit the growth in energy-related greenhouse gas emissions in the framework of development co-operation. DAC Members agree to help developing countries limit energy-related greenhouse gas emissions through:

- support for the formulation of national energy planning policies and for the establishment of monitoring systems;
- support for the promotion of energy efficiency, both by consumers and producers, in the household sector, industry, transport and agriculture; special attention will be paid to institutional

development, training, human resources, technology transfer, environmental protection and energy costs;

- support for long-term projects and programmes aiming at providing a contribution to a sustainable national energy economy; special attention will be paid to energy pricing policies, cost recovery and reduction of CO_2 emissions;
- support for research on and promotion of the wider use of renewable energy sources, in particular in rural areas;
- support for research on and transfer of energy economic technology which minimalises emissions of global warming gases and allows for special attention to new and renewable forms of energy;
- investigation of the potential for widespread use of renewable sources of non-combustion energy, biomass, especially in rural areas; and
- exploration of the scope and application of new technologies, including innovations to raise thermal efficiency and minimise distribution losses, and of the potential of adapting alternative technologies to the circumstances of different countries.

Forestry-related concerns arising from climate change

Guidelines for donors

Action to conserve and improve the management of forests is urgently required in view of the benefits that forests provide to national economies. With respect to climate change, deforestation is estimated by the World Resources Institute (WRI) and the IPCC to account for 14 cent of annual emissions of greenhouse gases from man-induced sources. Improved management of existing forests together with reforestation is one of the key options identified by the IPCC for limiting emissions. The special significance of forests as a natural sink for CO_2 provides justification for action to ameliorate climate change through their conservation and management. Both deforestation and reforestation can be addressed by development policies and investment within and outside the forestry sector. There is significant scope for effective action by bilateral donors, many of whom have already implemented or plan substantial increases in forestry assistance.

It is generally recognised that deforestation will be reduced only when sustainable use of forests is seen to be economically more valuable than alternative uses of the same land. Development assistance policies should

therefore first address national needs. That implies priority attention to national economies and the needs of local populations, measures to promote sustainable forest management, the development of sustainable agriculture outside existing forest areas and issues of land tenure and poverty alleviation. The non-marketed benefits that forests currently provide to local communities need to be borne in mind.

Guidelines for bilateral donor action must therefore seek to maximise the coincidence of interest between the global objectives for climatic stability and the national objectives of tropical countries for sustainable development of their forest resources and deforested lands. The basic climate objective is to reduce net emissions of carbon dioxide and other greenhouse gases through lower rates of destructive deforestation, accompanied by increased absorption of atmospheric carbon through reforestation and afforestation schemes. Other important means to meet both national and global environmental objectives are through increased efficiency in forest management and harvesting practices, the use of wood and the prolongation of the 'life' of wood and wood products as stores of carbon.

Ultimately, the major contribution of the forestry sector to global climatic stability will be made during a critical transition of perhaps 50 to 75 years to more stable management of the human influences on climate. Once intensified reforestation, the recapitalisation of the global stock of forest and its sustainable management have been achieved, the net benefit from the forestry sector may diminish as wood increasingly is used as an alternative energy source to fossil fuels and as a lower cost substitute for other industrial materials.

The national objectives of many tropical countries are primarily dominated by short term demands for food, other basic subsistence needs and foreign exchange earnings. Consequently they often conflict with global environmental objectives as well as with the long-term interests of the population. This situation has resulted in the use of the natural forests as a land bank whose capital stock of timber, soil fertility and biological diversity has been progressively reduced instead of being managed for sustained and enhanced yield. As a result remedial action is now needed in the form of substantial reinvestment to build up the missing national capability for sustainable management and to restore productivity to the deforested and degraded lands. A much larger amount of co-ordinated and above all sustained development assistance will be required from the multilateral and bilateral donor community and from the private sector throughout this period. Donors should also be willing to meet a higher proportion of local costs than is normal in other sectors.

Guidelines and priorities for bilateral donor actions need to be co-ordinated with those of multilateral activities. The Independent Review of the Tropical Forestry Action Programme (TFAP), initiated by the Director-General of FAO and completed in May 1990, provides the international donor community with a good basis for its revitalisation and endorsement as the agreed framework to guide and co-ordinate development assistance to the sector. The Review report recommends the specific inclusion of environmental protection (enhancing the contribution of tropical forests to national life-support systems and global security, including biodiversity and climatic change) as an explicit objective of the TFAP. A revised TFAP which operates through the preparation and implementation of a national development plan for the forestry sector with linkages to other sectors in each country could provide a framework for national action. This framework on the national level should be completed with international action in fields which are best undertaken on a regional or global basis.

The Food and Agriculture Organisation (FAO) through its intergovernmental bodies on forestry at global and regional level can help provide technical assistance to address emerging issues affecting the forestry sector. There is a particular role for the International Tropical Timber Organisation (ITTO) in promoting sustainable forest management. Bilateral agencies should promote the wide implementation of the ITTO Guidelines on the sustainable management of tropical forests, including the provision of appropriate financial and technical assistance to countries, organisations and agencies that want to put these guidelines and others of a similar nature into practice. Other relevant work is that of FAO on the Global Forest Resources Assessment, and similar fields of information gathering and dissemination; UNEP and the IUCN in regard to the conservation of biological resources and biodiversity; the International Union of Forest Research Organisations (IUFRO) and the Consultative Group on International Agricultural Research (CGIAR) in research. In addition, work is continuing through the UNCED to negotiate a non-legally binding authoritative statement of principles on the management, conservation and sustainable development of all types of forests, taking into account the special situation of developing countries. Nevertheless, the long-term sustainable development of tropical forest resources is primarily dependent on the development of national capability in each country.

Deforestation and land degradation are the result not only of the past neglect of investment in the sector but also of the sacrifice of the resource and its environmental influences to the short-term demands of other sectors, interests and individuals. Much can be achieved by correcting policy distortions affecting the forestry sector. In addition, the environmental management

process, which includes such tools as the environmental impact assessment (EIA) and full analysis of long-term economic costs and benefits of all development schemes bearing on the forestry sector are essential to ensure more appropriate development decisions and priority to the sector in the national economy. Information on EIA should be made widely available.

Top-down approaches generally have proven to be ineffective when local user groups consider that such approaches are not consistent with their socio-economic objectives. Policy and programme interventions, therefore, have to be developed in such a way that local communities can participate effectively in their design. Similarly, the implementation of programmes should be based on a participatory planning process which incorporates the knowledge and interests of affected groups. The full role for local people and their representatives in forest management must be ensured if sustainability is to be achieved.

Short-term priorities

It is important to distinguish those actions likely to have the quickest effect in slowing deforestation and in promoting afforestation and reforestation schemes. These are essentially a matter of national policies and of actions to meet the subsistence needs of rural populations.

Although the principal causes of deforestation, such as issues arising from patterns of land tenure, land speculation, shifting cultivation, cattle ranching, fuelwood demand, unsustainable timber production, overgrazing, mining operations, reservoir construction occur to varying degrees in almost all tropical countries, each country is unique in terms of its priorities for forestry conservation and development. The development of national strategies to tailor action to the precise needs of each country within an appropriate national policy framework could be a basis for establishing priorities.

The precise definition and prioritisation of national level programmes, to be supported as necessary by external assistance projects, must be done in both the national context and the revised policy framework. Immediate action is likely to be needed in many countries to define and secure the permanent forest estate within overall land-use plans and national legislation and to prepare maps and inventories of forest resources, flora and fauna for the most efficient strategies to conserve forest and biological resources.

Satisfactory implementation of national programmes in each country is dependent not only on appropriate sectoral policies, objectives and guidelines for action; adequate human and financial resources are also needed. Given the severe institutional and financial weakness of the sector in almost all tropical countries, immediate financial and technical assistance must come from the donor community. Since both financial and human resources are limited, this implies a re-ordering of donor financial priorities and a planned strengthening of the limited pool of expatriate expertise available for technical co-operation programmes in the sector through intensified schemes to provide training and field experience.

The intensification of action to build the national capability in tropical countries, through training schemes and infrastructural development, is an immediate high priority. This action includes not only the development of technical competence in forestry and related sciences, but socio-economic competence for sector planning and policy making, including the improvement of consultation procedures involving local communities.

The preparation of national guidelines for sustainable management of forests, including the maximisation of the economic benefits through sustainable harvesting of timber and other forest products, is an urgent requirement in all tropical countries. The international guidelines for sustainable management of natural tropical forests adopted by the ITTO in May 1990 provide a basis for developing national guidelines. External assistance, however, will be needed in most cases to develop and apply national guidelines; hence this should be a high priority for bilateral aid.

All aspects of assistance, both short-term and long-term, require careful preparation, analysis and documentation. The inadequacy of existing capacities for project preparation and appraisal has been highlighted in the context of the TFAP and will become an increasingly severe constraint as international activities in the sector expand further. Action to remove this constraint must be a high priority for the donor community as a whole. Both individual action by bilateral agencies and joint action are likely to be needed.

Longer-term priorities

Long-term conservation and sustainable management of tropical forest resources in the face of increasing populations and progressive land degradation depends on enhanced and sustained efficiency in land use, both in the allocation of land and in the nature of agricultural, silvicultural or agroforestry practices.

This implies a greatly intensified, long-term research programme. The great diversity of tropical tree species, in formations from arid savanna to rainforest, and the high genetic variability within species provide a powerful and as yet little explored basis for enhanced and sustainable productivity. Increases in productivity of several hundred per cent have been achieved through intensive research programmes on trees for fast-growing industrial plantations. Intensified research is now needed for improving the productivity of multipurpose trees, particularly for use in agroforestry systems. The development of national research capabilities, assisted by bilateral aid, is thus of high priority.

The need to increase productivity is greatest in the most difficult environments, for example in the Sahelian Zone in Africa and similar conditions in Asia and Latin America, where increasing human and livestock populations have caused progressive degradation of the vegetation and carrying capacity of the land. Intensified research in naturally occurring systems that withstand environmental problems of moisture or nutrient deficiency offer the best basis for restoration of productivity to severely degraded tropical lands. Reforestation of the large areas of degraded land in both the humid and seasonally arid tropics could make a substantial contribution both to the local economy and to global climatic stability.

Sustainable management of the species-rich and complex tropical rainforests is also dependent on maximising economic benefits on a sustainable basis. In addition to actions to provide incentives for sustainable management (including the possibility of labelling) recommended within the ITTO, longer-term actions are also needed for a more complete understanding of the ecosystems, including their likely response and vulnerability to possible climatic changes. These actions involve taxonomic studies, inventories of flora and fauna, and physiological and ecological research into the forest dynamics. Bilateral aid, involving the scientific community in the developed countries, can help with collaborative research and assist the development of expertise in the tropical countries themselves.

On the basis of the above analysis concerning the relationship of forests and climate change, DAC Members agree to work towards:

- early establishment and operation of an international representative consultative forum for TFAP;
- the implementation of the ITTO guidelines on sustainable forest management and strengthening of the activities of the ITTO, where producing and consuming countries are united in their efforts to

achieve a more positive relationship between the international trade in tropical timber and the conservation and sustainable management of the forests;

- measures that build national capability in developing countries through training schemes and infrastructural development encompassing technical expertise in forestry and related sciences, socio-economic expertise for sector planning and policy making, and improved consultation procedures involving local communities;
- intensified forestry research, particularly through the CGIAR, on among other things the management of tropical moist forests, the restoration of productivity of severely degraded tropical lands and the use of indigenous and multipurpose tree species in agroforestry systems;
- programmes that address underlying causes of deforestation in the broader framework of bilateral relations with developing countries, including analysis of policy issues and the potential need for refocussing national policies to promote incentives for sustainable forest management as well as programmes on land tenure, sustainable agriculture, land use planning and alternative domestic energy sources.

Sea-level rise

Background

In its report of August 1990, the IPCC Science Working Group (WG I) concludes that global sea level has been rising over the last 100 years by 1.0 - 2.0 mm/yr on average. The Working Group concludes that there has been a globally coherent, secular rise in sea level and that the causes are most likely related to climate change. There has been no firm evidence of an acceleration in global mean sea level over the present century, although there is some evidence that sea level has risen faster in this century than in the previous two centuries. It appears that the rise in sea level is due largely to thermal expansion of the oceans and increased melting of glaciers at the margin of the Greenland ice sheet.

Future changes in sea level have been estimated for different scenarios. For the IPCC "business-as-usual" scenario (i.e. no action) at year 2030, global mean sea level is 8-29 cm higher than today, with a best estimate of 18cm. At the year 2070, the rise is 21 to 71 cm, with a best estimate of 41 cm. Even with

substantial decreases in the emissions of the major greenhouse gases, future increases in temperature and as a consequence the sea level are unavoidable. The IPCC Science Working Group concludes that a rise of more than one metre over the next century is unlikely. Even so, the rate of rise implied by the business-as-usual scenario (best estimate) is 5 to 6 times faster than that experienced over the last 100 years.

Potential sea level rise could mean that beaches would retreat as much as several hundred metres and protective structures may be breached. Flooding would threaten lives, agriculture, livestock, buildings and infrastructures. Salt water would advance landward into aquifers and up estuaries, threatening water supplies, and agriculture as well as valuable and rare ecosystems.

Some nations are more vulnerable than others. For example, it has been estimated that 8 to 10 million people live within one metre of high tide in the unprotected river deltas in Bangladesh, Vietnam and Egypt. Half a million people live in archipelagos and coral atoll nations that at present lie almost entirely less than three metres above mean sea level (e.g. Maldives, Marshall Islands, Tuvalu, Kiribati and Tokelau). Other archipelagos and island nations could lose much of their beaches and arable land, which would cause severe economic and social disruption.

Guidelines for donors

The Coastal Zone Management Subgroup (CZMS) of the IPCC Response Strategies Working Group (WG III) identified three major response options to protect human life and property against the rising sea; Retreat, Accommodation and Protection. Retreat involves no effort to protect the land from the sea: the coastal zone is abandoned and ecosystems shift landward. Accommodation implies that people continue to use the land at risk but do not attempt to protect the land from being flooded. This option includes erecting emergency flood shelters, elevating buildings on piles, converting agriculture to fish farming and growing salt-tolerant crops. Protection involves hard structures such as sea walls and dikes, as well as soft solutions such as dunes and vegetation to protect the land from the sea.

To determine the most suitable response option, information on the elevation of coastal lowland as well as information on the environmental, socio-economic, legal and institutional implications is required. Except for a few countries, there are no reliable data from which to determine how many people and how much development are at risk.

The CZMS concludes that at least for the foreseeable future the impacts of sea level rise for most coastal nations would be serious but manageable if appropriate actions are taken. It is important, therefore, for coastal nations to practice sound coastal zone management to avoid adverse impacts both now and in the future. These issues will be of particular importance for small island states and may require special attention by aid agencies in their assistance to such countries.

DAC Members should consider the scope of guidelines for international coastal zone management. Such guidelines could provide a framework for bilateral and multilateral co-operation in dealing with the full range of concerns related to impacts of sea level rise and other effects of climate change on the coastal zone. The guidelines could also help to establish an international frame of reference as well as a clear set of goals and objectives.

Possible elements of such guidelines are:

- support for institutions conducting research on sea level rise and other impacts of climate change on the coastal zone;
- international co-operation to monitor sea level rise and other impacts of climate change on the costal zone;
- contribution to systematic mapping and resource assessment of coastal zones to identify functions and critical areas at risk;
- support for international initiatives to provide information and technical assistance to co-operating countries for the preparation of coastal management programmes;
- exchange of information, expertise and technology among countries on the response to sea level rise and other impacts of climate change on the coastal zone;
- promotion of awareness of the implications of sea level rise and other impacts of climate change on the coastal zone;
- management of the coastal zone so that environmental values are preserved whenever possible;
- avoidance of measures that are detrimental to the coastal zones of adjoining states;

- provision of emergency relief to coastal nations struck by storm surge disasters.

DAC Member countries together with developing countries should support research to identify populations as well as agricultural and industrial production at risk in coastal areas and inlands. Moreover, a methodology to assess the vulnerability of environments and socio-economic systems to climate change should be further developed. This should include case studies directed to the development of coastal zone management plans, assessment of coastal resources at risk and increased national ability through education, training and technology transfer to address sea level rise. Criteria for the selection of cases studies should be established, e.g. geographic diversity, including both island nations and countries with large river deltas in various parts of the world, and the risk to particular resource activities common to countries under threat, such as fishing, cropping and tourism. These studies should analyse options for coping with sea-level rise (retreat/resettlement, accommodation or protection) and the potential environmental, social and economic implications associated with each choice.

DAC Members should help developing nations to develop by the year 2000 the institutional capability to prepare their own coastal management programmes and to establish a regulatory framework with the means for enforcement. The required technical capability should be brought to an adequate level by training programmes, expert advice and appropriate equipment.

Nations should ensure that coastal development does not increase vulnerability to sea level rise. Structural measures to prepare for sea level rise may not yet be warranted. Nevertheless, the design and location of coastal infrastructure and defences should take into consideration sea level rise and other impacts of climate change. Environmental impact assessment could be helpful in this regard. It is sometimes less expensive to incorporate these factors into the initial design of a structure than to rebuild it later. Actions in particular need of review include river levels and dams, conversion of mangroves and other wetlands for agriculture and human habitation, harvesting of coral and increased settlement in low lying areas.

In all coastal nations the coastal areas in danger of inundation should be identified and the implications of adaptive responses should be assessed. By the year 2000 coastal nations should implement comprehensive coastal zone management plans, e.g. setting national policy objectives for coast and resource use, collection and regular updating of information; establishment of

environmental objectives for land use planning, coastal water planning, conservation requirements, etc.; use of environmental impact assessments, public education and participation in decision-making; establishment of necessary legislation and institutional arrangements, such as designating a lead administrative agency to co-ordinate sectoral inputs into an overall coastal strategy; and monitoring and enforcement procedures. These plans should respond both to potential sea level rise and other impacts of global climate change. They should ensure that adverse effects to populations are minimised, while recognising the need to protect and maintain important coastal ecosystems.

A continuing international focus on the impacts of sea level rise needs to be maintained. International organisations such as the UNEP, e.g. through its Regional Seas Programme, should be strengthened to focus awareness and attention on sea level change, prepare "regional" international coastal zone management plans for defined regions and provide a framework for planning. Funding from participating governments and aid assistance could be used to implement recommendations for the plans and their regular updating.

Data and information on sea level change and adaptive options should be widely disseminated. A methodology should be developed with the participation of the parties concerned for collecting and exchanging data and information on climate change, its impact on the sea level and coastal zones, and various adaptive options. Sharing this information with developing countries is critically important for the preparation of coastal management plans. The database on coastal resources at risk due to sea level rise, adaptation techniques and potential response strategies should be fully operational by the year 2000. The format of this database can be defined during the case study projects as proposed above. A database of this kind will promote exchange of information and knowledge among coastal nations.

Based on the above analysis and the recommendations of the IPCC Response Strategies, DAC Members agree to work towards:

- consideration of the need for international guidelines on coastal zone management;

- assistance for research on and monitoring of sea-level rise and potential impacts of climate change on coastal areas and islands;

- assistance to developing countries to build the institutional capacity for coastal management programmes as well as the regulatory framework and means for enforcement;

- support for the development of risk assessment methodologies and subsequent planning action in respect of possible impacts on people and the natural resource base, including agriculture and industrial production;

- the exchange of information, expertise and technology among countries as well as the promotion of public and political awareness on the implications of sea-level rise and potential impacts of climate change on coastal areas and islands; and

- the provision of emergency relief to coastal zones and island nations struck by storm surge or cyclone disasters.

Ozone Depletion

Background

The depletion of the ozone layer by the action of certain persistent man-made chemicals, notably chlorofluorocarbons (CFCs) and halons has been suspected since the early Seventies. Increasing scientific understanding of the gravity of the ozone problem and a realisation that tackling it required a co-ordinated international effort led to the Vienna Convention on the Protection of the Ozone Layer, which was signed in March 1985. The Vienna Convention introduces the idea of precautionary action in dealing with the threat to the ozone layer; it sets down certain duties concerning research and reporting and includes mechanisms for agreement on specific protocols to control the emission of ozone depleting substances (ODS).

Within thirty months of the convention being adopted, its parties agreed to a protocol which identified five CFCs and three halons as the major ozone depleting substances, together with a schedule to reduce production and consumption of CFCs by 50 per cent by 1998 and freeze the production and consumption of halons from 1992, both on the basis of the figures for 1986. Recognising the fact that developing countries were not yet major contributors to ozone depletion but could become so in the future, the protocol stipulated a ten year grace period for developing countries, as long as their annual consumption per capita did not exceed 0.3kg. The agreement, named Montreal Protocol on Substances that Deplete the Ozone Layer, was opened for signature in September 1987, and entered into force in January l989. By June 1990 sixty states had become parties to the Protocol, including all Members of the DAC; these parties are responsible for more than 90 per cent of the production and consumption of CFCs.

Scientific evidence and concern over ozone depletion had been increasing during the negotiation process of the Montreal protocol; the discovery of the ozone hole over Antarctica in 1985 served as a focus for all these concerns. In addition it became clear that CFCs contribute to a significant degree to global

warming. Concerned scientists and environmental groups began calling for a total elimination of ODS.

In this situation, the review process instituted by the Montreal Protocol was decisive in advancing knowledge and action. The four panels on ozone scientific assessment, environmental effects, technology review and economic assessment drew together the expertise of hundreds of specialists from all over the world. The work of these panels helped prepare the way for the revision of the Montreal Protocol at the London Conference in June 1990. The work of these panels also facilitated an international exchange of experience, thus helping to establish a common perception of the best available technologies. For the implementation of the new and stringent schedule of the Montreal Protocol the reports of the technology review panel will be particularly helpful, both for industrialised countries and their co-operation with developing countries.

The following reports of the panels provide useful information for furthering development co-operation:

-- final report of the economic assessment panel, August 1989;

-- report of the technology review panel, 30 June 1989;

-- refrigeration, air-conditioning and heat pumps technical options report, 30 July 1989;

-- flexible and rigid foams technical options report, 30 June 1989;

-- electronics, degreasing and dry-cleaning solvents technical options report, 30 June 1989;

-- report on aerosols, sterilants and miscellaneous uses of CFCs, 30 June 1989;

-- technical options report on halon fire extinguishing agents, 30 June 1989;

-- terms of reference for national case studies (including proposals for survey questionnaires), finalised in a workshop in January 1990.

These reports show the technical options, the conditions under which they can be realised, the costs involved and possible strategies. The terms of

reference for the national case studies and the questionnaire may serve as guidelines for assessing the situation in countries wishing to join the phase-out activities set out by the Montreal protocol.

Increasing scientific and political concern that the 1987 Montreal Protocol was insufficient to reverse the depletion of the ozone layer led to its renegotiation at the second meeting of the Parties to the Protocol in London in June 1990.

The most important results of the renegotiation were:

-- Inclusion of methyl-chloroform and carbon tetrachloride as ozone depleting substances in the reduction schedule.

-- A reduction schedule which aims at almost total elimination of ODS by the year 2000 (2005 for methyl-chloroform), except for a few essential halon uses.

-- A resolution to consider HCFCs as transitional substitutes, for use only when other solutions are not available. The resolution calls for the elimination of HCFCs by 2020, or at the latest by 2040. The Protocol requires reports on and further review of these substances.

-- Creation of an Interim Multilateral Fund through a decision by the parties to finance measures in developing countries pursuant to the goals of the Protocol. The fund will be US$160 million for the first three years; if India and China become parties it will be increased by US$80 million. Creation of a more permanent fund will require entry into force of the London Agreement.

-- Signals from China and India, the major producers and consumers of CFCs and halons among the developing countries, that they would be prepared to ratify the Protocol.

-- Production rights may be transferred between parties, provided that the combined production does not exceed the permitted levels. This would enable countries to shut down production facilities in exchange for guaranteed delivery.

The developing countries have a 10-year grace period.

Guidelines for donors

Assistance to developing countries on phasing out ODS for the remainder of the 1990s need not be concentrated on ensuring that they fulfill production and consumption targets since these targets, even for those developing countries which are parties to the Protocol, do not apply until 1999. Developing country parties to the Protocol do have obligations with regard to reporting on production and consumption and fulfilling the stipulations regarding restrictions of trade in ODS. Trade in regulated substances between parties to the Protocol and non-parties is forbidden. The focus of bilateral donor efforts to assist developing countries in this area should be therefore to help them to take anticipatory action:

-- to phase out technologies which will become obsolete within the next few years in the industrial countries;

-- to take measures which are cost-effective or will become so in the next few years as a result of new technical developments in the industrial countries;

-- to take action before the obligations come into force.

Four areas of priority action for donors can be distinguished:

Discontinue all funding for CFCs' production expansion

This requirement should not only be applied to CFCs, but also to halons, carbon tetrachlorides and methyl-chloroform, that is to all substances controlled in the revised Protocol, but excluding the HCFCs for which only reporting of data is required. Countries participant to the Protocol have a legally binding obligation not to assist expansion of CFC production in non-signatory countries. While the number of developing countries currently known to produce CFCs is only seven, this will increase when methyl-chloroform and carbon tetrachloride are considered. It is also more difficult to identify production facilities for the latter substances than for the production of CFCs and halons. A careful check of all plans to finance the construction, expansion or rehabilitation of chemical plants is therefore necessary.

Fund national and industry-specific feasibility studies on phasing out controlled substances

Studies, such as those to be conducted by the Interim Multilateral Funding Mechanism, on the production, export/import, application and disposal of controlled substances should be the basis for implementing the Montreal Protocol; this is especially true for countries with a large industrial base and a wide variety of applications. Such studies should identify those measures which can readily and cost-effectively be taken to phase out production and application of controlled substances and to reduce their emissions. Moreover, they should also determine measures to be taken when substitutes and/or alternative technologies become available. Finally, such studies can assist the developing country in fulfilling its duties to report to the Secretariat of the Protocol and to regulate trade, especially with non-parties. Guidelines and questionnaires for such studies (general and industry-specific) have been developed under the auspices of UNEP, several donors and the Interim Multilateral Fund.

Influence industrial planners to use substitute products or alternative technology

It is important to build awareness among the engineers, management experts and administrators of industries in developing countries that the movement away from CFCs and other regulated substances has begun in all industrial countries and is being seriously pursued. Technologies dependent on these substances will ultimately become unavailable. It should also be pointed out that the phase-out of these substances can be cost-effective in the short term (especially for aerosol applications) and that transition problems can be minimised by planning.

Donors should check projects, especially in the industrial sector, where the use of controlled substances is being planned or continued; minor applications, such as solvents or fire extinguishing agents, also should be identified. If alternatives are already available the recipient should be urged to implement projects without the application of controlled substances; the incremental costs should be financed at especially favourable terms. Referral to the Interim Multilateral Fund is possible, but it should be borne in mind that the assessment of specific project components which are part of a larger construction or rehabilitation project is extraordinarily difficult.

Provide technical and financial assistance to ease the phase-out of controlled substances

The possibilities of assistance have been redefined by the London Conference. The bilateral donors in the DAC have declared their readiness to help finance investments and technical assistance for measures pursuant to the Montreal Protocol. Under the renegotiation of the Montreal Protocol donors are providing at least 80 per cent of their contribution to the Funding Mechanism through the Interim Multilateral Fund. Up to 20 per cent of each donor's total contribution can be channelled bilaterally. On the basis of the above analysis DAC Members see the necessity of donor assistance in the following fields:

- discontinuation of all funding for the production of chlorofluorocarbons and other controlled substances;

- financial support for industry-specific feasibility studies on phasing out controlled substances;

- examination of aid projects, especially in the industrial sector, in which the use of controlled substances is being planned or continued;

- financing of the incremental costs of available alternatives at especially favourable terms as an incentive to substitution; and

- technical assistance to ease the reduction and phase-out of emissions of controlled substances under the Montreal Protocol.

Hazardous Wastes

Background

Wastes are items which are disposed by various means such as burial, insertion into the sea, incineration, spreading onto land and many other means. Hazardous wastes are those which, if improperly managed, could harm living creatures and/or the environment because they are toxic, corrosive, explosive or combustible. Often certain components of wastes, for example heavy metals, cause that waste to be judged potentially hazardous by regulatory authorities. Lists of potentially hazardous wastes have been issued by many countries. In May 1988, Member countries of the OECD agreed upon a list of 44 potentially hazardous wastes. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal of 22 March 1989, which has been signed by about sixty countries, incorporates this list; the European Community is in the process of adopting the OECD list as well.

There is thus world-wide agreement that adequate monitoring and control of hazardous wastes is necessary in order to minimise possibilities for harm to living creatures and/or the environment. It is also generally agreed that there is scope for the use of economic incentives and regulations to limit the production of wastes. Monitoring of hazardous wastes implies that the whereabouts of such wastes should be known at all times, that is "from cradle to grave" and that the wastes in fact arrive at an appropriate facility for treatment, storage and/or disposal. One particular problem is that certain chemical products can turn into 'wastes' as a result of accidents or improper use or storage (e.g. pesticides). Control of hazardous wastes can only be fully realised if adequate monitoring systems are in place (which is not the case in many countries); control means that competent authorities can act rapidly to ensure that the possibility for inappropriate handling of the wastes is minimised. In case mishap does occur, control means that the authorities have the capability, both legal and financial, to act quickly in order to reduce any dangers posed to human health and/or the environment.

Certain features are common to all existing monitoring and control systems for hazardous wastes. These include:

- Definition of "wastes", "hazardous wastes" and the setting of a boundary (which may be sharp or fuzzy) between wastes destined for disposal and "materials" destined for recycling, resource recovery, reuse or reclamation.

- Designation of a list of waste substances which will constitute "hazardous wastes".

- Compilation of a list of probable sources (generators) of hazardous wastes. This list may be general, e.g. industries X, Y Z, hospitals, or specific, e.g. firms A, B, C etc. Many countries use both.

- Assessment of the quantity of each type of hazardous waste to be monitored and controlled. This result depends entirely upon the list of wastes deemed to be hazardous coupled with the existing sources.

- Provision of treatment, storage and disposal (TSD) facilities to match the quantities of each type of hazardous waste produced. The goal is to provide sufficient capacity (sites) to protect people and/or the environment at lowest practicable cost.

- Implementation of a monitoring scheme which will afford the competent authorities the means to track the wastes from "cradle to grave" and perhaps beyond.

- Means to respond quickly and appropriately to any emergencies caused by accident, failure of the system or discovery of abandoned hazardous wastes which may pose a threat to people and/or the environment.

- Adequate resources for setting standards of compliance with the regime selected to monitor and control hazardous wastes and for enforcing the rules in case of non-compliance.

In one form or another, and with certain national (or local) variations, these eight items form the foundation for all active systems of hazardous waste management. A number of factors bear on how individual countries choose to emphasize various elements; these factors include costs, geography, industrial

public awareness and many others. Resources measured in money units, directed towards hazardous waste management, tend to fall in the range of $5 to $15 per capita annually in many industrialised countries. For example, OECD European countries generate roughly 24 million tonnes of hazardous wastes annually; costs to properly manage these wastes average about $100 per tonne in 1989 and are expected to rise rapidly.

Generation rates for developing countries are not very well known. Nonetheless, on the basis of the list of hazardous wastes adopted by the Basel Convention, a fairly reasonable estimate is that for each $1 million of annual gross domestic product in developing countries, the quantity of these wastes ranges from 2.5 to 4.5 tonnes. Thus, on average, a country having a gross domestic product of $1 billion is likely to have to manage about 35 000 tonnes of hazardous wastes yearly.

Broadly speaking, three primary sources produce hazardous wastes in developing countries:

- wastes generated within the country either by foreign-owned, state-owned or joint-venture firms, small entrepreneurs such as electroplaters, metal finishers etc., as well as local farmers and householders;

- wastes imported into the country; and

- wastes as residual sludge from sewage treatment plants.

According to UNEP findings, waste management in developing countries suffers from a variety of difficulties. For example, countries in or near the tropical rainbelt must cope with frequent heavy rains; landfill waste is thus subject to the strong possibility of rapid leaching or even direct overflow due to water content. Since there may be little or no pre-treatment of the waste prior to landfilling, this practice could lead to contamination of water supplies (ground and surface water) as well as to direct exposure of nearby dwellers. Again, according to UNEP, most industrial production in developing countries is concentrated in congested areas. Landfilling of hazardous waste generally occurs close to industrial estates which are surrounded by poor neighbourhoods. Hazardous and other wastes are not regularly separated in many developing countries. These dangers point to the clear need for land use planning in developing countries and the urgency of implementing and enforcing such plans.

Run-off from hazardous waste sites can also contaminate large areas of land. In communities strongly dependent on agriculture such an occurrence, which could result in large amounts of land being rendered useless, might be catastrophic.

In developing countries, the state apparatus with respect to control over the activities of possible sources of hazardous wastes is neither well-developed nor strong. Such hazardous waste disposal will always be a risk and often an acute danger. Thus, the government of many developing countries may well be faced with a future need to react and cure uncontrolled disposal areas. Technical expertise and considerable funds may be required for such tasks. The alternative to remedial action could be serious harm to human beings and/or the environment.

Technology transfer from industrialised areas to developing areas affects waste management needs and options as well. In the 1970s and 1980s industries that predominated in constructing facilities which were ultimately transferred to control of the host country were mainly chemicals, energy, metallurgy and construction materials, and to a lesser extent textiles, paper, mining, food processing and waste treatment. These are activities which are likely to produce potentially hazardous wastes. Thus, in many instances, the state is likely 'de facto' to hold control of those industries prone to generate most hazardous wastes in developing countries.

No matter who controls the technology -- the state, local enterprises or an outside investor -- proper hazardous waste management facilities need to be taken into account in expansion or new development of enterprises which generate such wastes in developing economies. Contractual obligations are usually agreed between foreign investors and host country governments. Requirements could be imposed that these investors, if their activities generate hazardous wastes, dispose of these wastes as they would in the home country. Indeed, certain large multinational chemical firms already assume such a responsibility. Thus, achieving agreement along these lines is possible. The assumption is that auditing will be included as part of the contractual obligations and that hazardous wastes are handled appropriately as in the home country. Moreover, when special treatment of waste is required, the investor might agree to provide for such treatment. Independent experts could be utilised to advise on the type and cost of such special arrangements so as to protect people and/or the environment at lowest practicable cost.

Therefore, the key issue for developing economies is how to institute some means of monitoring and control of hazardous wastes within the professional

and financial resources available. Some strengthening of control institutions will be necessary especially for 'anticipate and prevent' strategies, but this needs to be achieved with a view to the scarcity of resources that can be made available. Finally, uncontrolled sites from past practices require regular inspection and plans need to be made for remedial action to control any emissions.

Guidelines for donors

Assessment of the enterprises which are likely to generate hazardous wastes, including type and quantity, is essential to any effective management approach. This same assessment can be used to establish efforts to reduce and eventually minimise the quantity of hazardous wastes generated and to encourage recycling and reuse of those wastes. Transfer of pollution preventing technologies and the deployment of resource recovery methods could represent the highest possible return on donor investment in the field of waste management. The cost estimates of controlling and treating wastes should thus be considered during the environmental impact assessment and throughout the project evaluation.

In many developing countries, the recruitment and training of senior policy personnel is an important requisite to adequately responding to the hazardous waste problem. They are needed to determine the issues the country faces with respect to waste management and then advise on and implement appropriate policies in the context of the many other problems and priorities faced by the country. This task requires resources and funding which few developing countries are ready to assign to this priority. One possibility is to tie funding for training and engaging management personnel to the investment that gives rise to the wastes that need to be managed. Additionally, where the financing of an enterprise is assisted by bilateral or multilateral agencies, they may be asked to reinforce such a policy and facilitate training. Non-governmental organisations sponsored by industry may also be effective in providing such training.

In most cases developing countries want assistance in implementing the components of a system for hazardous waste management which includes appropriate administrative and legal provisions, technology, infrastructure and support services. A key area for donors is likely to be provision of assistance to ensure that the adequate support structure and services are available and that technologies are properly matched to manage the wastes generated. For example, upgrading of an existing cement kiln to destroy liquid wastes may be

as effective environmentally as building a special incinerator and will almost certainly cost far less.

The development and training of inspectors who can audit firms which may generate hazardous wastes would seem to be an important requirement, not only for waste management but also for reducing the possibility of mishaps involving hazardous materials. In this context, the Awareness and Preparedness for Emergencies at Local Level (APELL) Programme of UNEP could perhaps serve as a model for donors.

Agricultural activities can create hazardous wastes which are particularly difficult to monitor and control. Donors might well consider as worthy investments specialised audits and appropriate waste management approaches for the agricultural sector. In this context, wastes from the use of pesticides and fertilisers are hazardous wastes; farmers need to be able to properly and conveniently dispose these wastes at low cost to themselves. A special collection system could be of considerable value, whereby a vehicle would come to the farm to remove these and other agricultural wastes for reuse, recycling and disposal at a central site. Indeed, programmes which encourage liberal use of pesticides and fertilisers may require re-examination and restructuring in order to minimise waste generation. For example, agricultural plastic can cut dependence on chemical weed killers and then can be recycled to polyethylene resin and reused to make plastic goods. The use of integrated pest management techniques can also over time reduce hazardous waste production from agriculture.

Based on the above analysis, DAC Members agree to work towards:

- provisions in a project's Environmental Impact Assessment for the control of wastes and in the project design for cost estimates involved in avoiding, handling and treating such wastes that are produced;

- promotion of the transfer of pollution preventing technologies and the deployment of resource recovery methods and waste minimisation techniques;

- assistance to developing countries to recruit, train and engage senior policy personnel who can determine the particular issues the country faces with respect to hazardous waste management and to design implementation policies in the context of other priorities facing the country;

- assistance for the training of inspectors who can audit firms which generate hazardous wastes and also reduce the possibility of mishaps involving hazardous materials;

- assistance to ensure that the support structure and related services are available and that technologies are properly matched to the needs of waste management;

- assistance for specialised audits and design of appropriate waste management approaches for investments as well as support programmes which encourage the use of integrated pest management techniques to reduce waste production from agriculture;

- assistance to ensure that provisions are made for the application of prior informed consent procedures to reduce shipment of hazardous wastes to developing countries;

- assistance for constructing an adequate and accurate tracking and accounting system to identify the location of hazardous wastes and shipments to developing countries; and

- co-operation with relevant UN and other agencies to support regional or country workshops, training institutes and twinning arrangements.

Biodiversity

Background

The loss of biological diversity is an issue of global concern. Not only are species lost, but many of the remaining species are becoming rare or are losing parts of their genetic variability. Wild species account for most of the biodiversity on earth. Domesticated species, however, enable our agricultural systems to support the global population. Conservation efforts must therefore include both wild and domesticated organisms.

In-situ conservation is a fundamental requirement for the conservation of biological diversity while ex-situ conservation constitutes an important complementary measure. Biological diversity conservation is often thought of in terms of legal habitat protection. While protected areas are essential for the conservation of biological diversity, they are not sufficient. Because protected areas represent only 4.8 per cent of the world's land surface (the most optimistic projections place the eventual total at no more than 10 per cent), most biological diversity resources will always be found outside strictly protected areas. Efforts to maintain biological diversity in unprotected landscapes will become increasingly important as population and land-use pressures intensify and as opportunities for the creation of new protected areas diminish.

Through a rich genetic diversity, societies have more options for adapting to future economic and ecological changes. Species and ecosystems have more capacity to evolve and adapt to pests, unforeseen weather conditions and other environmental factors. Protection of biodiversity could prove essential for developing sustainable agriculture.

The problem of conserving biodiversity is, however, only one aspect of the biodiversity issue today. Through biotechnology, genes from wild and domestic species are becoming economically more valuable for agriculture, food technology, medicine and industry. Important issues arise, notably the rights to

genetic resources and agricultural or industrial products derived from these resources, as well as the interests of gene-poor economically developed countries in the North and those of gene-rich, but economically poor countries in the South.

Biodiversity is currently threatened in many ways. Considerable biodiversity exists in settled areas where the environments are modified by various forms of human land use. Hence conservation strategies should not only be directed towards nature reserves. Agriculture and plantation forestry encroach on the remaining areas of natural habitats. Urbanisation, tourism, mining, other industrial activities and pollution also contribute to the disappearance of biodiversity on land and in the sea. In industrialised countries, the major threats come from polluting industries, agriculture, sewage, motorcars, etc. In developing countries, poverty and demographic pressure on a limited resource base are frequent causes of severe environmental degradation. It is, however, not enough to combat the problems of poverty. The environmental effects of development activities and of efforts to modernise economies must be carefully analysed since activities such as energy projects, mining, logging, road constructions, industry and modernisation of agriculture also contribute to the loss of biodiversity in developing countries.

Biodiversity of current or potential value for agriculture is far wider than that currently on the farms of the world. Most traditional crop and livestock species have wild forms and a number of closely related species are extensively used in modern plant breeding. In addition a number of other species are either under incipient domestication or under examination for their potential commercial values. Moreover, with the progress of modern biotechnology, all species are potential donors of genetic materials for the improvement of crops or livestock.

The intensification of modern agriculture has led to increasing specialisation and concentration on a limited number of crop and livestock species. Breeding strategies, particularly of crops, generally tend to produce more uniform varieties and varieties successful on a short term may be adopted over vast areas replacing the wealth of domestic diversity leading to problems with long-term sustainability of agricultural system. Hence unless special conservation measures are taken, this diversity will be lost. The importance of biodiversity for food security including factors such as adaptability to pests, abnormal weather conditions and other environmental factors should be analysed.

Biodiversity can be conserved by in situ or ex situ measures. In situ conservation of biodiversity for domesticated species means conservation within an agro-ecosystem, which allows continued evolutionary adaptation in a natural way. Biomaterial conserved by ex situ measures will not continue to evolve, and the cultural dimension -- the local knowledge and management skills -- may be lost. Of special interest in view of the present problems is breeding and the potential of modern biology are the wild relatives of uncultivated species which must be conserved primarily by protecting their habitat.

For ex-situ conservation of genetic material, gene banks (seed banks) have up to now constituted the main conservation measure. Although they cannot cover all crop conservation needs, they need to be maintained and developed to cope with the progressive genetic erosion in many gene rich areas. Many developing countries do not have a national or regional gene bank; moreover, insufficient capacity constrains many of the gene banks from exploring domestic crop diversity and wild relatives of these crops within their areas or from providing adequate security for preservation.

The commercialisation of crop genetic resources in conventional plant breeding and in biotechnology raises the issue of ownership. Some gene banks are national or regional institutions under government ownership. But many gene banks are international, under the auspices of FAO or the CGIAR. Issues concerning general access to and ownership of the huge stocks of crop diversity collected by the network of international gene banks are presently under discussion in a number of international fora.

Because gene banks cannot cover all needs for conservation of crop diversity, there is a need for a policy of conservation of the resource base, complementary to the gene bank activities. Domestic species must also be maintained in situ, a difficult problem while agriculture is being intensified to meet needs of an increasing population. With in situ conservation, biodiversity is managed at the local level. The success of such management depends on the active involvement of local people, with special attention to the role women play in management and harvesting of natural resources. A relevant strategy for in situ conservation of crop genetic diversity would involve a closer look at how different forms of economic incentives are functioning in a biodiversity context. Such a strategy must also include the habitat of wild species which contribute to crop evolution. Many such areas are now threatened and need to be covered by integrated programmes of natural resource management where genetic resources must be given serious attention.

Most of the biodiversity of the world is found in the developing countries of the South. The industrial countries of the North depend on gene flows from the South for plant breeding. With commercialisation of the seed industry and the implications of patenting of genetic resources, issues relating to ownership of genetic resources have become sources of conflict. Conflicts concerning issues such as intellectual property may be aggravated by the rapidly expanding biotechnology industry. Many developing countries fear that their efforts to conserve their genetic resources will benefit new biotechnology-based industries in the North rather than their own societies. This new industrial revolution may even undermine the economy of developing countries by replacing traditional third world export commodities through the development of new biotechnological products. Much of the international debate on these issues has been focused on two main themes: intellectual property rights and ownership of genetic resources.

Genetic resources stored in international gene banks have until recently been regarded as common property. The advent of a more important market for biotechnology products and processes has given impetus to extend private property rights, in the form of patents and plant breeders rights, also to genetic material in various stages of isolation and modification. Patents have already been granted for plants in Europe and in the United States, and to animals in the United States. International harmonization of patents is now carried out in the EEC and in the GATT, and important processes linked to biodiversity/biotechnology issues are underway in the International Union for the Protection of New Varieties of Plants and the World Intellectual Property Organisation (WIPO) as well. The advent of harmonised patents may have important implications for the international gene banks.

A possible outcome of the GATT negotiations may be that all states will be obliged to honour patents granted for plants, the genetic expressions of plants or exploitation of chemical produce derived from plants. Some developing countries with limited capacity fear that such harmonised patents may impede their scope to exploit genetic resources and also hinder transfer of technologies. The question of how biodiversity is linked to biotechnology issues is a major issue of discussion between developing and industrialised countries in the preparatory process for the 1992 UN Conference on Environment and Development.

The principle of national sovereignty is raised in opposition to FAO's position that plant genetic resources are the common heritage of mankind, access to genetic resources must be given to all users and therefore states have

an obligation to safeguard the resources for the benefit of users of present and future generations.

As the above analysis suggests, strategies to conserve biodiversity have implications for economic policies within industrialised as well as developing countries. Trade policies are also affected by the controversies on intellectual property rights.

Numerous international organisations, treaties and conventions support biological diversity. In order to avoid duplication and enhance international co-operation in this field, the 14th Governing Council of UNEP adopted a decision on the desirability and possible form of an umbrella convention.

Although the new international legal instrument is still in preparation, agreement has already been reached on the following points:

- the new international legal instrument should be developed in the form of a framework convention supported by legally binding protocols on concrete issues;

- the full range of biological diversity should be addressed at the intra-species and inter-species levels, in different kinds of terrestrial and aquatic ecosystems and in all biogeographical regions, together with appropriate funding mechanisms to help developing countries address these concerns and to fulfill their convention obligations;

- co-ordination is needed between the proposed international legal instruments on biological diversity and on climate change (and an international instrument on forests); and

- the principle of refraining from action that may be harmful to biological diversity in other states should be included.

Country studies now under way in nine countries which include an inventory of financial needs, should provide useful information. Support for UNEP's programme of national country studies on the basis of UNEP's guidelines should be considered by DAC Members.

Key issues of debate concerning the proposed biodiversity convention relate to the relative importance of domesticated species, appropriate incentives

for sustainable use of resources, financing of conservation measures, technology transfer and ownership of genetic resources.

From a development perspective, a number of issues related to the biodiversity convention process are relevant:

- the extent to which activities under the Convention can be distinguished from standard development activities;
- the obligations imposed under the Convention for which developing countries will require assistance;
- the relationship of existing bilaterally and multilaterally financed activities to the funding mechanism;
- the possible role of the Global Environment Facility led by the World Bank, UNEP and UNDP in the funding mechanism;
- the elements of the funding mechanism for the Montreal Protocol that may be appropriate for a mechanism for the Biodiversity Convention;
- the relationship of the funding mechanism for the Biodiversity Convention to any funding mechanism under the proposed Forestry Convention or Agreement and the Climate Change Convention.

A considerable number of bilateral donors, UN-organisations and other bodies are providing technical and financial assistance to developing countries through specific or sectoral programmes addressing biological diversity. National and international NGOs also finance major programmes on biological diversity. A UNEP study estimates that total donor assistance to developing countries is currently at least $200 million a year for activities which have the conservation or sustainable use of biodiversity as their main aim. Expenditure on related activities which have indirect benefits for biodiversity is much greater. Nonetheless, it should be recognised that other activities supported by development assistance agencies may have impacts that reduce biodiversity.

Biodiversity is not an area to which most DAC Member countries have traditionally allocated priority within their aid programmes. Assistance from the United States, the Nordic countries, Germany, the Netherlands and the United Kingdom has, however, in different ways made significant contributions to

biodiversity conservation. Most bilateral activity appears to consist of technical assistance rather than financial aid: for example, research, training and education, surveys and inventories, protected area management and national conservation strategies.

It has been estimated that multilateral agencies, including the UN family, the international development banks and the CGIAR currently spend about $75 million a year on biodiversity related projects. The development banks have hitherto allocated only modest resources to activities which have the conservation of biological diversity as their main aim. This no doubt reflects the perceived low financial returns at a national level from biodiversity activities. Recently, however, the banks have been giving increasing attention to biological diversity issues. Biodiversity is one of the four areas identified for support under the Global Environment Facility, whose activities are being implemented through a tripartite arrangement by UNEP, UNDP and the World Bank.

UN agencies, in particular FAO, UNEP and UNDP have major biodiversity programmes. The FAO Forest Genetic Resources programme spent about $0.7 million in 1985; its Conservation of Tropical Forest Ecosystems Programme about $41.4 million in 1986; and the FAO/UNEP/UNDP Genetic Plant Materials Programme about $1 million in 1989. Within the FAO programmes, there is particular expertise on the ex situ conservation of plant genetic resources. The CGIAR, which includes 13 agricultural research centres, together with the International Board for Plant Genetic Resources (IBPGR) have major programmes on ex situ conservation, primarily through gene banks. UNDP allocated about $300 million to environmental expenditures in 1988, of which $9.4 million was for biodiversity, plant resources conservation and wildlife management. Additional environmental expenditure included assistance for forest and soil management, which is closely related to biodiversity. Among other international organisations, the International Tropical Timber Organisation and the Commonwealth Secretariat have modest funds for technical assistance for biodiversity.

Guidelines for donors

Conservation measures are not only important for biodiversity-rich areas such as rainforests. Although biological resources in arid areas or in temperate regions is smaller, these areas frequently include endemic forms which are essential for the sustainability of agriculture, animal husbandry or forestry in the region. Rural communities and especially those in more remote areas are highly

dependent upon the diversity found in their local ecosystems; the conservation of this biodiversity is of crucial importance to these local communities irrespective of its importance on a global scale. Moreover, local communities have important knowledge relating to their local eco-systems which are in danger of being lost, to the detriment of the communities themselves as well as the rest of the world.

Donors could encourage biodiversity conservation in a number of ways. Donor strategies should be established for different levels in development aid including: policy reforms, enhancing of institutional capacities in developing countries, national conservation strategies and field actions. Strengthening donor abilities to integrate conservation measures in development aid is also important.

Policy development. Programmes developed to protect and manage biodiversity must reflect the need to ensure a balance between the economic development of human communities and the conservation of threatened non-human faunas and flora. Donor activities to promote policy actions consistent with the conservation of biological diversity should include:

- Review of policies critical to biological diversity conservation, for example, land tenure, forestry, settlement, population, natural resource management, agriculture, energy, employment generation, and rural development.

- Macro-economic policy reform to maintain biological resources and biological diversity, including land use and tenure policies and economic policies which place a monetary value on biological resources as capital stock in national income accounts. The benefits of natural resource protection are difficult to quantify in cost-benefit analysis because they are often non-economic, diffuse and accrue to future generations. Inappropriate discount rates and methods applied to biological resources can lead to depletion rather than conservation.

- Realistic valuation of biological resources and biological diversity. Efforts to quantify the direct and indirect values of forest, wetlands, marine systems and the genetic diversity of agricultural species are being made in a number of developing countries and deserve donor support. In addition to assessing the value of commercially harvested products and of commercial services generated by e.g. tourism, field research can give value to game

and non-timber forest products which are consumed directly, often without passing through the market place. The indirect values of ecosystem functions, such as watershed protection, soil conservation and climate regulation are harder to quantify, but even rough estimates will be more accurate than the current de facto valuations (zero in most cases). The importance of agricultural biodiversity for food security should be given more priority and analysis. Such estimations can provide important inputs to economic policy reforms which support the conservation of biodiversity.

- To assist non-governmental natural resources organisations. Non-governmental organisations can play a key role in defining conservation policy issues that need attention and in building a constituency for conservation policies. They can be critical in advocacy, raising public awareness, research, support for and implementation of local projects and returning management responsibility to local communities.

Strengthening institutional capacities. Assistance to develop local capacity should benefit developing country environment and natural resources agencies (including those responsible for agriculture and coastal resources), universities and other training institutions, and national and local level non-governmental organisations. Donor activities might include:

- appropriate support to natural resource management agencies, research institutions and non-governmental organisations of the host country;

- effective environmental education and public awareness programmes for the general public, students and decision makers to build constituencies for implementing conservation policies and programmes;

- enhanced support for existing or new training programmes, the improvement of curricula dealing with ecological systems, natural resource management and the linkage to social and economic issues;

- support for stronger linkages between universities and both policy makers and local communities;

- support for indigenous research capacity through the development of national and regional research institutions, research collaboration with institutions in donor countries and co-operative initiatives on relevant biotechnology; and

- support for strengthening resource management capacities of local user groups.

National conservation strategies. Strategies which can increase the effectiveness of conservation activities should be developed by institutions in the developing countries with financial and technical assistance as needed from outside agencies and organisations. From the beginning the process should be open and have clear goals and participation by other sectors. Biodiversity strategies should be co-ordinated with other complementary initiatives, plans and programmes (such as the Tropical Forestry Action Programme, Conservation Strategies, Environmental Action Plans, National Reports for UNCED, etc.).

Donor activities to support such strategies might include:

- Assessment of biological resources through ecological inventories and surveys. The selection of areas for immediate action should weigh three factors: biological distinctiveness, gravity of existing and potential threats and the extent of opportunities for conservation in light of social, economic and institutional factors.

- Information exchange centres with data on species distributions, natural habitats, human land-use and cultural characteristics of populations. Whether independent institutions or associated with universities or government agencies, such centres must be directly linked to the policy making process and widely accessible.

- Donor communication and co-ordination on assistance for the implementation of such strategies.

Field actions. Donor activities to support field actions to conserve biological diversity might include:

- Establishment and management of park and conservation areas; action in the next 5 to 10 years is crucial to protect currently unprotected remnants of distinctive and unique habitats. Special attention should be given to coastal and marine ecosystems which

have received relatively little protection in most countries. Establishing protected areas requires not only allocating land, but also donor support for the legal, governmental and financing necessary to make them fully operational and to maintain them.

- Buffer zone management and ecological restoration with due attention to physical, social and economic relationships with the surrounding regions and involvement by local residents and outside organisations. Several factors which are critical to the long-term viability of the project must be be addressed during the planning process: land tenure and traditional land rights, population dynamics, social and cultural elements, and economic benefits to local communities. Associating ecological restoration requirements with the economic needs of residents in buffer zones may be the only way to fully protect the biological diversity in the core protected areas. This cannot be assured unless the local communities participate effectively in the design and implementation of such programmes and projects.

- Management of resources for the sustainable use of biological diversity resources to provide direct economic benefits for local communities and resource users. The recognition of local rights to non-timber forest products and traditional fishing areas, together with marketing and credit programmes, can provide the basis for sustainable management and increased incomes.

- Genetic resource conservation for agriculture, forestry and fisheries to reduce the risks of crop failure and to develop new varieties adapted to specific environmental conditions. Maintenance of wild or domesticated plant and animal genetic material in the wild or within agroecological systems (in situ) or in gardens, orchards, seed collections and laboratories (ex situ) are both essential strategies for managing the basic genetic stock. In forestry the use or reliance on exotic species for monocultures and the potential silvicultural value of indigenous tree species should be more systematically analysed.

- Support for seed banks as a supplement, not as an alternative to in situ conservation.

- Support for inventories of national biotas and systematic research in the tropics. Fewer than two million of the world's species have

been identified, out of an estimated number of species between 30 to 50 million.

- Applied conservation research: social, economic and biological. Of particular urgency are field studies that illuminate the ecological processes of tropical forest, coastal wetland and marine systems to determine trends in biological productivity, degree of resilience to disruption by human activities, and current as well as potential economic and social values. Socio-economic research at the field level is also needed to document how biological resources contribute to the food, health and livelihoods of rural people and traditional systems of resource management. Socio-political research at the field level is needed to document how certain policies affect both introduced and indigenous management systems.

- Population planning services as critical steps toward the long term maintenance of biological diversity.

Enhancing donor capacity. Donor agencies should also strengthen their own abilities to assess conservation needs and devise effective strategies that will integrate the maintenance of biological diversity in planning and development goals. Steps in this direction might include:

- dedicated funding for activities related to biological diversity as a means to reduce initial competition with other priorities;

- specific guidelines for an environmental assessment of project impacts on biological diversity (which could be included as part of the DAC series on guidelines for aid agencies);

- innovative financing, e.g. debt-for-nature swaps, endowments, bonds and leveraging mechanisms to provide long term, stable assistance to conservation programmes and institutions, particularly non-governmental organisations, while addressing the recovery of recurrent costs;

- strategy statements on biological diversity conservation which can serve as a reference point in determining agency policies, regional strategies, country strategies and requirements for environmental impact assessment;

- increased expertise in environmental sciences and natural resources conservation within donor agencies through recruitment of conservation specialists and policy analysts as well as by training of staff;

- mechanisms to provide environmental projects with continuity and long-term horizons by focusing on strategic programmes rather than isolated projects for the conservation of biological diversity;

- integration of the maintenance of biological diversity in agriculture, forestry, coastal resources and other sectoral programmes including rural development, energy, education and private enterprise development. Advisory committees, sector reviews, or other mechanisms can help identify conservation problems and opportunities in development assistance programmes.

DAC Members agree to encourage biodiversity conservation through policy reform, strengthening of indigenous institutional capacities and national conservation strategies. On the basis of the above analysis, DAC Members agree to assist developing countries through:

- review of policies -- including sectoral policies -- critical to biological diversity conservation;

- macro-economic policy reform to maintain biological resources;

- efforts to establish realistic valuation of biological resources and biological diversity, including indirect values of ecosystem functions;

- strengthened institutional capabilities of environment and natural resource agencies, universities, training institutions and non-governmental organisations;

- strengthened participation of local user groups and their organisations in the planning and implementation of bio-diversity conservation programmes;

- assessment of biological resources through ecological inventories and surveys, identification of areas for immediate attention based on biological distinctiveness, gravity of threats and opportunities

for conservation based on social, economic and institutional factors; and

- information centres that are directly linked to the policy making process.

DAC Members will endeavour to support field actions through:

- support for the establishment and management of protected areas;
- support for improved buffer zone management and ecological restoration;
- support for better management of sustainable yields of biological resources (such as non-timber forest products and tourism) for direct economic benefits to the communities;
- support for the conservation of genetic resources in agriculture, forestry and fisheries by in-situ as well as ex-situ measures;
- support for seed banks, inventories, applied socio-economic research; and
- support for population and planning services integrated with conservation programmes for natural resources.

DAC Members also agree to strengthen their own abilities to assess conservation needs and devise strategies for the maintenance of biological diversity in their development goals through:

- donor strategy statements on biological diversity conservation;
- funding for activities related to biological diversity;
- assessment of development projects for impacts on biological diversity;
- innovative financing opportunities for conservation;
- increased aid agency expertise in environmental sciences and natural resource conservation;

- mechanisms to provide continuity for environmental programmes with long-term horizons; and

- integration of biological diversity in development assisted sectoral programmes relating to agriculture, forestry and coastal resources as well as other relevant sectors through advisory committees, sector reviews and environmental impact assessments.

ANNEX

LIST OF ACRONYMS

APELL	Awareness and Preparedness for Emergencies at Local Level (UNEP Programme)
ASEAN	Association for South-East Asian Nations
CFC	Chlorofluorocarbons
CGIAR	Consultative Group on International Agricultural Research
CZMS	Coastal Zone Management Subgroup
DAC	Development Assistance Committee
ECE	Economic Commission for Europe
EEC	European Economic Community
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organisation of the United Nations
GATT	General Assembly on Tariffs and Trade
HCFC	Hydro-chlorofluorocarbons
IBPGR	International Board for Plant Genetic Resources
ILC	Iternational Law Commission
INC	International Negotiating Committee on a Framework Convention on Climate Change
IPCC	Intergovernmental Panel on Climate Change
ITTO	International Tropical Timber Organisation
IUCN	World Conservation Union
IUFRO	International Union of Forest Research Organisations
NGO	Non-governmental organisation
ODA	United Kingdom Overseas Development Administration
ODS	Ozone depleting substances
OECD	Organisation for Economic Co-operation and Development
TFAP	Tropical Forestry Action Programme
TSD	Treatment, storage and disposal
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNGA	United Nations General Assembly

USEPA	United States Environment Protection Agency
WIPO	World Intellectual Property Organisation
WHO	World Health Organisation
WMO	World Meteorological Organisation
WRI	World Resources Institute