
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.*

In 1993, the DAC adopted the *Guidelines No 5 on Chemicals Management*, and in 1994 the *Guidelines No 6 on Pest and Pesticide Management*, and the *Guidelines No 7 on Disaster Mitigation*. 1995 saw the adoption of *Guidelines No 9 on Improved Conservation and Sustainable Use of Tropical and Sub-Tropical Wetlands*.

This volume, on *Global and Regional Aspects of the Development and Protection of the Marine and Coastal Environment*, is eighth in the series. It provides an overview of major issues relating to the state of the marine and coastal environment, and sets out various approaches for its protection, including institutional, managerial, economic and scientific approaches. The roles played by public awareness and international co-operation are also discussed. In addition, the Guidelines offer advice for aid agencies for priority activities for technical and financial assistance for a better integration of marine concerns in environment protection and development activities. Annexed are a checklist for environmental impact assessments of projects affecting the marine and coastal environment, a list of relevant international agreements, and other pertinent reference material.

The Guidelines are only one aspect of the DAC activities which bear on sustainable development. Current activities include work on capacity development in the field of environment; environmental assessment; technology co-operation; trade, environment and development co-operation; and national planning for sustainable development.

Contents

I.	Introduction	7
II.	The state of the marine and coastal environment	8
	The resources	8
	Open oceans	8
	Coastal zones	9
	Biological resources	10
	The threats	10
	Pollution	10
	Degradable waste	11
	Toxic wastes	11
	Other miscellaneous wastes	12
	Climate change and ozone layer depletion	12
	Habitat destruction	13
	Other threats	13
	Institutional and policy context	13
	Economic issues	13
	Science and technology	14
	Institutions and manpower	14
	Public awareness	14
	Conclusions	14
III.	Approaches to the protection of the coastal and marine environment	15
	Introduction	15
	Increasing public awareness	15
	Management approaches (including integrated coastal zone management)	16
	Institutional approaches	18
	Economic and fiscal approaches	18
	Technical and scientific approaches	20
	Legal approaches	20
	International co-operation	21

IV. Recommendations for activities of aid agencies	22
Introduction	22
Considerations for a better integration of marine concerns in development activities and environment protection	23
Technical details relevant to the considerations	23
Recommendations for activities for technical and financial assistance	24
Priority activities in coastal areas	24
Technical details relevant to the recommendations	25
Priority activities in inland areas	26
Technical details relevant to the recommendations	26
Priority activities for marine areas	27
Technical details relevant to the recommendations	27
Areas requiring priority funding to assist future aid projects	29
Notes	31
Annex 1: Pollution from land-based sources	32
Annex 2: Possible impact of climate change and ozone layer depletion	36
Annex 3: List of the most important international agreements relevant to the protection of the marine and coastal environment and their resources	39
OECD Council Recommendations	39
Global agreements	41
Regional agreements	43
Annex 4: The regional seas programme	45
The Mediterranean Action Plan	47
The Black Sea Programme	50
Annex 5: Advisory checklist for preparation of environmental impact assessment reports for projects affecting the marine and coastal environment	51
I. Existing environment and site selection considerations	51
II Site preparation and construction	52
III. Project operation	52
IV. Mitigation and monitoring measures	52
Annex 6: Recent examples of major projects relating to the protection of the marine environment	53

GUIDELINES FOR AID AGENCIES ON GLOBAL AND REGIONAL ASPECTS OF THE DEVELOPMENT AND PROTECTION OF THE MARINE AND COASTAL ENVIRONMENT

I. Introduction

As in the past, the oceans play a decisive role in maintaining life on this planet by sustaining energy flows, gas exchange and biogeochemical processes. The damage to many terrestrial ecosystems that also perform some of these functions has increased the value of ocean ecosystems. Despite their size oceans remain intimately linked with terrestrial environments and the atmosphere. This interdependence is most evident in coastal and near-shore areas, particularly in enclosed and semi-enclosed areas, as well as around islands.

Throughout history, coastal areas (often referred to as the coastal zone) have offered advantages for settlement and travel. Sixty percent of the world's population lives within 60 km of coastal waters, with a projected duplication within the next 20 to 30 years. Associated with settlements are major infrastructure, industrial and recreational facilities. The coastal zone contains commercially exploitable resources, with about 95 per cent of world fisheries catch (about 80 million tons) coming from near-shore waters. Relatively new activities, such as tourism and mariculture, are expanding fast. The cumulative effect of development has been an ever-increasing rate of environmental degradation.

Currently, only a small amount of world food supply comes from the oceans. Nevertheless, some coastal nations rely heavily upon the sea for food. For some fisheries current harvests already exceed sustainable levels.

Apart from hydrocarbons and desalinated water only a few minerals and chemicals are extracted from the oceans in significant amounts. Nevertheless, the potential economic value of the oceans is enormous and they offer significant future source of energy and minerals. This potential has been recognised in recent years. For example, the resources under about 35 per cent of the ocean's surface have been incorporated into the jurisdiction of coastal states. The resources of these "Exclusive Economic Zones" are considerable and may, if properly managed, become a significant driving force in the economic development of many coastal states.

The scale of the problems affecting the marine and coastal environment has altered in recent times, but their nature has remained constant. Perceptions of the main threats and corresponding solutions have become more refined as knowledge has increased. The current major environmental problems of the oceans and coastal areas include:

- widespread degradation of coastal zones, including physical damage to ecosystems, from various human activities (e.g. coastal construction, land reclamation);
- pollution¹ of coastal waters and semi-enclosed seas by wastes from land- and sea-based sources;
- widespread depletion of living resources, particularly coastal fisheries, through commercial over-exploitation and damaging fishing practices, and through the degradation of coastal ecosystems;
- increasing movement to coastal areas, thus increasing pressure on existing resources;
- major accidents (natural disasters or man-made ones) occurring inland, in coastal or marine areas that could or do lead to significant environmental damages.

Solutions to these problems lie in the resolution of conflicting interests for space and resources within a framework of environmentally sound economic development.

The first aim of these guidelines is to present a summary of major issues relating to the state of the marine and coastal environment, and to identify institutional and other approaches for its protection. The second aim is to suggest activities which aid agencies can support to achieve this objective.

II. The state of the marine and coastal environment

The resources

This section provides a summary of the state of marine and coastal environment and the major threats. Annexes 1 and 2 provide additional details on two specific threats, pollution from land-based sources and climate change and ozone layer depletion. Due to the significance of coastal zones for human activities, particular attention is paid to these areas.

Open oceans

With the exception of damage to some fisheries resources and large marine mammals, the open oceans remain largely undamaged by man's activities. Nevertheless, pollutants, particularly airborne pollutants such as polycyclic aromatic hydrocarbons are accumulating in oceanic surface waters, and concentrations similar to those occurring in coastal waters have been found.

Ocean areas have been used for the disposal of certain types of waste (e.g. spent nuclear fuels and the incineration of hazardous chemicals such as polychlorinated biphenyls). Although the oceans are vast, and their waste-receiving capacity is today recognised as an asset, their ability to assimilate wastes ad infinitum cannot be assured. Caution should therefore be applied when considering ocean disposal of wastes.

Currently, ocean dumping of waste and discharge of pollutants from ships seems to be under adequate control (Annex 3). Compliance varies from country to country, but is considered to be relatively good. Overall, the threat to open oceans from extensive pollution is today considered, by some experts, to be less acute than was presumed two decades ago. Although progress is being achieved in reducing pollutants to the marine environment, more work is required. Other activities, such as sea-bed exploration and exploitation may also become a problem if they are undertaken on an increasingly larger scale.

Coastal zones²

Coastal zones include a variety of ecosystems influenced by both terrestrial and open ocean processes. For example, sediments derived from land provide the basis for the natural productivity of many estuaries. Similarly, up-wellings from the deep ocean provide nutrients for important coastal fisheries. Coastal zones therefore represent the dynamic interface between the land and the sea. Many coastal zones contain significant wetlands. Further information about wetland conservation can be found in OECD/DAC Guidelines No. 9. *Guidelines for Conservation and Sustainable Use of Tropical and Sub-Tropical Wetlands*, OECD, Paris 1996.

While some coastal zones are in a pristine state, many are increasingly stressed by human activities. Coastal waters, lagoons and estuaries which only decades ago were rich with wildlife and were a source of pleasure and food, have now been harmed by coastal development and pollution. Today, these areas are aesthetically degraded, are characterised by an impoverished flora and fauna, and may be a health hazard. This is a global problem affecting temperate, tropical and even polar zones. Important ecosystems such as mangroves, coral reefs and seagrass beds are under threat as a result of ill-conceived development schemes, over-exploitation, pollution, siltation, land reclamation, and heavy tourism.

These impacts are most evident near existing centres of human activity and areas of effluent discharge from major river basins. There is evidence that the physical and ecological degradation of these areas is accelerating at an alarming pace as a result of the increasing pollution of near-shore waters from land-based sources (Annex 1). These problems are exacerbated by the extent of human settlement in the coastal zone, which is now widespread. Protecting and managing the coastal and near-shore areas and their living resources, especially in the more vulnerable enclosed and semi-enclosed seas, is an urgent task, with particular attention being paid to resources which exhibit low resilience to stress (e.g. species exhibiting slow growth rates and/or rates of reproduction).

Biological resources

The over-exploitation of continental shelf fisheries, both demersal and pelagic³, is now widespread and many previously important fisheries have become uneconomic. The collapse of the anchovy and herring industries are examples of the results of over-exploitation, caused by the growing world need for protein and improved harvest technology. Where fish resources can be found, also the open ocean is endangered. A special problem accompanying modern harvest technology is the additional killing of animals like dolphins, turtles, and by-catches of non-target fish species, birds, cetaceans and seals. Disturbance from human activities, e.g. leisure activities, leaves limited space where seals, turtles and birds can haul out and breed. Translocation of animals and birds, and migrations caused by the depletion of food resources can cause spread of diseases and cause epidemics among free-living populations. Collapse of fisheries will lead to socio-economic impacts (reduction in income, migration, change in resource exploitation patterns) which may need alleviation through food aid delivery. Also, these socio-economic changes can lead to additional environmental damage as exploitative pressure shifts to other resources and other coastal localities. This damage is often difficult to predict and may, for example, result in changes to biological communities, food chains and levels of natural predation.

The threats

Pollution

The release of wastes from land-based sources into coastal water is an attractive disposal option due to its simplicity and low costs (often in the short term only). Longer-term costs from rehabilitation and loss of living resources may, in fact, be high. When the total amount of wastes was relatively small, and their components easily degradable, such practices posed little threat. In recent decades with a growing population, however, the volume and variety of discharges has increased, especially the input from inland agricultural and industrial sources which are transported by air and rivers to marine and coastal areas, where unwanted aquatic organisms are a visible result. In particular, toxic and non-degradable substances poses threats to wildlife and mankind through their wider dispersal, longevity and bio-accumulation⁴.

Most types of wastes, once introduced into the sea, cannot be removed. Their fate is determined by their chemical nature (e.g. discharges of ballast water) and by the physical transport processes of the receiving waters and rates of decomposition. Non-degradable wastes such as plastics and persistent synthetic chemicals remain in the oceans for many years and are often transported over considerable distances.

Although pollution from land-based sources is ubiquitous and assuming global dimensions, the transboundary effects of this pollution are, at present, generally less severe than is perceived by non-experts. In enclosed or semi-enclosed seas bordered by a large number of countries, transboundary consequences may be significant, like in the Baltic Sea. In global terms, with the

exception of substances whose decay is extremely slow and of discharges from sites in the vicinity of state borders, most pollutants remain, at present, within the coastal waters of the countries from which they have originated. Alternatively they degrade and dilute to insignificant concentrations before reaching neighbouring countries. Future transboundary effects cannot, however, be ruled out if current trends in discharges continue.

It is convenient to consider negative impacts under the following categories:

- degradable wastes of natural origin, such as sewage and food processing effluents;
- toxic wastes and products including pesticides, polychlorinated biphenyls, metals, oil and petroleum compounds;
- other miscellaneous wastes such as heated effluents from power stations and discarded plastics and litter;
- climate change and ozone layer depletion;
- habitat destruction.

Degradable waste

Organic wastes are reduced relatively rapidly through bio-degradation. Their end products may cause, however, disturbances of ecosystems (e.g. low dissolved oxygen levels and eutrophication due to an excess of nutrients) if they are present in excessive quantities. These effects can be reduced by limiting input into receiving waters. Toxic materials are often present in sewage as a result of industrial discharges into public sewerage systems, so simple dilution cannot always render waste harmless. Associated with some wastes (especially sewage) are health risks, for example, viral and bacterial infections.

The exploitation and transport of oil, gas and their derivatives have resulted in a number of catastrophic accidents (e.g. the Exxon Valdez). These have caused impacts up to regional magnitude and international concern. With measures and enforcement aiming at improved safety of navigation, with improved design of ships, with restrictions on navigation in sensitive areas, and with the formulation and adequate implementation of contingency and emergency plans, the number of accidents and their environmental impact could be reduced.

Of continuing concern is the illegal practice of washing out oil tankers at sea, as well as oil pollution from standard vessel operations and from land-based sources. For example, the frequent release of used lubricating oils into the coastal environment is a problem because they contain a variety of highly toxic non-degradable chemicals.

Toxic wastes

Metals are of natural origin, but are concentrated in mining and associated industrial processes. Some metals are toxic to marine organisms, sometimes at very

low concentrations. Metals can not be degraded and most metals entering the ocean usually remain fixed to bottom sediments, relatively close to the point of discharge. These sediments release metals and metal bearing compounds into the water column where they can enter the food chain. In addition some metals, such as lead, zinc, arsenic and cadmium, are distributed widely in the marine and coastal environment through atmospheric transport (see also Annex 1).

Other wastes, including some toxic synthetic substances, such as polychlorinated biphenyls and some of the most effective anti-fouling paints (e.g. Tri-Butyl Tin - TBT) are dangerous contaminants due to their high toxicity and extremely slow breakdown. Other synthetic substances, including many modern pesticides, are rapidly broken down, but may, however, be highly toxic during their short residence period (days or weeks), and little is known about the toxicity or persistence of the break-down products. Certain very persistent compounds have been found in the tissues of animals far from the point of origin. For example, the pesticide DDT has been recorded in penguins of Antarctica. The recovery of ecological systems damaged by toxic wastes is a slow process and cannot be remedied quickly by reducing the amounts entering the systems.

Man and other animals at or near the top of the food chain are particularly at risk from bio-accumulation. The classic example of the effects of this form of pollution occurred at Minamata in Japan, where methyl mercury from industrial effluents affected local communities and resulted in a disorder of the central nervous system of local people who regularly ate fish containing very high concentrations of methyl mercury.

Other miscellaneous wastes

Localised pollution results from heated cooling waters discharged from power stations and other facilities. Depending on the temperature differentials, there may be a reduction in biodiversity as species intolerant of the higher temperatures die or move away to be replaced by populations of species which can survive in the “hotter” water. The problems caused by marine litter (e.g. discarded or lost nylon fishing nets and plastic containers) are increasing. It has been recorded from all the oceans and is present on the coasts of remote and uninhabited areas. Deaths of marine animals from entanglement and ingestion of discarded plastics has occurred and economic activities affected.

Climate change and ozone layer depletion

The impact of climate changes will exacerbate problems in coastal zones through inundation of low lying areas, storm damage and destruction of coastal habitats. Large scale changes in total marine fisheries production are not expected, although individual stocks may suffer. The growth of temperature-dependent organisms may be adversely affected. Impacts to global CO₂ balance between the oceans and atmosphere may also be apparent.

Current abilities to predict regional and local climate changes with any degree of certainty are inadequate. It is therefore imperative that more accurate predictions of local climate and sea level changes are developed if uncertainties concerning the magnitude and rate of their potential impacts on sensitive and valuable habitats/areas (e.g. coral reefs, mangroves, sea-grassbeds and inter-tidal mud flats) are to be reduced.

Marine algae especially will be destroyed with ongoing ozone layer depletion. They are the beginning of a food chain, that includes fish and also man. Reduced fish catches would pose nutrition problems to many countries. Also the function of the sea as a global CO₂-sink will be reduced. According to results of scientific research, the effects of the ozone layer depletion on the marine biology are of presently unpredictable magnitude.

Habitat destruction

Physical disturbance and destruction of habitats is increasingly evident in the coastal zone. It arises from a variety of activities including dredging and spoil dumping, inappropriate fishing activities and, perhaps most importantly, from coastal development projects. Indirect impacts can result from increased turbidity and siltation causing changes to sensitive habitats (e.g. corals). Problems are exacerbated when dredge spoil is contaminated with toxic compounds.

Destructive fishing activities include dredging for shellfish and dynamite fishing. Locally significant damage to coral reefs is caused by direct coral harvesting for building materials and souvenirs.

Other threats

The introduction of harmful non-indigenous aquatic species transferred with ballast water of ships has in many regions all over the world shown to pose significant threats to ecosystems, resulted in the collapse of fisheries and damage to aquaculture causing tremendous economic losses, as well as in the reduction of marine biodiversity.

Institutional and policy context

Economic issues

Oceans and coastal areas still tend to be considered as exploitable areas with limitless capacity to provide resources and accept wastes. Therefore, relatively low priority is assigned to the protection of these areas or to their rational use. In the long term, the damage to marine and coastal resources results in reduced capacities for economic development, particularly in poor countries. Specific reference has to be made to the fact that the open ocean is not exploited to any measure by the majority of developing countries.

The relatively low level of financial resources targeted at management of the marine environment is a serious issue, but is not the fundamental reason underlying the current problems. Existing priorities, for the allocation of available resources for development, still reflect economic policies (overuse of natural resources due to inadequate pricing policy for water use and pollution abatement) and accounting formulas which do not incorporate adequate environmental protection measures or the “true” cost of environmental damage, particularly to marine/coastal areas.

To some extent, the Global Environmental Facility (GEF) can help. Within GEF, Global Environmental Trust Funds are relevant because the funds assist low- and middle-income countries with investments and technical assistance in four focal areas, three of them directly related to the protection of the marine and coastal environment (international waters, biodiversity and global warming).

Science and technology

Technological solutions to reduce or eliminate pollution and to deal with other problems are generally well understood and are available to those who can afford them. Opportunities to implement this knowledge are, however, frequently missed, due to the lack of adequate integrated coastal zone planning and management, inadequate international and national legislation and weak enforcement, sometimes also due to the lack of financial resources.

Although poor management rather than the limitations of science and technology is one of the main reasons for ineffective control, this problem stems partly from the failure to present, effectively, the findings of scientific studies. In addition, the uncertainty associated with some scientific information has been used as a rationalisation for not taking preventive action. In the absence of scientific proof, damaging activities have been, and still may be, allowed to proceed.

Institutions and manpower

The capabilities of many countries are insufficient to cope with the problems facing marine and coastal environments and their management. Weak institutional structures and limited manpower capabilities including training opportunities are the main problems. These are compounded by the prevailing sectoral approach to environmental management and often by the lack of effective co-operation between public and private sectors (including non-governmental environmental groups) in planning and implementing environmental protection measures.

Public awareness

Public understanding of the problems facing the marine and coastal environment is still limited in many countries. There are, however, increasing efforts to mobilise support through campaigns and education programmes, many of which are being promoted by non-governmental organisations.

Conclusions

Human use of the oceans and coastal areas has resulted in significant threats to living resources. Limited time is available for remedial action.

Four main factors, none of them specific to the marine and coastal environment, seem to be at the core of current environmental problems:

- the failure of national and international economic policies and forms of development to adequately address the environmental consequences of these policies;
- weak regulatory mechanisms and administrative systems dealing with environmental issues;
- insufficient public awareness about the real causes and magnitude of environmental problems and the consequences of not dealing with them; and
- inadequate forecasting for some emerging environmental problems.

One of the main obstacles to success is the view that measures needed to achieve these objectives are economically, politically and socially too costly, impractical or unrealistic.

III. Approaches to the protection of the coastal and marine environment

Introduction

Exploitation of non-renewable coastal and marine resources cannot continue indefinitely. Their use should provide the basis for activities that will ensure or contribute to long-term, sustainable human and environmental well-being⁵. Further those activities will help ensure that social disruption is minimised or, indeed, absent when the resource is exhausted, or can no longer be used in an environmentally acceptable way. A variety of obstacles, must be overcome in order to achieve its effective protection. Some of the most common approaches to deal with them are reviewed below.

Increasing public awareness

Political commitments and actions occur, usually, when there is social acceptance of the need for them. Public awareness plays a key role in reaching a social consensus for political action. Only concerned and well-informed citizens can assess the short- and long-term benefits/disadvantages of environmental protection measures, especially where implementation of such measures involve solutions and financial burdens which may, at first sight, appear onerous.

Information provided to the general public and the media should be factually correct and presented in an understandable form. The causes and magnitude of environmental problems, of associated health risks, and of economic benefits from

planned environmental protection measures should be presented in a balanced way. When combined with extended and improved public education programmes, this will help to stimulate public participation in the implementation of preventive and/or improvement measures.

Public participation requires education and public awareness programmes, including the introduction of environmental subjects at all levels of school curricula, as well as the use of mass media and publicity campaigns. These should emphasize the importance of individual contributions in maintaining a sustainable environment. The freedom to comment freely on the implications of development are still limited in many countries. Such attitudes to public information, provision and debate are harmful and should be considered counter-productive.

Management approaches (including integrated coastal zone management)

The application of environmentally sound management practices (i.e. sustainable management) is now accepted as the key to environmental protection. Appropriate management controls the changes imposed by human activities and, hopefully, prevents the ultimate degradation of ecosystems. Unplanned or poorly planned and managed land and sea-use practices, the non-regulated exploitation of natural resources, and associated pollution can only be avoided by this means.

Integrated coastal zone and, where appropriate, watershed management, is one of most effective approaches to the protection of the marine and coastal environment. Other very important mechanisms deal with long-range transport of air pollutants and the introduction and enforcement of environmentally sensitive practices in maritime transport and fishing practices. Furthermore, it is now recognised that an anticipatory rather than a reactive approach is necessary to protect the marine and coastal environment from further degradation and foreseeable threats.

Although the effects of predicted climate changes and ozone layer depletion (see Annex 2) may not be felt in the near future, in the medium to long term their implications for the socio-economic development of coastal zones may firstly be particularly serious for low-lying countries and small islands.

Actions to deal with these effects should be pursued in a phased and flexible manner, on the basis of medium- and long-term goals and strategies, taking advantage of scientific advances and technological developments. As uncertainties over climate change are still significant, action plans and related measures need to be able to cope with new data and “surprise” events so that they can be adapted, quickly, to deal with possible rapid changes. This requires an appropriate technical and institutional framework. Whenever possible, such measures should have “add-on” economic and social benefits.

The sectoral approach to problem-solving will maintain its importance in dealing with specific issues, but it should be supplemented by an integrated and holistic approach, which does not isolate environmental problems from the full complexity of underlying social and economic issues. For example, formulation,

adoption and enforcement of pollution and resource exploitation control measures⁶, including measures designed to protect and rehabilitate damaged ecosystems and living resources, are among effective management approaches.

Below emphasis will be placed on the role of integrated coastal zone management in achieving the sustainable use of the marine/coastal environment. This activity has great potential as a supplement to existing measures. Sectoral solutions to specific problems in the coastal zone may cause unintended environmental consequences. If they were formulated and implemented in the context of a coastal zone management plan then adverse effects might be avoided.

Coastal zone planning or management should be based on specific problems, best available scientific data, appropriate institutional structures/functions, the precautionary principle and perhaps most importantly, the wishes and views of local communities. From a technical viewpoint, it should include the classification of coastal waters according to their biodiversity and intended use ("sea-use"). Common regional environmental quality criteria (e.g. standards) should be agreed for coastal waters of the same intended use (e.g. swimming, aquaculture) and similar biotic characteristics. Emission standards and pollution load quotas, specific for individual emitters, should ideally be derived from environmental quality criteria by assessing the cumulative and, when appropriate, synergistic effects of pollutants. It is essential to take into account the estimated capacity of the receiving environment to absorb the wastes from all sources without unacceptable alteration of its quality. These criteria should not be exceeded and, whenever possible, pollutant emissions should be reduced below the allowable limits. Ideally, these criteria should be viewed not as an end but as a starting point. Pollution reduction through the implementation of cleaner technologies should always be pursued, whether or not specific water quality standards have been met.

In the past only limited attention was paid to the environmental consequences of coastal development and resource utilisation. With increasing pressure on these assets, the disadvantages of this approach have become obvious and appropriate predictive tools and processes such as Environmental Impact Assessment (EIA) have been introduced. EIA is an example of the precautionary approach and is a mechanism by which the possible environmental (including social, economic and health) effects of a proposed development can be identified and evaluated systematically and comprehensively. EIA can be applied to individual projects, or "strategic" initiatives such as regional development plans and sectoral programmes such as off-shore licensing programmes for hydrocarbon exploration and exploitation. Its aim is to provide information on likely environmental effects so that planners and decision-makers are fully aware of the implications of development proposals. The use of EIA in decision-making is increasingly widespread and forms a component of many bilateral and multilateral aid activities. An advisory checklist to assist preparation of EIA reports in the coastal/marine environment is presented in Annex 5.

A number of land- and sea-based activities which, in principle, do not affect the marine environment if carried out correctly, must be taken into account in designing management plans. Some of the most important include:

- operation of port reception facilities;
- decommissioning of coastal oil production platforms;
- clean-up operations after maritime and coastal accidents, including harbour accidents;
- maritime and terrestrial transport of hazardous waste;
- dredging for mineral resources (e.g. sand) and for clearing/improving ports and waterways;
- aquaculture;
- incineration of waste;
- manipulation of hydrological cycles (e.g. construction of dams, irrigation and drainage systems);
- land-use activities in adjacent hydrological catchments that increase silt and/or pollution burdens;
- sewage treatment/discharge and storm overflow from sewage systems.

Institutional approaches

The effectiveness of national institutions in charge of environmental protection in many countries remains limited. In particular, their resources are often small with marginal influence on preparation of national development plans and development-related decision-making. The failure to create effective national infrastructures equipped with interdisciplinary expertise and adequate resources is a major constraint in marine and coastal environmental management.

Sustainable management of the oceans and coastal areas requires a variety of expertise and, above all, a good understanding of the cross-sectoral nature of environmental issues. While narrow, sectoral technical expertise exists in most countries, greater efforts should be devoted to training experts in interdisciplinary skills. This requirement for more training of interdisciplinary experts is certainly highlighted whenever developing countries have to respond to significant marine pollution incidents.

Economic and fiscal approaches

A clean and healthy marine and coastal environment is an economic asset, for example, through tourism and fisheries and its use should not be allowed without cost. To safeguard the sustainable use of resources requires careful and, frequently, costly management. Although there is no adequate or universally applicable method for the comparison of the benefits and costs associated with the maintenance of a clean environment, the costs for such management seem, in most cases, to be below the total benefits derived from a clean environment.

Environmental management costs could be met through a combination of financial sources and economic and fiscal measures, for example, by use of “user

fees”. At present where such fees are levied, they are frequently symbolic and fail to reflect the real costs involved.

One approach is a levy on individuals/organisations for discharging effluents. Dischargers should be charged a realistic user fee. Alternatively, authorisation for discharge may be issued in the form of tradable permits, as this would stimulate reduction and recycling of waste, and application of non- or less-polluting technologies. However, tradable permits do not take into account the location of the permitted source since in trading that varies and discharges from one location could be more harmful than those from another site.

In addition, a charge could be levied on people/organisations moving certain residential, commercial or industrial activities to the coastal zone. All charges would contribute toward the cost of environmental management. Of course, some development would need to be prohibited outright as their impacts would be unacceptable.

Certain specific user fees are already collected. Tourist taxes are included in hotel and restaurant bills, and nautical taxes are collected from pleasure boats. To date, however, only a small fraction is set aside for environmental management. This approach could be expanded to the fees and taxes collected from the users of non-renewable, finite or scarce natural resources. For example, the imposition of a user fee on oil tankers and the like for the free use of the oceans as a transport facility may merit further consideration. The fee should then be used for oil monitoring and control of potentially polluting ships. Restructuring of ship charges, re: port fees, reception facilities, adequate salvage capacity, training, emergency preparedness and response, are all being examined by the Members of the International Maritime Organisation (IMO).

Fines for violating pollution control measures or other management prescriptions (e.g. unauthorised constructions and land reclamation in coastal zones) are deterrents, but are less well known as mechanisms for financing the maintenance of environmental quality. Frequently after the payment of legal fees and administrative costs, to collect these penalties, nothing is left for environmental protection. A major constraint on this approach is that the penalties are unrealistic compared to potential financial gains. Thus, there is no incentive for the potential offender to apply measures to avoid violations.

Pricing policies and practices can make an important contribution to environmental protection. Subsidies on the price of goods (e.g. fresh water, fertilisers, pesticides) which ultimately appear as, or lead to, increased pollution, provide little incentive to refrain from their excessive use. An alternative approach would be to make the unit price of products dependent on the volume used. This would help reduce the volume of waste generated by stimulating more efficient use, re-use or recycling.

Much may be achieved by providing incentives for those who “behave better than expected”. For instance, establishments which:

- re-use or recycle their waste (e.g. treated effluent waters);
- install pollution control devices which provide a higher degree of waste treatment than the minimum prescribed; or

- reduce the total amount of their wastes below the amounts authorised by permits;

could benefit from subsidies and other tax incentive arrangements, shortened depreciation periods for pollutant control devices, and favourable interest loan programmes for anti-pollution investments.

User fees, charges for violating pollution control measures, pricing policies, fiscal incentives and taxes, have a major advantage over other fiscal and economic measures. They are automatic mechanisms which, when combined with appropriate institutional and regulatory arrangements, provide an effective vehicle for financing environmental protection.

Although relatively modest in size the special funds set up to control marine pollution, such as the trust funds established for the regions covered by the United Nations Environment Programme (UNEP) Regional Seas Programme (see Annex 4), are of great value because they provide the necessary financial back-up for the co-ordination of regional protection mechanisms. Furthermore, these funds play a catalytic role in attracting financing from other sources for projects and activities. This is contrasted with the limitations facing the IMO as that organisation has to obtain extra budgetary funds for marine pollution control technical assistance projects, in spite of it having a defined global programme for the protection of the marine environment. IMO has the responsibility for implementing several unfunded global conventions, including MARPOL 73/78 and the Oil Pollution Preparedness, Response and Co-operation Convention, 1990.

National budgets, remain the major funding source for environmental projects. However, the sums allocated are usually inadequate compared to actual needs. Also, budgets vary from year to year creating problems in the long-term planning and staffing of projects. Finally, such funding is often amongst the first to be reduced during periods of economic recession. If governments fixed the level of environmental expenditures as a percentage of “stable” budget items, a more stable financing system would result.

Technical and scientific approaches

Long-term policies and management decisions need to be based, as far as possible, on facts collected, analysed and interpreted according to scientific criteria.

Knowledge of the main causes and effects of pollution and physical degradation is, in most cases, sufficient to provide reliable advice as to practical control measures. Nevertheless, further research is needed because existing databases and our understanding of the processes shaping the natural state of the marine environment are generally inadequate for reliable predictions about changes and trends. The importance of monitoring “key” environmental indicators cannot be over-stressed. By appropriate monitoring it is possible to track progress in achieving environmental objectives and to learn from experience the relative effectiveness of different approaches/measures.

Legal approaches

The national environmental policies and practices of most countries are embodied in legislation. Since environmental concern is relatively recent, environmental provisions are often scattered in a number of sectoral laws. Only a few countries have enacted comprehensive environmental laws, with clear definitions of the functions and powers of the authority(ies) responsible for their implementation and enforcement. Where environmental legislation has been enacted, fragmentary application and weak enforcement have been major problems.

Often marine and coastal environmental problems are shared by neighbouring countries. Therefore, their solutions require international (bilateral, regional or global) co-operation. Legally binding international agreements (conventions, protocols, etc.) can play a decisive role in organising and maintaining such co-operation.

Minimum requirements for effective international agreements are political consensus on:

- the overall goal to be achieved;
- a set of principles, approaches and measures applicable to the area covered by the agreement;
- a general strategy based on these principles, approaches and measures;
- a costed and targeted programme of action for the implementation of the strategy; and,
- the institutional and financial mechanisms supporting the agreement and ensuring its implementation.

The obligations of the parties to international agreements should form the basis of new or amended national laws.

International co-operation

The oceans, as opposed to designated coastal areas, do not respect any artificial man-made boundaries and international co-operation is necessary. Although many problems remain global in nature, there are significant regional and local differences in their causes, magnitude and significance. As a result, the most cost-effective remedies are those local and national level actions, undertaken as part of a wider, flexible framework of regional and global environmental and development agreements and activities. It is essential, therefore, to strengthen and expand multilateral programmes according to the specific needs of the countries concerned. Assistance to poor countries must be part of these programmes.

Examples of bilateral and multilateral co-operation in solving problems connected with the use of the marine and coastal environment are available since antiquity. In the past, most related to fishing, shipping rights and the safety of navigation and commerce. In recent decades, such programmes have increased in number and scope, and today cover a wide variety of subjects ranging from

pollution control to technology transfer. This is particularly evident in the recent work of IMO in the GEF project underway in the East Asian Seas and the Wider Caribbean regions. Another example is the global inventory of marine protected areas around the world by the World Bank, Australia's Great Barrier Reef Marine Park Authority and the World Conservation Union (IUCN).

The need for a global approach to deal with the management of oceanic resources "in the interests of the mankind" was brought to the attention of the United Nations in 1967. The ensuing negotiations led in 1982 to the adoption of the United Nations Convention on the Law of the Sea (UNCLOS). The Convention takes an ecosystem approach and covers all forms of marine pollution. Part XII of the convention contains the only existing, comprehensive, binding international law, covering pollution from all sources, whether land-based, oceanic or atmospheric. It also provides a comprehensive, binding system for the peaceful settlement of environmental issues.

In parallel, and in the spirit of UNCLOS negotiations, further impetus for the development of regional programmes was provided in 1974 by the decision of the UNEP to launch a Regional Seas Programme through a series of regional action plans. Recognising the intimate links between the marine/coastal and terrestrial environments, the Programme aimed to deal with the problems of deteriorating conditions in the marine/coastal environment through the control of their land-based causes.

Implementation of the Convention on Biological Diversity when it enters into force, will strengthen the existing international regime dealing with the threatened and endangered species. The new convention obligates nations to a much more comprehensive set of approaches involving the establishment of protected areas, and the protection of key habitats. A key point that must not be overlooked is that many polluting substances originating from land-based sources are of particular concern to the marine environment since they exhibit at the same time toxicity, persistence and bioaccumulation in the food chain/marine animals.

IV. Recommendations for activities of aid agencies

Introduction

The recommendations in the present section provide advice for priority activities for technical and financial assistance, and for a better integration of marine concerns in environment protection and development activities.

The recommendations and guidelines are largely based on those currently considered as of major importance in dealing with the most significant global and regional problems. The recommendations contained in the Agenda 21 adopted by the UN Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992), and the legally binding obligations resulting from the relevant international (global and regional) conventions, were in particular taken into account in selecting the recommendations and guidelines included in the present chapter. Agenda 21 lists 33 objectives and more than 180 types of activities which are recommended

under the heading “Protection of the Oceans, all kind of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their resources” (Chapter 17 of the Agenda). Likewise, the international conventions (global and regional) contain numerous legally binding obligations resulting in hundreds of activities on national, regional and global levels.

Considerations for a better integration of marine concerns in development activities and environment protection

As shown in Section III development and protection of the coastal and marine environment is cross-sectoral and complex, and no generally applicable ‘blue-print’ for priority activities can be recommended; this must be identified for each single situation.

Sectoral projects often lack long-term success as they have hardly any possibility to influence framework conditions; it is also often difficult to identify the contribution of an individual project to a large-scale environmental problem. These projects should be developed, whenever possible, in the general framework of an integrated management programme for coastal and marine environment. These programmes should undergo a strategic environmental assessment, and restrictions to successful implementation should be identified and addressed at this level.

Technical details relevant to the considerations

1. The marine and the coastal terrestrial environment are organically linked and highly interdependent. Therefore the protection and development of this environment requires approaches which are integrated in content and are precautionary and anticipatory in ambit.
2. Integrated management of the coastal and marine environment, including the hinterland as far as it exerts a significant influence on the marine and coastal environment (e.g. atmospheric transport of pollutants), is the most promising avenue to achieve a harmonious and sustainable socio-economic development without jeopardising the environmental qualities and resources of the coastal and marine areas. Therefore, whenever possible, sectoral projects (e.g. projects dealing with the development of settlements, agriculture, aquaculture and fisheries, tourism, ports and harbours, industries, etc.) should be undertaken as part of, and contribution to, a more general environmental, social and economic development policies.
3. Various international (global and regional) conventions and programmes designed for the protection of the marine environment form a viable framework for national action. Prior to providing support for any project which may affect the marine environment, the aid agencies should be fully satisfied with an analysis showing that the

project is in conformity with the provisions of the relevant conventions (refer Annex 3). Furthermore, assistance in enhancing the capacity for implementing these conventions through national laws and actions should be part of development co-operation.

Recommendations for activities for technical and financial assistance

Although the environmental and developmental features of the marine and coastal terrestrial environment are highly interdependent, for pragmatic reasons the recommendations for priority activities are grouped according to their main relevance to coastal, inland or marine areas.

Environmental risk and impact assessments should be mandatory for all projects in these areas which are likely to affect human health and well-being, environmental quality or biodiversity. The “precautionary principle” should be one of the main guiding principles in preparing the assessments, and the assessments should be carried out before any such project is implemented⁷. Economic incentives and cost-recovering fees should also be considered as environmental management tools.

Priority activities in coastal areas

These activities are:

- a) preparation and maintenance of up to date inventories of land-based sources of marine pollution, pollution loads through air and water originating from these sources, and land-based human activities affecting the marine environment, including support for the adjustment of the legal framework;
- b) development of integrated coastal area management plans and integration of sectoral projects into such plans; the development of these plans should start in priority areas (high population density, major inflows into the ocean, valuable resources like mangroves, corals, etc.);
- c) prevention, reduction and control of pollution from coastal land-based sources, with focus on identifiable point-sources, capability of emergency response to accidents and on measures (e.g. minimisation, treatment, re-use) to be taken at the source of pollution;
- d) prevention, reduction and control of ecologically unsustainable fisheries, especially the unintended by-catch of marine mammals, sea turtles, sharks, sea birds and non-target fish species, and the intended unsustainable catch of populations of small cetaceans;
- e) rehabilitation of destroyed, damaged or radically altered natural features, habitats and ecosystems of coastal areas;

- f) limitation of disturbance to seals at their haul-out sites, and sea turtles and birds at their breeding sites.

Technical details relevant to the recommendations

1. As an important step leading to the development of integrated coastal area management plans, the preparation of coastal profiles should be supported. Such profiles should identify: natural features and processes characteristic for the area; ecologically critical areas; demographic and development patterns; user conflicts; and specific priorities for management.
2. Prevention, reduction and control of pollution from coastal land-based sources deserves the highest priority. The main activities contributing to this goal include^{8 9} :
 - a) environmentally sound waste management (treatment, recycling, reuse, minimisation, special handling of hazardous substances, disposal, waste audits); whenever feasible, technologies allowing for recycling and reuse of the waste, and for waste minimisation, should be used; in deciding about the waste disposal in coastal areas the various available alternatives and their environmental impact should be taken into account; when opting for land disposal of liquid and solid domestic and industrial waste, their potential effect on the underground water reservoirs should be specifically taken into account, as well as ensuring the preparation of contingency plans, adequately trained staff and proper equipment for coping with accidents or unplanned releases;
 - b) construction and/or improvement of sewage collection, treatment and disposal facilities, and their proper maintenance; sewerage should not be constructed without adequate treatment and disposal facilities; the degree of the treatment should depend on the type of disposal (land, river, estuary, sea) and the environmental (particularly the sanitary) standards applicable to the site of disposal; the capacity of the recipient countries to maintain the sewage treatment facility after the completion of the project should be an important factor in selecting the type of the treatment technology;
 - c) industrial effluents should not be allowed to be discharged into the sewerage systems, or by direct marine or freshwater outfall, before they meet the standards applicable for the recipient waters; industrial wastes should be treated at the site of their origin to an acceptable level before their disposal¹⁰;
 - d) the best practicable control and reduction of substances and waste that are toxic, persistent or liable to bioaccumulate; the

- emission or discharge of metallic and synthetic organic compounds falling in this category (such as mercury, organochalogenes, organotin) should be eliminated¹¹
- e) the inputs of nitrogen and phosphorous substances into coastal waters, rivers and estuaries should be kept to an absolute minimum from projects in areas where such inputs may contribute to eutrophication and thus threaten the natural balance in aquatic ecosystems; and
 - f) promotion of local, national, sub-regional and regional regulatory and monitoring programmes to control the disposal of liquid and solid waste in coastal terrestrial areas.

Priority activities in inland areas

These activities are:

- a) prevention, reduction and control of pollution from land-based sources, with focus on non point sources of pollution (surface run-off and atmospheric transport); and,
- b) development of integrated watershed (river basin) management programmes, including environmentally sound land-use planning, and integration of sectoral projects into such management.

Technical details relevant to the recommendations

1. Projects dealing with the control of pollution from point and non-point sources should receive the highest priority. The control of the former should follow the recommendations given in the section on priority activities for coastal areas. As to the projects dealing with the control of pollution from non-point sources (e.g. agrochemicals, compounds used in vector control programmes, pollutant intake through atmospheric transport), the following is specifically recommended:
 - a) introduction of integrated pest management (IPM)¹², i.e. methods combining the use of chemical compounds with introduction of biological agents, and with measures such as appropriate crop rotation and engineering works (e.g. drainage of swampy areas to destroy breeding grounds for malaria or bilharzia vectors — note, however, that such areas may also be important wetlands, and compensation measures may be warranted. To help determine priorities, see *OECD/DAC Guidelines No. 9 on Improved Conservation and Sustainable Use of Tropical and Sub-Tropical Wetlands*, OECD, Paris 1996);

- b) development and implementation of environmentally sound land-use techniques and practices to reduce run-off to water courses and estuaries which could cause pollution or degradation of the marine and coastal environment; and
 - c) generally limiting the discharge of pollutants into the atmosphere (e.g. energy production, industrial production, traffic).
2. Development of integrated watershed (river basin) management programmes should be promoted so as to:
- a) introduce a comprehensive control and prevention of pollution from inland sources;
 - b) reduce land degradation (including desertification) and siltation of estuaries and coastal waters due to inappropriate agricultural and land-use practices; and
 - c) reduce sediment depositions caused by reduced flow of rivers (e.g. as the consequence of changes in the hydraulic regimes due to large scale irrigation works or creation of artificial water reservoirs) to avoid coastal erosion.

Priority activities for marine areas

These activities are:

- a) building or reconstruction (upgrading) of port reception facilities for collection of oily and chemical residues and garbage from ships;
- b) systematic monitoring of the quality of the marine environment, the trends in this quality, and the environment effects of land- and sea-based development projects;
- c) reduction, prevention and control of unsustainable fisheries, of the bycatch of non-target fish species, marine mammals, sea turtles and birds in the fisheries, and of the intended unsustainable catch of small cetaceans; and
- d) development of contingency plans for dealing with accidental marine pollution emergencies (e.g. oil spills).

Technical details relevant to the recommendations

- 1. In addition to the projects designed to eliminate or minimise the amount of pollution reaching the marine environment (described under priority activities for terrestrial coastal and inland areas), the highest priority should be given to building, or reconstruction of existing, systems for disposal of domestic and industrial wastes into the coastal

- waters, including estuaries and coastal lakes. The ultimate aim of a well constructed system is to maintain an acceptable level of environmental quality and to avoid exposing bathing areas, shellfish growing waters, and water intakes to pathogens and other harmful substances.
2. In assessing the suitability of wastes still eligible for sea disposal under the London Convention, as amended (see Annex3, paragraph 3), the following factors should be taken into account:
 - a) general characteristics of the waste: origin (e.g. industrial, sewage); form (e.g. liquid, sludge); total amount (volume); discharge pattern (e.g. continuous, intermittent, seasonally variable); composition (concentrations with respect to major constituents); and physical, chemical and biochemical properties;
 - b) harmfulness of the waste: persistence (physical, chemical, biological) in the marine environment; toxic, teratogenic, mutagenic and carcinogenic properties; accumulation in biological materials or sediments; biochemical transformation producing harmful compounds; adverse effects on the oxygen content and balance;
 - c) characteristics of the discharge site and the receiving marine environment: hydrographic, meteorological, geological and topographic characteristics of the coastal area; location of the discharge site and its relation to sensitive areas; type of the discharge; initial dilution at the point of discharge into the environment; dispersion characteristics; physical, chemical, biological and ecological conditions in the discharge area; capacity of the receiving aquatic environment to receive waste discharges without unacceptable effects; and
 - d) potential impairment of marine ecosystems and sea-water uses (as far as identifiable for a single activity): effects on human health through edible marine organisms and bathing waters; effects on marine ecosystems, in particular living resources, endangered species and critical habitats; aesthetic effects (e.g. floating material, bad smell); effects on other legitimate uses of the sea (e.g. hindrance for fishing and intake of water for desalination plants).
 3. As raw (untreated) solid domestic waste contains a variety of toxic and persistent substances, and sea disposal is therefore prohibited, aid agencies should support developing countries in search for alternative disposal ways to marine dumping.
 4. The establishment of port reception facilities should be specifically promoted for all types of vessels, specifically at smaller scale in

marinas and fishing harbours. The environmentally acceptable disposal of waste collected through port reception facilities should be integrated with land-based waste management systems.

5. Although monitoring of the specific environmental effects caused by the developmental projects should be a standard feature of all such projects, the establishment of comprehensive and systematic regional and sub-regional observation systems to monitor marine environmental quality, and to determine causes and effects of marine degradation, should be promoted and assisted. Such monitoring programmes should cover pollution from all (maritime and terrestrial, including riverine) sources, especially from illegal discharges or dumping. The results of the monitoring programmes should serve as a rational basis for the formulation of sub-regional and regional pollution control measures and programmes.
6. An environmental impact assessment should be made on all types of fisheries. Observers should be onboard various types of fishing vessels to estimate the intended catch and the bycatch, and regulations and control measures should be implemented where necessary.
7. The development of contingency plans for dealing with accidental maritime pollution emergencies (e.g. spills of oil or hazardous chemicals, breakdown of sewage treatment plants) should be promoted on the national and international level. In this context, national authorities and regional oil/chemical-spill response centres should be strengthened and/or established, adequately staffed, and assistance should be provided in the form of equipment, material and training of personnel needed to implement contingency plans or operate response centres.

Areas requiring priority funding to assist future aid projects

There is no shortage of national or subregional projects in the marine environment protection field that are seeking funding. However to avoid piecemeal and possibly ineffective initiatives it is important to have certain information at the global or regional level for assisting competing demands for development assistance. Through clearing-house activities among co-ordinating organisations, such gaps, overlaps, needs and demands can be better detected.

For IMO the following areas are identified for funding background studies so that self-sustaining capacity-building activities to assist developing nations in controlling or preventing marine pollution are able to be properly evaluated:

- port reception facilities and related disposal of wastes;
- facilities for emergency response and training of personnel for mobilisation in case of accidents;
- environmental aspects of port operations and development;

Marine and coastal environment

- incremental expenses for navigational safety and adequate protection of the marine environment in international straits and other heavily trafficked marine areas;
- availability of new technologies to assist in distance learning for possible new and existing international centres of professional maritime education;
- development of ballast water and control methods on board ships.

NOTES

1. In the context of this document, marine pollution is defined according to the UN Joint Group of Experts on the Scientific Aspects of Marine Pollution, and means "... the introduction by man, directly or indirectly, of substances and energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairing of quality for use of sea water and reduction of amenities."
2. There is considerable variation in the width of coastal zones. This is reflected in the range of administrative boundaries used in different countries for coastal zone management activities.
3. Demersal species are those associated with the seabed, while pelagic species are associated with the open water column. Different fishing techniques are used in the capture of each group.
4. Bio-accumulation is defined as the concentration of persistent toxins within living matter. Effects become more pronounced as toxins accumulate in organisms such as seals/penguins which are higher in the food chain.
5. i.e. "sustainable development" which is defined as development which "... meets the needs of the present without compromising the ability of future generations to meet their own needs." World Commission on Environment and Development: *Our Common Future* (1987), Oxford University Press, Oxford.
6. A good and detailed description of measures applicable in pollution control can be found in: *Montreal Guidelines for the Protection of the Marine Environment against Pollution from Land-Based Sources*, (1985). UNEP, Nairobi.
7. Detailed guidelines for the preparation of EIAs can be found in the publication *An approach to environmental impact assessment for projects affecting the coastal and marine environment* (UNEP, 1990).
8. The *Montreal Guidelines for the Protection of the Marine Environment from Land-Based Sources* (UNEP, 1985) contain a long list of suggestions which should be consulted whenever a project dealing with the control of pollution from land-based sources is considered.
9. The technical details listed in this section mainly concentrate on pollution from point sources; details relevant to the pollution from non-point sources are presented in the section dealing with inland areas, which are the main source of such pollution.
10. See also OECD/DAC *Guidelines No. 9 on Improved Conservation and Sustainable Use of Tropical and Sub-Tropical Wetlands*, OECD, Paris, 1996.
11. The existing regional agreements on control of pollution from land-based sources contain lists of substances whose release as waste is prohibited, or restricted by specific regulations.
12. See also OECD/DAC *Guidelines for Aid Agencies No. 6 on Pest and Pesticide Management*, OECD, Paris 1995.

Annex 1

POLLUTION FROM LAND-BASED SOURCES

Land-based sources of pollution are by far the most significant form of pollution to the marine and coastal environment. According to the latest estimate land-based sources are responsible for about 77 per cent of the load (44 per cent through run-off and land-based discharges; 33 per cent through the atmosphere). The remaining comes from maritime transport (12 per cent), dumping (10 per cent) and offshore resource exploitation (1 per cent).

In certain regional marine environments the actual pollution load through atmospheric transport differs from these global figures; e.g. 50 per cent of the heavy metal input into the North Sea is caused by atmospheric intake. In densely populated areas landbased pollution sources contribute to an even higher amount to marine pollution; they are e.g. responsible for 85 per cent of the Mediterranean pollution burden. Under the Economic Commission for Europe (ECE) a regional monitoring programme for atmospheric transport of pollutants serves as a basis for calculations of the respective contribution to marine pollution. Figures for 1985 show an annual intake of 2 400 t lead, 14 t cadmium, 61 t arsenic, and 920 t zinc into the North Sea. 1 400 t Lead, 18 t cadmium, 98 t arsenic and 650 t zinc into the Baltic Sea.

Ever since man settled in the coastal zones and along rivers, the marine environment became his natural repository for all types of wastes. Initially pollution consisted mainly of degradable domestic wastes, in particular, sewage. The volume and nature of these wastes was generally small and, they were easily absorbed and neutralised by the seas and any eventual local impact was not considered significant. However, with changing land-use patterns caused by the increasing number of people living in the coastal zones, and particularly with the development of industries and the increasing use of agrochemicals, domestic wastes combined with industrial and agricultural wastes gradually became the major threat.

The major land sources of pollution vary from country to country and from region to region, depending on the nature and intensity of specific activities in the coastal strip and the associated drainage area. Activities associated with human settlements, agriculture, industry and tourism can be identified as the major contributors to the pollution load and the relative importance of the different pollutants shows significant spatial variation. The direct discharge of wastes from land-based sources is not the only, and for many pollutants not even the most important, route by which they reach the marine environment.

While the direct discharges and inputs from rivers mainly affect coastal waters, the inputs of atmospheric pollutants from land-based sources, affect oceanic regions.

The oceans are not static. Their waters mix, the surface layer is in constant and dynamic interaction with the atmosphere, generating down and up-welling of ocean water from and towards the surface. The ocean currents are transporting volumes of water several orders of magnitude greater than the largest rivers and are carrying pollutants with them in the process. Therefore, pollutants, particularly persistent non-degradable types introduced at one point, can spread very far from their origin without any respect for international boundaries. For example, the Gulf Stream is about 50 miles wide and occasionally reaches a depth of 1 000m. Within the Florida Straits it carries an estimated 25-35 million m³ of water per second, almost a thousand times the volume transported in the Mississippi, with speeds up to 220km per day.

Examples of the impact of pollutants from land-based sources are listed below:

- a) impact on public health:
 - bathers in sewage polluted waters are frequently affected by gastro-intestinal problems (diarrhoea); ear, eye and skin infections; or respiratory diseases;
 - seafood, particularly the filter-feeding bivalves, is increasingly becoming unsafe or unpalatable for human consumption;
 - mercury-contaminated seafood at Minamata in Japan has caused more than 2 000 cases of illness and the death of 43 people since 1953;
 - outbreaks of cholera and infectious hepatitis are occurring with increasing frequency among coastal populations, claiming many deaths; recent studies suggest that, even inland, a substantial proportion of all cases of endemic infectious hepatitis is caused by the consumption of raw bivalves contaminated by viruses;
 - increase in frequency and severity of paralytic shellfish poisoning and ciguatera fish poisoning which appear to be related to environmental stresses;
 - epidemics associated with polluted coastal waters and marine “products”, aside from their impact on human health, are a serious setback for economies of affected regions, as shown by the 1973 outbreak of cholera in Italy, and its more recent appearance along the Pacific coast of Latin America.
- b) impact on ecological systems:
 - populations of birds feeding on contaminated sea-fish have been reduced in many regions through the effects of organohalogen compounds;

- it is suspected that polychlorinated biphenyls can interfere with the hormone cycles of mammals, and thereby hamper reproduction in free-living species;
- enrichment by nutrients and other organic carbon substances is strongly suspected as being the single most important factor contributing to the plankton blooms occurring with increasing frequency in coastal waters world-wide;
- there is circumstantial evidence linking pollution with fish diseases (e.g. ulcers, fin rot) frequent in many parts of the world;
- polluted coastal waters and degraded coastal amenities are significant and potentially very serious for some local, national and regional economies, associated with lost revenues in domestic and foreign tourism;
- in some areas fishing or mariculture has to be restricted or abandoned due to public health considerations, or where fish stocks decline due to destruction of habitats or breeding grounds, associated with economic losses in commercial fisheries;
- decline in the quality and quantity of fishery products is a particularly serious economic problem for many developing countries where artisanal fisheries provide the largest part of animal proteins for local consumption which, for economic reasons, cannot be easily substituted from other sources.

For certain areas, the data indicate a serious situation. For example, a study in 1976-1977 to assess the pollutants reaching the Mediterranean sea estimated that this relatively small sea, barely 0.7 per cent of the total surface and about 0.28 per cent of the total volume of the oceans, receives annually about:

- 3.3 million tons of biochemical oxygen demand (BOD) and 8.6 million tons of chemical oxygen demand (COD) (1.8 and 3.5 million tons, respectively, through rivers) as organic load;
- 360 thousand tons of phosphorous (300 thousand through rivers);
- 1 million tons of nitrogen (800 thousand through rivers);
- 18 thousand tons of detergents;
- 120 thousand tons of mineral oils;
- 130 tons of mercury (120 tons through rivers);
- 4.8 thousand tons of lead (3.2 thousand tons through rivers);
- 2.8 thousand tons of chromium (1.6 thousand tons through rivers);
- 25 thousand tons of zinc (18 thousand tons through rivers);
- 350 million tons of suspended matter (300 thousand tons through rivers); and
- 90 tons of organochlorine pesticides (most through rivers).

According to a later study, the total volume of domestic waste-waters reaching the Mediterranean in 1985 from its 122 million coastal dwellers was 2 839 million m³, carrying substances with 1.5 million tons of BOD and 3.4 million tons of COD, 2.17 million tons of suspended solids, 175 thousand tons of nitrogen, and 21.2 thousand tons of phosphorous. The same study estimates that by the year 2025 the number of people living on the shores of the Mediterranean Basin may be in the range of 164-211 million, and that the amount of their domestic waste-waters may be in the range of 4 058-6 137 million m³, with a corresponding increase in the substances carried in these waste waters.

Similar statistics and assessments are available only for a few other marine regions (e.g. the Baltic and the North Sea), but the figures presented for the Mediterranean, although not typical for the whole globe, are a clear illustration of the magnitude of the problems encountered world-wide.

Control of pollution from land-based sources has been neglected by the political establishment. The prevailing view of policy-makers has been that the oceans are to be used as a limitless waste repository and that curbing marine discharges may put an unjustifiable burden on sensitive economies. While such an approach may have been understandable until the mid-20th century, since then the problems observed in a few "hot spots" have spread world-wide with a speed that must have caught the attention, if not the imagination, of politicians. Ironically, with a few exceptions, the preoccupation of governments with control of dumping and pollution by tanker accidents, operations which are locally or regionally significant and albeit continue to occur too regularly, however, are judged to be minor issues, when compared with pollution from land-based sources, has contributed to the false impression that adequate action to safeguard the marine environment is being taken.

The lengthy negotiation preceding the Law of the Sea Convention, concentrating on the ownership of coastal resources and the exclusive rights to the riches of the open oceans and the seabed, also desensitised the political leaders and their legal advisors to current and growing problems. Under the pressure of evidence, political decisions have been taken in the form of national legislation and a few regional agreements to curb the degradation of the marine environment from land-based sources of pollution and coastal activities. Unfortunately, these legislative acts and international agreements have achieved far less than even the reluctant legislators expected.

Annex 2

POSSIBLE IMPACT OF CLIMATE CHANGE AND OZONE LAYER DEPLETION

Climate change and the depletion of the ozone layer are among the major emerging global environmental issues which are expected to have a significant impact on the oceans and coastal areas. The only real certainty about climate change is that it will happen. According to the conclusions adopted by the Second World Climate Conference, if no action is taken to reduce the emissions of greenhouse gases,

“... global warming is predicted to reach 2 to 5°C over the next century, a rate of change unprecedented in the past 10 000 years. The warming is expected to be accompanied by a sea level rise of 65 ± 35 cm by the end of the next century. There remain uncertainties in predictions, particularly in regard to timing, magnitude and regional patterns of climate change.”

Aside from the changes in temperature and sea-level, a shift in weather patterns and, especially, in the frequency, intensity and duration of storms is forecast by most experts. These events and their consequences (such as storm surges, droughts and rain storms) are expected to be felt even before the larger scale global changes become evident.

The potentially cataclysmic consequences of events which are driven by climate are best illustrated with one of the greatest documented natural disasters in history. On the Ganges delta of Bangladesh a large overcrowded population lives on flat nutrient deficient marginal lowland, barely above sea-level, despite the ever-present danger from climatic-related events for which the region is well known. In November 1970, some 300 000 people perished when a huge tidal wave, driven by a cyclone, swept over the delta. Although the coming of the cyclone was known, practically no preventive action was taken. This occurred because of weaknesses typical of poor countries; lack of disaster preparedness and planning and the means to mount a rescue operation. For more information on disaster preparedness in developing countries see *OECD/DAC Guidelines No.7 on Disaster Mitigation*, Paris 1994. The post-disaster situation was further exacerbated by starvation of survivors.

Climate change is an historic and inevitable fact regardless of man's influence on its direction and rate. The argument is often put forward that people have survived climate change in the past and will continue to do so. However to

talk merely of survival as a species is to ignore the issue of the degree of social disruption and human suffering that have attended regional climate fluctuations in recent history and, presumably, in the more distant past. The fact that the drought-induced famine in the Sahel in the early 1970s did not threaten to extinguish the human race is no consolation to the thousands who died. Today the absolute magnitude of human misery that could be caused by climate change is much larger than before because populations in virtually all regions of the world are much larger. More people would be affected by any given regional climate change and the opportunity to flee to “empty” adjacent regions is much reduced as such areas no longer exist.

It is clear that climate change will have major effects on all countries and that the areas which are likely to be most profoundly affected are the low-lying islands and coastal zones of the world, where more than half of the world’s population currently lives. Although it is difficult to predict accurately the magnitude, significance and spatial distribution of specific climate change impacts on land-use practices, natural ecosystems, physical processes, and social and economic activities, it is nevertheless possible to state that in general there will be profound and sweeping changes. Aside from impacts on the structure and functioning of natural ecosystems, the impact will be diverse and significant to all sectors of human activity, and in particular will affect freshwater management, agriculture, fisheries and forestry.

Predicted changes in temperature, precipitation and the solar radiation budget, as well as in patterns of atmospheric and oceanic circulation, will alter the spatial distribution of biological processes which support social systems. Such changes will result in long-term alterations in resource availability and use by different societies. For example, the potential effects of long-term climatic variations on fisheries resources is well illustrated by the well-documented example of the decline in cod populations of Greenland in the early Middle Ages, and their replacement with fully arctic ecosystems.

The frequency, intensity, location and duration of extreme meteorological events, including hurricanes, storm surges, droughts and rain storms, if increased as predicted by some experts, will cause additional stress on societies and reduce their ability to achieve sustainable development by endangering lives, by destroying shelters, communication infrastructures and industrial installations, tourism facilities, and by reducing food security. Any subsequent sea level rise will cause inundation of coastal lowland areas, erode beaches, exacerbate flooding and increase the salinity of soils and groundwater, rivers, estuaries, lagoons and aquifers.

A global rise in the mean sea level of up to 20 cm would not, in itself have a significant impact, except locally where the rise could be as much as five times this value due to subsidence, groundwater or oil extraction and sediment compaction. More severe problems can be expected if sea level rise exceeds this increase, or if the rate of increase exceeds the capability of sensitive coastal ecosystem to respond by natural adaptation and growth to the new conditions.

The depletion of the ozone layer will have impacts on the biological system world-wide, that exceed current abilities of prediction. Apart from hazards to human health by increasing the risk of skin cancer, eye diseases and weakening the immune system, most plants react sensitive to ultra-violet radiation with resulting reduction in productivity and consequences for agriculture and nutrition. Marine algae will be destroyed, reducing the basis of nutrition for fish and subsequently population in many fishery-dependant countries. Chlorofluorocarbons (CFCs) being mainly responsible for the depletion of the ozone layer, also contribute to climate change.

Environmental problems are already critical in many parts of the world, and the potential impacts of climate change and ozone layer depletion will exacerbate them. Without prompt remedial action, such problems will increase, rendering sustainable development an unachievable goal in many countries. In addition, the failure to address these problems now, will make future responses to climate change and sea level rise more difficult and in some cases even impossible.

Annex 3

LIST OF THE MOST IMPORTANT INTERNATIONAL AGREEMENTS RELEVANT TO THE PROTECTION OF THE MARINE AND COASTAL ENVIRONMENT AND THEIR RESOURCES

Legislation and other agreements governing the protection of the marine and coastal environment are a relatively recent development. Initially, measures were aimed at the control of pollution (e.g. Bonn Agreement 1969, London Convention 1972), however, subsequent agreements dealt with other sectoral issues (fisheries, marine sciences and ocean climate) and also the development of cross-sectoral activities such as the Regional Seas Programme sponsored by UNEP. The development of the Regional Seas Programme is reviewed in Annex 4 and is not discussed in detail here.

The development of marine legislation and agreements has often been long and complex because of the number of parties involved in negotiations and the varied implications of the measures. Even when signed, the effectiveness of agreements is complicated by the practical difficulties of monitoring and enforcement. Brief summaries of key agreements are provided below. The IUCN Environmental Law Centre in Bonn, Germany and IMO are two institutions, that could be addressed for further information.

OECD Council Recommendations

On 23 July 1992, the Council of the OECD adopted at its 787th session a set of recommendations to its Members on integrated coastal zone management. In making these recommendations, the OECD Council reiterated that coastal zones and the oceans are areas where improved policy integration is necessary through integrated resource management strategies and comprehensive land use planning. Inter alia, the following recommendations were made:

[The Council]

I. RECOMMENDS that, to help achieve the goals of ecologically sustainable development and integrated resource management, strategic

planning and integrated management of coastal zones should be developed, and implemented by Member countries, through:

- Defining policy objectives specific for the coasts and their resources to provide guidance to and enhance co-ordination of national, regional and local government strategies/plans for coastal zones;
- Strengthening the integration and harmonization of sectoral policies affecting coastal zone management and resource usage.

This can be achieved through more effective utilisation or extension of existing planning and management structures and by designating an authority to co-ordinate action. The necessary resources for this co-ordination to be provided by all concerned levels of government;

II. RECOMMENDS that, in view of the diverse and often conflicting uses of and pressures on coastal zone resources, Member countries should employ policy instruments, individually or in combination, in integrated coastal zone planning and management, including:

- Collection and updating of relevant information, and development of coastal environment indicators to guide planning and monitoring of coastal zone activities and processes;
- Establishment of environmental objectives for: land use planning and zoning, coastal waters planning, (including inland waters, semi-enclosed seas, estuaries) conservation requirements, ecosystem protection and restoration, discharge limits, water quality for receiving waters and waters flowing into the coastal zone, and control and reduction of inputs from polluting and hazardous substances;
- Establishment and maintenance of monitoring and enforcement procedures for environmental objectives and targets;
- Environmental assessment incorporating economic and social criteria;
- Public education and participation in decision-making at an early stage of policy formulation and project assessment, and adoption of wider public participation procedures;
- Application of regulations and economic instruments within the framework of the Polluter-Pays Principle, and pricing coastal zone resources to reflect social costs of use and depletion;
- Where appropriate, enactment of national legislation to enforce coastal zone management objectives;

III. RECOMMENDS that particular attention should be given to achieving sustainable management and conservation of fishing resources at the local,

national and international levels, and that co-ordination of all relevant authorities should be ensured;

IV. RECOMMENDS that, in view of the economic and environmental significance of tourism and its associated infrastructure, a designated co-ordination authority should ensure that a proper balance is found between tourism development and the carrying capacity of the coastal zone;

V. RECOMMENDS that international co-operation for the management of shared or common coastal areas should be enhanced by existing or extended international coastal zone management bodies preparing, implementing and monitoring an integrated action plan that is consistent with other relevant coastal zone management initiatives.

Global agreements

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as amended (London Convention). The intention of this convention is to prevent pollution of the marine environment through the dumping of waste materials at sea. The convention identifies specific controls for selected wastes and the methods of their disposal. It should be noted that the convention does not directly address the reduction of land-based marine pollution at source. Contracting Parties (74 at present) are currently reviewing the Convention, the result of which is to be adopted at a diplomatic conference in November 1996. As a first step of this review, amendments to the Annexes I and II to the Convention were adopted in 1993 concerning the prohibition of sea disposal of all radioactive wastes and other radioactive matter, of industrial waste as per 1 January 1996, and concerning the prohibition of incineration at seas of industrial waste and sewage sludge. These amendments have entered into force on 20 February 1994.

The International Convention for the Prevention of Marine Pollution from Ships 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). This convention is the most comprehensive global treaty covering marine pollution from ships. Specific details of the convention include regulations governing :

- Annex I: oil pollution (dirty ballast waters, fuel residues, etc.);
- Annex II: pollution by noxious liquid substances in bulk;
- Annex III: pollution by harmful substances in freight or packaged forms;
- Annex IV: pollution from ship-generated sewage;
- Annex V: pollution from ship-generated litter and garbage.

The convention also identifies “Special Areas” where stricter methods for prevention of marine pollution must be applied. Special areas are designated on technical, ecological or oceanographical reasons and include the Baltic, Mediterranean, North, Red, Black and the wider Caribbean Sea areas, the Antarctic Ocean, the Gulf of Aden and the Persian Gulf area. However, due to lack of

reception facilities, this “Special Area” status is not in force in all of the mentioned areas.

The International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC Convention). This convention was initiated because of the severe local damage that can be caused by routine operational oil spills and major accidents and their all too frequent occurrence. Obligations of contracting parties include preparation of:

- oil pollution emergency plans for tankers and other ships, offshore gas or oil platforms, seaports and oil handling facilities;
- a national contingency plan having designated national authorities and operational focal points for oil spill management;
- national and regional (where possible) systems for preparation and response to oil pollution incidents;
- oil spill combating equipment;
- a programme of exercises for response organisations and training of relevant personnel;
- co-operation and mutual assistance programmes;
- bilateral or multilateral co-operation plans;
- research and development programmes.

Other international conventions or instruments having bearing on the marine environment are:

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| 1969 | International Convention on Intervention on the High Seas in Cases of Oil Pollution Casualties |
| 1969 | International Convention on Civil Liability for Oil Pollution Damage (CLC) |
| 1971 | International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND) |
| 1973 | Protocol Relating to Intervention on the High Seas in Cases of Pollution by Substances other than Oil — London, 2 November 1973 (in force, 1983 — amended in 1991, amendments in force) |
| 1982 | United Nations Convention on the Law of the Sea (UNCLOS) —Montego Bay, 10 January 1982 (in force, 1994) |
| 1985 | Montreal Guidelines for the Protection of the Marine Environment against Pollution from Land-based Sources, Montreal, 24 May 1985 (surpassed by entry into force of UNCLOS III) |
| 1989 | International Convention on Salvage (SALVAGE) |
| 1992 | Framework Convention on Climate Change, New York, 9 May 1992 |
| 1992 | Convention on Biological Diversity, Nairobi, 24 May 1992 |

The following maritime safety conventions through their regulations, codes and guidance contribute significantly to the prevention of marine pollution:

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| 1972 | Convention on the International Regulations for Preventing Collisions at Sea (COLREG) |
| 1974 | International Convention for the Safety of life at Sea (SOLAS) as amended and as modified by the Protocols of 1978, 1988 and 1992 |
| 1978 | International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), being amended in 1995 |

Regional agreements

There are a significant number of international agreements that apply to specific regions. These can be relevant to development activities affecting the coastal zone and other marine resources in these regions. The more significant of these are listed below:

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| 1981 | Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region — Abidjan, 23 March 1981 (in force, 1984) |
| 1981 | Protocol Concerning Co-operation in Combating Pollution in Cases of Emergency — Abidjan, 23 March 1981 (in force, 1984) |
| 1981 | Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific - Lima, 12 November 1981 (in force, 1986) |
| 1981 | Agreement on Regional Co-operation in Combating Pollution of the South-East Pacific by Hydrocarbons or Other Harmful Substances in Cases of Emergency — Lima, 12 November 1981 (in force, 1986) |
| 1982 | Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment — Jeddah, 14 February 1982 (in force, 1985) |
| 1982 | Protocol Concerning Regional Co-operation in Combating Pollution by Oil and Other Harmful Substances in Cases of Emergency — Jeddah, 14 February 1982 (in force, 1985) |
| 1982 | Protocol concerning Mediterranean Specially Protected Areas — Geneva, 3 April 1982 (in force, 1986) |
| 1983 | Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region — Cartagena de Indias, 24 March 1983 (in force, 1986) |
| 1983 | Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region — Cartagena de Indias, 24 March 1983 (in force, 1986) |
| 1983 | Supplementary Protocol to the Agreement on Regional Co-operation in Combating Pollution of the South-East Pacific by Hydrocarbons or Other Harmful Substances — Quito, 22 July 1983, (in force, 1987) |
| 1983 | Protocol for the Protection of the South East Pacific against Pollution from Land-Based Sources — Quito, 23 July 1983 (in force, 1986) |
| 1985 | Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region — Nairobi, 21 June 1985 (not yet in force) |

Marine and coastal environment

- 1985 Protocol Concerning Co-operation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region — Nairobi, 21 June 1985 (not yet in force)
- 1986 Convention for the Protection of the Natural Resources and Environment of the South Pacific Region — Noumea, 24 November 1986 (in force, 1990)
- 1986 Protocol for the Protection of Pollution of the South Pacific Region by Dumping — Noumea, 25 November 1986 (in force, 1990)
- 1986 Protocol Concerning Co-operation in Combating Pollution Emergencies in the South Pacific Region — Noumea, 25 November 1986 (in force, 1990)
- 1992 Convention on the Protection of the Black Sea against Pollution — Bucharest, 21 April 1992 (in force, 1994)
- 1992 Protocol on Protection of the Black Sea Marine Environment against Pollution from Land Based Sources — Bucharest, 21 April 1992
- 1992 Protocol on Co-operation in Combating Pollution of the Black Sea Marine Environment by Oil and Other Harmful Substances in Emergency Situations — Bucharest, 21 April 1992
- 1992 Protocol on the Protection of the Black Sea Marine Environment against Pollution by Dumping — Bucharest, 21 April 1992
- 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (with 4 Annexes and 2 Appendixes) — Paris, 22 September 1992

Annex 4
THE REGIONAL SEAS PROGRAMME

Regional action plans, adopted at inter-governmental meetings, are the backbone of the Regional Seas Programme. Since the Programme was launched in 1974, ten regional action plans for the protection and development of specific marine and coastal areas have been adopted: Mediterranean (1975), Red Sea and Gulf of Aden (1976), Gulf (1978), Wider Caribbean (1981), East Asian Seas (1981), South-East Pacific (1981), West and Central African (1981), South Pacific (1982), Eastern African (1985) and Black Sea (1992) regions.

The structure of the action plans follows the framework adopted by the United Nations Conference on the Human Environment (Stockholm 1972) for the Action Plan for the Human Environment and consists of three basic components:

- environmental assessment (evaluation and review, research, monitoring, information exchange);
- environmental management (goal setting and planning, international consultation and agreements); and
- supporting measures (education and training, public information, technical co-operation, organisation, financing).

In spite of the formal similarity of the action plans, they are highly specific in their details to respond to the actual problems, priorities, needs and capabilities of the participating countries.

The explicit goal of all action plans is the protection and development of the environment and resources in geographic areas covered by the action plans. This goal is to be achieved, gradually, through a cross-sectoral approach taking into account the urgency of the problems as perceived by the relevant governments and their capacity (financial, manpower, institutional) to tackle the problems in a realistic way.

The initial focus was on marine pollution monitoring, assessment and — later — control which was assigned a high priority and required a harmonised regional policy and strategy. However, the common experience of all action plans soon confirmed that inappropriate development was at the roots of most environmental problems, and that lasting environmental protection is inseparable from social and economic development. As a result, the focus of the action plans gradually shifted — but still not very evident — from pollution control to integrated coastal zone planning and management. Information exchange, training,

technical assistance and regional co-operation projects are seen as important components of the action plans.

Nine regional conventions were adopted as the legal framework of the action plans for the Mediterranean (Barcelona, 1976), Gulf (Kuwait, 1978), West and Central African (Abidjan, 1981), South-East Pacific (Lima, 1981), Red Sea and Gulf of Aden (Jeddah, 1982), Wider Caribbean (Cartagena, 1983), East African (Nairobi, 1984), South Pacific (Noumea, 1986) and Black Sea (Bucharest, 1992) regions. All but one of the regional seas conventions (Nairobi) are today in force and more than 120 coastal states are potential parties to them. The conventions are of a “framework” type committing the contracting parties to protect and enhance the marine environment covered by the convention area, which is in most cases restricted to the 200 mile Exclusive Economic Zones. In a few instances (e.g. the Cartagena and Noumea conventions) high seas which are enclosed from all sides by the 200 mile zones of the contracting parties are also included in the convention area.

Each convention is supplemented with at least two protocols dealing with specific problems such as co-operation in cases of pollution emergencies, control of pollution from dumping and land-based sources and protection of endangered species and ecologically sensitive areas. For the purpose of the protocols on control of pollution from land-based sources and on protection of endangered species and sensitive areas, the convention areas have been enlarged to include internal waters, up to the freshwater limit, as well as specific selected coastal areas.

In developing the regional seas conventions and their protocols, care has been taken to avoid any conflict with the provisions of the United Nations Convention on the Law of the Sea, or of any other international agreement on subjects covered by the regional seas conventions.

The action plans operate under the authority of periodic inter-governmental meetings of the participating states or the meetings of the contracting parties in cases where a convention is in force as the legal framework for the action plan.

UNEP provides the overall co-ordination of the Regional Seas Programme and serves as the secretariat of six action plans and five conventions. In several instances the participating countries decided to set up their own secretariats or designated an existing regional organisation as a secretariat. The implementation of the action plans is supported by active participation of 14 organisations of the United Nations system, about 30 non-UN international and regional organisations, and more than 1 000 national institutions.

The Environment Fund of UNEP provided the financial resources needed to initiate the development and implementation of the early phases of the action plans. However, the resources of this Fund are gradually being replaced by special trust funds set up by participating governments as well as funds provided by international financial institutions, aid agencies and voluntary contributions from governments.

The Mediterranean action plan is probably the best known of the Regional Seas Programmes because it is the oldest and most mature. However, several other regional action plans can be also considered as mature and highly viable entities of

the Regional Seas Programme. In fact, some of them in their complexity, geographic scope, political significance and impact on participating countries surpass the Mediterranean action plan. Nevertheless, the Mediterranean action plan, although not typical of all action plans serves to illustrate the development, achievements, problems and failures of the wider Programme.

The Mediterranean Action Plan

By the early 1970s, it was agreed, generally, that the environmental problems of the Mediterranean basin required urgent attention and that solutions should be sought through the international co-operation of all 18 coastal states. Therefore, in 1973, the Mediterranean was selected by UNEP to test the regional approach to the protection of marine areas.

In spite of considerable differences in political and socio-economic systems and levels of development it proved relatively easy for 17 of the Mediterranean's coastal states to reach agreement on an action plan (Albania did not join until 1990). This plan specifically called for:

- integrated planning of the development and management of the resources of the Mediterranean basin;
- co-ordinated programme of research, monitoring and exchange of information; and
- development of a framework convention and related protocols.

Shortly after the adoption of the action plan the Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL) was launched to provide the assessment of the sources, levels and effects of pollutants on a continuous basis. The programme was based on networks of national institutions and on an agreed common methodology. The number of institutions participating in the network has grown and, today, the programme has more than eighty active members.

Within a year of the adoption of the action plan, negotiations were completed for a legally binding agreement which would serve as the legal framework of the action plan. The agreement, in a form of a convention (the Barcelona Convention) supplemented by two protocols (control of dumping and co-operation in cases of pollution emergencies), was signed in early 1976 by 11 countries and the Commission of the European Communities (CEC). Less than two years after it was signed, the convention and the two protocols entered into force, and today 20 Mediterranean countries and the CEC are parties to them. In June 1995, the Conference of Plenipotentiaries to the Barcelona Convention adopted further amendments to the Convention and to the Dumping Protocol, as well as a new Protocol concerning Specially Protected Areas and Biological Diversity. There are now 5 protocols to the Barcelona Convention.

The assessments carried out after the adoption of the Mediterranean Action Plan (MAP) revealed that land-based sources were the single most significant source of pollution. As a result, negotiations for an additional protocol on

approaches to curb pollution from land based sources was initiated in 1977. The negotiations proved to be lengthy and difficult, as they touched on the sensitive subject of economic development, transfer of technologies, and mutual assistance. While recognising the need for urgent action, the developing countries rightly felt that the developed countries, which contribute about 80 per cent of the Mediterranean's land-based pollution load should not restrict legitimate development goals of the developing country partners. The protocol was finally adopted and signed (Athens 1980) by 12 Mediterranean countries and the CEC and entered into force in 1983 and today 16 Mediterranean countries (all except Lebanon and Syria) and the CEC are parties.

In parallel with the efforts to deal with the problems related to marine pollution, another protocol dealing with specially protected areas was signed (Geneva, 1982). Large scale study of existing and expected Mediterranean development, the Blue Plan, was undertaken; and a series of projects were initiated as part of the action plan's Priority Action Programme. They dealt with subjects such as; soil protection, tourism, rehabilitation of historic settlements, freshwater resource development, solid and liquid waste disposal, renewable sources of energy, aquaculture, environmental impact assessment, coastal zone planning and management.

Realising that the action plan would not solve the urgent environmental problems of the Mediterranean basin at the pace it was progressing, contracting parties adopted the Genoa Declaration (1985) committing them to ten targets to be achieved as a matter of priority during the second decade (1986-1995) of the Mediterranean Action Plan. When adopting the Genoa Declaration, the parties also adopted a long-term (10 year) programme for the implementation of the Athens protocol. This envisages that a detailed assessment be prepared for each pollutant or groups of pollutants listed in the annexes of the protocol, accompanied by firm proposals for their control. Among other issues, it also envisages the preparation and adoption of an annex to the protocol which would deal with the control of atmospheric pollution of the Mediterranean from land based-sources.

Detailed assessments and proposals for control measures have been prepared for 12 pollutants or groups of pollutants listed in the annexes. Eight of the proposed measures (for example, microbiological quality of bathing and shellfish growing waters; mercury in seafood and in discharges; and discharges of used lubricating oils, cadmium, organotins and organohalogens) have already been adopted, formally, by the parties to the Barcelona convention, and several more are being considered for adoption in the near future. The technical negotiations on the annex on control of air pollution have been completed and the annex may soon be adopted.

By 1987, it had become obvious that the action plan lacked a common focus and was spreading its resources and activities too widely. This reduced the ability of the action plan to concentrate on the major issues and thus limited its effectiveness in providing co-ordinated environmental policies for the region. Therefore, the contracting parties decided to refocus the action plan on its original central goal that is, on integrated planning of the development and management of the resources of the Mediterranean basin. The gradual refocusing of the action plan

was attempted through a series of integrated coastal zone management pilot projects, taking full advantage of the past achievements of the action plan as well as of ongoing activities and structures adapted to the newly defined central goal.

UNEP co-ordinates the implementation of the action plan according to a precise workplan and budget approved at biennial meetings of the parties to the Barcelona Convention. For the technical co-ordination of certain specific activities carried out under the action plan international regional centres have been established (e.g. the Regional Marine Pollution Emergency Response Centre in Malta). In some cases national institutions assumed the role of regional activity centres.

Although it is difficult to assess the influence of the action plan, on the environmental policies and practices of Mediterranean countries, there is direct and indirect evidence that a large number of actions have been taken by many countries in conformity with the requirements and provisions of the action plan and the convention. A few examples for such actions are highlighted in the following paragraphs.

There are no precise statistics on the status of sewage treatment and disposal systems in all Mediterranean countries. However, the increasing number of beaches monitored in the framework of MED POL, which meet the required quality standards (78 per cent in 1983 and 96 per cent in 1987) provides indirect evidence that the treatment and disposal of sewage is improving in many parts of the Mediterranean.

In the Mediterranean coastal zone of France (1 700km of coastline, 5.8 million permanent residents and 22.2 million tourists annually) the proportion of treated sewage has increased from 22.5 to 66.5 per cent, in the period 1980-1990 and presently 93 per cent of the population is served by public sewerage systems. Plans have been developed to provide the major coastal settlements and tourist complexes of Cyprus with communal sewage treatment and disposal systems. Between 1973 and 1988 the amount of pollutants discharged into the sea from one of the Mediterranean's largest industrial complexes, at Fos-Berre in France was reduced by over 90 per cent. Reception facilities for wastes from ships exist in 50 Mediterranean harbours, although most of them are below the required capacity or standards. Finally, environmental impact assessment has been introduced in most Mediterranean countries as a standard requirement for all major development projects which may have significant environmental implications.

The role of UNEP, as the secretariat of the action plan, was essential for its rapid development. UNEP, as an independent extra-regional organisation, was able to mobilise the countries of the Mediterranean basin around the most complex programme ever undertaken by them jointly. The active and assertive leadership provided by UNEP, and the use of UNEP's financial resources to launch the agreed programme were of crucial importance in the early phases of the action plan. The action plan has been financially self-sufficient since 1984. Today practically all expenses are borne by the contributions from the contracting parties to the Mediterranean Trust Fund established in 1979.

At the June 1995 Conference of Plenipotentiaries to the Barcelona Convention, MAP Phase II was designed, taking into account the achievements and shortcomings of MAP's first twenty years of existence. The Parties also adopted Priority Fields of Activities for the Environment and Development in the Mediterranean (1996-2005) as an appendix to the Barcelona Resolution on the Environment and Sustainable Development in the Mediterranean Basin.

Updated information regarding the Mediterranean Action Plan may be obtained from Mediterranean Action Plan Co-ordinating Unit (Mr. Lucien Chabason, Co-ordinator, Tel: 30.1.7253190, Fax: 30.1.7253197).

The Black Sea Programme

The Black Sea Environmental Protection and Management Programme, financed by the Global Environmental Facilities (GEF), has been carried out with the aims of: the preparation of the Black Sea Action Plan, the strengthening and creation of a regional capacity for managing the Black Sea ecosystem and facilitation of the preparation of sound environmental investments which are primary objectives of the Contracting Parties of the Convention on the Protection of the Black Seas Against Pollution (Bucharest Convention). The Co-ordinating Unit of the Programme, and the Black Sea Commission and its Secretariat regarding the Bucharest Convention are located in Istanbul. Further information about the Programme could be obtained from GEF Black Sea Environmental Programme Co-ordination Unit (Dr. Laurence Mee, Co-ordinator, Tel: 90.212.5745174, Fax: 90.212.5742874).

Annex 5

ADVISORY CHECKLIST FOR PREPARATION OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS FOR PROJECTS AFFECTING THE MARINE AND COASTAL ENVIRONMENT

In situations where an EIA is deemed necessary, the following checklist may be used as guidance for the EIA work and the form/content of the EIA Report. This checklist is based on a format devised by FINNIDA in their draft “Guidelines for Environmental Impact Assessment in Development Assistance” (1989).

I. Existing environment and site selection considerations

- Assess whether there are possible alternative sites or locations which could be considered in project siting.
- For each alternative site, whether there are, within or nearby, assess natural conditions and man-made activities.
- Whether the project location might cause conflicts with the above-mentioned land or resource uses, interests, values or communities.
- Whether the project locations are affected by major natural hazards (e.g. hurricane, volcanic activity).
- The extent of existing development in the area and whether there are already significant environmental problems (e.g. water quality, coastal erosion, habitat damage, over-fishing) in the project vicinity.
- Any relevant human health/disease concerns in the project vicinity.
- Whether the surrounding area can provide adequate supporting facilities.
- Whether there are relevant environmental policy (including EIA) guidelines.
- Whether there are any relevant planning/land use policy considerations (including coastal zone management plan, economic development zones).
- Whether there is relevant international legislation (Ramsar, SPA sites, international waterways, etc.).

II Site preparation and construction

- Identify relevant site preparation and construction activities and components.
- Identify and predict impacts on natural and socio-economic conditions.

III. Project operation

- Identify alternative design, manufacturing processes, raw materials, fuels, etc., which could be considered.
- Identify for each alternative relevant activities/components.
- Identify the extent to which discharges (particularly to marine/estuarine environments) may cross regional or national boundaries.
- Identify and predict impacts on natural and socio-economic environment.

IV. Mitigation and monitoring measures

- Plan adequate mitigation of harmful impacts.

Annex 6

**RECENT EXAMPLES OF MAJOR PROJECTS
RELATING TO THE PROTECTION OF THE MARINE
ENVIRONMENT**

The 1990s have seen a significant shift in the manner in which UN and multilateral funding agencies fund technical assistance activities and the roles and responsibilities of recipient nations and specialised agencies who act as executing agencies. The International Maritime Organisation has been named as the executing agency for two regional programmes for the prevention and management of marine pollution.

In 1994, a five-year \$8 million East Asian Seas project funded by UNDP and the Global Environment Facility (GEF) was approved. It is designed to reduce pollution from land- and sea-based sources. The programme objectives are:

- to strengthen national and regional capabilities in marine pollution prevention and management;
- to develop a regional marine pollution monitoring and information management network;
- to strengthen the ability of countries to implement and enforce international marine pollution conventions and codes;
- to develop and initiate sustainable financing mechanisms which will support ongoing activities beyond the life of the project.

Also in 1994, a \$5.5 million initiative was authorised to help solve the problem of how to dispose of ship-generated waste in the Wider Caribbean area. The aim of the Wider Caribbean Initiative for Ship-Generated Waste (WCISW) is to promote the widest possible ratification and implementation of MARPOL 73/78. The WCISW addresses the legal, operational and financial aspects of providing the facilities for the reception of wastes from ships, so that they can be disposed of without harming the environment. Future work will aim to encourage the international donor community to invest in port reception facilities, waste management infrastructure projects, and institutional training programmes to ensure full implementation of the Convention, including the special area rules.

Currently work is in progress to quickly implement the OPRC Convention (May 1995 entry into force) by assisting nations with the development of national contingency plans to prepare for and respond to major oil pollution incidents. A series of three model training courses are being finalised for guiding nations in training their national authorities and industry response teams.