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## INTEGRATED PLANNING OF THE DEVELOPMENT AND MANAGEMENT OF THE RESOURCES OF THE MEDITERRANEAN BASIN

### Introduction

1. The levels of local, regional and even global degradation of the Mediterranean Sea now being observed and the time that must elapse before the results of programmes of scientific research on the dynamics of the sea and on the impact of the expansion of various human activities in and around the Mediterranean become available, require consideration of the adoption of a plan of action designed to limit, if not halt, this process of degradation. One of the essential aspects of such a plan would be to promote the co-ordination of activities by international governmental and non-governmental organizations relevant to this problem. Similarly, priority should be given to the signing of a convention between the coastal countries on limiting the discharge of pollutants.
2. However, measures of this kind cannot be fully effective unless they are worked out, firstly, in the context of an effort to acquire a comprehensive scientific understanding of the dynamics of the Mediterranean eco-region and, secondly, within a global framework of long-term management of resources aimed at harmonious development. It is this second aspect that the present note seeks to expand on and to translate into proposals drawn up in purely tentative terms.
3. These proposals regard the Mediterranean eco-region as a coherent structure, for beyond its diverse ecological and socio-cultural conditions, the region possesses a fundamental unity both geographically and historically and, hence, culturally; never has the concept of unity in diversity seemed more appropriate than in the case of the Mediterranean region.
4. The adoption of such proposals, in the context of a long-term approach, is particularly urgent because the Mediterranean is a highly vulnerable and practically enclosed environment which has always been marked by relatively scanty biological resources and which is exposed to industrial and agricultural pollution, to excessive sedimentation due to severe erosion, and to the pollution caused by shipping, hydrocarbons and the expansion of tourism. In this regard, the attention of participants is drawn to the texts of three draft international instruments, regional in scope, which are placed at their disposal for information:

- draft convention on the Mediterranean;

- draft protocols (with technical annexes) on the prevention of pollution of the Mediterranean Sea by dumping from ships and aircraft (UNEP/WG.2/INF.4 & 5), and on co-operation between States in case of accidents causing pollution of the marine environment.

I. Environment and development: towards a strategy of harmonization

5. The problem of the environment has become an important problem of the day because of a renewed awareness of the true dimensions of the physical and natural base of human societies. The environmental crisis, caused by the use of methods of exploiting resources that have disregarded the balance between social processes and natural processes, has led to a questioning of the types of development that were in fashion until quite recently.

6. From an operational viewpoint, there are three aspects of the environment that must be considered: the method of exploiting renewable and non-renewable natural resources, the space available and how it is used, and, lastly, the quality of the resulting environment with respect to the population and its living conditions and to local, regional or global ecological balances. It is by analysing and understanding the close relationships between those three aspects that the environment can be integrated into development planning. Management of the environment, far from being in conflict with development, is one of the essential dimensions of development. It will henceforth have to be incorporated into the development process and will have to occupy an increasingly important place in that process in the decades to come.

7. A strategy for the harmonization of development and long-term management of the environment ought to take advantage of the room for manoeuvre that exists in the relations between the various levels of productive activity:

(a) composition of the social product and patterns of consumption (durability and quality of products, relative proportions of private and public goods, of goods and services, etc.);

(b) technological options for attaining a given social product, in which such additional criteria should be taken into account as:

- extent to which resources are tapped and intensity of consumption of energy,

- impact on the quality of the environment,

- organization of space resulting from style of consumption,

- physical planning and siting, which are related to questions of alternative capabilities, sensitive points in the environment and possible incompatibilities between activities in terms of their demands and effects;

(c) the long-term management of resources and the search for patterns of utilization that exploit the specific characteristics of resources and must become major considerations.

8. There is unquestionably a close connexion between decisions made at various levels even if advantage can be taken of the existing room for manoeuvre. Consequently, thought must be given to alternative styles of development. Adoption of the above-mentioned strategy for harmonization means advocating a long-term development style having the following main features:

- (a) In each eco-region, the effort is directed to developing specific resources; special attention is paid to satisfying the basic needs of the population for food, housing, health and education.
- (b) Natural resources are identified, developed and managed in a perspective of diachronic solidarity with future generations; the campaign against waste and the maximum utilization of renewable resources, more particularly in the case of energy, is to help to put off the moment when non-renewable resources will be exhausted.
- (c) The negative effects of human activities on the environment are mitigated by using production processes and organizational structures involving all possible complementary elements and utilizing waste for productive purposes;
- (d) At the technological level, a steady escalation of pollution accompanied by measures to control it does not constitute an acceptable solution. Accordingly, novel techniques should be sought which cause little or no pollution and are suited to ecological conditions while satisfying economic criteria.
- (e) In the case of developing countries, the approach outlined above calls for the selection of strategies which are centred largely on meeting the basic needs of the population and cater for employment objectives.

9. In planning to combat degradation of the Mediterranean region, it is advisable to examine activities undertaken with the assistance of international bodies with a view to assessing the effects - beneficial or otherwise - of such activities on the environment. It would be useful if information on the experience gained in such activities were readily accessible to all interested parties.

10. In view of the dimensions of the environment in the Mediterranean eco-region, and more particularly of the sea's dynamics, the strategy of harmonizing the environment and development should be internationalized and this calls for co-ordination of national policies and for co-operation in preparing a number of programmes. However, despite the historical community and common responsibility of the coastal countries for the future of the Mediterranean Sea, the ecological and social diversity of the countries and areas implies a search, in every particular case, for novel solutions to develop resources and utilize space, since there cannot be universal solutions for the entire Basin. In this connexion, the importance must be emphasized of setting up a research infrastructure suited to each coastal country, for which international assistance should be envisaged.

11. With a view to satisfying the basic needs of the populations and, first and foremost, the food requirements of the least favoured strata, the central problem must be seen as that of rebalancing the industrial and the agricultural development of the coastal countries. The trends towards a new international industrial geography originating in new international economic and political conditions have to be assessed in the light of their effects on the Mediterranean environment, their capacity to make wise use of the potential of available resources their contribution to the satisfaction of social needs.

## II. Proposals for action

12. The various international organizations, including FAO, WHO, UNESCO and more particularly its Intergovernmental Oceanographic Commission, WMO, IAEA and OECD, have already embarked on a large number of projects in the Mediterranean region. It is on this basis that UNEP, in keeping with its co-ordinating role, might encourage the mounting of an overall programme aimed at making greater headway.

13. The proposals that follow are to be regarded as preliminary elements of such a programme. The purpose of these proposals is to seek a better management of the resources of the Mediterranean Basin; the proposals concerning the use of space and the siting of industries are aimed solely at lending support to those made in relation to resources.

A. At resource level.

14. Soils, water and sun are among the principal resources of the Mediterranean Basin.

Soils

15. The Mediterranean Basin is one of the regions of the world characterized by severe erosion. In addition to its effects on agricultural potential, the consequent soil degradation has resulted in a massive movement of sediment into rivers and then towards the Mediterranean Sea. This excessive input of rich material will, if prolonged, lead to the eutrophication of the Sea. Moreover, a characteristic of some of these sediments is to absorb the pollutants present in the water and bring them down to the sea, where the meeting of acidic and basic substances in the estuaries results in a process of flocculation which causes the pollutants to settle there on the bottom.

16. The highest priority should thus be given to soil renewal and protection programmes. Among such programmes, mention must be made of the national programmes and those supported by inter-governmental organizations, particularly UNDP and FAO. An analysis of the effects of alternative methods of cultivation should be made for each edapho-ecological type in order to determine the most suitable techniques. In addition, implementation of a general programme for the reafforestation of the Mediterranean Basin would, by controlling the phenomenon of erosion, reduce the transfer of pollution to the sea and reduce the sedimentation process to reasonable proportions. Finally, a campaign should be undertaken against all causes of erosion and soil degradation.

17. The development of resources to satisfy needs and consideration for the constraints imposed by their renewal will necessarily have effects on physical planning projects providing for the establishment of industries or tourist facilities. These effects are particularly significant for the coasts.

Water

18. In the face of growing needs, water has become a rare resource and often a factor limiting development. It is therefore necessary to introduce overall management of the water cycle. Systematic consideration of the various uses of water should be started in order to determine the extent to which both quantitative and qualitative requirements may be limited, by turning to new techniques (recycling of industrial water, limitation of evaporation and seepage through insulated systems), and to new patterns of the cycle (all uses do not require the same quality of water). What is required, in fact, is to extend the cycle to the maximum before the water returns to water courses and the sea; research on the growing of crops in brackish water might lead to major breakthroughs removing the water constraint in agriculture.<sup>1/</sup>

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<sup>1/</sup> See document UNEP/WG.2/3 on the programme for research monitoring for the Mediterranean.

19. It would appear from the studies made so far, that while the western part of the sea is affected mainly by pollutants of industrial origin, the eastern part is being affected more by pollutants from pesticides and fertilizers. The development and dissemination of methods for the biological control of nuisances in these regions would make it possible to improve the state of the Mediterranean.

20. Traditionally, water problems are dealt with separately by the various disciplines (hydraulic engineers, and others). Therefore, if the task defined above is to be undertaken, there is a clear need for interdisciplinary training and research with respect to water. Accordingly, the Governments of Mediterranean States should consider whether existing institutions are sufficiently equipped to undertake this task or whether they need to be strengthened and their work on water co-ordinated. In this connexion, the attention of participants is drawn to the results of a study mission on the scientific laboratories and institutes of the Mediterranean region, (UNEP/WG.2/INF.6).

21. In view of the importance of the nutritional problems in some Mediterranean countries, the exploitation of the Mediterranean's potential for aquaculture should be regarded as a development priority, particularly since fishing possibilities have been and will be reduced. Lagoons and closed aquaculture systems appear to be the most rewarding for the region. In this connexion, it would be useful to begin by refining the estimates of potential made by FAO and the General Fisheries Council for the Mediterranean.<sup>1/</sup> Thereafter, along with the current efforts of certain industrialized countries that promote industrial aquaculture to supply luxury markets, considerable efforts should be made to develop relatively simple eco-technologies to satisfy the nutritional needs of local populations. In this regard, aquaculture presents two problems, namely, that of the planning of coastal zones and that of water pollution. If wastes are to be re-used, possibilities should be examined for fertilizing aquaculture basins by means of organic waste-matter, which at the same time can serve the needs of biological treatment of sewage.

22. Similarly, in view of the nuclear programmes of several Mediterranean countries, which will mean the establishment of nuclear power stations on the coast, careful consideration should be given to the possibility of using thermal wastes for aquaculture. In addition to the technical management problems involved (the power stations have to be stopped periodically for maintenance work) it is necessary to mention the difficulties inherent in the quality of the water that will thus be supplied. The possible utilization of such waste water obviously presents some major health control problems which manifestly must be tackled. Work on this subject has been started under the auspices of WHO.

23. Lastly, a systematic effort should be made to discover where agriculture and aquaculture complement each other, since the wastes of one may prove useful to the other, and a common infrastructure (for conditioning, processing and marketing) should be introduced wherever possible.

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<sup>1/</sup> FAO estimates are of the order of one million hectares of brackish water of varying potential yields in the Mediterranean Basin; in France, for example, estimated yields for mussels and oysters are between 5,000 and 8,000 kg per hectare.

### Solar Energy

24. From the point of view of sunshine, the Mediterranean Basin is a privileged region. If used systematically for certain purposes (solar pumps, water heaters, driers, small engines for rural workshops), solar energy would make a major contribution towards improving the agricultural production and living conditions of the rural population. What is needed is to intensify considerably current efforts to find technologies which are simple, easily learned by most people, inexpensive and requiring very little maintenance.

25. Particular attention should be paid to photosynthesis as a means of capturing solar energy. Research should be concentrated on studying different forms of intensive agriculture suited to ecological and social conditions, possibly combining, for example, hydroponics and closed-circuit aquaculture. <sup>1/</sup>

26. The Governments of Mediterranean States should examine the capacity of existing institutions to develop the utilization of solar energy. The results of research already undertaken or to be undertaken could be disseminated as part of a regional programme. Such a programme could also provide for the training of specialists in solar ecotechnologies, and could serve to co-ordinate national research activities in this field and to launch a certain number of pilot projects. It could also involve the evaluation of alternative techniques as regards impact on the environment, and should be an integral part of a prospective study of economic relationships between Mediterranean countries.

#### B. At the level of physical planning for industrial and tourist development

27. For coastal areas in particular, an endeavour should be made to harmonize the many uses suited to the various zones (aquaculture, agriculture, tourism, heavy industry such as the iron and steel and petrochemicals, nuclear power stations). Such harmonization must take account of the suitability of the environment for a particular activity, its absorptive capacity and its sensitivity to various inroads; consideration must be given not only to the land and marine environment and their interaction at the local level, but also to the cumulative nature of certain effects and the over-all dynamics of the sea, which may bring about inter-regional transfers of pollutants. This problem can only be solved by an exact analysis, for each zone, of the environment's dynamics and by systematic investigation of the impact of the various projects and their requirements on the environmental quality desired; it is on the basis of such data that the problem of possible compatibilities or incompatibilities can then be approached. It is for each State, of course, to implement such a procedure if it so desires. Governments will certainly wish to consider how they can use existing international machinery to assess the effects of economic activities on the environment. Some lessons may be learned, for example, from the OECD project on environmental degradation caused by coastal development and on the relationship between the siting of industrial plants and large tourist developments.

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<sup>1/</sup> Insofar as new forms of intensive agriculture are concerned, careful study should be given to the experiment with "sand crops" (enarenados) in southern Spain.

28. One of the best ways of making various activities compatible and of reducing pressure on the land and marine environment is the re-use of waste for productive purposes, and the incorporation of recycling in production lines. Governments might, in given circumstances, consider how to promote research and publicize results in this field.

29. Any redeployment of industries should take account of both the objectives of development and the protection of the Mediterranean region. To this end, a number of factors should be borne in mind as guidelines for such redeployment and for deciding on siting policies; they include, inter alia:

the absorptive capacity of the environment in certain Mediterranean areas, from the point of view of both pollution and overcrowding,

the proximity of polluting or non-polluting renewable and/or cheap sources of energy,

the volume of maritime transport and its implications for the environment,

the possibilities of using renewable resources in the process of local industrialization.

30. This redeployment can only be directed through co-ordination of the industrial policies and the long-term physical planning policies for the Mediterranean coast followed by each coastal State. Such co-ordination should be established sector by sector and perhaps be reflected in long-term supply contracts.

31. High priority should be given to studying trends in redeployment and means of controlling and channelling it in a direction that suits the various coastal States and the Mediterranean eco-region as a whole. Such a project might be the subject of consultations with UNIDO, whose preparatory work for the Second General Conference to be held at Lima is also directed towards the expansion of industrial co-operation among the developing countries and between those countries and industrialized countries.

32. The spread of tourism over a large part of the coastal area has been accompanied by important environmental problems. Those problems could be solved by a planning policy which brought about an appropriate synthesis of concern for conservation and expansion of tourist installations. The regulations in force in several coastal countries for the protection of the seacoast from pollution by the tourist industry should be strengthened and made general throughout the Mediterranean Basin. Clearly, any tourism development policy which ignores protection of the environment is doomed to failure. The measures now envisaged for protection of certain regional biotopes of great scientific value deserve support. But detailed studies of two kinds are needed: first, studies on the assessment of the effects of tourism on the environment in each type of region, and secondly, studies on alternative models of tourism organization aimed at minimizing negative ecological and social consequences.

C. At the level of scientific knowledge of the dynamics of the Mediterranean eco-region

33. Along with the measures recommended above, the effort should be intensified to acquire a comprehensive scientific understanding of the processes affecting the Mediterranean eco-region.<sup>1/</sup> That efforts could be based on the development of a model for the Mediterranean that would bring out in localized and differentiated terms the effects of human activities on the environment. Ultimately, this could lead to the establishment of standard guidelines for utilization of the coastal area.

34. The data base for the region, and particularly for the sea, must also be expanded: what level of degradation has been reached? How is pollution shifted from one country to another, from one coast to another? Which zones have the most biological resources and which are the poorest? To answer such questions and many others, a permanent observation and monitoring system should be set up; in this connexion, a satellite remote sensing programme might be very useful.

D. At the level of eco-development programmes

35. The above outline of a new style of development based on the harmonization of development and long-term environment management may be illustrated in certain UNEP programmes grouped under the heading of eco-development, which will principally cover problems of regional and micro-regional development, in particular in rural and coastal areas, and problems of urban renewal. The cultural and ecological diversity of the Mediterranean region provides an exceptional opportunity to enrich this concept by a comparative study of the experiments to be conducted in the various Mediterranean eco-systems. In this connexion, the following proposals might be considered:

(a) Urban eco-development should seek to improve the living conditions of sectors of the marginalized urban population that is usually reduced to being crowded into shantytowns. Such town planning, based on the active participation of the people concerned when priority needs and specific projects are determined, would endeavour to find solutions requiring little capital and make use of local building materials. In urban areas characterized by undernourishment, such planning should be so designed as to enable, if possible, the population to have supplementary food sources of their own (small-scale animal husbandry, kitchen gardens).

(b) For coastal rural areas, efforts to find elements of complementarity between aquaculture and agriculture should, as already stated, constitute a line of research of major importance.

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<sup>1/</sup> See document UNEP/WG.2/3, which describes a number of pilot research and monitoring projects for the Mediterranean.



(c) An eco-development programme for desert and semi-desert zones should endeavour to develop new forms of farming. In some countries, techniques involving a considerable first investment might conceivably be tried. 1/

E. At the level of institutional machinery for co-ordination and co-operation among the coastal States of the Mediterranean

36. The implementation of the measures proposed implies the establishment of co-ordination and co-operation between States and those responsible for various economic activities, between States and international institutions and between States themselves. It would be for governments to consider whether such co-ordination and co-operation can be achieved within the existing international institutional machinery, or whether other machinery should be established. It would be for such machinery to collect the data needed for more specific co-operation and co-ordination. This would mean an exchange of data as a minimum, or it might entail the organization of co-operation for the implementation of given projects or programmes. Contracts between industries, association of the institutes of various countries, preparation of codes of conduct, systems of guarantees, and the setting up of co-ordination bodies on a subject or regional basis are only some of the solutions which might be welcome and should be explored.

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37. The establishment of co-ordination and co-operation among the coastal States of the Mediterranean is a delicate task which requires the political will of each and respect for the interests of all. Only by working together can these States hope to ensure the harmonious development of the region while preserving its scenic beauty, which is its common and irreplaceable heritage.

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1/ For example, sealing of underground strata to promote water retention by injection of an asphalt obtained as a by-product of oil refining; the equipment necessary for injection of the asphalt seems to have been developed by Japanese researchers, who are also proposing experimentation with genetic varieties of plants adapted to brackish water.