

INTEGRATED WATER MANAGEMENT TO ADDRESS ENVIRONMENTAL DEGRADATION IN THE MEDITERRANEAN REGION

May 2002

IUCN Mediterranean Office



Prepared by
Arturo López Ornat and Carmen Morales
PANGEA Consultores SL
pangea@pangea21.com
(34) 91 5443848

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ACRONYMS

CAP	(European Union) Common Agricultural Policy
CBD	Convention on Biological Diversity
CCD	Convention to Combat Desertification
CEDARE	Centre for Environment and Development for the Arab region and Europe
CIHEAM	Centre International des Hautes Etudes Agronomiques Méditerranéens (International Centre for Advanced Mediterranean Agronomic Studies)
EU	European Union
FAO	Food and Agriculture Organisation
GNP	Gross National Product
GWP	Global Water Partnership
ICID	International Commission on Irrigation and Drainage
IFAP	International Federation of Agricultural Producers
IME	Institut Méditerranéen de l'Eau (Mediterranean Water Institute)
IUCN	The World Conservation Union
IWM	Integrated water management
IWMI	International Water Management Institute
MAP	(UNEP) Mediterranean Action Plan
MCSDE	Mediterranean Commission on Sustainable Development
MEDTAC	Mediterranean Technical Advisory Committee
MedWet	Mediterranean Wetlands Initiative
METAP	Mediterranean Environmental Technical Assistance Programme
MIO/ECSDE	Mediterranean Information Office
MWN	Mediterranean Water Network
SEMIDE	Système Euro-méditerranéen d'Information dans le Domaine de l'Eau
SMAP	Short and Medium-term Priority Environmental Action Programme
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WHO	World Health Organisation
WWC	World Water Council
WWF	World Wide Fund For Nature

EXECUTIVE SUMMARY

Worldwide, the integrated management of river basins is widely recognized as one of the most basic elements of sustainable development. In the Mediterranean region it is even more important, both for human development and the environment.

Because of its natural conditions (climatic and topographic) the Mediterranean basin is prone to frequent droughts and floods, including violent seasonal runoff on dry river beds, some of which are used for human settlement. Forest fires and soil erosion are a frequent consequence of these events. Water availability is one of the most pressing constraints to human development in the region: a growing population and increasing demands by irrigated agriculture are placing ever greater stress on freshwater ecosystems, while increasing numbers of tourists in the dry summer season exacerbate the problem. These demands have led countries in the region to maximize supply-side solutions for growing human needs, with limited understanding of the effects at the water catchment (basin) scale.

Water resources are overexploited and distributed irregularly in the region. They are also becoming scarcer. Currently, agricultural activities are responsible for 72% of water consumption in the Mediterranean basin, while the industrial sector uses 17% and 10% goes to domestic supply. Besides the excessive consumption of water, more widespread irrigation has other effects: gradual degradation of the most fertile soils, particularly through increasing salinity, and the accumulation of chemicals in soil and water.

To date, the expansion and intensification of human use of natural resources has already claimed many environmental resources: over 50% of all freshwater wetlands, over 70% of available fresh water, and a high percentage of river basin ecosystems. These include forests as well as the rivers themselves, some of which have been reduced to a seasonal trickle, or stagnant and polluted pools. Around 2,000 dams and water storage and distribution systems, with net water losses in excess of 30% from evaporation and seepage, have fragmented river ecosystems, threatened minimum ecological water flows during long, dry periods, and reduced storage capacity as a result of siltation. Coastal fisheries meanwhile have shrunk, coastlines have eroded and river deltas have subsided as nutrients and sediments are held back by dams. These adverse effects are expected to become more serious as a warming climate brings further desertification, higher erosion in watersheds and higher sea levels. To avoid, or at worst to ameliorate, these negative consequences requires sustainable management of river basins.

As the consumption of renewable water resources passes through the recognized limits of sustainable use, it is clear that there are few new supply-side solutions. Better use must be made of existing resources, and a range of programmes is underway with this objective in mind. At the same time it is important to manage the transition from the process of constantly diverting and removing water from natural systems, the trend of the last 100 years, towards trying to look at how to provide water for ecosystem support as a contribution to sustainable development.

If sustainable development is to be achieved, water distribution must seek an equilibrium between the different competing sectors, taking into equal consideration the social, economic and environmental needs. River basins, lakes and aquifers must be the primary framework for water resource management. To this end, the necessary institutional and participative mechanisms need to be promoted to make current water diversion practices more environmentally sustainable.

This concept has been broadly endorsed through 'Agenda 21 for the Mediterranean', drawn up in Tunis in 1994 and accepted by all Parties to the Barcelona Convention. This states that *"Integrated water resources management is based on the perception of water as an integral*

part of the ecosystem.....water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perennality of the resource, in order to satisfy and reconcile needs for water in human activities'. Further reaffirmation of this approach came from the World Water Forum and the Bonn International Conference on Freshwater (2001). These high-level meetings raised the need for greater dialogue between the agricultural and environmental sectors to develop a shared vision on water management, a knowledge bank to sustain dialogue and a network of field projects at local levels and river basins, implementing innovative solutions to improving the sustainability of water provision for agriculture and for nature.

Among the barriers to better water planning and use are inappropriately low water prices, inadequate information on new, efficient technologies, inequitable water allocations, building dams, and government subsidies for growing water-intensive crops in arid regions.

The first challenge is ensuring sustainable yields of water through all seasons and maintaining the capacity of basins to deliver clean water supplies. For the Mediterranean region, this means the regeneration of vegetation cover in most river basins, land-use planning schemes, reforestation, prevention of fires, overgrazing and resultant erosion, and bringing rates of groundwater extraction to within sustainable rates.

The second challenge is reducing water demand. Most importantly, agriculture as the main user of the resource (with the possible exception of the Balkan countries, France and Turkey) should be much more water-efficient everywhere.

Experience to date shows that water pricing and decentralizing irrigation management, placing responsibility directly with the water users, are amongst the main tools for water saving. Many programmes are underway on this issue in the Mediterranean region.

Lastly, the document raises the question of how to maintain allocation of water to the environment when extraction begins to reach levels that threaten ecosystem functions and integrity. Will water resource managers return water obtained through efficiency gains to the natural system, will they at least be used to offset the need for additional new supplies, or will they simply be used to extend irrigated area? A number of programmes in the region are developing methods and approaches which address this issue.

RÉSUMÉ

Dans le monde entier, on s'accorde généralement à reconnaître que la gestion intégrée des bassins fluviaux est un des aspects les plus importants du développement durable. Dans la région méditerranéenne, cette gestion est même essentielle, à la fois pour le développement humain et pour l'environnement.

En raison de ses conditions naturelles (climatiques et topographiques), le bassin méditerranéen est fréquemment sujet à des inondations et à des sécheresses, à des incendies de forêt, à l'érosion des sols et à de violents ruissellements saisonniers sur les lits majeurs des rivières, où des constructions ont souvent été édifiées par l'homme. Un des problèmes les plus pressants qui limite le développement humain dans notre région est la disponibilité de l'eau. L'augmentation de la population, la demande croissante d'irrigation, la surexploitation des ressources en eau douce des écosystèmes et la demande supplémentaire des vacanciers en été, pendant la saison sèche, ont conduit les pays à mettre en valeur autant que possible des sources d'approvisionnement nouvelles pour satisfaire ces besoins croissants, alors même que la compréhension des relations d'interdépendance à l'échelle du bassin reste limitée.

Les ressources en eau sont surexploitées et irrégulièrement distribuées dans la région. Elles deviennent aussi de plus en plus rares. Actuellement, les activités agricoles occasionnent 72 % de la consommation d'eau dans le bassin méditerranéen (contre 17 % pour le secteur industriel et 10 % seulement pour l'usage domestique). Outre une consommation excessive, la généralisation de l'irrigation a d'autres effets : dégradation graduelle des sols les plus fertiles, notamment en raison de la salinisation, et accumulation de produits chimiques dans les sols et les eaux. L'homme et la nature en subissent les conséquences à travers la dégradation des sols, la perte de zones humides et la réduction de la biodiversité des écosystèmes.

À ce jour, l'expansion et l'intensification des activités humaines ont déjà provoqué la disparition de beaucoup trop de ressources naturelles : plus de 50 % de toutes les zones humides, plus de 70 % de l'eau disponible et un pourcentage élevé des écosystèmes du bassin, non seulement les forêts et les terres non cultivées, mais aussi les rivières elles-mêmes ; certaines ont été réduites à un filet d'eau saisonnier, ou sont devenues un égout stagnant et pollué. Les quelque 2000 barrages construits sur nos cours d'eau, les systèmes de stockage et de distribution, avec des pertes nettes d'eau excédant 30 %, ont augmenté l'évaporation et fragmenté les écosystèmes fluviaux. Les flux d'eau écologiques minimums ne sont plus garantis pendant les longues périodes de sécheresse, et les capacités de stockage ont diminué du fait de l'envasement. Par ailleurs, les ressources halieutiques côtières se réduisent comme peau de chagrin, quand les éléments nutritifs sont retenus dans les barrages. L'érosion littorale s'accélère tandis que les deltas sont frappés de mort lente en raison de l'insuffisance des sédiments. On s'attend à ce que ces effets indésirables aillent en s'accroissant sous l'effet du changement climatique, qui augmente la désertification et l'érosion des berges et fait monter le niveau des mers sur les côtes. La question est de savoir comment éviter ces conséquences négatives et de tenir compte de ces paramètres dans nos efforts visant à mettre en place de nouvelles formes de gestion des bassins hydrographiques, plus soutenables à long terme.

La distribution de l'eau doit rechercher un équilibre pour satisfaire la demande concurrentielle des différents secteurs. Pour le développement durable, il est nécessaire de tenir compte des dimensions sociale, environnementale et économique de l'eau et des relations d'interdépendance entre les eaux de surface et souterraines, l'aménagement du territoire et le besoin de préserver l'intégrité des écosystèmes. Les bassins fluviaux, les lacs et les aquifères doivent constituer le cadre essentiel de toute politique de gestion des ressources en eau. À cette fin, il importe de créer et de promouvoir les mécanismes institutionnels et participatifs nécessaires pour que les pratiques actuelles de gestion de l'eau deviennent plus respectueuses de l'environnement.

Alors que la consommation des ressources renouvelables engendre désormais un dépassement des limites communément admises de l'exploitation viable, il est clair que dans la plupart des

cas on pourra difficilement trouver de nouvelles sources d'approvisionnement. La seule voie possible est une utilisation plus efficace des ressources existantes. De nombreux programmes sont en cours pour appuyer les tentatives en ce sens. De la même façon, il convient de se demander comment réussir la transition entre l'approche consistant à constamment dériver et extraire l'eau des écosystèmes, qui a été celle des cent dernières années, et une approche cherchant à garantir l'approvisionnement en eau en vue de préserver les écosystèmes et contribuer ainsi au développement durable.

Ce concept a recueilli une très large adhésion. Ainsi, l'Agenda MED 21 (Tunis, 1994), accepté par toutes les parties à la Convention de Barcelone, stipule que « *la gestion intégrée des ressources en eau est fondée sur la perception que l'eau est une partie intégrante de l'écosystème [...] les ressources en eau doivent être protégées, en tenant en compte le fonctionnement des écosystèmes aquatiques et la pérennité des ressources, afin de satisfaire et de réconcilier les besoins en eau induits par les activités humaines* ». Cette approche a été réaffirmée lors du Forum mondial de l'eau et de la Conférence internationale sur l'eau douce qui s'est tenue à Bonn en 2001. Ces réunions ont mis en lumière le besoin d'un dialogue intersectoriel plus important dans les domaines de l'agriculture et de l'environnement pour élaborer une vision partagée en matière de gestion de l'eau, créer une banque de données pour alimenter le dialogue et développer un réseau de projets sur le terrain, au niveau local et dans les bassins fluviaux, afin de mettre en œuvre des initiatives innovatrices ou d'appliquer des solutions susceptibles de garantir sur le long terme l'approvisionnement en eau, pour l'agriculture comme pour la nature.

Parmi des obstacles qui empêchent une meilleure planification et mise en valeur des ressources en eau, il faut citer des prix beaucoup trop bas, l'insuffisance de l'information sur les nouvelles technologies qui permettent de rationaliser l'exploitation, la répartition inéquitable des ressources, la construction de barrages et les subventions gouvernementales à des cultures exigeant une grande consommation d'eau dans les régions arides.

Le premier objectif est de garantir un débit soutenable en toute saison et de préserver la capacité des bassins à fournir une eau pure. Pour nos régions, cela passe par la régénération de la couverture végétale dans la plupart des bassins, l'élaboration de plans d'utilisation des sols, le reboisement, la prévention des incendies, du surpâturage et de l'érosion qui s'ensuit. Il faudra en outre ramener l'exploitation des eaux souterraines à des niveaux raisonnables.

Le deuxième objectif est de réduire la demande d'eau. À cet égard, l'agriculture, en tant que principal consommateur, devrait partout s'attacher à mieux utiliser les ressources hydriques (sauf peut-être dans les Balkans, en France et en Turquie).

À la lumière de l'expérience acquise à ce jour, il apparaît que fixer le prix de l'eau à un niveau approprié et décentraliser la gestion de l'irrigation afin de responsabiliser directement les utilisateurs figurent parmi les outils les plus efficaces pour économiser l'eau. De nombreux programmes axés sur ces aspects sont en cours dans la région.

Enfin, la question est de savoir comment réserver de l'eau pour les besoins de l'environnement, quand les niveaux actuels d'extraction commencent à menacer l'intégrité et le fonctionnement des écosystèmes. Les gains dérivés d'une plus grande efficacité devraient-ils être réinjectés dans le milieu naturel, ou du moins permettre de ne pas avoir à recourir à de nouveaux approvisionnements supplémentaires ? Les exemples d'initiatives dans ce domaine ne manquent pas dans la région, où l'accent est de plus en plus mis sur la définition de nouvelles méthodes et approches pour aborder ces questions.

RESUMEN

La gestión integrada de cuencas fluviales es ampliamente reconocida en todo el mundo como uno de los elementos más básicos para el desarrollo sostenible. En la región mediterránea, es incluso más importante, tanto para el desarrollo humano como para el medio ambiente.

Debido a sus condiciones naturales (climáticas y topográficas) la cuenca mediterránea es propensa a sufrir con frecuencia sequías e inundaciones, incendios forestales, erosión del suelo y violentas escorrentías estacionales en los lechos de los ríos secos, que a menudo se usan como asentamientos de población. La disponibilidad de agua es uno de los mayores obstáculos para el desarrollo humano de nuestra región: una población creciente, un aumento de la demanda de riego, una mayor escasez del recurso en nuestros ecosistemas de agua dulce, y una mayor demanda de visitantes estacionales en la temporada seca del verano han contribuido todo ello a que los países optimicen soluciones principalmente orientadas hacia el abastecimiento para hacer frente a las crecientes necesidades humanas y con una conciencia limitada de las conexiones a nivel de cuencas.

Los recursos hídricos están sobre explotados e irregularmente distribuidos por la región. Además, son cada vez más escasos. Actualmente, las actividades agrícolas suponen el 72% del consumo de agua en la cuenca mediterránea (mientras que el sector industrial consume el 17% y sólo el 10% se destina para uso doméstico). Aparte del excesivo consumo de agua, el crecimiento generalizado del riego tiene otras consecuencias: la paulatina degradación de los suelos más fértiles, especialmente mediante la salinización, y la acumulación de productos químicos en tierra y agua, dando lugar a un grave efecto sobre el hombre y la naturaleza a través de la degradación del suelo, pérdida de humedales y reducción de la biodiversidad en los ecosistemas de agua dulce.

Hasta la fecha, la expansión e intensificación de los diversos usos humanos ya han explotado demasiados recursos : más del 50% de todos los humedales, más del 70% del agua disponible y un alto porcentaje de ecosistemas de cuencas, no sólo bosques y humedales sino también los propios ríos, algunos de los cuales han sido reducidos a meros “chorritos” estacionales, o a zanjas de drenaje estancadas y contaminadas. La existencia de unas 2.000 presas en nuestros ríos, el almacenamiento de agua y los sistemas de distribución, con pérdidas de agua netas que superan el 30%, han provocado un aumento de la evaporación, una fragmentación de los ecosistemas fluviales, una amenaza para los caudales ecológicos mínimos durante los largos períodos de sequía, y una reducción de la capacidad de almacenamiento debido al arrastre, mientras que los caladeros costeros desaparecen debido a que los nutrientes son retenidos en las presas, se erosionan los litorales, y los deltas de los ríos se hunden por falta de sedimentación. Se prevé que estos efectos indeseables se vuelvan aún más graves a medida que el cambio climático provoque más desertificación, mayor erosión en las cuencas y haga subir el nivel del mar en la costa. La cuestión es si, en la búsqueda de formas más sostenibles de gestionar las cuencas hidrográficas, es posible evitar tales consecuencias negativas y cómo.

La distribución del agua debe encontrar un equilibrio entre los distintos sectores de demanda y oferta, teniendo en cuenta los valores sociales, económicos y medioambientales del agua, y la relación existente entre las aguas superficiales y subterráneas, la administración del suelo, y la necesidad de mantener la integridad de los ecosistemas si queremos conseguir un desarrollo sostenible. Las cuencas de los ríos, lagos y acuíferos deben constituir el marco primario para la gestión de recursos hídricos. Para ello, es necesario crear y promover los mecanismos institucionales y participativos pertinentes para que la práctica actual de desviar los cursos de agua sea más sostenible desde el punto de vista medioambiental.

A medida que el consumo de recursos hídricos renovables supera los límites reconocidos de uso sostenible, se hace cada vez más patente que en muchos casos quedan pocas soluciones orientadas hacia nuevas fuentes de abastecimiento. Hay que hacer un mejor uso de los recursos existentes, y hay varios programas en curso cuya finalidad es la de intentar conseguir semejante objetivo. Asimismo, resulta apropiado preguntar cómo gestionar la transición del proceso de

desviar continuamente el agua y sacarla de los sistemas naturales -que ha sido la tendencia durante 100 años- a intentar estudiar cómo suministrar agua en apoyo del ecosistema como contribución al desarrollo sostenible.

Este concepto ha sido ampliamente respaldado en la Agenda 21 para el Mediterráneo (Túnez 1994), aceptada por todas las partes en el Convenio de Barcelona, en el que se manifestaba que *“la gestión integrada de los recursos hídricos se basa en la percepción de que el agua es una parte integral del ecosistema... los recursos hídricos deben ser protegidos, teniendo en cuenta el funcionamiento de los ecosistemas acuáticos y la perennidad del recurso, con el objeto de satisfacer y reconciliar las necesidades de agua en las actividades humanas”*. En el Foro Mundial sobre el Agua y en la Conferencia Internacional de Bonn sobre Agua Dulce (2001) se reafirmaba este mismo enfoque. Estas reuniones plantearon la necesidad de que hubiera un mayor diálogo entre los sectores agrícolas y medioambientales para poder desarrollar una visión compartida sobre la gestión del agua, un banco de conocimientos para apoyar el diálogo y una red de proyectos de campo a nivel local y a nivel de las cuencas de los ríos, poniendo en práctica estrategias y soluciones innovadoras que mejoren la sostenibilidad en el abastecimiento de agua para la agricultura y la naturaleza.

Entre los obstáculos que se interponen a una mejor planificación y uso del agua están los precios inadecuadamente bajos del agua, una falta de información sobre las nuevas y eficientes tecnologías, un reparto desigual del agua, la construcción de embalses, y las subvenciones estatales para el creciente cultivo en las regiones áridas de cosechas que requieren un alto consumo de agua.

El primer desafío es asegurar rendimientos de agua sostenibles en todas las estaciones del año y mantener la capacidad de las cuencas para que proporcionen reservas de agua limpia. En lo que respecta a nuestra región, esto significa la regeneración de la capa vegetal en la mayoría de las cuencas, programas de planificación del uso del suelo, el sobre pastoreo, la erosión, la repoblación forestal, la prevención de incendios, así como la reducción a unos niveles sostenibles de los niveles de explotación abusiva de las aguas subterráneas.

El segundo desafío es reducir la demanda de agua. Es sumamente importante que el sector agrícola, principal consumidor del recurso, sea más eficiente en lo que a consumo de agua se refiere en general (con la posible excepción de los países de los Balcanes, Francia y Turquía).

La experiencia tenida hasta ahora demuestra que la fijación de precios del agua y la descentralización de la gestión de riego con una responsabilidad directa de los usuarios, se encuentran entre las principales herramientas para poder ahorrar agua. Actualmente en la región existen varios programas en curso en esta dirección.

En tercer lugar, se plantea la cuestión de cómo distribuir el agua a efectos del medio ambiente cuando la extracción empieza a alcanzar niveles que amenazan la funcionalidad y la integridad del ecosistema. ¿Sería posible que los ahorros conseguidos volvieran a los sistemas naturales o que se usaran, al menos, para contrarrestar la necesidad de nuevas fuentes de abastecimiento adicionales? En la región se están elaborando cada vez más métodos y estrategias para hacer frente a este tema.

1. Scope of Document

At the behest of Mediterranean members of IUCN–The World Conservation Union, the IUCN Centre for Mediterranean Cooperation is identifying needs and opportunities in promoting integrated water management (IWM) in the Mediterranean basin. IWM provides a holistic and multi-sectoral approach to a strategically important and scarce resource. It encompasses land-use planning, water storage and distribution, water use and disposal, including human and ecosystem needs, and finding a balanced trade-off between all these factors and interests. Ninety-seven per cent of the world's water is salty, while much of the 3% that is fresh water is locked up in the polar ice caps. Owing to its increasing scarcity, and dwindling availability in many parts of the world, fresh water is fast becoming one of the most important topics globally, from political, economic, social, scientific and environmental points of view. The water agenda is of such strategic importance in the Mediterranean region that many international and multilateral organizations and donors have included water management within their priorities for the region.

Of the three focuses of World Water Vision (water for people, for nature, for food), IUCN is concentrating its efforts on 'water for nature' trade-offs, particularly in relation to 'water for food' because of the significance of food production systems in the consumption of fresh water; irrigation accounts for over 70% of the water used in the Mediterranean region. IUCN's *Initiative for water and nature* (2000) focuses on these trade-offs.

This report deals with the relationships between river basin management and environmental problems, and proposes possible fields of action for IUCN and its partners in 23 countries in the region¹. In particular, it focuses on the challenge of maintaining valuable ecosystem functions and services in the context of increasing use and diversion of water, rather than on aspects such as urban use, water pricing or infrastructures.

The report also proposes strategy directions for IUCN on the subject of fresh water. The topic is dealt with from a pan-Mediterranean point of view, with details of national situations given only as particular examples.

Sections cover:

- Diagnosis of current water use and management of river basins;
- Principal international policies and instruments within Mediterranean countries;
- Principal Mediterranean (regional) policies, instruments, programmes and organizations currently involved in water and basin management;
- Proposed strategy for IUCN, taking into account organizational gaps, IUCN's strengths, and the main field opportunities with a regional significance (appended here – Annex 6)

This report was circulated to selected national and international organizations and to specialized IUCN members, with the aim of discussing its conclusions at the workshop organized by IUCN on 'Mainstreaming environmental considerations in integrated river basin management in the Mediterranean region' in Malaga on 8-9 April 2002.

¹ Albania, Algeria, Andorra, Bosnia-Herzegovina, Croatia, Cyprus, Egypt, France, FYROM, Gaza Strip and West Bank, Greece, Israel, Italy, Jordan, Lebanon, Lybia, Malta, Morocco, Portugal, Slovenia, Spain, Syria, Tunisia and Turkey.

2. The Mediterranean context

2.1 A view of the Mediterranean

2.1.1 The general environmental context

The peoples around the Mediterranean all share the same ecosystem. However, belonging to four important religions and speaking over 15 different languages (and throughout more than 30 centuries of historical conflicts), all these peoples have developed a so-called 'Mediterranean culture' in their relations with natural environment, from architecture to cuisine, and from agriculture to water management or fishing techniques. As a result, a large array of common adaptations to a common environment – water – are shared by peoples in over 20 different countries. Indeed, one of the first environmental conventions – the Barcelona Convention (1976) – was signed to protect the Mediterranean Sea.

However, such have the pressures on natural resource use grown in the Mediterranean Sea and its river basins, they are amongst the most overexploited ecosystems in the world. The main environmental threats can be summarized as:

- Growing desertification, as a result of deforestation, forest fires, overgrazing, agricultural pressure and climate change;
- Increasing consumption of fresh water (mainly for agriculture), pollution of tributary rivers, and limited recycling and sewage systems for growing urban populations – and their combined effects on ecosystem functioning and species survival;
- Physical, chemical and biological pollution of this closed sea;
- Declining fish stocks;
- Loss of forested areas;
- Economic activities concentrated along the coasts, with increasing development – industry, infrastructures, transport, urban development and tourist resorts – along narrow coastal flatlands;
- Sea level rise threatening the most productive ecosystems: deltas (agriculture), wetlands (fishing), beaches (tourism), and coastal groundwaters (for all purposes).

A consequence of these threats has been a loss of marine, freshwater and terrestrial biodiversity. At the heart of most of these threats is weak or non-existent integrated management of both land use and water resources, including its availability, use and disposal.

Since fresh water is both scarce and a priority for all Mediterranean countries, and is crucial for human development and nature conservation, it is an appropriate subject for trans-boundary cooperation.

2.1.2 Socio-political aspects; **Error! Marcador no definido.**

An important consideration are the increasing inequalities between northern and southern countries. Almost every environmental trend mentioned above has a stronger impact in the least developed Mediterranean countries, because of their drier climate, higher dependence on basic natural resources, higher population growth and poverty rates, and lower institutional and financial capacity to face these challenges.

Human development indicators for the Mediterranean basin (UNDP 2000) show that at least eight countries (Cyprus, France, Greece, Israel, Italy, Malta, Slovenia and Spain) are ranked in the world's top 30 countries (out of 174) in terms of 'high human development'. The rest are

among 'medium human development' countries, but there are great differences between them (Croatia lies 49th, Albania 94th, Egypt 119th and Morocco 124th).²

Population growth dynamics vary enormously between countries (statistically clustered in three homogeneous groups: Eastern / Southern / EU countries). Currently, in the Mediterranean basin there are about 450 million inhabitants (European Environment Agency 2000). Their growth dynamics vary from 0% in the European area to a mean of 1.7% per year in Eastern and Southern countries. It is estimated that the population in the Eastern and Southern countries will grow from 218 million in 1990 to 360 million in 2020, some two-thirds of the expected total Mediterranean population of 520 million (CIHEAM 2000). As for population movements, there are two trends: a continuous flow from inland to coastal areas in each country, and a migration flow from the south and east to the northwest.

These growth rates and population dynamics influence, to a large extent, the use of natural resources and the rates of environmental impact. There is little doubt that shortages in the availability of resources such as fresh water and cultivable land will limit development and restrict growth in per capita gross product in the least developed countries, according to the human development indicators (CIHEAM 2000).

EU guidelines have changed many landscapes in northern countries, particularly through application of the Common Agricultural Policy (CAP). As a consequence of economic globalization, eastern and southern countries will face a choice between alternatives such as continuing as raw material producers in the agriculture or energy sectors, or fostering services such as tourism. However, in both cases they are under the influence of market pressures beyond their control. In 1995, gross product distribution per sector and country clearly demonstrated the enormous inequities that exist between the different areas of the Mediterranean basin. For example, the agricultural sector was the least important in northern countries, ranging from 2% of GNP in France to 11% in Greece, while in southern countries it ranged from 11% in Tunisia to 17% in Egypt (UNEP 2000). Agriculture claims over 70% of all freshwater consumption in Mediterranean countries. Another trend with environmental consequences is the translocation of polluting industries from the north to the south as a result of less restrictive environmental legislation and increased profitability.

2.2 Water and wetlands

Water can only be managed effectively if all the uses of water within river basins, for natural ecosystems and for human use, both above and below ground, are considered as a coherent whole. For example, water-related constraints in wetlands, which are among the Earth's most productive ecosystems, are well documented. To maintain their natural properties, wetlands depend largely on the proper functioning of river basins. In the dry environment of the Mediterranean wetlands provide a complete and sustainable set of supplies and services (see Box 1) that are of economic, social and ecological importance, and which cannot be compared to the agricultural yields and environmental stress resulting from wetland conversion.

A wetland is part of a wider hydrological system, dependent on processes operating in the upper reaches of the water catchment area, with downstream sections depending upon wetland processes for their hydrological regime and water quality. Wetlands are composed of a number of physical, chemical and biological components. Processes linking these components allow wetlands to perform important functions, such as flood control, fisheries, and their ability to retain nutrients (whether sewage effluent and fertilizers which cause eutrophication and pollution, or as wetland plants and soil bacteria which fix nitrates and phosphates) and to generate products (Skinner and Zalewski 1995).

² Per capita incomes range from US\$16,000–20,000 for countries in the European Union and from US\$3,000–4,000 in developing countries.

Box 1

THE VALUE OF MEDITERRANEAN WETLANDS

Wetland components provide many goods of great value, including:

- **Fish:** Two-thirds of the fish we eat depend upon wetlands at some stage of their life cycle.
- **Wildlife:** Wildlife is exploited in a number of ways. Tourism is particularly important in many wetlands.
- **Fertile land for agriculture:** Periodic inundation of floodplains and other wetlands promotes deposition of fertile soils and maintains the fertility of riparian land.

In addition, wetlands provide a range of other products, including reeds for thatching and mat-making, and medicines and fruits which are key to the income base of local villages.

- **Water supply:** Source of water for domestic, agricultural (irrigation, livestock) or industrial use. Surface or near-surface water is a characteristic of many wetland types, such as lakes, rivers, mires and bogs, and is thus easily available for direct use.
- **Water transport:** Many communities have developed close to or actually on wetlands and use the waterways as a means of transport.

Functions

- **Flood control:** The level of control depends on the type of wetland. Saturated river margins allow little storage, hence rainfall or upslope runoff is transferred directly to the river. These are called contributing areas and may augment river flow. In contrast, floodplains store large quantities of water during floods. This reduces the height of the flood peak and thus reduces flood risk downstream.

- **Storm protection:** Coastal storms cause severe flooding in many parts of the world. Coastal wetlands, particularly mangroves, help to dissipate the force and lessen the damage of wind and wave action.

- **Groundwater recharge:** Many wetlands exist because their soils are impervious, thus precluding significant groundwater recharging. However, periodically inundated floodplains often have more permeable soils and groundwater recharge is recognized as an important function.

- **Sediment/pollutant retention:** Sediment is often the major pollutant in many river basins. Because wetlands commonly occupy basins, they may serve as sediment settling ponds. Where reeds and grasses are present, river velocities are slowed and the opportunity for settling is increased. Because pollutants (such as heavy metals) often adhere to suspended sediment, they may be retained simultaneously with the sediment.

- **Nutrient retention:** This function occurs when nutrients, most importantly nitrogen and phosphorus, accumulate in the sub-soil or are stored in vegetation.

- **Evaporation:** This is normally dismissed as being a simple loss from a wetland. Hare (1985) suggested, however, that much inland rainfall actually derives from locally evaporated water and not from moist air from the oceans.

- **Preservation:** Wetlands have preserved important archaeological and human remains.

Sources: Skinner and Zalewski 1995, Barbier *et al.* 1997

Historically many wetlands have been treated as wastelands and drained or otherwise degraded. Today, they are among the most threatened ecosystems and landscapes as a result of drainage, land reclamation/conversion, pollution, and overexploitation. Despite their value, the loss of wetlands is widespread. The demand for agricultural land caused Mediterranean farmers to drain wetlands until the late 20th century. Partly as a result of this process, half of all Mediterranean wetlands have been lost (Inst. Català de la Mediterrània 1999). In the Middle East, 97% of wetlands have been drained to allow the development of human activities (UNEP, Blue Plan 1992). Available information indicates that approximately two-thirds of all European wetlands that existed at the beginning of the 20th century have been lost (European Commission Communication 1999). In the EU, the following wetland types have suffered substantial losses:

- rivers and floodplains – lost to hydraulic protection works
- wet meadows, flooded grasslands and temporary freshwater marshes – extensive loss due to dam building, drainage and conversion to dry pasture and arable land
- saltmarshes – progressively claimed for conversion to arable or industrial land.

The remaining wetlands suffer from the following types of degradation:

- excessive quantities of nitrogen and phosphorus from urban sewage and agricultural runoff, often causing eutrophication

- increasing consumption of groundwater, for irrigation and drinking water supply, threatening to desiccate many wetlands
- upstream dam construction, causing coastal erosion due to the lack of sediment inflow into river deltas.

Box 2

THE MAIN FUNCTIONS OF SELECTED MEDITERRANEAN WETLANDS

Groundwater recharge	Garaet Haouria (Tunisia)
Groundwater discharge	La Vera (Spain), Azraq (Jordan)
Flood storage	Lac Fetzara (Algeria)
Shoreline anchoring and reduction of erosion	Göksu River and Delta (Turkey)
Sediment trapping	Sebkhet Kelbia (Tunisia), Axios Delta (Greece)
Nutrient retention/removal	Tablas de Daimiel (Spain)
Habitat for fisheries	Lake Kastoria (Greece), Lake Kinneret (Israel), Etang de l'Or (France)
Habitat for wildlife	Göksu Delta (Turkey), Albufera de Valencia (Spain), Camargue (France)
Recreation and heritage value	Mekhada marshes (Algeria), Camargue (France).

Source: Skinner and Zalewski 1995

2.3 Watersheds and land degradation

Water management should include both its sustainable availability and its sustainable use. Its availability strongly relates to river basin management, which is based on sound land-use planning, a matter of extreme concern in the Mediterranean owing to the fragility of terrestrial ecosystems.

The region has a dry, subtropical climate in which annual rainfall is distributed in an irregular way. This, combined with a rough coastal topography, causes negative consequences such as frequent droughts and floods, forest fires, soil erosion, and violent runoffs and water flows on dry river beds, which are often used for human settlements. Most of these problems, which threaten human lives, economies and ecosystems, could be minimized by an integrated water catchment policy.

The long history of human settlement and agricultural expansion in Mediterranean river basins has led to massive deforestation, exacerbated by firewood gathering, extensive cattle grazing and forest fires. Today, the main threats to the remaining forest areas in southern and eastern countries is overexploitation for firewood and grazing needs. For example, in Morocco the area of forest lost every year amounts to 31,000 ha. Should this rate of loss continue, desertification could be irreversible in 30–50 years. In northern countries forest fires are the main cause of forest loss (an average of 1% of Mediterranean woodlands, around 450,000 ha, are burnt every year in an average of 60,000 fires, WWF 2000). The second most damaging cause is urbanization (UNEP, Blue Plan 1992).

The impact of these trends on terrestrial biodiversity is severe, while the preservation of such fragile land ecosystems is very inconsistent. While 20% of all Mediterranean species are threatened, only 5% of the vegetation cover is protected (WWF 2000), representing less than 1% of the total Mediterranean land surface. This, together with a widespread lack of adequate land-use policies and planning, presents a bleak outlook for sustainable water catchment management in the region.

Table 1. Forest area, protected area and percentage of forest protected area in Mediterranean countries

Country	Total forest area (km ²)	Protected forest area (km ²)	%
Spain	140,236	15,198	10.8
France	108,306	14,817	13.7
Italy	67,573	4,130	6.1
Greece	44,225	754	1.7
Bosnia-Herzegovina	23,027	226	1.0
Slovenia	6,957	617	8.9
Croatia	13,913	1,373	9.9
Albania	10,660	127	1.2
Cyprus	1,396	466	33.4
Morocco	18,621	490	2.6
Algeria	26,946	991	3.7
Tunisia	3,005	67	2.2
Libya	526	0	0.0
Egypt	1,380	0	0.0
Lebanon	358	0	0.0
Syria	471	0	0.0
Turkey	83,898	1,012	1.2

Source: UNEP, Blue Plan 1999

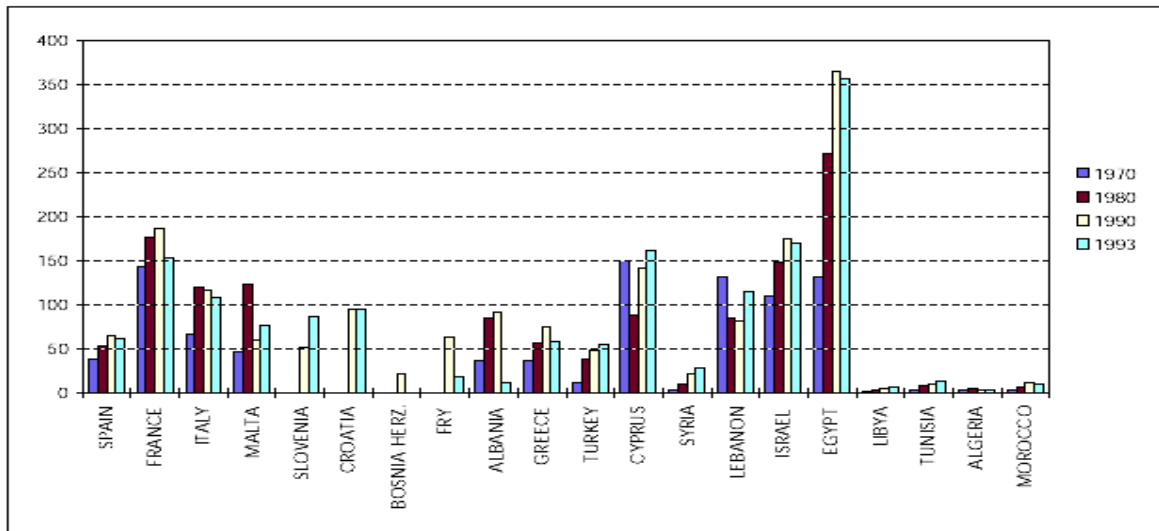
Soils and agriculture

In general, the Mediterranean basin does not have wide fertile plains, and optimal conditions for productive agriculture are only present in intermountain valleys, as well as along the basin's largest rivers (Ebro, Rhone, Po, and Nile). Away from these areas, the peoples of the region have had to cut down woods and colonize hillsides for their agriculture. An understanding of the way in which Mediterranean civilizations have searched for and used agricultural land throughout history (Hillel 1991) allows for a better understanding of the current terrestrial situation, the paucity of wooded land and the advance of desertification.

Overgrazing has harmed soils, destroyed the vegetation layer and prevented its regeneration. In Tunisia, for example, the current fertile land area is estimated in 3,800,000 ha, while the actual area of farmed land is larger (4,781,000 ha). This means that almost 1 million ha of agriculture takes place on marginal land, 60% of it in an arid environment prone to desertification (Ministry of the Environment and Territory Management of Tunisia 1998).

Soil degradation processes have grown with the introduction of technological farming methods; methods that have helped to consolidate human welfare in the north, while bringing only food security for southern and eastern countries. The use of fertilizers (see Figure 1) in 1993 was over 350 kg/ha in Egypt, 150 kg/ha in Israel, France and Cyprus, and 100 kg/ha in Spain, Italy and Lebanon (World Bank 1996). These values indicate a source of environmental threat and also confirm the historic sequence described above. The use of fertilizers also increases levels of salinity in soils.

Figure 1. Fertilizer consumption in Mediterranean countries 1970–1993 (kg/ha)



Source: World Bank. Social Indicators of Development 1996

Desertification and climate change

In December 2000, the Secretariat of the Convention to Combat Desertification (CCD) stated: “the magnitude of this problem is outstanding, because it has an effect on a quarter of the terrestrial area: about 3,600 million ha are suffering from the effects of this process, particularly in developing countries. Furthermore, 6 million ha of the most productive land are lost every year since 1990 because of land degradation.”

In the Mediterranean, a large part of the population lives in arid areas that can become deserts; up to 78% in Morocco and Tunisia (Ferchichi 2000). Other southern Mediterranean countries have very high rates of desertification and desertification risk: for example, 90% of Libya is desertified, with the remaining 10% in danger of desertification. In the east, according to Akrimi (2000) Syria has the lowest rate of desertification, with only 9.9% of the land desertified, although 58.8% is at risk. Some northern countries are also threatened with desertification. In Spain, for example, during the 1990s approximately 150,000 forest fires (92% of them started by people) destroyed more than 1.3 million ha of forests (Inst. Català de la Mediterrània 1999). The soil loss ranges from 5 to 50 ton/ha/year, particularly in the south.

Climate change may have particularly serious consequences in the Mediterranean, with more frequent droughts (reducing the water available for irrigation and nature), forest fires adding carbon dioxide to the atmosphere, stronger storms and floods causing erosion, and sea level rise. The latter may further reduce freshwater availability in coastal areas, as salt water intrudes the phreatic layer, a serious problem already taking place in areas of high water demand (e.g. tourist coasts and islands in Catalonia and the Balearics). At the same time rising temperatures will increase evaporation and evapotranspiration rates, with consequent effects on water demands for irrigation.

The importance of river basins

Water resources require strong protection, so ecosystems from which water flows should be protected or managed wisely. In mountain regions, where most rain falls, soils and vegetation, often combined with aquifers, store water. Further downstream, wetlands can act as flood control and filters for pollution, again helping to safeguard supplies (Pearce 1996). As this

author states, freshwater, because it is essential to life on Earth, and because it flows through ecosystems and interacts freely with land, atmosphere and oceans, requires integrated management more than any other resource. River basins must be viewed as a whole, with headwater activities in harmony with downstream needs. A river with stable soils and trees in its watershed and secure aquifers and wetlands in its floodplain is more likely to flow right through the year and during period of drought.

Special attention should be given to Mediterranean islands. There are over 4,000 of them, belonging to eight countries, hosting a population of 11 million inhabitants, and containing a large part of the approximately 15,000 endemic plant and vertebrate species in the region. The islands make up about 6% of the total Mediterranean watersheds, and water is among the main limiting factors for island development and conservation.

2.4 Water demand and uses; Error! Marcador no definido.

Water is scarce in the Mediterranean, yet demand is rising. It is also unevenly distributed, both in time and space, a fact that is creating additional challenges.

2.4.1 Water scarcity

In the past, some Mediterranean cultures developed advanced water management techniques. Around the year 5000 BC Egyptians used artificial irrigation systems by means of dikes along the Nile. In Petra, Jordan, the Nabateans practised a surface runoff technique in supplying water for human use and agriculture, abstracting surface waters coming from scarce winter rainfall (100 mm) in the desert. Methods like these were taken further by the Arabs, who developed new technologies for rational water management and spread them into southern Europe (Negev 1979).

In contrast to the rational use of water in former times, the situation has been worsening in recent times owing to population growth, the intensification of irrigated farming, and increasing industrial activity.

The level of exploitation of water resources is generally high in most countries and pressure over water resources is increasing. Exploitation ratios are over 50%, sometimes nearing 100%, in many parts of Egypt, the Palestinian Authority, Israel, Libya, Malta, Tunisia, most Mediterranean islands and the eastern regions of Spain. Meanwhile, exploitable reserves of water are decreasing. Disruptions between water demand and renewable conventional supply are growing. Widespread salt-water intrusion is occurring as a result of overexploitation (Medtac 2000). In the Mediterranean the average increase in water demand has been 60% over the last 25 years.

Table 2. Exploitation index of natural and renewable water resources (1990–1997)

Country	% exploitation index of water	Country	% exploitation index of water
Spain	33	France	21
Italy	23	Greece	10
Bosnia - Herzegovina	-	Yugoslavia	-
Slovenia	2	Croatia	1
Albania	3	Malta	50
Cyprus	27	Morocco	41

Algeria	25	Tunisia	57
Libya*	103	Egypt*	91
Lebanon	27	Gaza*	208
Syria	48	Israel*	95
Turkey	15		

*Countries close to or in excess of renewable rates.

Source: UNEP, Blue Plan 1999

By subregions in the Mediterranean, the availability of renewable water resources is 72% in the north, 23% in the east, and 5% in southern countries. In Libya, 87% of the water used comes from non-renewable fossil aquifers in the Sahara (UNEP, Blue Plan 1999), while Egypt is wholly dependent on water resources originating in other countries.

Regardless of shrinking availability, demand for water in the Mediterranean is constantly rising. Currently, agricultural activities consume 72% of fresh water in the Mediterranean basin (84% in southern and eastern countries), whereas the industrial sector uses 17% and only 10% is used for domestic supply.

2.4.2 Uneven distribution

The timing of Mediterranean rainfall does not usually coincide with the time of major water demand (by agriculture and tourism) during the summer. This brings the need for storage infrastructure. While over 80% of annual precipitation occurs between September and March, rainfall in the northern regions reaches 900 mm, whereas in the southern, arid regions it barely touches 100 mm. The seasonal contrast is most pronounced in the south and east, where most of the annual rainfall may come in a few days of torrential downpours. In parts of southern Tunisia as much as 60% of annual precipitation may fall on a single day.

The seasonal variability forces local people and municipalities to use groundwater resources and fossil waters with a growing intensity. The overuse of groundwater places a heavy toll on the remaining wetlands, as well as in coastal areas, running the risk of salt-water incursions that destroy the usefulness of the aquifer, a process difficult to reverse (as has occurred in Cap Bon, Tunisia, and the Gaza Strip). In the Mediterranean many wetlands become temporarily dry. Prolonged dry periods of three to five years may also occur, resulting in many shallow lagoons and floodplains remaining desiccated for long periods. In such stressing situations, conservation of aquatic and semi-aquatic fauna and flora requires a wide range of alternative wetlands. For these reasons wetlands should not be considered in isolation but as forming a global, interconnecting network, linking distant areas, within and between river basins.

Within a country, rainfall in different river basins may vary between 200 and 800 mm, causing governments to make enormous investments in storing water and transferring it to other parts of the country. Examples of this are the transfer of water from North Tunisia to Cap Bon, the Spanish National Hydrological Plan, and the Anatolian tunnels in Turkey.

2.4.3 Dams

As a consequence of the scarcity and uneven distribution of water, many rivers have been dammed – usually a popular measure among irrigators and urban populations who stand to benefit most. But dams bring other new and significant problems. They can fragment river ecosystems, threatening and in many cases completely stopping minimum ecological water flows during long dry periods. They increase water losses from evaporation, and silt up over time, reducing storage capacity. Coastal fisheries also shrink as nutrients are held back in dams, while coastlines slowly erode and river deltas sink – the life expectancy of Spain's Ebro River delta is put at 50 years as a result of the many dams and infrastructures built along the course of

the river. These undesirable effects are expected to become more serious as climate change causes higher erosion in watersheds and higher sea levels on the coast.

By 1998, 3,899 dams had been built by Mediterranean countries to capture water in the wet season for use during the long, hot summer when demand is highest (see Table 3). While dams have produced many positive results for human development, their functionality and impact on natural ecosystems show that this solution is both expensive and unsustainable. Irrigation and/or energy production are the main functions of dams in Mediterranean countries, with, in general, irrigation being the main function in drier countries such as Algeria, Egypt, Libya and Morocco.

Table 3. Dams and their functions in Mediterranean countries

Country	Number of dams	Irrigation %	Energy %	Flood control %	Water supply %	Other uses* %
Albania	306	98	2	0.3	0.7	0.7
Algeria	107	91	2	0.9	25	0.9
Bosnia	25	20	56	20	12	20
Croatia	29	10	66	66	10	3
Cyprus	52	96	0	0	0	19
Egypt	6	100	50	17	0	67
France	569	19	54	8	22	26
Greece	46	48	50	0	15	0.9
Italy	524	32	60	3	21	0
Lebanon	5	40	100	0	0	0
Libya	12	83	0	83	8	0
Morocco	92	67	22	15	37	37
Portugal	103	49	54	1	40	6
Slovenia	30	10	60	30	0	37
Spain	1187	51	32	2	35	7
Syria	41	66	7	2	15	5
Tunisia	71	92	0	3	4	31
Turkey	625	88	9	11	10	1
Yugoslavia	69	16	36	1	45	3

*Includes fish farming and recreation.

NB The sum of percentages is not necessary 100% because some dams have multiple uses.

Source: World Register of Dams 1998

Today, surface water collected behind dams is the prime source of water supply in Italy, Spain, Turkey, Lebanon, Egypt and the Maghreb (Morocco, Algeria and Tunisia).

Almost all important rivers in the Mediterranean have been dammed: for example, the Rhône in France has 48 hydroelectric dams, the Guadalquivir in Spain has 30 dams, and the island of Sardinia (Italy) has 35 reservoirs, the highest density in the Mediterranean region.

Large dams and reservoirs were originally considered by many nations as vital for national security, economic prosperity and agricultural survival. Until the late 1970s and early 1980s, few people took into account the environmental consequences of these massive projects. Today, however, experience with dams shows that these mega-structures have often damaged the ecosystems in and around countless rivers, lakes and streams. A handful of countries are even taking steps to remove some of the most harmful dams – in France and the US around 500 dams have been removed in the past few years (Gleick 2001).

Dams create problems in coastal areas as well, reducing of the amount of freshwater and precious sediments reaching river deltas. The amount of sediment carried in the Nile and the Ebro has been reduced by over 95%; for the Po the reduction is about 75% and for the Rhône about 50%. The building of dams causes drastic changes in the natural cycle of sediment delivery and deposition, resulting in sediment build-up at the entrance to water reservoirs, bringing additional problems. In Morocco, 8% of the total reservoir capacity (800 million m³) had been lost to siltation by 1990; in Algeria this figure is of 11% and is predicted to rise to 24% by 2010. A study of Tunisian reservoirs found that silt reduces their capacity by 1–2.5% a year (Pearce 1996).

The rapid erosion of river deltas (as much as 100 m a year in some parts of the Nile delta) is not the only impact. Fisheries lose a vital source of annual fertilization due to the reduction of the river's annual flood-load of rich silt. Freshwater fish suffer from habitat fragmentation by dams in rivers; Gleick (2000) stated that over 20% of all freshwater fish species are threatened or endangered by dams, as they may bar the path of migrating fish such as trout and sturgeon to upstream spawning sites, and alter river water temperature, chemical characteristics and flood cycles that are essential to the life cycles of plants and animals downstream. Occasionally, however, dams can have beneficial effects in wildlife by providing a habitat for waterbirds, or replenishing groundwater.

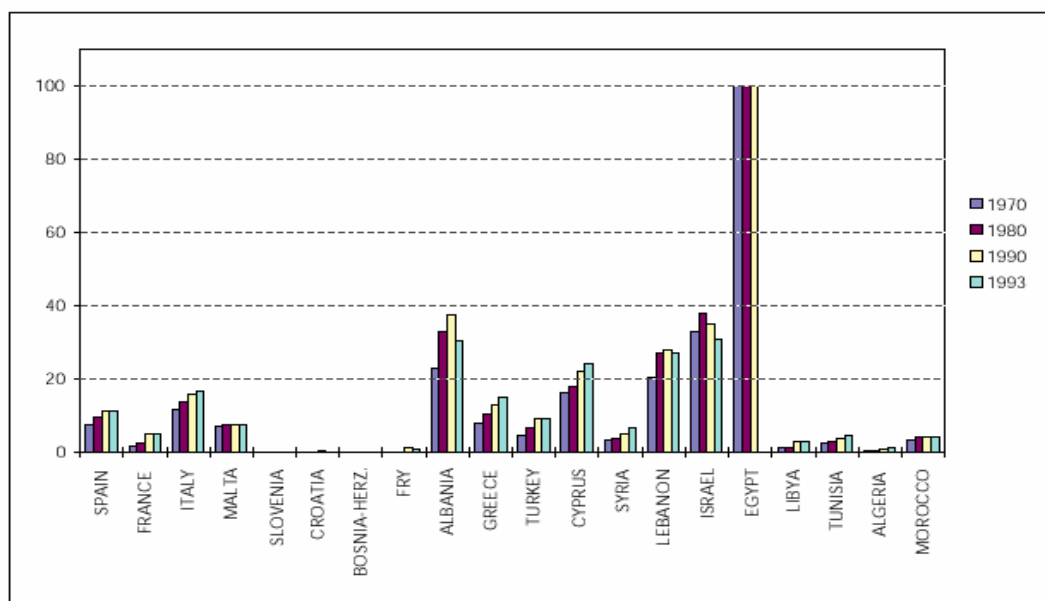
Dams and Development, the report of the World Commission on Dams published in 2000, examined the controversial issues associated with dams and shows a way to improve their planning, construction and operations, along with other water and energy infrastructures. IUCN is collaborating on implementation strategies that avoid or mitigate the impacts of dams on biodiversity and livelihoods, and applying the lessons learned to reduce such problems in the future.

2.4.4 Agriculture and irrigation

Even in industrialized countries, irrigation often dominates water use (Spain 70%, Italy 57%, Greece 89%). It only drops below half in France (13%) and former Yugoslavia (5%).

Irrigation is the biggest water consumer but also, by extension, the activity where water savings could be greatest and more easily achieved. New irrigation programmes are still being launched, although their growth has flattened and existing irrigation schemes are slowly tending towards water conserving methods, such as sprinkler and drip systems. However, in most regions few if any steps have been taken to move towards less water-demanding crops, such as the traditional Mediterranean crops of olive, vines or wheat. In southern European countries this is mostly due to heavily subsidized agriculture, and throughout the region there is little incentive for change as the price of water does not include its real economic costs, let alone environmental costs.

Figure 2. Extension of irrigated land in countries of the Mediterranean basin (% agricultural land)



Besides the excessive consumption of water, the generalization of irrigation has other, more irreversible effects: degradation of the most fertile soils and, in particular, salinization. In southern and eastern countries, there are 16 million ha of salinized lands. In Maghreb countries alone it is estimated that more than 100,000 ha of cultivable land is lost every year. In Egypt, 100% of the farming lands is under threat (Akrimi 2000). Accumulation of chemical fertilizers in soil or in waters (Table 4) is another problem, one that further exacerbates salinization. Certain irrigation practices also degrade soil quality and reduce agricultural productivity, heralding a premature end to the green revolution started in the 1950s.

Table 4. Soil erosion and disposal of phosphorus (p), nitrogen (n) and organic carbon from farming lands to the Mediterranean Sea

Country	Drainage area (km ²)	Soil 10 ⁶ t	Total P 10 ³ t	Total N 10 ³ t	Total Org. C 10 ³ t	Estimated soil loss per year (t/ha)
Albania	30,400	6.8	3.7	6.7	74.1	2.24
Algeria	99,100	55.8	15.9	41.4	387.6	5.3
Cyprus	9,100	14.1	6.9	20.3	161.1	15.49
France	130,000	38.2	25.6	51.7	565.0	2.94
Greece	106,100	207.5	146.7	268.7	2,492.3	19.56
Israel	10,300	3.8	1.3	3.2	33.0	3.69
Italy	279,300	410	341.7	619.4	6574.4	80.13
Lebanon	7,800	25.7	6.5	17.4	196.4	32.95
Morocco	62,800	43.7	9.1	29.7	502.0	6.96
Spain	180,300	116.1	103.1	177.3	1,801.1	6.44
Syria	5,700	34.0	14.8	27.4	267.9	59.65
Tunisia	34,400	54.9	28.7	56.5	571.0	15.96
Turkey	153,700	296.9	129	250.9	3,315.0	19.32

Source: UNEP/Mediterranean Action Plan 1997

Leakage and theft of water are a constant in many water-supply systems. Pearce (1996) showed that most countries have only a vague idea of how much water is lost in this way. Few have installed the complex systems necessary to monitor the flow of water through pipes. Moreover, leakages tend to worsen as systems age and pipes crack. Seepage and theft probably account for over 30% of freshwater use in the Mediterranean.

Farmers are the main consumers of water. Although traditionally concerned only with the quantity of available water, they have become very concerned by the increasing salinity of water and soil. Unfortunately, attempts to provide every irrigator with useful information are hampered in many places by a lack of strong and effective associations of irrigators.

2.4.5 Other water-use related situations

Another problem is the scarcity of drinking water, particularly as a consequence of pollution. Albania is a prime example in this regard. The general overview provided in Table 5 indicates the worsening conditions of access to secure drinking water supplies in eastern and southern countries such as Albania, Egypt and Lebanon.

Table 5. Percentage population without access to drinking water in Mediterranean countries

Country	1975	1985	1995
Spain	-	1	-
France	-	2	0
Italy	-	1	-
Greece	35	15	-
Monaco	-	0	0
Slovenia	-	-	2
Croatia	30	37	-
Albania	-	8	24
Malta	-	1	0
Morocco	49	43	43
Algeria	-	23	-
Tunisia	51	11	10
Libya	42	10	5
Egypt	7	10	16
Israel	-	0	1
Lebanon	8	2	6
Syria	29	29	12
Turkey	32	31	-
Cyprus	5	0	0

Source: UNEP, Blue Plan 1999

In most developed countries population growth is low, and per capita water consumption for human use is not expected to increase in the near future. Nonetheless, the volume of available drinking water may reduce due to the pollution produced by intensive agriculture and industrial activities. Furthermore, salinization of groundwater is expected to increase due to sea level rise as a consequence of climate change.

There are other economic activities requiring large freshwater supplies. One of them is tourism. For example, WWF (1995) stated that the water consumed by one tourist was 800 l/day, as opposed to 70 l/day by a resident. The Mediterranean is the world's main tourist destination, receiving 175 million visitors per year (OMT 1998), amounting to 30% of all international arrivals and one-third of the global income for this sector. Tourism is now the main currency

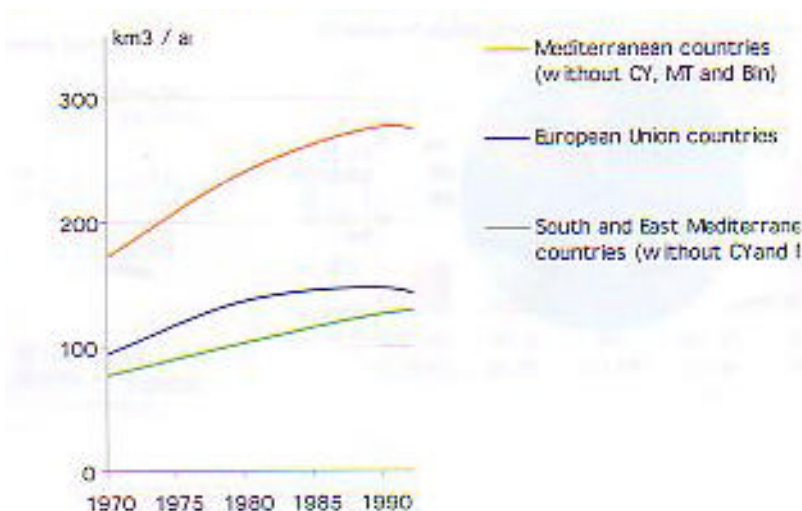
source in the Mediterranean region, and representing an average 7% of national GDP (up to 24% in Malta and 22% in Cyprus) (EEA 2000). If current forecasts pointing to a 2.8% annual increase over the next 20 years are correct, it is estimated that 350 million people will visit the Mediterranean coast in 2025 (UNEP Blue Plan 1995). Such a high number of tourists, 80% of whom come in the seven driest months of the year, will have a huge impact on water resources in the islands and coastal areas.

Table 6. Subregional distribution of water withdrawal

Region	Water withdrawal by sector							% by region (1993)	m ³ /year per inhabitant
	Agricultural		domestic		Industrial		Total		
	km ³ per year	% of total	km ³ per year	% of total	km ³ per year	% of total	km ³ per year		
Maghreb	21.1	85	2.5	10	1.2	5	24.8	4.8	363
North-eastern Africa	65.0	88	3.9	5	4.8	7	73.7	14.4	764
Middle East	77.7	85	7.7	8	6.0	7	91.4	17.8	907
Subregion total	163.8		14.1		12.0		189.9	100.0	
World total 1990	2 235.6	69	259.2	8	745.2	23	3 240.0		660

Source: Aquastat, FAO-AGL 2001

Figure 3. Total water withdrawals (renewable and non-renewable) in country groups



Source: UNEP, Blue Plan 2000

2.4.6 Water quality

A sharp rise in the industrial use of water is expected in the Mediterranean basin. However, taking as a reference the percentages representing industrial consumption in the richest Mediterranean countries, this does not even reach 5% of the total. Relatively low though this volume of water demand may be, the pollution caused by industry can sometimes be serious. And even though it seems that the ‘polluter pays’ principle is becoming more established globally, it is also true that the resulting clean-up cost is often not a sufficient deterrent and is viewed by industry as an additional production cost. In 2001 the EU reported that freshwater pollution in inland recreation swimming areas had increased by 1.1 % in just one year, and 48 inland swimming areas had to be closed (19 of them in Spain)

Around 500 rivers flow into the Mediterranean. Some of them, like the Ebro, Rhone, Po or the Nile, carry pollutants from land-based sources (mostly industry and agriculture) totalling up to 80% of all pollution sources affecting the Mediterranean Sea (Mediterranean Action Plan 1995). It is estimated that 500,000 m³ of solid waste are dumped every year without control or deputation. Soils suffer from polluting processes too, especially in eastern and northern countries. For example, in Bosnia and Herzegovina some 300,000 ha of land are polluted by heavy metals. In Lebanon, many types of waste are dumped on road margins as well as in irrigation channels, affecting soil, water and irrigation systems.

2.4.7 Transboundary issues

A complicating factor in efforts to conserve water in the Mediterranean is the fact that water will increasingly be the cause of regional conflicts. In the Mediterranean basin water resources are often shared by different countries, since political boundaries do not always follow hydrological boundaries. National boundaries sometimes run down the middle of rivers, as with the Danube and Neretva rivers; or else they flow from one country to the other as with the Jordan, Tagus, Douro, Rhone and Nile rivers. The most representative example is the Jordan basin which is shared by Jordan, Israel, the Palestinian Authority, Syria and Lebanon. Underground aquifers also frequently cross national boundaries, and the potential for conflict is perhaps greatest here, for instance with the great fossil-water aquifers beneath the Sahara.

The Global Water Summit Initiative, founded in 1989 as a non-profit, non-governmental organization (NGO), estimated that “Israel, the West Bank, Gaza and Jordan are facing a combined water deficit of at least 300–400 million m³ per year”. Despite efforts towards water-use efficiency, Israel still uses three times as much water per capita than Jordan, and ten times as much as Gaza.

2.4.8 General remarks

Water must now be regarded as a limited and scarce resource that must be shared in the context of policies for nature conservation and protection of other features of the water cycle. Not all of nature’s water can be corralled for human use. The complex interchanges within a river basin – between rivers and groundwater and wetlands – must be respected. As Pearce (1996) stated: “While short-term costs are readily appreciated, ecological requirements are less easy to quantify. So too is the long-term impact on sustainability, through the destruction of natural water stores such as wells and aquifers”.

Rather than trying endlessly to find enough water to meet hazy projections of future demand, it is time to find a way of meeting present and future needs with the water that is already available, while preserving the ecological cycles that are so integral to human well-being.

Table 7, from GWP/MEDTAC (2000), summarizes the environmental situation of the Mediterranean region and presents some possible issues.

Table 7. Summary of some key sustainability issues in different subregions of the Mediterranean

	<i>LEVEL OF EXPLOITATION OF WATER RESOURCES AND TRENDS</i>	<i>ROLE OF AGRICULTURE</i>	<i>WATER QUALITY AND ECOSYSTEMS</i>	<i>WATER DEMAND MEASURES</i>	<i>DESALINATION AND WASTEWATER</i>	<i>INSTITUTIONAL AND LEGAL SYSTEM</i>	<i>REALLOCATION ISSUES</i>	<i>OTHER ISSUES</i>
<i>North Africa</i>	High level of exploitation and over-abstraction of groundwater leading to salt-water intrusion Major deficits in drinking water supply in rural areas of some countries (e.g. Morocco, Egypt).	Important contributor to GDP in most countries. Provides high levels of employment. Expansion of irrigated areas is on the agenda. Modernization is needed	Little information. Increasing concern.	Not widely applied. Problems with the implementation of pricing schemes. Tunisia has examples of successful water demand management.	Still a small contributor to total water supply. Desalination is being used in Tunisia, Egypt and Libya.	The institutional legal framework for IWRM is in place in many countries. Improvement in the efficiency of some institutions is needed. Need for effective enforcement of the law and regulations	Water savings in agriculture could be reallocated to other areas where there is competition for the resource.	A key challenge is the effective functioning of water services in urban areas. Need for educational, institutional and financial support. Strong state budget deficit control is a reality.
<i>Islands</i>	Full exploitation and over-abstraction of groundwater. Some islands depend on transported water at high	Importance varies with size of Island. Little reduction of water allocated to irrigation. Technical improvements	Little information. Increasing concern.	Implemented in some islands (Cyprus). Problems with the implementation of pricing schemes.	It is becoming a major option for most islands, including Cyprus and Malta.	Fragmentation of the institutional framework is common even in places where IWRM institutions are in place.	Resizing the agriculture sector is on the agenda. More stringent water pricing. More information and	Need for increased coordination of institutions. Need for effective integration of stakeholders and water users.

	prices and suffer from shortages.	are being put in place.		Successful combination of incentives (economic, legal, education).		Problems of legal definition. User rights not clearly defined in some cases.	advice about risks is necessary.	
<i>North Mediterranean</i>	No overexploitation, except in East Spain and South Italy. Over-investments and expensive solutions for water supply would need to be avoided. South Europe countries face shortages in coastal areas, aggravated by the affluence of tourists and irrigation practices.	Agriculture is not a large contributor to GDP but is responsible for high consumption of water in South European countries (Spain, Italy, Greece and Turkey). The other countries do not in the main use irrigation. Irrigation is now increasing in France.	Main problems arise from the lack of adequate wastewater treatment, threatening underground and surface water resources and marine ecosystems, as well as wetlands. In water-scarce areas quantitative impacts are an issue.	South European countries use economic instruments including conservation pricing and markets. The rest are making slow progress thanks to the increase in water prices. Population is very often totally unaware of high water losses.	Wastewater treatment is insufficient in most countries (except France and Italy, Spain and Greece where it is improving fast), causing harm to ecosystems and ground and surface water.	Institutional framework is fragmented. Coordination mechanisms are insufficient and too complex. IWRM exists in most countries. The Balkans need long-term management plans and strong financial support. Effective integration of coastal areas management is also missing.	Resizing agriculture, using water savings for redistribution to other sectors is economically, socially and environmentally more feasible than in other regions. Markets are starting to be used.	Risk planning is not sufficiently developed, particularly related to floods and droughts.
<i>East Mediterranean</i>	High level of overexploitation of	Small to moderate role of agriculture in the	Decreasing quality of water as a result of	Water conservation pricing structures,	Wastewater re-use implemented in the	There is a variety of organizations	Water savings for reallocation of the	River basins and aquifers are shared by more

ean	groundwater due to severe shortage of rainfall in many areas. High seasonal and interannual variations worsen the problem.	region's GDP, but agriculture is the main consumer of water. Important water losses in irrigation.	industrial discharge and insufficient water treatment mechanisms. Problem of salinization of surface water. Lack of adequate monitoring to measure the loss of quality. Quantitative impacts are being considered.	promotion of water saving technologies, public awareness campaigns on the importance of saving water and programmes for reduction of losses in distribution are being implemented or are on the agenda of some countries. Some good practice experience in the subregion.	subregion. Desalination plants are widely used in Israel and are being considered in other countries. Potential for wastewater re-use and substitutions of good quality water is growing with increased wastewater treatment.	involved in planning, regulation, delivery etc in many countries. Coordination mechanisms efficient in some of them. Need to reinforce regulatory functions and enforcement of standards. Some good practice experience in the subregion.	resource. System of water quotas in Israel periodically revised. No permanent water rights.	than one country, creating conflicts of interest. High population growth in the area will affect water availability in the future.
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Source: Framework for Action for the Mediterranean, GWP/MEDTAC 2000

3. Achieving sustainable use of water

In Mediterranean countries water is diverted for human use on a massive scale, creating a growing concern about the damage to the ecological functions of water within rivers and wetlands, and about the risks to future water resources being created by current overuse.

Table 7 gives a summary of the key sustainability issues related to water management in the different subregions of the Mediterranean. The information about impacts on nature and ecosystems is still very scarce. However, in countries (mainly in the north) where there is more information the situation is already a matter of concern: growing erosion and desertification, loss of wetlands, salinization, fragmented rivers with no guarantees of minimum ecological flows, severe water pollution, and insufficient monitoring. The situation in eastern and southern Mediterranean countries, with a drier climate, generally weaker legal and administrative frameworks, and growing demographic patterns, is yet more pressing.

3.1 Water offer and infrastructures

Even with impressive gains in technological capabilities in the 21st century, finding, transporting and conserving fresh water may not be sufficient to meet increasing demand.

Water demand is not usually focused through water saving but through increased offer. Most water-supply policies in the Mediterranean region remain geared primarily by conventional solutions to water shortages. Algeria plans over 50 dams and 10 diversion canals; Morocco intends to double the proportion of its river flow that is controlled by dams, and will build 60 large dams and 280 km of water-transfer structures; Spain plans to build over 100 dams in the next few years.

These methods of water supply and transfer are now a major element in many national budgets. Costs are likely to increase as remaining water sources lie furthest from where they are needed, and the easiest sources and best dam sites have already been developed. Increasingly, water transfers aim to move water from one catchment to another. This creates another set of ecological problems as river beds and wetlands run dry, and stressed ecosystems change in character and are invaded by new, sometimes non-native, species.

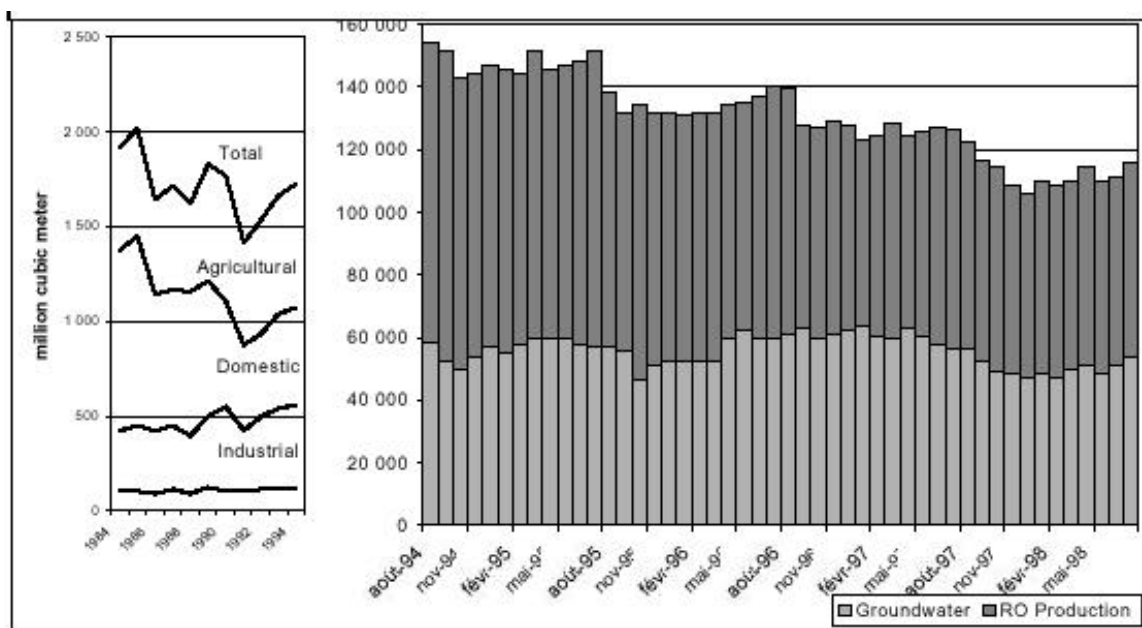
Existing infrastructures could be used in smarter ways, rather than building new facilities. The challenges we face are to use the water we have more efficiently, to rethink our priorities for water use, and to identify alternative supplies of this precious resource.

3.2 Water saving

Appropriate land use practices would provide the basis for river basin recuperation and for the conservation of water ecosystems and sustainable yields of fresh water. Although there are some positive examples (see Annex 5), such a goal may take decades to achieve. In the short term, sustainable yields of water for man and nature can only be provided by water saving. Importantly, there is potential to improve the efficiency of water resource use in many countries. A first line of attack is to improve efficiencies in irrigation. More efficient and environmentally sound technologies exist that could reduce water demand on farms by up to 50% (Postel 2001). Reducing water losses in urban and irrigation networks can provide 30–50% savings in irrigation supplies and 28–50% in urban supplies (GWP/MEDTAC 2000). The Global Water Partnership, the World Bank, and the Blue Plan for Environment and Development in the Mediterranean Region (funded by UNEP's Mediterranean Action Plan with contributions from international bodies and national governments) are all actively pursuing such issues in the region.

A few countries (Israel, Malta, Tunisia) are managing to reduce their water demands (Figure 4).

Figure 4. Examples of water demand decrease



Left: Israel, demand evolution 1984–1994

Right: Malta, evolution water production 1994–1998 (RO = reverse osmosis)

Source: UNEP, Blue Plan 1999

In coastal areas where many economic sectors, especially tourism, depend on the availability and quality of water, non-conventional water resources such as desalination and wastewater re-use have been developed. Desalination is still expensive, but costs are declining rapidly, in places making it a competitive alternative for drinking water supply (e.g. in Israel). Most smaller Mediterranean islands also rely on it to cover between 18% and 50% of domestic water supply. Desalination is also used in Spain, Cyprus, Malta, Tunisia, Egypt and Libya.

The technology to desalinate brackish or salt water is well developed, but it remains an expensive process and is currently an option only in wealthy but dry areas near the coast (Martindale 2001).

Wastewater re-use (e.g. in Tunisia) also has an important value because it substitutes good-quality water in uses such as irrigation of urban gardens. In Israel, treated wastewater already accounts for 30% of the water supply (Postel 2001), mainly for irrigation of crops not destined for human consumption. Similar efforts are also going on in the Canary Islands. Efforts to capture, treat and re-use more wastewater are also under way in Jordan (Gleick 2001).

The diagnosis points to water saving in agriculture as the single most urgent need. Water saving techniques need to be made widely available to large- and small-scale farmers, not least because water consumption is already reaching unsustainable levels in countries where agriculture has the highest social and economic significance. To this can be added mounting demand for water, together with demographic growth. Water saving would also mean curbing the need for investment in heavy infrastructure, which is the main factor responsible for water loss and irreversible fragmentation of habitat.

3.3 Possible uses of saved water

Greater availability of a given resource does not necessarily mean better use of the resource, but rather, higher consumption. In the case of Mediterranean water, savings could be used to satisfy growth in demand, and in some parts to improve access to drinking water. However, a more likely scenario is the risk that saved water will promote a further increase in agricultural land under irrigation.

It would be wiser, perhaps, to consider saved water as a buffer to offset climate change, which is expected to cause water shortages and increased unevenness in its spatial and temporal distribution. Water savings may also help to reduce the need for new, often very expensive supply-side measures, such as water transfers or desalinization.

Given the general situation described in this document, saved water could also be returned to nature, supporting highly threatened ecosystem services and functions.

3.4 New policies to save water

Experience to date (see also the following sections) shows that water pricing and decentralization of irrigation management are among the best tools for water saving. Greater information flow to and training in modern techniques for water managers and water users are also necessary.

Increasingly, pricing is being used to reduce water demand during water shortages and to encourage farmers to invest in water conservation technology, such as drip irrigation. The higher costs of these technologies (relative to simple flooding methods) have been a barrier to their more widespread acceptance and use, but so too has the prevalence of national water policies that discourage rather than foster efficient water use (Postel 2001).

In general, farmers take the initiative to transform their irrigation systems into more efficient systems not because of the price of water, which is subsidized in most countries and which is low for the producer, but because of the limited availability of water. With no proper information and technical assistance, the hardest thing to do is convince farmers to change their crops, since they are used to particular techniques and farming cycles that they can control, as well as to more or less stable, and familiar, markets. Carles (1999) pointed out other reasons for the modernization of medium or large farms, which focus on water saving, because it implies major saving in other inputs, such as workforce, energy, protection measures and fertilizers. Technicians assert that the price paid by farmers for irrigation water must depend on the volume consumed, even though a certain amount is fixed. Similarly, several authors (Carles 1999, De Miguel 1999) state that, in crops irrigated by groundwater, farmers cover all the direct costs derived from the overexploitation of aquifers. It should not be forgotten that the major problem affecting groundwaters is overexploitation of aquifers beyond their capacity to renew.

In the northern Mediterranean countries, subsidies under the Common Agricultural Policy have shaped most of present use of water. The CAP is now beginning to consider agricultural activities also as an important environmental and landscaping factor, and have established a new set of 'agro-environmental' subsidies, supporting technical conversions to better environmental standards. Nevertheless, the EU will not liberalize agriculture, and irrigation schemes will continue to be subsidized. Globally, incentives that sound trade-offs between ecosystem and environmental needs are perverse, as agriculture only produces a small percentage of GNP in EU countries (<10%)³ while the economic, social and ecological values of healthy freshwater ecosystems (including all the biodiversity they harbour) do not figure in the economic balance sheet.

³ In California, supporting 100,000 high-tech jobs requires some 250 million gallons of water per year; the same amount of water used in the agricultural sector sustains fewer than ten jobs (Gleick 2001).

All around the Mediterranean, politicians, scientists, technical bodies and civil society organizations are increasingly aware of these problems (see next section), and in many agreements and declarations integrated river basin and water management is now recognized as a priority. It is unquestionably an important and appropriate issue for trans-Mediterranean cooperation.

4. International policies and instruments promoting integrated river basin management

Water is managed mostly at the national level as there is no agreed international convention on this topic. However, at least three international treaties are related to sustainable management of land, water resources and biological diversity, from which elements for wiser management of river basins can be drawn.

In the past five years international concern and activities on sustainable freshwater and basin management have grown significantly in the Mediterranean. This chapter presents a brief description of the policies and institutional approaches to the management of water and river basins. More detailed descriptions can be found in Annexes 1 and 2.

The **Convention on Wetlands** (commonly referred to as the Ramsar Convention after its place of origin in Iran) includes 24 Mediterranean countries as Contracting Parties. Recently the Convention called on governments to “integrate the conservation and wise use of wetlands... in the planning and decision-making processes, at national and local levels, about land use, groundwater management, the planning of river basins and coastal zones...”. Resolution VI.23 of the Convention calls on Parties to involve Ramsar National Committees and local water stakeholders in integrated water catchment management and to work jointly with specialized organizations in all matters relative to water management. Consequently, in 2000, the Ramsar Convention adopted the River Basin Initiative in order to “integrate biological diversity, wetland and river basin management” in a joint effort with the **Convention on Biological Diversity (CBD)**. Its goal is “to establish a global network to share information, and link and support activities where the principles of integrated management of biodiversity, wetlands and river basins are demonstrated”. The first conclusions of the Initiative, based on a questionnaire to Ramsar Contracting Parties in the Mediterranean, were:

- the need for better integration of the management of biodiversity, wetlands and river basins;
- the need for information, with emphasis on policies and legal instruments;
- planning procedures and mechanisms for promoting an ecosystem approach to integrated river basin management.⁴

Also, the Conference of Contracting Parties to the CBD has adopted an ‘ecosystem approach’ for the implementation of this treaty.

The **Convention to Combat Desertification (CCD)** calls on its Contracting Parties, through cooperation between all levels of government, communities, non-governmental organizations and land users... including peasants, shepherds, women and their representative organizations... to establish the institutional means and appropriate policies to combat desertification through the integrated management of natural resources, including agricultural lands and rangelands, forests and vegetation cover, wildlife, and water resources. Its last Conference of Parties, in October 2001, agreed that “the management of water resources shall complement the fight against desertification and other forms of environmental and ecological degradation”.

Over 90% of Mediterranean countries are signatories to the treaties on wetlands, biodiversity and desertification.

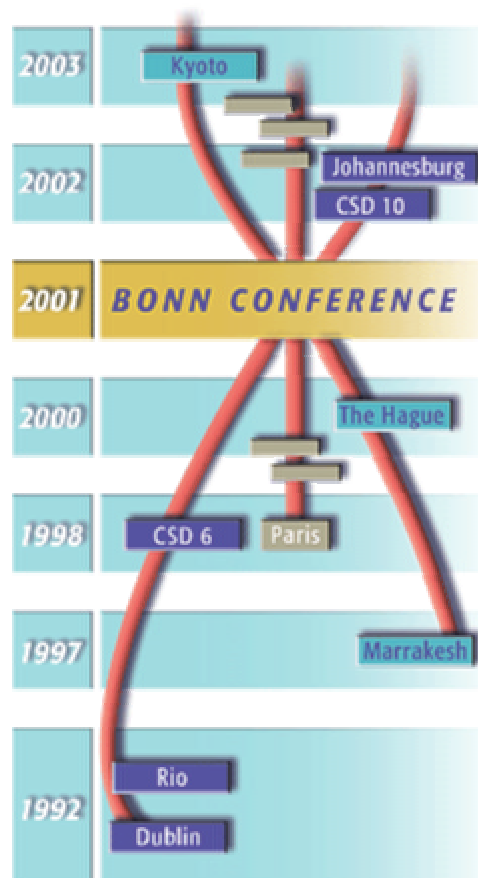
As well as these international conventions, numerous Ministerial Declarations have recognized the need for sound management of water and committed the parties involved to establishing all necessary policies and means. Such is the case of the **Dublin Principles** of 1992, which state that:

⁴ Drawn from questionnaires to Ramsar Contracting Parties in the Mediterranean, about *The national needs and contributions assessment on integrating biodiversity, wetlands and river basin management*.

- Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment;
- Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels;
- Women play a central part in the provision, management and safeguarding of water;
- Water has an economic value in all its competing uses and should be recognized as an economic good.

Figure 5 depicts the chronological evolution of the recent ministerial meetings on water issues, which converged in the Bonn Conference of 2001, and which in turn prepared the world for decisions on water management to be taken at the World Summit on Sustainable Development in Johannesburg in 2002 and the third World Water Forum in Kyoto in 2003.

Figure 5. Chronology of recent ministerial meetings on water issues



During the second World Water Forum in The Hague in 2000, a Mediterranean Framework for Action was proposed. Along with key guidelines was the message that peace and political stability are prerequisites for success in water management, particularly regarding co-management of jointly shared river basins and water resources in the Middle East and the Balkans. It stressed the need to change the political framework of water management and develop a new philosophy of governance in the region. It showed that without information exchange and the proper participation of all concerned parties (users, institutions, private sectors, donors, etc), sustainable water management will not be possible. The Forum also highlighted two specific problems in the Mediterranean: high irrigation needs and increased tourism demand during the summer period. Every drop of water in the Mediterranean region must be used and re-used if sustainable water management is to be achieved. Re-using

wastewater is an old practice, but developing this on a large scale requires a regulatory framework now lacking. Guidelines for Mediterranean water re-use were identified. The Forum concluded that political willingness in the region is not sufficient, and the Framework for Action should be backed by funding.

The main milestone in the development of integrated water management came with the **Bonn International Conference on Freshwater** in 2001, which declared: “For sustainable development, it is necessary to take into account water’s social, environmental and economic dimensions and all of its varied uses. Therefore, water management requires an integrated approach”. And it added “integrated water resource management is needed to bring all water users to the information-sharing and decision-making tables”.

The Bonn Declaration urged policies and management of water resources to take account of other international agreements, such as the CBD, CCD, Ramsar and the UN Framework Convention on Climate Change. Water distribution must seek an equilibrium between the different demanding and competing sectors, taking into consideration the social, economic and environmental values of water, and the relationship between surface and groundwater, land administration and the need to maintain ecosystem integrity. Crucially, it stated that river basins, lakes and aquifers must be the primary framework for water resource management. To this end, the appropriate institutional and participative mechanisms need to be created and promoted, and the decision-making processes, project execution and on-the-ground operations need to be as decentralized as soon as possible.

Also meeting in Bonn in 2001, the **Dialogue on Water, Food and Environment**, a process established by ten sponsoring organizations (FAO, GWP, ICID, IFAP, IUCN, IWMI, UNEP, WHO, WWC, and WWF), concluded the need for greater dialogue between the agricultural and environmental sectors. It emphasized the need to develop a shared vision on water management, a knowledge bank to sustain dialogue, and a network of field projects at local and river basin level, implementing innovative focuses and solutions improving the sustainability of water provision for agriculture and for nature.

At the multilateral level, support for these new policies is also clear. The United Nations have repeatedly called for an end to unsustainable exploitation of water resources, urging the formulation of management strategies at regional, national and local levels. The **Global Water Resources Evaluation Programme** aims at the development of instruments and competence to improve the understanding of the main processes, management practices and policies that will help to improve the quality and supply of fresh water worldwide. In particular, **FAO’s Land and Water Development Division** is concerned with sustainable use and conservation of water in agriculture. It assesses water resources and monitors agricultural use, and promotes appropriate water policy and integrated water management in river basins, including information sharing and conflict resolution in shared river basins.

For its part, the European Union in 2001 approved the **Water Framework Directive**. This obliges EU member states to develop policies integrating water management with ecosystem and environmental criteria. With respect to countries in the Mediterranean region, this only affects France, Greece, Italy, Portugal and Spain. The Directive aims to prevent further deterioration, to protect and to improve aquatic ecosystems, and to cover the water needs of terrestrial ecosystems directly dependent on wetlands. Should countries like Slovenia, Cyprus and Malta (and later possibly Turkey) join the EU, they will be bound by the obligations of this Directive.

5. Policies and instruments with a specific focus on the Mediterranean region

The widely acknowledged strategic importance of fresh water in the Mediterranean region is shown by the existence of numerous international, regional and multilateral bodies focused on

the issue. The World Bank and the European Union are the major donors funding this work. A more detailed description of the following Mediterranean organizations and policies is given in Annex 2.

‘Agenda 21 for the Mediterranean’ states that “Integrated water resources management is based on the perception of water as an integral part of the ecosystem... water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perennality of the resource, in order to satisfy and reconcile needs for water in human activities”.

Following its Euro-Mediterranean policy, adopted in Barcelona in 1995, the European Union established the **Short and Medium-term Priority Environmental Action Programme for the Mediterranean (SMAP)**. This is a framework programme working on five aspects, one of which is integrated water management. Among its most urgent measures is the protection of water reservoirs and wetlands and, if necessary, the establishment of management plans for river basins and water catchment areas, programmes aimed at reducing water losses – including the improvement of existing networks, leak detection, preventive management, cartography and training – and development of techniques to reduce the use of water for irrigation. It also encourages support to non-centralized authorities (basin committees, local agencies, etc) with responsibilities for water management at local, community levels.

At a governmental level, the **Mediterranean Water Network (MWN)** brings together chief representatives from the water sectors of 15 Mediterranean countries. Financed by the EU and the World Bank, it aims at promoting the development of technology in matters concerning water, and exchange of information on such aspects as assessment of resources and water demand, planning methods and techniques, administration of water resources, legislation and regulations. However, the MWN has not declared explicit support to integrated management of river basins and water for nature trade-offs. The **Turin Ministerial Declaration**, however, recently established clear policies for Euro-Mediterranean cooperation on water management, calling for sustainable use of water and balanced trade-offs between water demand and ecosystem needs.

5.2 Technical assistance and information

A range of organizations are working towards sustainable water use in the region, on issues ranging from policy and information, to field actions.

The **Mediterranean Environmental Technical Assistance Programme (METAP)** will help the 14 METAP countries to acquire the necessary technical and policy tools to establish credible and operational environmental impact assessment (EIA) systems. One of three METAP guidelines is ‘Integrated Water and Coastal Resources Management’ on which a regional capacity building programme (MED-BRANCH) depends. **MED-BRANCH** is designed to assist Algeria, Egypt, Jordan, Morocco, Syria and Tunisia in developing local capacity needs assessments for selected national ‘hotspots’. During the first two phases of METAP (1990–1995), 58% of its funds were mobilized for project identification activities and 36% for capacity building.

Box 3**METAP's NETWORKS CENTRED ON PRIORITY THEMES FOR THE MEDITERRANEAN**

- MEDCITIES for promoting decentralized cooperation and the institutionalized development of coastal towns;
- MEDBRANCH developed within the Regional Programme for Capacity Building aimed at building national water management and pollution-abating capacities in sensitive areas;
- MED POLICIES for promoting sustainable economic growth through the integration of environmental concerns in economic and budgetary policy;
- MED-ECOMEDIA for awareness raising and information.

Source: MCDS 2001

The main objective of the **Centre for Environment and Development in the Arab Region and Europe (CEDARE)** is capacity building in its 32 member countries, promoting skills in environmental management, technology transfer, environmental education and development of environmental policies. CEDARE is an intergovernmental network that also facilitates inter-country cooperation and exchange of information and experience through its Land and Water Resources Management Programme.

The **Mediterranean Hydrological Cycle Observing System (MED-HYCOS)** contributes to water resources assessment and management by helping national hydrological services to strengthen their capacities and by promoting exchange of information and skills.

Several other information and monitoring bodies are dedicated to providing information on water management. The METAP Capacity Building Unit's '**Programme Performance and Monitoring**' system comprises a framework of specific indicators related to METAP's priority themes and is intended to assist countries in monitoring their progress towards meeting environmental objectives. The Mediterranean Action Plan's **Blue Plan** initiative is developing environmental performance indicators at national and project level under the supervision of UNEP. Other programmes dealing with the same topic are UNESCO's International Hydrological Programme, FAO's **Aquastat**, and **Semide** (Euro-Mediterranean Information System) which is focused on water management know-how. The latter is a partnership project giving its members (Parties to the Barcelona Convention) access to water resource specialists, specialized information, and specific water management methods. **FAO's Land and Water Development Division** assesses water resources and monitors agricultural use, including information sharing and conflict resolution in shared river basins.

5.3 Main funding sources

The EU's **MEDA** (the principal financial instrument for implementing the Euro-Mediterranean Partnership) benefits 12 Mediterranean countries: Morocco, Algeria, Tunisia, Malta, Cyprus, Turkey, Egypt, Jordan, Israel, Syria and the Palestinian Authority. In the environmental area one of the themes is integrated water management. The main objectives of the MEDA programmes are: launching river basin agencies, regulating different water uses (especially water for agriculture), protecting water resources, and developing public-private partnership. In Morocco, for example, EUR120 million have been provided for adjustment of the water sector, including actions on drinking water and irrigation.

The EU's **LIFE-Environment** programme (with 47% of the total LIFE budget and available only to EU member states) promotes the sustainable management of ground and surface waters. **LIFE-Third Countries** focuses on technical assistance in other countries bordering the Mediterranean, aimed at the creation of administrative capacities and structures necessary in the environmental field, and the development of policies and action programmes. The EU's **Line 6200-Environment** applies to Mediterranean developing countries, assisting with the implementation of international obligations arising from multilateral environmental conventions such as the CBD and Climate Change.

The **GEF-Water bodies** supports the integration of land and water projects, emphasizing the regeneration of damaged ecosystems and concentrating in particular on integrated management of freshwater river basins and coastal areas.

METAP's **NGO Small Grants Facility** provides support for small-scale innovative actions that support the METAP priority themes and are initiated by community-based organizations and NGOs. The Facility is active in Turkey, Algeria, Jordan and Lebanon.

5.4 Fora, networks and civil society

A large number of NGOs, scientific, technical and professional groups, and other associations work on water management issues around the Mediterranean. Most significantly there are several fora in which civil society organizations participate jointly with international and national institutions. A more detailed description of these fora and NGOs is given in Annex 3.

Among NGOs, **WWF's Mediterranean Programme Office** and the **MIO/ESCDE** organization of NGOs have particular policies and field actions geared to integrated river basin management. Numerous technical organizations are active in water and river basin management, such as the **International Commission on Irrigation and Drainage (ICID)** which works on the concept of water-for-food-and-nature; ICID comprises members from 88 countries, is a member of the World Water Council and has consultative status in the UN Economic and Social Council (ECOSOC), in UNESCO, in WMO and in FAO. The **International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM)** aims at town and country planning and water resource management, while the **Mediterranean Water Institute (IME)** was entrusted by the Global Water Partnership with the animation, coordination and technical capacity of the **Mediterranean Technical Advisory Committee (MEDTAC)**.

MEDTAC (a forum of the Global Water Partnership) is inspired by the principles of the Dublin Ministerial Declaration (1992) and the Earth Summit. Its goals are to establish the principles of sustainable management of water resources, and to support actions that bolster such principles at local and national levels. Specific topics on which MEDTAC focuses include water conservation and the interaction of water, food and the environment.

The **Mediterranean Wetlands Initiative (MedWet)**, which supports close linkages between wetland conservation and river basin management, is designing guidelines for integrated river basin management (see Box 4 and Annex 4). One key element in the MedWet philosophy is that each wetland site cannot be seen as an isolated, independent island, but as part of a wider whole that encompasses the surrounding area, catchment basin, region, country, and the Mediterranean. MedWet maintains that wetland conservation depends on concerted actions taken at all levels simultaneously (Papayannis and Montemaggiore 1996)

Box 4 Medwet

The Ramsar Convention on Wetlands, under whose guidance the MedWet Initiative was developed, established the Mediterranean Wetlands Committee, comprising representatives of 25 Mediterranean governments, the Palestinian Authority, the European Commission, intergovernmental conventions and UN agencies (Barcelona/UNEP; Council of Europe/Bern; Ramsar; UNDP), non-governmental organizations (BirdLife International, IUCN, Wetlands International, WWF International), and the Greek Biotope/Wetland Centre (EKBY), Station Biologique de la Tour du Valat in France, and Sede para el Estudio de los Humedales Mediterraneo (SEHUMED) in Spain.

In 1999 MedWet became a formal inter-regional structure for the implementation of the Ramsar Convention (Ramsar Resolution VII.20). It serves as a model for regional wetland cooperative structures worldwide.

The goal of MedWet is "to stop and reverse the loss and degradation of Mediterranean wetlands, as a contribution to the conservation of biodiversity and to sustainable development in the region".

The eight general objectives of the MedWet Strategy address:

- achieving wide acceptance and implementation of the Strategy;
- achieving wise use of Mediterranean wetlands;
- improving knowledge and awareness of wetland values and functions;
- reinforcing the capacity of institutions and organizations;
- ensuring effective management of all Mediterranean wetlands;
- conferring legal protection on major wetland sites;
- strengthening international cooperation and increased financial assistance;
- strengthening collaboration among all involved, governmental and non-governmental, public and private sectors.

6. National water management policies with respect of river basins

Previous sections show there is a strong international will for integrated water management, in the EU, in the wider Mediterranean region, and indeed worldwide. Nonetheless, when such will is applied to national policies and regulations, they tend to vary greatly between the large diversity of Mediterranean countries. Even within EU countries, obligated by the new Water Directive, there are significant differences in legal provisions, land use and water-pricing policies, institutional arrangements and participatory procedures in planning and implementation. Carrying out a country-by-country analyses of gaps and opportunities across all countries in the Mediterranean basin would be a lengthy project. However, national situations and experiences can provide illustrative examples of the real context and difficulties surrounding the concept and practice of integrated water and river basin management. In addition to the national examples given below, a number of illustrative cases of positive and negative experiences in river basin management are presented in Annex 5.

The main conclusions which can be drawn from the examples in Annex 5 from France, Morocco, Spain, Tunisia and Turkey show how integrated water management is based on institutional coordination and on the active participation of users and other stakeholders. It is also clear that positive results always occurred where water management decisions were decentralized to the local and basin levels.

6.1 National examples

Spain's Water Act states that all actions undertaken by the relevant authorities concerning water must be based on the National Hydrological Plan, as well as on River Basin Hydrological Plans drawn up by river basin institutions. All decisions taken about water – surface or underground – are subject to hydrological planning. However, application of the law has required a lengthy period owing to its complexity, and its preparation has taken almost ten years.

A number of contradictions exist between the Spanish Ministries of Environment and Agriculture over water intended for irrigation. Surprisingly, the Ministry of Environment favours an increase in irrigated land higher than that given in the National Plan of Irrigated Land. The National Hydrological Plan, a macro-investment scheme costing more than EUR20,000 million over ten years, is based on inter-basin water transfers, mainly from the Ebro catchment to coastal Mediterranean regions. It has created much debate among local stakeholders in Aragón and Catalonia, as well as in the rest of the country. Environmental impacts are deemed severe, including on many internationally protected areas. The Plan may also further open the development imbalance between the arid inland and the developed coastlines. Water-saving alternatives have been proposed by its opponents, and it has been denounced in Brussels as acting against the spirit of the EU Water Directive. This is an example of the political difficulties facing integrated river basin management, even though a basin organization exists. This is also an example of how the EU Water Directive can be interpreted differently by different interest groups. (See Annex 5[a] for a fuller description.)

Also in Spain, the Guadamar Green Corridor is an example of regeneration of a polluted basin. In 1998, the retaining wall of a tailings dam broke at the pyrite mines in Aznalcollar, from which the Agrio and Guadamar rivers were polluted by a toxic sludge and heavy metals. The incident was recognized as one of Spain's most catastrophic environmental disasters, as the two affected rivers feed parts of the Doñana wetlands (a National Park and a Ramsar site) which drain to the Guadalquivir fishing areas. After a fast and coordinated response from national and local administrations – involving, among other things, the collection and removal of thousands of tons of toxic mud and the planting of large numbers of plant species which capture toxic elements – the catastrophe opened the way for planning an integrated river basin action plan. This included the prevention of further pollution from towns and agro-industries, and restoration

of the ecological connectivity of the landscape. The promising land-use plans and successful regeneration works were made possible thanks to a common vision and a consensus on action, both built through a participatory process. The Guadiamar is a good example of planning river basin regeneration using ecological criteria, promoted by national and regional governments with the full participation of local stakeholders, municipalities, scientists, NGOs, and the National Park authorities. (See Annex 5[b] for a fuller description.)

In **France**, the decentralization of water planning and management is ensured by six River Basin Committees, whose plans are subject to approval by the state. The Rhone-Mediterranean-Corse Basin Committee has 124 members grouped in several sections: territorial and local communities, competent persons and users, representatives from socio-professional sectors, and state representatives. The basin's Water Agency receives payment from users depending on the amount of water used or the pollution generated, a system which fosters better use of water by users. The revenues paid allow the Agency to finance studies, works and activities that help reduce wastage and pollution of water. The principle employed is 'those who protect the environment (preserves, economizes on the resource, combats pollution) will be helped'. One area in which the Agency operates is co-financing the recovery and preservation of aquatic environments. (See Annex 5[c] for a fuller description.)

In **Turkey**, the transfer of irrigation systems to water users began gradually in the early 1950s. In 1993, with financial support from the World Bank, the country accelerated this decentralization process as a result of an estimated 83% shortfall between operation and maintenance allocations and state-wide collected tariffs. In five years, 1.5 million ha have been transferred, supported by enhanced internal training, including seminars and workshops. Positive results with pilot schemes included an increased sense of responsibility, a more reliable and equitable water supply, improved irrigation efficiency (water savings increased by 34% and in energy use by 31% in five years), and a collection rate increase from 42% to 80%. (See Annex 5[d] for a fuller description.)

Tunisia has developed expertise in the fields of water resources mobilization and integrated management against a background of aridity, water scarcity and social and economic constraints. This expertise has been supported from the outset by a national strategy, strong political commitment and increasing user awareness. The country has embarked on a new irrigation policy, which gradually shifts water-management responsibilities and costs to local administrations; their capacity to develop this approach remains to be seen. A particular feature of the policy is the creation of associations of underground-water users that will improve water use by all irrigators drawing on shallow aquifers. To date, these measures have resulted in 25% water savings and a 33% increase in water-use efficiency. (See Annex 5[e] for a fuller description.)

One example from Tunisia is **Ichkeul National Park**, which though much degraded, remains one of the most important wetlands in the Mediterranean basin, being a Ramsar Site, Biosphere Reserve and World Heritage Site. The lake and marshes, covering some 12,000 ha, have seasonal variations in water depth and salinity, influenced by inflow of fresh water from the catchment in winter, and in summer by inflow of sea water. The low salinity in winter promotes the development of aquatic plants and attracts some 200,000 migrant waterbirds. Since its international recognition, the construction of six dams, part of the country's Master Plan for the Waters of Northern Tunisia, has changed the ecological character of the wetland. Three dams were built between 1982 and 1992, causing a significant change in the local hydrological system. The Ministry of Agriculture evaluated the impact of the dams, organized an international seminar and instigated a multidisciplinary study. This resulted in numerous measures by the Tunisian authorities, including the cancellation of the other three dams and the classification of Ichkeul as a water user (with an annual allocation of 20 million m³). The fundamental question now is whether it is possible to restore the lake to its original condition. The area needs an integrated management plan, for which the government is planning an inter-

ministerial and public participation process capable of developing and implementing it. The plan will take account of the human users: fishermen and graziers, visitors and tourists. Its implementation will include reinforcing the management body with the necessary powers of action. This is an instance where a government has taken very important decisions to allocate scarce water resources to a wetland and to restore a very important hydrological system. To succeed, the participation of local users is fundamental, and concerted coordination across the different governmental departments will be essential: Forests, Hydraulic Works, Rural Engineering, Fisheries and Aquaculture (all in the Ministry of Agriculture), and the Ministry of Environment. (See Annex 5[f] for a fuller description.)

In **Morocco**, a pilot project for land-use planning in a dry and environmentally degraded region in the Rif mountains shows how local inhabitants have played a key role in reaching agreement on a long-term vision for development. Environmental measures need to go hand-in-hand with concrete improvements in basic human needs, such as basic infrastructures, or with micro-projects which generate local income. Development projects must take into account local knowledge and traditional customs, and mobilize local capacities, and at the same time work to strengthen these capacities, whether in civil society or public institutions. (See Annex 5[g] for a fuller description.)

7. Challenges in implementing integrated water resources management in the Mediterranean

7.1 Needs

The previous sections have shown:

- the urgent need for strengthened integrated water and river basin management;
- the strong international commitments in this direction, reinforced by international agreements, policies and committed organizations; and
- the complexity of making the concept a reality, bringing together different aspects such as land-use planning, water storage, distribution and use, and the disposal of wastewater.

National case studies show that there are some recent pioneering and partial attempts to start implementation of integrated water management. However, there is a long way to go before the rationalization of water use and disposal is achieved, and before sustainable yields of good quality water are guaranteed for ecosystem functions and freshwater species.

The first challenge is to ensure sustainable yields of water through all seasons. For the Mediterranean region, this means the regeneration of vegetation cover in most river basins, land-use planning schemes, reforestation, and the prevention of fires, overgrazing and the resulting erosion, as well as lowering the exploitation of groundwater to sustainable levels.

The second challenge is to reduce water demand. Most importantly, agriculture should become much more water-efficient everywhere (with the possible exception of the Balkan countries, France and Turkey). Along coasts and on islands the high water demand from summer tourism should cease drawing water from shallow aquifers.

Among the barriers to better water planning and use are inappropriately low water prices, inadequate information on new, efficient technologies, inequitable water allocations, building dams, and government subsidies for growing water-intensive crops in arid regions (Gleick 2001).

7.2 Responses

Because of its links with agricultural exports and tourism services, water management is a highly economic issue. Owing to the growing scarcity of fresh water, interest in the topic among political, social and scientific sectors has steadily increased at international and national levels. The water agenda has become of such strategic importance around the Mediterranean that most international and multilateral organizations and donors have included water management within their priorities for the region.

Integrated river basin management is strongly encouraged by international conventions, agreements and ministerial declarations, and, at the European level at least, this has translated into clear policies. In the Mediterranean the concept is generally accepted by many bodies, with a growing tendency to analyse effects at an ecosystem level.

Based on documental information, the institutional capacity to make good the spoken words would seem to be already in place at the regional level. A (surprisingly) high number of multilateral and technical organizations and international fora are willing, from different angles, to move towards sustainability in the use of water.

7.3 Constraints

In spite of the growing recognition of the need to manage water sustainably, the demand for water keeps on rising. Irrigation continues to expand and the building of dams and heavy infrastructure are still a priority, burdening national budgets. Inter-institutional coordination, land-use planning, integrated basin management and water saving efforts are still the exception, not the rule, and already impacted ecosystems continue to be degraded. The reasons for this situation appear to be many.

There seem to be important gaps and weaknesses in implementing international policies at national and, particularly, local levels when it comes to planning, participation, coordination and coherence between the different stakeholders. At national and local levels water is still managed sectorally, with a focus on covering demands for agricultural and urban (and tourism) growth; institutional arrangements within the different countries reflect this (obsolete) approach. Also, although agriculture is the main water consumer, farmers in general have lower incomes, so the cost of water continues to be subsidized, which in turn does not promote saving.

While short-term interests and acquired rights are not easy to overcome, overall there seems to be a sizeable gap between new international policies and local practices. Management of all the factors that influence the river basin involves many governmental departments and local authorities, and experience often shows the great difficulties in coordinating their actions. In some countries the decentralization needed to manage water and basins is non-existent. Where decentralization has occurred, and even though supportive policies are in place, very often the mechanisms ensuring participation and co-responsibility among local stakeholders in planning the management of water and basins are lacking.

Technical capacity needs to be strengthened at national and local levels, particularly in southern and eastern Mediterranean countries, where the environmental situation is under greater stress. At local levels there is a lack of leading organizations with a clear view of integrated river basin management and the ability to mobilize resources, promote participation and coherence, create consensus and push win-win proposals and solutions.

Water users and most stakeholders are often unaware of the high water losses occurring and the potential for saving. In general, there seems to be little information and awareness about the problem and about the international commitments and agreements. At national and local levels much more needs to be done to raise concerns about the linkages between the management of river basins and the availability of water, including the effects on natural ecosystems, about current unsustainable trends, and about the implications of this lack of awareness and action in the development options for most Mediterranean countries.

An additional difficulty facing integrated water management is the fact that some river basins are transboundary. The most extreme example is the Jordan River basin which is shared by five countries: Jordan, Israel, the Palestinian Authority, Syria and Lebanon.

Any integrated water management should address demand. Purely technical measures, such as the introduction of new irrigation technologies or equipment, are in themselves not sufficient. Financial measures, such as pricing water at its real cost, may be necessary but politically will be more difficult to implement. Finally, the involvement of water users is a key element in a successful integrated water management strategy.

In summary, there has been good progress in regional policies and political declarations, and there is a broad consensus on the need to save water and be more water-efficient throughout, but much remains to be done in terms of real, on-the-ground action. This situation is analogous to other sustainability and conservation problems and challenges around the world. In the case of fresh water, progress may be expected in the years to come as most of these policies, declarations and fora have only been launched in the last two or three years.

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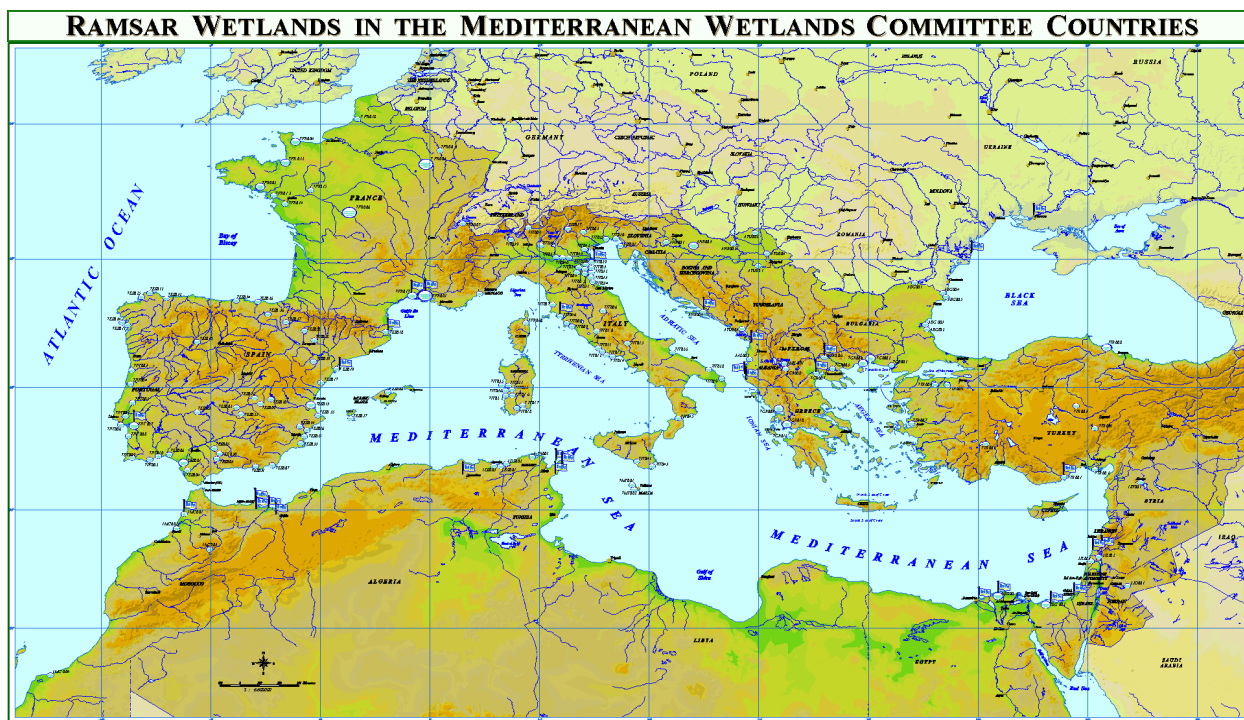
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Annex 1

INTERNATIONAL AND MULTILATERAL POLICIES WITH DIRECT OR INDIRECT APPLICATION TO RIVER BASIN MANAGEMENT IN THE MEDITERRANEAN

a) The (Ramsar) Convention on Wetlands

Strongly motivated by waterbird conservation and, later, by the wise use of wetlands, the Ramsar Convention, founded in 1971 and signed by 25 countries in the Mediterranean, has provided for the wise and sustainable management of the water basins which feed the Ramsar list of wetlands of international importance.



Source: Ramsar/MedWet/Greek Biotope Wetland Centre

Resolution VII.18, adopted at the 7th Conference of Parties (Costa Rica 1999), recalls Operative Objective 2.2 of the Convention's Strategic Plan 1997–2002, asking Parties to “integrate the conservation and wise use of wetlands... in the planning and decision-making processes, at national and local levels, about land-use, groundwater management, the planning of river basins and coastal zones...”. Earlier, Resolution VI.23 (Brisbane 1996) meanwhile called upon countries to involve Ramsar National Committees and local water stakeholders in integrated water catchment management and to work jointly with specialized organizations in all matters relative to water management.

As a consequence, in May 2000 the Convention adopted the ‘River Basin Initiative’ in order to “integrate biological diversity, wetland and river basin management in a joint effort with the Convention on Biological Diversity. Its goal is “to establish a global network to share information, and link and support activities where the principles of integrated management of biodiversity, wetlands and river basins are demonstrated”.

The 8th Ramsar Conference of Parties in Valencia in November 2002 will be the first one to take place in the Mediterranean region. There, its Draft Strategic Plan (2003–2008) will be issued, giving greater priority, among others, to the following activities:

- Elaborating and implementing institutional frameworks, policies and laws (including legal requirements) related to assessing procedures that take into account the wide range of environmental, social and economic values of wetlands;

- Developing further the special programmes of the Ramsar Convention intended for particular regions or issues, such as the Mediterranean Wetlands Initiative (MedWet);
- Integrating the conservation and rational use of wetlands with planning and with the national, provincial and local decision-taking processes, particularly regarding river basin management, coastal areas management, and groundwater resources management.

Ramsar is actively participating in the World Water Council and the Global Water Partnership which aims at the integrated management of water resources.

By means of a questionnaire, in 2001 the River Basin Initiative assessed the needs for information in 84 countries. Two of the findings were the need to share information for better integration of activities in management of biodiversity, wetlands and river basins, and flexibility in sharing information in order to adapt to regional differences and user preferences.

b) The Convention to Combat Desertification (CCD)

Twenty Mediterranean countries and the European Union are Parties to this Convention, which entered into force in December 1996. The CCD includes several provisions which can be used to promote sustainable management of river basins.

Articles 3(c) and 10 state that “Parties shall, through cooperation between all levels of government, communities, NGOs and land users... including peasants, shepherds, women and their representative organizations..., promote better understanding of the value of land resources and scarce water resources aiming at policy planning, decision taking, and the execution and revision of national plans pursuing the sustainable use of these resources”. Article 4(d) calls for cooperation between Parties, while Article 7 gives priority to African countries, included those bordering the Mediterranean. Article 8 in the Annex of regional application in Africa calls for determination of the factors contributing to desertification and drought, and for the establishment of the institutional means and appropriate policies to combat these phenomena; for example, the integrated management of natural resources, including agricultural lands and rangelands, forests and vegetation cover, wildlife, and water resources.

There is a specific Annex for northern Mediterranean countries calling for national plans to combat desertification, including measures related to:

- (a) Legal, institutional and administrative spheres;
- (b) Modalities for land use, ordination of water resources, conservation of soils, forestry and agricultural and range activities;
- (c) The conservation of flora and wildlife and any other manifestations of biological diversity;
- (d) Protection against forest fires;
- (e) Research, training and public awareness.

Spain, Algeria and Egypt, among other countries, have since prepared national strategies against desertification that now need to be implemented.

The last Conference of Parties (Geneva 2001) agreed that “the management of water resources shall complement the fight against desertification and other forms of environmental and ecological degradation”.

c) The Convention on Biological Diversity (CBD)

The Conference of Parties to the CBD has adopted an ecosystem approach through which to implement the treaty. Decision III/11 at the 3rd Conference recognizes the need for an integrated and multidisciplinary approach in planning and management of land resources, and that attaining the multiple objectives related to sustainable agriculture and rural development requires an ecosystem approach, taking account of the inter-related impacts with freshwater environments. In

view of the latter, the CBD agreed a Joint Work Programme endorsed by the respective Conferences of Parties.

d) The Dublin Principles

Five hundred participants, including government-designated experts from a hundred countries and representatives of 80 international, intergovernmental and non-governmental organizations attended the International Conference on Water and the Environment (ICWE) in Dublin, Ireland in January 1992. The Conference Report sets out recommendations for action at local, national and international levels, based on four guiding principles:

- Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment;
- Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels;
- Women play a central part in the provision, management and safeguarding of water;
- Water has an economic value in all its competing uses and should be recognized as an economic good.

e) The Bonn International Conference on Freshwater

Government representatives from 118 countries attended this conference in December 2001. Among them were 46 ministers, representatives of 47 international organizations and delegates from 73 other important groups and civil society bodies. The conference examined the function of water in sustainable development. Moreover, it took stock of the implementation of Agenda 21, determining ways in which it can be improved.

Among the conclusions, five key points were established in order to attain better water management and to take an important step toward achieving sustainable development: “The key to long-term harmony with nature is neighbour and cooperative arrangements at the water basin level, including across waters that touch many shores. We need integrated water resource management to bring all water users to the information-sharing and decision-making tables. Although we have great difficulty with the legal framework and the form agreements might take, there is substantial accord that we must increase cooperation within river basins, and make existing agreements more vital and valid.”

Throughout the conference, the ministries of 46 countries also signed a declaration which included the following: “We confirm our resolve to stop the unsustainable exploitation of water resources by developing water management strategies at regional, national and local levels. Water is necessary in all aspects of life. For sustainable development, it is necessary to take into account water’s social, environmental and economic dimensions and all of its varied uses. Therefore, water management requires an integrated approach.”

Water distribution must seek an equilibrium between the different demanding and competing sectors, taking into consideration the social, economic and environmental values of water, and the existing relation between surface and groundwater, land administration and the need to maintain ecosystem integrity. River basins, lakes and aquifers must be the primary framework for water resource management. To this end, it is necessary to create and promote the necessary institutional and participative mechanisms. The decision-making processes, project execution and services operation must be as decentralized as possible.

f) Global organizations of the UN system working in the Mediterranean region

i) UNESCO's International Hydrological Programme (IHP): The IHP is UNESCO's intergovernmental scientific cooperative programme on water resources – a vehicle through which UN member states can upgrade their knowledge of the water cycle and thereby increase their capacity to better manage and develop their water resources. It also aims at the improvement of the scientific and technological basis for the development of methods for the rational management of water resources, including protection of the environment.

ii) UNESCO's World Water Assessment Programme: In its Millennium Declaration (September 2000), the UN decided to:

- reduce by half by 2015... the percentage of people lacking access to safe drinkable water or who cannot afford it;
- put an end to the unsustainable exploitation of water resources, formulating management strategies at the regional, national and local levels.

The World Water Assessment Programme aims at the development of the instruments and competence to improve understanding of the main processes, and the management practices and policies that will help improve the quality and supply of fresh water on the planet. The *World Water Development Report* is the main component of the programme, using case studies as a testing ground for new methodologies that will be examined in terms of the eleven challenge areas: governing water wisely, meeting basic needs, securing the food supply, protecting ecosystems, sharing water, managing risks, valuing water, improving the knowledge base, water and energy, water and industry, water and cities.

iii) FAO's Land and Water Development Division (AGL): This service is concerned with sustainable use and conservation of water in agriculture. It assesses water resources and monitors agricultural use, assists in water policy formulation, and promotes irrigated agriculture and efficient water use through management innovations, modernization and institutional reforms. The programmes and activities include development of water resources through small-scale irrigation and appropriate water control technologies, best practice for sustainable water use and conservation, and the avoidance and mitigation of adverse environmental effects of water development.

Activities:

1. Creates awareness and contributes to the international debate on food security, sustainable water development and resource conservation.
2. Cooperates with UN and specialized agencies, international and national bodies in the fields of activity in which the AGL is involved.
3. Promotes appropriate water policy and integrated water management in river basins including information sharing and conflict resolution in shared river basins.
4. Promotes an integrated and multi-disciplinary approach to water management, taking account of major land-water interactions including mechanisms to ensure benefit sharing of all stakeholders.
5. Promotes efficient use and conservation of water in agriculture through improved irrigation and water harvesting technologies, effective crop water management and training.
6. Develops appraisal tools and specific measures for wetland development and conservation.
7. Supports irrigation systems improvement and modernization, through institutional reforms, technical innovations, management tools and capacity building of technical staff and managers of irrigation systems and water user associations.

8. Advises on water logging and salinity control including information sharing through networks and newsletters.
9. Advises on standards and guidelines on water quality management, safe use of wastewater, mitigation of environmental effects and mitigation of health hazards related to water development.
10. Promotes improved preparedness and national planning for recurrent droughts, floods and climate variability.
11. Maintains a database on rural water use and is a recognized point of reference on the state of land and water for food and agriculture in the world through the water information database (AQUASTAT). Contributes to the *World Water Development Report*.
12. Acts as a reference centre, maintains internet-based information systems and provides a question-and-answer service on important water issues to guide effective planning and sound management of water resources.
13. Supports member countries in the formulation and implementation of water policies and water development projects including SPFS and emergency and relief operations.

iv) FAO's AQUASTAT: This is a global information system about the use of water for agriculture and in rural regions. Its main objective is to provide users with comprehensive information on the state of agricultural water management across the world, with an emphasis on developing countries and countries in transition.

g) Global Environment Facility (GEF)

Established in 1988 and managed by UNDP, UNEP and the World Bank, the GEF resources are implemented in actions related to climate change, biodiversity, international waters and ozone layer depletion. Projects addressing other damaging effects, such as desertification and deforestation, can also receive financing as long as they are related to the four main areas. In relation to water, GEF supports two operational programmes:

i) Water bodies (integrated land and water projects): Stresses the regeneration of damaged systems. In particular, the projects included in this component envisage the integrated management of freshwater river basins and coastal areas as a key factor of a sustainable future. The aim is to help countries to modify human activities in several sectors so that water bodies and corresponding multinational river basins are used in a sustainable way. In the period 1998–2000 GEF allocated US\$75–90 million, assisting in the realization of the following types of action:

- a) Trans-border diagnoses in order to identify high-priority transboundary environmental problems;
- b) Strategic action plans to describe the measures that must be adopted by each country in order to face the problems defined, including a distinction between agreed basic measures and complementary actions, and to mobilize non-GEF resources for both kinds of actions;
- c) Financing the increasing costs of technical assistance, the strengthening of capacity, case studies and (some of) the investment necessary for dealing with high-priority transboundary problems;
- d) Promoting the use of new scientific methods and technological innovations appropriate for management.

ii) Water pollutants: Stresses the prevention of damage to threatened waters. The budget for 1998–2000 was approximately US\$100 million. Two GEF projects on water management in the Mediterranean have been 'Preservation of brackish ecosystems and Mediterranean coasts' (in Albania, Egypt, Lebanon, Morocco, the Palestine Authority and Tunisia) and 'Determination of

Priority Actions for the Further Elaboration and Implementation of the Strategic Action Programme for the Mediterranean Sea – Regional’ (affecting Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, Lebanon, Morocco, Slovenia, Syria, Tunisia and Turkey). The latter is focused on combating pollution ‘hotspots’ and not on integrated basin management.

h) European Union policies and instruments

i) The Water Framework Directive: Approved in September 2001, this is the principal legal instrument covering the Mediterranean region for integration of water management with environmental and ecosystem parameters, but affecting only the EU member states of France, Greece, Italy, Portugal and Spain. Its guidelines include integrated management by river basin (regardless of administrative or political divisions), and the protection of resources by means of economic, financial and social instruments. Water is not only considered a resource, but also an economic good.

The Directive’s *general aims* are to set up a framework for the protection of continental surface water, transition water, coastal water and groundwater in order to:

- prevent further deterioration by protecting and improving aquatic ecosystems, and to cover water needs of terrestrial ecosystems and wetlands directly dependent on aquatic ecosystems;
- promote the sustainable use of water, based on the long-term protection of the available water resources;
- contribute to relieving the effects of floods and draughts.

Its *environmental aims* are to:

- prevent the deterioration and pollution of surface waters, to regenerate them to good ecological status, and to attain a good potential ecological status for very modified and artificial water bodies;
- prevent deterioration to and aid recovery of groundwater bodies;
- achieve the enforcement of all the regulations and aims concerning protected regions at the latest 16 years after entry into force of the Water Framework Directive.

The Directive requires the drawing up of a hydrological plan for each river basin district. Prior to this, the following steps must have been taken: a study on the impacts of human activity on the status of surface water and groundwater and an economic analysis of water consumption. Further it states that: “Member states will ensure, at the latest in 2010, that the policies on water pricing include appropriate incentives so that users make an efficient use of water resources; a suitable contribution of the economic sectors (at least industry, household consumption and agriculture must be distinguished) to the recovery of water-related costs, based on the economic analysis made according to Appendix III, and particularly according to the principle that the polluter should pay.”

Transfers between basins should be limited to emergency situations. The Directive also requires the granting of participation by the entire public (users included) in each river basin district in order to obtain feedback.

For countries like Slovenia, Cyprus and Malta (and possibly Turkey at a later stage) becoming member states of the European Union, this directive would automatically be binding on them.

ii) LIFE: LIFE is the financial instrument supporting EU environmental policy. Adopted in 1992, the first phase of LIFE covered the period 1992–1995. A revised regulation, LIFE II, was adopted in 1996 for the period 1996 to 1999. LIFE III, adopted in June 2000, covers the period 2000–2004 and has a budget of EUR640 million. LIFE aims at co-financing nature conservation actions (LIFE-Nature) and other fields of the environment (LIFE-Environment), as well as specific environmental actions outside the European Union (LIFE-Third Countries).

LIFE-Environment (for EU member states) holds 47% of the total LIFE budget and finances innovative pilot and demonstration actions aimed at the:

- integration of environmental considerations into land-use development and planning, including in urban and coastal areas;
- promotion of the sustainable management of groundwater and surface water;
- minimization of the environmental impact of economic activities;
- prevention, recycling and sound management of waste streams.

LIFE-Nature operates in EU member states plus Slovenia. In practice, LIFE-Nature must contribute to the implementation of the EU's Wild Birds and Habitats Directives, in particular the creation of a European network of protected areas. It cannot contribute directly to integrated river basin management.

LIFE-Third Countries, with just 6% of the total LIFE budget, focuses on technical assistance actions in non-EU countries bordering the Mediterranean and the Baltic, including Jordan. It aims at the creation of administrative capacities and structures necessary in the environmental field, and the development of policies and action programmes concerning the environment. With respect to programmes affecting river basins, it has financed projects such as the execution of national environmental action plans (for METAP), MedWet, the Blue Plan's project on indicators for sustainable development in the Mediterranean region, and an Agenda 21 for the river basin of north-eastern Tunisia.

Annex 2

INTERNATIONAL AND MULTILATERAL POLICIES, INSTRUMENTS AND PROGRAMMES WITH SPECIFIC FOCUS ON THE MEDITERRANEAN REGION

The widely acknowledged strategic importance of fresh water in the Mediterranean is shown by the existence of numerous international, regional and multilateral organizations working on the issue. The World Bank and the European Union are the major donors. To date, the greatest emphasis appears to have been placed on the use of water for agriculture, rather than on sustainable use of water and the integrated management of river basins.

There are several pan-Mediterranean agreements. They include the Geneva Declaration (1985), the Nicosia Charter (1989), and Agenda 21 for the Mediterranean (Tunisia 1995), the latter creating a Mediterranean Committee for Sustainable Development (1996). The Convention to Combat Desertification includes an appendix devoted to the northern Mediterranean region.

Other pan-Mediterranean initiatives launched in the 1990s include the Mediterranean Wetlands Initiative (MedWet) (EU and the Ramsar Convention), WWF's Mediterranean Programme (MEDPO), the NGO network MEDForum and the MEDCOAST initiative on integrated coastal management.

a) Mediterranean Water Network (MWN)

This network was founded in 1993 by government representatives (mainly Secretaries General) from the water sectors of 15 countries in the Mediterranean basin⁵. It is financed by the EU and the World Bank.

Its general aims are to:

- promote the development of technology in matters concerning water in the countries of the area;
- exchange information on such aspects as resources and water demand assessment, planning methods and techniques, administration of water resources, legislation and regulations;
- encourage the preparation of programmes and plans for joint action;
- contribute to integrated water management and to ensure the appropriate financial resources to develop joint projects.

In order to reach its aims, several working groups have been created. One of them addresses irrigation prospects by trying to:

- modernize agricultural technologies and organizations in order to obtain higher performance;
- intensify water savings by introducing cultures needing less water;
- envisage conventional infrastructures for water;
- encourage making final users aware of the problem;
- provide farmers with training and information on environmentally sustainable techniques and practices.

b) Barcelona Convention

The Barcelona Convention, with its five protocols, acts by means of the Mediterranean Action Plan (MAP/UNEP). The MAP concentrates mainly on pollution-related issues, but it also

⁵ Albania, Algeria, Croatia, Cyprus, Egypt, France, Italy, Jordan, Libya, Malta, Morocco, Slovenia, Spain, Tunisia and Turkey.

coordinates regional activity centres on other topics, such as marine and coastal biodiversity and protected areas, integrated coastal zone management, and databases and scenarios for the Mediterranean environment and development (Blue Plan). In 1995, the Parties to the Convention adopted 'Agenda MED 21'. Since 1996, the Mediterranean Commission on Sustainable Development has been in charge of its follow-up.

The Mediterranean Action Plan has 3 pillars:

1. Institutional and legal – six protocols for the protection of the Mediterranean Sea;
2. Scientific – the MED-POL programme for continuous monitoring and research on sea pollutants;
3. Socio-economic – focusing on the environmental priorities of bordering countries, the launching of Blue Plan Regional Activity Centres, and the Priority Actions Programme.

The Blue Plan promotes and measures two kinds of indicators: those for sustainable development in the Mediterranean (some of which are directly related to water; for example, exploitation rates of renewable water resources, production rates of non-sustainable water) and indicators of environmental performance (operating in 13 Mediterranean countries measuring the variance between actual data and the quantified environmental aims set by the protocols; water management, water supply and water pollution are included among its four priority topics.

c) Agenda 21 for the Mediterranean

Agreed in Tunis (1994) by all the Contracting Parties to the Barcelona Convention, it proposes the integrated management of water resources based on the perception of water as an integral part of the ecosystem, a natural resource, and a socio-economic good, the use of which must depend on its quality and quantity. In order to do this, water resources have to be protected, taking into account the way ecosystems work and the perennial nature of the resource. In this way, an attempt has to be made to satisfy the different water needs of human activities.

The Agenda 21, in its section 18.8. "*Integrated Water Resources Management*", states: "*Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilization. To this end, water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perenniality of the resource, in order to satisfy and reconcile needs for water in human activities. In developing and using water resources, priority has to be given to the satisfaction of basic needs and the safeguarding of ecosystems. Beyond these requirements, however, water users should be charged appropriately*".

d) The Mediterranean Commission on Sustainable Development (MCSD)

The MCSD is a consultative body of the MAP in which contracting parties and civil society meet:

- 21 experts, usually officials from the Ministries of Environment of bordering countries (Albania, Algeria, Bosnia and Herzegovina, Cyprus, Croatia, Egypt, Spain, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Morocco, Monaco, Slovenia, Syria, Tunisia, Turkey) and the European Union;
- 15 representatives of civil society (5 NGOs, 5 representatives from the socio-economic area and 5 local authorities).

Its role is to give advice, to analyse, and to draw up proposals. Its general aims are to review progress in executing Agenda 21 for the Mediterranean and to review financing mechanisms.

Among eight priority issues, each dealt with by a particular working group, there is one dedicated to the sustainable management of water needs.

In 2001, the MCSDD published its *Strategic review for sustainable development in the Mediterranean region* to help political decision-makers to shape and adopt a regional strategy, including river basin management.

e) EU policies and instruments for the Mediterranean

i) Turin Declaration: The Ministerial Declaration arising from the Euro-Mediterranean Ministerial Conference on local water management, held in Turin in October 1999, reasserted and completed the principles and areas for action of the Rome Mediterranean Charter for Water of 1992 and the Marseilles Declaration of November 1996 with the following points:

1. The importance of water resources in social, economic and environmental terms needs to be acknowledged at all levels and integrated into sustainable development policies;
2. Decision-makers, institutions, water managers and users should be aware of the interaction and complementarity of their roles and encourage the development of a 'culture system' directed to water that aims to change behaviour in order to achieve sustainable water management;
3. Good coordination, complementarity and synergy among existing organizations and activities in this field are indispensable;
4. A participatory approach should be encouraged that involves civil society, including water users and organizations at local, regional, sub-national and national level;
5. Greater priority should be given to sustainable water demand management within the framework of integrated water policy;
6. Water scarcity could be alleviated through mobilization of non-conventional water resources, such as re-use of wastewater or desalination, and sustainable methods of rain stimulation, whenever justified;
7. Improved water management in urban and rural areas, especially disadvantaged areas, needs special attention in order to provide access to clean water and to avoid inefficient use.

ii) Short and Medium-term Priority Environmental Action Programme for the Mediterranean Sea (SMAP): An EU framework programme mainly using MEDA funds, this programme works on five aspects, one being integrated water management, considered as an essential feature for environmental protection and sustainable development in the Mediterranean basin.

Following the approach adopted at the 1996 Marseilles Euro-Mediterranean Conference on water management, actions aimed at promoting sustainable water resource management must be supported by a global and integrated approach. The most urgent measures under the SMAP are:

- evaluation and continuous vigilance of water quality and quantity;
- evaluation of potential (available and new) resources, particularly in critical regions (densely populated regions or areas characterized by strong seasonal demographic variations, mostly due to tourism);
- establishment of water conservation plans, including flow control techniques and techniques for highland soil conservation and for dredging;
- protection of water reservoirs and wetlands and, if necessary, establishment of management plans for river basins and water catchment areas;
- identification and use of measures and techniques for (i) implementing the processing, disposal and re-use of urban and industrial waters, sludge and rainwater, including the construction of infrastructures for the processing of urban effluents, and (ii) preventing salinization and treating salinized waters;

- establishment and implementation of programmes aimed at reducing water losses – including the improvement of existent networks, leak detection, preventive management, cartography and training – and development of techniques to reduce water use in irrigation;
- support to non-centralized authorities (basin committees, local agencies responsible for water management, etc) by bringing together consumers and local communities, based on the distribution of responsibilities, and by using appropriate measures to modify non-sustainable production models and the use of water so that integrated water management is encouraged at the local level.

iii) **MEDA: This is the main financial instrument of the SMAP programme. Twelve Mediterranean countries benefit from this European cooperation programme: Morocco, Algeria, Tunisia, Malta, Cyprus, Turkey, Egypt, Jordan, Israel, Syria and the Palestinian Authority.**

In the environmental area, there are several choices: integrated water management, waste management, polluted or protected areas ('hotspots'), integrated coastal zone management, and the strategy to combat desertification. Some countries have opted for integrated water management. One example is Morocco which, under MEDA II, has been granted EUR120 million for the adjustment of the water sector, including actions on drinking water and irrigation. The main objectives of these programmes are: launching basin agencies, regulating the different water uses (especially water for agriculture), protecting water resources, and developing public-private partnerships.

iv) **Euro-Mediterranean Information System (Semide):** This initiative addresses the know-how of water management. It is a partnership project giving its 27 members (signatories to the Barcelona Convention) access to specialized contacts on water resources, enabling exchange of specialized information, and implementation of specific methodologies. It has a EUR2.5 million budget.

v) **Line 6200-Environment in developing countries:** Created in 1992, the priority topics for 2000–2001 were:

- assistance to developing countries for the implementation of international obligations stemming from multilateral environmental agreements (Ramsar Convention, CBD, Climate Change, etc);
- support for implementation of the sustainable development concept in specific sectors of development cooperation;
- integration of environment in the European Commission's development cooperation.

Projects relating to integrated river basin management that comply with international agreements are valid for support under this budget line.

f) The World Bank in the Mediterranean

i) **Mediterranean Environmental Technical Assistance Programme (METAP):** The METAP was established in 1990 to cope with and reduce the effects of environmental degradation in the Mediterranean region. Until 1995, METAP's first two phases mobilized over US\$32.0 million in activities that identified investment projects, strengthened capacity in national and local environmental institutions, promoted sustainable environmental policy actions, and created the first professional networks in the region. The METAP III (1996-2000) is financed by the EU and the EIB (28,5%), the UNDP and the WB (16,5%), and 10% from other donors Switzerland, Japan, Canada, Luxembourg and Italy) and its approximate total budget comes to US\$30 million.

One of the 3 METAP guidelines is "Integrated Water and Coastal Resources Management".

Partner countries (beneficiaries) of the METAP are Albania, Algeria, Croatia, Cyprus, Egypt, Jordan, Lebanon, Morocco, Slovenia, Syria, Tunisia, Turkey, the Gaza Strip and the West Bank. Additionally, Egypt has provided office space in Cairo.

At the request of the European Commission, METAP has started the RF (Regional Facility) consisting of two autonomous units: the Project Preparation Unit (PPU), which focuses on preparing investment projects and jointly managed by the Bank and EIB, and a Capacity Building Unit (CBU), which focuses on national and regional capacity building activities, and is managed by UNDP Agenda 21. The CBU manages a Regional Capacity Building Program (RCBP) focusing the following activities:

- Building Regional and National Capacity in Hot Spots (MED-BRANCH), completed in 1998. This pilot effort worked to build capacity of stakeholders in environmental hot spots in the region and to initiate policy dialogues on key themes such as urban environmental management and planning, and water legislation. It was managed by UNDP-Regional Bureau for Arab States through the METAP RCBP, which is based at the METAP RF. It was technically supported by the International Academy for the Environment, an NGO, in Geneva.
- Program Performance and Monitoring (PPM) is an environmental monitoring system comprising a framework of specific indicators related to the METAP priority themes intended to assist countries to monitor their progress towards meeting environmental objectives. The Blue Plan of the Mediterranean Action Plan (MAP) is implementing the national and project environmental performance indicators (EPI) components under the supervision of the UNDP - RBAS RCBP Staff at the PPU.

The *METAP EIA Initiative* will help METAP countries to acquire the necessary technical and policy tools to establish credible and operational Environmental Impact Assessment systems. This initiative is technically supported by the EIA Centre at the Victoria University of Manchester, UK under the supervision of the UNDP - Capacity 21 CBU staff.

The *NGO Small Grants Facility (SGF)* provides grant support for small-scale innovative activities that support the METAP priority themes and are initiated by community-based and NGOs. The SGF is active in Turkey, Algeria, Jordan, and Lebanon, implemented through the joint efforts of the UN Resident Missions in the four countries and the Bank.

The *METAP III* programme has been affected by two limiting factors:

- The considerable mismatch between the funds actually made available for project studies and the ambitions flagged up in 1995, which served as a basis for mobilizing the countries (around 30 and 120 million dollars respectively)
- The programme studies produced by METAP have not always been followed by preparation of feasibility and investment studies for related projects.

Annex 3

MEDITERRANEAN FORA AND THE INVOLVEMENT OF CIVIL SOCIETY

There is a long list of NGOs, scientific and technical groups, professional and other associations working on water management issues around the Mediterranean. Most significantly, there are several fora in which civil society participates jointly with international and national institutions.

a) Principal civil society organizations

i) WWF Mediterranean Programme (MEDPO): In 1995, WWF International set up a programme for the Mediterranean based in Rome. It participated very actively in the process of revision and update of the Barcelona Convention, particularly the new SPA Protocol and its follow-up. Currently, it coordinates the conservation activities of three priority biomes: coastal and marine, forests, and freshwater. Since 1994 WWF has coordinated the 'Across the Waters' project for capacity building and training of Mediterranean NGOs. One outcome has been the Mediterranean Directory of Environmental Organizations listing over 2,000 environmental organizations in the region.

Through its European Programme, with national offices established in France, Greece, Italy, Spain and Turkey, and a project office in Tunisia, WWF has developed a 'Water and Wetland Index'. This measures gaps and weaknesses in the implementation of policies on water and wetlands in 16 European countries, including Turkey. The method measures, first, the quality of the data available (parameters, accuracy of data and the possibility of comparison with other data sets). Only where data quality is good enough is compliance with the EU Water Directive then measured, e.g. on river fragmentation, threatened species, pressures on water quality and quantity, and knowledge about their causes. Preliminary results show that southern European countries rank lowest in the Index, not meeting any of the expected standards.

ii) Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE): A federation of Mediterranean NGOs, MIO-ECSDE is a technical and lobbying platform based in Athens. It cooperates closely with the European Commission, MAP/UNEP, UNESCO and other international and regional governmental organizations, as well as in work groups, federations and scientific forums. It focuses, among other issues, on sustainable water management for agriculture as a Euro-Mediterranean priority, defending the following position (June 2001): it must make visible and clear the links between sustainable water management and sustainable agriculture, and both policies should ensure regional food security, viable rural livelihoods and management of rural ecosystems, as well as adequate quantities of good-quality water in the region for present and future generations.

iii) Med Forum: This network, created in 1995, involves 115 NGOs from 23 Mediterranean countries. It focuses on conservation and sustainable development. Among its priorities, as submitted to the 2nd World Conservation Congress (Amman 2000), are the attainment of integrated and sustainable water management, such as hydrological plans, integrating ecosystem requirements in the water cycle management, water pricing reflecting its real costs, and the risk of exhaustion of the resource in all sectors, especially in agriculture.

iv) European Environmental Bureau (EEB): Based in Brussels and comprised of 134 NGOs from 25 countries, the EEB works on environment and the protection of nature. It has consultative status and is related to the Council of Europe, the Commission of the European Union, the European Parliament, the Economic and Social Committee of the European Union, the OECD, and the United Nations Commission on Sustainable Development.

b) Scientific and technical organizations

i) International Commission on Irrigation and Drainage (ICID): This is a scientific and technical NGO made up of members from 88 countries. In the Mediterranean basin it has members from Algeria, Cyprus, Egypt, France, Greece, Israel, Jordan, Morocco, Portugal,

Slovenia, Spain, Syria and Turkey. Some countries have formed National Committees. It is a member of the Global Water Partnership and also the World Water Council. At the 2nd World Water Forum in The Hague in 2000, ICID presented its “Long-Term Vision for Water, Life and Environment in the 21st Century”, which addressed three aspects: water for people, water and nature, and water for food and rural development. The ICID has consultative status in the United Nations Economic and Social Council (ECOSOC), in UNESCO, in WMO, and in FAO. It has also worked with the World Bank and UNDP in the International Programme for Technology and Research in Irrigation and Drainage (IPTRID).

ii) International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM): Founded under the auspices of the Council of Europe and the OECD in 1962, it currently has 13 member countries: Albania, Algeria, Egypt, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Spain, Tunisia and Turkey. It has four Mediterranean Agronomic Institutes (MAI), situated in Bari (Italy), Chania (Greece), Montpellier (France), and Zaragoza (Spain). The Centre is directed by a governing board which includes one representative from each member country. Along with the OECD and the Council of Europe, FAO, the EU, and the Arab Organization for Agricultural Development (AOAD) participate in board meetings. Some of CIHEAM’s institutional objectives – such as town and country planning, and water resource management – are carried out by the MAI in Bari, which specializes in irrigation agriculture.

iii) International Water Management Institute (IWMI): This is a scientific research organization focused on water management for agriculture and water needs for developing countries.

iv) Mediterranean Water Institute (IME): Created in 1982, in 1998 the Global Water Partnership entrusted it with the coordination and technical assistance of the MEDTAC (see below).

c) Other fora, networks and processes

i) Centre for Environment and Development in Arab Region and Europe (CEDARE): CEDARE is an intergovernmental organization with focal points in the Ministries of Environment in the Arab and European Mediterranean countries. It is an enabling agency supportive of sustainable development initiatives at national, subregional and regional levels, stimulating the implementation of international conventions and agreements, such as Agenda 21. Its main mission is to build the capacity of its member countries, promoting skills in environmental management, transfer of technologies, environmental education and development of environmental policies. CEDARE also facilitates inter-country cooperation and exchange of information and experience through its Land and Water Resources Management Programme.

ii) MED-HYCOS: This is first regional component of the World Hydrological Cycle Observing System (WHYCOS) programme to be put into operation. MED-HYCOS focuses on contributing to water resources assessment and management by helping national hydrological services to strengthen their capacities and by promoting exchange of information and skills among participating countries.

iii) Users associations (e.g. irrigators): The creation of a Mediterranean Confederation of Irrigators Associations is projected by the national irrigators’ associations of France, Greece, Lebanon, Spain and Turkey. The Spanish Federation of Irrigators does not support the EU Water Framework Directive, considering that it may cause the abandonment of a large area of irrigated agriculture.

iv) Global Water Partnership (GWP) and MEDTAC: Established in 1996 under the initiative of the World Bank, UNDP and the Swedish International Development Agency (SIDA), GWP is an international network of organizations and institutions interested in the development and administration of water resources. It is inspired by the Dublin Principles and those of the Earth Summit. Its goals are to:

- clearly establish the principles of sustainable management of water resources;

- support actions that bolster the principles of sustainable management of water resources in local, national or river basin areas;
- identify deficiencies and to foster definition of critical needs within the framework of available human and financial resources;
- provide help with the needs identified by favouring measures according to the availability of resources.

In the Mediterranean basin, the GWP's Mediterranean Technical Assistance Committee (MEDTAC) comprises seven institutions or networks (CIHEAM-Bari, CEDARE, METAP, IME, MIO, MWN and Blue Plan-MAP/UNEP) which work in the following areas:

- Establishing on-the-ground partnership and supporting established alliances;
- Developing awareness and changing attitudes towards water management;
- Generating and disseminating knowledge about good practice in integrated water resources management, and supporting dialogue on key results;
- Completing regional action plans and prioritizing actions;
- Identifying and supporting specific studies.

Some of the specific topics on which MEDTAC focuses are water conservation, educating children about water, groundwater management, drought management, and the interaction of water, food and the environment.

v) Mediterranean Wetlands Initiative (MedWet): See Annex 4.

vi) European Union of National Associations of Water Suppliers and Waste Water Services (EUREAU): This is an association of public and private institutions of the 15 Mediterranean EU member states: It promotes the river basin as the unit for sustainable water management.

vii) Mediterranean Regional Action Programme to Combat Desertification (MEDRAP): The Convention to Combat Desertification, in force since June 1996, urges all member countries affected by desertification to set national, subregional and regional Action Programmes. EU reports on desertification in the Mediterranean have since underlined the need to coordinate and harmonize these actions, given the different approaches adopted. To try and integrate the different solutions proposed, the EU set up MEDRAP, a three-year programme which started in January 2001. Its three specific objectives are to:

- determine the current status of knowledge concerning desertification, by evaluating the impact of the activities and of planning policies in the threatened regions;
- establish priorities, as well as space and time strategies, to implement measures to prevent and attenuate; and to improve the sustainable management of lands;
- determine targets, as well as scientific, institutional and political opportunities, and to propose adapted solutions.

In order to reach these objectives, an electronic network fosters information exchanges between the scientific community and focal points of the CCD, institutional agencies and NGOs involved in the management of land at all levels. To strengthen MEDRAP's output, five workshops have been set up to cover: sustainable management of soil and water resources; political and socio-economic aspects of desertification; identification of fragile areas; prevention and attenuation; and design of regional strategies. The results are expected to influence the design of a Regional Action Programme against Desertification.

viii) Dialogue on Water, Food and Environment: Following the December 2000 meeting in Colombo, Sri Lanka, 130 participants and 10 sponsoring organizations (FAO, GWP, ICID, the International Federation of Agricultural producers (IFAP), IUCN, IWMI, UNEP, WHO, WWC and WWF) concluded the need for greater dialogue between the agricultural and environmental sectors to develop a shared vision on water management. This 'Dialogue on Water, Food and Environment' contains three main elements:

- A real process of dialogue between actors at global, national and local levels, open, transparent and inclusive. At the global level, a yearly forum called by FAO is expected; at the local level the political challenge is to include the real users of water;
- A knowledge bank to sustain dialogue with accurate, solid, convincing information. This bank would comprise food security and natural environment, and would include a series of thematic studies allowing for a global evaluation of the subject;
- A network of field projects at local levels and river basins, implementing innovative focuses and solutions to improve the sustainability of water provision for agriculture and for nature. It would be a platform to exchange best practice.

For the purposes of the Dialogue, 'agriculture' is defined as all means of food production including ranching and aquaculture, and 'environment' is defined as water quality and ecosystem functions (land and freshwater) and biodiversity, including fisheries. The Dialogue is expected to be a decentralized process lasting several years, with milestones at the 3rd and 4th World Water Forums in Kyoto and Montreal respectively. A Secretariat has been established.

ix) International Water Office: Cooperation agencies, national ministries, river basin agencies, universities and research centres, professional groups, water dealers, related businesses and NGOs are part of the 149 member organizations of the International Water Office, the aim of which is to bring together all public, social and private water bodies involved in water management worldwide.

Annex 4

MEDITERRANEAN WETLANDS INITIATIVE (MedWet)

MedWet is a coordination mechanism for wetland activities in the Mediterranean basin. It owes its origins to an international conference organized by the International Waterfowl & Wetlands Research Bureau (IWRB) [now Wetlands International] in Grado, Italy, in February 1991. The MedWet1 project (1992–1996), funded by the EU and involving the five EU member states in the Mediterranean (France, Greece, Italy, Portugal and Spain), began building the collaborative MedWet network and developed regional methods and tools.

As part of MedWet1, the *Mediterranean Wetlands Strategy* was developed by the 11 participating partners (Ramsar Convention Bureau, the European Commission, five EU member states, and four NGOs). MedWet1 culminated in a major conference on Mediterranean wetlands held in Venice, Italy in June 1996, at which the Strategy, based on the first global Strategic Plan of the Ramsar Convention, was endorsed.

In the same year, the Ramsar Convention on Wetlands, under whose guidance MedWet had been developed, established the Mediterranean Wetlands Committee. It meets annually and guides the strategic direction and implementation of the initiative. It comprises representatives of 25 Mediterranean governments, the Palestinian Authority, the European Commission, intergovernmental conventions and UN agencies (Barcelona/UNEP, Council of Europe/Bern, Ramsar, UNDP), four NGOs (BirdLife International, IUCN, Wetlands International and WWF International), the Greek Biotope/Wetland Centre (EKBY), Station Biologique de la Tour du Valat in France, and Sede para el Estudio de los Humedales Mediterraneos (SEHUMED) in Spain.

In 1999, MedWet became a formal inter-regional structure for the implementation of the Ramsar Convention (Ramsar Resolution VII.20) and serves as a model for regional wetland cooperative structures elsewhere.

MedWet's goal is "to stop and reverse the loss and degradation of Mediterranean wetlands, as a contribution to the conservation of biodiversity and to sustainable development in the region".

The eight general objectives of the Strategy address:

- achieving wide acceptance and implementation of Strategy;
- achieving wise use of Mediterranean wetlands;
- improving knowledge and awareness of wetland values and functions;
- reinforcing the capacity of institutions and organizations;
- ensuring effective management of all Mediterranean wetlands;
- conferring legal protection on major wetland sites;
- strengthening international cooperation and increased financial assistance;
- strengthening collaboration among all involved, governmental and non-governmental, public and private sectors.

MedWet2 (1995–1998), also funded by the European Commission, extended the MedWet approach to five non-EU countries (Albania, Algeria, Croatia, Morocco and Tunisia) and introduced a new element to MedWet's portfolio: socio-economic aspects of wetlands and their impacts on management.

MedWetCoast (1999–2004) is addressing the conservation of wetlands and management of coastal zone sites in Albania, Egypt, Lebanon, Morocco, Tunisia and the Palestinian Authority, with funding from GEF and its French counterpart, FFEM.

MedWet4 (1998–2000) developed twinning of Mediterranean deltas in Egypt, France, Greece, Italy, Spain and Turkey. Other projects currently in progress include MedWet5/Slovenia on salinas management, development and dissemination of the 'MW Database 2000' and further work on the MW Database as a monitoring and cartographic tool.

As part of its role in providing assistance to Mediterranean countries on wise use of wetlands, MedWet has developed a wide range of tools and guidance. This 'toolkit' contains: an inventory system including database and mapping protocols, wetland management, participation of local people, training and capacity building, information and public awareness, applying research results, and application of a socio-economic approach.

A handbook series – *Conservation of Mediterranean Wetlands* – published by Tour du Valat for MedWet, covers ten topics: Characteristics of Mediterranean Wetlands; Functions and Values of Mediterranean Wetlands; Aquaculture in Lagoons and Marine Environments; Colonial Waterbird Nest Site Management; Wetlands and Water Resources; Aquatic Emergent Vegetation – Ecology and Management; Freshwater Fish Conservation; Temporary Marsh Vegetation – Ecology and Management; Salinas and Nature Conservation; and Wetlands and Hydrology.

A further important tool is the MedWet Inventory System. This includes five manuals covering the inventory process, a habitat description system, mapping conventions, a database users' guide and inventory datasheets. Important features of the inventory system are its hierarchical structure (catchments, sites and habitats) which permits users to select data entry at different levels of scale and detail, its availability in multiple languages, and flexible reporting routines that permit output of standard datasheets (for example, for Ramsar site designation or, for EU countries, Natura 2000 sites). The methodology and database are becoming widely used both in the Mediterranean and elsewhere, and have been recognized by the Ramsar Convention as a model for use in national wetland inventories throughout the world.

MedWet activities related to integrated management of water resources

- Member of MEDTAC (see Annex 3c[iv]), helping to incorporate biodiversity and wise use aspects in MEDTAC activities;
- Participates in the Mediterranean Committee on Sustainable Development;
- MedWet Regions Network launched to develop regional wetland policies and strategies to:
 - collect knowledge and information on wetlands and their functioning at regional, provincial or local scale, through standardized inventories;
 - contribute to maintaining or enhancing the conservation status of wetlands, through integrated management actions and scientific monitoring;
 - promote sustainable activities and the wise use of the natural resources of wetlands;
 - contribute to the capacity building of regional, provincial and local governments responsible for wetland conservation;
 - improve the technical capacity and training of the management staff of wetlands and of the different actors who intervene in their conservation.
- Establishment of a memorandum between the Ramsar and Barcelona Conventions focusing on the MedWet initiative, including:
 - establishment of guidelines for the sustainable use of wetlands in the region;
 - preparation, together with the national authorities of the countries concerned, of a project concerning the sustainable and integrated management of the Neretva River and wetlands in its catchment area, involving Bosnia and Herzegovina and Croatia;
 - cooperation on technical assistance for the conservation and sustainable use of wetlands in Libya.
- Support to Prespa Balkan Transboundary Park, involving Albania, Greece and the FYR of Macedonia;
- Support to the Strategic Action Plan for Biodiversity (SAP-BIO) project, part of a wider GEF project. Its focus is the Mediterranean marine environment and coastal areas, primarily wetlands. The main objective is to develop – through a participatory approach – a strategy for the conservation and sustainable use of marine and coastal biodiversity. Other goals are the coordination of other strategic instruments concerning biodiversity in the region, and

preparation a portfolio of project proposals for eventual funding through GEF and/or other donors. SAP-BIO involves twelve Mediterranean countries and is managed by UNEP's Regional Activity Centre for Specially Protected Areas (RAC/SPA);

- MedWet methodology is contributing to a wetland inventory in Albania, and five sites in Greece;
- Forthcoming publication of a MedWet manual on cultural aspects of wetlands being developed by SEHUMED;
- Supportive of the development of GEF projects in Syria and Turkey which complement the MedWetCoast GEF project;
- Contributes to the integrated management of the Soca River, Slovenia, with Tour de Valat;

For more information visit www.sehumed.uv.es and www.ramsar.org

Annex 5

EXAMPLES FROM NATIONAL POLICIES

a) The Spanish Hydrological Plan and the Ebro River

Spain's proposed National Hydrological Plan, a macro-plan with a EUR20,000 million investment over ten years, is based on inter-basin water transfers from the Ebro River basin to coastal Mediterranean regions. It has caused controversy both internationally and within Spain, with many differing reactions among local stakeholders in Aragon and Catalonia.

Scientists and NGOs, backed by concerned regional governments, stress that such transfers may have significant ecological impacts, notably in the delta of the Ebro (a Ramsar site and Important Bird Area recognized by BirdLife International). Likely impacts include reductions in river sediment loads, creating marine water intrusions, reducing minimum river flows and navigability, and the building of dams in several valleys in the Pyrenees with a distribution network affecting 14 Natura 2000 habitats and 18 protected species.

Those concerned in local governments fear that large water transfers may further open the development gap that exists between arid inland areas and touristic coastal regions. The very announcement of the water transfer scheme sparked speculative new urban and tourism growth on the coasts of Valencia. Other groups argue that 25% of the cost of the National Hydrological Plan could be saved by updating the present obsolete and inefficient water distribution network. The Ebro River basin's management authority, the 'Confederación hidrográfica del Ebro', has been unable to influence the decision on the Plan by central government, while the Ministry of the Environment, in defending the Plan, argues that it does not contravene the EU's Water Framework Directive. Nonetheless the regional autonomous government of Aragón (an inland region that will be affected by the water transfer) and civil society groups country-wide want the European Commission to insist that the Spanish government adhere to the spirit of the Directive and take into account ecosystem values and a full cost recovery approach. The Aragón government feels the Plan breaches the principles of sustainable development included in the Directive with respect to water use for regeneration of the natural environment; the use of water for irrigation; preservation of groundwaters; and exploitation of aquifers. The Water Framework Directive in fact states that inter-basin transfers must be limited to exceptional cases.

With regard to integrated river basin management, this is an example of the difficulties that can arise where decisions are taken at a high political level without due consultation with affected parties and stakeholders. This is also an example of how the Directive can be interpreted differently by different interest groups. The European Commission needs now to make a decision on whether it will co-fund the project.

b) Andalucía: The Guadiamar Green Corridor

In April 1998, the retention wall of a tailings dam broke at a pyrite mines in the municipality of Aznalcóllar. The Agrío and the Guadiamar Rivers were flooded with toxic sludge and water contaminated with heavy metals. The event gained widespread notoriety not least for the seriousness of the incident, but more for fact that the Guadiamar River is one of the most important waterways flowing into the wetlands of Doñana National Park, a Ramsar site, Biosphere Reserve and World Heritage Site. However, the entire episode opened a new approach for designing and developing action plans to counter similar future events, both in Spain and elsewhere.

The geographic characteristics of the Guadiamar watershed form a natural interconnection between the western Sierra Morena mountains and the coastal ecosystems of Doñana. The watershed in general and its network of rivers in particular have suffered serious ecological deterioration, though not entirely caused by the spillage. Wastewaters coming from the main villages located along the valley, together with wastewater from a number of agro-industrial plants, have also damaged the ecosystem. Almost complete deforestation of the riverbanks for agricultural purposes has further exacerbated the situation, fragmenting the watershed's terrestrial habitats.

The 'Guadiamar Green Corridor' project was launched with the aim of providing a bridge connecting both the mountain and coastal ecosystems, along with the diverse natural and human habitations in between. The regeneration of the basin and the potential creation of an ecological corridor is also the objective of Andalucía's 'green' movement, which regard its implementation as a means of preventing the growing isolation suffered by most ecosystems in Doñana.

The Green Corridor Strategy, prepared under the auspices of the Autonomous Government of Andalucía in a broad participatory process, functioned as a new land-use planning scheme. This fostered its development and allowed the addition and integration of up-to-date environmental policies designed to enhance the well-being of both people and wildlife in the area. Thus the Strategy:

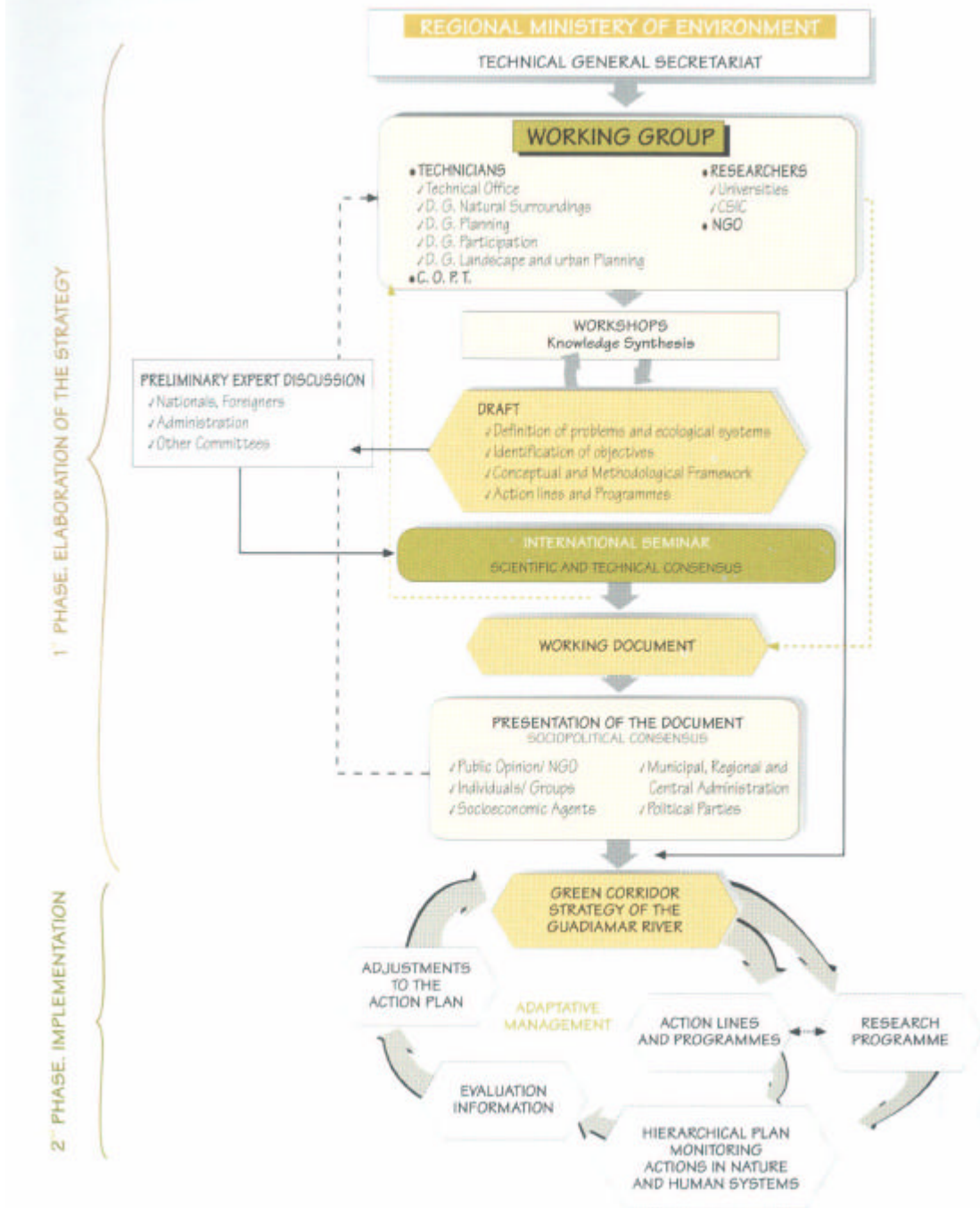
- promotes acceptance of the commitments made by the various stakeholders;
- explores new and more effective techniques for involving public and private sectors;
- encourages the principle of shared responsibility.

A working group, which included international expertise, produced drafts of the Strategy (see chart), which provides for regular monitoring and evaluation.

The Guadiamar Green Corridor project is a good example of planning river basin regeneration incorporating ecological criteria, promoted by regional government with the full participation of stakeholders from all sections of the community.

For more information visit www.cma.junta-andalucia.es/guadiamar/indguadiamar.html

OPERATING CHART FOR THE ELABORATION AND IMPLEMENTATION OF THE GREEN CORRIDOR ESTRATEGY



Source: The strategy for the Green Corridor of the Guadiamar River, Consejería de Medio Ambiente, Junta de Andalucía, April 2000

c) Institutional arrangements in France

In France, there are six River Basin Committees, one for each of country's catchment areas. Together, they drew up the SDAGE (Schéma Directeur d'Aménagement et Gestion des Eaux), which was approved by the State in 1996. The committees are comprised of the different water management stakeholders: representatives of the state, local groups, associations and users. The committees have three principal objectives: tracking implementation of the SDAGE; guiding the intervening policies of the 'Agences de l'eau' (Water Agencies), and giving their opinion about wider arrangements. As an example, the Rhone-Mediterranean-Corse Basin Committee has 124 members grouped in several sections: territorial and local communities, competent persons and users, representatives from socio-professional sectors, and state representatives.

Water Agencies are public bodies supervised by the Ministry of Town, Country Planning and Environment, and by the Ministry of Economy. Their aim is to oversee the rational use of water resources. They operate in six areas: water sanitation; combating industrial pollution and toxic waste disposal; combating agricultural pollution; improvement of drinking water quality; management of surface and underground water resources; and recovery and preservation of the aquatic environment.

The one responsible for the Mediterranean region is the 'Agence de l'eau du bassin Rhône-Méditerranée-Corse', which comprises the basins of Saone-Rhone and the coastal rivers of Languedoc-Roussillon, Provence Alpes-Côte d'Azur and of Corsica and the Mediterranean coast. The agency receives payment from users depending on the amount of water used or the pollution generated, a system which fosters better use of water by users. The revenues paid allow the agency to finance studies, works and activities that help reduce wastage and pollution of water. The principle employed is 'those who protect the environment (preserves, economizes on the resource, combats pollution) will be helped'.

d) Turkey: Water saving and decentralized irrigation management

Turkey has the most favourable water situation in the Mediterranean. Average annual precipitation is highest in the Black Sea region (2,400 mm) and exceeds 800 mm in some Mediterranean coastal areas. In the remaining 70% of the country, precipitation averages less than 500 mm, which is still sufficient for winter cultivation in some areas.

The transfer of irrigation systems to users started gradually in the early 1950s. In 1993, encouraged by the experience of Mexico and with financial support from the World Bank, Turkey began an accelerated programme of transferring management of responsibilities for large irrigation systems. The main motives driving this transfer programme were concern about the ability of the Devlet Su Isleri (DSI), the state water works, to operate and maintain the large irrigation systems for which it was responsible and the heavy financial burden on the

government. In 1993, it was estimated that there was an 83% shortfall between operation and maintenance allocations to DSI and collected tariffs. In three years, DSI succeeded in transferring about 1 million ha to local government units or to irrigation associations, and has now completed the transfer of the nearly 1.5 million ha it has developed.

Four provinces – Antalya, Adana, Konya and Izmir – were selected for the pilot programme of accelerated transfer, largely because officials and farmers in these provinces were more receptive. Transfer was supported with enhanced internal training, including seminars and workshops. Friendly rivalry between the regions in promoting successful transfer contributed positively to the process. As a pilot case, the Antalya Regional Directorate of the DSI carried out a comparative study that showed that transfer of operation and maintenance services to water user associations had a significant and quantifiable positive impact on water savings, from both technical and financial points of view. Positive results included:

- an increased sense of responsibility;
- a more reliable and equitable water supply;
- improved irrigation efficiency with modern techniques such as drip irrigation, sprinkler and California systems (efficiency in water saving increased by 34% and in energy use by 31% in five years);
- a collection rate increase from 42% to 80%.

Source: Case studies on water conservation in the Mediterranean region: IPTRID Secretariat, Food and Agriculture Organization of the United Nations. Rome, 2001

e) Tunisia: Integrated water management in the context of scarce water resources

Tunisia has developed expertise in the fields of water resources mobilization and integrated management in a context of aridity, water scarcity and social and economic constraints. This expertise has been supported from the outset by a national strategy, strong political commitment and increasing user awareness.

In Tunisia the present water management strategy is the result of 30 years of water resources evaluation and mobilization and socio-economic development priorities for which water is essential. The present objectives of irrigation in Tunisia are to extend the irrigable surface by fostering adoption of water-saving techniques for irrigation – use of marginal waters and re-use of treated wastewater – and to implement corresponding measures for agricultural and irrigation system development. The recent review of the water sector emphasized the need to strengthen demand management in order to preserve and improve the use of declining and random water resources.

Prominent features of this expertise were the implementation of a regularly updated water database and decision support tools, the initiation of water saving programmes at network and field levels (following a government-sponsored survey of individual water consumption and subsidization of 40–60% of equipment. These programmes resulted in water savings of around 25%, the use of pricing as a parameter of water demand and water saving management, and the protection of the environment through allocation of water to protected sites.

The new irrigation policy gradually shifts water management responsibilities and costs to local authorities. A comparable irrigation policy using surface water has been adopted in Turkey and other parts of the world. One of the special features of the Tunisian policy, however, is the creation of associations of underground water users that will improve management of the water requirements of all irrigators using a shallow aquifer.

In Tunisia, irrigation differs from most regions of the world because water resources are almost entirely tapped and brackish water is used at salt concentrations of up to 4–6 gm/litre higher than standard irrigation practices. Tunisia has therefore acquired considerable experience in using low-quality water, which explains why the use of treated wastewater is relatively developed in Tunisian irrigation programmes. With regard to equipment, however, the Tunisian water saving programme has not focused sufficiently on software, such as farmer training in optimum use of the equipment. Research shows that the introduction of drip irrigation does not save much water in Tunisia, although it increases yields. Use of brackish or salty water, for example, of which there is not much experience in the world, leads to the clogging of equipment.

The Tunisian development cannot be based solely on the mobilization of new water resources or on water transfers from the north to the drier south. Any integrated water management must now address water demand. Technical measures such as the introduction of new irrigation

technologies or equipment are not sufficient. Financial measures such as pricing water at its real cost are necessary but politically more difficult to implement. Finally, the involvement of water users has been a key element of a successful integrated water management strategy.

Tunisia has embarked on a new irrigation policy which gradually shifts water management responsibilities and costs to water user associations. One of the special features of the Tunisian policy, however, is the creation of associations of underground water users that will improve management of the water requirements of all irrigators using a shallow aquifer. Experience will show whether such associations can manage aquifers in a sustainable manner.

The outputs of these measures have been water savings of 25% and a 33% increase in water use efficiency.

Source: Case studies on water conservation in the Mediterranean region, IPTRID Secretariat, Food and Agriculture Organization of the United Nations. Rome, 2001

f) Tunisia: Ichkeul National Park – a restoration plan

The 12,000 ha Ichkeul National Park harbours three major landscape units:

- A shallow lake extending over 89 km² with seasonal variations in water depth and salinity, influenced by inflow of fresh water from the catchment in winter, and in summer by reverse flow of sea water via the Lake of Bizerta through the Tinja canal. The low salinity in winter promotes the development of aquatic plants that are the main food source for some 200,000 migrant waterbirds;
- Temporarily flooded marshes covering some 30 km² consisting of *Scirpus lacustris* and *S. maritimus*, the main food of Greylag Geese *Anser anser* and of approximately 2,000 cattle belonging to people living in the park. These plants require a period of flooding with water of low salinity for several months;
- A 'jebel' (mountain), which constitutes an isolated outcrop on the southern shore of the lake and makes a major contribution to the natural beauty of the site.

Ichkeul is listed as a Biosphere Reserve (1977), World Heritage Site (1979) and Ramsar Site (1980). The documents presented at the time of Ichkeul's inclusion in these lists noted that the construction of dams on the catchment's rivers, as provided for in the Master Plan for the Waters of Northern Tunisia, was likely to have an impact on the ecological character of the lake and its fringing wetland habitats.

During the 1980s, a research programme under the auspices of the Ministry of Agriculture evaluated the impact of the dams on Ichkeul. The Master Plan, in its original version, contemplated the building of six dams on rivers flowing into Ichkeul, the largest of which became operational in 1983, with the following two dams coming on stream in 1994. The Tunisian authorities, aware of the impact of these dams, organized an international seminar in 1990. This recommended a multidisciplinary study – 'Etude pour la Sauvegarde du Parc National d'Ichkeul' – from which numerous measures were adopted by the Tunisian authorities, including:

- cancellation of the construction of the remaining three dams;
- the classification of Ichkeul, in the planning of water resources by the General Department of Hydraulic Studies and Works in the Ministry of Agriculture, as a water consumer and the decision to grant Ichkeul an annual water quota;
- the decision to supply Ichkeul with water from the Sidi El Barrak dam (situated in a neighbouring catchment) once this dam became operational;
- closure of the marble quarries on the mountain at Ichkeul;
- re-routing the future Tunis-Bizerta motorway well away from Ichkeul;

- continual monitoring of the status of Ichkeul;
- construction of wastewater treatment plants at Mateur and Menzel Bourguiba.

Current conservation status: Despite all the conservation measures taken by the Tunisian authorities, the wetland has undergone a loss of biological diversity following the change in hydrological regime. The fundamental question is whether it is possible to restore the lake, at least in part, to its original condition. As forecast in the study, the decrease in inflow of fresh water caused by the dams has led to salinization of the lake and marshes, changes in the flora, and to a decrease in numbers of waterbirds, especially of wintering birds. Recent drought has exacerbated the situation.

Proposals on the long-term management of Ichkeul: An integrated management plan and an institution capable of implementing it are planned. A water allocation of 20 million m³ per annum has been made to assist with restoration of the lake, along with the construction of a sluice at the exit to the sea. The plan comprises a description of the site, definition of short, medium and long-term objectives, and measures to attain these objectives, following Ramsar Convention guidelines. In all cases the plan encourages the participation of local communities, and its objectives take account of the human users: fishermen and graziers, visitors and tourists.

Institutional frame work: Implementation of the plan foresees reinforcement of an appropriate management body with the necessary powers of decision. Ichkeul National Park is currently managed by the General Department of Forests of the Ministry of Agriculture. Other departments of the same ministry also have responsibilities that affect the park: the General Department for Hydraulic Studies and Works for dams; the General Department of Rural Engineering for management of adjoining agricultural areas (there is no buffer zone); the General Department of Fisheries and Aquaculture for fishery management and negotiations with the private fishery licence holder. The Ministry of Environment and Land Planning plays an important role in coordinating the activities of other ministries (in particular environmental impact studies), and represents Tunisia at many international events. The ANPE (which comes under the Environment Ministry) is responsible for management of the park's Visitor Centre and for collecting data on the natural environment, and plays a coordinating role in the development of the management plan.

g) Morocco: The Oued Broun River Basin – a participative approach to integrated rural development

The rural communes of Jbama and Beni Ftah are located in the north of Morocco, in the province of Taza in the pre-Rif mountains. The Oued Broun River basin is a sub-basin of the M'Soun River basin. It covers 12,500 ha and supports a population of 7,400 people. Water resources are scarce and rainfall is irregular, with long periods of drought interspersed with short periods of torrential rain. These characteristics have negative consequences for the local

economy and seriously increase soil erosion. The local economy is based almost exclusively on extensive raising of sheep and goats, with some traditional crops. The area suffers from high emigration, precarious employment opportunities, and a lack of infrastructures and basic social facilities. The cycle of poverty is further degrading the natural resource base.

To counter this situation, a pilot project based on the river basin was started. Adopting a participative approach, it involves numerous partners. These include the Moroccan NGO ENDA Magreb, the central and regional administrations of the Secretary in charge of Waters and Forests (which directs the project), the FAO and the United Nations Development Programme, as well as other institutions and bodies such as the Forest and Basin Planning Service, the National Research Centre, the Provincial Division of Agriculture, rural communes, local authorities, and the Provincial Services for Public Works, Health, and Education. The project's main objectives are:

- sustainable management of natural resources (anti-erosion and hydro-agricultural management);
- improvement of basic infrastructures (e.g. drinking water installations);
- education;
- support for revenue-generating initiatives (mainly among women, youth and small farmers);
- building the capacity of local communities to cope with development.

The project has developed into an ongoing process of agreement and integrated development.

The main constraints of the strong participative approach adopted have been:

- inequality in terms of revenues and of access to land;
- local organizations – the traditional 'jemaâ' – are non-operative and their conciliatory role is weak;
- poor integration of women;
- difficulties in mobilizing the institutional actors and lack of familiarity in participative methodologies.

Despite efforts, it is feared that sustainable management in the Oued Broun River basin will not be possible until there is greater capacity for decision-making at the local level, and better income generation. In addition, one of the strongest lessons to emerge from this project has been the lack of information and expertise necessary to restore degraded land.

Source: Enda Maghreb 

Annex 6

IUCN's REGIONAL ROLE IN MAINSTREAMING ENVIRONMENTAL CONSIDERATIONS IN RIVER BASIN MANAGEMENT IN THE MEDITERRANEAN REGION

The diagnosis on freshwater management issues in the Mediterranean and the potential role of IUCN were developed in a draft paper which was circulated and then discussed and complemented in a Workshop (Malaga 8-9 April 2002) with the participation of twenty of the main organisations and experts on this topic in the region. The synthesis and strategy here presented are a result of the discussions and conclusions from this Workshop.

1. THE CONTEXT

In the Mediterranean, forested river basins and wetlands play a crucial role in water management, by regulating seasonal floods, refilling aquifers, controlling pollution, and as water reservoirs for human uses and for wildlife. In the last few decades, however, meeting human development needs around the Mediterranean has led to levels of water extraction and watershed degradation that threaten the capacity of ecosystems to provide enough water for man and for nature throughout the year.

By 2002, water demand for human uses has claimed most of the available water, in some countries already over the renewable rates that nature can provide. Irrigation for agriculture uses 70% of our freshwater resources. Offering water to ever growing demands for agriculture and tourism has depleted coastal aquifers and posed a high burden both on national budgets and on ecosystems, as water needs to be stored and then distributed over ever-increasing distances. Today, consumption rates are close to unsustainability and prospects are of growing demand per-capita and growing demographic patterns. However this growth in demand is exacerbated by the fact that the quantity and the quality of the available water is diminishing due to the combined effects of deforestation, pollution, fires and overgrazing in watersheds, soil erosion, climate change and desertification processes, all of which are particularly prevalent in the Mediterranean basin.

Freshwater quality and availability has been widely recognised as the most pressing limitation to human development in our region, and also a source of increasing conflicts at local, national, and international levels. Aware of this complex situation, since 1992 the water agenda around the Mediterranean has acquired a strategic importance, international declarations and agreements have multiplied, and many international and multilateral organisations and donors have included water management within their priorities for the region. While the broad political principles of ensuring the environmental sustainability of water use are generally established, these innovative steps forward at the international level have not yet reached the ground and been put into practice (only in the EU have these become a binding Directive).

These international principles recommend intersectorial planning, local participation and coordination between water users and different stakeholders, decentralisation of water management, and training and information at all levels. However, in national and local situations, where water is actually managed, there are important gaps and weaknesses in implementing these policies: water is still generally managed sectorally with a focus on covering demands for agricultural, urban and tourism growth, and institutional arrangements within countries reflect this approach. There is limited awareness about the international commitments and much remains to be done to promote the linkages between the management of river basins and the availability of water, about water management and ecosystem needs, on the unsustainability of present trends (either for agriculture, national economies or nature), and on the implications that this lack of awareness and action may have in the mid-term development options for most Mediterranean countries.

There is also a technical weakness and we are short of leading organisations with a clear vision and experience of integrated river basin management to mobilise resources, promote dialogue and participation, assist in conflict resolution and promote increased consensus for win-win proposals and solutions in watershed planning and management.

2. IUCN's ROLE IN INTEGRATED WATER AND BASIN MANAGEMENT

In spite of the complexity of this topic, it is a field where every actor involved agrees that water needs be used more rationally. As opposed to sectorial and vertical focuses, which have too often left aside environmental concerns and criteria, the latest approach to this rationalisation, through integrated river basin management, is encouraged by international Conventions, Agreements and Declarations. IUCN itself (*Initiative for water and nature 2000*) strongly backs an approach based on holistic ecosystem management.

The main priority now is to bridge the gap between the international agreements and policies, and their implementation at the national and field levels. The topic is complex as it may include land use planning, water storage and distribution, water use, and water treatment. This in turn needs, as international organisations and field experience recommend, intersectoral and participatory approaches in planning and management, conflict resolution techniques, decentralisation, capacity building and sharing information.

To avoid spreading limited resources into such a broad topic, among the three focuses of World Water Council (water for people, for nature, for food), IUCN will concentrate on the *water-for-nature* trade-offs, but most particularly in relation to *water-for-food* (because of its significance in the consumption of this scarce resource in the Mediterranean). These activities will bring an environmental and ecosystem contribution to the existing Mediterranean networks working on water related issues.

2.1. IUCN's Vision and Role :

IUCN's strategy on water management is based on its *Vision for Water and Nature: A world strategy for conservation and Sustainable management of water resources in the 21st century*. The 6 components of IUCN's *Vision* can apply to Mediterranean needs:

- **Demonstrate conservation and ecosystem management in river basins** through a network of field projects
- **Empower people** to participate in sustainable water management – public participation and tools
- **Wise governance** - Policy reviews and dialogues; Integrated planning and management
- **Economics and financial tools**, economic, ecological, cultural and intrinsic values of ecosystems to incorporate in decision making and water management
- Create and share **knowledge**
- Structured learning to **raise awareness** about the need for ecosystem protection and sustainable use of water.

2.2. IUCN's niche

a) IUCN strengths

IUCN strengths on this subject are its policy making and field experience worldwide, but most importantly, the existing and potential networks of regional and international experts from its Commissions, and its unique mixed governmental and NGO membership. In the Mediterranean there are 162 IUCN members from 22 countries, including 10 international organisations, and there are eight National Committees (Egypt, France, Italy, Jordan, Lebanon, Morocco, Spain and Syria).

Consequently with these characteristics and experience, IUCN is particularly well placed to act as a policy catalyst, coordinating with partners, involving members to regional efforts, networking and establishing linkages between north and south members, and facilitating scientific advice and information exchange.

IUCN will try to fill gaps, where required, avoiding duplication of any existing efforts but convening dialogue and coordinated action, providing information and technical assistance, strengthening local capacities, and facilitating win-win solutions.

b) A role for IUCN

The workshop identified several fields where IUCN can play a significant role especially in bringing an ecosystem or environmental approach in complementarity to actions carried out by others (for example on demand side management, water recycling, improved crop per drop etc) , e.g. capacity building (promoting wise governance, training and sharing knowledge) and supporting best practice in selected demonstrative areas. For example, IUCN is working in the follow-up to the environmental aspects of the report of the World Commission on Dams (2000), inviting the participation of all relevant stakeholders and bringing together different perspectives from governments, advocacy groups, affected people, scientific networks and the private sector.

3. IUCN's FIELDS OF ACTIVITY

Through the workshop (Malaga, April 2002), participants recommended that IUCN focus on activities in the fields of advocacy, best practice, capacity building, technical assistance, sharing of information, and mobilising funding sources.

3.1. Advocacy. Providing advice to influence public administrations, bridging the gaps between the legal provisions and their enforcement, or identifying and mobilising financial resources from multi and bilateral donor and cooperation agencies.

Promote Dialogue and joint activities bringing water managers and conservation actors together, particularly at the level of river basins.

Support recommendations for the WSSD (World Summit on Sustainable Development, Johannesburg 2002) promoting and supporting the implementation of the most relevant recommendations from the summit, and those from other thematic fora on water and water resources.

Mobilising funds for reinforcing environmental perspectives in integrated water management. The main sources of funding in EU countries are the LIFE, and in non-EU countries the MEDA, LIFE Third countries (both from the European Union) and the GEF (World Bank), plus, for example, the bilateral co-operation agencies of Italy, France and Spain (and some autonomous communities), and other European non-Mediterranean countries.

Advising and evaluating particular interventions of donor agencies

Assisting donor agencies to identify positive and negative experiences in the management of river basins. The DAC-OCDE and the EU latest policies (2001) underline sustainable development as the overall objective for all bilateral cooperation from OCDE Member States. In latter years, most donor agencies have included mid-term and final evaluations in their projects.

Assistance to new EU Member states

Through IUCN Members, providing technical advice and support to meet the EU Water Directive standards for river basin management in Mediterranean candidate countries to the EU (Cyprus, Malta and Slovenia).

3.2. Best practice and technical assistance facilitating technical services, advising the preparation of strategies and action plans, assisting in their implementation, monitoring and evaluation.

Promote and assist integrated river basin and water management

Assistance to members in management of river basins, rivers and wetlands. Selection of a small number of field sites, based on criteria such as ecological significance, institutional framework and existing local capacity to develop field activities that would promote dialogue at catchment level, and proposing and advising on mechanisms and tools in order to integrate environmental criteria in river basin planning and water management.

Assessment of regional experience in environmental flow approaches and development of proposals to define ways in which water can be allocated to ecosystem maintenance purposes within the water resources planning process. This includes defining the water needs of wetlands in ways that can be used by water resources planners.

Tools on economic valuation of ecosystems

To promote the consideration of economic valuation of ecosystems goods and services when planning investments for water.

Producing guidelines for :

- Integrated river basin management with an environmental approach linking basin management with the wetlands and biodiversity conservation;
- Wise governance (legal and institutional frameworks);
- Establishing tools to evaluate environmental flow requirements ;
- Adapting to climate change.

Species Action Plans related to those in Red list of Mediterranean freshwater species.

3.3. Capacity building and information. Exchanging experiences between members, thematic workshops and discussion fora, drawing common lessons, facilitating training activities in field sites, outplacng IUCN staff and experts into interested institutions, or providing internships in IUCN offices.

Capacity for participation in basin planning and management

Contribute to encourage participation by strengthening IUCN members and other stakeholders in selected areas in participatory techniques and other effective instruments for conflict resolution. This work may follow-up on the guidance given by the World Commission on Dams.

Training of national and local experts and leading organisations

Draw lessons learned and best practices from worldwide experiences, and test these at pilot sites in the Mediterranean, working with partners to prepare a full course (for example, in collaboration with CIHEAM, CEDARE, FAO-AGL and other institutions) to train national and local experts (governmental and non-governmental) who may be participating in the field pilot projects, who in turn may in the future lead or support river basin integrated management processes in their countries.

Red List of Mediterranean Freshwater species

Commission experts to evaluate the feasibility of producing a Red List of threatened freshwater species in the Mediterranean countries.

Communications:

Raise awareness of international commitments and policies, the linkages between the management of river basins and the availability of water and ecosystem needs, about the unsustainability of present trends and on its implications for development and conservation options. IUCN may prepare communication materials, plus updated information, analyses and field experiences to be circulated to all members, to the water sector and to the media, while supporting the establishment of a working group with specialised NGO members to prepare and implement a communications strategy on the topic.

3.4. Networking and co-ordination, by establishing and strengthening links with other regional partners, promoting members' field activities, and establishing north/south linkages between IUCN members.

Exchange with partners and important actors at the regional level such as MAP-UNEP, GWP, MedWet, INBO, and water engineering networks, and continued participation in regional fora such as the Dialogue on Water, Food and Environment, GWP Dialogue on climate change, and the working group on water in the MCSDD.

Internal co-ordination between IUCN's National Committees, specialised members, and Commission experts, together with the emerging Freshwater Thematic Centre in Jordan (one of seven WESCANA's thematic centres).

4. IMPLEMENTATION OF THE PROGRAMME

4.1. Programme development and activities

a) Programme development

The Mediterranean Cooperation Centre of IUCN in Malaga will prepare a proposal to appropriate donor agencies to launch a programme based on elements drawn from the present document. These will include a balanced set of short-to-mid term projects and activities in the fields of advocacy, best practice and technical assistance, capacity building, communications and networking, preparing project profiles in collaboration with relevant IUCN members and partners, and submitting these to appropriate donor agencies. Programme proposals will need to fit clearly into the IUCN intersessional programme of key Result Areas agreed for the period 2001-2004 by the World Conservation Congress in Amman (2000).

b) Programme implementation

The programme will be steered by the Mediterranean Cooperation Centre of IUCN, coordinated by an expert appointed to develop the programme proposal, and supported by an advisory group in collaboration with appropriate global programmes in HQ, especially the Water and Nature Initiative.

c) Programme monitoring and evaluation

The programme will be subject to regular review and evaluation, both within the normal project cycle within IUCN, and through regular internal evaluation of the Mediterranean programme.

4.2. Potential partnerships

IUCN seeks to assist its members and to add value to existing programmes and ongoing efforts. It therefore actively pursues collaborative partnerships with other Mediterranean organisations in developing its programme while promoting a bridge between global processes and regional actions. Based on the analyses presented in this document, potential synergistic alliances for IUCN include, for example:

Networking:

- The MCSD (Mediterranean Commission for Sustainable Development)
- The Mediterranean Water Network of General Directors of water resources.

Overall alliances for advocacy, policy implementation and field activities:

- The Dialogue on Water, Food and Environment, where IUCN already participates. Reinforce the Mediterranean presence at international level and promote the Dialogue at regional level.
- The World Commission on Dams where IUCN already participates
- The MEDTAC of the GWP shares most objectives with IUCN and could be complementary in many fields of activity.
- The FAO ADL (Water Development Division) in promoting sound water management tools and practice at national and basin levels.

For capacity building and technical assistance:

- The CIHEAM (particularly the Bari Centre, training and water programmes; and the Zaragoza centre on water irrigation efficiency)
- The ICID (Int'l Commission on Irrigation and Drainage)
- The CEDARE for training and networking in arabic countries
- The International Network of river Basins Organisation (INBO) for linkage with integrated management in the region.
- The WWF-MedPO in field projects and communication strategy

Other partnerships will be developed as required, and this should be considered an indicative list.

Annex 7

RÔLE RÉGIONAL DE L'UICN DANS L'INTÉGRATION DES CONSIDÉRATIONS ENVIRONNEMENTALES À LA GESTION DES BASSINS FLUVIAUX EN MÉDITERRANÉE

Une analyse des enjeux liés à la gestion des ressources en eau douce en Méditerranée et du rôle potentiel de l'UICN a été développée dans un document de réflexion qui a été largement diffusé. Le débat ainsi engagé a été approfondi et prolongé lors d'un atelier tenu à Malaga les 8 et 9 avril 2002, avec la participation de 20 des principaux organismes et spécialistes de ces questions dans la région. Nous présentons ici les grandes lignes d'une stratégie élaborée sur la base des discussions et conclusions de cet atelier.

1. INFORMATIONS GÉNÉRALES

En Méditerranée, les bassins fluviaux sous couvert forestier et les zones humides jouent un rôle essentiel dans la gestion de l'eau en régulant les inondations saisonnières, en assurant le renouvellement des aquifères, en contrôlant la pollution et en tant que réservoirs d'eau pour les utilisations humaines et pour la faune et la flore. Au cours des dernières décennies, cependant, les besoins du développement humain dans toute la Méditerranée ont conduit à des niveaux de prélèvement et à une dégradation des bassins hydrographiques qui menacent la capacité des écosystèmes à fournir suffisamment d'eau pour l'homme et la nature tout au long de l'année.

En 2002, la plupart des ressources disponibles servent à satisfaire la demande d'eau pour des utilisations humaines, qui est déjà supérieure aux taux de renouvellement naturel dans certains pays. L'irrigation consomme 70 % de nos ressources en eau douce. La satisfaction des besoins toujours croissants de l'agriculture et du tourisme a épuisé les aquifères côtiers et prélève un lourd tribut sur les écosystèmes et les budgets nationaux. L'eau doit en effet être stockée, puis distribuée sur des distances de plus en plus importantes. Aujourd'hui, alors même que les niveaux de consommation sont à la limite de l'insoutenable, tout laisse prévoir une augmentation constante de la demande par tête et un accroissement de la pression démographique. Cette situation est en outre exacerbée par le fait que la quantité et la qualité de l'eau disponible diminuent sous les effets conjugués du déboisement, de la pollution, des incendies et du surpâturage dans les bassins hydrographiques, de l'érosion des sols, du changement climatique et de la désertification, des processus qui sont couramment observés en Méditerranée.

Il est largement admis que la qualité et la disponibilité de l'eau douce constitue une des limitations les plus pressantes du développement humain dans notre région, ainsi qu'une source de conflits de plus en plus nombreux aux échelons local, national et international. Il a été pris acte de cette situation complexe, et depuis 1992, la question de l'eau en Méditerranée revêt une importance stratégique. Les déclarations et accords internationaux se sont multipliés tandis que de nombreux donateurs et organismes internationaux ou multilatéraux inscrivaient la gestion de l'eau au rang de leurs priorités pour la région. Les grands principes politiques selon lesquels il faut garantir une exploitation des ressources en eau respectueuse de l'environnement sont certes bien établis dans l'ensemble, mais ces initiatives innovatrices à l'échelon international n'ont pas encore été mises en œuvre et sont loin d'être une réalité sur le terrain (l'Union européenne est la seule à les avoir énoncés dans une directive réglementaire).

Ces principes internationaux recommandent une planification intersectorielle, une participation locale et une coordination entre les utilisateurs de l'eau et les différentes parties prenantes, la décentralisation de la gestion de l'eau, ainsi que la formation et l'information à tous les niveaux. Cependant, lorsque l'eau est effectivement gérée aux échelons national et local, d'importantes lacunes et faiblesses entravent l'application de ces politiques. Le plus souvent, la gestion demeure sectorielle et priorité est donnée à la satisfaction de la demande induite par la

croissance agricole, urbaine et touristique. Les accords institutionnels au sein des pays reflètent cette approche. La connaissance des engagements internationaux est limitée et beaucoup reste à faire pour mettre en lumière les liens existants entre la gestion des bassins fluviaux et la disponibilité de l'eau, la gestion de l'eau et les besoins des écosystèmes. Il faut faire prendre conscience du fait que les tendances actuelles ne sont souvent pas soutenables (ni pour l'agriculture ni pour les économies nationales ni pour la nature) et sensibiliser aux conséquences que cette méconnaissance et l'inaction pourraient avoir sur les options de développement à moyen terme de la plupart des pays méditerranéens.

Il y a aussi des insuffisances techniques et un manque d'organisations chef de file ayant une vision claire et l'expérience de la gestion intégrée des bassins fluviaux pour mobiliser les ressources, promouvoir le dialogue et la participation, aider à résoudre les conflits et générer un large consensus sur des propositions et solutions avantageuses pour tous en matière de planification et gestion des bassins hydrographiques.

2. LE RÔLE DE L'UICN DANS LA GESTION INTÉGRÉE DES RESSOURCES EN EAU ET DES BASSINS FLUVIAUX

En dépit de la complexité de cette question, tous les acteurs concernés reconnaissent que l'eau doit être utilisée de manière plus rationnelle. Dans cette optique, par opposition aux approches sectorielles et verticales, qui ont trop souvent laissé de côté les critères et les préoccupations écologiques, l'accent est désormais mis sur la gestion intégrée des bassins fluviaux. Cette dernière approche est vivement encouragée par les conventions, déclarations et accords internationaux. L'UICN elle-même (*Initiative pour l'eau et la nature* 2000) soutient vivement une approche fondée sur une gestion holistique des écosystèmes.

Aujourd'hui, la priorité essentielle est de combler l'écart existant entre les politiques et les accords internationaux et leur mise en œuvre aux échelons national et local. L'entreprise est complexe car cela peut englober la planification de l'utilisation des terres ainsi que le stockage, la distribution, l'utilisation et le traitement de l'eau. Ces activités requièrent à leur tour, comme le recommandent les organisations internationales et l'expérience sur le terrain, des approches intersectorielles et participatives à tous les niveaux : planification et gestion, techniques de résolution des conflits, décentralisation, renforcement des capacités et partage de l'information.

Le sujet est vaste. Pour éviter de disperser ses ressources, parmi les trois composantes de la vision du Conseil mondial de l'eau (de l'eau pour tout le monde, de l'eau pour la nourriture, de l'eau pour la nature), l'UICN se concentrera sur les corrélations *eau-nature*, plus particulièrement en relation avec l'utilisation de *l'eau pour la nourriture* (en raison de l'importance de ce volet dans la consommation de ce bien précieux). Ces activités fourniront aux réseaux méditerranéens existants travaillant sur des questions liées à l'eau une contribution en termes d'environnement et d'écosystèmes.

2.1. La vision et le rôle de l'UICN

La stratégie de l'UICN en matière de gestion de l'eau est fondée sur le document intitulé *Vision de l'eau et de la nature. Stratégie mondiale de conservation et de gestion durable des ressources en eau au 21^e siècle*. Les six volets de la *Vision* de l'UICN peuvent être appliqués aux besoins de la région méditerranéenne :

- **Faire la démonstration de la conservation et de la gestion des écosystèmes dans les bassins fluviaux** par un réseau de projets sur le terrain
- **Donner à tous les moyens** de participer à la gestion durable des ressources en eau – participation du public et outils
- **Bonne gouvernance** – Réexamen des politiques générales et dialogue ; planification et gestion intégrées

- Intégrer aux processus de prise de décision et de gestion de l'eau les **outils économiques et financiers**, ainsi que les dimensions économique, écologique et culturelle et la valeur intrinsèque des écosystèmes
- Enrichir et partager les **connaissances**
- Structurer l'enseignement pour **faire prendre conscience** de la nécessité d'assurer la protection des écosystèmes et de promouvoir une utilisation durable de l'eau

2.2. Le créneau de l'UICN

c) Les atouts de l'UICN

Outre ses compétences en matière d'élaboration de politiques et son expérience sur le terrain à travers le monde, les atouts de l'UICN dans ce domaine sont les réseaux existants et potentiels d'experts régionaux et internationaux issus de ses commissions ainsi que son composition unique, (organisations gouvernementales et non gouvernementales). En Méditerranée, l'Union compte 162 membres originaires de 22 pays, dont 10 organisations internationales, et huit comités nationaux (Égypte, Espagne, France, Italie, Jordanie, Liban, Maroc, Syrie).

Étant donné ses caractéristiques et son expérience, l'UICN est particulièrement bien placée pour catalyser des politiques, coordonner des actions avec ses partenaires, associer les membres à ses initiatives régionales, travailler en réseau et établir des liens entre les membres du Nord et du Sud, fournir des avis scientifiques et faciliter les échanges d'informations.

L'UICN s'efforcera de combler les lacunes là où le besoin s'en fera sentir, en évitant tout double emploi avec les initiatives en cours. Elle s'attachera à faciliter le dialogue et une action coordonnée en fournissant des informations et une assistance technique, en renforçant les capacités locales et en proposant des solutions avantageuses pour tous.

d) Le rôle que pourrait jouer l'UICN

L'atelier a identifié plusieurs domaines dans lesquels l'UICN pourrait jouer un rôle important, notamment pour intégrer une approche soit axée sur les écosystèmes, soit environnementale, aux actions menées par d'autres (gestion de l'eau en agissant sur la demande, recyclage de l'eau, amélioration du rendement de l'irrigation au goutte-à-goutte, etc.). Une voie possible est le renforcement des capacités (promotion d'une bonne gouvernance, formation et partage des connaissances) et le soutien des bonnes pratiques dans certains domaines choisis à des fins de démonstration. À titre d'exemple, l'UICN travaille au suivi des aspects environnementaux du rapport de la Commission mondiale des barrages (2000), en invitant les principaux intéressés à participer à la réflexion et en rapprochant les points de vue des gouvernements, des groupes de défense de l'environnement, des populations affectées, des réseaux de scientifiques et du secteur privé.

3. LES CHAMPS D'INTERVENTION DE L'UICN

Les participants à l'atelier (Malaga, avril 2002) ont recommandé que l'UICN se concentre sur des activités dans les domaines suivants : sensibilisation ; bonnes pratiques ; renforcement des capacités ; assistance technique ; partage de l'information ; mobilisation des sources de financement.

3.1. Plaidoyer. Formuler des avis pour influencer les administrations publiques, réduire le décalage entre les dispositions législatives et leur application, et identifier et mobiliser les ressources financières pouvant être apportées par les agences de coopération et les donateurs aux niveaux bilatéral et multilatéral.

Promotion du dialogue et des activités conjointes en rassemblant les gestionnaires de l'eau et les acteurs de la conservation, notamment au niveau des bassins fluviaux.

Appui des recommandations pour le Sommet mondial sur le développement durable (Johannesburg 2002) qui font la promotion et soutiennent la mise en œuvre des recommandations les plus significatives du sommet, et de celles émanant d'autres forums thématiques sur l'eau et les ressources en eau.

Mobilisation de fonds pour renforcer les points de vue écologiques dans la gestion intégrée de l'eau. Les principales sources de financement sont LIFE dans les pays européens et, dans les pays tiers, MEDA, LIFE-Third Countries (deux fonds de l'Union européenne) et le Fonds pour l'environnement mondial (Banque mondiale), ainsi que, par exemple, les agences de coopération bilatérales d'Italie, de France, d'Espagne (plus celles de certaines Communautés autonomes) et d'autres pays européens non méditerranéens.

Services consultatifs et évaluation de certaines interventions des organismes donateurs

Aider les organismes donateurs à identifier les expériences positives et négatives en matière de gestion des bassins fluviaux. Le DAC-OCDE et les dernières politiques communautaires (2001) soulignent que le développement durable doit être l'objectif global de toutes les coopérations bilatérales des États membres de l'OCDE. Ces dernières années, la plupart des organismes donateurs ont prévu des évaluations à moyen terme et des évaluations finales de leurs projets.

Assistance aux nouveaux États membres de l'UE

Par l'intermédiaire des membres de l'UICN, fournir des conseils techniques et une assistance pour aider les pays méditerranéens candidats à l'Union européenne (Chypre, Malte et la Slovaquie) à satisfaire aux exigences environnementales de la directive-cadre communautaire sur l'eau pour la gestion des bassins fluviaux.

3.2. Bonnes pratiques et assistance technique. Fourniture de services techniques pour la préparation de stratégies et de plans d'action ainsi qu'une assistance pour la mise en œuvre, le suivi et l'évaluation.

Promotion et aide à la gestion intégrée des bassins fluviaux et des ressources en eau

Fourniture d'une assistance aux membres en matière de gestion des bassins fluviaux, des rivières et des zones humides. Sélection d'un petit nombre de sites sur la base de critères tels que l'importance écologique, le cadre institutionnel et les capacités locales existantes pour développer des activités de terrain visant à promouvoir le dialogue au niveau des bassins versants. Formulation d'avis et proposition de mécanismes et d'outils en vue d'intégrer les critères écologiques à la planification et à la gestion des bassins fluviaux.

Évaluation de l'expérience régionale des approches en termes de débits environnementaux et élaboration de propositions pour définir la manière dont l'eau pourrait être allouée à des fins d'entretien des écosystèmes dans le cadre du processus de planification des ressources en eau. Dans cette optique, il importe de définir les besoins en eau des zones humides selon des paramètres pouvant être pris en compte par les planificateurs.

Outils pour l'évaluation économique des écosystèmes

Promotion de la prise en compte de la valeur économique des biens et services des écosystèmes au moment de la planification des investissements.

Production de lignes directrices pour :

- la gestion intégrée des bassins fluviaux selon une approche environnementale liant la gestion des bassins et la conservation des zones humides et de la biodiversité ;
- une bonne gouvernance (cadres juridique et institutionnel) ;

- la mise en place d'outils pour l'évaluation des exigences en matière de flux environnementaux ;
- l'adaptation au changement climatique.

Élaboration de plans d'action des espèces menacées sur la Liste rouge des espèces méditerranéennes d'eau douce.

3.3. Renforcement des capacités et information. Échanges d'expériences entre membres, ateliers thématiques et forums de discussion, partage des enseignements tirés des expériences, réalisation d'activités de formation sur le terrain, détachement d'experts et de membres du personnel de l'UICN auprès des institutions intéressées, offre de stages dans les bureaux de l'UICN.

Capacité à participer à la planification et à la gestion des bassins

L'UICN pourrait contribuer à encourager la participation en renforçant la capacité de ses membres et d'autres parties prenantes dans des zones pilotes à recourir à des techniques participatives et à d'autres instruments efficaces pour résoudre les conflits. Ce travail pourrait s'inscrire dans le prolongement des orientations données par la Commission mondiale sur les barrages.

Formation d'experts nationaux et locaux et des principales organisations

Tirer des enseignements des expériences menées dans le monde entier et définir des bonnes pratiques. Les tester dans le cadre de projets pilotes en Méditerranée. Travailler avec des partenaires à la préparation d'un cours complet (par exemple en collaboration avec le CIHEAM, le CEDARE, la FAO-AGL et d'autres institutions) pour former des experts nationaux et locaux (gouvernementaux et non gouvernementaux) qui pourraient participer aux projets de terrain pilotes. Ces experts pourront à l'avenir impulser ou soutenir les processus de gestion intégrée des bassins fluviaux dans leurs pays.

Liste rouge des espèces méditerranéennes d'eau douce

Charger des experts d'évaluer la faisabilité de produire une liste rouge des espèces d'eau douce menacées dans les pays méditerranéens.

Communication :

Sensibiliser davantage aux politiques et aux engagements internationaux, aux liens entre la gestion des bassins fluviaux, la disponibilité de l'eau et les besoins des écosystèmes, au fait que les tendances actuelles ne sont pas viables à long terme et à leurs implications pour les options de développement et de conservation. L'UICN pourra préparer des outils de communication et diffuser auprès de tous les membres, de la filière eau et des médias les dernières informations, des analyses et des expériences de terrain. Parallèlement, elle appuiera l'établissement d'un groupe de travail avec des spécialistes membres d'ONG en vue de préparer et de mettre en œuvre une stratégie de communication dans ce domaine.

3.4. Travail en réseau et coordination. L'UICN s'attachera à nouer des liens avec d'autres partenaires régionaux et à les renforcer, à faire la promotion des activités de terrain des membres et à établir des liens Nord-Sud entre les membres de l'Union.

Échanges avec des partenaires et d'importants acteurs au niveau régional (PAM/PNUE, GWP, MedWet, Réseau international des organismes de bassin, réseaux des services techniques dans le domaine de l'eau, etc.), et poursuite de la participation à des forums régionaux tels que le Dialogue sur l'eau, la nourriture et l'environnement ou le Dialogue du GWP sur le changement climatique, ainsi qu'au groupe de travail sur l'eau au sein de la CMDD.

Coordination interne entre les comités nationaux de l'UICN, les membres spécialisés et les experts des commissions, ainsi qu'avec le nouveau Centre thématique de l'eau en Jordanie (l'un des sept centres thématiques de WesCANA).

4. MISE EN ŒUVRE DU PROGRAMME

4.1. Élaboration du programme et activités

d) Élaboration du programme

Le Centre pour la coopération en Méditerranée de l'UICN, établi à Malaga (Espagne), préparera une proposition à l'intention des organismes donateurs compétents en vue de lancer un programme fondé sur des éléments tirés du présent document. Ceci englobera un ensemble équilibré de projets et d'activités à court et à moyen terme dans les domaines de la sensibilisation, des bonnes pratiques et de l'assistance technique, du renforcement des capacités, de la communication et du travail en réseau, ainsi que la préparation de descriptifs des projets en collaboration avec les membres de l'UICN et les partenaires concernés. Ces documents seront ensuite soumis aux donateurs. Les propositions de programme devront s'inscrire clairement dans le programme d'intersessions de l'UICN, qui est articulé autour des domaines d'action prioritaires décidés par le Congrès mondial de la conservation à Amman (2000) pour la période 2001-2004.

e) Mise en œuvre du programme

Le programme sera conduit par le Centre pour la coopération en Méditerranée, coordonné par un expert désigné pour mettre en œuvre la proposition de programme, et soutenu par un groupe consultatif en collaboration avec les programmes mondiaux pertinents au siège de l'UICN, tels que l'Initiative pour l'eau et la nature.

f) Suivi et évaluation du programme

Le programme sera régulièrement soumis à des évaluations dans le cadre du cycle normal de réexamen des programmes de l'UICN. Il sera également revu dans le cadre de l'évaluation interne du programme méditerranéen.

4.2. Partenariats potentiels

L'UICN vise à aider ses membres et à apporter une valeur ajoutée aux programmes existants et aux initiatives en cours. Dès lors, elle recherche activement des accords de partenariat avec d'autres organisations méditerranéennes pour la mise en œuvre de son programme tout en favorisant la création de passerelles entre les processus internationaux et les actions régionales. Sur la base des analyses exposées dans le présent document, elle pourrait travailler en synergie avec les organismes ci-après :

Travail en réseau :

- la CMDD (Commission méditerranéenne du développement durable)
- le Réseau méditerranéen de l'eau (RME) des directeurs généraux de l'eau

Alliances globales pour les activités de sensibilisation, la mise en œuvre des politiques et les programmes de terrain :

- le Dialogue sur l'eau, la nourriture et l'environnement, auquel l'UICN participe déjà. Renforcement de la présence méditerranéenne à l'échelon international et promotion du Dialogue au niveau régional
- la Commission mondiale des barrages, à laquelle l'UICN participe déjà

- le Réseau méditerranéen du GWP (GWP-Med, ancien MEDTAC) partage la plupart des objectifs de l'UICN et pourrait être complémentaire dans de nombreux domaines d'activité
- la FAO-AGL (Division pour le développement des ressources en eau), pour la promotion de pratiques et d'outils satisfaisants de gestion des ressources en eau à l'échelle nationale et des bassins

Renforcement des capacités et assistance technique :

- le CIHEAM (notamment le centre de Bari et les programmes Formation et Eau, ainsi que le centre de Saragosse pour l'efficacité de l'utilisation de l'eau d'irrigation)
- la CIID (Commission internationale des irrigations et du drainage)
- le CEDARE pour la formation et l'établissement de contacts dans les pays arabes
- le Réseau international des organismes de bassin pour établir un lien avec la gestion intégrée dans la région
- le WWF-MedPO pour les programmes de terrain et la stratégie en matière de communication

D'autres partenariats seront conclus si nécessaire. La liste ci-dessus est donnée à titre indicatif uniquement.