



Conférence ministérielle sur l'**EAU**  
Ministerial Conference on **WATER**  
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Processus de Barcelone: une Union pour la Méditerranée  
Barcelona Process: Union for the Mediterranean  
عملية برشلونة : اتحاد من أجل البحر المتوسط

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# Water in the Mediterranean basin: assessment and prospects

(Source: *Plan Bleu*, <http://www.planbleu.org>)

Water is a priority problem in the Mediterranean basin. Questions of access to and management of water – whether for drinking, irrigation or industrial uses – are increasingly urgent. Some 70% of the water consumed in the Mediterranean basin is used for irrigation. Meanwhile, desertification is spreading, not only south of the Mediterranean, but now also to the north.

## Observation: 20 million people in the Mediterranean basin with no access to drinking water

Around the Mediterranean, water is a resource that is scarce, with a precarious existence, and unequally distributed over space and time.

- **The demand for water doubled** in the second half of the 20<sup>th</sup> century and reached 280 km<sup>3</sup>/year in 2005 for all the countries bordering the Mediterranean.
- Agriculture, the sector responsible for most water consumption, accounts for 64% of the total demand: for 45% in the northern part of the region and for 82% in the south and east.
- In many Mediterranean countries, water abstraction is approaching the limiting capacity of the available resources. Water shortages are observed, both associated with an acute situation and of a structural nature. By 2005, the Mediterranean population that can be considered “water-poor”, that is the people in countries with less than 1,000 m<sup>3</sup>/inhabitant/year, had increased to 180 million, of whom 60 million were experienced a water shortage (where there was less than 500 m<sup>3</sup>/inhabitant/year).
- **20 million people in the Mediterranean basin have no access to drinking water**, and this is particularly the case in countries to the south and east.

Water supplies in several Mediterranean countries have become more vulnerable on the one hand, by **overexploiting some of the renewable underground water** (leading to ingress of salinity that makes the water unusable) and on the other hand, through **exploiting non-renewable resources** (including fossil, or connate, water). The provision of non-sustainable water is thus estimated at 16 km<sup>3</sup>/year, 66% of which comes from abstraction of fossil sources and 34% from overexploitation of renewable sources.

Thus, added to the pressure on natural water resources, there is the damage done and pollution of human origin, which alter the water regime and/or quality, further restricting the resources' usage possibilities. The result is an increase in:

- supply vulnerability because of rising costs (particularly for water treatment);
- health risks;
- conflicts over usage by the various users, major sectors, regions and countries.

## Predictable future: growing pressure on water resources and the effects of climate change

The pressures on water resources will continue to increase significantly in the south and east of the region, and 80 million people in the Mediterranean basin will experience a shortage (where there is less than 500 m<sup>3</sup>/inhabitant/year) by 2025. As a result of the growth in agricultural and urban demand for water and the scarcity of resources, **water abstraction in one Mediterranean country in three will involve taking more than 50% of the annual consumption** from non-renewable natural resources.

The changes in temperature and precipitation described by climate models will exacerbate these trends. The Mediterranean regions, which are already suffering major water stress, are going to find themselves particularly exposed to reductions in their water resources. In some countries, such developments could produce situations of acute crisis. It is estimated that, to the south and east of the Mediterranean, **population growth will result by 2050 in 290 million people living in countries experiencing water shortage.**

The share of water supplies that is not sustainable, coming from fossil sources or resulting from overexploitation, will increase. In these circumstances, rapid exhaustion of certain fossil resources will be seen, together with continued destruction of coastal aquifers through the ingress of seawater. In addition, silt accumulation behind dams means that many of them have a limited useful life (the reservoirs in Algeria, for example, have already lost a quarter of their initial capacity), and sites for the construction of new dams are running out. The quality of water and of the aquatic systems will also be affected by the growth in industrial and urban waste products, and by the reduced flow caused by increased abstraction. It is probable that **wetlands will continue to regress.** This prospect is adding to the factors that are making water resources increasingly vulnerable (with adverse implications for costs, health and conflicts).

## Alternatives: Acting on the demand for water, and not only on the supply

The observations and outlook show that growth in supply, which was the traditional water-policy response in the Mediterranean, is now reaching its limits. Given this situation, there is enormous scope for **managing the demand for water.** This involves reducing losses and poor use (with waste and leaks exceeding 50% in some towns) and **improving efficiency of use for the resource.**

There is considerable scope for progress in this area, as better management of demand would enable usage to be reduced by a quarter, that is by more than 85 km<sup>3</sup>/year in 2025. Irrigated agriculture presents the greatest potential saving in volume, accounting for nearly 65% of the total potential water savings identified in the Mediterranean (with losses in transport being reduced by half, to 10%, and efficiency in the use of water to irrigate plots increased from 60% to 80%). The remaining potential water savings relate to industry in the case of 22% (with recycling brought up to 50%), and the supply of drinking water in the case of 13% (by reducing by half the losses in transport and leaks on users' properties, reaching figures of 15% and 10% respectively). With this optimistic outlook, assumed to apply throughout the Mediterranean countries, the total demand for water could be 102 km<sup>3</sup>/year in the north and 144 km<sup>3</sup>/year in the South and in the Near East, **overall equivalent to a reduction by about 40 km<sup>3</sup>/year as compared to current total demand.** These water savings would, in addition, make it possible to economise on energy and make financial savings.

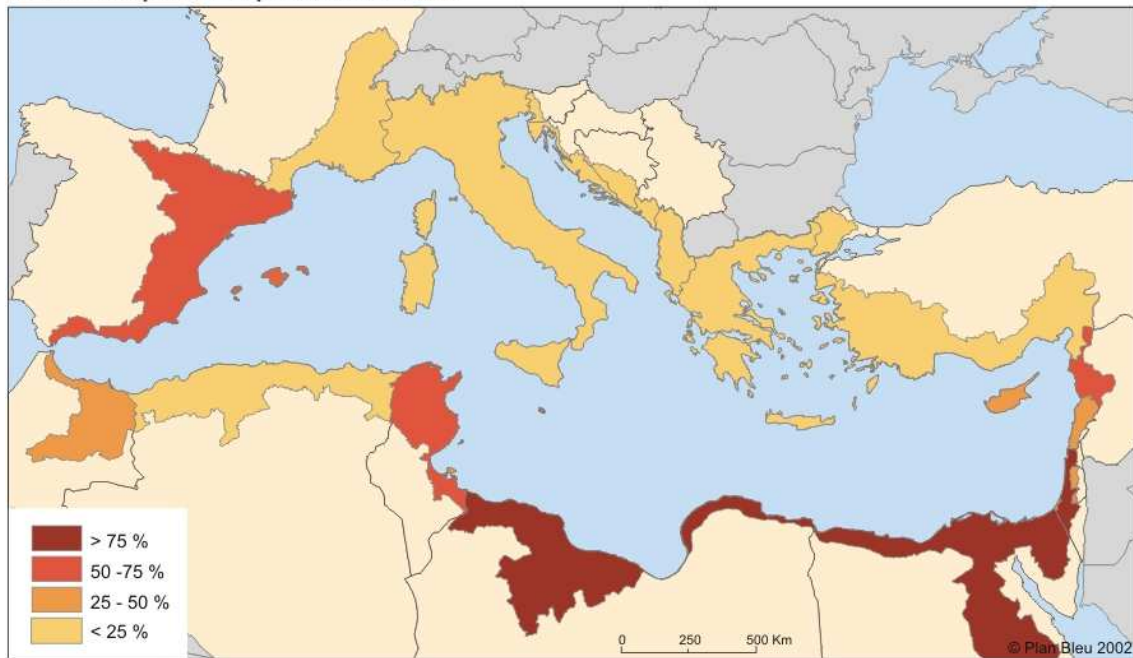
Attaining these targets would, at the same time, limit environmental impacts, the risk of conflicts and costs of access to water, while releasing the potential for economic growth and stability in the region.

**Nota: 25%**

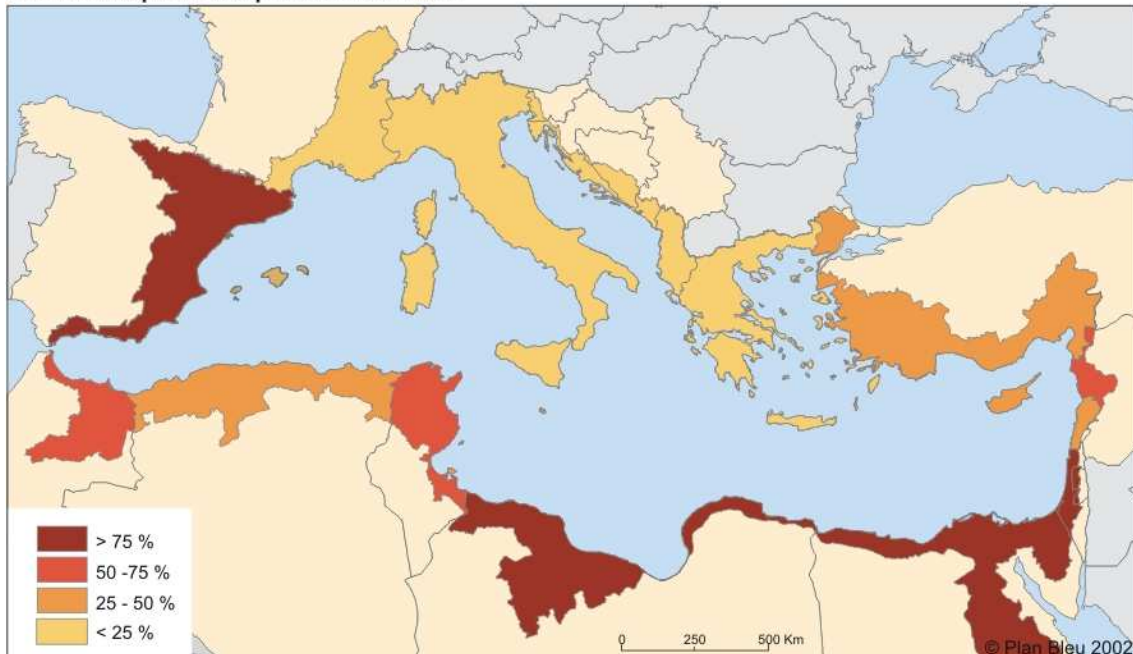
It is estimated that the water losses that could be avoided by better management in the Mediterranean countries amount to 25% of the demand in 2005 (estimated at 280 km<sup>3</sup> for that year).

**Indicators of renewable natural-water-resource exploitation**

Indices d'exploitation par bassins - 2000



Indices d'exploitation par bassins - 2025



# The “Barcelona Process”: state of cooperation in the field of water in the Mediterranean

(Source: report drawn up by EMWIS<sup>1</sup>, 2008, <http://www.semide.org>)

## Observation: a wealth of projects, but insufficient co-ordination

The Barcelona Process, initiated in 1995 between the European Union and the countries to the south and east of the Mediterranean basin, has given rise to numerous initiatives and various action plans, programmes, studies and forms of action in the field. There have, at the same time, been other processes, expressed through various co-operative activities, and these initiatives have been implemented by mobilising or setting up numerous organisations.

There are currently almost 50 co-operative projects in progress, testifying to the complexity of the field concerned and **the wealth of initiatives and investigations being carried out**.

However, a certain confusion and lack of overall clarity has been noted in how the co-operative processes are implemented, producing the following obstacles:

- difficulties in ensuring effective coordination; overlapping responsibilities, redundancy and dispersion of efforts;
- difficulties in getting a consistent strategic view of the initiatives to emerge;
- difficulties in assessing the programmes and the action carried out.

The arrangements' overall effectiveness is therefore called into question, and the results have been less than expected, as a result of increasing needs (through population growth, economic development and the alarming changes in climate).

## Approaches proposed

**Water should be put at the top of the political agenda.** Responsibilities for water are often dispersed among a number of government departments. An inter-departmental approach is essential, and strategic thinking – such as governance of the forms of action carried out – should be dealt with on an inter-departmental basis.

**Joint responsibility for deciding programmes.** Co-operative initiatives often appear to be directed from the north to the south, which works against their being wholly accepted by all the partners involved in implementing the initiatives and resultant activities. More account needs to be taken of what countries to the south are really requesting, which sometimes differs from what is wanted by countries to the north.

**A consistent strategy to be drawn up for the region, with which all the partners can identify.** This should be based on shared data and joint experience. It would allow use to be made of skills, and better co-ordination of the initiatives and stakeholders.

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<sup>1</sup> SEMIDE/EMWIS = Euro-Mediterranean Information System on know-how in the Water Sector

**Pooling of strengths in financial innovation.** It is becoming apparent that co-ordination of sponsors is necessary to organise financing that performs well and is appropriate for operations that are not always considered credit-worthy by conventional criteria.

**Developing a culture of practical projects.** At the same time as giving thought to the situation, it is important to identify and implement practical projects that help improve the situation on the ground.

# “Barcelona Process: Union for the Mediterranean” – a new framework

## Stages in the “Barcelona Process: Union for the Mediterranean”

- 1975: Formulation of the Mediterranean Action Plan (MAP/United Nations) - Barcelona Convention on protection of the Mediterranean Sea
- 1992: Earth Summit on Sustainable Development - Rio
- 1995: Barcelona Declaration (with Euro-Mediterranean policy being given the name “Barcelona Process”)
- 1996: 1<sup>st</sup> Euro-Mediterranean Ministerial Conference on Water Management, in Marseille; establishment of EMWIS (Euro-Mediterranean Information System on know-how in the Water Sector)
- 1999: 2<sup>nd</sup> Euro-Mediterranean Ministerial Conference on Water Management, in Turin; establishment of the Meda Water Programme
- 2000: United Nations Millennium Summit for Development, in New York
- 2001: Establishment of the Mediterranean Strategy for Sustainable Development (MSSD) within the framework of MAP
- 2002: World Summit on Sustainable Development, in Johannesburg; establishment of the EU Water Initiative
- 2003: Establishment of the Mediterranean Component of the EU Water Initiative.
- 2007: Establishment of the European Neighbourhood Policy (European Union and partner countries)
- 13 July 2008: Creation of “Barcelona Process: Union for the Mediterranean” - Paris
- 22 December 2008: 3<sup>rd</sup> Ministerial Conference on Water – Jordan

## New principles that serve to unite and are practical

**The plan to create a Mediterranean Union** was launched by France’s Head of State in 2007, with official inauguration on 13 July of this year, in the course of the **Paris Summit for the Mediterranean**. It brought together 44 States: the 27 members of the European Union, 13 Mediterranean countries that are members of the Barcelona Process (Albania, Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Mauritania, the Palestinian Authority, Syria, Tunisia and Turkey), and another four countries bordering the Mediterranean (Bosnia-Herzegovina, Croatia, Monaco and Montenegro), together with Community institutions and regional organisations.

Starting from the observation that unequal development between the two sides of the Mediterranean is becoming more pronounced, thus increasing the risk of instability throughout the region, the Heads of State and of Government in European and Mediterranean countries have given a new and dynamic impetus to partnership in the Mediterranean basin. **The project builds on the progress already made as part of the Barcelona Process**, inaugurated 13 years ago, primarily at the instigation of Spain and France, but it is considerably more ambitious, envisaging a wider range of operation and of means for taking action.

The intention is to strengthen and deepen co-operation between the two sides of the Mediterranean, producing greater solidarity in political, economic and social matters. This involves developing large projects with regional coverage, to meet the populations' needs.

There are **three simple, but fundamental principles** underlying the plan for a Mediterranean Union, to provide a new factor, giving it structure:

- **political mobilisation at the highest level**, through summits every two years, involving Heads of State and of Government (with the first having taken place in Paris on 13 July 2008);
- **governance on an equal footing**, embodied in a north-south co-presidency and a permanent secretariat with equal representation;
- giving emphasis to **practical projects of regional application**, creating *de facto* solidarity.

The following **priority issues** have been identified:

- **environmental and energy problems**, with, in particular, proposals for dealing with pollution in the Mediterranean, developing solar energy and managing water resources;
- **responding to the increased risk of natural phenomena and deficiencies in transport infrastructure**, notably through joint programmes for civil protection and the development of marine "motorways";
- **the challenges presented by economic and social development in the Mediterranean basin**, which could be partly lifted through action supporting small and medium-size enterprises, and through support programmes for higher education and research.

Water issues primarily involve eliminating pollution from the Mediterranean, protecting coasts and – above all – **"efficient management of water resources and of the demand for water"**.

There has also been adoption of some initial large practical projects.

# Ministerial conference on water

## Two aims: a regional strategy and practical projects

This conference, under the co-presidency of France, Egypt and Jordan, has two aims:

- **setting guidelines for a water strategy** in the Mediterranean, which should be approved by the ministers meeting for this conference, at the earliest in 2010, and if possible submitted to the Heads of State in the course of their second Summit in that year;
- **presenting an initial set of practical projects** that are consistent with the strategy set for the region.

### Deciding on a regional strategy

The strong components proposed for this water strategy in the Mediterranean are as follows:

- displaying high-level political commitment, making it possible to tackle problems – notably those associated with climate change and environmental needs – that exceed the means of action available to a single country or a single organisation;
- taking account of water as a fundamental component in the development of countries to the south and east of the Mediterranean, and promoting a new culture in relation to water;
- setting two major objectives: protecting water quality and finding a balance between drawing on new water resources and managing the demand for water;
- obtaining agreement from the stakeholders on common approaches, mainly relating to effective modes of governance, that bring together all the players involved;
- establishing a co-ordinating body for sponsors;
- drawing the attention of the permanent “Barcelona Process: Union for the Mediterranean” secretariat this is going to be created to the need to give priority to practical projects relating to water;
- strengthening the co-ordination of existing initiatives on information and expertise issues;
- giving a mandate to water managers in the “Barcelona Process: Union for the Mediterranean” member countries so that they can draw up and adhere to the strategy;
- involving civil society.

### Presenting practical projects

This involves new dynamics, starting from practical projects and *de facto* solidarity, which must help Mediterranean and European countries come closer together. The projects will be capable of geometric variation to suit the countries that wish to participate, depending on their own specific interests.

The aim is for the projects to be drawn up and implemented, supported by all of the stakeholders involved, particularly the local and regional authorities, private-sector firms, associations and NGOs, universities, research and training centres, foundations, etc. Carrying out these projects will bring together public and private sources of finance, and not be limited to Community financing.

Establishing the Barcelona Process has already made it possible to identify certain potential projects relating to water, relevant to the following priority concerns:

- adjusting to climate change;
- achieving a balance between drawing on new water resources and managing the demand for water;
- rehabilitating and making use of natural environments;
- removing pollution from the Mediterranean Sea;
- drawing on technology and using water efficiently.

The work of this conference takes place within the spirit of the Paris Summit. It is based on short-term implementation of practical projects on the ground, helping resolve the acute problems raised by the deterioration, in both quality and quantity, of water resources, and by the growing gap between the resources available and increases in need and demand from the agricultural, domestic, industrial, tourist and environmental sectors.

# Examples of Initial Projects Identified

## Adaptation to Climate Change

### **Climate Change Impact and Adaptation Studies in the Water Resources Sector for the coastal line and deltas (Egypt)**

Implementation of this project can improve climate change adaptation capacity and mechanisms for knowledge exchange within the region.

#### Context

During the past few decades, it has become apparent that human activities such as fossil fuel burning and land-use change (e.g. deforestation) have considerably increased the atmospheric concentrations of greenhouse gases (GHGs). As a result, changes in climate have started and are expected to continue for centuries/millennia after GHGs' concentrations stabilize (if at all possible). It is expected that climate change will cause a chain of impacts at the global, regional, and local levels affecting all economic sectors in one way or another. The expected change in climate is likely to affect natural ecosystems, including forests, wetlands, coastal areas, water resources systems, food supplies, human health, and socio-economic systems.

Climate change is likely to increase the stress on currently stressed resources, especially in the developing world. Studies have shown that most systems are sensitive to both the magnitude and the rate of climate change. However, the vulnerability of a system to the expected change depends on economic strength and existing infrastructure, which makes developing countries, such as Egypt and other southern Mediterranean countries, generally more vulnerable and less able to adapt. The uncertainty of the change and its interaction with non-climatic changes in non-linear systems make it difficult for policy makers to anticipate the changes and take steps to mitigate, adapt, or take advantage of it. Nevertheless, current knowledge of climate change should never be ignored in the formulation of future policies regarding, for example, water resources management, food production, or environmental protection.

#### Problem Statement

Water resources are amongst the most vulnerable sectors to climate variability and change in Egypt and other southern Mediterranean countries. Previous assessments of climate change impacts on water resources, especially for the Nile Basin, are characterized by a high level of uncertainty that made it difficult to devise possible adaptation options and build the required adaptive capacity within the water management system.

#### Objectives

This project aims to assess the impacts of climate change on water resources and develop adaptation strategies within the water management policies to address climate change issues. Specific objectives include:

- To conduct a rapid preliminary assessment of climate change impacts on water resources
- To assist regional experts undertake scientific studies to assess the impacts of climate variability and change on the availability of water resources
- To establish a regional network among the EURO-MED on adaptation to climate change in the water sector, facilitating improved communication and increased commitment from various ministries, local governments, research institutions, partners, the business community and NGOs
- To develop a regional agenda and action plan for climate change adaptation in the water resources sector

### Expected Outputs

By the end of the project, the following outputs should be available:

- Projected changes in the water resources system in response to climate change
- Identified adaptation strategies and policies in the water sector that influence the planning, operation and management of water resources infrastructure
- A network of professionals from the water sector in the EURO-MED countries that facilitates exchange of ideas, experience, best practices and lessons learned within this field

## Balance between supply and demand

### Water Saving in Irrigation; Morocco's National Plan

The contrast between areas irrigated using traditional techniques and areas irrigated using modern methods is regarded as spectacular.

What is more, the figures in terms of water savings (a total of 1 billion m<sup>3</sup> per annum) are very significant at a time when public awareness of the problems posed by climate change is running high.

There are major advantages to be gained from fostering this approach in the Mediterranean area.

#### Context

Irrigation is the dominant factor in terms of water consumption in the Mediterranean seaboard countries. This is even truer in the countries to the south and east of the Mediterranean, where farming accounts for between 75% and 85% of water consumption. Those countries are also those where overall resources are particularly limited.

Unless something is done, the situation can only get worse as a result of population growth, economic development and climate change, which will undoubtedly translate into a decrease in rainfall to the tune of about 20%.

Fairly generally, however, irrigation techniques remain traditional (largely gravity irrigation) and particularly uneconomical with water. Some countries have already embarked on or drawn up major programmes of conversion to modern methods (spot irrigation), which are far more economical with water. A number of practical schemes are thus envisaged in several countries in the short term.

To cite one example, Morocco has just drawn up a national irrigation water saving programme, which is currently being launched.

#### Project

The National Irrigation Water Saving Programme (PNEEI) was drawn up in December 2007; implementation is scheduled over a 15-year period and comprises the conversion of 550,000 hectares, including 390,000 hectares served by the public water mains and 90,000 hectares with private irrigation.

The anticipated results are:

- A 20 to 50% water saving, meaning a total of 1 billion m<sup>3</sup> per annum upon completion of the programme, and a 10 to 100% increase in agricultural yield.
- An increase in farmers' income and, consequently, scope for improving water charges.
- A reduction in electricity demand from the irrigation sector.

## Description

The programme comprises five chief components:

- Collective modernisation schemes;
- Individual modernisation schemes;
- Agricultural upgrading;
- Stepping up of technical support;
- Facilitating measures.

## Extensions

The programme is conducive to “south-south” exchange of experience and skills: some countries are further ahead than Morocco in the modernisation of irrigation, and their know-how might be pooled with a view to implementing the Moroccan scheme. Vice versa, Morocco is not the only country where the modernisation of irrigation is necessary, and its programme might be implemented in other countries as well.

## Partners

The programme is being managed by the Moroccan Government (Ministry of Agriculture and Maritime Fisheries MAPM).

## Budget

The overall cost of the PNEEI is estimated at 37 billion dirhams (US\$ 4.7 billion or € 3.3 billion), including 30 billion dirhams in investments and 7 billion Dh. in facilitating measures (100 Dh. equals € 8.9 or US\$ 12.6).

- The cost of facilities installed outside the plots of land will be fully covered by the state.
- The internal facilities for collective conversion will be wholly financed by the state, which will recover 40% of the outlay under special arrangements.
- The state will subsidise individual farmers’ conversions at the rate of 60% of the cost.

Overall, the state will make advances accounting for 80% of the total budget and the beneficiaries for 20%. The funding envisaged will be sourced from various financial backers, as appropriate.

The PNEEI will incorporate all the irrigation water saving drives, including the one currently being set up with the World Bank (the Oum Er Rbia Basin).

## Obstacles

The chief obstacle is that of the resources that it will be possible to mobilise from the financial backers. The programme’s rate of advancement may be slowed or, on the contrary, speeded up in line with the pace at which funding is obtained.

# Conservation and Rehabilitation of Natural Environments

## Red Sea – Dead Sea Transfer Project

By stepping up cooperation on water and environment among the three parties concerned (Israel, Jordan and the Palestinian Territories), this project also acquires geo-strategic interest by virtue of its ambition to contribute to peace and stability in the Middle East.

### Context

The idea of topping the Dead Sea up with seawater has been around for over a century. Besides evaporation due to industrial extraction of potassium hydroxide, the exploitation of the waters of the Jordan and its confluents for 50 years or so, mainly for irrigation, is now creating a situation in which the level of the Dead Sea is dropping by a metre a year. The integrity of this unique ecosystem is threatened, while the demand for drinking water in the region is growing at a rate that the local river basin will not be able to cover in the long term. At the urging of the United States, the countries bordering it launched an initial pre-feasibility study, which was delivered in 1997.

A joint Israeli-Jordanian statement made at the World Sustainable Development Summit held in Johannesburg in August 2002 imparted fresh thrust to the idea of a project to convey water from the Red Sea to the Dead Sea, which was named the “Peace Conduit.” This political approach is being given precedence over national projects (whether public or private on courses plotted from the Mediterranean or the Red Sea), as it makes it possible, in a concerted fashion, to

- meet the region’s medium-term water requirements;
- achieve economies of scale;
- “resuscitate” the Dead Sea.

The three parties (Israel-Jordan-Autonomous Palestinian Territories) approved the terms of reference for the launch of a feasibility study in May 2005. The World bank was then commissioned to conduct technical and economic studies as well as studies on the environmental and social impact of such a project also called “Red-Dead”. France, the main donator (3.5 million dollars out of 15 million), is financing with 6 other countries these studies that started in the Spring of 2008 and should end in the Fall of 2010. Implementation of the project itself should last about 10 years for a total cost of 5 to 10 billion dollars.

### Project

The water transfer project aims are threefold:

- To stabilise water levels in the Dead Sea;
- To produce hydroelectricity;
- To produce additional fresh water resources to meet the region’s long-term needs through desalination.

It would consist in a pipeline pumping water in the Aqaba Gulf on the Jordanian shores and bringing it to a desalination unit near the Dead Sea. The important amount of water being envisaged – 2 billion m<sup>3</sup> per year, half of it going to desalination – makes it an exceptionally big project. The desalinated water would supply the main urban centres of Jordan and the West Bank while the brine and the non-desalinated water would supply the Dead Sea. This exogenous supply would first allow a halt in the drop of the Dead Sea levels and subsidence of its banks.

The second phase would involve taking advantage of the natural slope between level 0 of the Red Sea in Aqaba and that of the Dead Sea (–400 metres) to produce hydroelectricity.

Besides optimisation of the management of traditional water resources and of the reprocess of residuary waters, the Red-Dead project would be a response to the lack of infrastructures in the region, by 2030.

However, scientific studies must be conducted during the next 2 years, regarding the impact of pumping water on the marine ecosystem of the Aqaba Gulf, as well as the consequences of an input of water and brine on the ecosystem of the Dead Sea.

Once the technical and financial feasibility has been proved and the conditions in which it can preserve the environment, mobilizing public and private international sources of financing will be the next challenge for a project with such an economic, human, and historic importance for the countries concerned.

## **Rehabilitation of the lower Jordan River (Israel, Jordan and the Palestinian Territories)**

This project would exemplify a committed international approach, combining, in a consensual and sustainable way, environmental safeguard and economic development, with the aim to find a solution to the deterioration of the environmental, economic and touristy potential of this emblematic site in Mediterranean history.

### Context

The Jordan River basin has accompanied Mediterranean culture since the dawn of time: it is closely associated with the cornerstones of three important monotheistic religions. It is furthermore an area rich in biodiversity.

However, the lower course of the River Jordan – between Lake Tiberiade and the Dead Sea – has been very severely deteriorated due to excessive water withdrawal. In summer, certain sections of its course dry out completely or only contain waste water, preventing economic development, particularly touristic development, despite strong potential.

### Project

The project suggests a global regional approach to rehabilitation of the lower River Jordan to restore the minimum flow needed and process the upstream residuary waters flowing into it. This involves a transfer to the river of saved water that may be generated in the region considered as a whole.

This project is based on the notion of “contributive parts”. Its objectives are the following:

- Identify, at a local level, potential water savings, making up “contributive parts” to return to the river;
- Assist the emergence of a political commitment to concretise these transfers.

### Description

The project suggests engaging in the following actions; basing them on an in-depth understanding of the environment:

- evaluation of the minimum necessary flow to rehabilitate the lower course of the River Jordan;
- identification of sources of river pollution;
- identification of the obstacles in view of changes in water policies;
- cross-border analysis to identify the opportunities for saving/transfer in each of the three countries, for the agricultural, household and industrial sectors; the addition of these “contributive parts” would permit the necessary flow for rehabilitation of the river to be attained;
- elaboration of a strategic action plan aimed at the decision-makers wielding power to mobilise each “contributive part”, by involving all the ministerial departments concerned in the three countries: water, infrastructure, agriculture, environment, tourism and finance;
- set-up of assistance centres, benefitting from international support to assist the implementation of the plan.

The initiative’s originality lies in the mobilisation of Israeli, Jordanian and Palestinian experts to create multi-disciplinary teams of experts responsible for the planned projects.

### Extensions

The project's transnational approach would allow the development of a better reciprocal understanding of water policies and would thus contribute to the establishment of peace.

The implementation of the action plan would allow the development of tourism in the region. An endeavour strong in symbolism could be the creation of a nature reserve located partly in each of the three countries.

The envisaged methodology may be extended to other stretches of water, heavily damaged by excessive water withdrawals.

### Partners

The project initiator is the NGO, Friends of the Earth Middle East (FoEME). The project benefits from the support of the regional authorities on both banks of the Jordan River. Universities from Israel, Jordan, the Palestinian Authority, France, and the United Kingdom are also involved, and the Chirac Foundation is considering getting involved also.

### Budget

The required studies could be conducted within 24 to 30 months for an estimated cost of 2 million Euros.

It is important for these studies to be seen as complementing naturally the Red-Dead project as it would illustrate an integrated approach to conservation of the environment and transnational governance of water resources.

France wished for the international community to promote this approach by the parties involved. It is to be hoped that within the next 2 years, both projects will have gone beyond abstract definition in order to reach the stage of operational decisions.

## Depolluting the Mediterranean Sea

### **Sanitation of Cairo (Egypt) / enlargement of the Gabal El Asfar waste water treatment plan and strengthening capacities of contracting authorities**

This project is of major interest due to limited development in the treatment of waste water in Mediterranean conurbations until this time. It could act as an example for other large conurbations.

#### Context

The sewerage master plan dates back to 1978. It foresees the expansion of the capacity of the waste water collector network and its extension to new urban areas, and the concentration of waste water treatment in two large, modern sewage treatment plants, Gabal El Asfar for the eastern bank and Abou Rawash for the western bank. The deficit in the treatment capacity is estimated at 1.37 M m<sup>3</sup>/day just for the eastern bank. Non-treated waste water is pumped directly into the drainage system that crosses the Delta and is discharged into the Mediterranean.

The first section of the Gabal El Asfar plant became operational in 1998 with a treatment capacity of 1.2 M m<sup>3</sup>/jour, serving a population of 6 million inhabitants.

The second section became operational in 2005 with an additional capacity of 500,000 m<sup>3</sup>/day (in fact almost 600,000 m<sup>3</sup>/day are treated). Therefore the plant has currently a capacity of 1.7 M m<sup>3</sup>/day and employs classic activated sludge technology. 60% of its energy needs are satisfied by electricity produced by methane, generated by the plant itself.

An optimisation scheme of these two sections is underway, financed by the Egyptian budget. It will allow the plant's total treatment capacity to rise to 2 M m<sup>3</sup>/day.

#### Project

The project consists of creating a capacity increase of 500,000 m<sup>3</sup>/day at the Gabal El Asfar waste water treatment plant. The planned treatment is activated sludge treatment, with sludge digestion and production of biogas and the possibility for tertiary treatment.

This project will therefore allow the plant's capacity to rise to 2.5 M m<sup>3</sup>/day. It will be constructed on the plant's current site.

#### Budget

The total cost of the project (updated in July 2007) is 200 M€, of which 54% are local costs and the rest foreign costs. This cost only covers the "construction" part. The financing plan foresees:

- Egyptian self-financing of 103 M€,
- co-financing between the African Development Bank (47 M€) and the French Development Agency (50 M€)

In addition to this financing, it would be useful to find approximately 1 M€ in subsidies to reinforce the project owner capacities.

Recognition of the project would result in international financing, justified by its economic, human and environmental importance.

## **Reusing Greater Tunis' Treated Waste Water (Tunisia)**

This project is of major interest due to the limited development in valorisation of treated waste water by Mediterranean conurbations. It could serve as an example for other large conurbations.

### Context

Tunisia is faced with low water resource availability, and the renewable fraction is already exploited to 95%. This is why the reuse of treated waste water is a major issue for the Tunisian authorities and consequently for the ONAS, a national company with competence in sanitation. According to their indications, 65 M m<sup>3</sup> of treated waste water (more than a quarter of the 237 M m<sup>3</sup> purified each year) is currently reused to water 9 000 ha of park land and leisure areas, (golf courses), and for irrigation.

### Project

Tunisia hopes to increase its so-called non conventional water resources. The study of an ambitious project to transfer and partially reuse treated waste water from the Greater Tunis for irrigation and refilling the water table is listed in the Mediterranean Hot Spots Investment Programme, identified by the European Commission, with a view to the "Horizon 2020" Programme.

The first scenarios concern the possible reuse of treated waste water from the Greater Tunis, whose volume was estimated at 132.4 M m<sup>3</sup> in 2021.

Four scenarios that may be combined are envisaged by a scoping study underway, headed by the Tunisian authorities:

- The creation of a maximum of 33,100 ha of irrigated areas (cereal and feed crops, olive trees and the introduction and cultivation of *Jatropha curcas* in the governorates of Sousse, Zaghuan and Kairouan),
- Refilling the water table to a depth of 50 M m<sup>3</sup> (governorates of Ben Arous, Bizerte, Nabeul, Zaghuan, Sousse and Kairouan),
- A combination of the first two scenarios (90.5 M m<sup>3</sup> irrigating 23,000 ha and 41 M m<sup>3</sup> refilling the Cap Bon water table),
- a discharge scenario by two sea outfalls (2.91 m<sup>3</sup>/s flow rate for the first 3,300 m long outfall and 3.49 m<sup>3</sup>/s for the second, with a length of 4,800 m).

### Budget

The Tunisian authorities have launched the first part of a feasibility study for this clean resources project. The steering committee is presided over by the Tunisian Ministry of the Environment, and guardianship of the National Sanitation Office (ONAS). This said, the feasibility study including the elements of technical and economic feasibility remains to be

launched. Several European partners have been approached informally. This study could be partly financed in 2009 by the European Commission's Neighbourhood Investment Facility.

Investment sums have not yet been made clear, but the project could hit the 500 M€ mark and would require participation from several lenders.

Recognition of the project would result in international financing, both for the feasibility study and for the realisation of the project itself, justified by its economic, human and environmental importance.

### **Monitoring of Water Quality in the Northern Lakes and Nile River Branches through the application of Remote Sensing Technologies (Egypt)**

The project will help building a local-scale mapping of indicative quality of the water in the Northern lakes and the Nile River delta. This will help in improving the quality of the sea water at local and regional levels, and this can be generalized to other locations along the shoreline of the Mediterranean Sea.

#### Background

Water turbidity and harmful algal blooms are two important parameters in defining water quality in the Mediterranean Sea. Existing observations suggest a dominant effect of freshwater discharge and wind on those parameters, yet it still remains a challenge to establish a significant relation-ship due to the typical high variability and short life time of those parameters in the Mediterranean region. It is anticipated that remote sensing techniques can help in monitoring water quality in the Northern lakes and the Nile River delta given that several satellite observation platforms are nowadays available and new sensors are being launched to increase our capacity in water quality assessment and monitoring. This will help in the short and long run to improve the Mediterranean Sea water quality in a cost effective way.

#### Problem Statement

The impact of humans on the water cycle and terrestrial water and ecosystems is of increasing importance, especially in relation to water quality. In this sense, degrading water quality contributes heavily to water insecurity globally. This becomes clear where water is drained into the Mediterranean Sea as the quality of this water degrades over time. Therefore, the quality of this drained has to be monitored in order to identify the locations where its quality degrades and implement plans to improve it (i.e. hot spots).

#### Objectives

- Review existing water quality monitoring programs for the Northern lakes and Nile River delta;
- Review and apply remote sensing techniques to monitor water quality to assist in the reduction of water pollution.
- Monitor the quality of the drained water to the Mediterranean Sea in order to improve the Mediterranean Sea water quality.
- Recommend water quality indicators and classification schemes.

## Expected Outputs

- Maps showing indicative quality of the water in the Northern lakes and the Nile River delta.
- Detailed mapping of water quality parameters where quality problems exist.
- Recommendations regarding water quality improvements.

## **Technologies and Efficient Use of Water**

### **Autonomous desalination system of salted or brackish waters in rural areas, using renewable sources of energy (Jordan, Morocco, Tunisia)**

#### Context

Access to adequate resources for the rural populations of the south and east of the Mediterranean region allowing for potable water supply security, is one of the main factors of economic and social development.

One of the Mediterranean's characteristics is the development of an urban-rural fabric made up by groups of inhabitants often located close to large urban conurbations and lacking a potable water supply. This generates constraints often leading to social imbalances (rural exodus and lack of schooling, in particular for girls).

It is in this context that a pilot project, in the framework of the action plan adopted at the Euro Mediterranean Ministerial Conference in Turin (1999) allowed the development of a fresh water supply concept for rural areas produced from sea water or brackish water. This project (ADIRA<sup>2</sup>) has aided the establishment of solar powered desalination plants in four countries, (Cyprus, Jordan, Morocco and Turkey), although it is in Morocco that ADIRA has aided rural populations.

#### Project

Taking into account the results achieved with ADIRA, a veritable Mediterranean synergy in this sector is envisaged, by extending the application area of this type of autonomous desalination plant to other countries (Tunisia, Jordan, Egypt, etc.).

This kind of project is supported by a partnership in the framework of the "Barcelona Process: one Union for the Mediterranean", as it will permit the development of consolidated cooperation through the supply of technologies and concepts allowing the creation of these autonomous desalination plants.

This project will be initiated by a regional feasibility study that will carry out an inventory of these new concepts based on renewable energies and more particularly on solar energy.

Following this study, the identification of potential sites will start in each country and a priority creation period will be established. In the case of generalisation of the system, the country concerned will of course include it in its list of priorities.

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<sup>2</sup> Autonomous Desalination system concepts for seawater and brackish water In Rural Areas with renewable energies - Potentials, Technologies, Field experience, Socio-technical and Socioeconomic impacts –

Taking into account its importance, this project will be assisted and coordinated by a regional institution, supported by the departments concerned in each country in the region. An ad-hoc committee will have to be set-up to oversee the project.

#### Budget and Partners

A budget allocated to this kind of project would be around 35 M€; this project will generate macro-economic spin-offs for a large number of countries in the Mediterranean region. It may be initiated by Tunisia in collaboration with Morocco and Jordan.

The Mediterranean Water Institute (IME), as a regional centre for expertise and evaluation, may launch such a project to be taken responsibility for gradually by the countries in the region.

Recognition of the project would result in international financing, justified by its economic, human and environmental importance.

# **APPENDICES**

# First list of projects identified as examples on the issue of water

(FOR INFORMATION ONLY - NOT MEANT FOR ADOPTION  
PAPER PRESENTED BY FRANCE, JORDAN, GREECE, SPAIN, THE NETHERLANDS,  
EGYPT, and TURKEY)

## A. Financed and replicable projects

1. Adaptation to climate change
  - Agricultural techniques under plant cover (Tunisia)
2. Balance between supply and demand
  - Efficient management of agricultural water in the Jordan Valley (Jordan)
  - Joint management of the Northern Sahara aquifer (Algeria, Libya, Tunisia)
3. Conservation and rehabilitation of natural environments
  - Rehabilitation of the Korba Laguna by reusing treated wastewater (Tunisia)

## B. Projects to be finalised

1. Adaptation to climate change:
  - Assessment of hazardous impact of sea level rise in area of Nile Delta (Egypt)
  - Framework for intra- and Inter- Multistakeholder Cooperation for the promotion of Sustainable Development in the Mediterranean with emphasis on Water (covering all Mediterranean countries)
  - Cooperation on Climate Change Impact and Adaptation Studies in the Water Resources Sector (Egypt, region)
  - Climate Change Impact and Adaptation Studies for the Coastal Line and Deltas (Egypt, region)
2. Balance between supply and demand:
  - Installation of small desalinisation units using solar energy (Morocco, Tunisia, Jordan)

- Water saving in irrigation (Morocco)
- Reusing Greater Tunis' treated wastewater (Tunisia) (Horizon 2020 Programme's project)
- Rehabilitation of Southern Ghors Irrigation Project (Jordan)
- Improvement of Technical Applicability of Computational Means Compiling the Water Budget-Balancing and Allocation of the National Water Resources (Jordan)
- Implementation of a DSS (Jordan, Palestine and Israel)
- Reuse project Wadi Shalala. (Jordan)
- Utilization of Husban brackish water to Supply Amman (Jordan)
- Irrigation Improvement and Drainage Rehabilitation Projects (Egypt)

### 3. Conservation and rehabilitation of natural environments:

- Red Sea – Dead Sea transfer (Israel, Jordan, Palestinian Territories)
- Rehabilitation of the lower Jordan River System (Israel, Jordan, Palestinian Territories)
- Rehabilitating the Environment of the Yarmouk Basin and Suggesting Strategies for best Management and Optimal use of Yarmouk Water Resources. (Jordan, Palestine, Syria and Israel)

### 4. Depollution of the Mediterranean:

- Sanitation in Cairo (Egypt)/enlargement of the Gabal El Asfar waste water treatment plant and strengthening capacities of contracting authorities (Horizon 2020 Programme's project)
- Promotion of schemes minimising the impact of industrial waste (Morocco, Tunisia)
- Management of Water Resources to Reduce Pollution Risks (Jordan, Palestine and Israel)
- Sanitation (Morocco - National programme of environmental improvement in rural schools - and Turkey)
- Monitoring of Water Quality in the Northern Lakes and Nile River Branches through the application of Remote Sensing Technologies (Egypt)
- Improve and Enhance the Efficiency and Performance of the Nile Delta Northern Pump Stations (Egypt)

- Solar Energy Utilization for Energy Saving and Environmental protection (Egypt)

#### 5. Technologies and efficient use of water

- Seawater desalination (Tunisia, Morocco, Algeria)
- Water efficiency technology: irrigation modernization (Algeria)
- Technology transfer (experimental centre of non conventional treatment of waste water in small cities, Morocco)
- Establishment of a National Water Information System (Jordan, EMWIS member's)
- EU Mediterranean water initiative – Moving long-term water issues up the political agenda & strengthening water technology research and development capacity in the region (region)
- Capacity Building in Areas of IWRM, Water Quality, Information Systems, Climate Change and Monitoring (Egypt, region)
- Formulate a Permanent Joint Research Committee between the Euro-Med countries (Egypt, region)
- Institutional Reform (Egypt, region)

# PROVISIONAL PROGRAM

## Sunday 21 December 2008

08:30 - 16:45 **Civil Society day**

17:45 - 19:45 **Presentation of concrete projects**

## Sunday 22 December 2008

09:00 **Reception of participants**

09:30 **Inauguration session co-presided by Jordan, Egypt and France**

- Speech by Mr. Raed Abu Soud, Jordanian Minister of Water and Irrigation
- Speech by Mr. Mahmoud Abou Zeid, Egyptian Minister of Water Resources and Irrigation
- Speech by Mr. Jean-Louis Borloo, State Minister, French Minister of Ecology, Energy, Sustainable Development, and Town and Country Planning
- Speech by Mr. Stavros Dimas, Commissioner in charge of Environment, European Commission

10:30 **Group photo**

11:00 **Morning session – Water in the Mediterranean: a Strategy concerning Water in the Mediterranean**

12:30 **Lunch**

14:30 **Afternoon session – Water in the Mediterranean: practical projects**

15:30 **Adoption of the Ministerial Declaration**

15:45 **Closure session by the three Jordanian, Egyptian and French Ministers**

- Mr. Mahmoud Abou Zeid, Egyptian Minister of Water Resources and Irrigation
- Mr. Jean-Louis Borloo, State Minister, French Minister of Ecology, Energy, Sustainable Development, and Town and Country Planning
- Mr. Raed Abu Soud, Jordanian Minister of Water and Irrigation

16:15 - 16:45 **Press Conference**