



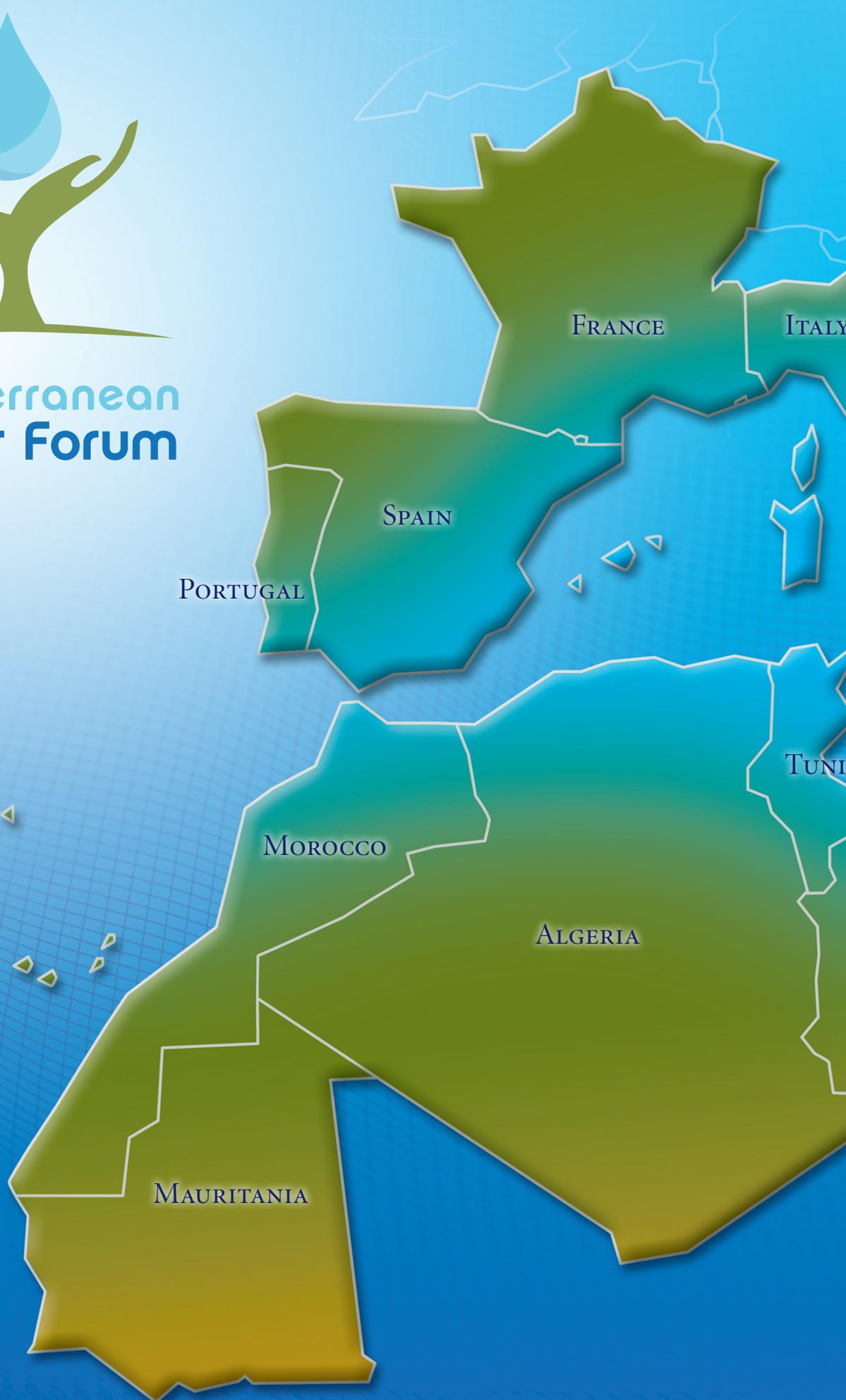
FIRST MEDITERRANEAN WATER FORUM
Marrakech, 19 - 20 December 2011

PROCEEDINGS





Mediterranean Water Forum





SLOVENIA

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BOSNIA

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ALBANIA

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TABLE OF CONTENT

1 Stakeholders Consultation in the Mediterranean	6
1.1 Panel of Decision-making bodies and Donors.....	7
1.2 Panel of Regional Networks.....	8
1.3 Panel of Networks and NGOs	9
2 Mediterranean priorities of the 6th World Water Forum	11
2.1 Improving water demand management.....	13
2.2 Promoting non-conventional water resources use	15
2.3 Improving water governance	17
2.4 Improving urban and industrial sanitation	18
3 Solutions and innovations on water management in the Mediterranean	21
3.1 Water demand management.....	22
3.1.1 Water demand Management in Jordan.....	22
3.1.2 The issue of drinking water network efficiency – Oujda city	24
3.2 Non conventional water resources	28
3.2.1 Allowing industrial growth while preserving water resources (OCP)	28
3.2.2 non conventional water resources in West Bank and in Gaza Trip.....	30
3.3 Water governance.....	32
3.3.1 Urban development/integrated water resources management plan in ‘Arghene’ basin.	32
3.3.2 Collaboration on Transboundary Water Resources Management.....	35
3.4 Urban and industrial waste water treatment.....	39
3.4.1 Industrial waste water management: the Tunisian experience	39
3.4.2 ONEP’s work in the wastewater and sanitation sector	41
4 Perspectives in the Mediterranean.....	44
4.1 Geopolitical and regional cooperation	45
4.2 Funding.....	46
5 Annexes	47

Introduction

The challenges represented by water in the Mediterranean region are a highly relevant focus of attention for all stakeholders.

As a result of its geographic, geo-climatic and geo-political specificity, the Mediterranean region has placed these challenges at the highest level of the agenda of its social, economic and environmental development policies.

In recent decades, water has been included in all the initiatives and cooperation programmes as well as exchanges of experiences and knowhow.

The first Mediterranean Water Forum was held on December 19th-20th, 2011 in Marrakech (Morocco), and its main objectives were:

- To set up a consultation process favourable to a mobilization of the Mediterranean water community
- To finalize the Mediterranean process towards the 6th World Water Forum (March 12th-17th, 2012).

A large number of representatives of different stakeholders from the Mediterranean water community were thus able to take part in the different working groups and panels organized within this framework.

The holding of this First Forum was financially supported by different national and regional stakeholders from the water community and in particular, by the State Secretariat for Water and the Environment of the Moroccan Ministry for Energy, Mines, Water and the Environment, the Provence-Alpes-Côte d'Azur Regional Council and the French Development Agency.

In conformity with the objectives of the Mediterranean Water Forum, the activities carried out during the opening and closing ceremonies and during the work groups were mainly related to the following purposes:

- Give a new impetus to the consultation and dialogue between water stakeholders in the region;
- Propose a coherent and federative approach for the four priority themes defined by the Mediterranean process for the 6th World Water Forum, namely:
 - Water demand management
 - Non-conventional water resources use
 - Water governance
 - Urban and industrial sanitation.

1 STAKEHOLDERS CONSULTATION IN THE MEDITERRANEAN

In order to initiate the thought process on the consolidation of dialogue and exchanges between all stakeholders in the Mediterranean Community, three panels of representatives of these stakeholder successively took place in the plenary session, namely:

- Decision-making bodies and donors
- Regional networks
- NGOs

1.1 PANEL OF DECISION-MAKING BODIES AND DONORS

Mr. André Flajolet, a French Parliamentarian, proposes to facilitate consultation through a framework of territorial coherence which will be followed by the setting up of a structural organization. This organization will be supported by intermediary structures with appropriate communication tools. This assembly relies upon an effective presence of civil society associated with other stakeholders to confront the different perspectives on the reality of the experiences and science. As an example, he proposes the Planning and Water Management Schemes (SDAGE) developed in France.

Mrs. Cécile Helle, Vice President of the Provence-Alpes-Côte d'Azur Regional Council (France) presents the experience of a regional model based on consultation with all stakeholders engaged in water issues. Based on a representative assessment of the situation regarding these issues in the region, Regional Conferences were launched. These Regional Conferences allowed all stakeholders to be mobilized in order to highlight the strengths and weaknesses of the management mechanism. The two-year assessment was that both the Mediterranean specificity of our region and the need to integrate this specificity into our way of understanding a management and water resources preservation model, may seem obvious at first (common culture/identity). However, over time, an observation has emerged, which is today recognized by all stakeholders, and which is considering that the spatial level represented by the region as a territory would appear to be the relevant level to launch the organization of this consultation.

Mr. Abdelmajid Benbiba, Director General for Water (Morocco), based on the Moroccan experience, proposes to define an appropriate framework bringing together all levels of consultation (local, regional and national).

At the level of the Mediterranean region, the consultation should be developed on this model and Morocco is willing to join an extended consultation project.

Mr. Philippe Guettier, representing the French Ministry of Ecology, notes the need to reinforce consultation between all stakeholders since the Mediterranean region currently possesses great vehicles which are: the Mediterranean Action Plan and the Union for the Mediterranean.

There are other initiatives such as EMWIS and the Mediterranean component of the European Union Water Initiative (MED EUWI). The statement that can be made is that consultation between stakeholders can be improved.

Mr. Maurice Bernard, Director of the Sustainable Development Department of the French Development Agency put forth the perspective of a development banking institution which finances infrastructure and management projects. This financing must be associated with measures to accompany the beneficiaries, namely national-level decision-makers who are forced to establish sustainable policies. One of the main catalysts that allows public policies to evolve is the capitalization and sharing of experiences.

The Mediterranean territory should be defined, since it is difficult to imagine a consultation taking in political decision makers with citizens from all over the region. The first stage of consultation is the one between all States; it is decisive for the definition of the coherence of the project on the Mediterranean territory. Subsequently should be the consultation between the stakeholders groups from all the countries.

1.2 PANEL OF REGIONAL NETWORKS

Mr. Michael Scoullou, President of GWP Med, wonders about the setting up of a new consultation framework. He presents an assessment of the role of civil society recalling that a network has existed since the Rio Summit in 1992 with balance between the north and south of the Mediterranean.

Through the environmental wing of this civil society integration process, networks such as ARLEM, EMWIS and MEDWET have been able to join. This synergy has been accompanied by Euro-Mediterranean programmes and initiatives (Horizon 2020, MED EUWI, etc.) and has been reinforced by networks of parliamentarians and journalists. He underscores however that further thought is required in order to facilitate the progress in consultation between stakeholders in the Mediterranean community.

Mr. Walter Mazzitti, President of EMWIS, confirms that a concrete evolution is necessary for the establishment of a consultation framework. This evolution could be achieved through a structural reform of current systems due to the absence of links between existing networks and political decision-making bodies. This reform applies first and foremost to the evolution of political frameworks represented both by the Barcelona Process and the Union for the Mediterranean. The integration of all civil society networks is essential in order to define a consultation framework aiming to reinforce dialogue and allow concerted decisions to be made on the main water-related questions.

The objectives of the Marseille Forum are to promote new ideas and solutions for water management. Without information, without knowledge, or culture, it is difficult to move forward. Some thought must be put into the drawing up of a Mediterranean white paper on water, based on reliable data which would be validated by the Forum.

This would be a first strong example of consultation on an essential theme providing knowledge and data for the future planning and sharing of water in the Mediterranean basin.

Mr. Antonio Guerreiro de Brito, President of MENBO, presents the Mediterranean specificity according to a principle of equitable allocation of water which responds to clearly defined frameworks, both on the legislative and regulatory levels, accompanied with technical knowhow for a sustainable management of water resources.

He underlines that consultation is necessary based on the existing situation, but an innovative mechanism is still pending to be found.

1.3 PANEL OF NETWORKS AND NGOS

Mr. Mohend Mahouche, representing WWF's Alps/Mediterranean office, insists on the quality of information that can help a stakeholder consultation to advance. Stakeholders are not all water experts, so a shared consultation should be drawn up in order to have them buy into it. Users are the most important stakeholders, and should be involved in the challenges over the medium and long terms for a greater buy-in on the choices of politicians at the local, regional and national levels.

Mr. Mohammed Benblidia, Honorary President of the Mediterranean Water Institute, underlines that this initiative, coordinated by IME, aims to be dynamic and unifying in order to consolidate the consultation between all stakeholders in the Mediterranean water community. There is some confusion over the term "Forum" which means both "platform" and "event". It is thus not a question of creating a new structure or duplicating the existing. This consultation must lead to a better coordination and to everyone being involved in the regional dialogue.

Mr. Hugues Ravenel, Director of Blue Plan, draws attention upon the need to be extremely cautious not to complicate the relationship between different stakeholders in the region. There are currently bodies that facilitate this consultation and which should evolve. For that purpose, the thought process must continue while associating all components of the Mediterranean community.

Mr. Nejib Benessaiah, Coordinator of MEDWET, insists upon the fact that it is not a question of creating a new structure based on the existing and that a more sustained consultation between decision makers, networks and institutions must be carried out.

Mr. Hachmi Kennou, Executive Director of IME, specifies that more light will be shed on this issue from discussion, rather than consultation. It is not a question of going back on more than forty years of achievements, since Stockholm then Dublin, with a commitment from civil society.

The idea of launching the Mediterranean Forum was born in the southern countries, the first proposals coming from Tunisia, Algeria, Morocco, Egypt and other countries from the east of the Mediterranean. Why did this consultation come about?

It is clear that the establishment of this forum initiative will take the necessary time. It will only be possible with the support of all. What is needed is to think in order to ensure that the southern and eastern countries appropriate new partnership and cooperation rules. Today, Europe is going through a crisis, as is also the case in southern countries.

For over 40 years, we have tried to build together, not just with the European Union, since on water issues this began with METAP and a certain number of projects funded regionally by other donors.

As part of the preparatory process for the 6th World Water Forum, an Organizing Committee for the Mediterranean cross-continental process was organized, bringing together networks, countries and donors in order to prepare the Mediterranean's participation. This committee will present and convene a certain number of sessions, and will take part in other specific sessions. A dialogue, bringing together parliamentarians, elected officials and decision makers, a specific Mediterranean session, joint sessions with donors (OECD) are also foreseen.

Within this committee, this unifying idea should continue without questioning the existing prerogatives (MEDWET, MENBO, EMWIS, the Euro-Mediterranean Irrigators Community, etc.). The thought process must be general in order to take a very strong message to Marseille. The southern countries should be led towards appropriating water-related challenges, just like the countries to the north of the Mediterranean.

2 MEDITERRANEAN PRIORITIES OF THE 6TH WORLD WATER FORUM

The Mediterranean region was present in all World Water Fora by its specificity in field of water in coherence with themes held for every forum.

The Mediterranean region will participate in the 6th World Forum of the Water which will be held in Marseille (12-17 Mars 2012), through a **Mediterranean Cross-Continental Process**. This Process which gathers all categories of stakeholders including decision-makers (Ministries, Parliamentarians, and Local and Regional Authorities), professionals (public and private), and representatives from civil society will enable the Mediterranean water community to identify and outline innovative and existing solutions to priority water issues, notably:

- Improving water demand management
- Promoting non-conventional water uses
- Improving water governance
- Improving urban and industrial sanitation

Preliminary priorities and targets were discussed and further developed in Regional Target Groups with the participation of selected stakeholders. Within the four aforementioned priority water issues, eight (8) regional Mediterranean targets were developed:

Regional Target MED 1.1: By 2015, each Mediterranean country has set its own national objectives for water use efficiency in the various using sectors and for water allocation between the different uses (productive and environmental) and defined (implemented) “efficiency plans” for achieving their short-, medium- and long-term objectives.

Regional Target MED 1.2: By 2015 (2020?), each Mediterranean country has set its own national objectives for improving the water productivity of rainfed and irrigated agriculture, in the framework of an integrated water and food-security strategy, and defined (implemented) measures for achieving their objectives in the short, medium and long term.

Regional Target MED 2.1: By 2015, to ensure that national water resources planning in all Mediterranean countries includes the contribution of non-conventional resources within the global water resources systems models and analysis. This planning should take into account the related possible effects on the environment, economy, health and energy.

Regional Target MED 2.2: By 2015 to develop a common regulatory framework for the Mediterranean area that considers the specific hydroclimatic features of the region, with its singular problems of scarcity and droughts in semiarid environments. This framework must integrate the contribution of non-conventional resources with the rest of supply and demand, structural and non-structural alternatives.

Regional Target MED 3.1: In the medium term (by 2020), every Mediterranean country - supported by multi-stakeholder national dialogues and in view of achieving cross-sectoral water resources management - has in place operational and applicable national IWRM Plans and Water Efficiency Strategies and has developed and/or substantially advanced river basin management plans, all of which are linked/align with National Development Strategies, National and/or Sectoral Financing Strategies, National Adaptation Plans and, where applicable,

National Integrated Coastal Zone Management Plans and International Agreements regarding the protection of transboundary water bodies

Regional Target MED 3.2: By 2020, every country has activated and implemented mechanisms for effective stakeholder participation throughout the different components of basin water resources management, and has in place a functioning articulation between central and decentralized levels.

Regional Target MED 4.1: By 2020, every Mediterranean country has established the technical and economic modalities for the discharge of industrial waste in the public sanitation systems.

Regional Target MED 4.2: By 2020, each Mediterranean country has defined a strategy of sustainable cost recovery (SCR) for sanitation services through the use of tariffs and fees, public subsidies and international financial assistance to ensure economical sustainability, equitable access for all and pollution control.

For each target a draft report was prepared which covered the context and issues around the target, a target action plan and commitments, solutions, recommendations and conclusions.

Within the framework of preparing solutions and recommendations, the First Mediterranean Water Forum was held on 19 and 20 December 2011 in Marrakech, Morocco. The Forum brought together the stakeholders of the Mediterranean Water Community, set up a platform of dialogue and exchange to strengthen cooperation on water issues, delivering strong and targeted messages and contribute to reaching the objectives for sustainable development of the region.

The dialogue and exchange of experiences and know-how was carried out by representatives from all water stakeholders in the Mediterranean in four thematic working groups, corresponding with the aforementioned priority areas. The working groups concentrated on finding practicable solutions for the achievement of the targets above.

2.1 IMPROVING WATER DEMAND MANAGEMENT

The Mediterranean region is confronted with an ever increasing water demand. Since the 1950s, total water demand has almost doubled and an additional increase of almost 20% is expected until the year 2025. The increase in water demand can only partly be covered by new development of fresh water resources. In particular in the southern and eastern parts of the Mediterranean, water resources are already exploited close to the maximum and the development of these water resources becomes increasingly expensive.

Moreover, the stress on the remaining water resources is further accentuated by climate change which is predicted to bring less rainfall to the Southern and Eastern Mediterranean areas.

Set against this background, water demand management becomes increasingly important. Recent studies indicate that about 40% of the presently used water resources are lost through leakage or inadequate use. Proper water demand management may cut such losses by half or more. Moreover, water demand management may open a wide spectrum of water saving measures, both in urban and in agricultural water use.

The Barcelona Convention has set a target of 25% water savings to be reached until the year 2025 and there is regional commitment, such as promoted by the 2005 Mediterranean Strategy for Sustainable Development, the Mediterranean component of the EU Water Initiative and the Marseille Centre for Mediterranean Integration « Environment and water » cluster. On the national level, targets are not always set and concrete solutions for their implementation still pending.

Regional Target MED 2.1 gives particular emphasis to water savings in agriculture. Irrigated agriculture is by far the largest consumer of fresh water resources in the Mediterranean region. However, where in urban water use water saving is largely a technical-organisational-economic issue, water savings in agriculture are intrinsically complex and solutions can only lay in holistic approaches to agricultural water use that include all socio-economic, financing, marketing and even cultural aspects of farming. A global Mediterranean vision on water and agriculture, including rain-fed and irrigated agriculture, is long overdue and would be an important guiding document for policy making.

During the working group sessions of the First Mediterranean Water Forum, a number of solutions/actions were discussed to bring water demand management forward and give it a more prominent place on the agenda of the decision-makers. These are:

On the level of water users:

- Promotion of water saving behaviour (Examples: Cyprus, Tunisia SONEDE, Morocco ONEP, Jordan IDARA)
- Promotion of water saving equipment (Examples: Jordan IDARA, Spain)
- Improvement of agricultural practices and field water management (Example: Morocco PNEEI)
- Optimisation of industrial processes (Example: Morocco OCP)

On the level of water supply services:

- Rehabilitation and improvement of irrigation conveyance systems and bring them under pressure (Examples: Jordan Valley, Morocco PNEEI)
- Rehabilitation of urban networks and reduce their losses (Examples: Algeria/Algiers, Jordan/Aqaba)
- Introduction of cost recovery and adaptation of tariffs where needed (Examples: Tunisia/irrigation water, Rabat/Casablanca/urban water supply)

On the local level:

- Encouragement of participatory management and introduction of regulation to control the overexploitation of aquifers (Examples: Jordan Highland Water Forum and Morocco Souss-Massa)
- Encouragement of intersectoral water transfers (wastewater reuse in agriculture, desalinated water for urban water supply)
- Improvement of information systems for a better knowledge of water resources and water uses

- Upgrading of tools for inter-sectoral water management, also taking into account the needs of ecosystems (Example: French Water Agency RMC)
- Implementation of cost-effectiveness approaches on a river basin scale (Example: Spain/Guadalquivir)
- Improvement of rainwater management (water and soil conservation; retention of rainwater) (Example: Tunisia)

On the national level:

- Institutional reinforcement of WDM with gradual and consistent implementation of improvement measures (Examples: Jordan/WDM Unit, Israel/National Plan for the Improvement of Water Efficiency, Tunisia)
- Creation of financial incentives to improve the added value per cubic meter of water and reduce the water footprint (to be further developed)

On the regional level:

- Introduction of benchmarking and exchange of good practices (Example: CMI programme of WDM including a chapter on the economy of WDM)

2.2 PROMOTING NON-CONVENTIONAL WATER RESOURCES USE

Non-conventional water resources include desalination, the use of treated wastewater, the use of treated grey water and rainwater harvesting. Of these, the first two are direct resources that can be developed more or less the traditional way and are most important in terms of quantity and economic value. Rainwater harvesting in the sense of improving rain-fed agriculture should however not be underestimated in socio-economic terms and get sufficient attention. Where natural renewable fresh water resources become exhausted because of population growth and food production needs, the use of non-conventional water resources becomes, next to water demand management, the only sustainable possibility for reduce actual and future imbalance between demand and supply.

Under this perspective, the use of non-conventional water resources becomes of strategic importance throughout the Mediterranean, which enforces and underlines the need for short- and medium-term shared perspectives and commitments between regions and countries.

With abundant saline and brackish water available throughout the region and the costs of the desalination process now reduced to less than 40 Eurocents per cubic meter, desalination seems to be an attractive option. However, desalination is energy intensive (which may increase its costs in future) and environmental problems around desalination (scaling agents, brine disposal, effects on the marine ecosystems in the vicinity of desalination plants) have not yet been solved. Desalinated water is not generally used for irrigated agriculture as mixing may be required and long-term effects on soil quality are still not clear. Desalination is therefore, although an important source for water supply, not a panacea for all water problems.

The use of treated wastewater is already a large scale solution in a number of densely populated arid/semi-arid countries such as Israel and Jordan. Theoretically 80% of water used in urban water supply can be recovered and used again in agriculture, landscaping and for industrial process water. In terms of costs it can easily compete with desalination. However, in most countries, the use of treated wastewater is largely unplanned, with discrepancies between actual treatment and the quality required for the intended use. Treated wastewater is mainly used for agriculture, but the interest for urban landscaping and use as industrial process water is growing. Different from the use of desalinated water, the use of treated wastewater needs strong quality regulation and control. It is further encouraged by the simultaneous positive environmental impact which comes along with the treatment of urban and industrial wastewater.

The use of both desalinated water and treated wastewater needs to be fully integrated in the inter-sectoral planning of water resources uses with a full range of alternatives that will be evaluated on its socioeconomic and environmental impacts. Only then, development of non-conventional water resources can be efficiently implemented. The harvesting of rainwater through improvement of rain-fed agriculture is equally important as an option to generate more water resources, in particular in the light of increasing concerns about food security, and should get equal attention in water resources management.

Its development is however placed in a completely different context, within a holistic approach for agricultural development, fully integrated with water demand management in agriculture.

During the working group sessions of the First Mediterranean Water Forum, a number of solutions/actions were discussed to stimulate the use of non-conventional water resources and integrate it fully in the planning processes. Three solutions were chosen as priorities for implementation:

1. The development of water resources management plans which include non-conventional water resources must follow all the necessary steps, such as previous global design, political commitment, user's acceptance and technological, financial, legal framework, environmental and institutional issues. The General Plan for Sewerage and Wastewater Treatment of the Region of Murcia, 2001-2010, can serve as an example that has accomplished successfully these conditions. It could also be the base on which common guidelines to develop water resources management plans and legal frameworks for the Mediterranean Region can be developed.
2. The development of Mediterranean Guidelines for reuse of treated wastewater that contemplate the technical, sanitary, social, environmental, economic and regulatory aspects is mandatory in order to achieve a rational implementation of using non-conventional water resources. The "Guidelines to better use of treated wastewater", developed by CMI is a regional synthesis of various studies and articles about the implementation of treated wastewater reuse projects, including cost-benefit analysis. This survey should be taken into account as a reference for a better approach towards implementation of non-conventional water use.
3. Global approaches of water management must include non-conventional water resources.

Throughout the Mediterranean, there are many references that could be considered as pilot projects. As an example, the global approach of the Office Cherifien des Phosphates (OCP) in Morocco to its water consumption include: Improving its process to decrease the amount of water used, recycling the water use in the process and reusing the treated wastewater of the domestic wastewater treatment plant of Khourigba.

2.3 IMPROVING WATER GOVERNANCE

Water governance refers to the range of political, social, economic, and administrative systems that are in place to develop, manage and conserve water resources and the delivery of water services at different levels of society. It comprises the mechanisms, processes, and institutions through which all involved stakeholders, including citizens and interest groups, articulate their priorities, exercise their legal rights, meet their obligations and mediate their differences.

Water governance has four main inter-related and poverty-centered dimensions. The social dimension points to equitable use of water resources; the environmental sustainability dimension shows that improved governance allows for sustainable use of water resources & ecosystem integrity; the economic dimension draws attention to the efficient use of water resources & the role of water in overall economic growth; and the political empowerment dimension points at granting water stakeholders and citizens equal democratic opportunities to influence and monitor political processes and outcomes.

Despite country variations, most water reforms (on-going and planned) in the Mediterranean region include promoting and implementing IWRM principles; watershed, transboundary & ICZM management approaches; clarifying the institutional & legislative framework; consolidating and strengthening stakeholder participation; managing water at the appropriate institutional level, addressing climate change considerations (adaptation & mitigation); incorporating national development priorities; and promoting financing innovations. Although all these aspects are included in the programmes of each individual country, the complexity of the water issue in each Mediterranean country does not allow for a solution for all.

Special attention deserves the involvement of stakeholders in the governance process. Because of strong and rapid changes related to population growth and climate changes, and therefore escalating water scarcity, quality and flood risks problems, the political and social dimension of water management becomes increasingly more important and water management becomes every time more complex. It is therefore crucial that stakeholders join forces and find together the best way to manage their water resources.

During the working group sessions of the First Mediterranean Water Forum, a number of solutions/recommendations/actions were discussed to improve governance.

These include:

General solutions for improving Water Governance

- Extensive knowledge sharing and exchange of good and bad examples

- Management of water at catchment and river basin level
- Strengthening of the role of wetlands as natural infrastructure/ecosystem approach
- Stimulation and support of local water governance
- Establishment of a Mediterranean Water Governance Task Force to foster bench learning of water governance in Mediterranean Countries

Solutions that concern guidelines and principles for IWRM Plans and Strategies

- Plans and Strategies should be integrative and cross-sectoral so as to address multiplicity of needs and objectives
- Taking stock of regional and international experiences that have a replication potential in the Mediterranean context
- Plans and Strategies should be developed on a case-by-case basis to respect country contexts through policy dialogues
- Due consideration should be given to issues of good governance, water as a human right, equity.....

Solutions that concern the implementation of adequate means of participation

- Options of decentralisation, delegation of responsibilities and public-private partnerships need to be carefully investigated and brought forward when considered to be adequate.
- More coordination and dialogue is needed on all government levels
- Empowerment of water users and their participation in decision-making needs an intensive process of capacity building
- Knowledge management and information sharing on participatory approaches needs to be enhanced
- Further innovation in participatory approaches is needed

2.4 IMPROVING URBAN AND INDUSTRIAL SANITATION

The Mediterranean coast houses a population of more than 100 million inhabitants and 200 million tourists every year, but also numerous manufacturers, among which more than 200 petrochemical complexes but also traditional mining companies, classical textile companies, fertilizers, chemistry, cement companies, agro-food companies, surface finishing and finally traditional companies such as tanneries, oil mills, canneries and breweries. The pollution caused by these human activities, with waste discharges often untreated, puts a heavy burden on the environment of the Mediterranean Sea and the adjacent coastal zones.

Within the framework of the Barcelona Convention, the Mediterranean countries committed to treat 80% of the human pollution which finds its way to the Mediterranean. If considerable efforts have been made from the perspective of urban sanitation, industrial sanitation remains the greatest challenge to be overcome in order to reach this objective of cleaning up the Mediterranean.

Whereas domestic waste in most countries has been the subject of a defined strategy for public sanitation and substantial means have been mobilized, industrial waste often remains a problem, which treatment options are poorly defined, at the institutional, technical and financial levels. The multiplicity of actors, variability of effluents, lack of funding and capacity are one of the reasons of this situation.

The disposal of both urban and industrial waste is capital intensive and depends on long-term borrowing against future revenue streams. In practically all Mediterranean countries, waste and wastewater disposal is underfinanced and moreover faces huge financing needs over the next decades. Tariffs remain (politically motivated) low and do not cover running costs. As a result, existing systems are badly maintained; services are often failing and cannot be extended to those without access to these services. In order to close this financing gap, costs need to be minimised and additional funds need to be raised.

During the working group sessions of the First Mediterranean Water Forum, a number of solutions/actions were discussed to stimulate the improvement of urban and industrial sanitation. The following solutions were chosen as priorities for implementation:

With regard to industrial waste management:

- In each Mediterranean country, the institutional framework needs to be strengthened by defining which body is in charge of authorizing wastewater discharge and implementing a control mechanism of industrial wastewater quality (Example: Spain)
- The Operation & Maintenance of industrial wastewater treatment must be financed applying the polluter-pays principle, combining incentives and sanctions, distinguishing between big and small industries (Example: Agence de l'Eau Rhône Méditerranée Corse)
- The separation and collection of toxic industrial waste and its independent disposal should be promoted (Example: RADEEF, Fes, Morocco)
- In each concession area, an inventory should be made of industrial pollution, industrial pollution should be evaluated and options for separate treatment of industrial wastewater should be investigated (Example: ONAS, Tunisia)
- Industrial de-pollution should be accelerated by industrial environmental funds and technical support of relevant state agencies (Example: FODEP, Morocco; ONEP, Morocco)

With regard to financial aspects:

- A clear regulatory and institutional framework needs to be set up that defines responsibilities and means; who is responsible for de-polluting, financing, invoicing and control/police. Financing means should include transfers from different government levels or between sectors (e.g. energy, water)
- Incentives should be provided to reduce pollutant discharges; these could include output oriented grants or loans with economic added value for the beneficiary
- An effective police and invoicing system should be established
- The global cost of sanitation should be reduced by implementing simple technologies that are easy to operate and maintain

- Sustainable costs recovery schemes that are acceptable for developing countries include a model in which tariffs cover operation and maintenance, and investment (new and rehabilitation) costs are covered by taxes and transfers.
- A fair tariff structure needs to be implemented, taking into account the affordability (ability to and willingness to pay)
- Investigate the options to generate new revenues (reuse waste water & sludge, energy production). For wastewater reuse, socio-economic studies are necessary to assess feasibility
- Introduction of payment for ecosystem, ecotax, environmental tax

The First Mediterranean Water Forum produced a number of viable solution proposals which are summarized in this synthesis paper and need to be further discussed during the 6th World Water Forum in March 2012 in Marseille.

3 SOLUTIONS AND INNOVATIONS ON WATER MANAGEMENT IN THE MEDITERRANEAN

3.1 WATER DEMAND MANAGEMENT

3.1.1 WATER DEMAND MANAGEMENT IN JORDAN

By Mrs Nisreen S. Haddadin, Director, Water Demand Management Unit, Ministry of Water and Irrigation

Jordan is considered to be one of the poorest countries worldwide in water resources, available water resources per capita is very low at a level of 145 m³/capita/year compared to international standards of 1000 m³/capita/year, competition between demands on limited fresh water quantities is ever increasing. The expanding population with high growth rate aggravated with problems associated with growth shocks, due to sudden influx of refugees and the climatic and topographical conditions of the country have caused enormous pressure on the limited water resources and created a severe water supply-demand imbalance. Jordan's water problems have been further compounded by the fact that most of its water resources are shared with neighbouring countries.

Current approaches towards water resources management tend to be "supply driven"; meaning that whenever there is a shortage, the solution usually involves the capital investment in new water supply projects. A shift from the traditional supply orientated approach towards one of water conservation and demand management is essential for the sustainability of water resources and the environment, as well as economic efficiency and social development.

In order to address some of Jordan's water problems, the Royal Commission for Water developed a high-level water strategy, entitled 'Water for Life', that outlined sectoral goals and approaches on institutional reform, irrigation efficiency, reclaimed water, and alternative water resources. And in 2008, a national WDM policy was approved with the aim of maximum utilization and minimum waste of water, and promotes effective water use efficiency and water conservation, for social and economic development and environmental protection. Sustained implementation of this water demand management policy will generate water savings that will be an important source of additional water to help bridge the gap between supply and demand and advance economic growth and social development.

The Water Demand Management Policy addresses the management of water demands in all sectors of Jordan's economy including municipalities, industry, tourism, agriculture and other activities of national importance.

The Ministry of Water and Irrigation established the Water Demand Management Unit (WDMU) in 2002, with the stated responsibility to formulate policy, propose and develop programs, and oversee the effectiveness of the various institutions in the Kingdom of Jordan regarding Water Demand Management.

MWI has also been collaborating with IDARA “Instituting Water Demand Management in Jordan” a USAID Funded project on several activities:

- Development of water use efficiency tracking tool and demand forecasting model for the three water utilities; Miyahuna Water Company, Yarmouk Water Company, Aqaba Water Company, and WDMU and the development of Five-Year Efficiency Plans for these water utilities.
- Preparation of a new Water and Sanitation Plumbing Code that includes national technical regulations for the recommended water use specifications and sanitation for plumbing fixtures such as faucets, toilets, and showerheads as well as appliances.
- Establishment of a water-efficiency laboratory at the Royal Scientific Society to test the locally manufactured and imported water and sanitation plumbing fixtures and appliances for compliance with JSMO standards that save you water, energy, and money.
- Creation of Master Plumber certification and training program that provides plumbers with the qualification and capacity building for installation of water-efficient fixtures, appliances and equipment in your existing or new facility according to the new plumbing code instructions.

The WDMU has worked also Integration of water and energy efficiency criteria into the King Abdullah II Center for Excellence (KACE) award for public and private sectors and the Integration of water-wise landscaping into the curriculums of German Jordan University, Jordan University, and Jordan University for Science and Technology. In addition, the establishment and/or renovation of six municipality parks were based on “Water Wise Landscape” concepts and techniques.

A menu of best management practices was prepared for each water-use category to make efficient use of supplied water and benefit from water saving. The water efficiency best management practices are presented in six guides covering the residential, health, and tourism sectors, high rises, office buildings, and landscaping, as well as a guide for communication.

3.1.2 THE ISSUE OF DRINKING WATER NETWORK EFFICIENCY – OUJDA CITY

By Rachid Benchikhi, General Director of RADEEO - Morocco

1. Foreword

The *Régie de Distribution d'Eau et d'Electricité d'Oujda* (RADEEO, Oujda's water and electricity supply authority) is a Moroccan public company whose main role is to sustainably contribute to the health and well-being of the public and protect the environment via five priorities:

- Ensure the security of the city's drinking water supply,
- Ensure the long-term maintenance of the existing facilities and ensure water conservation,
- Extend drinking water supply and sanitation services,
- Collect and treat wastewater to protect the environment,
- Provide local contact and high-quality services for the population.

Currently, RADEEO mobilises 26 million m³ of drinking water to supply over 500,000 inhabitants. Every day, it operates and maintains 2,630 km of drinking water and sewage pipes, 11 reservoirs totalling 51,750 m³, a wastewater treatment plant with a daily capacity of 40,000 m³, 5 wastewater pumping stations with a combined flow rate of approximately 1.8 m³/s and 191,000 connections to the drinking water and sewage networks.

2. The issue of drinking water network efficiency

Prior to 2008, the overall efficiency rate (commercial efficiency = 1 – proportion of unbilled water) of the drinking water network in Oujda city had never exceeded 53% for over 20 years. RADEEO gave an international Consulting Engineer the task of auditing network operation with the aim of diagnosing this problem and specifying a five-year action plan to increase the efficiency rate. In 2008, the baseline year for the audit, it was 51.6 %.



Bilan volumétrique et conséquences économiques 2008 (année de base)



Eaux mobilisées (Mm3)	26.12
Eaux facturées (Mm3)	13.48
ENF(Mm3)	12.64
Economie potentielle par rapport à un rendement de 70% : 6.8 Mm3	24.3 MDH (2.2 M€)/an (>10% des charges d'exploitation)
Economie potentielle par rapport à un rendement de 80% : 9.3 Mm3	33 MDH (3 M€)/an (>15% des charges d'exploitation)

Translation of above picture

Rendement du réseau (%)	Network efficiency (%)
Volume facturé / volume produit	Billed volume / volume produced
ILP (m ³ /Km/j)	Linear loss index (m ³ /km/day)
ENF/linéaire réseau/j	Unbilled water/pipe length/day
Bilan volumétrique et conséquences économiques 2008 (année de base)	Volume balance and economic impact in 2008 (baseline year)
Eaux mobilisées (Mm3)	Mobilised water volume (million m3)
Eaux facturées (Mm3)	Billed water volume (million m3)
ENF (Mm3)	Unbilled water volume (million m3)
Economie potentielle par rapport à un rendement de 70%: 6.8 Mm3	Potential saving for an efficiency of 70%: 6.8 million m3
24.3 MDH (2.2 M€)/an (>10% des charges d'exploitation)	24.3m Dirhams (€2.2m)/year (over 10% of operating costs)
Economie potentielle par rapport à un rendement de 80%: 9.3 Mm3	Potential saving for an efficiency of 80%: 9.3 million m3
33 MDH (3 M€)/an (>15% des charges d'exploitation)	33m Dirhams (€3m)/year (over 15% of operating costs)

3. Strategy for increasing the efficiency of the drinking water network

3.1 Volume balance and water demand in 2008 (baseline year)

Input 26.12 million m3 (100%)	Authorised consumption 13.48 (51.6%)	Billed authorised consumption 13.43 million m3 (51.4%)	Billed and measured 13.43 (51.4%)	Billed water 13.43 (51.4%)
			Billed and unmeasured 0	
		Unbilled authorised consumption 0.05 (0.2%)	Unbilled and measured 0.025 (0.1%)	Unbilled water 12.69 (48.6%)
		Unbilled and unmeasured 0.025 (0.1%)		
	Losses 12.64 (48.4%)	Commercial losses 2.35 (9%)	Unauthorised consumption 0.2 (0.8%)	
			Metering losses 2.15 (8.2%)	
	Physical losses 10.29 (39.4%)			

3.2 The diagnosis

- Insufficient pipe lengths inspected for invisible leaks,
- 47% of leaks are found on service lines, 48% at meters and 5% on pipes. It should also be noted that 25% of leaks represent 80% of leakage volume,
- The network renewal strategy is inadequate (less than 1% for pipes and less than 1.5% for service lines),
- Corrosive water in some areas, damaging the pipes and ancillary components,
- Malfunctions and failures in the IT systems,
- Malfunctions and failures in network management,
- Under-metering, with a significant proportion (over 2%) of jammed meters,
- Fraudulent behaviour of certain customers in the absence of a rigorous monitoring policy.



3.3 Actions undertaken by RADEEO (2009-2015)

- Preliminary actions (2009-2011)
 - Reduction of billing delays and anomalies,
 - Improvements to customer meter reading and to the remote reading of zone meters, and systematic replacement of faulty meters,
 - Pressure modulation and suitable simplified zoning,
 - Intensification and optimisation of leakage detection and fraud prevention.
- Planned actions regarding infrastructure (2012-2015)

In the context of a funding contract signed with the French Development Agency in July 2010, RADEEO plans to implement the following priority actions between 2012 and 2015:

- Increase the pipe renewal rate (128 km, which is over 8% of the network),
- Make up for accumulated delays in the renewal of old customer meters (60,000 meters, which is 50% of the total), and redesign of large meters,
- Renewal and bringing up to standards of defective service lines,
- Improved leakage detection and repair (400 km/year checked, which is 25% of the network),
- Installation of a geo-referenced geographic information system (GIS) for the network, interfaced with remote meter reading.

4. Programme content and its impact on efficiency improvement (2011-2015)

Description	Montant en DH TTC
1. Audit de gestion et d'exploitation du réseau d'alimentation en eau potable	1,20
2. Renouvellement réseau d'eau potable (128Km - >8% réseau)	83,64
3. Reconditionnement et restructuration réseau	3,42
4. Renouvellement compteurs (60 000 cpts – 50% parc cpts)	33,84
5. Détection et réparation de fuite (400Km/an – 25% réseau)	9,72
6. Mise en place de la 2 ^{ème} tranche de télégestion	8,04
7. Système d'information géographique (SIG)	2,40
8. Assistance de maîtrise d'œuvre	9,24
TOTAL TTC	151,50 (13.8 M€)
Financement AFD	110,00 (10 M€)
Financement RADEEO	41,50



Les actions (2009-2015) permettront une économie cumulée d'eau de **15 Mm3** égale à la consommation de la ville d'Oujda (500 000 hab)

Translation of above picture

Description	Description of action
Montant en DH TTC	Cost in millions of Dirhams (including all taxes)
Audit de gestion et d'exploitation du réseau d'alimentation en eau potable	Audit of the management and operation of the drinking water supply network
Renouvellement réseau d'eau potable (128Km -> 8% réseau)	Drinking water network renewal (128 km, which is over 8% of the network)
Reconditionnement et restructuration réseau	Network reconditioning and restructuring
Renouvellement compteurs (60 000 cpts – 50% parc cpts)	Replacement of meters (60,000 units, 50% of total)
Détection et réparation de fuite (400Km/an – 25% réseau)	Leakage detection and repair (400 km/year – 25% of network)
Mise en place de la 2 ^{ème} tranche de télégestion	Installation of the second phase of remote management
Système d'information géographique (SIG)	Geographic information system (GIS)
Assistance de maîtrise d'oeuvre	Project management assistance
TOTAL TTC	TOTAL (INCLUDING ALL TAXES)
Financement AFD	AFD funding
Financement RADEEO	RADEEO funding
Objectifs de rendement	Efficiency targets
Economie	Saving
7 Mm3 : 24,7 MDH (2,3 M€)	7 million m3: 24.7m Dirhams (€2.2m)
Les actions (2009-2015) permettront une économie cumulée d'eau de 15 Mm3 égale à la consommation de la ville d'Oujda (500 000 hab)	The actions between 2009 and 2015 will save a total of 15 million m3 of water, equal to the consumption of Oujda city (500,000 inhabitants)

3.2 NON CONVENTIONAL WATER RESOURCES

3.2.1 ALLOWING INDUSTRIAL GROWTH WHILE PRESERVING WATER RESOURCES (OCP)

By M. El Moutaoikkil El Baraka, Director of Industrial Development, Operations Department – OCP SA (Morocco)

With over 90 years experience in mining and 45 years in chemicals, OCP is one of the global leaders in the phosphate and derivatives market.

Within the framework of its industrial development policy aiming at a near doubling of its mining capacity and a tripling of its chemical processing capacity, OCP has chosen to make sustainable development an important resource for increased competitiveness. At the heart of this policy, the Water Strategy allows the achievement of industrial growth objectives while preserving water resources. Thus, to better manage its water needs- an essential resource for its activity- , OCP has developed an innovative approach to the integrated management of its water needs by implementing a strategy based on three levers:

1. *Optimizing water use throughout the value chain*

- In the mining facilities: a 20% reduction of water consumption per ton of enriched rock thanks to:
 - A better recovery of water from the sludge treatment process
 - A better draining of the humidity of washed phosphate
- In the chemical facilities: a 25% à 30% reduction of the specific water consumption of phosphoric acid production units thanks to the adoption of the latest techniques enabling process water recycling.
- In the transport: a saving of nearly 3 million m³ of water thanks to the Khouribga-Jorf Lasfar pipeline. Indeed, transporting wet phosphate from the washing plants over the pipeline, instead of by railroad, will save water and energy (no drying at the mine and re-moisturizing when reaching the chemical plant for processing as required for transport by train). This hydraulic mode of transport is ecological as the pulp is being driven down the pipeline by sheer gravity, enabling the integrality of the water used for its transport to be reused for its processing at the chemical units.

2. *Reducing or abandoning the tapping of groundwater by setting up projects to replace it with surface water.*

The preservation of underground water reserves is one of OCP's main priorities; the Group will abandon its current tapping of groundwater in Tadla and Bahira by 2020. To meet the industrial water needs of its mining zones (washing phosphate and transport by pipeline etc.) and compensate for the deficit associated with this conservation measure, OCP uses water upstream from the Oum Er-Rbia Basin. Moreover, it reduces the evaporation and infiltration losses caused by the tapping downstream.

It also fits within a modified industrial process, where the washing plant is now enriching and preparing the ore for transport directly on the mining site.

Two projects within OCP's Water strategy will enable the Group to meet the industrial needs of its three mining sites through the adduction of surface water from Ait Messaoud and Al Massira dams.

3. *Mobilizing non-conventional resources, through seawater desalination units and sewage treatment plants*

- Industrial urban wastewater reuse :

OCP is investing in used water recycling to further develop raw phosphate processing and enrichment. Mining cities such as Khouribga, Youssoufia and Benguerir will thus have their wastewater collected and treated to supply the Group's washing plants. In total, three sewage treatment plants will enable the reuse of over 10 million m³/year of wastewater (20% of which will be used for watering green spaces in the upcoming Mohammed VI Green City to be built in the Benguerir area).



Wastewater treatment plant in Khouribga: First industrial reuse of urban wastewater in Africa

- Use of desalinated seawater :

To meet the water needs of its chemical plants, OCP plans to build new seawater desalination units and take advantage of surplus power generated by these units using

the reverse osmosis process. OCP is familiar with this fresh water production process because it has been using it since 2005 in its unit in Laâyoune. The two upcoming desalination units of Jorf Lasfar and Safi will eventually produce 100 million m³/year of fresh water (15 million m³ of which will meet the needs in drinkable water of the city of El Jadida).

By working hand in hand with the local authorities, Hydraulic Agencies and the National Office of Drinking Water, OCP spares no efforts to preserve natural water resources.

3.2.2 NON CONVENTIONAL WATER RESOURCES IN WEST BANK AND IN GAZA TRIP

By Mr Rebhi El Sheikh, Deputy Director Palestinian Water Authority (PWA)

Abstract

The groundwater is the main source of fresh water at the present time which is being massively over pumped in Gaza and the aquifer is showing clear signs of imminent failure or collapse while limited accessibility to water resources is encountered in the West Bank since Israel is seizing more than 90% of those resources. Generally speaking that in order to maintain the water balance to the positive condition and to fulfil the domestic water demand in terms of quality and quantity, a new water resource should be introduced into the water sector as soon as possible. Those new water resources will relief stress on the aquifer and prevent further deterioration of its water quality.

The annual sustainable yield of the aquifer within the geographical boundary of Gaza is widely quoted as 55 MCM/y. Recent rates of pumping from the aquifer are estimated at 170 MCM/year. Further very small volumes arise from several scattered desalination facilities in Gaza but these are currently insignificant at the strategic level.

In addition a 600 m³/d Sea Water Desalination plant had been built in the Middle area of Gaza and will be expanded soon to 2700 m³/day capacity. Moreover, Five Brackish water desalination plants operated by the Municipal Departments also exist and produce in total around 3,000 m³/d.

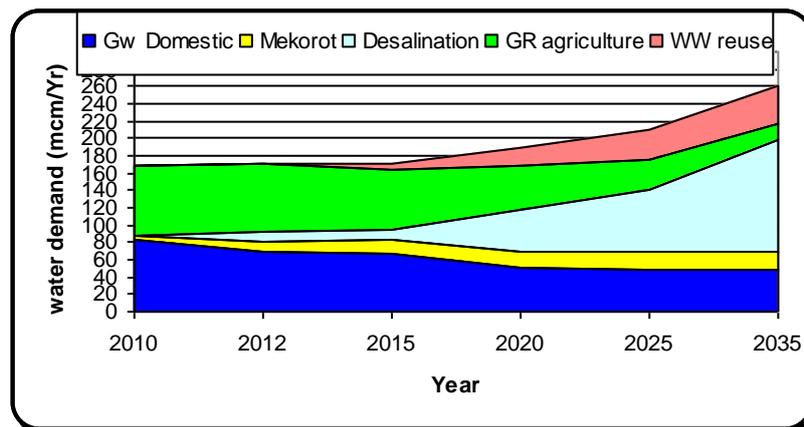
In the current context, the Palestinian Water Authority (PWA) feels strongly that the groundwater abstraction rates must be reduced as a first priority. PWA is currently developing in Gaza both Short Term Low Volume Desalination (STLV) with capacity of 13 MCM/y in the coming two years and the central desalination component with a first phase capacity of 55 MCM in its medium term; both relying on sea water desalination. A second facility of 22 MCM/y would be required shortly after the year 2020. Pilot brackish water desalination plants have been implemented as well in the West Bank. PWA is planning to utilize brackish water desalination from both the brackish water wells and the springs in the order of 33 MCM/y capacity in the Jordan Valley. This plan implementation has been interrupted by the Israeli side since they consider it a component to be resolved in the final negotiations.

Wastewater reuse is envisaged primarily as a means to support the agricultural sector. The reuse of wastewater was flagged against the Social criterion, due to the previous controversy amongst farmers in Palestine relating to the social acceptability of this practice.

However, recent experience in small pilot reuse projects has shown that wastewater reuse is an acceptable technique in the agricultural sector, and the option was therefore deemed to pass the Social criterion.

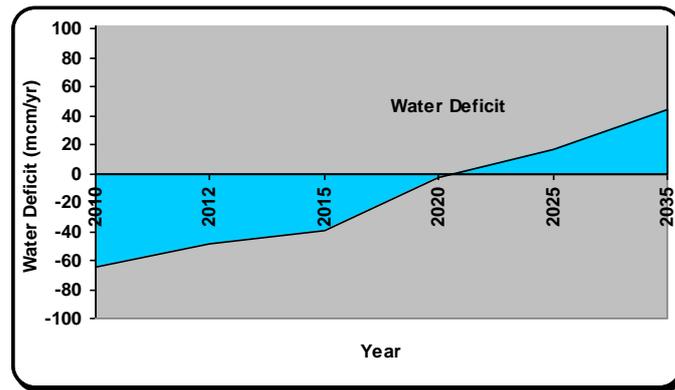
Pilot wastewater reuse schemes have existed for some years, and there are plans for these to be augmented shortly. The key requirement, however, is for the completion of the three major wastewater treatment plants scattered throughout Gaza, and thirteen in the West Bank; as reuse cannot be introduced at any significant scale in the absence of high-quality wastewater treatment. The Palestinian Water Authority (PWA) is currently developing a 35,000 m³/day recovery and reuse system matching with the advancements in construction of North Gaza Wastewater treatment plant which effluent shall cope with direct reuse and infiltration

The total seawater desalination quantity in conjunction with Mekorot water supply and wastewater reuse will be able to cover completely the domestic water demand (D&I) compatible with WHO standard in terms of quantity and quality.



Water Demand Management in Gaza

With the option to construct large seawater RO desalination plant, the aquifer over drafting will decrease. As a result, it is expected that seawater will be pushed back (transgression) toward the sea preventing further deterioration of the aquifer water quality. Ultimately, an approximation of about 40mcm/y-aquifer water balance will be maintained in the coastal aquifer of Gaza starting by year 2022.



Water Balance in Gaza

3.3 WATER GOVERNANCE

3.3.1 URBAN DEVELOPMENT/INTEGRATED WATER RESOURCES MANAGEMENT PLAN IN 'ARGHENE' BASIN

The *Schéma d'Aménagement et de Gestion Intégrée de l'Eau du Bassin Hydraulique d'Arghene* (SAGIE, Urban development and integrated water resources management plan in 'Arghene' basin), is a Franco-Moroccan co-operation project whose purpose is to organise integrated water management for the Oued Arghene catchment basin, which flows into the Oued Souss. It aims to pass on French experience in the successful management of sub-catchment basins.

The project involves an operating zone that principally extends over three (3) municipalities in the province of Taroudant (Freija, Arazan and Toughmart) and secondarily over the municipality of Azaghar N'ris which is at the source of the Oued Arghene. The area studied has a population of 14,000 and a surface area of 1000 km².

The SAGIE project is in line with the objective of *Programme de Développement et d'Aménagement Intégré des Ressources en Eau* (PDAIRE, the Moroccan programme for development and integrated management of water resources), which is to maintain populations in mountain areas by improving their living conditions and increasing their income.

The SAGIE project, which is to run until 2016, has established a system for shared planning, development and integrated management of water resources on the scale of a small, uniform catchment area. Thus, it has been an opportunity to:

- produce a detailed monograph of the study area, making use of all existing knowledge of the region,
- make an assessment of available water resources, both conventional and unconventional (such as brackish groundwater, drainage and wastewater), in terms of quantity, quality and their current usage. To achieve this, the following analyses have been produced:

- drinking water demand, in the context of a vision to meet the needs of 90% of the rural population by adopting suitable systems;
 - irrigation water demand, on the basis of a vision for rational management that requires the design of a suitable model for the Arghene catchment basin;
 - water resource management criteria, to share water between the various users;
 - water balances for the various scenarios for the development of surface water and groundwater resources and for water demand management.
- make an assessment of the current state of water management and water resource development to draw the necessary conclusions for possible corrections and improvements to be proposed in the context of this study;
 - define the priorities for water resources development in the short, medium and long terms, consistent with the regional options for economic, social and environmental development and with options concerning sectors affected by water planning and management;
 - produce water resource development scenarios and provide decision-making data for choosing an optimum scenario;
 - produce an action plan for the development and conservation of water resources;
 - produce the programme and the timetable for its implementation;
 - propose the institutional measures required for the effective implementation of the plan, in particular with respect to its organisational aspects.

It should be stressed that the success of the consultation process during the production of the SAGIE project was due to the organisation of the Steering Committee, led by the Governor of Taroudant and comprised of representatives of the partners and main stakeholders, which monitored and validated the analyses.

It is comprised of representatives from the following:

- the Souss Massa Draa Regional Council,
- AGROTECH (the Souss Massa Draa agrotechnology association),
- the General Council of Hérault in France, the Rhone-Mediterranean and Corsica Water Agency, the Taroudant Water Authority, the *Direction Régionale de l'Agriculture* (DRA, the regional agriculture body), *Office National de l'Eau Potable* (ONEP, the Moroccan Drinking Water Agency), *Haut Commissariat aux Eaux et Forêts et à la Lutte Contre la Désertification* (the Moroccan High Commission for Water, Forestry and Combating Desertification), *Institut National de la Recherche Agronomique* (INRA, the Moroccan Institute for Agricultural Research), the Moroccan Environmental and Urban Planning (land development) Services, the Regional Chamber of Agriculture, the affected municipalities and development associations.

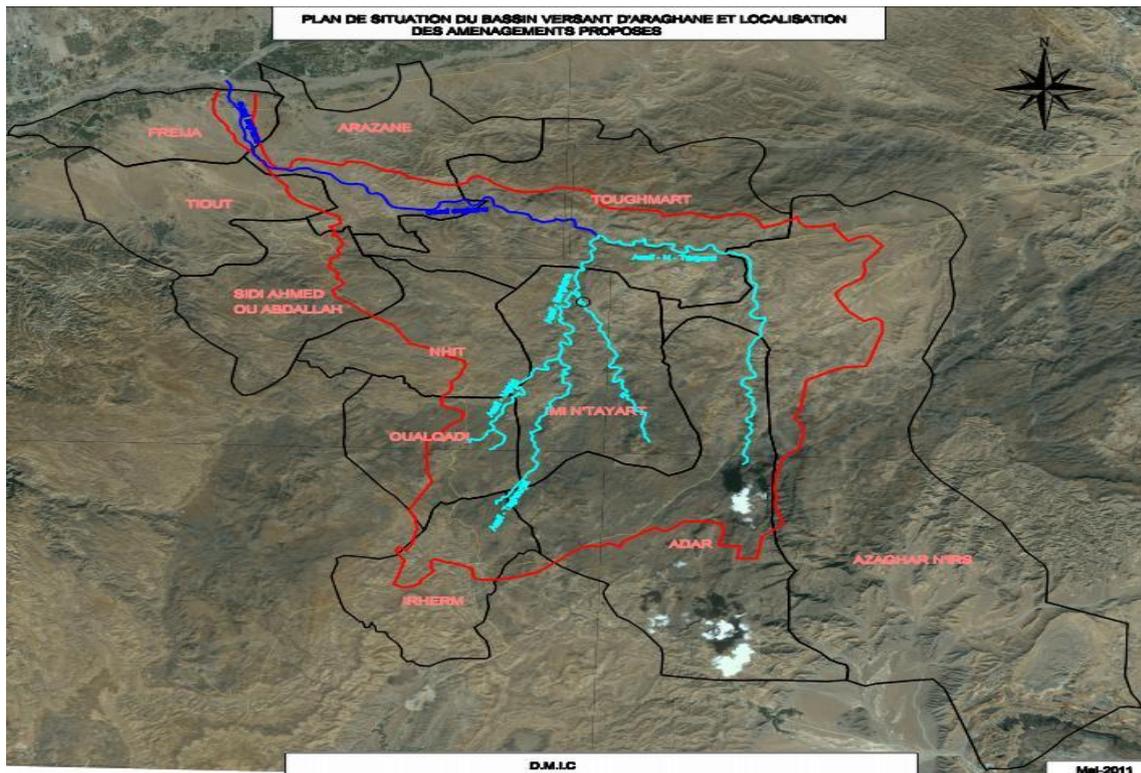
Furthermore, a larger committee, called the Consultation Workshop and grouping all stakeholders, has enabled exchanges of information and consultation on various aspects and activities of the project.

Through this, the project for development and integrated management of water resources has developed a concrete action plan on the following themes:

Theme	Cost (in 1000 Dirham)	2012	2013	2014	2015	2016
Drinking water supply	9100	3300	2800	1800	1200	0
Sanitation, treatment and reuse of treated wastewater	9930	1200	3760	2560	1050	1360
Surface-water mobilisation	9800	1000	4000	3000	1300	500
Groundwater mobilisation	5000	500	500	1500	500	500
Small-scale water schemes and irrigation water conservation	7700	2500	2000	1200	1050	950
Watering animals	3880	1000	700	880	700	600
Crop field protection	4200	840	840	840	840	840
Installing a measurement network	1600	400	600	200	200	200
Baseline studies	2500	2500	2500	2500	2500	2500
Training, informing and communicating	2500	500	500	500	500	500
Total	56210	13740	18200	14980	9840	7950

This whole set of specified activities will be the subject of a Catchment Basin Contract over the period (2012-2016), requiring the creation of a local water Committee.

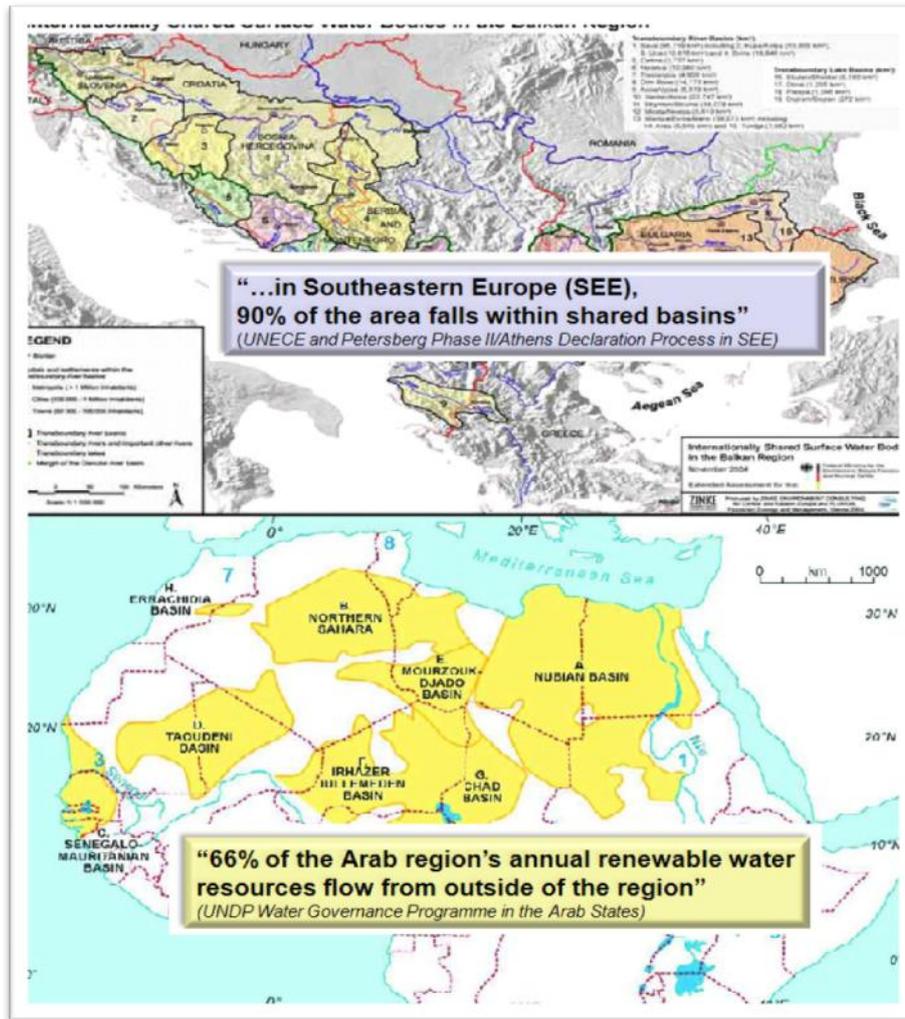
Local map of the Arghene catchment area and locations of the proposed developments



3.3.2 COLLABORATION ON TRANSBOUNDARY WATER RESOURCES MANAGEMENT

By Prof Michael Scoullos, Chairman, GWP-Med

All around the Mediterranean, winter droughts are becoming increasingly common, partly as a result of human induced climate change. Focusing on the Southeastern Europe and Middle East and North African Regions, where shared water resources represent the vast majority of renewable water resources, the need for effective water governance becomes evident.



Despite encountering diverse political and socio-economic adversities, the two regions face a common challenge with regard to the management of shared water resources, especially in a changing environment.

Therefore, it is crucial to create the necessary conditions and enhance cooperation for the integrated management of water resources at transboundary level. This has been achieved to some extent in the following three cases of transboundary collaboration in the SEE and MENA regions, representing applied solutions towards Transboundary Water Resources Management:

- The International Sava River Basin Commission,
- The Drin Dialogue, and
- The North Western Sahara Aquifer System.

The International Sava River Basin Commission

The launching of the Sava River Initiative was done in the framework of the Stability Pact for SEE in June 2001 among four riparian countries of the Sava River Basin - Bosnia and Herzegovina, Yugoslavia at the time - later Serbia and Montenegro- Croatia and Slovenia.

The signing of the Framework Agreement on the Sava River Basin (FASRB) took place at Kranjska Gora, Slovenia, on December 2004, setting the principles of cooperation of the Parties and three main objectives: (i) to establish an international regime of navigation, (ii) to establish a sustainable water management, and (iii) to prevent/limit hazards and eliminate/reduce their consequences.

The International Sava River Basin Commission (ISRBC) was established in June 2005 and its Secretariat six months later in Zagreb. ISRBC is composed of two country representatives per party nominated by the governments (a Member and a Deputy Member). It has a mandate to implement the FASRB and is given the international legal capacity for: (i) making decisions in the field of navigation, and (ii) providing recommendations on all other issues. Among its tasks, the ISRBC coordinates the preparation of a joint / integrated Sava River Basin Management Plan and the establishment of an integrated information system, cooperates with national and international organizations and issues documents and publications. A River Basin Management Plan is currently under preparation and a platform for the structured participation of the stakeholders (Sava Water Partnership) is being considered.

The Drin Dialogue

The Drin Basin comprises of the watersheds of the Prespa, Ohrid and Shkoder Lakes and Drin and Buna/Bojana Rivers covering a geographical area that extends in Albania, Greece, FYR Macedonia, Montenegro and Kosovo (under UNSCR 1244). In the past, there have been significant bi- and multi-lateral efforts to establish cooperation for the joint management of water resources in the region with the establishment of joint commissions/committees in the sub-basins and the signing of the Agreement on the "Protection and Sustainable Development of the Prespa Park Area" signed by the ministers of Environment of Albania, Greece and FYR Macedonia; the EC recently joined the agreement and the Agreement between Albania and FYR Macedonia for the Ohrid Lake Basin.

However, due to the absence of coordinated action in the basin level, the Extended Drin River Basin Dialogue was initiated during the first meeting of the Drin Core Group, in Podgorica, Montenegro, on 1 December 2009. The Drin Core Group comprises of representatives of the: (i) competent Ministries of the riparian countries, (ii) the joint structures already in place, (iii) UNECE, (iv) GWP-Med, and (v) MIO-ECSDE.

During the Drin Dialogue Process, the Drin Core Group has worked towards achieving the main objective of developing a Strategic Shared Vision among the competent national authorities and stakeholders for the sustainable management of the Drin basin. Activities were financed primarily by the Swedish EPA, MED EUWI through Greek support, and the GEF Med Partnership and they were coordinated by UNECE and GWP-Med. Following a series of national consultations and Drin Core Group meetings, the Riparians signed the Memorandum of Understanding (MoU) related to the development of the Shared Vision for the Sustainable Management of the Basin, during the Multi-Stakeholder Consultation Meeting, in Tirana, Albania, on 25 November 2011. Through the MoU, the Drin Core Group was given the mandate to coordinate actions for its implementation.

The North Western Sahara Aquifer System

The North Western Sahara Aquifer System (NWSAS) shared among Algeria, Libya and Tunisia, is the main source of water for approximately 5 million people. The collaboration of the three countries progressed from strictly scientific in the 1960s and technical projects in the 80s and 90s, to a temporary mechanism in 2002 that evolved into a permanent mechanism six years later (in 2008). The progress in this step-by-step collaboration was largely achieved due to the enabling conditions created by the Sahara and Sahel Observatory (OSS) that has been acting as the technical facilitator of the process. The OSS involvement has enabled a number of scientists and experts to communicate and work together. The structure of the NWSAS Permanent Consultation Mechanism comprises of the Council of Ministers in charge of water resources at the highest level, supported by a Permanent Technical Committee in cooperation with three National Committees and finally a Coordination Unit complemented by *ad hoc* Working Groups.

Lessons learnt - Conclusions

Through the analysis of the three cases, it is possible deducting some useful lessons, for example: i) the process for establishing cooperation is not linear but can be top-down, bottom-up, scientifically-based or even opportunistic, ii) scientific data can never be too much but need to be enough to support planning, iii) despite being an important catalyst, international financing cannot be sustained without functional institutions and iv) the asymmetry of subsidiarity needs to be addressed at an early stage.

Specifically from the SEE region, some additional learning points include: i) the crucial role of broad dialogue in establishing a climate of understanding and trust among the different stakeholders, ii) the need to conscript all driving forces including the convening power of neutral international and regional initiatives, iii) the possibility of creating a common vision as a first step towards cooperation enhancement and iv) the value of a proactive approach (as opposed to crisis management).

On the basis of lessons learned from functional Transboundary Water Resources Management in SEE and MENA, it is important to stress the value of sustainable benefit sharing as a major driving force for conflict resolution, also using the hydrodiplomacy tool, and the paramount role of stakeholders' involvement in enhancing collaboration.

At the same time, several challenges remain as to i) the adequate integration of human and environmental considerations into transboundary management, ii) the effective promotion of multilateral cooperation through capacitated human resources and information infrastructure or iii) the provision of mechanism(s) that can facilitate the implementation of agreed actions/measures (including monitoring).

Whilst recognizing the challenges and potential shortcomings, it is important to widely share the experience gained from the different cases, enhance the knowledge exchange and stimulate the potential for replication of success stories. In the case of both SEE and MENA there is a lot to share and learn from one another.

3.4 URBAN AND INDUSTRIAL WASTE WATER TREATMENT

3.4.1 INDUSTRIAL WASTE WATER MANAGEMENT: THE TUNISIAN EXPERIENCE

By Mr. Khalil ATTIA, Chairman of the Office National d'Assainissement – National Sanitation Utility (Tunisia)

A successful initial experience

The South Lake of Tunis clean-up and development project was designed to eliminate industrial wastewater discharge into the lake. Since 2001, industrial effluents have been treated in a specific pilot treatment plant for industrial wastewater (the Ben Arous treatment plant). This pilot project consists of:

- An industrial wastewater treatment plant (with a capacity of 5000 m³/day),
- A collection and transport network,
- Three pumping stations.

Contaminated effluents are piped to the station via the network or brought by road tanker, a prior agreement having been signed with the industrial units, specifying the quantity and quality of effluents to be treated.



(Ben Arous pilot plant – in the southern suburbs of Tunis).

Locations of the ten planned Industrial Wastewater Treatment Plants:

- **El Fejja**
- **Moknine**
- **Sfax**
- **Enfidha**
- **Oued El Bey**
- **Utique**
- **Bir El Kassaa**
- **Mjez El Bab**
- **Bizerte**
- **Monastir**



This operation:

- Prevents the discharge of industrial wastewater into South Lake of Tunis,
- Collects highly-polluted industrial wastewater at a single plant, with the aim of better management and treatment of these effluents,
- Ensures treated water quality that complies with Tunisian Standard NT 106.02
 - Meets Tunisian State commitments on the lake's water quality,
 - Provides a pilot project that could be rolled out in other industrial zones in Tunisia,
 - Covers all its operating and depreciation costs via the fees collected.

Outlook

A priority programme has been implemented to install industrial wastewater treatment plants in existing industrial zones. These (ten) plants will protect urban treatment plants from contamination risks, which will promote the commercial development of their by-products (treated water and sludge).

ONAS performed an institutional, legal and economic feasibility study for this programme and an action plan has been produced for its implementation.

The action plan describes the strategic options and suggests measures to manage the following aspects:

Institutional aspects

Two areas of intervention are identified:

- Set up development and maintenance companies,
- Develop private-sector partnerships.

Modifications to the legal framework

There may need to be amendments to the Tunisian Water Code, national specifications regarding the development and maintenance of industrial zones and buildings, legislation pertaining to the public companies for water supply (SONEDE) and sanitation (ONAS), and legislation regarding public contracts.

Economic aspects

The following suggestions are made:

- Compulsory connection and price regulation – the pricing system must be improved to include parameters other than chemical oxygen demand (such as heavy metals),
- The possibility of subsidies for cluster stations and State guarantees for private operators,
- Application of the “polluter pays” principle and the inclusion of clean-up costs in production costs,
- Various subsidy rates which can be used to increase incentive effects and better target subsidies,
- The adoption of a specific contribution system for each zone.

3.4.2 ONEP’S WORK IN THE WASTEWATER AND SANITATION SECTOR

By Mr Ali Fassi Fihri, General Manager Office National de l’Eau Potable, National Office for Potable Water – Morocco

1. Waste water management at a national scale

1.1. Current situation

In Morocco, 700 million m³ of domestic waste water are released each year from urban centres, with approximately 360,000 tonnes of organic pollution. According to forecasts, by 2020, waste water released from urban areas will reach 900 million m³.

Morocco has a total population of approximately 31 million, including 18 million in urban areas: the rate of connection to a sanitation system in these areas currently stands at approximately

70% and will reach 80% by 2020 with around 13,000 km of pipe networks installed at a national scale.

With regard to treated waste water, at the end of 2010, Morocco had set up 62 operational waste water treatment plants, which treated approximately 20% of waste water produced in urban regions.



1.2. The National programme for sanitation and waste water treatment (PNA)

Further to recommendations from the Interministerial Water Committee in February 2005, a National Programme for Sanitation and Waste Water Treatment (PNA) was set up on a national scale.

The programme objectives for the year 2020 are as follows:

- Achieve a global rate of connection to the sewer system of 80% in urban areas;
- Achieve an urban waste water treatment rate of at least 60%.

This programme covers 260 towns and urban centres, representing a total population of more than 10 million in 2005. The amount invested for this programme is approximately 43 billion dirham.

2. ONEP work in terms of sanitation

2.1. 2008-2010 programme contract

A 2008-2010 contract programme, signed between ONEP and the Moroccan government in 2008, aimed to make investments evaluated at 2.9 million dirham for 121 centres and a population of 3.5 million.

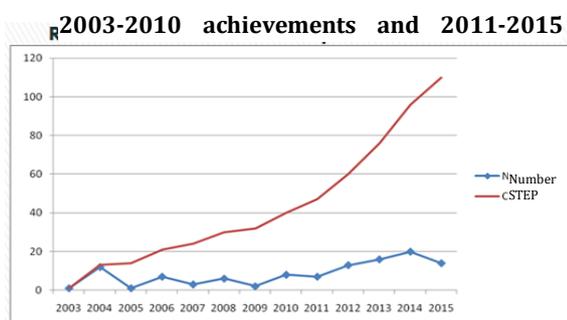
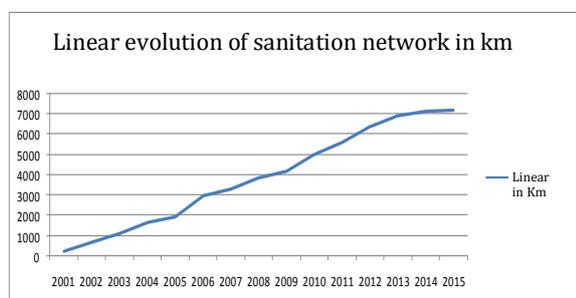
2.2. 2011-2015 programme contract

A new 2011-2015 contract programme is currently being validated by the Ministry of Economic Affairs and Finance, for total sanitation investments of approximately 6.95 billion dirham; this programme aims to complete the work in ongoing projects and to launch new sanitation projects in 153 towns and centres.

3. ONEP achievements in terms of sanitation:

Since the beginning of its work in the sanitation sector, ONEP achievements at the end of 2010 can be summarized as follows:

- ONEP undertook management of sanitation services in 79 communes;
- ONEP built 41 waste water treatment plants with a treatment capacity of 177 600 m³/day;
- Installation of approximately 6,000 km of pipes in the waste water collection system;
- In terms of investment: between 2003 and the end of 2010, ONEP has implemented projects for a total cost of 4,900 million DH.



4. Future ONEP developments:

From among the sanitation projects and programmes (collection/transfer systems and waste water treatment plants), the following can be cited with work in progress:

- The Grand Nador sanitation project performed within the context of cleanup efforts in the Marchica lagoon, at a cost of 850 million DH, impacting the town of Nador and six neighbouring centres, representing a population of 230,000;
- The cleanup programme of the Sebou basin, at a cost of 1,076 million DH, impacting 12 towns in this basin, representing a population of 580,000;
- The cleanup programme of the Oum Erbia basin, at a cost of 600 million DH, impacting 11 towns in this basin, representing a population of 250,000.

Furthermore, new funding programmes are currently being implemented by ONEP with different funding organisations (AFD, KFW, BEI, the EU, CTB, JICA), which, combined with contribution from the state as part of the PNA, will make it possible to complete all projects set out in the 2011-2015 programme contract.

4 PERSPECTIVES IN THE MEDITERRANEAN

In recent decades, the Mediterranean water community has paid particular attention both to the geo-political context on the one hand and financial issues on the other.

For water issues, while the region's northern shore follows a uniform geo-political and trans-regional framework, the southern and eastern shores lack any common basis. For this latter case, each country is governed by its own water management modes and governance mechanisms.

However, a regional cooperation framework has been developed, promoting a greater standardization of integrated water resources management. Initiated by the Action Plan for the Mediterranean under the responsibility of the United Nations Environment Programme, a major consultation between the countries in the region was carried out.

This regional cooperation framework was consolidated by the Euro-Mediterranean partnership process launched in Barcelona in 1995. Other international and bilateral programmes as well as funding instruments and programmes established by international institutions or donors have accompanied and supported this regional cooperation framework.

4.1 GEOPOLITICAL AND REGIONAL COOPERATION

Initiated in Stockholm (1972), the first World Environment Summit allowed water to be recognized as one of the basic elements of any environmental protection policy. This position was consolidated by two further Summits (Rio 1992 and Johannesburg 2002), which generated a large number of regional cooperation initiatives and programmes based on a sustainable development strategy in the Mediterranean (WSSD).

During the kick-off of the Euro-Mediterranean Partnership process in Barcelona (Spain, 1995), the consolidation of regional cooperation developed a concrete water programme. It was within this framework that in Turin in 1999, a consultation and follow-up mechanism bringing together Euro-Mediterranean Water Directors established regional projects.

Driven by the European Union, regional programmes encouraging the exchange of knowledge and experiences towards the southern and eastern countries have allowed tangible results to be obtained in water management and governance modes (MEDA Programme).

In 2005, during "Barcelona +10", new regional cooperation programmes were initiated, encouraging the region's southern and eastern countries to adopt a closer appropriation of sustainable water resources management (European Neighbourhood Partnership Instrument-ENPI, Horizon 2020, SWIM, etc.).

During the Water Ministers' Conference in Jordan (2008), this regional cooperation allowed the basic premises of a Mediterranean water strategy to be launched, to which an action and implementation plan should be associated.

Based on the political framework (Union for the Mediterranean), a secretariat for the environment and water is currently working towards the establishment of a cooperation framework that generates projects, which would receive the name "Union for the Mediterranean".

Given the events that have occurred in the region, such a secretariat will have the legitimacy to host any new initiative that could foster the development of exchanges of experiences and support in the establishment of new water governance and management mechanisms in the region's southern and eastern countries.

4.2 FUNDING

Of course, no regional cooperation can come to fruition without funding, in order to allow the region's southern and eastern countries to reach consequent development goals.

The majority of the Mediterranean region's southern and eastern countries have benefited from a large amount of funding support destined for the establishment of basic infrastructure, giving priority to supply management.

From the 60s onwards, projects aiming to secure water supply have allowed southern and eastern countries to be equipped with dams as well as mechanisms for transfer and treatment which facilitate irrigated agriculture and secure drinking water supply.

Economic and social development policies have allowed urban development to be generated which is often uncoordinated with industrial and touristic development. As a result, varied sources of funding have allowed often fragile natural ecosystems to be protected, combined with an improvement in the living conditions of citizens, requiring the construction of urban sanitation infrastructure.

The geographic and geo-climate context, a source of shortage and scarcity of water resources, has imposed the concept of water demand management. Driven by a certain number of donors present in the region, efficient water management is often associated with the concept of integrated water resources management.

5 ANNEXES

The annexes of the 1st Mediterranean Water Forum Proceedings are available in attached CD-Rom.

It is composed of:

- 1. Agenda**
- 2. Speeches of Opening and Closure ceremonies**
- 3. Speaker Presentations (powerpoint)**
- 4. Pictures library**
- 5. Participants list**
- 6. Proceedings**



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